REMEDIAL ACTION WORK PLAN
For the
RENAISSANCE COMMERCIAL PARK

CONSTRUCTION OF ODELL STREET EXTENSION AT STEELWORKERS WAY
(Tecumseh Phase II Business Park Sites II-12 and II-13 NYSDEC BCP Site Nos. C915198L and C915198M and Tecumseh Phase I Business Park Sites I-1 and I-2, NYSDEC BCP Site Nos. C915197, C915197B and C915197L Bethlehem Shoreline Trail)

AND

RIDGE ROAD EXTENSION AT FURHMANN BOULEVARD
(Tecumseh Phase I Business Park Sites I-8 and I-9 Site Nos. C975197H, C915197I, and C915197L Bethlehem Shoreline Trail)

At

New York State Route 5
Lackawanna, New York

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1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) has been prepared for Industrial Land Development Corporation (ILDC) a Member of the Eire County Industrial Development Agency (ECIDA) Financing and Development Group by LiRo Engineers Inc. (LiRo) under a subcontract with Azar Design Co. (ADC) formerly Foit Albert Associates. The proposed remedial action is being conducted under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). The Agreements applicable to the project are:

- Agreement Index No. B9-0696-05-06(A) for Parcels Site I-1 (BCP Site No. C915197), Site I-2 (BCP Site No. C915197B), Site I-8 (BCP Site No. C915197H, Site I-9 (BCP Site No. C915197I), (2005, NYSDEC), and as modified by amendments,
- Agreement Index No. C915197L-01-18 (BCP Site No. C915197L), (2018, NYSDEC)
- Agreement Index No. B9-0696-05-06(B) for Site II-12 (BCP Site No. C915198L), (2007, NYSDEC), as modified by amendments, and,
- Agreement Index No C915198M-06-22 (2022, NYSDEC) as modified by amendments, for Site II-13 (C915198M).

These initial agreements Index No. B9-0696-05-06(A), B9-0696-05-06(B) C915197L-01-18 and C915198M-06-22 have undergone several amendments which add or remove land areas to create new parcels or modify the areas of existing parcels. These amendments do not change the environmental compliance requirements of the initial agreements.

ILDC has retained ADC to design the Odell Street Extension and the Ridge Road Extension at the Renaissance Commercial Park (RCP). ADC retained LiRo, as the Qualified Environmental Professional (QEP), to prepare and to provide oversight during implementation of the RAWP. The new construction is located in multiple land parcels of the RCP. These land parcels are located 2303 Hamburg Turnpike, Lackawanna, New York 14218 (former Bethlehem Steel Site) Figure 1-1.

The project consists of three major elements:

1) Odell Street Extension, located within Tecumseh Phase II Business Park Site II-12 (BCP Site No. C915198L) and Site II-13 (BCP Site No. C915198M), and Tecumseh Phase I Business Park Site I-1 (BCP Site No C919597) and Site I-2 (BCP Site No. C915197B),
2) The Bioretention Pond, part of the Odell Street Extension surface water drainage located within Tecumseh Phase I Business Park Site I-2 (BCP Site No. C915197B), with storm water sewer lines on BCP Site No. C915197L, and
3) Ridge Road Extension, located within Tecumseh Phase I Business Park Site I-8 (BCP Site No. C915197H), Site I-9 (BCP Site No. C915197I) and Shoreline Trail (BCP Site No. C915197L).

All three construction elements and the corresponding land parcels are shown on Figure 1-2.

Odell Street Extension

The Odell Street Extension project proposes to construct approximately 700 feet of new roadway for the Odell Street Extension extending from Times Square to just east of the intersection with Steelworkers Way shown on Figure 1-2 and in Appendix 1. Other road improvements include new public stormwater drainage, ADA compliant sidewalk, street lighting, and signage. The property is the former Bethlehem Steel Plant that has or will undergo remediation in accordance with Brownfield Cleanup Agreement (BCA) Index Nos. B9-0696-05-06(A), C915198M-06-22, B9-0696-05-06(B) and C915197L-01-18(2005, 2007, 2018, 2022

NYSDEC).

The implementation of the Odell Street Extension will result in a cover system modification for Site I-1 C915197 and Site II-12 C915198L that is consistent with the decision documents required remedy and the existing Site Management Plans (SMP) for Site I-1 and Site II-12. The Odell Street Extension construction on Site I-2 C915197B and Site II-13 C915198M will result in a cover system that is required by their decision documents.

Bioretention Pond

The Bioretention Pond proposes to construct an approximately 225 feet long, 100 feet wide and 5 feet deep drainage bioretention structure located to the northeast of the Odell Street Extension shown on Figure 1-2 and on construction drawings in Appendix 1. The retention pond will accept stormwater drainage from the Odell Street Extension storm sewers via underground piping. The property is within the former Bethlehem Steel Plant that has or will undergo remediation in accordance with BCA Index No. B9-0696-05-06(A) (2005, NYSDEC) and BCA Index No. C915197l-01-18 (2018, NYSDEC). The Bio Retention Pond will be constructed within site I-2 C915197B. The Bio-retention Pond, high water will flow to a high water retention structure and then drain via a new sewer line to an existing drainage structure on NY Rte. 5. A highway work permit will be completed when a Contractor for the project construction is known. The new sewer piping will be constructed through parcels Site 1-2 C915197B and BCP Site No. C915197L (Shoreline Trail) to the existing storm sewer located on NYS Route 5.

The implementation of the bioretention pond construction will result in a cover system over the current soils that will be completed in accordance with the decision documents for Site I-2 C915197B (2012, NYSDEC) and BCP Site No. C91197L (Shoreline Trail) (2005, 2018 NYSDEC), and the SMP for the Shoreline Trail BCP Site No. C91197L (2014a, Turnkey).

Ridge Road Extension

The Ridge Road Extension project proposes to construct approximately 650 feet of new roadway for Ridge Road Extension from Fuhrmann Boulevard on the east to a turn-around circle on the west. Other road improvements include new public stormwater drainage, ADA compliant sidewalk, street lighting, signage and construction of a north/south trending multi-use trail segment parallel to Fuhrman Boulevard.

The property is the former Bethlehem Steel Plant that has or will undergo remediation in accordance with BCA Index Nos. B9-0696-05-06(A) and C915197L-01-18 (2005, 2018 NYSDEC). The implementation of the Ridge Road Extension will result in a cover system over the existing surface soils that will be compliant with the decision documents for Site I-8 C915197H, Site I-9 C915197I and Shoreline Trail C915197L (2012, 2018 NYSDEC) and the SMP for Site I-9 C91515197I and Shoreline Trail C915197L (2014a, Turnkey).

1.1 Environmental Background

The Sites were accepted into the NYSDEC Brownfield Cleanup Program in 2005 and 2007. Agreements, DDs, Remedial Investigations (RI) and Alternative Analysis Reports, Final Engineering Reports (FER) and Periodic Review Reports (PRR), used in preparation of this RAWP are listed in Table 1-1.

Generally, the two completed RIs determined that conditions were consistent with the historic use of the Controlled Property for steel-making and finishing operations, with the widespread presence of fill material containing dark brown, non-plastic fines with fine to medium sand, slag, cinders, ash, gravel, cobbles, brick,

metal debris, and concrete, all of which are ubiquitous on the Controlled Property. Soil/fill concentrations, where identified above 6NYCRR Part 375 commercial-use soil cleanup objectives (SCOs), varied according to the type and nature of the constituents. The following paragraphs summarize the investigative studies and laboratory data by parcel, site and construction item as obtained from applicable RI or SMP documents for the parcel.

Site I-1 C915197 Odell Road Expansion

No laboratory results were reported for VOCs in soil for Site I-1 C915197. Base-neutral semi-volatiles (SVOC) (i.e., polyaromatic hydrocarbons or PAHs) were detected in two composite soil samples created from soil aliquots from test pits. The composite soils were collected from depth intervals of 0.0-2.0 feet below ground surface (ft. bgs) and 2.0-5.5 ft. bgs. The area also had two surface soil (SS) samples collected from a depth interval of 0.0-1.0 ft. bgs. The analytical results for these samples reported seven SVOC concentrations above commercial SCOs ranging from 1 milligram per kilogram (mg/kg) to 62 mg/kg. The analytical results for these same samples reported inorganic compounds (total cadmium, chromium, lead, and mercury) were detected above commercial SCOs. No groundwater samples were collected for Site I-1 C915197; however, a groundwater sample was collected from monitoring well MW-17A on the adjacent Site I-3 C915197C. Groundwater samples reported no Volatile Organic compounds (VOCs), SVOCs, PCBs or inorganic compounds at concentrations above NYSDEC Class GA Groundwater Quality/Guidance Values (GWQGVs). RI sampling and historical sampling have shown that Site soil has been impacted with SVOCs and metals (2006 Revised 2007 Turnkey). Appendix 2 provides the SMP which contains the summary tables for soil/fill and groundwater analytical data for Site I-1 C915197 (2014aTrunkey) .

Site I-2 C915197B Odell Road Expansion and Bioretention Pond

Base-neutral SVOCs were detected in two composite soil samples created from soil aliquots from test pits. The composite soils were collected from depth intervals of 0.0-1.0 ft. bgs and 1.0-2.0 ft. bgs. The area also had two surface soil samples. One composite sample was created from soil aliquots collected at three locations from a depth interval of 0.0-1.0 ft. bgs. The second surface soil sample was collected from the soil boring completed as a monitoring well from a depth interval of 0.0-1.0 ft. bgs. The analytical results for these samples reported seven SVOCs at concentrations above commercial SCOs. Polychlorinated biphenyls (PCBs) (Aroclor 1254 and 1260) were reported above SCOs in the composite sample SS-(19-22), the only sample analyzed for PCBs. One pesticide compound (4-4'-DDT) was reported above SCOs in one sample. The analytical results for these same four samples reported inorganic compounds (total arsenic, cadmium, chromium, copper, lead, manganese, mercury and zinc) at concentrations above commercial SCOs in one or more samples. Groundwater samples were collected from monitoring well MW-13 and reported no VOCs, SVOCs, or PCBs at concentrations above GWQGVs. Only one inorganic compound (total cyanide) was analyzed and reported a concentration below GWQGVs. RI sampling and historical sampling have shown that Site soil has been impacted with SVOCs, PCBs, pesticides and inorganic compounds. The RI provides summary tables for the soil/fill and groundwater analytical data, and sample location figures for Site I-2 C915197B (2006, Turnkey). A SMP has not been developed for Site I-12 C915197B as of the date of this RAWP.

Site II-12 C915198L Odell Road Expansion

One VOC (benzene) was reported in one soil sample at a depth interval of 0.0-2.0 ft. bgs with a concentration above SCOs. SVOCs were detected in twelve grab samples collected from a depth interval of 0.0-2.0 ft. bgs. Two samples reported PCB concentrations above SCOs. The analytical results for these samples reported seven SVOCs detected at concentrations above commercial SCOs. The analytical results for these same samples reported inorganic compounds (total arsenic, cadmium, chromium, lead, manganese, mercury, nickel and zinc) at concentrations above commercial SCOs. Groundwater samples collected from monitoring well MWN-64A reported no SVOC or inorganic compounds at concentrations

above GWQGVs. RI analytical data is summarized in the SMP have shown that Site soil has been impacted with VOCs, SVOCs, PCBs and metals. The SMP in Appendix 2 provides summary tables of the RI soil/fill and groundwater analytical data for Site II-12 C915198L (2014b, Turnkey).

Site II-13 C915198M Odell Road Expansion

Parcel Site II-13 C915198M was created by subtracting acreage from parcel Site II-11 C915198K for the construction of the Steelworkers Way (aka Public Road B). Therefore, no RI was produced for Site II-13 C915198M and the RI data for Site II-11 C915198K has been summarized, as follows. VOCs in soil were not analyzed; however, elevated concentrations of volatile petroleum compounds (i.e., elevated PID readings) were observed at two test pit locations where field evidence of impact was observed (e.g., odor, sheen, and staining). SVOCs were detected at several locations above commercial SCOs; however, only three total SVOC concentrations were reported above 500 parts per million (ppm), which was deemed a site-specific SCO based on NYSDEC CP-51 guidance for non-residential sites where a cover system will be employed. Certain metals (total arsenic, mercury, and lead) were detected above commercial SCOs at several locations. Smear zone impact was present in several locations as indicated by sheen and/or product on the water within the test pit, odor and staining. RI sampling and historical sampling have shown that Site soil has been impacted with SVOCs, PCBs, and metals. The RI provides summary tables for the soil/fill and groundwater analytical data, and sample location figures for Site II-13 C915198M which was administratively created form a small parcel of Site II-11 C915198K (2011, Turnkey). A SMP has not been developed for Site I-13 C915198M as of the date of this RAWP.

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Site I-8 C915197H Ridge Road Expansion

VOCs were detected at concentrations exceeding SCOs in one of four grab samples. The detected VOCs were reported in a grab sample collected from test pit (TP-9-3) from a depth interval 1.0-4.5 ft. bgs. The analytical soil results reported seven SVOCs at concentrations above commercial SCOs in one or more of the six samples collected. The composite soils were collected from depth intervals of 0.0-1.0 ft. bgs and 1.0-7.0 ft. bgs, and four surface soil samples (three grab and one composite) were collected from a depth interval of 0.0-1.0 ft. bgs. One PCB (Aroclor 1260) was reported above SCOs in one grab sample collected from a depth interval of 0.0-1.0 feet. One Pesticide compound (4-4'-DDT) was reported above SCOs in one grab sample from a depth interval of 0.0-1.0 ft. bgs. The analytical results for four of six samples reported inorganic compounds (total arsenic, cadmium, chromium, lead, and mercury) at concentrations above commercial SCOs in one or more samples. No groundwater data was summarized for parcel Site I-8 C915197H in the RI. RI sampling and historical sampling have shown that Site soil has been impacted with SVOCs, PCBs, pesticides and inorganic compounds. The RI provides summary tables for the soil/fill and groundwater analytical data and sample locations figures for Site I-8 C915197H (2006, Turnkey). A SMP has not been developed for Site I-12 C915197H as of the date of this RAWP.

Site I-9 C915197I Ridge Road Extension

No laboratory results were reported for VOCs in soil, and total organic vapor readings performed as part of field soil screening at test pits reported no vapor readings above background. SVOCs were detected in two composite soil samples. The composite soils were collected from depth intervals of 0.0-1.0 ft. bgs and 1.0-7.0 ft. bgs. The analytical results for these samples reported seven SVOCs at concentrations above commercial SCOs. The analytical results for these same samples reported inorganic compounds (total cadmium, chromium, lead, and mercury) at concentrations above commercial SCOs. No groundwater samples were collected for Site I-9 C915197I; however, a groundwater sample was collected from monitoring well MW-17A on the adjacent Site I-3 C915197C. RI data as summarized in the SMP have shown that Site soil has been impacted with SVOCs and metals. The SMP in Appendix 2 provides summary tables of the RI soil/fill analytical data for Site I-9 C915197I (2014a, Turnkey.

Multiple Sites C915197L (Lakeshore Trial) Ridge Road Expansion and Bio-Retention Pond (sewer piping)
Parcel Multiple Sites C915197L was created by subtracting acreage from multiple Tecumseh Phase I and Phase II Business Park Sites which run parallel to NYS Route 5 for the construction of the Shoreline Trail Therefore, no parcel specific RI was produced for C915197L (Shoreline Trail) and any data used has been summarized in the above parcels. The RI data from multiple sites is summarized in the SMP for Shoreline Trail C915197L (2014a , Trunkey).

1.2 Environmental Setting

Odell Street Extension and Bioretention Pond
This construction will impact five Parcels (Site I-1 C915197, Site I-2 C915197B, Site II-12 C915198L, Site II-13 C915198M, and C915197L (Shoreline Trail) as shown on Figure 1-2. Each parcel has it is own environmental remedial history and is subject to specific regulatory documents and plans.

The northwestern portion of the Odell Street Extension will be constructed on Site I-1 C915197. This area is flat and has a constructed cover system consisting of a demarcation layer atop sub-grade soil/fill followed by a minimum 12-inch layer of NYSDEC approve cover material (2017, Turnkey). The cover system is subject to an annual EC/IC report (2024, Labella). The eastern portion of the Odell Street Extension, including the Bioretention Pond will be constructed on Site I-2 C915197B. The area is flat, unimproved industrial land with sparce secondary growth urban vegetation. The southern portion of the parcel has been used as a staging/temporary laydown area for construction of Steelworker's Way. The southwestern portion of the Odell Street Extension will be constructed on Site II-12 C915198L. The area is flat and has a constructed cover system comprised of 12 inches of clean soil, stone or NYSDEC-approved material, with a demarcation layer in all areas that are not paved or covered by concrete or structures and the cover system is subject to an annual EC/IC report (2024b, Labella). The southeastern portion on the Odell Steet Extension and its connection to Steelworkers Way will be constructed on Site II-13 C915198M. The area is flat and has a partial cover system, northern and eastern portions of the parcel do not have a cover system in place. All three parcels are zoned for commercial use.

The Bioretention Pond overflow will be connected to an existing stormwater structure located adjacent to NYS Route 5. A small section of the sewer pipe connecting the Bio-retention pond to the existing storm sewers will be through C915197L (Shoreline Trail).

Ridge Road Extension
This construction will impact three Parcels (Site I-8 C915197H, Site I-9 C915197I and C915197L) as shown on Figure 1-2. Each parcel has it is own environmental remedial history and is subject to specific regulatory documents and plans. The eastern portion of the Ridge Road Extension will be constructed on Site I-8 C915197H and the Shoreline Trail C915197L. Site I-8 C915197H area is a flat unimproved urban property with secondary growth urban vegetation. There is no cover system currently constructed on this parcel. Shoreline Trail C915197L consists of a paved sidewalk with grassed areas adjacent to it. The turn around gravel circle is planned at the western edge of the Ridge Road Extension on Site I-9 C915198I. This area is flat and has a constructed a cover system. The existing cover system is subject to an annual EC/IC report (2024a, Labella). Both parcels are zoned for commercial use.

All the sub-parcel Sites are located in the Erie-Ontario Lowlands physiographic province of New York State. Low Plains with little relief characterize the province with glacial deposition and shoreline deposits having modified topography. Erie County was buried by glacial ice and during subsequent retreats, glacially eroded soil and bedrock material were redeposited as a mixture of unconsolidated sediments across Erie County.

The United States Department of Agriculture Soil Survey of Erie County, New York indicates that the parcel is covered by surface soil classified as Urban Land; soil consisting of paved, foreign, or disturbed soils. Subsurface lithology observed during the RIs generally consisted of a soil/fill unit comprised of non-cohesive coal and coke fines; slag; cindery ash and brick; concrete; gravel; silt; reddish silt (precipitator dust); and sand, all of which are ubiquitous from the former Bethlehem Steel Plant property. Boring logs from monitoring wells indicate that the thickness of the soil/fill unit ranges from approximately four feet (west side) to 12 feet (east side). Below the soil/fill unit is a native silty clay or clayey silt layer; a peat layer was noted at some test pits immediately below the soil/fill unit. The clay/silt/peat layers are underlain by Dolomitic limestone with shale bedding. This bedrock was encountered at 34 feet below ground surface (ftbgs) along the western perimeter of the RCP.

The Odell Street Extension/Bio-Retention Pond areas have either a cover system or are partially vegetated with secondary urban growth. In areas without an engineered cover system, the Site surface soils/fill are well drained with little occurrence of sheet flow or ponding. Post construction surface water runoff will flow into the Odell Street Extension's new storm drainage system and then into the Bioretention Pond which then discharges into the existing storm water system along the Hamburg Turnpike.

The Ridge Road Extension construction areas have either a cover system or are partially vegetated with secondary urban growth. In areas without an engineered cover system, the Site surface soils/fill are well drained with little occurrence of sheet flow or ponding. Post construction surface water runoff will flow into Ridge Road Extension's new storm drainage system then into the existing storm water system along the Hamburg Turnpike.

Historically, due to the proximity of Lake Erie and municipal supplied water, groundwater in the area has not been developed for industrial, agricultural, or public supply purposes, no groundwater supply wells are present on any of the parcels. Additionally, the Tecumseh Business Parks have environmental easements (EEs) placed on the properties that prohibit the use of groundwater. These construction actions will not develop or use groundwater.

Groundwater elevation measurements reported in the RIs, indicate that the first water bearing zone (i.e., water table) ranges from approximately 6 to 13 ft. bgs within the soil/slag-fill unit.

1.3 RA Summary of Constituents of Concerns

The constituents of concern for this RA are VOCs, SVOCs, PCBs, pesticides and metals in soils.

1.4 Existing Controlling Documents and Construction Design

The project construction are subject to the following documents.

1. Plans for Construction of the Renaissance Commerce Park – Odell Street Extension Beginning at Steelworkers Way and Ridge Road Extension at Fuhrmann Boulevard by Azar Desing Co, dated March 31, 2025 (Attachment 1)
2. This Remedial Action Work Plan

These documents contain methods and procedures to be employed in the performance of this Remedial Action and are the site specific controlling documents. Additional documents may be required during the performance of the RA such as a Contractor's Health and Safety Plan (CHASP). The Tecumseh Phase I

and II Business Park SMPs EWPs have been used historically by the Department for interim management of the Tecumseh Business Park Brownfield sites. However, upon approval, the RAWP will be the controlling document for the remedial components associated with Odell Street Extension and Ridge Road Extension construction.

2.0 REMEDIAL ACTION

The decision documents (DD) for Parcels Site I-1 C91517, Site I-2 C91517B, Site II-12 C91518L, Site II-13 C91518M, Site I-8 C915197H, Site I-9 C915197I and Shoreline Trail C915197L (2012, 2017a, 2017b, 2018, 2022 NYSDEC) require the selected remedy to comply with the following:

1. The selected remedy is a Track 4: Restricted use with site-specific soil cleanup objectives remedy.
2. The selected remedy is referred to as the Site Cover with Institutional Controls remedy.
3. Site cover will be required to allow for commercial use of the site in areas where the upper one foot of exposed surface soil exceed the commercial soil cleanup objectives (SCOs).
4. The site cover may consist of paved parking areas, sidewalks, soil cover, or other Department approved cover.
5. Where soil cover is required, it will be a minimum of one foot of soil with the upper six inches of soil of sufficient quality to maintain a vegetative layer.
6. All cover will be placed over a demarcation layer.
7. Any cover material, including any fill material brought to the site, will meet the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d).
8. In areas where existing constructed cover systems, building foundations or building slabs, which preclude contact with soil exist, the requirement for a site cover will be deferred until such time that they are removed.

The construction of a paved road with associated sidewalks, curbing, utilities is consistent with the selected remedy items 1,2,3, and 4. A general description of the RA to be completed during the construction of Odell Extension are the excavation, regrading and removal (if necessary) of soils for the installation of utilities and construction of paved roads, sidewalks, snow storage areas, clean fill corridors and green spaces, in the approximately 115 feet wide, 700 feet long roadway area; construction of 80 feet diameter stone circle turn around at the western end of the road; and construction of a Bioretention Pond approximately 225 feet long, 100 feet wide and 5 feet deep located to the northeast of the Odell Street Extension.

Excavation will be required for construction/installation of the roadways, gravel turn-around circle, utility lines, storm sewers and the Bio-Retention Pond. The gravel turnaround circle will require removing up to 12 inches of stone/surface and installing a new demarcation material over the existing cover system at Site I-1 C915197 and Site 11-12 C915198L. The cover systems for Site II-12 C915198L and Shoreline Trail C915197L will require shallow excavations for the installation of roadway, utilities and storm sewer lines. Once construction is complete, the areas of excavation will be covered with concrete, asphalt or 12 inches of cover over a demarcation layer.

Odell Street Extension general plan and profiles are shown on Figures 2-1, 2-2 and 2-3. Details are provided in Appendix 1.

For the Ridge Road Extension, the construction of a paved road with associated sidewalks, curbing, utilities is consistent with the selected remedy items 1,2,3, and 4. A general description of the RA to be completed during the construction of Ridge Road Extension are the excavation, regrading and removal (if necessary) of soils for the installation of utilities and construction of paved roads, sidewalks, snow storage areas, clean

fill corridors and green spaces, in the approximately 80 feet wide, 650 feet long roadway area; and construction of 80 feet diameter stone circle turn around at the western end of the road. Excavation will be required for construction/installation of the roadways, gravel turn-around circle, utility lines, and storm sewers The gravel turnaround circle will require removing up to 12 inches of stone/surface and installing a new demarcation material over the existing cover system at Site I-9 C915197I. The stone and soil will require import approval from DEC. The work in the Shoreline Trail C915197L will require shallow excavations for the installation of roadway, utilities and storm sewer lines. Once construction is complete, the areas of excavation will be covered with concrete, asphalt or 12 inches of cover over a demarcation layer.

The Ridge Road Extension general plan and profiles are shown on Figures 2-4 and 2-5. Details are provided in Appendix 1.

Once excavations and final grades are achieved, a demarcation layer will be installed, and asphalt and/or concrete paving will be constructed. The demarcation layer is consistent with item 6 above. The installation of asphalt and/or concrete paving is consistent with item 4 above. In those areas where no paving is performed a minimum of 12 inches of NYSDEC approved cover material will be placed over the demarcation layer. The top 6 inches of cover material will be suitable for maintaining a vegetative layer. The 12 inches of cover is consistent with item 5 above, the 6 inches of soil suitable for vegetative layer is consistent with item 5, and NYSDEC approved cover material is consistent with item 7.

The total cumulative thickness of cover for the bioretention pond will be 12 inches. This thickness will be comprised of new and existing cover. In areas of the pond (sides) where the cut is shallow the existing cover material will have additional new material place to result in a 12 inch thick layer. The 12 inches of cover is consistent with item 5 above, the 6 inches of soil or other substrate that is suitable for a vegetative layer is consistent with item 5, and NYSDEC approved cover material is consistent with item 7. A demarcation layer will be installed prior to addition of cover material, this consistent with item 4.

2.1 RA Cleanup Objectives

The cleanup objective of this RA is to remove or mitigate exposure to soils which are suspected to be contaminated at the unimproved open area located in Parcels Site I-1 C915197, Site I-2 C915197B, Site II-12 C915198L, Site II-13 C915198M, Site I-8 C915197H, Site I-9 C915197I and Shoreline Trail C915197L (Figure 1-2).

The RAO's listed in the three DDs that are applicable to the project are

Groundwater

RAOs for Public Health Protection

• Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.

RAOs for Environmental Protection

• Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

• Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

• Prevent migration of contaminants that would result in groundwater or surface

water contamination.
• Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

The applicable soil cleanup objective is defined by 6 NYCRR Subpart 375-6.8 (b) Restrictive Use Soil Cleanup Objectives (SCOs) Protection of Public Health Commercial.

Remedial actions will occur in the limits of work for Odell Street Extension and Ridge Road Extension construction (Appendix 1). The remedial objectives will be achieved by as-needed removal with off-site disposal of impacted soils as determined in the field following the procedures in Section 2.3 of this RAWP and installation of clean cover system consisting of asphalt/concrete paving or 12 inches of NYSDEC approved clean soil (i.e., soil that meets NYSDEC commercial Soil Cleanup Objectives) cover material. The Odell Street Extension and Ridge Road Extension construction will provide a composite cover system for any soils that may be impacted from the former Bethlehem Steel Plant operations.

2.2 RA Standards, Criteria and Guidance (SCGs)

The standards, criteria, and guidance (SCG) to be applied for the RA are listed on the following table:

Item Description	Parameter	Criteria
Soils	VOCs, SVOCs, PCBs, Pesticides Metals	6 NYCRR Subpart 375 6.8 (b) Restrictive Use Soil Cleanup Objectives (SCOs) Protection of Public Health Commercial
Soils	Per and Polyfluoroalkyl Substance (PFAS)	Following "Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substance (PFAS)" [June 2021, NYSDEC].

The RA achieves these standards by installing a cover system comprised of asphalt or concrete paving and in unpaved areas a 12 inch thick, clean cover soil layer with the top 6 inches of soil suitable for vegetative cover that follows material requirements as set forth in 6 NYCRR Part 375-6.7(d).

2.3 Remedial Action Activities

The work to be performed during the remedial action includes: the excavation, management, testing, transport, and disposal of soil removed during the installation of utilities and road/sidewalk construction. A breakdown of the work to be performed is as follows.

1) Excavation as required by project design (Appendix 1) for installation of utilities and road grading.
2) Screening, characterization, and segregation of excavated soils. Soil with no observable impacts will be reused to achieve design grade to the extent possible. Observably contaminated soil – if encountered, will be characterized and transported to a permitted landfill or disposal facility. Refer to Appendix 1, Drawing AB-1for details.
3) Import as needed of clean fill for backfilling the utility corridor, bedding and grade establishment. Imported fill will comply with Appendix 1, Drawing AB-1 and will be approved for import by NYSDEC prior to being brought to the site and meet the requirements of 6 NYCRR Subpart 375-6.8 (b) Restrictive Use Soil Cleanup Objectives (SCOs) Protection of Public Health Commercial category.

4) Installation of a demarcation membrane or geotextile over pre-final grade existing soils, prior to backfill or paving.
5) Installation of asphalt and/or concrete roadway or sidewalks
6) In areas not to be paved a minimum of 12 inches of NYSDEC approved cover material shall be placed, the upper 6 inches of any soil cover must be suitable quality to support vegetation.
7) All necessary incidental services not specifically noted but which are required for completion of the specified work; and,
8) Environmental reporting.
    a) Proof of qualification credentials.
    b) Copies of transport manifests.
    c) Contaminated soil field report.
    d) Logs, reports, and record keeping; and,
    e) Bills of ladings, Certified Weight Tickets.

During the excavation work, a Qualified Environmental Professional (QEP) will provide oversight for compliance with this RAWP.

2.3.1 Interim Excavation Work Plan (EWP)

All excavation work associated with the project shall be in accordance with the Interim Excavation Work Plan (EWP) for Phase II Business Park Area , Lackawanna, New York dated February 2013 and Revised July 2021. The EWP has been prepared by Turnkey Environmental Restoration LLC in accordance with NYSDEC Program Policy DER-10, Section 6.1 (b).

At least fifteen (15) days prior to the start of any activity that is anticipated to encounter remaining contamination Mr. Andrw Zwack, Assistant Engineer, NYSDEC – Region 9, 700 Delaware Avenue, Buffalo, NY will be notified of the activities. Notification will include:

a) A detailed description of the work to be performed, including the location and area extent, plans for site re-grading, intrusive element or utilities to be installed bellow the soil cover, estimated volumes of contaminated soil to be excavated, any work that may impact existing engineering control. Appropriate locations for staging and stockpiling of non-impacted soil/fill materials will be identified.
b) A summary of environmental conditions anticipated in the work areas. Including the nature and concentration levels of contaminants of concern, Potential presence of grossly contaminated media and plans for pre-construction sampling.
c) A schedule for work, detailing the start and completion dates of all intrusive work.
d) A summary of applicable component of this Final RAWP.
e) A statement that the work will be performed in compliance with this Final RAWP and 29 CFR 1911.120.
f) A copy of the Construction Specific/Contractor's Health and Safety Plan in electronic format, if it differs from the Site-wide Health and Safety Plan.
g) Identification of disposal facilities for anticipated waste streams.
h) Identification of sources of anticipated backfill along with all required analytical testing.

2.3.2 Soil Screening Segregation Methods

All excavated materials will be field screened for environmental impacts by a QEP during all intrusive activities. Field screening will consist of visual and olfactory observation and total volatile organic vapor

measurements, using a photoionization detector or equivalent. Visibly stained or debris, petroleum or chemical odors or total volatile organic vapor readings of 5 parts per million above ambient/background levels will be considered impacted and require additional evaluation or testing.

If evidence of impacted materials are encountered the NYSDEC project manager will be contacted and the material will be stockpiled on polyethylene sheeting in an acceptable location near the impacted area. The location of the staged materials will be coordinated with the owner and will remain within the same Business Park Site were the soil laydown areas have been established as shown on Appendix I Drawings ECP-1, PL-1 ECP-2, and SWP-2.

2.3.3 Stockpile Methods

Stockpile soils will be segregated based on field screening. Materials based on field screen assumed to be impacted and not suitable for use as sub-grade fill will be segregated into separate stock piles. Material that are assumed not impacted based upon field screen will be stockpiled separately from the impacted soils.

A continuous berm and/or silt fence will be placed around the stockpiles. Hay bales will be used as needed near catch basins, surface waters and other discharge points. Stockpiles will be covered at all times with appropriately anchored tarps or poly sheeting. Stockpiles will be routinely inspected at a minimum of once a week and after a storm event. Damaged Tarps will be promptly replaced.

2.3.4 Material Excavation and Load Out

A QEP or person under their supervision will monitor all intrusive work and the excavation staging, segregation and load-out of excavated materials. Decontamination of trucks/equipment prior to leaving the site / demobilization is required. Locations were vehicles enter or exit the Site will be inspected daily for evidence of off -site tracking. The QEP will be responsible for ensuring that all equipment is decontaminated prior to leaving the site and that the egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during excavation.

2.3.5 Material Reuse On-Site

Soil/Fill

On-site reuse of soil/fill material will be allowed provided that the material is not found to be impacted based upon field screening, The QEP will ensure that procedures for material reuse are followed and that unacceptable material does not remain on-site. Excavated soil/fill that is acceptable for reuse will be placed below the engineered demarcation layer or impervious surface and will not be reused within a cover soil layer with landscaping berms or as backfill for subsurface utility lines.

Petroleum-Impacted Soil/Fill

Excavated soils impacted by petroleum hydrocarbons based upon field screening or testing may be transported with NYSDEC approval to a designated portion of the ECIDA controlled land parcels for biotreatment. Qualitative assessment of treatment performance will be made by a QEP based upon field screening. Once an assessment is made the petroleum impacted soils are remediated, confirmatory soil samples will be collected at a frequency of no less than one sample per 1,000 cubic yards of soil. Samples will be analyzed for NYSDEC Target Compound List (TCL) volatile organic compounds (VOCs), and base-neutral semivolatile organic compounds (BNAPs). The analytical results will be compared to NYSDEC soil clean-up objectives and based upon the chemical concentrations the action specific re-use of the materials will be determined. Once NYSDEC approves of the action specific re-use of the materials,

the treated soils will be transferred back to the original excavation Site and used as subgrade material.

Petroleum impacted soils that have undergone remedial treatment and meet NYSDEC SCOs, will be reused, unless the treated materials do not meet NYSDEC SCOs. If the treated soils do not meet NYSDEC SCOS the soils will be disposed of, with NYSDEC approval, at an off-site disposal facility permitted to treat and/or dispose of the material.

Debris

Any demolition material or historical anthropomorphic debris encountered that are suspected to contain asbestos (such as roofing materials, insulation and transite building materials) will be tested for asbestos following NYSDOL rules and guidance. If reported to be non-asbestos containing the results reported to NYSDEC, for acceptance prior to re-use or disposal. Concrete crushing or processing on-site will not be performed without NYSDEC approval. Organic matter (wood, roots, stumps etc.) or other soil waste derived from clearing and grubbing of the Site will not be reused on-site without prior NYSDEC approval. Rail road ties will be staged as directed by the owner. Final disposition to rail road ties will be determined by the owner in consultation with NYSDEC.

2.3.6 Slag Management

Slag in some cases is considered technologically-enhanced naturally occurring radioactive material (TENORM). A gamma walk over survey, soil sampling and laboratory analysis for Ra-266 concentrations were performed for the areas of construction, A Gamma Walkover Survey and Sampling Report by MJW Companies, dated August 15, 2025, submitted to NYSDEC for review. Based upon this report the NYSDEC has concluded that excavated material is not TENORM. Appendix 3 contains the NYSDEC letter and the Gamma Walkover Survey and Sampling Report.

2.3.7 Fluid Management and Dewatering from Excavations

The surface of the work areas are generally vegetated and/or stone-covered and are relatively flat. Therefore rainwater will accumulate in small, depressed areas of the Site prior to infiltration Therefore, stormwater runoff is not expected to pose a significant soil particulate or contaminant transport pathway during construction activities. The contractor will enact erosion and sediment control measures as part of the Storm Water Pollution Prevention Plan (SWPPP).

As noted in the Site Management Plans (see section 2.4) there is an absence of groundwater in the upper 4 feet of the overburden soils and an absence of leachable contaminants in the surrounding soil/fill, based on toxicity characteristic leaching procedure testing. If dewatering is required during excavation, the construction contractor shall include furnishing and maintaining weir (frac) tanks with settlement chambers designed to separate suspended solids from collected ground water (Appendix 1, Drawing AB-1). The excavation water will be tested and discharged per the NYSDEC Tecumseh Phase I & Phase II Business Park Project Site Remediation Waste Water Discharge SPDES Permit Equivalent.

The weir (frac) tank(s) with settlement chambers shall be of sufficient size to retain ground water pumped from excavations and enable access or means to the collected ground water for sampling and testing. The tank(s) shall be equipped with discharge valves to facilitate discharge of fluids in accordance with permitted testing results. Water pumps to transport all fluids from the excavation to the weir (frac) tank shall be of appropriate size to provide the necessary head lift capacity to discharge directly into the weir tanks. The

weir tank(s) with settlement chambers shall be set on level ground in accordance with the manufacturers' recommendation and positioned to facilitate pumping of ground water encountered during excavations into the tank(s) for the Odell Street Extension and Ridge Road Extension construction site(s). The Contractor shall submit a drawing with applicable equipment specifications for review and approval to the Engineer. The NYSDEC shall have final approval for the system being proposed. Pending satisfactory results of the fluid testing, all fluids deemed suitable will be discharged by the requirements of the NYSDEC Tecumseh Phase I & Phase II Business Park Project Site Remediation Waste Water Discharge SPDES Permit Equivalent. The location of the discharge point is to be approved by the ILDC and NYSDEC.

Collection and testing of contained ground water obtained during excavation will be performed prior to disposal of dewatering fluids. The Contractor shall submit a plan for collection of effluents from weir (frac) tank(s). The plan shall list the name of the NYSDOH approved Laboratory conducting the analysis of the samples and the tests being conducted. The Engineer will forward the plan to NYSDEC who shall have final approval of the plan, testing and discharge of the fluids.

Effluent samples will be collected weekly until a baseline data is established. Effluent samples for the first two weeks will require a 24-hour turnaround time for the results and analysis. If visual or olfactory (i.e. NAPL or Sheen) is encountered, the material (soil/water) exhibiting visual or olfactory signs of impact will be containerized for additional treatment or disposed of off-site at a permitted facility. All fluids deemed suitable will be permitted to be discharged onto the existing surface away from any immediate excavation site at a location to be approved by the ILDC and NYSDEC.

2.3.8 Cover Materials

A minimum of 12 inches of NYSDEC approved cover material swill be placed over any unpaved or unlined areas as a component of the final remedy. The upper six inches of the soil cover will be of suitable quality to support vegetation. A demarcation layer will be placed under the cover materials to provide a visual reference for the top of the untreated in-place material.

2.3.9 Backfill From Off-Site Sources

Off-site Fill (soil/fill) may be used as backfill provided that originates from:

a) An NYSDEC approved borrow Site, or
b) A known source having no evidence of disposal or release of hazardous substances, hazardous, tox or radioactive waste, or petroleum.

Imported soil, backfill, hardfill or top soil must be tested and demonstrated to meet the criteria shown in Appendix 5 of DER-10 for Commercial Use. The contractor will submit an Imported Fill Request for NYSDEC approval prior to bringing any imported fill (soil, hard fill or top soil) on-site.

Hard fill material may be imported without chemical testing provided it contains less than 10% (by weight) of particulate matter that would pass through a size 100 sieve and meet the following:

a) Rock or quarry stone consisting of virgin material from a permitted quarry.
b) Steel Slag under BUD#555-9-15 with NYSDEC approval.
c) Recycled concrete, brick or asphalt from a NYSDEC-registered or permitted C&D debris processing facility (as specified in section 6 NYCRR Part 360-16.1 that conforms to section 204 of NYSDOT standard specifications construction materials, Volume 1, dated 2002.

Top soil is subject to the same requirements as backfill and requires NYSDEC approval prior to being brought on-site.

2.3.10 Contingency for Previously Unidentified Contaminants

During excavation activities, if underground tanks or other previously unidentified potential contamination sources are encountered, the NYSDEC Project Manager will be promptly informed via phone. Reportable quantities of petroleum product will be reported to NYSDEC Spill Hotline. Excavation activities will be suspended. Equipment will be mobilized to address the condition and sampling and analysis will be performed to determine the nature of the material and proper disposal methods.

2.4 Site Management

Site management will follow the requirements of the following Site Management Plans (SMP)

a) Brownfield Cleanup Program (BCP) SMP Tecumseh Phase I, Business Park, NYSDEC Site Numbers C915197 Through C915197L.
b) Brownfield Cleanup Program (BCP) SMP Tecumseh Phase II, Business Park, NYSDEC Site Numbers C915198 Through C915198L.

The SMPs state that exposure to the remaining contamination in soil/fill will be prevented by a cover system The cover system will be comprised of a minimum of 12 inches of clean soil, stone or NYSDEC approved materials with a demarcation layer (i.e. geotextile or orange poly netting of similar nondegradable visual demarcation) in all areas not paved or covered by concrete structures. Areas within the right of way will include a cover system complying with the SMP. Excavated soils will be managed in accordance with the SMPs the Excavation Work Plans included as appendices to the SMPs.

2.5 Project Monitoring

A QEP will be on-site during excavation work and site cover/restoration work on a full-time basis to document the RA activities and to provide any required air monitoring and soil sampling. Documentation will include at a minimum, daily reports of RA activities, air monitoring results, photographs, and sketches. In addition, the horizontal and vertical extent of all excavations will be surveyed to document the extent of remedial excavation. These extents will be shown on a figure stamped by a professional engineer licensed to practice in New York State.

Standard daily reporting procedures will include preparation of a daily report, and when appropriate, problem identification and corrective measures report. Information that may be included in the daily report form includes:

- Approximate sampling locations (sketches) and sample designations.
- Processes and locations of activities underway.
- Equipment and personnel working in the area, including subcontractors.
- Approximate volume and description of materials removed (i.e., hazardous and non-hazardous materials soil).
- Number and type of truckloads of materials removed from the Site.
- Cover thickness measurement field verified using measuring tape from demarcation layer to final grade. Measuring locations will be tied to surveyed horizontal control stakes using field tape

measure or measuring wheel. Photographs, with a vertical scale in the photograph, will be taken showing the depth of cover from demarcation layer to final grade at each measuring location.

The completed reports will be submitted to the NYSDEC as part of the RA Construction Completion Report. Photo documentation of the RA activities will be prepared by the Engineer or Scientist throughout the duration of the project as necessary to convey typical work activities and whenever changed conditions or unexpected circumstances are encountered. The QEP will provide RA oversight to evaluate the on-going adequacy of the RA to ensure that all activities are conducted in accordance with the RA Work Plan.

2.6 Health and Safety

Temporary controls will be employed for protection against off-site migration of soil and safety hazards during the RA. The work will be performed by workers who are trained and certified as required for specific tasks. The Contractor shall be required to develop a written Health and Safety Plan (HASP) that will comply with all applicable federal and state regulations protecting human health and the environment from the hazards posed by activities during this Site remediation. The Contractor's HASP will be developed for this project and will be provided to NYSDEC as an addendum (Appendix 4) to this Remedial Action Work Plan when completed.

2.6.1 Community Air Monitoring Plan

A Real-time community air monitoring program (CAMP) will be implemented during any ground intrusive activity and active handling of soil/fill excavated at the Site. Community air monitoring will be performed in accordance with the Generic Community Air Monitoring Plan (2010, NYSDEC) that is included as Appendix 5 to this Work Plan). Particulate and VOC monitoring will be performed along the upwind and downward perimeter of the work area during subgrade excavation and soil handling activities in accordance with this plan. A construction specific CAMP will be provided to the NYSDEC for review prior to the commencement of construction activities. The site specific CAMP will have a figure with the placement of the particulate monitoring stations, a minimum of one upwind and two downwind of the construction.

2.5.2 Vapor Monitoring

During subsurface soil excavation, QEP will perform real time soil vapor monitoring using a PID. VOCs will be monitored upwind and downwind at the perimeter of the work area during all ground intrusive activities.

- If the 15-minute ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued.
- If the organic vapor decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If the ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone persists at levels above 5 ppm over background but less than 25 ppm, activities must be halted, the source of vapors identified, corrective actions to abate the emissions taken, and monitoring continued. After these steps, work activities can resume provided that: the organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest off-site potential receptor or residential or commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the exclusion zone work activities must be shut down and Site Health Officer (SHO) will be informed, the SHO will contact

emergency personnel as needed and air monitoring will be continued at ½ the distance from the exclusion zone to the nearest receptor.

2.5.3 Particulate Monitoring

Particulates will be monitored upwind and downwind of the perimeter of the work area on a continuous basis during the soil excavation and soil load-out activities. The particulate meters will be programmed to calculate 15-minute average concentration. If the difference between the measured upwind and downwind concentrations is greater than or equal to 100 ug/m3 earthwork activities will be stopped and dust suppression methods employed. Work may resume only after the measured upwind/downwind difference has been reduced to less than 100 ug/m3. If visible dust is observed the contractor will implement dust suppression techniques, such as applying potable water to the dust producing areas using hoses, misting fans, or changing their construction methods to prevent dust production.

2.6 Quality Assurance Project Plan (QAPP)

No analytical testing is anticipated that will require a QAPP. If any characterization samples are required for disposal, the samples will be analyzed by a laboratory certified under NYSDOH ELAP. If the project scope changes then a QAPP will be developed and provided to NYSDEC as an addendum to this RAWP. Any analytical testing will be performed by a laboratory that is a participant in the NYSDOH Environmental Laboratory Accreditation Program.

2.7 Schedule

Key milestones of the RA schedule are detailed below:

• Mobilization – 4th Quarter 2025
• On-site RA Work – Begins 4th Quarter 2025
• RA Closure Report – 2nd Quarter 2026

3.0 RA REPORTING

3.1 Monitoring

The project work will be monitored by a Construction Manager (CM), retained by the owner to oversee and function as their representative for the project. The CM is responsible for conformance with projected plans and specifications, work plans and other documents defining the work to be completed on the project.

The Construction Manager will be assisted by:

- QEP and/or New York State Licensed Professional Engineer {PE} are responsible for ensuring the remedial elements identified in this RAWP are implemented and documented
- QEP to implement the Community Air Monitoring Program, verify classification of materials, collect soil, waste and water samples if needed.
- The Construction Inspector under the direction of a PE will perform field inspections required by the contract documents.

The CM will be responsible that all daily, weekly and monthly reports and other documents required by the contract area produced and distributed as required. Resume of proposed NYS Licensed Professional

Engineer (Mr. Mike Lydle) and Qualified Environmental Professional for CAMP implementation (Mr. Jon Willams) are provided in Appendix 7.

3.2 RA Completion Report

Details of completion of RA activities will be documented in an RA Construction Completion Report submitted to the NYSDEC. The results of all sampling and analysis will be presented. The Report will present a detailed summary of Site physical conditions, chemical conditions and potential risks to human health or the environment. The RA Report will be stamped by a Professional Engineer and will include (at a minimum):

- Text describing the RA activities performed; a description of any deviations from the RAWP and associated corrective measures taken; and other pertinent information necessary to document that Site activities were conducted in accordance with this RAWP.
- A Site map showing areas of impacted soils as determined from field screening, and significant Site features.
- Tabular quantity summaries of volume of materials removed.
- Documentation on the disposition of material removed from the Site.
- Tabular comparison of soil sampling and disposal characterization analytical results to disposal criteria, respectively.
- Confirmation of Soil Cover system meets RA Objectives.
- As-built drawings of the cover system signed and stamped by a PE.
- Copies of daily inspection reports.

4.0 REFERENCES

2005 NYSDEC, *"Brownfield Cleanup Program (BCP) Brownfield Cleanup Agreement Index No. B9-0696-05-06(A)"*, NYSDEC, December 5, 2005.

2007 NYSDEC, *"Brownfield Cleanup Program (BCP) Brownfield Cleanup Agreement Index No. B9-0696-05-06(B)"*, NYSDEC, March 14, 2007.

2010 NYSDEC, *"New York State Department of Health Generic Community Air Monitoring Plan, Appendix 1A of Final DER-10 Technical Guidance for Site Investigation and Remediation"*, NYSDEC, May 2010.

2012 NYSDEC, *"Decision Document Tecumseh Phase I Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915197"*, NYSDEC, January 2012.

2017a NYSDEC, *"Decision Document Site II-11 Tecumseh Phase II Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915198K"*, NYSDEC, January 2017.

2017b NYSDEC, *"Decision Document Site II-12 Tecumseh Phase II Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915198L"*, NYSDEC, January 2017.

2018 NYSDEC, "*Brownfield Cleanup Program (BCP) Brownfield Cleanup Agreement Index No.C915197L-01-18",* NYSDEC, March 09, 2018.

2022 NYSDEC, *"Brownfield Cleanup Program (BCP) Brownfield Cleanup Agreement Index No.C915198M-06-22"*, NYSDEC, July 1, 2022.

2023 NYSDEC, "DMM-5 / Management of Soils Contaminated with Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM), NYSDEC, October 27, 2023.

2006 Turn Key, *"Remedial Investigation Report, Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York"*, Turn Key Environmental Restoration, LLC, October 2006. Revised June 2007.

2007 Turn Key, *"Alternative Analysis Report , Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York"*, Turn Key Environmental Restoration, LLC, October 2006. Revised July 2007, Revised May 2010.

2011 Turn Key, *"Remedial Investigation and Alternative Analysis Report, Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York"*, Turn Key Environmental Restoration, LLC, May 2011, Revised June 2021.

2012 Turn Key, *"Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York"*, Turn Key Environmental Restoration, LLC, Revised March 2012.

2014 Turn Key, *"Construction Completion Report, Metal-Impacted Hotspots, Business Park Sub-parcels II-2,II-3,II-5 & II-11"*, Turn Key Environmental Restoration, LLC, January 2014.

2013 Turn Key, *"Brownfield Cleanup Program Excavation Work Plan Tecumseh Phase II Business Park, Site Nos C1915198 through C915198L"*, Turn Key Environmental Restoration, LLC, December 2013.

2014a Turn Key, *"Site Management Plan (SMP) Brownfield Cleanup Program Tecumseh Phase I Business Park, Site Nos C1915197 through C915197K"*, Turn Key Environmental Restoration, LLC, January 2014, Revised 2019.

2014b Turn Key, *"Site Management Plan (SMP) Brownfield Cleanup Program Tecumseh Phase II Business Park, Site Nos C1915198 through C915198L"*, Turn Key Environmental Restoration, LLC, January 2014, Revised 2021.

2017c Turn Key, *"Final Engineering Report – Tecumseh Phase I Business Park : Sub-parcels I-1and I-3 BCP Site No. C915197 and C915197C"*, Turn Key Environmental Restoration, LLC, R August 2017.

2017d Turn Key, *"Final Engineering Report – Tecumseh Phase II Business Park : Sub-parcels II-10 and II-12 NYSDEC Site Nos C915198 and C915198L"*, Turn Key Environmental Restoration, LLC, August 2017.

2017e Turn Key, *"Final Engineering Report – Tecumseh Phase I Business Park : Sub-parcels I-9, I-10 and I-11"*, Turn Key Environmental Restoration, LLC, September 2017.

2023 Turn Key, *"Final Engineering Report – Tecumseh Phase II Business Park : Sub-parcels II-11 NYSDEC Site Nos C915198K"*, Turn Key Environmental Restoration, LLC, December 2023.

2024a Labella, *"Periodic Review Report – Tecumseh Phase I Business Park : Sites I-1, I-3, I-5, I-7, I-9 and I-10"*, Labella, June 2024, Revised July 2024.

2024b Labella, *"Periodic Review Report – Tecumseh Phase II Business Park : Site II-12"*, Labella, June 2024, Revised July 2024.

5.0 PROFESSIONAL ENGINEER SIGNATURE

I, Michael Lydle, certify that I am currently a NYS registered Professional Engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10)

Michael F. Lydle, P.E.



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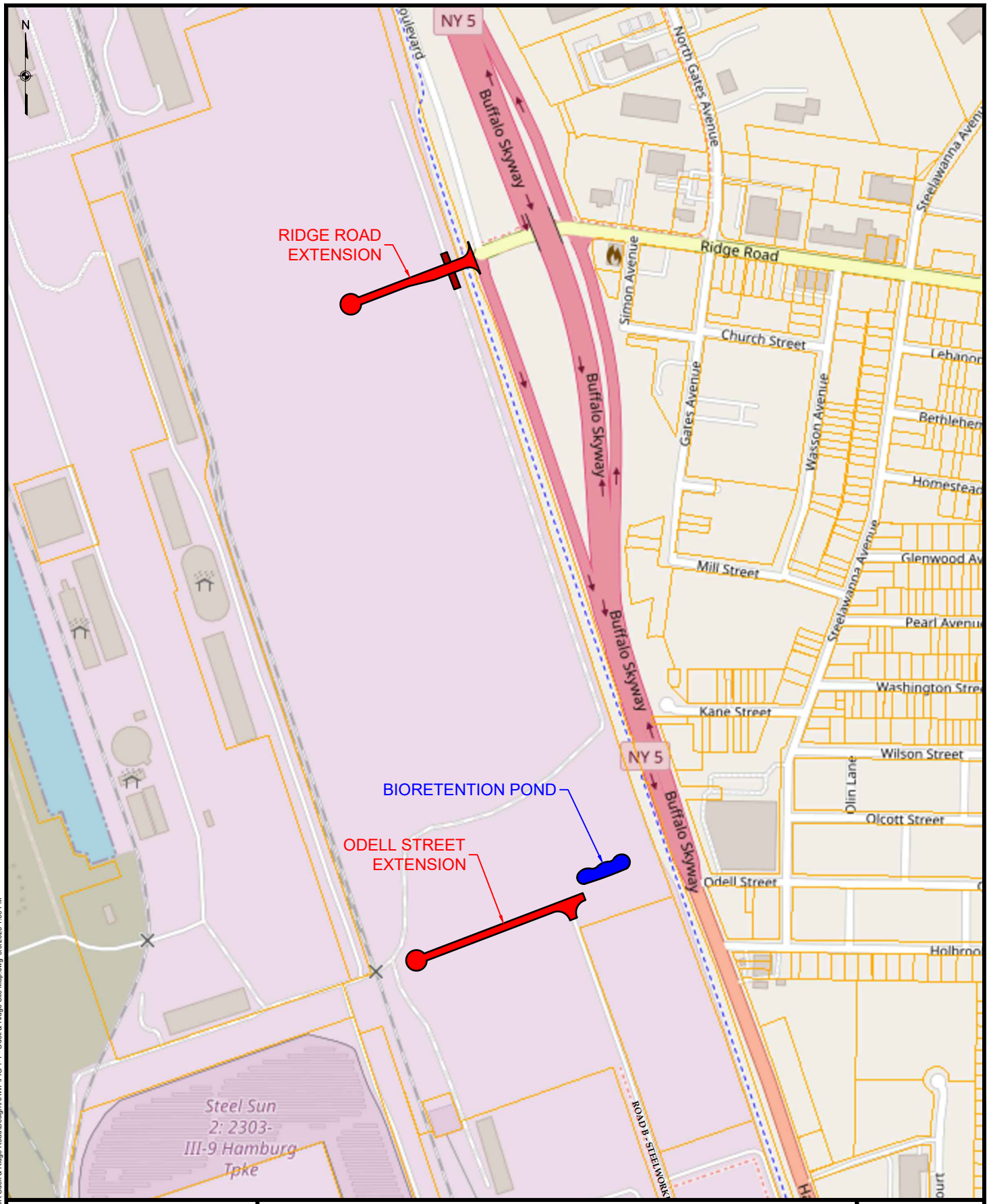
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TABLE 1-1
LIST OF DOCUMENTS, REPORTS AND PLANS

Construction Element	Land Parcel	Agreements	Decision Document	Remedial Investigation Reports Alternative Analysis Reports	Site Management Plan	Final Engineering Report	EC/IC Reports (Most Recent)
Odell Street Extension	Site I-1 C915197 (Class C)	B9-0696-05-06(A)	Decision Document Tecumseh Phase I Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915197", NYSDEC, January 2012.	Remedial Investigation Report Phase I Business Park, Lackawanna New York, Turnkey, October 2006, Revised June 2007 Alternative Analysis Report (AAR) Phase I Business Park ArcelorMittal Tecumseh Redevelopment, Inc. Lackawanna New York, Turnkey, July 2007, Revised May 2010	Site Management Plan (SMP) Brownfield Cleanup Program Tecumseh Phase I Business Park NYSDEC Site Nos. C915197 through C915197K Lackawanna New York, Turnkey, January 2014, Revised 12/09/19	Final Engineering Report Tecumseh Phase I Business Park, Sub-Parcels I-1 and I-3 BCP Site Nos. C915197 and C915197C Lackawanna, New York", Turnkey, August 2017.	2024 Periodic Review Report (for Period April 28, 2023, to April 28,2024) Tecumseh Phase I Business Park – Sites I-1, I-3, I-5, I-7, I-9, I-10 and I-11, Labella, June 2024, Revised July 2024
	Site I-2 C915197B (Class A)	B9-0696-05-06(A)			Not Yet Developed	Not Yet Developed -	Not Yet Developed
	Site II-12 C915198L (Class C)	B9-0696-05-06(B)	"Decision Document Site II-12 Tecumseh Phase II Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915198L", NYSDEC, January 2017.		Site Management Plan (SMP) Brownfield Cleanup Program Tecumseh Phase II Business Park NYSDEC Site Nos. C915198 through C915198L Lackawanna New York, Turnkey, January 2014, Revised 2021	Final Engineering Report Tecumseh Phase II Business Park, Sub-Parcels II-10 and II-12 Lackawanna, New York", Turnkey, August 2017. Final Engineering Report Site II-11 (BCP Site No. C915198K) 2 Steelworkers Way, Lackawanna, New York, Roux , December 2023,	2024 Periodic Review Report (Reporitng Period April 28, 2023, to April 28,2024) Tecumseh Phase II Business Park – Site II-12, Labella, June 2024, Revised July 2024
	Site II-13 C915198M (Class A)	C915198M-06-22	Decision Document Site II-11 Tecumseh Phase II Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915198K", NYSDEC, January 2017.	Remedial Investigation/Alternatives Analysis Report (RI/AAR) Phase II Business Park Area, Lackawanna, New York. May 2011, Turnkey, Revised March 2021	Not Yet Developed	Not Yet Developed -	Not Yet Developed

Construction Element	Land Parcel	Agreements	Decision Document	Remedial Investigation Reports Alternative Analysis Reports	Site Management Plan	Final Engineering Report	EC/IC Reports (Most Recent)
Bio Retention Pond	Multiple Sites C915197L (Class C)	C915197L-01-18	Decision Document Tecumseh Phase I Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915197", NYSDEC, January 2012.	Remedial Investigation/Alternatives Analysis Report (RI/AAR) Phase I Business Park Area, Lackawanna, New York. May October 2006, Turnkey, Revised March 2007	Site Management Plan (SMP) Brownfield Cleanup Program Tecumseh Phase I Business Park NYSDEC Site Nos. C915197 through C915198K Lackawanna New York, Turnkey, January 2014, Revised 12/09/19	Final Engineering Report Tecumseh Phase II Business Park, Sub-Parcels II-10 and II-12 Lackawanna, New York", Turnkey, August 2017. Final Engineering Report Site II-11 (BCP Site No. C915198K) 2 Steelworkers Way, Lackawanna, New York, Roux , December 2023,	2024 Periodic Review Report (Reporting Period April 28, 2023, to April 28,2024) Tecumseh Phase II Business Park – Site II-12, Labella, June 2024, Revised July 2024
	Site I-2 C915197B (Class A)	B9-0696-05-06(A)	Decision Document Tecumseh Phase I Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915197", NYSDEC, January 2012.	Remedial Investigation Report Phase I Business Park, Lackawanna New York, Turnkey, October 2006, Revised June 2007 Alternative Analysis Report (AAR) Phase I Business Park ArcelorMittal Tecumseh Redevelopment, Inc. Lackawanna New York, Turnkey, July 2007, Revised May 2010	Not Yet Developed	Not Yet Developed -	Not Yet Developed
Ridge Road Extension	Site I-8 C915197H (Class A)	B9-0696-05-06(A)	Decision Document Tecumseh Phase I Business Park, Brownfield Cleanup Program Lackawanna, Erie County Site No. C915197", NYSDEC, January 2012.	Remedial Investigation Report Phase I Business Park, Lackawanna New York, Turnkey, October 2006, Revised June 2007 Alternative Analysis Report (AAR) Phase I Business Park ArcelorMittal Tecumseh Redevelopment, Inc. Lackawanna New York, Turnkey, July 2007, Revised May 2010	Not Yet Developed	Not Yet Developed -	Not Yet Developed
	Site I-9 C915197I (Class C)	B9-0696-05-06(A)			Site Management Plan (SMP) Brownfield Cleanup Program Tecumseh Phase I Business Park NYSDEC Site Nos. C915197 through C915197K Lackawanna New York, Turnkey, January 2014, Revised 12/09/19	Final Engineering Report Tecumseh Phase I Business Park, Sub-Parcels I-9, I-10 and I-11, Lackawanna, New York", Turnkey, September 2017.	2024 Periodic Review Report (Reporitng Period April 28, 2023, to April 28,2024) Tecumseh Phase I Business Park – Sites I-1, I-3, I-5, I-7, I-9, I-10 and I-11, Labella, June 2024, Revised July 2024
	Multiple Sites C915197L (Class C)	C915197L-01-18					

REV-1



V:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAW\FIG 1-1 - Odell & Ridge Site Map.dwg 5/6/2025 1:36 PM

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690 Delaware Ave.
Buffalo, New York

LOCATION MAP

FIGURE NO.

1-1

N

II-12
BCP SITE NO. C915198L
(± 12.02 ACRES)

II-13
BCP SITE NO. C915198M (± 6.74 ACRES)

II-11
BCP SITE NO. C915198K
(± 8.29 ACRES)

I-1
BCP SITE NO. C915197
(± 5.57 ACRES)

I-2
BCP SITE NO. C915197B
(± 6.23 ACRES)

I-3
BCP SITE NO. C915197C
(± 7.63 ACRES)

I-4
BCP SITE NO. C915197D
(± 10.37 ACRES)

I-5
BCP SITE NO. C915197E
(± 10.05 ACRES)

I-6
BCP SITE NO. C915197F
(± 10.02 ACRES)

I-7
BCP SITE NO. C915197G
(± 10.03 ACRES)

I-8
BCP SITE NO. C915197H
(± 10.24 ACRES)

I-9
BCP SITE NO. C915197I
(± 10.03 ACRES)

I-10
BCP SITE NO. C915197J
(± 9.98 ACRES)

ODELL STREET EXTENSION

RIDGE ROAD EXTENSION

BIORETENTION POND

BETHLEHEM SHORELINE TRAIL BCP SITE NO. C915197L (± 6.61 ACRES)

LEGEND

APPROXIMATE PARCEL LIMIT

100 0 100
SCALE IN FEET

V:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAW\FIG 1-2 - Odell & Ridge Parcel Areas.dwg 5/30/2025 10:50 AM

WARNING
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Buffalo, New York

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CHECKED BY:
DRAWN BY:

CLIENT:
ECIDA/ILDE
95 PERRY STREET, SUITE 403
BUFFALO, NEW YORK 14203

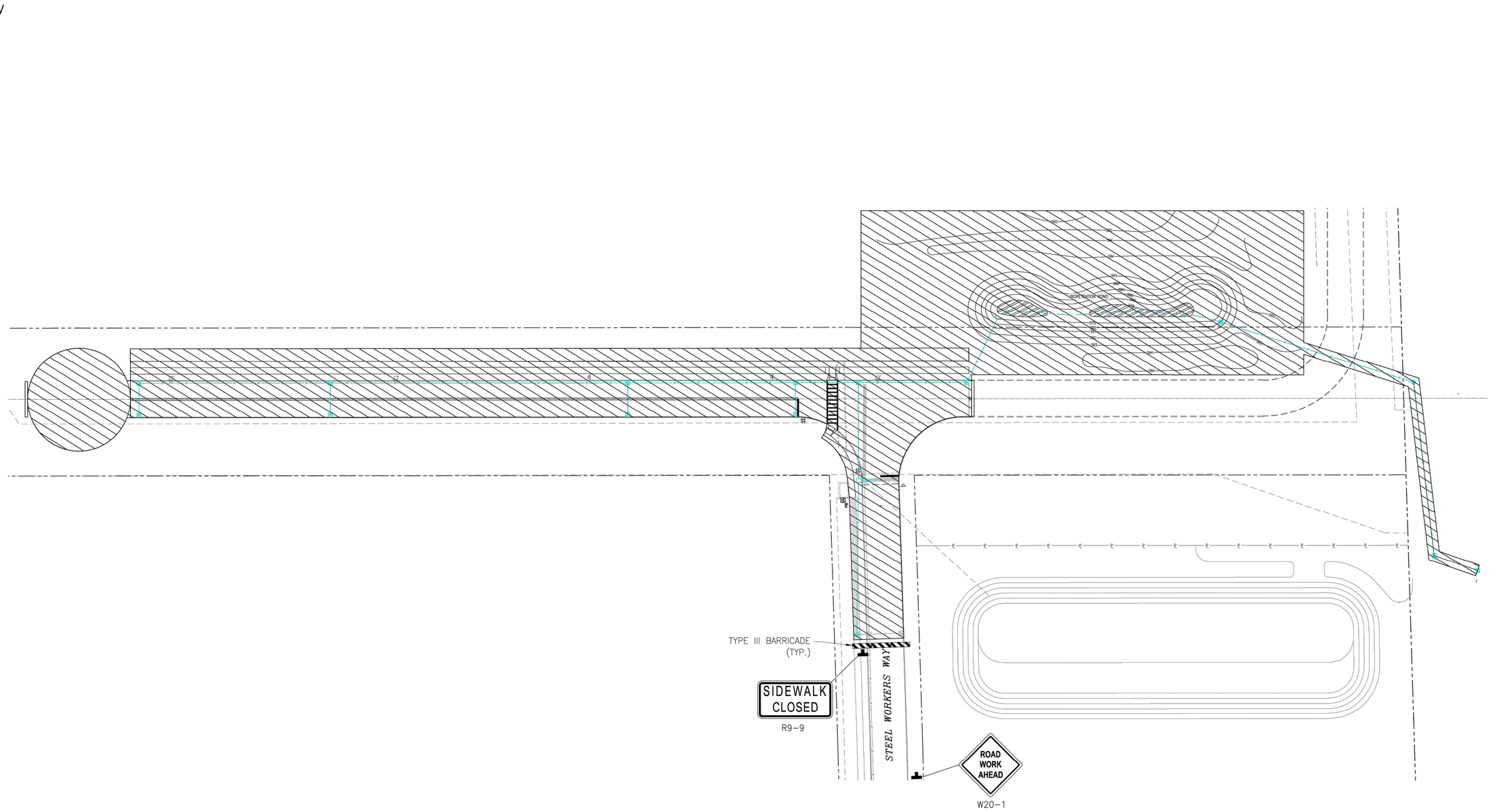
DATE: MARCH 2025
SCALE: AS SHOWN

JOB TITLE AND LOCATION:
ODELL STREET AND RIDGE ROAD EXTENSIONS

LIRO JOB NO.: 22-142-0135
SHEET OF

DRAWING TITLE:
ODELL STREET AND RIDGE ROAD EXTENSIONS LOCATION AND PROPERTY PARCELS

FIGURE NO.
1-2



LEGEND:

LIMITS OF WORK AREA

0 40 80 120 FT

1" = 40' SCALE BAR

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: TRAFFIC CONTROL PLAN, DWG. TCP-1, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

WARNING

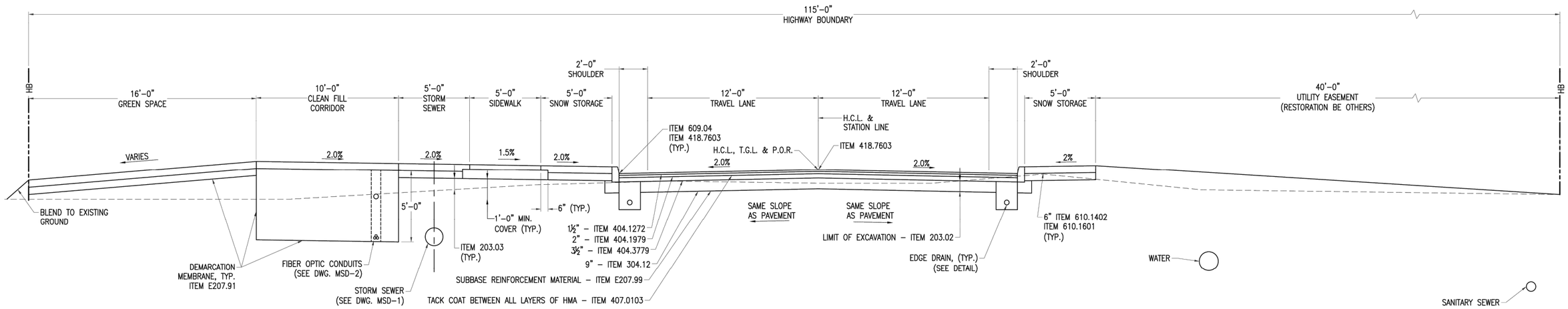
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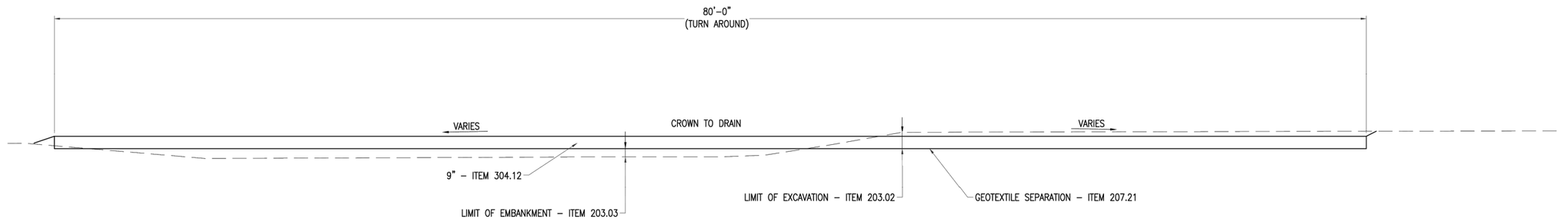
PROJ. ENG.:	
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DRAWN BY:	
CLIENT:	ECIDA/ILDE 95 PERRY STREET, SUITE 403 BUFFALO, NEW YORK 14203
DATE:	MARCH 2025
SCALE:	AS SHOWN
JOB TITLE AND LOCATION:	ODELL STREET AND RIDGE ROAD EXTENSIONS
LIRO JOB NO.:	22-142-0135
SHEET	OF
DRAWING TITLE:	ODELL STREET EXTENSION PLAN VIEW
FIGURE NO.	2-1

V:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAMP\FIG 2-1 - Odell Plan.dwg 5/6/2025 2:30 PM



TYPICAL SECTION – NORMAL CROWN

NOT TO SCALE



STONE CIRCLE TURN–AROUND

NOT TO SCALE

ITEM	DESCRIPTION	UNIT
203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY
203.03	EMBANKMENT IN PLACE	CY
206.0201	TRENCH AND CULVERT EXCAVATION	CY
207.21	GEOTEXTILE SEPARATION	SY
E207.91	DEMARCATION MEMBRANE	SY
E207.99	SUBBASE REINFORCEMENT MATERIAL, LAYER 2	SY
304.12	SUBBASE COURSE, TYPE 2	CY
404.1272	12.5 F2 TOP COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.1979	19 F9 BINDER COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.3779	37.5 F9 BASE COURSE ASPHALT, 70 SERIES COMPACTION	TON
407.0103	STRAIGHT TACK COAT	GAL
418.7603	ASPHALT PAVEMENT JOINT ADHESIVE	LF
605.1001	UNDERDRAIN FILTER, TYPE II	CY
605.1702	OPTIONAL UNDERDRAIN PIPE, 6" DIAMETER	LF
608.0101	CONCRETE SIDEWALKS AND DRIVEWAYS	CY
609.04	CAST–IN–PLACE CONCRETE CURB (AS DETAILED)	LF
610.1402	TOPSOIL – ROADSIDE	CY
610.1601	TURF ESTABLISHMENT – ROADSIDE	SY

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: TYPICAL SECTION, DWG. TS–1, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

WARNING

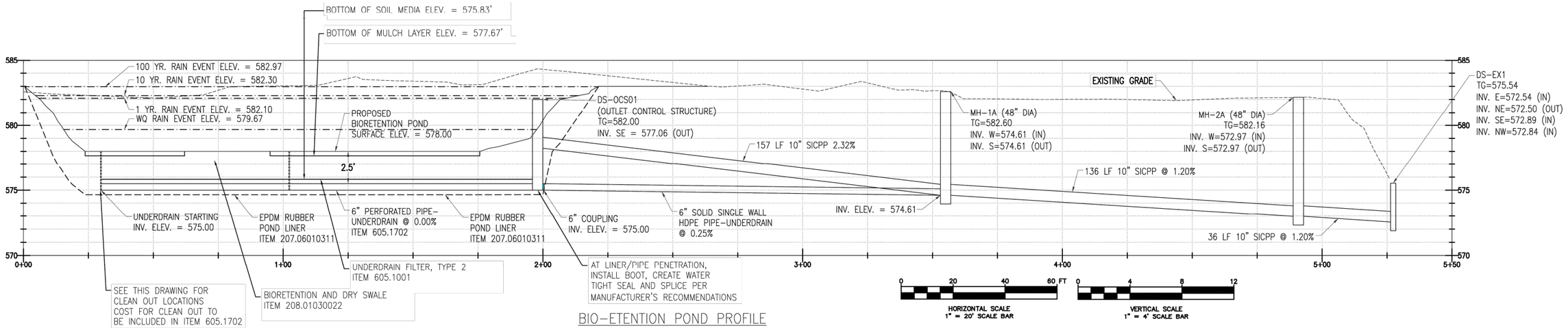
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REVISIONS		

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CLIENT:	ECIDA/ILDE 95 PERRY STREET, SUITE 403 BUFFALO, NEW YORK 14203
DATE:	MARCH 2025
SCALE:	NONE
JOB TITLE AND LOCATION:	ODELL STREET AND RIDGE ROAD EXTENSIONS
LIRO JOB NO.:	22–142–0135
SHEET	OF
DRAWING TITLE:	ODELL STREET EXTENSION SECTIONS
FIGURE NO.	2-2

V:\ECIDA\22-142-0135 – ECIDA Odell & Ridge Road\Design\RAWF\FIG 2-2 – Odell Section.dwg 5/6/2025 1:35 PM



BIO-ETENTION POND PROFILE

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: ODELL STREET BIORETENTION POND PLAN & PROFILE, DWG. SWP-1, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

WARNING

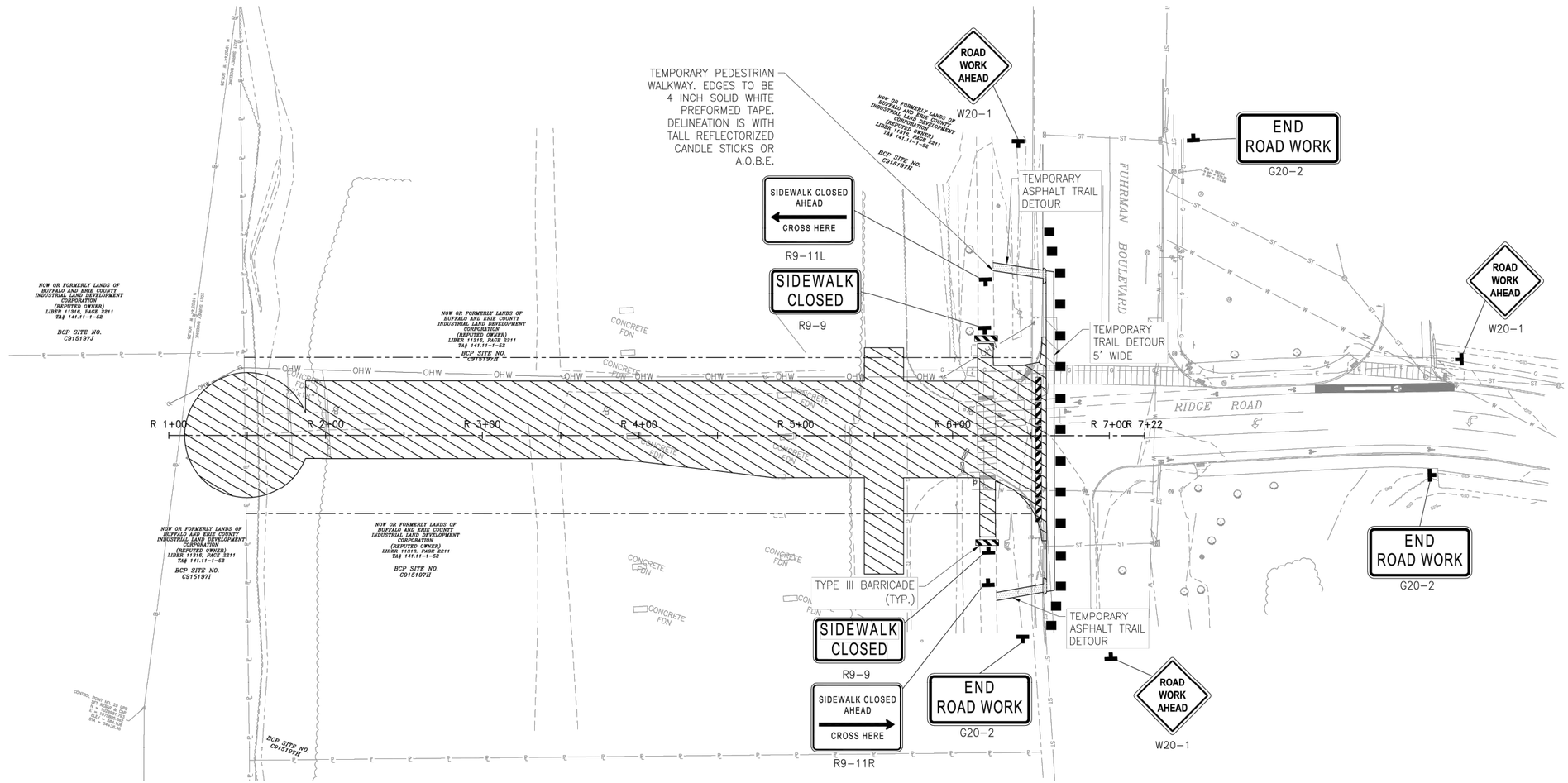
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REVISIONS		

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DESIGNED BY:			SHEET OF
CHECKED BY:		DRAWING TITLE: BIORETENTION POND CROSS SECTION	FIGURE NO. 2-3
DRAWN BY:	DATE: MARCH 2025 / SCALE: AS SHOWN		

V:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAW\FIG 2-3 - Bio Pond Section.dwg 5/6/2025 1:35 PM



LEGEND:

LIMITS OF WORK AREA

0 40 80 120 FT

1" = 40' SCALE BAR

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: TRAFFIC CONTROL PLAN, DWG. TCP-1, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

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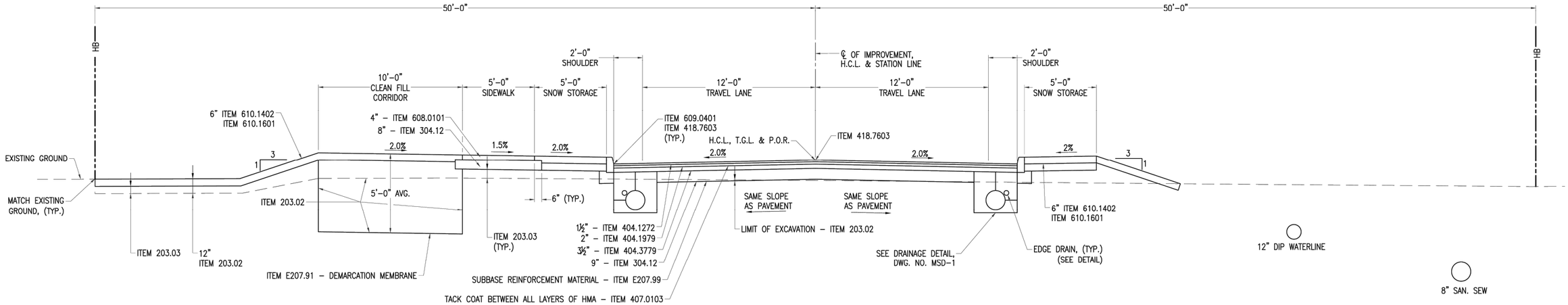
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		REVISIONS

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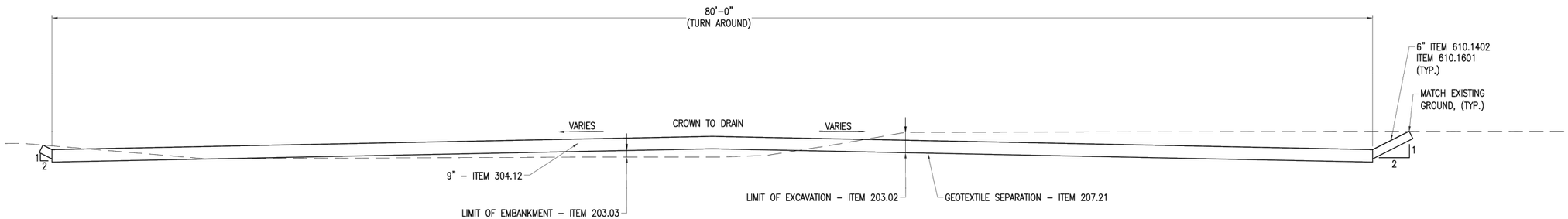
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CLIENT:	ECIDA/ILDE 95 PERRY STREET, SUITE 403 BUFFALO, NEW YORK 14203
DATE:	MARCH 2025
SCALE:	AS SHOWN
JOB TITLE AND LOCATION:	ODELL STREET AND RIDGE ROAD EXTENSIONS
LIRO JOB NO.:	22-142-0135
SHEET OF	
DRAWING TITLE:	RIDGE ROAD EXTENSION PLAN VIEW
FIGURE NO.	2-4

v:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAWP\FIG 2-4 - Ridge Plan.dwg 5/6/2025 2:30 PM



TYPICAL SECTION – NORMAL CROWN

NOT TO SCALE



STONE CIRCLE TURN-AROUND

NOT TO SCALE

ITEM	DESCRIPTION	UNIT
203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY
203.03	EMBANKMENT IN PLACE	CY
206.0201	TRENCH AND CULVERT EXCAVATION	CY
207.21	GEOTEXTILE SEPARATION	SY
E207.91	DEMARCATION MEMBRANE	SY
E207.99	SUBBASE REINFORCEMENT MATERIAL, LAYER 2	SY
304.12	SUBBASE COURSE, TYPE 2	CY
404.1272	12.5 F2 TOP COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.1979	19 F9 BINDER COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.3779	37.5 F9 BASE COURSE ASPHALT, 70 SERIES COMPACTION	TON
407.0103	STRAIGHT TACK COAT	GAL
418.7603	ASPHALT PAVEMENT JOINT ADHESIVE	LF
605.1001	UNDERDRAIN FILTER, TYPE II	CY
605.1702	OPTIONAL UNDERDRAIN PIPE, 6" DIAMETER	LF
608.0101	CONCRETE SIDEWALKS AND DRIVEWAYS	CY
609.0401	CAST-IN-PLACE CONCRETE CURB TYPE VF6	LF
610.1402	TOPSOIL – ROADSIDE	CY
610.1601	TURF ESTABLISHMENT – ROADSIDE	SY

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: TYPICAL SECTION, DWG. TS-1, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

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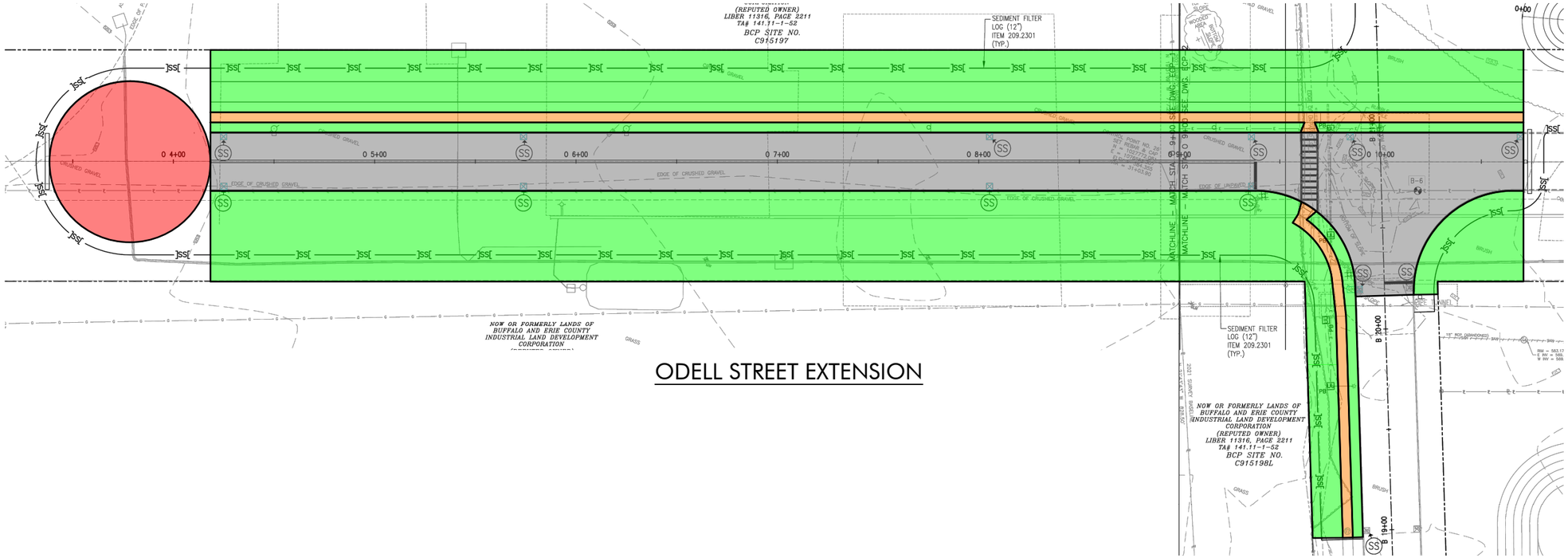
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NO.	DATE	DESCRIPTION
		REVISIONS

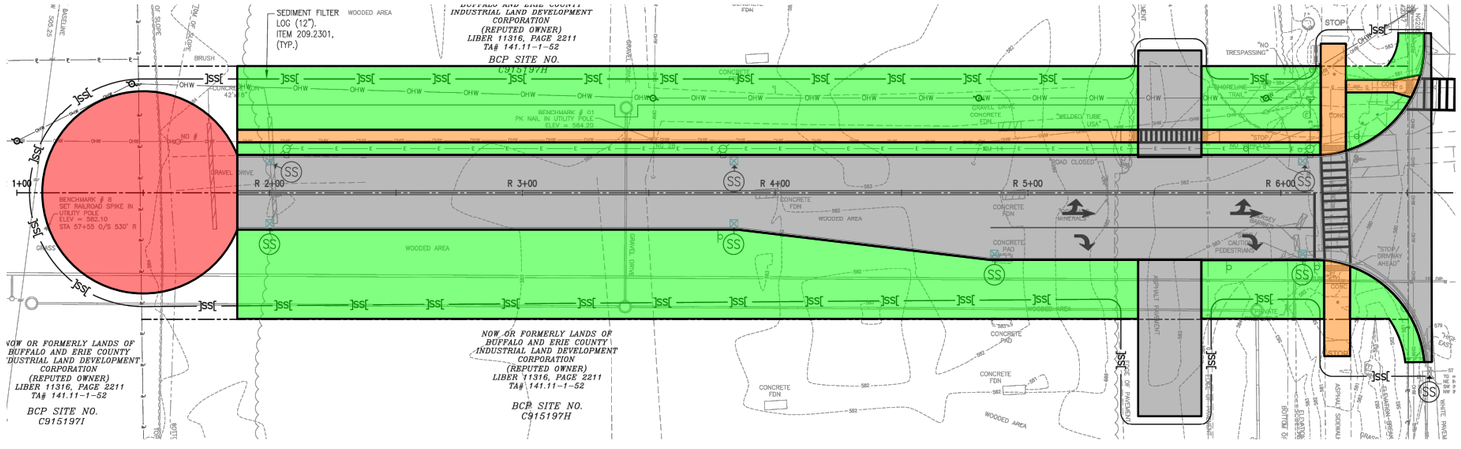
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CLIENT:	ECIDA/ILDE 95 PERRY STREET, SUITE 403 BUFFALO, NEW YORK 14203
DATE:	MARCH 2025
SCALE:	NONE
JOB TITLE AND LOCATION:	ODELL STREET AND RIDGE ROAD EXTENSIONS
DRAWING TITLE:	RIDGE ROAD EXTENSION SECTIONS
LIRO JOB NO.:	22-142-0135
SHEET OF	
FIGURE NO.	2-5

V:\ECIDA\22-142-0135 – ECIDA Odell & Ridge Road\Design\RAMP\FIG 2-5 – Ridge Section.dwg 5/6/2025 1:35 PM



ODELL STREET EXTENSION



RIDGE ROAD EXTENSION

LEGEND:

- ASPHALT ROAD/PAVEMENT
- CONCRETE SIDEWALK
- ONE-FOOT OF SOIL WITH THE UPPER SIX-INCHES OF SOIL OF SUFFICIENT QUALITY TO MAINTAIN A VEGETATIVE LAYER
- GRAVEL OVER DEMARCATION MEMBRANE. FINAL COVER SYSTEM WILL BE A MINIMUM OF 12 INCHES THICK

0 30 60 90 FT
1" = 30' SCALE BAR

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: EROSION AND SEDIMENT CONTROL PLAN, DWG. ECP-1, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

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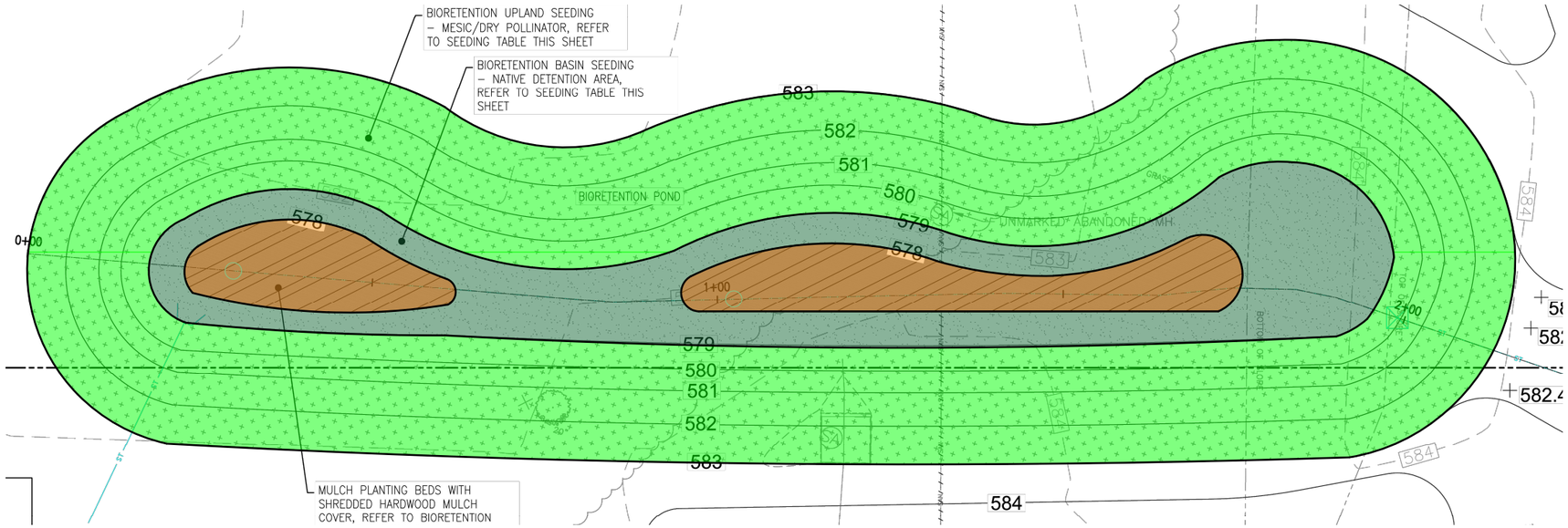
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REVISIONS		

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DRAWN BY:	
CLIENT:	ECIDA/ILDE 95 PERRY STREET, SUITE 403 BUFFALO, NEW YORK 14203
DATE:	MARCH 2025
SCALE:	AS SHOWN
JOB TITLE AND LOCATION:	ODELL STREET AND RIDGE ROAD EXTENSIONS
LIRO JOB NO.:	22-142-0135
SHEET	OF
DRAWING TITLE:	ODELL STREET AND RIDGE ROAD EXTENSIONS COVER TYPE
FIGURE NO.	2-6

V:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAMP\FIG 2-6 - Odell & Ridge Cover.dwg 5/6/2025 1:35 PM



LEGEND:

BIORETENTION BASIN SEEDING VEGETATIVE SURFACE LAYER, OVER DRY SWALE MATERIAL OVER EPDM RUBBER POND LINER. TOTAL COVER TYPE THICKNESS APPROXIMATELY RANGES FROM 1 TO 3.25 FEET

BIORETENTION UPLAND VEGETATIVE SURFACE LAYER, OVER DRY SWALE MATERIAL OVER EPDM RUBBER POND LINER. TOTAL COVER TYPE THICKNESS APPROXIMATELY RANGES FROM 2.5 TO 3.25 FEET

MULCH PLANTING BED MIX VEGETATIVE SURFACE LAYER, UNDERLAIN OVER FOOT OF MULCH, OVER 1.84 FEET OF DRY SWALE AND SOIL MEDIA, OVER UNDER-DRAIN FILTER TYPE 2 (6" PERFORATED PIPE SURROUNDED BY GRAVE), OVER EPDM RUBBER POND LINER. TOTAL COVER TYPE THICKNESS APPROXIMATELY 3.25 FEET

0 10 20 30 FT
1" = 10' SCALE BAR

SOURCE:

BACKGROUND SITE PLAN INFORMATION FROM AZAR DESIGN CO. DRAWING: ODELL STREET LANDSCAPE TABLES, DWG. LAT-01, DATED MARCH 2025. AND IS USED FOR VISUAL PURPOSES ONLY.

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REVISIONS		

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Buffalo, New York

PROJ. ENG.:	
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CHECKED BY:	
DRAWN BY:	
CLIENT:	ECIDA/ILDE 95 PERRY STREET, SUITE 403 BUFFALO, NEW YORK 14203
DATE:	MARCH 2025
SCALE:	AS SHOWN
JOB TITLE AND LOCATION:	ODELL STREET AND RIDGE ROAD EXTENSIONS
LIRO JOB NO.:	22-142-0135
SHEET	OF
DRAWING TITLE:	BIORETENTION POND COVER TYPE
FIGURE NO.	2-7

V:\ECIDA\22-142-0135 - ECIDA Odell & Ridge Road\Design\RAWR\FIG 2-7 - Bio Pond Cover.dwg 5/6/2025 1:35 PM

Appendix 1

Plans for the Construction of the Odell Street Extension at Steelworkers Way and Ridge Road Extension at Fuhrman Boulevard



Location Map
Not to Scale

INDUSTRIAL LAND DEVELOPMENT CORPORATION

A Member of the ECIDA Financing and Development Group

Plans for the Construction of the Renaissance Commerce Park- Odell Street Extension Beginning at Steelworkers Way & Ridge Road Extension at Fuhrmann Boulevard Project # F-A 8-19-21 (25)

City of Lackawanna
County of Erie
State of New York

Design Traffic Data				Design Criteria		
Description	Design Class	Year	ADT	Design Class	Design Speed	Actual Maxium Grade

Renaissance Commerce Park-
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 1 of 41

Type of Construction
New pavement construction (Full Depth) 0.14 miles of the Renaissance Commerce Park - Odell Street Extension at Steelworkers Way. Work also includes, drainage, sidewalks, street light, utility trench and other appurtenances.
New pavement construction (Full Depth) 0.10 miles of Ridge Road Extension at Fuhrmann Boulevard. Work also includes drainage, sidewalks, street light, utility trench and other appurtenances.

Specifications
All work performed under this contract is to be in conformance with the Standard Specifications for Construction and Materials of New York State Department of Transportation, dated January 1, 2022, (English), including current additions and modifications, as well as those made by the Erie County Department of Public Works, Division of Highways, except as modified by these plans, the itemized proposal and the instruction to bidder.

NYSDOT Standard Sheets
203-01, 05
209-01, 03, 05
604-02
608-01
609-03
609-01, 02, 10, 11, 12, 20, 30, 50, 60, 61
625-01
645-01, 02, 03
646-11, 13, 14
655-04
664-01
680-01, 02, 04, 05, 08, 11, 13, 14
685-01

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STATE OF NEW YORK
MICHAEL F. LYDLE
No. 070604
LICENSED PROFESSIONAL ENGINEER

Prepared and Recommended By
Michael F. Lydle
Michael F. Lydle, P.E. Date

Recommended for Approval
Date

Recommended for Approval
Date

Recommended for Approval
Date

Approved By
John Cappella 3/31/25
John Cappella Date
CEO/President
Buffalo and Erie County Industrial Land Development Corporation/ECIDA

AZAR DESIGN CO
FORMERLY FOIT-ALBERT ASSOCIATES

ECIDA/ILDC
95 Perry Street, Suite 403
Buffalo, New York 14203

Sheet No.
Date April 2025
Scale None
Renaissance Commerce Park Odell Street Extension at Steelwokers Way & Ridge Road Extension at Fuhrmann Boulevard
Title Sheet
Dwg. No: TL-1

INTERIM EXCAVATION WORK PLAN NOTES:

1. ALL EXCAVATION WORK ASSOCIATED WITH THIS PROJECT SHALL BE IN ACCORDANCE WITH THE INTERIM EXCAVATION WORK PLAN FOR THE PHASE II BUSINESS PARK AREA, LACKAWANNA, NEW YORK DATED FEBRUARY 2013, REVISED JULY 2021.

2. THE INTERIM EXCAVATION WORK PLAN (EWP) HAS BEEN PREPARED BY TURNKEY ENVIRONMENTAL RESTORATION LLC IN ACCORDANCE WITH THE NYSDEC PROGRAM POLICY DER-10, SECTION 6.1(b), INTERIM SITE MANAGEMENT. THE INTERIM EWP WILL BE FOLLOWED DURING ALL GROUND INTRUSIVE ACTIVITIES CONDUCTED DURING THE SITE PREPARATION WORK INCLUDING EXCAVATING FOR UTILITY LINES, GRADING WORK, AND GENERAL SITE WORK.

3. AT LEAST 15 DAYS PRIOR TO THE START OF ANY ACTIVITY THAT IS ANTICIPATED TO ENCOUNTER REMAINING CONTAMINATION, THE CONTRACTOR WILL NOTIFY THE NYSDEC. NOTIFICATION WILL BE MADE TO ANDREW ZWACK (andrew.zwack@dec.ny.gov) ASSISTANT ENGINEER, NYSDEC – REGION 9, 700 DELAWARE AVENUE, BUFFALO, NY 14209.

4. NOTIFICATION SHALL INCLUDE;

   a. A DETAILED DESCRIPTION OF THE WORK TO BE PERFORMED INCLUDING THE LOCATION AND AREA EXTENT; PLANS FOR SITE RE-GRADING, INTRUSIVE ELEMENTS OR UTILITIES TO BE INSTALLED BELOW THE SOIL COVER; ESTIMATED VOLUMES OF CONTAMINATED SOIL TO BE EXCAVATED; AND ANY WORK THAT MAY IMPACT AN EXISTING ENGINEERING CONTROL. APPROPRIATE LOCATIONS FOR STAGING AND STOCKPILING OF NON-IMPACTED SOIL/FILL MATERIALS WILL ALSO BE IDENTIFIED.

   b. A SUMMARY OF ENVIRONMENTAL CONDITIONS ANTICIPATED IN THE WORK AREAS, INCLUDING THE NATURE AND CONCENTRATION LEVELS OF CONTAMINANTS OF CONCERN, POTENTIAL PRESENCE OF GROSSLY CONTAMINATED MEDIA, AND PLANS FOR ANY PRE-CONSTRUCTION SAMPLING.

   c. A SCHEDULE FOR THE WORK, DETAILING THE START AND COMPLETION OF ALL INTRUSIVE WORK.

   d. A SUMMARY OF THE APPLICABLE COMPONENTS OF THE FINAL RAWP.

   e. A STATEMENT THAT THE WORK WILL BE PERFORMED IN COMPLIANCE WITH THIS FINAL RAWP AND 29 CFR 1910.120.

   f. A COPY OF THE CONTRACTOR'S HEALTH AND SAFETY PLAN, IN ELECTRONIC FORMAT, IF IT DIFFERS FROM THE SITE-WIDE HASP.

   g. IDENTIFICATION OF DISPOSAL FACILITIES FOR POTENTIAL WASTE STREAMS.

   h. IDENTIFICATION OF SOURCES OF ANY ANTICIPATED BACKFILL, ALONG WITH ALL REQUIRED ANALYTICAL TESTING RESULTS.

SOIL SCREENING SEGREGATION METHODS:

1. VISUAL, OLFACTYORY, AND/OR INSTRUMENT (PHOTOIONIZATION DETECTOR OR EQUIVALENT) BASED, SOIL SCREENING WILL BE PERFORMED BY A QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP), AS DEFINED BY NYSDEC IN DER-10 SECTION 1.3(b)49, DURING ALL INTRUSIVE ACTIVITIES.

2. IF FIELD EVIDENCE OF POTENTIALLY IMPACTED SOIL/FILL IS ENCOUNTERED DURING INTRUSIVE WORK, THE NYSDEC PROJECT MANAGER SHALL BE CONTACTED AND THE CONTRACTOR WILL BE DIRECTED TO STOCKPILE THE MATERIAL ON POLYETHYLENE SHEETING IN AN ACCEPTABLE LOCATION NEAR THE IMPACTED AREA. THE LOCATION OF STAGED, MATERIALS SHALL BE COORDINATED WITH THE OWNER, BUT SHALL REMAIN WITHIN THE SAME BUSINESS PARK SITE WHERE SOIL LAYDOWN AREA FOR THE ODELL STREET EXTENSION AND RIDGE ROAD EXTENSION HAS BEEN ESTABLISHED. PAID FOR UNDER ITEM 205.0201.

STOCKPILE METHODS:

1. STOCKPILE SOILS SHALL BE SEGREGATED BASED ON FIELD SCREENING/OBSERVATION AND ITS STATUS AT THE TIME OF EXCAVATION WORK INTO MATERIAL THAT CAN BE USED AS POTENTIAL APPROVED SUITABLE MATERIAL THAT CAN BE GRADED TO BRING THE GROUND TO THE PROPOSED TOP OF SUBGRADE ELEVATION FOR PLACEMENT OF THE DEMARCATION MATERIAL AT THE PARCEL THAT THE SPOIL MATERIAL CAME FROM UNLESS OTHERWISE APPROVED BY NYSDEC.

2. A CONTINUOUS BERM AND/OR SILT FENCE WILL BE PLACED AROUND SOIL/FILL STOCKPILES. HAY BALES WILL BE USED AS NEEDED NEAR CATCH BASINS, SURFACE WATERS, AND OTHER DISCHARGE POINTS. STOCKPILES WILL BE COVERED AT ALL TIMES WITH APPROPRIATELY ANCHORED TARPS OR POLY SHEETING. STOCKPILES WILL ROUTINELY INSPECTED AT A MINIMUM ONCE A WEEK AND AFTER STORM EVENT. DAMAGED TARP COVERS WILL BE PROMPTLY REPLACED. PAID UNDER ITEM 205.0201.

3. ALL SOILS PROPOSED TO BE INCORPORATED INTO THE SITE SHALL BE SAMPLES AND TESTED IN ACCORDANCE WITH THE CRITERIA FOR IMPORTED SOILS AS PROVIDED IN THE PROJECT MANUAL UNDER SECTION, "SPECIAL NOTE, EXCAVATIION, FILL AND BACKFILL".

4. ALL AGGREGATES PROPOSED FOR THIS PROJECT MUST COME FROM AN APPROVED NYSDOT SOURCE AND IS SUBJECT TO FINAL APPROVAL FROM NYSDEC. TESTING OF ANY AGGREGATES PURSUANT TO NYSDOT REQUIREMENTS SHALL BE COMPLETED AT NO ADDITIONAL COST TO THE ECIDA.

MATERIAL EXCAVATION AND LOAD OUT:

1. A QEP, OR PERSON UNDER THEIR SUPERVISION, WILL MONITOR ALL INTRUSIVE WORK AND THE EXCAVATION AND LOAD-OUT OF ALL EXCAVATED MATERIALS.

2. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED DAILY FOR EVIDENCE OF OFF-SITE TRACKING. THE QEP WILL RE RESPONSIBLE FOR ENSURING THAT ALL EGRESS POINTS FOR TRUCK AND EQUIPMENT TRANSPORT FROM THE SITE ARE CLEAN OF DIRT AND OTHER MATERIALS DERIVED FROM THE SITE DURING INTRUSIVE EXCAVATION ACTIVITIES.

MATERIAL REUSE ON-SITE:

SOIL/FILL:

ON-SITE REUSE OF SOIL/FILL MATERIAL IS ACCEPTABLE PROVIDED THAT THE MATERIAL DOES NOT EXHIBIT VISUAL OR OLFACTORY EVIDENCE OF CONTAMINATION AND PID MEASUREMENS OF THE ATMOSPHERE AT THE SOIL/FILL INTERFACE DO NOT EXCEED 5PPM ABOVE BACKGROUND. THE QEP WILL ENSURE THAT PROCEDURES DEFINED FOR MATERIALS REUSE ARE FOLLOWED AND THAT UNACCEPTABLE MATERIAL DOES NOT REMAIN ON-SITE. ON-SITE MATERIAL, INCLUDING HISTORIC FILL, THAT IS ACCEPTABLE FOR RE-USE ON-SITE WILL BE PLACED BELOW THE ENGINEERED COVER DEMARCATION LAYER OR IMPERVIOUS SURFACE (IF IN PLACE AT THE TIME OF EXCAVATION), AND WILL NOT BE REUSED WITHIN A COVER SOIL LAYER, WITHIN LANDSCAPING BERMS, OR AS BACKFILL FOR SUBSURFACE UTILITY LINES.

PETROLEUM-IMPACTED SOIL/FILL:

PETROLEUM-IMPACTED SOIL/FILL SUITABLE FOR ON-SITE BIOREMEDIATION (e.g., MATERIALS IMPACTED BY NON-TARRY PETROLEUM HYDROCARBONS) MAY BE TRANSPORTED, WITH NYSDEC APPROVAL, TO A DESIGNATED PORTION OF THE TECUMSEH PROPERTY (SPECIFICALLY ONE OF THE BUSINESS PARKS) FOR BIOTREATMENT. QUALITATIVE ASSESSMENT OF TREATMENT PERFORMANCE WILL BE MADE BASED ON FIELD ASSESSMENT OF VISUAL AND OLFACTORY CONDITIONS, WITH THE GOAL OF ELIMINATING GROSS IMPACTS. ONCE THE SOIL/FILL IS CONSIDERED TREATED, CONFIRMATORY SAMPLES WILL BE COLLECTED AT A FREQUENCY OF NO LESS THAN ONE PER 1,000 CUBIC YARDS OF TREATED SOIL/FILL. THE SAMPLES WILL BE ANALYZED FOR USEPA TARGET COMPOUND LIST (TCL) VOLATILE ORGANIC COMPOUNDS (VOCs) AND BASE-NEUTRAL SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) AND COMPARED TO SCOs TO BE DETERMINED WITHIN AN ACTION-SPECIFIC SOIL BIOTREATMENT WORK PLAN SUBJECT TO NYSDEC APPROVAL. ONCE THE SAMPLES MEET THESE SCOs, THE TREATED SOIL/FILL WILL BE REMOVED AND PREFERABLY TRANSFERRED BACK TO THE ORIGINAL EXCAVATED SITE AS SUBGRADE MATERIAL; BIOREMEDIATED SOIL/FILL WILL BE TRANPORTED OFF-SITE UNLESS DEEMED NECESSARY DUE TO POOR TREATMENT RESPONSE. IN SUCH INSTANCE THE MATERIAL WILL BE DISPOSED, WITH NYSDEC APPROVAL, IN ACCORDANCE WITH SECTION 3.3.

DEBRIS:

ANY DEMOLITION MATERIAL PROPOSED FOR REUSE ON-SITE WILL BE SAMPLED FOR ASBESTOS AND RESULTS WILL BE REPORTED TO THE NYSDEC FOR ACCEPTANCE. CONCRETE CRUSHING OR PROCESSING ON-SITE WILL NOT BE PERFORMED WITHOUT PRIOR NYSDEC APPROVAL. ORGANIC MATTER (WOOD, ROOTS, STUMPS, ETC.) OR OTHER SOLID WASTE DERIVED FROM CLEARING AND GRUBBING OF THE SITE WILL NOT BE REUSED ON-SITE WITHOUT PRIOR NYSDEC APPROVAL.

SLAG:

IF DURING EXCAVATION, A LAYER OR POCKET OF SLAG MATERIAL IS ENCOUNTERED, THE DESIGNATED ON-SITE QUALIFIED ENVIRONMENTAL PROFESSIONAL (QE) SHALL BE IMMEDIATELY NOTIFIED. IN ACCORDANCE WITH THE SITE TENORM MANAGEMENT PLAN (TMP), RADIATION MEASUREMENTS WILL BE COLLECTED TO DETERMINE MATERIAL STATUS AND HANDLING. THE CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE TMP AND THE GOVERNING NYSDEC PUBLICATION DMM-5/MANAGEMENT OF SOILS CONTAMINATED WITH TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIALS (TENORM). A COPY OF THE TMP AND PUBLICATION IS PROVIDED IN THE PROJECT MANUAL AS AN ATTACHMENT.

TO REUSE THE SLAG AND/OR ITS FINAL DISPOSITION WILL BE MADE IN ACCORDANCE WITH THE TMP AND CONSULTATION WITH THE NYSDEC. SLAG CONTAINING RADIUM-226 CONCENTRATIONS GREATER THAN 5 PICOCURIES PER GRAM WILL NOT BE ALLOWED FOR USE AS BACKFILL OR COVER ON ANY PORTION OF THE SITE. TENORM DISPOSED OF OFF-SITE MUST NOT BE DISPOSED OF IN NYS; 6 NYCRR PART 363-7.1 (O)(7) STATES THAT TENORM AT ANY LEVEL CANNOT BE DISPOSED OF IN NYS AND MUST BE DISPOSED OF AT AN APPROVED OUT OF STATE FACILITY. FIELD MEASUREMENTS AND ANALYSIS WILL BE PAID UNDER ITEM E205.0401-CONTAMINATED MATERIAL ANALYSIS. MATERIAL REMOVED OFF-SITE PER THE ENGINEER AND THE NYSDEC WILL BE PAID AS AN AGREED PRICE UNDER ITEM 697.03 FIELD CHANGE PAYMENT.

FLUID MANAGEMENT:

1. THE SURFACE OF THE SITE(S) ARE GENERALLY VEGETATED AND/OR STONE AND RELATIVELY FLAT, THEREFORE PRECEPITIONS WILL ACCUMULATE IS SMALL DEPRESSION AREAS OF THE SITE PRIOR TO INFILTRATION. THEREFORE, STORM WATER RUNOFF IS NOT EXPECTED TO POSE A SIGNIFICANT SOIL PARTICULATE OR CONTAMINANT TRANSPORT PATHWAY DURING CONSTRUCTION ACTIVITIES

2. THE CONTRACTOR SHALL SUBMIT A DEWATERING, CONTAINMENT AND DISCHARGE PLAN TO ADDRESS ANY GROUND WATER ENCOUNTERED DURING ANY EXCAVATION(S) TO THE ENGINEER. THE ENGINEER/QEP WILL REVIEW THE PLAN AND COORDINATE REVIEW AND APPROVAL WITH NYSDEC. THE DEWATERING, CONTAINMENT AND RECHARGE PLAN SHALL UNDERTAKE THE SPECIFIC ACTIONS AS OUTLINED IN ITEM 05209.9901 – WEIR TANK WITH SETTLING CHAMBERS AND ITEM 05205.9901 – LABORATORY ANALYSIS OF GROUND WATER.

3. THE WORK SITE(S) GROUND WATER TESTING AND DISCHARGE ARE COVERED UNDER THE TECUMSEH PHASE I ABD PHASE II BUISNESS PARK REMEDIATION WASTEWATER DISCHARGED SPEDES PERMIT EQUIVALENT. A COPY OF THE PERMIT WITH ADDITIONAL REQUIREMENTS FOR PROPER HANDLING OF DISCHARGE WATER IN CONTAINED IN THE PROJECT MANUAL, ATTACHMENT 2.

4. THE NYSDEC MUST BE NOTIFIED PRIOR TO COMMENCEMENT OF ANY EXCAVATION AND MUST BE NOTIFIED OF ANY GROUNDWATER OR FLUIDS DISTURBANCE.

5. IF ANY FLUIDS HAS BEEN DEEMED UNSUITABLE FOR RECHARGE, THE COST FOR REMOVAL AND DISPOSAL WILL BE PAID AT AN AGREED PRICE UNDER ITEM 697.03 – FIELD CHANGE PAYMENT.

COVER MATERIALS:

1. A MINIMUM OF 12 INCHES OF NYSDEC APPROVED COVER MATERIAL SHALL BE PLACED OVER ANY UNPAVED AREAS OF THE SITE AS A COMPONENT OF THE FINAL REMEDY. THE UPPER 6 INCHED OF ANY SOIL COVER MUST BE SUITABLE QUALITY TO SUPPORT VEGETATION. IN GENERAL, THIS WOULD BE A WELL-GRADED TOPSOIL WITH A Ph OF 5.5 TO 7.6, A MINIMUM ORGANIC CONTENT OF 2.5%, AND A SOLUBLE SALT CONTENT NOT GREATER THAN 500 ppm.

2. THE DEMARCATION LAYER SHALL BE PLACED TO PROVIDE A VISUAL REFERENCE TO THE TOP OF THE REMAINING IN-PLACE MATERIAL.

BACKFILL FROM OFF-SITE SOURCES:

1. OFF-SITE SOIL/FILL MAY BE USED AS BACKFILL PROVIDED THAT IT ORIGINATES FROM;

   a. AN NYSDEC APPROVED BORROW SITE; OR

   b. A KNOWN SOURCE HAVING NO EVIDENCE OF DISPOSAL OR RELEASES OF HAZARDOUS SUBSTANCES, HAZARDOUS, TOXIC OR RADIOACTIVE WASTES, OR PETROLEUM.

2. IN BOTH INSTANCES THE IMPORTED SOIL MUST BE TESTED AND DEMONSTRATED TO MEET THE CRITERIA SHOWN ON TABLE B-1 IN ACCORDANCE WITH APPENDIX 5 OF DER-10. IN ADDITION, NO OFF-SITE MATERIALS MEETING THE DEFINITION OF A SOLID WASTE AS DEFINED IN 6 NYCRR, PART 360-1.2 (a) SHALL BE USED AS BACKFILL THE CRITERIA PRESENTED IN TABLE B-1 REPRESENTS THE LESSER OF THE COMMERCIAL SOIL CLEANUP OBJECTIVES (SCO's) OR LEVELS OF GROUNDWATER QUALITY AS PUBLISHED IN 6 NYCRR PART 375-6.7(d)(c) AND 375-6.8.

3. CERTAIN MATERIAL MAY BE IMPORTED AS BACKFILL, WITHOUT CHEMICAL TESTING, PROVIDED IT CONTAINS LESS THAN 10% (BY WEIGHT) MATERIAL THAT WOULD PASS THROUGH A SIZE 100 SIEVE:

   a. ROCK OR STONE, CONSISTING OF VIRGIN MATERIAL FROM A PERMITTED OR QUARRY.

   b. STEEL SLAG UNDER BUD #555-9-15 WITH NYSDEC APPROVAL.

   C. RECYCLED CONCRETE, BRICK, OR ASPHALT FROM A NYSDEC-REGISTERED OR PERMITTED C&D DEBRIS PROCESSING FACILITY (AS SPECIFIED IN SECTION 360-16.1 OF 6 NYCRR PART 360) THAT CONFORMS TO SECTION 304 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS CONSTRUCTION AND MATERIALS VOLUME 1 (2002). AS STATED IN SECTION 360-16.4(b)(2), THE FACILITY MAY ONLY ACCEPT RECOGNIZABLE, UNCONTAMINATED, NON-PULVERIZED C&D DEBRIS OR C&D DEBRIS FROM OTHER AUTHORIZED C&D PROCESSING FACILITIES. ACCORDING TO SECTION 360-16.2(C), "UNCONTAMINATED" MEANS C&D DEBRIS THAT IS NOT MIXED OR COMMINGLED WITH OTHER SOLID WASTE AT THE POINT OF GENERATION, PROCESSING, OR DISPOSAL, AND THAT IS NOT CONTAMINATED WITH SPILLS OF A PETROLEUM PRODUCT, HAZARDOUS WASTE, OR INDUSTRIAL WASTE.

4. AS INDICATED ABOVE, OFF-SITE BORROW SOILS SHALL BE TESTED TO ASSURE CONFORMANCE WITH THE CRITERIA IDENTIFIED ON TABLE B-1. A TIERED APPROACH BASED ON THE VOLUME OF IMPACTED SOIL/FILL BEING EXCAVATED WILL BE USED TO DETERMINE THE FREQUENCY OF CHARACTERIZATION SAMPLING IN ACCORDANCE WITH DER-10 OR AS PRE-APPROVED BY THE NYSDEC.

BACKFILL FROM OFF-SITE SOURCES (CONT.):

5. THE SOIL/FILL SAMPLES WILL BE ANALYZED FOR USEPA TARGET COMPOUND LIST (TCL), VOCs, TCL SVOCs, PESTICIDES, PCBs, AS WELL AS SELECT METALS 1 AND CYANIDE IN ACCORDANCE WITH USEPA SW-846 METHODOLOGY BY A NYSDOH ELAP-CERTIFIED LABORATORY. ADDITIONALLY, SOIL/FILL SAMPLES WILL BE TESTED FOR PER AND POLYFLUOROAKLY SUBSTANCES (PFAS) IN ACCORDANCE WITH THE DEPARTMENT'S LATEST PROTOCOLS2. ANALYTICAL RESULTS WILL BE COMPARED TO TABLE B-1 CRITERIA AND PROVIDED TO THE NYSDEC AS PART OF THE APPROVAL PROCESS AND REPORTED IN THE PRR. ANALYTICAL RESULTS MUST BE MAINTAINED ON FILE FOR REVIEW IN SUPPORT OF THE PERIODIC INSTITUTIONAL AND ENGINEERING CONTROL (IC/EC) CERTIFICATION REQUIRED AS PART OF THE FINAL SMP.

6. SOILS THAT MEET 'EXEMPT' FILL REQUIREMENTS UNDER 6 NYCRR PART 360, BUT DO NOT MEET BACKFILL OR COVER SOIL OBJECTIVES FOR THIS SITE, WILL NOT BE IMPORTED ONTO THE SITE WITHOUT PRIOR APPROVAL BY NYSDEC. SOLID WASTE WILL NOT BE IMPORTED ONTO THE SITE. ALL MATERIALS PROPOSED FOR IMPORT ONTO THE SITE WILL BE APPROVED BY THE QEP AND IN COMPLIANCE WITH THE PROVISIONS OF THIS EWP PRIOR TO RECEIPT AT THE SITE. A REQUEST TO IMPORT/REUSE FILL OR SOIL FORM3 WILL BE PREPARED AND SUBMITTED TO THE NYSDEC PROJECT MANAGER ALLOWING A MINIMUM OF 5 BUSINESS DAYS FOR REVIEW. TRUCKS ENETRING THE SITE WITH IMPORTED SOILS WILL BE SECURELY COVERED WITH TIGHT FITTING COVERS. IMPORTED SOILS WILL BE STOCKPILED SEPARATELY FROM EXCAVATED MATERIALS AND COVERED TO PREVENT DUST RELEASES.

CONTINGENCY PLAN:

1. IF UNDERGROUND TANKS OR OTHER PREVIOUSLY UNIDENTIFIED CONTAMINANT SOURCES ARE FOUND DURING INTRUSIVE ACTIVITIES, EXCAVATION ACTIVITIES WILL BE SUSPENDED UNTIL EQUIPMENT IS MOBILIZED TO ADDRESS THE CONDITION.

2. SAMPLING WILL BE PERFORMED ON PRODUCT, SEDIMENT, AND SURROUNDING SOILS AS NECESSARY TO DETERMINE THE NATURE OF THE MATERIAL AND PROPER DISPOSAL METHOD. CHEMICAL ANALYSIS WILL BE PERFORMED FOR A COMPREHENSIVE LIST OF ANALYTES (RCRA METALS, TCL, VOCs, SCOC's, AND PCB's, AND CYANIDE), UNLESS THE SITE HISTORY AND PREVIOUS SAMPLING RESULTS PROVIDE A SUFFICIENT JUSTIFICATION TO LIMIT THE LIST OF ANALYTES. SAMPLING TO BE PAID FOR UNDER ITEM 205.0402.

3. IDENTIFICATION OF UNKNOWN OR UNEXPECTED CONTAMINATED MEDIA IDENTIFIED BY SCREENING DURING INTRUSIVE ACTIVITIES WILL BE PROMPTLY COMMUNICATED BY PHONE TO NYSDEC PROJECT MANAGER. REPORTABLE QUANTITIES OF PERTROLEUM PRODUCT WILL BE REPORTED TO NYSDEC SPILLS HOTLINE. DISPOSAL COSTS WILL BE PAID BY AN AGREED PRICE UNDER ITEM 697.03 – FIELD CHANGE PAYMENT.

SITE MANAGEMENT NOTES:

CONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF THE FOLLOWING SITE MANAGEMENT PLANS (SMPS)

a. BROWNFIELD CLEANUP PROGRAM, SITE MANAGEMENT PLAN, TECUMSEH PHASE I BUSINESS PARK, NYSDEC SITE NUMBERS: C915197 THROUGH C915198L, LACKAWANNA, NEW YORK.

b. BROWNFIELD CLEANUP PROGRAM, SITE MANAGEMENT PLAN, TECUMSEH PHASE II BUSINESS PARK, NYSDEC SITE NUMBERS C915198 THROUGH C915198L. LACKAWANNA, NEW YORK, JANUARY 2014 REVISED JULY 2021.

COPIES OF THE PLANS ARE AVAILABLE FROM ANDREW FEDERICK, (afederick@ecidany.com) 716-362-8364.

THE SMPS STATE THAT EXPOSURE TO REMAINING CONTAMINATION IN SOIL/FILL WILL BE PREVENTED BY A COVER SYSTEM. THE COVER SYSTEM IS TO BE COMPRISED OF A MINIMUM OF 12 INCHES OF CLEAN SOIL, STONE OR NYSDEC-APPROVED MATERIALS, WITH A DEMARCATION LAYER (I.E. GEOTEXTILE FABRIC, ORANGE POLY NETTING, OR SIMILAR NONDEGRADABLE VISUAL DEMARCATION) IN ALL AREA THAT ARE NOT PAVED OR COVERED BY CONCRETE OR STRUCTURES. AREAS WITHIN THE RIGHT -OF-WAY WILL INCLUDE A COVER SYSTEM COMPLYING WITH THE SMPS.

THE EXCAVATION WORK PLANS FROM THE SMPS (APPENDIX B), DEFINE THE SCREENING, SEGREGATION, STOCKPILING, FLUID MANAGEMENT, EXCAVATION, TRANSPORTATION,DISPOSAL AND REUSE REQUIREMENTS TO MANAGE SOIL/FILL ON THE BCP PROPERTY.

AN UNDERDRAIN WILL BE INSTALLED AS SHOWN ON THE PLAN, THE UNDERDRAIN WILL DISCHARGE TO THE STORMWATER SEWER SYSTEM IN THE PROJECT VICINITY.GIVEN THE KNOWN AND SUSPECTED ENVIRONMENTAL HISTORY OF THE PROJECT SITE ALL MATERIALS EXCAVATED FROM THE UNDERDRAIN TRENCH SHALL BE HANDLED IN ACCORDANCE WITH THE SMPS. ADDITIONALLY, THE TRENCH SHOULD BE LINED WITH A FABRIC FILTER AND ALL BACKFILL MATERIALS SHALL BE CLEAN OFF-SITE MATERIALS. NO ON-SITE MATERIALS SHALL BE USED IN THE BACKFILL OF THE UNDERDRAIN TRENCH.

THE SMPS NOTE THE ABSENCE OF GROUNDWATER IN THE UPPER 4-FEET OF THE OVERBURDEN SOILS IN THE AREA OF THE SITE AS WELL AS THE ABSENCE OF LEACHABLE CONTAMINANTS IN THE SURROUNDING SOIL/FILL (BASED ON TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) SAMPLES COLLECTED AT THE SITE AS REFERENCED IN THE SMPS. GROUNDWATER LEVELS WILL FLUCTUATE BASED ON RAINFALL AND CLIMATIC CONDITIONS.

A REMEDIAL ACTION WORK PLAN (RAWP) HAS BEEN SPECIFICALLY PREPARED FOR THIS PROJECT. THE RAWP IS AVAILABLE TO THE CONTRACTOR BY CONTACTING MICHAEL F. LYDLE, P.E. (mlydle@azardzn.com).

CONSTRUCTION:

STAKEOUT AND CRITICAL GRADING DOCUMENTATION – THE CONSTRUCTION STAKEOUT AND THE CRITICAL GRADING DOCUMENTATION SHALL BE PERFORMED BY A LICENSED LAND SURVEYOR.

COORDINATION – THE CONTRACTOR SHALL COORDINATE ALL UTILITY WORK TO AVOID ANY POTENTIAL CONFLICTS

STAGING – THE CONTRACTOR SHALL PROVIDE A SECURE STAGING AREA FOR STORAGE OF EQUIPMENT, MATERIALS, EMPLOYEE PARKING AND OFFICE SPACE.

STREAM – THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO PREVENT OR REDUCE TO A MINIMUM ANY DAMAGE TO ANY STREAM FROM POLLUTION BY DEBRIS, SEDIMENT OR OTHER FOREIGN MATERIAL AND/OR FROM MANIPULATION OF EQUIPMENT AND/OR MATERIALS IN OR NEAR SUCH STREAMS.THE CONTRACTOR SHALL NOT RETURN DIRECTLY TO A STREAM ANY WATER WHICH AS BEEN USED FOR WASH PURPOSES OR OTHER SIMILAR OPERATIONS WHICH CAUSE THIS WATER TO BECOME POLLUTED WITH SAND, SILT, CEMENT, OIL, OR OTHER IMPURITIES. IF THE CONTRACTOR USES WATER FROM A STREAM, THE CONTRACTOR SHALL CONSTRUCT AN INTAKE OR TEMPORARY DAM REQUIRED TO PROTECT AND MAINTAIN WATER RIGHTS AND TO SUSTAIN FISH LIFE DOWNSTREAM.

CLOSE-OUT – LIMITED TO THE FOLLOWING AT PROJECT CLOSE-OUT TO THE SATISFACTION OF THE ENGINEER AND THE OWNER

* REMOVAL OF ALL CONSTRUCTION DEBRIS.
* CLEANING PAVEMENT AND WALKWAY SURFACES.
* RESTORATION OF ALL DISTURBED GRASS AND LANDSCAPE AREAS.
* PROVIDING BONDS, GUARANTEES, CERTIFICATIONS, AS REQUIRED BY CONTRACT DOCUMENTS.
* COMPLETION OF FINAL PUNCH LIST ITEMS.
* COMPLETE A MINIMUM OF ONE MOWING PRIOR TO FINAL INSPECTION. ADDITIONAL MOWING MAY BE ORDERED IF ROADSIDE VEGETATION BECOMES UNSIGHTLY AS DETERMINED BY THE EIC.

INVASIVE SPECIES NOTES:

THE CONTRACTOR SHALL TAKE ALL PRUDENT AND REASONABLE EFFORTS TO SELECT STAGING AREAS THAT ARE FREE FROM THE INFESTATION OF THE FOLLOWING INVASIVE PLANTS SPECIES: PHRAGMITES (PHRAGMITES AUSTRALIS), JAPANESE KNOTWEED (POLYGONUM CUSPIDATUM), PURPLE LOOSESTRIEF (LYNTHRUM SALICARIA), AND GIANT HOGWEED (HERACLEUM MANTEGAZZIANUM).

IF INVASIVE PLANT SPECIES ARE IN CLOSE PROXIMITY TO STAGING OPERATIONS,THE CONTRACTOR SHALL TAKE THE NECESSARY STEPS TO ASSURE THAT NO INVASIVE SPECIES PLANT PARTS COME IN CONTACT WITH CONSTRUCTION VEHICLES, EQUIPMENT, AND MATERIALS.

IF CONTACT IS UNAVOIDABLE, AS PER SECTION 107-01A INVASIVE SPECIES OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING THE INFECTED EQUIPMENT TO REMOVE ALL INVASIVE PLANT PARTS PRIOR TO THAT EQUIPMENT LEAVING THE STAGING AREA. THIS PROCEDURE IS REQUIRED IN ORDER MINIMIZE THE POSSIBILITY OF TRANSPORTING THE INVASIVE PLANT SPECIES OFF THE IMMEDIATE STAGING AREA AND ONTO STATE HIGHWAYS OR THE PROJECT SITE. REFER TO EI 09-002 AND USE ITEM 617.11000024, EQUIPMENT CLEANING FOR INVASIVE PLANT SPECIES, TO HELP ENSURE NO PLANT PARTS LEAVE THE JOB SITE.

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 4 OF 41

RENAISSANCE COMMERCE PARK
ODELL STREET EXTENSION, STEELWORKERS WAY TO TIMES SQUARE
RIDGE ROAD EXTENSION, FUHRMANN BLVD TO WEST END

ITEM NO.	ITEM DESCRIPTION	PAY UNIT	EST. QUANTITY ODELL ST. EXT	EST. QUANTITY RIDGE RD. EXT	FINAL QUANTITY
201.06	CLEARING AND GRUBBING	LS	0.75	0.25	1
202.19	REMOVAL OF SUBSTRUCTURES	CY	1000	460	1460
203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY	3951	2415	6366
203.03	EMBANKMENT IN PLACE	CY	2555	382	2937
203.07	SELECT GRANULAR FILL	CY	900	438	1338
204.01	CONTROLLED LOW STRENGTH MATERIAL (CLSM)	CY	150	25	175
205.0201	SEGREGATION AND STORAGE OF CONTAMINATED SOIL	LS	0.5	0.5	1
E205.0401	CONTAMINATED MATERIAL ANALYSIS	EA	2	2	4
205.0402	LABORATORY ANALYSIS FOR HAZARDOUS WASTE RCRA TOXICITY CHARACTERISTICS	EA	2	2	4
05205.9901	LABORATORY ANALYSIS OF GROUND WATER	EA	7	3	10
206.0201	TRENCH AND CULVERT EXCAVATION	CY	1160	500	1660
206.03050005	CONDUIT EXCAVATION AND BACKFILL INCLUDING SURFACE RESTORATION	LF	705	475	1180
206.05	TEST PIT EXCAVATION	EA	1	1	2
207.21	GEOTEXTILE SEPARATION	SY	1530	1340	2870
E207.91	DEMARCATION MEMBRANE	SY	4000	4700	8700
E207.99	SUBBASE REINFORCEMENT MATERIAL, LAYER 2	SY	2100	1837	3937
208.5201	SWTD -MAXIMUM FLOW RATE OVER 1.0 cfs TO 2.0 cfs	EA	1	0	1
EC208.6001	BIORETENTION AREA(S) AND OUTLET CONTROL STRUCTURES	EA	1	0	1
05209.9901	WEIR TANK WITH SETTLING CHAMBER	LS	0.5	0.5	1
209.1003	SEED AND MULCH - TEMPORARY	SY	4240	9216	13456
209.1702	DRAINAGE STRUCTURE INLET PROTECTION, GRAVEL BAG - TEMPORARY	CY	2	1	3
209.2301	SEDIMENT FILTER LOG, 12"	LF	2400	1350	3750
304.12	SUBBASE COURSE, TYPE 2	CY	862	819	1681
404.1272	12.5 F2 TOP COURSE ASPHALT, 70 SERIES COMPACTION	TN	180	210	390
404.1979	19 F9 BINDER COURSE ASPHALT, 70 SERIES COMPACTION	TN	240	275	515
404.3779	37.5 F9 BASE COURSE ASPHALT, 70 SERIES COMPACTION	TN	415	400	815
407.0103	STRAIGHT TACK COAT	GAL	205	25	230
418.7603	ASPHALT PAVEMENT JOINT SEALER	LF	1442	1100	2542
490.30	MISCELLANEOUS COLD MILLING OF BITUMINOUS CONCRETE	SY		32	32
552.17	SHIELDS AND SHORING	SF	11198	2140	13338
E555.0105	PLUGGING ABANDON PIPES	EA	6	5	11
E603.9806	6-INCH CORRUGATED HDPE SINGLE WALL PIPE	LF	157	0	157
603.9810	SMOOTH INTERIOR CORRUGATED POLYETHYLENE CULVERT AND STORM DRAIN PIPE, 10 INCH DIAMETER	EA	290	0	290
603.9815	SMOOTH INTERIOR CORRUGATED POLYETHYLENE CULVERT AND STORM DRAIN PIPE, 15 INCH DIAMETER	LF	110	78	188
603.9818	SMOOTH INTERIOR CORRUGATED POLYETHYLENE CULVERT AND STORM DRAIN PIPE, 18 INCH DIAMETER	LF	665	477	1142
604.070501	ALTERING DRAINAGE STRUCTURES, LEACHING BASINS AND MANHOLES (DS-B22)	EA	1	0	1
604.070502	ALTERING DRAINAGE STRUCTURES, LEACHING BASINS AND MANHOLES (DS-B23)	EA	1	0	1
604.070503	ALTERING DRAINAGE STRUCTURES, LEACHING BASINS AND MANHOLES (DS-F1)	EA	0	1	1
604.300103	DRAINAGE STRUCTURE TYPE A	LF	52	41	93
604.301303	DRAINAGE STRUCTURE TYPE M	LF	5	0	5
604.4048	ROUND PRECAST MANHOLE TYPE 48	LF	24	0	24
605.1001	UNDERDRAIN FILTER, TYPE 2	CY	86	67	153
605.1702	OPTIONAL UNDERDRAIN PIPE, 6 INCH DIAMETER	LF	1155	895	2050
608.0101	CONCRETE SIDEWALKS AND DRIVEWAYS	CY	50	30	80
608.21	EMBEDDED DETECTABLE WARNING UNITS	SY	2	7	9
609.04	CAST-IN-PLACE CONCRETE CURB, (AS DETAILED)	LF	1260	1020	2280
610.1402	TOPSOIL - ROADSIDE	CY	710	1550	2260
610.1602	TURF ESTABLISMENT - ROADSIDE	SY	3925	4216	8141
614.060204	TREE REMOVAL OVER 6" TO 12" DBH STUMPS GRUBBED	EA	0	1	1
617.11000024	EQUIPMENT CLEANING FOR INVASIVE PLANT SPECIES	LS	1	1	2
619.01	BASIC WORK ZONE TRAFFIC CONTROL (3%)	LS	0.5	0.5	1
619.04	CONSTRUCTION BARACADES	LF	28	160	188
619.1711	TEMPORARY POSITIVE BARRIER - CATEGORY 1 (PINNING PROHIBITED)	LF	64	140	204
E620.03	STONE FILLING (LIGHT) RIVER ROCK	CY	35	0	35
625.01	SURVEY OPERATIONS	LS	1	1	2
625.04	CONCRETE R.O.W. MARKERS, TYPE L (LOW)	EA	4	4	8
625.06	PERMANENT SURVEY MARKERS	EA	2	2	4
627.50140008	CUTTING PAVEMENT	LF	26	185	211
637.11	ENGINEER'S FIELD OFFICE - TYPE 1	MO	5	5	10
637.34	OFFICE TECHNOLOGY AND SUPPLIES	D-C	0.5	0.5	1
645.5102	GROUND-MOUNTED SIGN LESS THAN OR EQUAL TO 325 SF WITH Z-BARS, HIGH VISIBILITY SHEETING	SF	19	40	59
645.81	TYPE A SIGN POSTS	EA	3	7	10
650.1016	TRENCHLESS INSTALLATION OF CASING UNDER HIGHWAY WITH DIAMETE LESS THAN OR EQUAL TO 24 INCH	LF	50	0	50
655.1202	MANHOLE FRAME AND COVER	EA	3	0	3
655.1103	WELDED FRAME AND RETICULINE GRATE 3	EA	10	7	17
663.0410	PLASTIC WATER PIPE	LF	58	0	58
670.00030104	LED ROADWAY LUMINAIRE	EA	3	3	6
670.00040205	ALUMINUM ROADWAY LIGHT STANDARD FOR TOP MTD LED FIXTURES TYPE C - NB	EA	3	3	6
670.0105	FOUNDATION FOR LIGHT STANDARDS	CY	3	3	6
670.2003	GALVANIZED STEEL CONDUIT - 2" DIA.	LF	55	0	55
670.2602	RIGID PLASTIC CONDUIT - 2" DIA	LF	703	500	1203
670.2604	RIGID PLASTIC CONDUIT - HIGH DENSITY PE 4" DIA	LF	645	320	965
670.3001	PULLBOXES LESS THAN 5 CUBIC FEET, INSIDE VOLUME (LIGHTING)	EA	3	2	5
670.53070104	REMOTE METER LOCATION, STREET LIGHT (POWER POINT DISCONNECT)	EA	0	1	1
670.60	PHOTO ELECTRIC CONTROL	EA	3	3	6
670.7002	SINGLE CONDUIT CABLE - NUMBER 2 GAGE	LF	2846	165	3011
670.7004	SINGLE CONDUIT CABLE - NUMBER 6 GAGE	LF	500	904	1404
670.700606	RISER ASSEMBLY 2-INCH DIAMETER	EA	0	1	1
670.7501	GROUND WIRE NO. 6 AWG	LF	500	425	925
E680.51960011	FURNISH AND INSTALL FIBER OPTIC PULLBOX	EA	2	2	4
683.06030010	HDPE INNERDUCT 1-1/2" ID	LF	2000	1350	3350
685.1102	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS	LF	420	880	1300
685.1202	YELLOW EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS	LF	470	3152	3622
685.14	WHITE EPOXY REFLECTORIZED PAVEMENT SYMBOLS - 20 MILS	EA	0	4	4
697.03	FIELD CHANGE PAYMENT	D-C	0.5	0.5	1
698.04	ASPHALT PRICE ADJUSTMENT	D-C	0.5	0.5	1
698.05	FUEL PRICE ADJUSTMENT	D-C	0.5	0.5	1
699.040001	MOBILIZATION	LS	0.5	0.5	1

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ESTIMATE OF QUANTITIES

Sheet No.
Date April 2025
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DWG. EQ-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 5 OF 41

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4	ESTIMATE OF QUANTITIES	EQ- 1
5	INDEX AND ABBREVIATIONS	IN- 1
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7	LEGEND POINT SYMBOLOGY	LEG- 2
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12	MAINTENANCE JURISDICTION PLAN	MJT 1
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14 - 16	MISCELLANEOUS DETAILS	MSD- 1 - 3
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	ODELL STREET EXTENSION	
18	TYPICAL SECTION	TS- 1
19	WORK ZONE TRAFFIC CONTROL PLAN	TCP- 1
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23 - 24	EROSION AND SEDIMENT CONTROL PLAN	ECP- 1 - 2
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29	BIORETENTION POND PLANTING PLAN	SWP- 2
30	STORMWATER MANAGEMENT DETAILS	SWD- 1
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36	DRAINAGE STRUCTURE TABLES	DST- 1
37	EROSION AND SEDIMENT CONTROL PLAN	ECP- 1
38	GENERAL PLAN AND PROFILE	PL- 1
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40	SERVICE ROAD PROFILE	PRO- 1
41	SIGNAGE, STRIPING AND LIGHTING PLAN	SSL- 1

ALIGNMENT

ABBR.	DESCRIPTION
AH	AHEAD
AZ	AZIMUTH
BK	BACK
℄	BASELINE
BRG	BEARING
℄	CENTERLINE
CS	CURVE TO SPIRAL
e	SUPERELEVATION RATE (CROSS SLOPE)
EQ	EQUALITY
EXT	EXTERNAL
HCL	HORIZONTAL CONTROL LINE
HSD	HEADLIGHT SIGHT DISTANCE
L	LENGTH OF CIRCULAR CURVE
LS	LENGTH OF SPIRAL
LVC	LENGTH OF VERTICAL CURVE
E	CENTER CORRECTION OF VERTICAL CURVE
f	MAIN LINE
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
POL	POINT ON LINE
PSD	PASSING SIGHT DISTANCE
PT	POINT OF TANGENT
PVC	POINT OF VERTICAL CURVE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
R	RADIUS
SC	SPIRAL TO CURVE
SSD	STOPPING SIGHT DISTANCE
ST	SPIRAL TO TANGENT
STA	STATION
T	TANGENT LENGTH
TGL	THEORETICAL GRADE LINE
TS	TANGENT TO SPIRAL
VC	VERTICAL CURVE

TOPOGRAPHY (DRAINAGE)

ABBR.	DESCRIPTION
BB	BOTTOM OF BANK (STREAM)
BC	BOTTOM OF CURB
BO	BOTTOM OF OPENING
CAP	CORRUGATED ALUMINUM PIPE
CB	CATCH BASIN
CIP	CAST IRON PIPE
℄ STRM	CENTERLINE OF STREAM
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE
CSP	CORRUGATED STEEL PIPE
CULV	CULVERT
DIA	DIAMETER
DMH	DRAINAGE MANHOLE
DS	DRAINAGE STRUCTURE PIPE
D'XING	DITCH CROSSING
EHW	EXTREME HIGH WATER
EL	ELEVATION
ELEV	ELEVATION
ELW	EXTREME LOW WATER
ES	END SECTION
HW	HEADWALL
INV	INVERT
MH	MANHOLE
MHW	MEAN HIGH WATER
OHW	ORDINARY HIGH WATER
OLW	ORDINARY LOW WATER
RCP	REINFORCED CONCRETE PIPE
SICPP	SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE
TB	TOP OF BANK (STREAM)
TC	TOP OF CURB
TG	TOP OF GRATE
VCP	VITRIFIED CLAY PIPE

TOPOGRAPHY (MISCELLANEOUS)

ABBR.	DESCRIPTION
ABUT	ABUTMENT
AOBE	AS ORDERED BY ENGINEER
ASPH	ASPHALT
BDY	BOUNDARY
BLDG	BUILDING
BM	BENCH MARK
CC	CENTER TO CENTER
CONC	CONCRETE
CONST	CONSTRUCTION
CR	COUNTY ROAD
D	DEED DISTANCE
DM	DIRECT MEASUREMENT
DWY	DRIVEWAY
EP	EDGE OF PAVEMENT
ES	EDGE OF SHOULDER
FEE	FEE ACQUISITION
FEE WO/A	FEE ACQUISITION WITHOUT ACCESS
FP	FENCE POST
FD	FOUNDATION
FL	FENCE LINE
GAR	GARAGE
GR	GRAVEL
HO	HOUSE
HWY	HIGHWAY
IP	IRON PIN OR IRON PIPE
MB	MAILBOX
MON	MONUMENT
N&W	NAIL AND WASHER
OG	ORIGINAL GROUND
O/H	OVERHEAD
P	PARCEL
PAV'T	PAVEMENT
PE	PERMANENT EASEMENT
PED POLE	PEDESTRIAN POLE
℄	PROPERTY LINE
POR	PORCH
RR	RAILROAD
RTE	ROUTE
ROW	RIGHT OF WAY
RW	RETAINING WALL
SH	STATE HIGHWAY
SHLDR	SHOULDER
SPK	SPIKE
ST	STREET
STK	STAKE
STY	STORY
SW	SIDEWALK
TE	TEMPORARY EASEMENT
TO	TEMPORARY OCCUPANCY
U/G	UNDERGROUND
WW	WING WALL

UTILITIES

ABBR.	DESCRIPTION
E	ELECTRIC
EMH	ELECTRIC MANHOLE
G	GAS
GP	GUY POLE
GSB	GAS SERVICE BOX (HOUSE LINE)
GV	GAS VALVE (MAIN LINE)
HYD	HYDRANT
LP	LIGHT POLE
LPG	LOW PRESSURE GAS
PP	POWER POLE
SA	SANITARY SEWER
SMH	SANITARY MANHOLE
ST	STORM SEWER
T	TELEPHONE
TCB	TRAFFIC CONTROL BOX
TELBOX	TELEPHONE BOX
TEL P	TELEPHONE POLE
TMH	TELEPHONE MANHOLE
CTV	CABLE TELEVISION
W	WATER
WSB	WATER SERVICE BOX (HOUSE LINE)
WV	WATER VALVE (MAIN LINE)

SUBSURFACE EXPLORATION

ABBR.	DESCRIPTION
	REPLACE ABBREVIATION "AB" WITH:
AH	HAND AUGER
CP	CONE PENETROMETER
DA	2? INCHES CASED DRILL HOLE
DM	DRILLING MUD
DN	4 INCHES CASED DRILL HOLE
FH	HOLLOW FLIGHT AUGER
PA	POWER AUGER
PH	PROBE
PT	PERCOLATION TEST HOLE
RP	1 INCH SAMPLER (RETRACTABLE PLUG)
	TO BE DEFINED AT THE TIME OF EXPLORATION
SP	SEISMIC POINT
TP	TEST PIT
	ABBREVIATION "C" IN CATAGORIES: DA, DM, DN, AND FH WITH:
B	BRIDGE
C	CUT
D	DAM
F	FILL
K	CULVERT
W	WALL
X	TO BE USED IF ONE OF THE ABOVE CANNOT BE DEFINED AT THE TIME THE EXPLORATION IS MADE

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INDEX AND ABBREVIATIONS

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Date April 2025
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DWG. IN-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 6 OF 41

ALIGNMENT

STYLE	NAME	DESCRIPTION
	AC	CONTROL (CENTERLINE)
	AD_P	DETOUR
	AT_P	TRANSITION CONTROL

BRIDGE

STYLE	NAME	DESCRIPTION
	BR	RAIL
	BSHT	SHEET PILING

CONTROL

STYLE	NAME	DESCRIPTION
℄	CB	BASELINE
℄	CBPR	BASELINE, PROJECTION

DRAINAGE

STYLE	NAME	DESCRIPTION
ST	DCP	CULVERT PIPE
ST	DCP_P	CULVERT PIPE (DIR)
	DDG_P	DITCH, GRASS LINED
	DDP_P	DITCH, PAVED INVERT
	DDS_P	DITCH, STONE LINED
	DFL_P	FLOW LINE
	DSSD	SLOTTED DRAIN
UD	DUD_P	UNDERDRAIN

ENVIRONMENTAL

STYLE	NAME	DESCRIPTION
S	EBLHS	BALE, STRAW
	ECT	CURTAIN, TURBIDITY
	EDMC	DAM, COFFER
	EDMEC_P	DAM, EARTHEN CHECK
	EDMGSC_P	DAM, GRAVEL BAG/SAND BAG CHECK
	EDMPC_P	DAM, PREFABRICATED CHECK
	EDMSC_P	DAM, STONE CHECK
	EFNS	FENCE, SILT
	EFNSV	FENCE, SILT & VEGETATION
	EFNV	FENCE, VEGETATION
AA	EWAA_P	WETLAND, ADJACENT AREA
FW	EWF	WETLAND, FEDERAL
FW SW	EWFS	WETLAND, FEDERAL AND STATE
SW	EWM	WETLAND, MITIGATION AREA
SW	EWS	WETLAND, STATE

LANDSCAPE

STYLE	NAME	DESCRIPTION
	LABL	AREA, BRUSH LINE
	LAHR	AREA, HEDGE ROW
	LAPB	AREA, PLANTING BED
	LAWA	AREA, WOODED AREA OUTLINE
	LAWE	AREA, WATERS EDGE
	LCUT_P	CUT LIMIT
	LFILL_P	FILL LIMIT
	LFNC	FENCE
	LTRC	TREE ROW, CONIFEROUS
	LTRD	TREE ROW, DECIDUOUS
	LWH	WALL, H PILE
	LWR	WALL, RETAINING
	LWS	WALL, STONE

ROW MAPPING

STYLE	NAME	DESCRIPTION
	MDL	DEED LINE
PE	MEE	EASEMENT, EXISTING
PE	MEP_P	EASEMENT, PERMANENT
APE	MEPA_P	EASEMENT, PERMANENT, APPROX.
TE	MET_P	EASEMENT, TEMPORARY
ATE	META_P	EASEMENT. TEMPORARY, APPROX.
FEE	MF_P	FEE ACQUISITION, W/ ACCESS
AFEE	MFA_P	FEE ACQUISITION, APPROXIMATE
	MFS_P	FEE ACQUISITION, SHAPE
FEE W/OA	MFWOA_P	FEE ACQUISITION, W/O ACCESS
	MHA	HISTORICAL, ACQUISITION
HB	MHB	HIGHWAY BOUNDARY
AHB	MHBA	HIGHWAY BOUNDARY, APPROX.
	MHBW	HWY BOUNDARY, FACE OF WALL
HB W/OA	MHBWOA	HIGHWAY BOUNDARY, W/O ACCESS
	MJC	JURISDICTION, CITY
	MJCY	JURISDICTION, COUNTY
	MJHD	JURISDICTION, HISTORIC DISTRICT
	MJLL	JURIS., (GREAT, MILITARY) LOT LINE
	MJN	JURISDICTION, NATION
	MJPB	JURISDICTION, PUBLIC LANDS
	MJS	JURISDICTION, STATE
	MJT	JURISDICTION, TOWN
	MJV	JURISDICTION, VILLAGE
	MPL	PROPERTY LOT LINE
	MPLA	PROPERTY LOT LINE, APPROXIMATE
	MSL	SUB LOT LINE

ROADWAY

STYLE	NAME	DESCRIPTION
CZ	RCZ_P	CLEAR ZONE
	RG	GUIDE RAIL, MISCELLANEOUS
	RGB	GUIDE RAIL, BOX BEAM
	RGBM	GUIDE RAIL, BOX BEAM, MEDIAN
	RGC	GUIDE RAIL, CABLE
	RGCB	GUIDE RAIL, CONCRETE BARRIER
	RGP_P	GUIDE POST
	RGW	GUIDE RAIL, W BEAM
	RGWM	GUIDE RAIL, W BEAM, MEDIAN
	RPB	PARKING BUMPER
	RRC	RAIL ROAD, CATENARY
3R	RRER	RAIL ROAD, 3RD RAIL
	RRPLS_P	RAIL, PHOTO, LARGE SCALE
	RRPSS	RAIL, PHOTO, SMALL SCALE
	RRS	RUMBLE STRIP
	RRSLS_P	RAIL, SURVEY, LARGE SCALE
	RRSSS	RAIL, SURVEY, SMALL SCALE

SIGNS

STYLE	NAME	DESCRIPTION
	SBLB	BILLBOARDS
	SM	MULTIPLE POST
	SSO	STRUCTURE, OVERHEAD
	SSOC	STRUCTURE, OVHD. CANTILEVER

STRIPING

STYLE	NAME	DESCRIPTION
	STB*	BROKEN LINE
	STDB*	DOUBLE BROKEN LINE
	STDL*	DOTTED LINE LONG
	STDS*	DOTTED LINE SHORT
	STFB*	FULL BARRIER LINE
	STH*	HATCH LINE
	STPB*	PARTIAL BARRIER LINE
	STRCT	ROUNDABOUT, CAT TRACKS
	STRYL	ROUNDABOUT, YIELD LINE
	STSB	STOP BAR
	STSE*	SOLID, EDGE
	STXL	X WALK, LADDER LINE
	STXLB	X WALK, LADDER BAR LINE

* = W (WHITE) OR Y (YELLOW)

TRAFFIC CONTROL

STYLE	NAME	DESCRIPTION
	TCSW	SIGNAL, SPAN WIRE

TRAFFIC WORK ZONE

STYLE	NAME	DESCRIPTION
	TWZBT_P	BARRIER, TEMPORARY
	TWZBTWL_P	BARRIER, TEMPORARY, W/ WARNING LIGHTS
	TWZCD_P	CHANNELIZING DEVICE
	TWZPMRC_P	PAVEMENT MARKING REMOVAL OR COVERING

UTILITIES

STYLE	NAME	DESCRIPTION
C	UC	CONDUIT, UNDERGROUND
]C[	UCH	CONDUIT, HANGING
OC	UCO	CONDUIT, OVERHEAD
E	UE	ELECTRIC LINE, UNDERGROUND
]E[	UEH	ELECTRIC LINE, HANGING
OE	UEO	ELECTRIC LINE, OVERHEAD
OET	UETO	ELECTRIC TRANSMISSION, OVERHEAD
	UESS	ELECTRIC, SUBSTATIONS
FO	UFO	FIBER OPTIC, UNDERGROUND
]FO[	UFOH	FIBER OPTIC, HANGING
OFO	UFOO	FIBER OPTIC, OVERHEAD
G	UG	GAS, UNDERGROUND
]G[	UGH	GAS, HANGING
OG	UGO	GAS, OVERHEAD
IC	UIC	INFORM CABLE, UNDERGROUND
]IC[	UICH	INFORM CABLE, HANGING
O	UO	OIL LINE, UNDERGROUND
]O[	UOH	OIL LINE, HANGING
	UPBP	POLE, BRACE, PUSH BRACE
	UPGW	POLE, GUY WIRE
SA	USA	SANITARY SEWER, UNDERGROUND
]SA[	USAH	SANITARY SEWER, HANGING
SAF	USAF	SANITARY SEWER, FORCE MAIN, UGND
]SAF[	USAFH	SANITARY SEWER, FORCE MAIN, HANG
T	UT	TELEPHONE, UNDERGROUND
]T[	UTH	TELEPHONE, HANGING
OT	UTO	TELEPHONE, OVERHEAD
CTV	UTV	CABLE TV, UNDERGROUND
]CTV[	UTVH	CABLE TV, HANGING
OCTV	UTVO	CABLE TV, OVERHEAD
UU	UUU	UNKNOWN, UNDERGROUND
]UU[	UUH	UNKNOWN, HANGING
OUU	UUO	UNKNOWN, OVERHEAD
W	UW	WATER LINE, UNDERGROUND
]W[	UWH	WATER LINE, HANGING
OW	UWO	WATER LINE, OVERHEAD

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LEGEND - LINE SYMBOLOGY

Sheet No.
Date April 2025
Scale As Noted
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ALIGNMENT

CELL	NAME	DESCRIPTION
	ACC	CENTER OF CURVATURE
	ACOGO	COGO
	ACS	CURVE TO SPIRAL
	ADPI_P	DETOUR, POINT OF INTERSECT.
	ADPL_P	DETOUR, POINT ON LINE
	AEQN	EQUATION
A	AEQNAHD	EQUATION AHEAD
B	AEQNBK	EQUATION BACK
	AEVT	EVENT STATION
	APC	POINT OF CURVATURE
	APCC	POINT OF COMPOUND CURVATURE
	API	POINT OF INTERSECTION
	APOB	POINT OF BEGINNING
	APOC	POINT OF CURVATURE
	APOE	POINT OF END
	APOL	POINT ON LINE
	APOS	POINT ON SPIRAL
	APOT	POINT ON TANGENT
	APOVC	POINT ON VERTICAL CURVE
	APOVT	POINT ON VERTICAL TANGENT
	APORC	POINT ON REVERSE CURVE
	APT	POINT OF TANGENCY
	APVC	POINT OF VERTICAL CURVATURE
	APVCC	POINT OF VERT. CMPND CURVE
	APVI	POINT OF VERT. INTERSECTION
	APVRC	POINT OF VERT. REVERSE CURVE
	APVT	POINT OF VERTICAL TANGENCY
	ASC	SPIRAL TO CURVE
	ASPI	SPIRAL POINT OF INTERSECTION
	ASTS	SPIRAL TO SPIRAL
	AST	SPIRAL TO TANGENT
	ATS	TANGENT TO SPIRAL
	AVEVT	VERTICAL EVENT POINT
	AVHIGH	VERTICAL HIGH POINT
	AVLOW	VERTICAL LOW POINT

DRAINAGE

CELL	NAME	DESCRIPTION
	DINV	INVERT
	DS	STRUCTURE, RECTANGULAR
	DSI	STRUCTURE, INVERT
	DSM	STRUCTURE, MANHOLE
	DSMTXX_P	STRUCTURE, MANHOLE, TYPE "XX" "XX" = 48, 60, 72, 96
	DSR	STRUCTURE, ROUND
	DST"X"CB_P	STRUCTURE, RECT., WITH CURB TYPE "X" "X" = F, G, N, O, P, R
	DST"X"_P	STRUCTURE, RECT., TYPE "X" "X" = I, K, L, M, O, P, U

ENVIRONMENTAL

CELL	NAME	DESCRIPTION
CULV	EIOP_P	STR., INLET, OUTLET PROT.
GB	EIPGB_P	STR., INLET PROT., GRAVEL BAG
H/S	EIPHS_P	STR., INLET PROT., HAY/STRAW
PREFB	EIPP_P	STR., INLET PROT., PREFAB.
SF	EIPSF_P	STR., INLET PROT., SILT FENCE
	ERCB	RISER, CONCRETE BOX
	ETRS_P	TRAP, SEDIMENT
	EWFG	WETLAND FLAG

GEOTECHNICAL

CELL	NAME	DESCRIPTION
	GDH	DRILL HOLE

LANDSCAPE

CELL	NAME	DESCRIPTION
	LELS	ELEVATION, SPOT
P	LFP	FLAG POLE
	LMB	MAILBOX
	LPB	PAPER BOX
	LPST	POST, SINGLE
	LRB	ROCK, BOULDER
	LSHC	SHRUB, CONIFEROUS
	LSHD	SHRUB, DECIDUOUS
	LTC	TREE, CONIFEROUS
	LTD	TREE, DECIDUOUS
	LTS	TREE, STUMP
	LTW_P	TREE, WELL OR WALL
	LUKP	UNKNOWN POINT

SIGNS

CELL	NAME	DESCRIPTION
	S	SINGLE POST
	S_P	SINGLE POST, PROPOSED
	SB_P	BACK TO BACK, PROPOSED
	SDEL	DELINEATORS
	SPM	PARKING METER
RFM	SRM	REFERENCE MARKERS
	SRSC3	SHLD, CTY, 123 DIG.
	SRSC4	SHLD, CTY, 4 DIG.
	SRSCT2	SHLD, CTY TOUR, 1–2 DIG.
	SRSCT4	SHLD, CTY TOUR, 3–4 DIG.
	SRSI	SHLD, INTERSTATE
	SRSN2	SHLD, NATIONAL, 2 DIG.
	SRSN3	SHLD, NATIONAL, 3 DIG.
	SRSS2	SHLD, STATE, 2 DIG.
	SRSS3	SHLD, STATE, 3 DIG.
	SRSS4	SHLD, STATE, 4 DIG.

TRAFFIC CONTROL

CELL	NAME	DESCRIPTION
	TCBJ	BOX, JUNCTION
T	TCBP	BOX, PULL BOX
	TCBS	BOX, SPLICE
C	TCMC	MICROCOMPUTER CABINET
	TCPP	PED POLE
	TCSH	SIGNAL HEADS
	TCSP	SIGNAL POLE

TRAFFIC WORK ZONE

CELL	NAME	DESCRIPTION
	TWZAP_P	ARROW PANEL
	TWZAPC_P	ARROW PANEL, CAUTION MODE
	TWZAPT_P	ARROW PANEL, TRAILER OR SUPPORT
	TWZBCD_P	BARRICADE (TYPE III)
	TWZCMS_P	CHANGEABLE MESSAGE SIGN (PVMS)
	TWZFLG_P	FLAGGER
	TWZFT_P	FLAG TREE
	TWZIA_P	IMPACT ATTENUATOR / CRASH CUSHION (TEMPORARY)
	TWZLUM_P	LUMINAIRE (TEMPORARY)
	TWZSDT_P	SYMBOL, DIRECTION OF TRAFFIC
	TWZSDTD_P	SYMBOL, DIRECTION OF TEMPORARY TRAFFIC DETOUR
	TWZSGN_P	SIGN (TEMPORARY)
	TWZSIG_P	SIGNAL, TRAFFIC OR PEDESTRIAN (TEMPORARY)
	TWZWL_P	WARNING LIGHT
	TWZWV_P	WORK VEHICLE
	TWZWVA_P	WORK VEHICLE WITH TRUCK MOUNTED ATTENUATOR

UTILITIES

CELL	NAME	DESCRIPTION
E	UEB	ELECTRIC, BOX
E	UEM	ELECTRIC, METER
E	UEMH	ELECTRIC, MANHOLE
	UEPT	ELECTRIC, POLE, TRANS.
G	UGM	GAS, METER
G	UGMH	GAS, MANHOLE
	UGLM	GAS, LINE MARKER
FP	UGP	GAS/FUEL PUMP
	UGV	GAS, VALVE
	UGVT	GAS, VENT
	ULP	LIGHTING, POLE
	ULPM	LIGHTING, POLE, MEDIAN
	ULPP	LIGHTING, POLE, PED.
	UMFC	MISC. FILLER CAP
	UOLM	OIL, LINE MARKER
	UP	POLE, WITH UTILITY
	UPD	POLE, DEAD (NO UTILITY)
	UPL	POLE, WITH LIGHT
S	USMH	SANITARY SEWER MANHOLE
P	UTB	TELEPHONE, BOOTH
	UTLM	TELEPHONE, LINE MARKER
T	UTMH	TELEPHONE, MANHOLE
	UTVLM	CABLE TV, LINE MARKER
	UTVPB	CABLE TV, PULL BOX
	UUB	UNKNOWN, BOX
	UUJB	UNKNOWN, JUNCTION BOX
	UUMH	UNKNOWN, MANHOLE
	UUPB	UNKNOWN, PULL BOX
	UUVL	UNKNOWN, VALVE
	UUVT	UNKNOWN, VENT
	UUW	UNKNOWN, WELL
	UWFH	WATER, FIRE HYDRANT
W	UWM	WATER, METER
W	UWMH	WATER, MANHOLE
	UWV	WATER, VALVE
W	UWW	WATER, WELL

BRIDGE

	BSC	BRIDGE, SCUPPER

CONTROL

	CBP	BASELINE, POINT
	CBPOL	BASELINE, POINT ON LINE
	CBSP	BASELINE, SPUR POINT
	CBTP	BASELINE, TIE POINT
	CPBM	BENCHMARK
	CPH	POINT, HORIZ. PHOTOGRAMMETRY
	CPSM	POINT, SURVEY MARKER, PERM.
	CPSV	POINT, VERT., PHOTOGRAMMETRY

NOTES:

1. THE LEGEND ILLUSTRATES MAPPING FEATURES (EXISTING AND PROPOSED).
2. FEATURES ARE SHOWN AS EITHER LINEAR (ROADWAY GUIDERAIL, ROADWAY SIDEWALK, UTILITY LINES, ETC.) OR POINT (SIGN, UTILITY POLE, ETC.).
3. FEATURES SHOWN ON THE LEGEND AS EXISTING FEATURES ALSO HAVE CORRESPONDING PROPOSED FEATURES.
4. PROPOSED FEATURE SYMBOLOGY IS IDENTICAL TO EXISTING FEATURE SYMBOLOGY EXCLUDING LINE WEIGHT. LINE WEIGHT FOR PROPOSED FEATURES IS THICKER (0.015 in ON B SIZE DRAWINGS).
5. MAPPING FEATURES NOT INCLUDED ON THE LEGEND SHEET DO NOT HAVE A UNIQUE SYMBOLOGY (SUCH AS THE PAVEMENT EDGE, PAVEMENT EDGE OF TRAVEL WAY) AND SHOULD BE LABELED ON THE PLANS.
6. FEATURES SHOWN AT THE HEAVIER WEIGHT ARE PROPOSED ONLY AND DO NOT HAVE CORRESPONDING EXISTING FEATURES.

GENERAL NOTES:

DESIGN SPECIFICATIONS: NYSDOT HIGHWAY DESIGN MANUAL, INCLUDING ALL PROVISIONS IN EFFECT AS OF MAY 2025.

CONSTRUCTION AND MATERIAL SPECIFICATIONS: STANDARD SPECIFICATIONS, CONSTRUCTION AND MATERIALS, NYSDOT, OFFICE OF ENGINEERING, DATED MAY 1, 2025, WITH CURRENT ADDITIONS AND REVISIONS.

WHERE STATE SPECIFICATIONS MENTION REGIONAL DIRECTOR, REGIONAL ENGINEER OR REGIONAL MATERIALS ENGINEER, THIS SHALL REFER TO ECIDA. WHERE THE SPECIFICATIONS MENTION NEW YORK STATE OR STATE, THIS SHALL REFER TO ECIDA.

ADDITIONAL NOTES WILL BE FOUND ON SUBSEQUENT SHEETS OF THE CONTRACT PLANS. THESE NOTES PERTAIN TO THE SPECIFIC DRAWINGS WHERE THEY ARE SHOWN AND ALSO SUPPLEMENT THE GENERAL NOTES LISTED HERE.

THE CONTRACT PLANS WERE PREPARED BASED ON FIELD SURVEYING AND OTHER AVAILABLE INFORMATION. ACTUAL FIELD CONDITIONS MAY DIFFER FROM THE DETAILS AND WORK QUANTITIES SHOWN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL PERFORM THE WORK IN ACCORDANCE WITH THE ACTUAL FIELD CONDITIONS AND A.O.B.E.

THE CONTRACTOR SHALL MAKE NO CLAIM AGAINST CITY OF LACKAWANNA OR ECIDA FOR WORK PERTAINING TO MODIFICATIONS AS MAY BE REQUIRED DUE TO DIFFERENCE BETWEEN ACTUAL FIELD CONDITIONS AND THOSE SHOWN IN THE CONTRACT PLANS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY FIELD CONDITIONS PRIOR TO BID.

THE CONTRACTOR SHALL CONDUCT THE WORK IN A MANNER THAT WILL ENSURE AS FAR AS PRACTICABLE, THE LEAST OBSTRUCTION TO TRAFFIC AND ADJACENT PROPERTY, AND SHALL PROVIDE FOR THE CONVENIENCE AND SAFETY OF THE GENERAL PUBLIC ALONG AND ADJACENT TO ROADWAYS IN THE CONSTRUCTION AREA, IN AN ADEQUATE AND SATISFACTORY MANNER.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH ADEQUATE ACCESS TO ALL WORK AREAS. THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE SO THAT ANY MATERIALS WHICH ARE TO REMAIN IN PLACE OR ARE THE PROPERTY OF THE CITY OF LACKAWANNA ANY OTHER AGENCY WILL NOT BE DAMAGED. ANY DAMAGED MATERIALS SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE ENGINEER AT NO EXPENSE TO ECIDA.

AREAS BEYOND THE WORK LIMITS DISTURBED FOR ANY REASON BY THE CONTRACTOR OR HIS EMPLOYEES SHALL BE RESTORED TO THE SATISFACTION OF THE ENGINEER AND THE OWNER AT THE CONTRACTORS EXPENSE.

ALL SALVAGED MATERIALS SHALL BE STORED BY THE CONTRACTOR AT A SITE APPROVED BY THE ENGINEER. IF THE SALVAGED MATERIALS ARE NOT REMOVED FROM THE JOB SITE WITHIN THE SPECIFIED TIME THE MATERIALS WILL BECOME WILL BECOME PROPERTY OF THE CONTRACTOR, WHO WILL BE RESPONSIBLE FOR THE DISPOSAL OF THE MATERIALS. THE COST OF STORAGE, REMOVAL, OR DISMANTLING OF ALL DESIGNATED SALVAGEABLE ITEMS SHALL BE INCLUDED IN THE CONTRACT ITEMS.

ADDITIONAL WORK, NOT SHOWN OR NOTED ON THE PLANS, THAT IS COINCIDENTAL OF AND/OR PERTAINING TO THIS PROJECT, MAY BE REQUIRED AS THE CONTRACT PROGRESSES. THIS WORK SHALL BE PERFORMED BY THE CONTRACTOR A.O.B.E. PAYMENT SHALL BE MADE AT AN AGREED PRICE AS STIPULATED UNDER THE PROVISIONS OF THE CONTRACT.

THE CONTRACTOR SHALL SUBMIT A SITE SPECIFIC HEALTH AND SAFETY PLAN TO THE CITY OF LACKAWANNA AND/OR HIS REPRESENTATIVE AT THE PRE–CONSTRUCTION MEETING. THE CONTRACTOR SHALL STRICTLY ADHERE TO THE SAFETY REQUIREMENTS OF ECIDA AND ALL OTHER STATE AND LOCAL AGENCIES ASSOCIATED WITH THIS CONTRACT.

THE CONTRACTOR SHALL CONSTRUCT THE CONTRACT IN ACCORDANCE WITH THE CONTRACT PLANS, SPECIFICATIONS AND ALL OTHER RELATED DOCUMENTATION. HE SHALL PROGRESS THE WORK IN A PROFESSIONAL, WORKMANLIKE AND TIMELY MANNER SO AS TO PRODUCE A FINISHED PRODUCT THAT IS OF HIGH QUALITY WORKMANSHIP, ON TIME, AND SATISFACTORY TO THE ENGINEER.

THE CONTRACTOR SHALL PERFORM TESTS AND PROVIDE TEST RESULTS FOR COMPACTION OF ALL BACKFILL MATERIAL AND PLACEMENT OF CONCRETE IN ACCORDANCE WITH THE NYSDOT STANDARD SPECIFICATIONS AND THE NYSDOT MATERIALS BUREAU.

THE CONTRACTOR SHALL PROOF ROLL, WITH A CHARIOT STYLE PROOF ROLLER, THE ENTIRE ROADWAY SUBGRADE PRIOR TO PLACEMENT OF THE SUBBASE REINFORCEMENT MATERIAL, LAYER 2. PROOF ROLLING LOADS SHALL BE IN ACCORDANCE WITH NYSDOT STANDARD SPECIFICATIONS, SECTION 203.

GENERAL NOTES (CONT.):

THE CONTRACTOR SHALL SUBMIT INVOICES, RECEIPTS, TEST REPORTS, PERMITS, MATERIAL CERTIFICATIONS ETC. TO THE ENGINEER–IN–CHARGE FOR ALL MATERIALS DELIVERED TO THE PROJECT SITE AND INCORPORATED INTO THE WORK.

WHENEVER ITEMS IN THE CONTRACT REQUIRE MATERIALS TO BE REMOVED AND DISPOSED OF, THE COST OF SUPPLYING A DISPOSAL AREA AND TRANSPORTATION TO THAT AREA SHALL BE INCLUDED IN THE UNIT PRICES BID FOR THOSE ITEMS.

THE CONTRACTOR SHALL PROTECT HIS WORKERS AN THE PUBLIC AT ALL TIMES IN CONFORMANCE WITH APPLICABLE OSHA REGULATIONS.

THE COST OF WATER FOR COMPACTION OF SELECT FILL ITEMS SHALL BE INCLUDED UNDER THOSE ITEMS THAT REQUIRE THE APPLICATION OF WATER. ALL PLACEMENTS OF SELECT STRUCTURE FILL, ITEM 203.21, SHALL BE COMPACTED TO 95 PERCENT OF STANDARD PROCTOR MAXIMUM DENSITY.

CARE SHALL BE TAKEN TO RETAIN NATURAL GROWTH AND PREVENT DAMAGE TO TREES THAT ARE NOT SCHEDULED FOR REMOVAL, BOTH INSIDE AND OUTSIDE THE LIMITS OF CONSTRUCTION. ANY DAMAGE CAUSED TO THE NATURAL GROWTH SHALL BE RESTORED AT THE EXPENSE OF THE CONTRACTOR A.O.B.E. CONTRACTOR SHALL FURNISH, INSTALL AND REMOVE TEMPORARY PLASTIC BARRIER FENCE, ITEM 607.4101001 AS SHOWN IN THE MISCELLANEOUS TABLES.

THE WORK AREA SHALL BE CLEARED AND GRUBBED AS NECESSARY WITHIN THE LIMITS OF GRADING SHOWN ON THE PLAN. WORK IS INCLUDED UNDER ITEM 201.06

GRASSED AREAS DISTURBED BY THE CONTRACTOR, AS PART OF WORK TO BE PERFORMED UNDER THIS CONTRACT SHALL BE RESTORED AS SPECIFIED, TO THE SATISFACTION OF THE ENGINEER. ALL DISTURBED GRASS AREAS SHALL BE GRADED IN A MANNER APPROVED BY THE ENGINEER, TOPSOILED AND SEEDED AS SHOWN ON THE PLANS. DISTURBED AREAS BEYOND THE GRADING LIMITS SHOWN ON THE DRAWINGS SHALL BE RESTORED AT THE CONTRACTORS EXPENSE TO THE SATISFACTION OF THE ENGINEER.

ALL DISTURBED UNSURFACED AREAS WITHIN THE NYSDOT ROW SHALL BE RESTORED USING ITEM 610.1402 TOPSOIL – ROADSIDE AND ITEM 610.1601 TURF ESTABLISHMENT – ROADSIDE, AND COMPLY WITH NYSDOT STANDARD SPECIFICATION SECTION 713 – LANDSCAPE DEVELOPMENT MATERIALS.

ANY SIGNS, MILE MARKERS, FENCING, DECORATIVE LANDSCAPING, ETC. REMOVED BY THE CONTRACTOR IN ORDER TO COMPLETE WORK ASSOCIATED WITH THE PROJECT, SHALL BE REPLACED BY THE CONTRACTOR. THE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT BID PRICE FOR VARIOUS ITEMS.

R.O.W. LIMITS SHOWN ON THE PLANS WERE OBTAINED FROM AVAILABLE MAPS INFORMATION AND RECORD DRAWINGS, AND ARE SHOWN FOR REFERENCE PURPOSES. AS SUCH, THE ACCURACY OF THEIR LOCATIONS ARE TO THE MOST CURRENT AND AVAILABLE INFORMATION.

THE CONTRACTOR SHALL LOCATE ALL PERTINENT PROPERTY, EASEMENT AND/OR R.O.W. LINES PRIOR TO STARTING WORK. THE CONTRACTOR SHALL NOT TRESPASS OR START WORK ON OTHER PROPERTIES, EASEMENTS OR R.O.W. WITHOUT PROPERLY NOTIFYING AND MEETING THE NECESSARY REQUIREMENTS OF THE PROPERTY OWNER OR AUTHORIZING AGENCY.

THE CONTRACTOR SHALL LOCATE, MARK, SAFEGUARD, AND PRESERVE ALL SURVEY CONTROL MONUMENTS, R.O.W. MONUMENTS, AND PROPERTY PINS WITHIN THE PROJECT AREA.

THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND THE CITY OF LACKAWANNA OF ANY HAZARDOUS SUBSTANCE ENCOUNTERED DURING THE CONSTRUCTION OF THE WORK. WHEN ENCOUNTERING OR WORKING WITH ANY SUCH HAZARDOUS SUBSTANCE, THE CONTRACTOR SHALL, AT HIS EXPENSE CONFORM TO ALL LAWS, RULES, REGULATIONS AND DIRECTIONS AS PROMULGATED BY THE US DEPARTMENT OF LABOR, OSHA, THE N.Y.S. DEPARTMENT OF HEALTH AND ALL LOCAL AGENCIES.

ALL CONSTRUCTION IN LOCAL, COUNTY OR STATE R.O.W. SHALL CONFORM TO THE REQUIREMENTS, RULES AND SPECIFICATIONS OF THE CORRESPONDING AGENCY. ALL WORK PERMITS AND FEES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

FOR ADDITIONAL GENERAL NOTES, REFER TO THE SPECIAL INSTRUCTIONS SECTION OF THE PROPOSAL BOOK.

UTILITY NOTES:

THE CONTRACTOR SHALL EXAMINE AND VERIFY IN THE FIELD ALL EXISTING CONDITIONS AND DIMENSIONS WITH THOSE SHOWN ON THE PLANS. IF FIELD CONDITIONS AND DIMENSIONS (INCLUDING STORM DRAINAGE STRUCTURE RIM AND INVERT ELEVATIONS AND PIPE SIZES) DIFFER FROM THOSE SHOWN ON THE PLANS, THE CONTRACTOR SHALL BRING SUCH INFORMATION TO THE ATTENTION OF THE ENGINEER AND WAIT FOR DIRECTION BY THE ENGINEER BEFORE PRECEDING WITH THE WORK.

THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE; OTHER UNDERGROUND FACILITIES NOT SHOWN MAY EXIST. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO WORKING IN THE AREA AND TO AVOID INTERFERENCE. IN THE EVENT THE CONTRACTOR DAMAGES AN EXISTING UTILITY CAUSING AN INTERRUPTION IN SERVICE, HE/SHE SHALL START WORK IMMEDIATELY TO RESTORE SERVICE AND MAY NOT CEASE UNTIL SUCH SERVICE IS RESTORED. ALL CORRECTIVE UTILITY WORK SHALL BE AT THE EXPENSE OF THE CONTRACTOR AND ACCEPTABLE TO THE ENGINEER AND UTILITY OWNER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONDUCT THE CONTRACT OPERATIONS AND TAKE THE NECESSARY PRECAUTIONS TO PREVENT INTERFERENCE WITH OR DAMAGE TO UTILITIES DURING THE COURSE OF CONSTRUCTION.

RECORD INFORMATION, PROVIDED BY UTILITY OWNERS, WAS PLOTTED ON THE CONTRACT PLANS. DEPTHS WERE NOT FIELD VERIFIED. PHYSICAL FEATURES LIKE MANHOLES, VALVE BOXES, AND HYDRANTS HAVE BEEN FIELD LOCATED. THE CONTRACTOR SHALL CONFIRM THE DEPTH AND LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. CONTACT UNDERGROUND FACILITIES PROTECTION ORGANIZATION (UFPO), 1–800–962–7962.

MAINTENANCE AND PROTECTION OF TRAFFIC NOTES:

THE CONTRACTOR SHALL MAINTAIN TRAFFIC THROUGHOUT THE LENGTH OF THE CONTRACT IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 619 OF THE STANDARD SPECIFICATIONS THE NYS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES; IN ACCORDANCE WITH ITEM 619.01 – BASIC MPT, THE CONTRACTOR SHALL MAINTAIN DRAINAGE FACILITIES AND OTHER HIGHWAY ELEMENTS, OLD OR NEW, INCLUDING DETOURS. THE CONTRACTOR SHALL KEEP ALL DRAINAGE FACILITIES FULLY OPERATIVE AT ALL TIMES. DITCHES SHALL BE PRO\DDE AT ALL TIMES EVEN DURING GRADING OPERATIONS TO ADEQUATELY DRAIN THE TRAVELED WAY.

FOR ADDITIONAL MPT NOTES AND DETAILS REFER TO DRAWINGS TC–01 .

PAVEMENT MARKING NOTES:

THE CONTRACTOR SHALL PROVIDE PAVEMENT MARKINGS AT ALL TIMES ON THE PROJECT. ALL MARKINGS ARE FOR TRAFFIC CONTROL AND SHALL CONFORM TO THE REQUIREMENTS OF THE NYS MUTCD, PAVEMENT MARKINGS ON DONA STREET THAT ARE IN CONFLICT WITH THE PROPOSED TRAFFIC PLAN SHALL BE BLACKED OUT WITH PREFORM TAPE. (ITEM 6190803). ALL TEMPORARY PAVEMENT MARKINGS SHALL BE WITH PREFORM PAVEMENT MARKING TAPE. (ITEM 619.0903)

ALL PAVEMENT STRIPING SHOWN ON THE CONTRACT PLANS IS APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL COORDINATE FINAL LAYOUT OF PAVEMENT STRIPING WITH THE CITY OF LACKAWANNA TRAFFIC SAFETY ENGINEER: GINA WILKOLASKI, P.E. PHONE: (716) 858–8067).

EMERGENCY ACCESS NOTES:

AT ALL TIMES DURING CONSTRUCTION, THE CONTRACTOR MUST PROVIDE SAFE AND AND CONVENIENT EMERGENCY ACCESS. LOCAL FIRE AND POLICE AUTHORITIES AND AMBULANCE SERVICES SHALL BE NOTIFIED BY THE CONTRACTOR IN ADVANCE OF THE BEGINNING OF THE WORK IN ORDER TO COORDINATE AND MAINTAIN SUFFICIENT EMERGENCY SERVICES.

RESPONSIBILITY FOR EMERGENCY REPAIRS: THE CONTRACTOR SHALL IN WRITING, SUBMIT TO THE APPROPRIATE LAW ENFORCEMENT AGENCIES, THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PERSON OR PERSONS AUTHORIZED TO SECURE LABOR, MATERIALS AND EQUIPMENT FOR EMERGENCY REPAIRS OUTSIDE OF NORMAL WORKING HOURS. DUPLICATE COPIES OF THE ABOVE SHALL BE FILED WITH THE ENGINEER IN CHARGE.

UTILITY INFORMATION IS PROVIDED TO A QUALITY LEVEL C. THE INFORMATION SHOWN ON THE PLANS HAS BEEN OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGEMENT IN CORRELATING THIS INFORMATION TO QUALITY LEVEL D INFORMATION.

THE SITE HAS SEVERAL UNDERGROUND UTILITIES THAT HAVE BEEN ABANDONED, THE CONTRACTOR SHALL COORDINATE WITH THE PROPERTY OWNER REGARDING THE STATUS AND LOCATION OF UNDERGROUND UTILITIES OUTSIDE OF THE HIGHWAY BOUNDARY

RIGHT OF WAY NOTES:

ALL WORK TO BE PERFORMED UNDER THIS CONTRACT WILL BE WITHIN THE PUBLIC RIGHT–OF–WAY (ROW) IN ACCORDANCE WITH SECTION 105–15 OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR IS TO ASSURE HIMSELF THAT ALL WORK IS BEING PERFORMED WITHIN THE ROW, INCLUDING BUT NOT LIMITED TO VEHICLE STORAGE OF EQUIPMENT, MATERIALS, DEBRIS AND WASTE; LANDSCAPING; VEGETATION REMOVAL AND MANAGEMENT; GRADING, SEEDING AND INSTALLATION OF TURF AND THE INSTALLATION OF ANY FENCES OR PROTECTIVE BARRIER. IF CONTRACTOR IS UNABLE TO IDENTIFY THE LIMITS OF THE RIGHTS–OF–WAY WHEN THE CONTRACT CALLS FOR WORK IN THOSE VICINITIES, THE CONTRACTOR MUST CONTACT THE PROJECT ENGINEER FOR DEFINITIVE BOUNDARY DETERMINATION BEFORE ANY WORK MAY BE INITIATED AT THOSE LOCATIONS (STANDARD SPECIFICATIONS SECTIONS 105–10 AND 625.

IN ACCORDANCE WITH SECTION 105–15 OF THE STANDARD SPECIFICATIONS, RELEASES NY NON–ESSENTIAL CONTRACT WORK OUTSIDE OF THE EXISTING RIGHTS–OF–WAY, INCLUDING PLANTINGS, LANDSCAPING OR DRIVEWAY ENHANCEMENT, WILL BE PROVIDED BY THE PROJECT ENGINEER AND IN NO INSTANCE ARE TO BE SECURED BY THE CONTRACTOR. THE CONTRACTOR SHALL NOT INVADE UPON PRIVATE PROPERTIES, LANDS OR BUILDINGS OUTSIDE OF THE RIGHTS–OF–WAY FOR ANY REASON WITHOUT FIRST SECURING WRITTEN PERMISSION FROM THE PROPERTY OWNER (STANDARD SPECIFICATIONS SECTION 105–15).

THE CONTRACTOR WILL BE HELD LIABLE FOR ANY DAMAGES DONE. ANY SUCH INJURIES OR DAMAGES SHALL BE SATISFACTORILY REPAIRED OR ITEMS REPLACED AT THE CONTRACTOR'S EXPENSE (STANDARD SPECIFICATIONS SECTION 107–08).

UTILITY CONTACT INFORMATION

OWNER	CONTACT & ADDRESS	EMAIL	PHONE	REMARKS
Erie County Sewer District (ECSD)	Lorenzo Quebral, Engineer Assistant, Erie County, Div. of Sewage Management, 95 Franklin St., Buffalo, NY	Lorenzo Quebral@erie.gov	Phone: (716) 858-6974 Fax: (716) 858-6257	ECDD Sewerlines and manholes are buried within the Tecumseh Properly at various locations throughtout the former Bethlehem Steel property.
Erie County Water Authority (ECWA)	Erie County Water Authority, 3030 Union Road, Cheektowaga NY	rstoll@ecwa.org	Phone: (716) 658-8276 Fax: (716) 684-3937	ECWA waterline and valves are buried along Dona Street Extension.
National Fuel	Andrew Gilbert, 6363 Main Street, Williamsville, NY 14221	Andrew Gilbert gilberta@natfuel.com	(716) 870-7110	National Fuel gasline and valves are buried in on the north side of Dona Street and crosses under the proposed Road B at approximately, STA. B 0+50+/-.
National Grid	Francis Porpiglia, 401 Water Street, Fredonia, NY 14063	Francis.Porpiglia@nationalgrid.com	(716) 467-3005	National Grid O/H power lines and poles exist on the west side of Road B. Contact to be made for energizing new street lighting for Road B. (Work Order 30512470) A two-inch plastic street light conduit is located on the north side of Dona Street between the curb line and sidewalk for Dona Street light standards. Conduit under Road B to be lowered and replaced with galvanized steel conduit.
Spectrum Cable			833-267-6094	Spectrum underground cable runs east to west on the north side of Dona Street and will cross under Road B. The depth of cover is unknown. Cable may conflict with road and storm sewer construction.

GENERAL NOTES:

THE CONTRACTOR SHALL MAINTAIN TRAFFIC THROUGHOUT THE LENGTH OF THE CONTRACT IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 619 OF THE CURRENT STANDARD SPECIFICATIONS, THE NATIONAL MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) 11th EDITION IN ADDITION TO THE NEW YORK STATE(N.Y.S.) SUPPLEMENT INCLUDING LATEST REVISIONS, THE MAINTENANCE AND PROTECTION OF TRAFFIC DETAILS IN THE PLANS AND PROPOSAL OF THIS CONTRACT, AND AS DIRECTED BY THE ENGINEER.

FOR TYPICAL APPLICATIONS OF TRAFFIC CONTROL DEVICE IN CONSTRUCTION AREAS NOT SPECIFIED IN THE PLANS, THE PROVISIONS OF PART 6 OF THE M.U.T.C.D. 11th EDITION WITH N.Y.S. SUPPLEMENT SHALL APPLY.

THE WORK ZONE TRAFFIC CONTROL (WZTC) PLANS IN NYSDOT STANDARD SHEETS ARE STANDARD FOR MOST COMMON SITUATIONS, ADDITIONAL PROTECTION SHALL BE PROVIDED WHERE SPECIAL CIRCUMSTANCES OCCUR AS DETERMINED BY THE ENGINEER AND PAID FOR UNDER ITEM 619.01, BASIC WORK ZONE TRAFFIC CONTROL.

THE CONTRACTOR SHALL REFERENCE THE FOLLOWING MAY 1, 2025 NYSDOT STANDARD SHEETS FOR WORK ZONE TRAFFIC CONTROL ON THIS PROJECT: 619.001, 619.002, 619.10 (WZTC GENERAL NOTES), 619.11 (WZTC LEGENDS AND NOTES), 619.12 (SIGN TABLE), 619.22(SHOULDER CLOSURE EXPRESSWAY/FREEWAY), 619-30 (SINGLE LANE CLOSURE MULTI-LANE HIGHWAY), 619.41 (DOUBLE INTERIOR LAND CLOSURE MULTI-LANE HIGHWAY), 619.61 (FLAGGING OPERATION 2-LANE 2-WAY ROADWAY INTERSECTION), 619.311 (RIGHT LANE CLOSURE, SHORT TERM).

THE CONSTRUCTION APPROACH SIGNAGE AS SHOWN IN THE CONTRACT PLANS IS IN ACCORDANCE WITH THE M.U.T.C.D., IF FIELD CONDITIONS REQUIRE THE CONSTRUCTION APPROACH SIGNAGE TO BE MODIFIED, THE CONTRACTOR SHALL SUBMIT MODIFICATIONS IN ACCORDANCE WITH M.U.T.C.D. SECTION 6F.16(WARNING SIGN FUNCTION, DESIGN AND APPLICATION) AND 6F.17 (POSITION OF ADVANCE WARNING SIGNS) TO THE ENGINEER FOR APPROVAL.

THE CONTRACTOR MUST SUBMIT TO THE ENGINEER, IN WRITING, PROPOSED REVISIONS TO THE TRAFFIC CONTROL PLAN FOR REVIEW AND APPROVAL BY THE ENGINEER, FIVE (5) WORKING DAYS PRIOR TO THE PLANNED IMPLEMENTATION OF SUCH PROPOSED REVISIONS.

PRIOR TO THE START OF ANY WORK OPERATIONS, ALL RELATED WORK FOR PROPOSED WORK ZONE TRAFFIC CONTROL, AS DIRECTED BY THE ENGINEER SHALL BE COMPLETE. THIS INCLUDES BUT IS NOT LIMITED TO ALL SIGNS, SIGNALS, PAVEMENT MARKINGS, BARRIERS, DELINEATION (CONES, DRUMS, ETC.), FLAGGERS, PAVEMENT MODIFICATIONS, AND ANY OTHER RELATED WORK.

THE TRAFFIC CONTROL PLANS SHOWN ARE TO BE CONSIDERED MINIMUM REQUIREMENTS, ADDITIONAL SIGNS AND/OR TRAFFIC CONTROL DEVICES MAY BE REQUIRED AS DETERMINED BY THE ENGINEER, COST TO BE INCLUDED IN THE PRICE BID FOR THE APPROPRIATE ITEMS.

IF AT ANY TIME THE ENGINEER DETERMINES THAT TRAFFIC IS NOT BEING PROPERLY MAINTAINED WITHIN A WORK ZONE, THE CONTRACTOR SHALL IMMEDIATELY CORRECT THE INDICATED DEFICIENCY, AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES SHALL BE KEPT IN PROPER POSITION, CLEAN AND LEGIBLE, REGARDLESS OF VARYING CONDITIONS.

TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH ALL THE PROVISIONS OF ITEM 619.01-BASIC WORK ZONE TRAFFIC CONTROL, OR AS AMENDED IN THESE PLANS.

THE MINIMUM AVAILABLE TRAVEL LAND WIDTH AT ANY TIME SHALL BE 10 FT.

WEEDS, SHRUBBERY, CONSTRUCTION MATERIALS, EQUIPMENT, VEHICLES OR WORKERS SHALL NOT OBSCURE TRAFFIC CONTROL DEVICES OR OBSTRUCT TRAFFIC. THE CONTRACTOR SHALL BE REQUIRED TO TRIM ANY FOLIAGE OBSTRUCTION THE VISIBILITY OF ANY TRAFFIC CONTROL DEVICES, WHETHER PERMANENT, TEMPORARY, OR CONSTRUCTION, AS DETERMINED BY THE ENGINEER.THE COST SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

THE CONTRACTOR SHALL TAKE EXTRA CARE TO MAINTAIN A DUST FREE ENVIRONMENT. CALCIUM CHLORIDE AND/OR WATER SHALL BE APPLIED FOR DUST CONTROL AS DETERMINED BY THE ENGINEER. THE COST SHALL BE INCLUDED IN THE PRICED BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

THE LUMP SUM PRICE BID FOR ITEM 619.01, BASIC WORK ZONE TRAFFIC CONTROL SHALL INCLUDE ALL EQUIPMENT, MATERIALS, AND LABOR NECESSARY TO ADEQUATELY AND SAFELY MAINTAIN AND PROTECT TRAFFIC, EXCEPT AS PROVIDED FOR IN SEPARATE PAYMENT ITEMS IN THE PROPOSAL.

WARNING LIGHTS MOUNTED ON BARRICADES OR OTHER CHANNELIZING DEVICES SHALL BE A STEADY BURN, LOW INTENSITY LIGHT, EXCEPT FOR THE FIRST ONE (1)IN THE SERIES WHICH SHALL BE A HIGH INTENSITY FLASHING LIGHT. PLASTIC DRUMS(C5-1) OR TYPE III BARRICADES MAY BE PLACED ALONG PAVEMENT TAPERS. REFER TO N.Y.S.D.O.T. STANDARD SHEET 619-02 FOR TYPE III BARRICADES WITH WARNING LIGHTS AND TABLE 619.3B OF THE NYSDOT STANDARD SPECIFICATIONS.

GENERAL NOTES (CONT.):

THE CONTRACTOR SHALL USE STEEL PLATES, TEMPORARY PAVEMENT, CONES,BARRELS, BARRICADES AND PROTECTIVE FENCING AS NECESSARY AND AS DIRECTED BY THE ENGINEER TO PROTECT AND MAINTAIN BOTH PEDESTRIAN AND TRAFFIC FLOW WITHIN THE PROJECT AREA. COST TO BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

ALL LANE TAPERS AND TRANSITIONS SHALL BE IN ACCORDANCE WITH TABLE 6H-4 OF THE N.M.U.T.C.D. OR AS DETERMINED BY THE ENGINEER.

ALL DROP-OFFS FROM EDGES OF TRAVELED WAY SHALL BE ADDRESSED PER THE CONDITIONS AND DIRECTIONS SET FORTH IN SECTION 619-3.02 PARAGRAPH K AND TABLE 619-3 OF THE N.Y.S.D.O.T STANDARD SPECIFICATIONS. NO DROP-OFF SHALL REMAIN OVER A WEEKEND OR HOLIDAY. A DROP-OFF IS CONSIDERED ELIMINATED IF TAPERED AWAY BY A 1-ON-6 OR FLATTER SLOPE.

SPECIAL ATTENTION SHALL BE GIVEN BY THE CONTRACTOR TO THE MAINTENANCE OF A SATISFACTORY TRAVELED WAY DURING THE SHUTDOWN OF CONSTRUCTIONS OPERATIONS IN COMPLIANCE WITH THE REQUIREMENTS OF SECTION 619.01, BASIC WORK ZONE TRAFFIC CONTROL.

WHEN THE VISIBILITY OF THE TRAVELING PUBLIC IS RESTRICTED DUE TO WEATHER CONDITIONS AND/OR THE WORK OPERATIONS COMMENCE PRIOR TO DAWN OR CONTINUED BEYOND DUSK, FLASHING BEACONS AND STEADY BURNING LIGHTS SHALL BE PROVIDED BY THE CONTRACTOR AND PLACED AS DIRECTED BY THE ENGINEER. IF FLAGGING OPERATION IS NECESSARY BEYOND DAYLIGHT HOURS, FLAGGERS ARE TO USE FLASHLIGHTS WITH ORANGE CONES ATTACHES PER M.U.T.C.D..

THE WORK AREA IS TO BE CLEANED DAILY AND LEFT IN A MANNER ACCEPTABLE TO THE ENGINEER.

WORK AREA NOTES:

THE CONTRACTOR SHALL COORDINATE ANY WORK WITH OTHER CONTRACTORS, UTILITY COMPANIES, OR MUNICIPALITIES IN ORDER TO ENSURE ALL TRAFFIC IS PROPERLY AND SAFELY MAINTAINED AND PROTECTED.

CONTRACTORS VEHICLES NOTES:

VEHICLES OR EQUIPMENT BELONGING TO THE CONTRACTOR'S EMPLOYEES SHALL NOT BE PARKED WITHIN THE CLEAR ZONE, ON THE PAVEMENT SHOULDERS ALONG THE ROADWAY WHERE PARKING IS NOT NORMALLY PERMITTED, OR ANY OTHER AREAS DEEMED HAZARDOUS BY THE ENGINEER.

VEHICLES OR EQUIPMENT BELONGING TO THE CONTRACTOR OR THE EMPLOYEES SHALL NOT BE PARKED IN A MANNER WHICH OBSTRUCTS SIGNS, BARRIERS, BARRICADES, OR OTHER TRAFFIC CONTROL DEVICES.

VEHICLES BELONGING TO THE CONTRACTOR OR CONTRACTOR'S EMPLOYEES ALSO SHALL NOT BE PARKED IN A MANNER WHICH INTERFERES WITH ACCESS TO ABUTTING PROPERTIES.

VEHICLES PARKED BEHIND GUIDE RAIL/BARRIER SHALL BE PARKED BEYOND THE GUIDE RAIL/BARRIER DEFLECTION DISTANCE.

THE CONTRACTOR SHALL PLAN AND INCORPORATE ACCESS POINTS INTO THE WORK ZONE SUCH THAT, TO THE EXTENT PRACTICAL, THE CONTRACTOR'S VEHICLES ENTERING AND LEAVING THE WORK ZONE SHALL NOT IMPEDE THE MOVEMENT OF THROUGH TRAFFIC IN THE ADJACENT OPEN LANES.

WHERE CONTRACTORS' VEHICLES ENTER OR EXIT A WORK ZONE A SPOTTER/FLAGGER MAY BE REQUIRED AS DETERMINED BY THE ENGINEER. FLAGGER/SPOTTER SHALL MEET ALL REQUIREMENTS AS SPECIFIED IN FLAGGER NOTES. COST OF THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

CONSTRUCTION AND TRAFFIC SIGNAGE NOTES:

ALL SIGNS AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE M.U.T.C.D. WITH N.Y.S. SUPPLEMENT. THE LOCATIONS OF THE SIGNS SHOWN ON THE TRAFFIC CONTROL PLANS AND DETAILS, FOUND IN THE CONTRACT DOCUMENTS, ARE APPROXIMATE. THE EXACT LOCATIONS SHALL BE DETERMINED BY THE ENGINEER.

ANY EXISTING SIGNS WHICH CONFLICT WITH WORK ZONE TRAFFIC CONTROL SIGN LAYOUT SHALL BE COVERED, REMOVED, STORED OR RESET, AS DETERMINED BY THE ENGINEER. BLANK COVERS USED TO COVER PORTIONS OF EXISTING SIGNS SHALL BE OF A COLOR AND REFLECTORIZED MATERIAL MATCHING THAT OF THE SIGN BEING PARTIALLY COVERED.

THE MODIFICATION, RELOCATION OR ADJUSTMENT OF EXISTING SIGNS FOR WORK ZONE TRAFFIC CONTROL PURPOSES, NOT ALREADY SHOWN ON THE PLANS. SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01

CONSTRUCTION AND TRAFFIC SIGNAGE NOTES (CONT.):

SIGNS AT OR NEAR INTERSECTIONS SHALL BE PLACED SO THEY DO NOT OBSTRUCT A MOTORIST'S LINE OF SIGHT.

THE COST FOR PROVIDING, INSTALLING, MAINTAINING, AND REMOVING CONSTRUCTION SIGNS SHALL BE INCLUDED IN THE AMOUNT BID FOR ITEM 619.01,BASIC WORK ZONE TRAFFIC CONTROL.

ALL EXISTING TRAFFIC AND PARKING SIGNS WITHIN THE CONTRACT LIMITS SHALL BE MAINTAINED BY THE CONTRACT THROUGHOUT THE ENTIRE PERIOD OF CONSTRUCTION UNTIL THESE SIGNS ARE REPLACED WITH PERMANENT SIGNS OR COVERED WHEN THEY DIRECTLY CONFLICT WITH THE MAINTENANCE AND PROTECTION OF TRAFFIC. THIS INCLUDES SIGNAGE AT INTERSECTING STREETS.

TRAFFIC MAINTENANCE SIGNS NOT CONSISTENT BETWEEN WORKING AND/ OR NON-WORKING HOURS SHALL BE COVERED AND/OR REMOVED FROM THE DRIVER'S VISION WHEN NOT IN USE.

PORTABLE SIGN SUPPORTS WILL BE ALLOWED ON AT LOCATIONS DEPICTED ON DETAILS OR LOCATIONS APPROVED BY THE ENGINEER. PORTABLE SIGN SUPPORTS SHALL ADHERE TO THE PROVISIONS OF THE N.M.U.T.C.D.. LATERAL PLACEMENT OF PORTABLE SIGNS SHALL BE SUCH TO ACHIEVE MAXIMUM VISIBILITY.

SIGN SUPPORTS SHALL BE SUCH AS TO RESIST OVERTURNING IN STRONG WINDS AND PROVIDE A MINIMUM MOUNTING HEIGHT OF 7'-0" MEASURED TO BOTTOM OF SIGN.

THE COVERING AND/OR REMOVING, RELOCATING, AND REPLACING OF EXISTING SIGN PANELS AND ASSEMBLIES SHALL BE AS DIRECTED BY THE ENGINEER. PAYMENT SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL,ITEM 619.01.

CARE SHOULD BE TAKEN NOT TO DAMAGE ANY EXISTING PERMANENT SIGNS TO REMAIN. ANY SIGN DAMAGED SHALL BE REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.

ALL CONSTRUCTIONS SIGNS SHALL BE NEW OR IN LIKE NEW CONDITION.

DELINEATION AND GUIDING DEVICES NOTES:

PAYMENT FOR CHANNELIZATION DEVICES IS INCLUDED UNDER ITEM 619.01, BASIC WORK ZONE TRAFFIC CONTROL, UNLESS PROVIDED FOR WITH SPECIFIC ITEMS IN THE CONTRACT DRAWINGS AND SPECIFICATIONS.

CONSTRUCTION ZONE PAVEMENT MARKINGS SHALL BE APPLIED PER SECTION 619OF THE NYSDOT STANDARD SPECIFICATIONS AND SHALL CONFORM TO THE PROJECT'S PERMANENT MARKINGS WITH RESPECT TO COLOR AND PATTERN. PAYMENT SHALL BE BASED ON 4 INCH LINE WIDTHS. THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

ANY EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH THE TRAFFIC CONTROL PLAN SHALL BE MOVED AS DETERMINED BY THE ENGINEER. THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

THE CONTRACTOR SHALL MAINTAIN EXISTING PAVEMENT MARKINGS WITHIN THE CONSTRUCTION LIMITS AS DETERMINED BY THE ENGINEER. PAYMENT SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

DELINEATION AND GUIDING DEVICES AT OR NEAR INTERSECTIONS SHALL BE PLACED SO THAT THEY DO NOT OBSTRUCT A MOTORIST'S LINE OF SIGHT.

WHERE POSSIBLE ALL DELINEATION AND GUIDING DEVICES ARE TO BE PLACED SO AS TO PROVIDE A MINIMUM 2'-0" CLEARANCE TO THE TRAVELED WAY UNLESS OTHERWISE SHOWN ON THE PLANS.

ALL TRAFFIC CONTROL DEVICES INITIALLY FURNISHED FOR THIS PROJECT SHALL BE IN ACCEPTABLE CONDITION AS DEFINED BY THE GUIDELINES PAMPHLET DEVELOPED BY THE AMERICAN TRAFFIC SAFETY SERVICE ASSOCIATION (ATSSA). AS THE CONDITION OF DEVICES DETERIORATE OVER TIME, THOSE THAT FALL BELOW THE MARGINAL CATEGORY SHALL BE REPLACED.

ACCESS NOTES:

THE CONTRACTOR SHALL PLAN AND INCORPORATE ACCESS POINTS INTO THE WORK ZONE SUCH THAT, TO THE EXTENT PRACTICAL. THE CONTRACTORS VEHICLES ENTERING AND LEAVING THE WORK ZONE SHALL NOT IMPEDE THE MOVEMENT OF THROUGH TRAFFIC IN THE ADJACENT OPEN LANES.

WHERE CONTRACTORS VEHICLES ENTER OR EXIT A WORK ZONE A SPOTTER/FLAGGER MAY BE REQUIRED AS DETERMINED BY THE ENGINEER. FLAGGER/SPOTTER SHALL MEET ALL REQUIREMENT AS SPECIFIED IN FLAGGER NOTES COST FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

ACCESS TO RESIDENTIAL AND COMMERCIAL DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES, UNLESS OTHER AGREEMENTS, SUITABLE TO THE OWNERS CAN BE MADE PROPERTY OWNERS WHOSE DRIVEWAYS WILL BE MADE INACCESSIBLE SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST 24 HOURS PRIOR TO RESTRICTING USE OF THE DRIVE. THE CONTRACTOR SHALL MAINTAIN ACCESS TO COMMERCIAL DRIVEWAYS AT ALL TIMES WHEN A FACILITY IS IN USE. FOR MULTIPLE ACCESS PROPERTIES, ONLY ONE DRIVEWAY MAY BE CLOSED AT ONE TIME. ACCESS SHALL BE RESTORED TO ALL DRIVEWAYS AS SOON AS POSSIBLE

WHEN DIRECT ACCESS TO DRIVEWAYS IS NOT POSSIBLE DUE TO NECESSARY CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL PLAN ALTERNATIVE MEANS OF ACCESS AND SUBMIT SUCH PLANS TO THE ENGINEER FOR APPROVAL. COST FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

SUITABLE RAMPS SHALL BE INSTALLED TO MAINTAIN SMOOTH TRANSITIONS FROM RESIDENTIAL AND COMMERCIAL DRIVEWAYS TO AND FROM THE WORK AREA. THE MATERIAL SHALL CONSIST OF CRUSHED STONE OR ASPHALT CONCRETE, WHICHEVER IS DEEMED MORE APPROPRIATE FOR THE CIRCUMSTANCE, AS DETERMINED BY THE ENGINEER. THE SIDEWALK PORTION OF ANY TEMPORARY RAMP MUST BE CONSTRUCTED WITH A FIRM, STABLE AND SLIP RESISTANT MATERIAL SUCH AS ASPHALT OR CONCRETE. PLASTIC DRUMS OR OTHER APPROVED TRAFFIC CONTROL DEVICES SHALL BE SUED TO DELINEATE THE DRIVEWAY AND TO CONTROL ACCESS DURING NON-WORKING HOURS. THE COST FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

NOTIFICATIONS AND EMERGENCY ACCESS NOTES:

RESPONSIBILITY FOR EMERGENCY REPAIRS – THE CONTRACTOR SHALL SUBMIT TO THE APPROPRIATE LAW ENFORCEMENT AND EMERGENCY AGENCIES IN WRITING THE NAME, ADDRESS, AND TELEPHONE NUMBER OF THE PERSON OR PERSONS AUTHORIZED TO SECURE LABOR, MATERIALS, AND EQUIPMENT FOR EMERGENCY REPAIRS OUTSIDE OF NORMAL WORKING HOURS. DUPLICATE COPIES OF THE ABOVE SHALL BE FILED WITH THE ENGINEER.

THE CONTRACTOR SHALL NOTIFY LOCAL AUTHORITIES FOR EMERGENCY SERVICES IN ADVANCE OF ANY SUBSTANTIAL CHANGE IN TRAFFIC PATTERNS.

AT LEAST ONE 10 FEET WIDE TRAVEL LANE OF SAFELY TRAVERSABLE ROAD IN EACH DIRECTION OR ONE 10 FEET WIDE TRAVEL LANE OF SAFELY TRAVERSABLE ROAD WITH THE USE OF FLAGGERS MUST BE MAINTAINED THROUGHOUT THE PROJECT AREA AT ALL TIMES FOR EMERGENCY VEHICLES. WORK ON ONE SIDE OF THE HIGHWAY SHALL BE COMPLETED PRIOR TO ESTABLISHING A WORK AREA ON THE OPPOSITE SIDE.

FLAGGERS NOTES:

FLAGGING OPERATIONS FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE PLANS. THE N.M.U.T.C.D. WITH N.Y.S. SUPPLEMENT, AND SECTION 619 OF THE STANDARD SPECIFICATIONS.

FLAGGERS SIGNS SHALL NOT BE USED FOR BRIEF PERIODS OF INCIDENTAL FLAGGING, AS DETERMINED BY THE ENGINEER. FLAGGER SIGNS SHALL NOT BE VISIBLE WHILE FLAGGERS ARE NOT BEING USED.

AT ALL TIMES, THE CONTRACTOR SHALL PROVIDE FLAGGERS WITH A CLEAR ESCAPE PATH, FREE OF PARKED VEHICLES, EQUIPMENT OR OTHER OBSTACLES. THE FLAGGING STATION SHOULD NOT BE LOCATED IN LANES BEING USED BY MOVING TRAFFIC, WHERE WORKERS GATHER, OR WHERE THE FLAGGERS VEST WOULD NOT CONTRAST WITH THE BACKGROUND. THE STATION SHALL BE LOCATED FAR ENOUGH AHEAD OF THE WORK SPACE SO THAT APPROACHING TRAFFIC HAS SUFFICIENT DISTANCE TO STOP BEFORE ENTERING THE WORK SPACE. THE FLAGGER SHOULD MOVE INTO A LAND ONLY AFTER TRAFFIC HAS STOPPED AND ONLY IF THE FLAGGER NEEDS TO BE VISIBLE TO OTHER TRAFFIC OR MUST COMMUNICATE WITH DRIVERS.

PEDESTRIAN NOTES:

THE CONTRACTOR SHALL PROVIDE, DELINEATE AND MAINTAIN A USABLE PATH OF TRAVEL FOR PEDESTRIANS EITHER THROUGH OR AROUND WORK ZONES FOR THE DURATION OF THE PROJECT, IN ACCORDANCE WITH THE PLANS. THE PATH OF TRAVEL SHALL COMPLY WITH THE "CONTINUOUS PASSAGE" PROVISIONS OF THE CURRENT AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) AND THE 2011 PROPOSED ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT OF WAY (PROWAG). THE CONTRACTOR MAY UTILIZE ANY COMBINATION OF THE FOLLOWING TO PROVIDE THE USABLE PATH OF TRAVEL.EXISTING SIDEWALKS/SHOULDERS; TEMPORARY SIDEWALKS/SHOULDERS; FINAL SIDEWALKS/SHOULDERS; AND EXISTING OR TEMPORARY SIDEWALK CURB RAMPS. THE USABLE TRAVEL PATH SHALL BE CLEARLY MARKED AND STAGED BETWEEN INTERSECTING ROADS TO ENSURE SAFE PEDESTRIAN CROSSING AND ACCESSIBILITY.PEDESTRIAN ACCESS TO RESIDENTIAL AND COMMERCIAL PROPERTIES SHALL BE MAINTAINED FOR THE DURATION OF CONSTRUCTION.

PEDESTRIAN TRAFFIC SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL FOLLOW THE STANDARD SHEETS TO CROSS PEDESTRIANS AT THE CLOSEST CROSSWALK POSSIBLE.

THE CONTRACTOR SHALL CONDUCT WORK OPERATIONS TO MINIMIZE THE INTERRUPTION OF PEDESTRIAN TRAFFIC. THE TEMPORARY STORAGE OF CONSTRUCTION EQUIPMENT OR MATERIALS SHALL NOT BE PERMITTED ON ANY USABLE TRAVEL PATH THAT IS OPEN TO PEDESTRIAN TRAFFIC.

ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO INSTALL AND REMOVE TEMPORARY SIDEWALK AND CURB RAMPS, INCLUDING THE RESTORATION OF DISTURBED AREAS, SHALL BE INCLUDED IN THE PRICE BID FOR BASIC WORK ZONE TRAFFIC CONTROL, ITEM 619.01.

LANE CLOSURE NOTES:

A SINGLE, LONG LANE CLOSURE IS PREFERRED OVER A SERIES OF SUCCESSIVE SHORTER LANE CLOSURES. THE LENGTH OF THE LANE CLOSURE SHALL BE THE MINIMUM NECESSARY TO ACCOMPLISH THE PLANNED WORK SAFELY AND EFFICIENTLY. THE APPROPRIATE LENGTH OF LANE CLOSURE SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

THE CONTRACTOR SHALL START SHORT TERM LANE CLOSURES TO PROVIDE OPTIMUM VISIBILITY, (I.E. BEFORE CURVES AND CRESTS). TO THE EXTENT PROJECT AND TRAFFIC CONDITIONS PERMIT.

THE CONTRACTOR SHALL NOT MIX CHANNELIZATION DEVICES IN A LINEAR CLOSURE OR TAPER (I.E. CONES, VERTICAL PANELS AND DRUMS SHALL NOT BE USED IN THE SAME TAPER OR CLOSURE). HOWEVER, DIFFERENT CHANNELIZATION DEVICES MAY BE USED IN DIFFERENT AREAS OF A PROJECT.

IF, IN THE OPINION OF THE ENGINEER, SHORT TERM LANE CLOSURES ARE CREATING EXCESSIVE DELAYS TO TRAFFIC OR ARE CREATING A SAFETY CONCERN DUE TO SLOW OR STOPPED TRAFFIC, AFFECTED LANE CLOSURES SHALL BE REMOVED AND THE ROADWAY OPENED TO TRAFFIC.

THE ENGINEER MAY REQUIRE THAT ALL LANES BE RE-OPENED AT ANY TIME IF THE ROUTE IS NEEDED FOR EMERGENCY PURPOSES. THIS COULD INCLUDE INCIDENTS AT LOCATIONS NOT WITHIN THE PROJECT LIMITS.

TIME AND HOLIDAY RESTRICTIONS FOR ROADWORK – NY ROUTE 5

1. NO WORK/SHOULDER CLOSURE/LANE CLOSURE SHALL BE ALLOWED ON NY ROUTE 5
   A. EASTBOUND – OLD LAKE SHORE ROAD TO CHURCH STREET: 6AM–9AM
   B. WESTBOUND – CHURCH STREET TO OLD LAKE SHORE ROAD: 3PM–6PM

2. NO WORK/SHOULDER CLOSURE/LANE CLOSURE WILL BE ALLOWED FROM NOON FRIDAY UNTIL TUESDAY, ON THE FOLLOWING OBSERVED HOLIDAYS

   CANADA CIVIC HOLIDAY, AUGUST 4TH
   ERIE COUNTY FAIR, AUGUST 6TH–17TH
   LABOR DAY, MONDAY, SEPTEMBER 1ST
   THANKSGIVING DAY, THURSDAY, NOVEMBER 27TH

3. NO WORK/SHOULDER CLOSURE/LANE CLOSURE WILL BE ALLOWED FROM NOON THE DAY BEFORE UNTIL NOON THE DAY AFTER, ON THE FOLLOWING OBSERVED HOLIDAYS

   ERIE COUNTY FAIR, AUGUST 6TH–17TH
   THANKSGIVING DAY, THURSDAY, NOVEMBER 27TH
   CHRISTMAS DAY, THURSDAY, DECEMBER 25TH
   NEW YEARS DAY, THURSDAY, JANUARY 1ST

4. TIME RESTRICTIONS ARE FOR SINGLE LANE CLOSURES AND SHOULDER CLOSURES. SITE SPECIFIC VARIANCES TO TIME RESTRICTIONS WILL BE CONSIDERED ON A CASE BY CASE BASIS AND ONLY WITH APPROVAL OF NYSDOT REGIONAL TRAFFIC AND SAFETY ENGINEER OR STC.

5. ROADWORK IS DEFINED AS ANY LANE AND/OR SHOULDER WORK THAT REQUIRES CLOSURE.

HORIZONTAL ROADWAY ALIGNMENT ODELL STREET EXTENSION

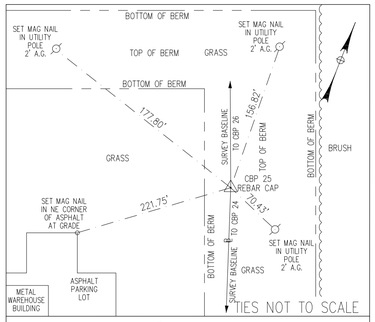
1	ELEMENT: LINEAR POB STA. O 1+41.80 N 1027548.9392 E 1075830.1233 POE STA. O 14+54.42 N 1027964.8538 E 1077075.1070 LENGTH: 1,312.62' BEARING: N 71° 31' 37" E

HORIZONTAL ROADWAY ALIGNMENT RIDGE ROAD EXTENSION

1	ELEMENT: LINEAR POB STA. R 1+00.00 N 1030151.9281 E 1075765.6590 POE STA. R 7+22.39 N 1030348.4296 E 1076356.2179 LENGTH: 622.39' BEARING: N 71° 35' 45" E

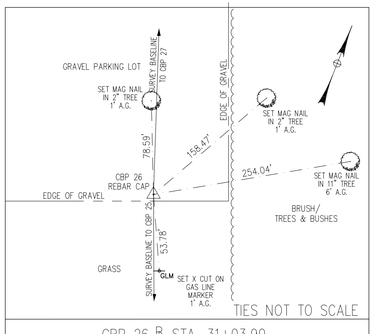
BENCHMARKS

BM-4	SET RAILROAD SPIKE IN UTILITY POLE ELEVATION = 585.17' N 1027605.8000 E 1075924.3710
BM-8	SET RAILROAD SPIKE IN UTILITY POLE ELEVATION = 583.40' N 1030394.1559 E 1076266.3509



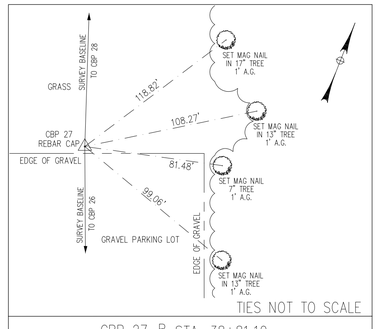
TIES NOT TO SCALE

CBP 25 ℄ STA. 22+75.40		
NYSPCS WEST ZONE	NAD83 (2011) EPOCH 2010.00	C.F. 0.99992087
N 1027002.443	E 1076859.007	



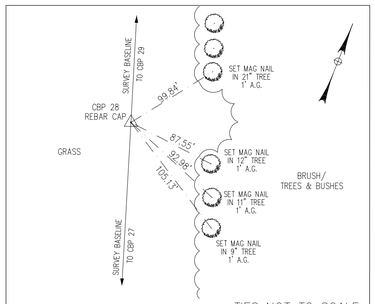
TIES NOT TO SCALE

CBP 26 ℄ STA. 31+03.90		
NYSPCS WEST ZONE	NAD83 (2011) EPOCH 2010.00	C.F. 0.99992087
N 1027772.081	E 1076552.287	



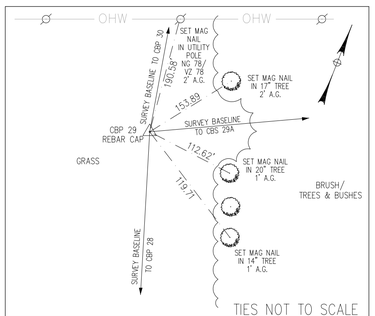
TIES NOT TO SCALE

CBP 27 ℄ STA. 38+81.10		
NYSPCS WEST ZONE	NAD83 (2011) EPOCH 2010.00	C.F. 0.99992087
N 1028504.618	E 1076292.606	



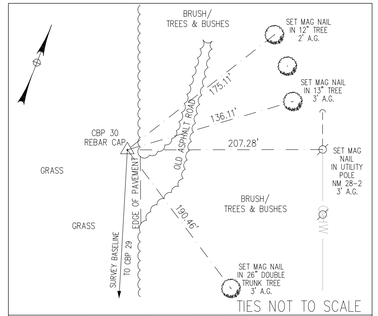
TIES NOT TO SCALE

CBP 28 ℄ STA. 46+58.81		
NYSPCS WEST ZONE	NAD83 (2011) EPOCH 2010.00	C.F. 0.99992087
N 1029243.285	E 1076049.289	



TIES NOT TO SCALE

CBP 29 ℄ STA. 54+36.46		
NYSPCS WEST ZONE	NAD83 (2011) EPOCH 2010.00	C.F. 0.99992087
N 1029981.793	E 1075805.662	



TIES NOT TO SCALE

CBP 30 ℄ STA. 59+41.71		
NYSPCS WEST ZONE	NAD83 (2011) EPOCH 2010.00	C.F. 0.99992087
N 1030477.879	E 1075709.871	

HORIZONTAL CONTROL TABLE – ODELL STREET EXTENSION

H.C.L. POINT	H.C.L. STA.	NORTHING	EASTING
POB	O 1+41.80	1027548.9392	1075830.1233
POE	O 14+54.42	1027964.8538	1077075.1070

HORIZONTAL CONTROL TABLE – RIDGE ROAD EXTENSION

H.C.L. POINT	H.C.L. STA.	NORTHING	EASTING
POB	R 1+00.00	1030151.9281	1075765.6590
POE	R 7+22.39	1030348.4296	1076356.2179

NOTES:

1. THIS BASE MAP WAS PREPARED FROM A FIELD SURVEY COMPLETED ON 8/10/2022.
2. COORDINATES ARE REFERENCED TO THE NEW YORK STATE PLANE COORDINATE SYSTEM WEST ZONE, NAD 83.
3. ELEVATIONS ARE REFERENCED TO THE NAVD 88 VERTICAL DATUMN.

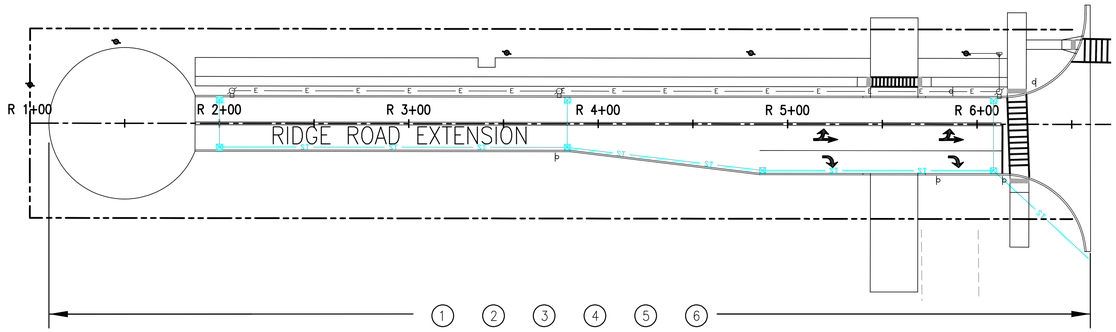
AZAR DESIGN CO
FORMERLY FOIT-ALBERT ASSOCIATES

ECIDA/ILDC
95 Perry Street, Suite 403
Buffalo, New York 14203

Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard

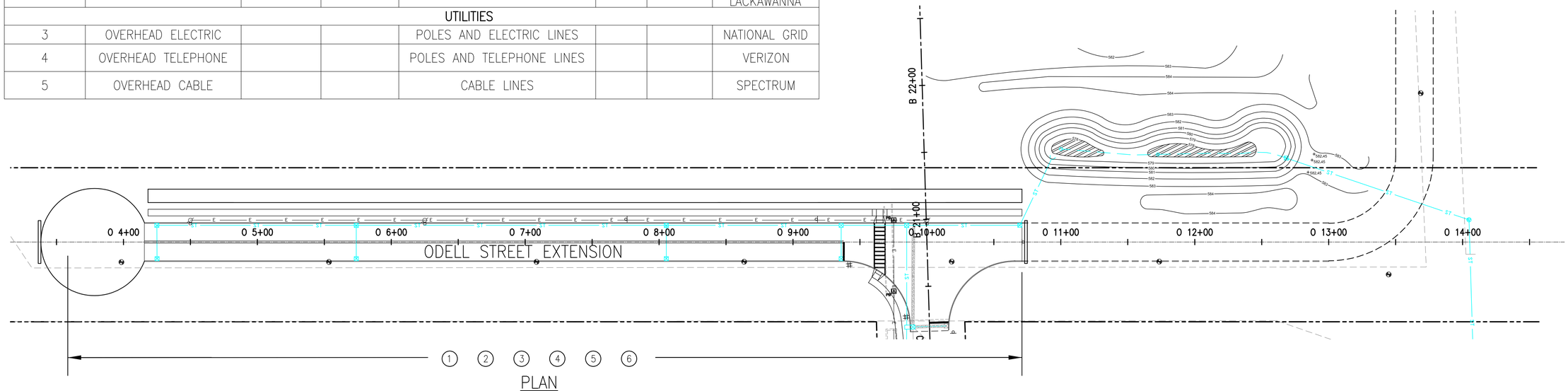
HORIZONTAL CONTROL PLAN, BASELINE TIES AND BENCHMARKS

Sheet No.
Date April 2025
Scale As Noted
DWG. HCP-1



PLAN
NOT TO SCALE

RIDGE ROAD EXTENSION MAINTENANCE JURISDICTION TABLE							
SECTION No.	HIGHWAY	LIMITS		FEATURES	FEET	LANE FEET	AGENCY
		STA	STA				
1	RIDGE ROAD	R 1+10.00	R 6+59.82	PAVEMENT, DRAINAGE SYSTEM, STRIPING, SIDEWALK, LIGHTING AND SIGNS	550	1100	CITY OF LACKAWANNA
SNOW AND ICE CONTROL							
2	RIDGE ROAD	R 1+10.00	R 6+59.82	SNOW AND ICE ON HIGHWAY	550	1100	CITY OF LACKAWANNA
UTILITIES							
3	OVERHEAD ELECTRIC			POLES AND ELECTRIC LINES			NATIONAL GRID
4	OVERHEAD TELEPHONE			POLES AND TELEPHONE LINES			VERIZON
5	OVERHEAD CABLE			CABLE LINES			SPECTRUM



PLAN
NOT TO SCALE

ODELL STREET EXTENSION MAINTENANCE JURISDICTION TABLE							
SECTION No.	HIGHWAY	LIMITS		FEATURES	FEET	LANE FEET	AGENCY
		STA	STA				
1	ODELL STREET	O 3+38.32	O 10+70.98	PAVEMENT, DRAINAGE SYSTEM, STRIPING, SIDEWALK, LIGHTING AND SIGNS	733	1466	CITY OF LACKAWANNA
SNOW AND ICE CONTROL							
2	ODELL STREET	O 3+38.32	O 10+70.98	SNOW AND ICE ON HIGHWAY	733	1466	CITY OF LACKAWANNA
UTILITIES							
3	OVERHEAD ELECTRIC			POLES AND ELECTRIC LINES			NATIONAL GRID
4	OVERHEAD TELEPHONE			POLES AND TELEPHONE LINES			VERIZON
5	OVERHEAD CABLE			CABLE LINES			SPECTRUM

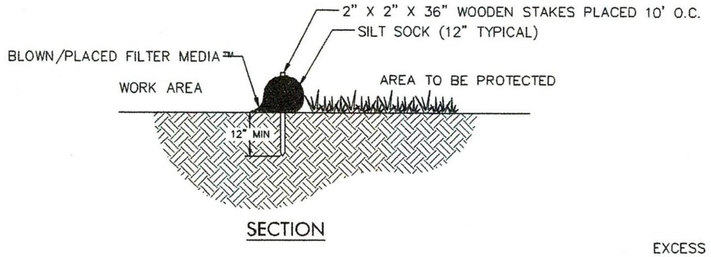
MAINTENANCE AND JURISDICTION NOTES:

1. 'SECTION No.' IN THE TABLE REFERS TO CORRESPONDING CIRCLED NUMBER ON ABOVE PLAN.
2. ALL EXISTING MUNICIPALLY OR PRIVATELY OWNED UTILITIES WITHIN THE LIMITS OF THE HIGHWAY RIGHT OF WAY (R.O.W.), WHICH REMAIN IN SERVICE UNCHANGED AND ALL SUCH FACILITIES RELOCATED AS A PART OF THE WORK PERFORMED UNDER THIS PROJECT, WHETHER CROSSING, LOCATED WITHIN OR ADJACENT TO THE R.O.W., SHALL BE MAINTAINED BY THE MUNICIPALITY OR BY THE PRIVATE OWNER AT NO COST OR EXPENSE TO THE COUNTY.
3. THE PORTION OF A DRIVEWAY OR PRIVATE ROAD CONSTRUCTED OR ADJUSTED UNDER THE PROJECT BETWEEN THE EDGE OF THE TRAVEL LANE AND THE OUTSIDE EDGE OF THE SHOULDER, OR GUTTER LINE, SHALL BE MAINTAINED BY THE COUNTY. THE REMAINING PORTION OF THE DRIVEWAY OR PRIVATE ROAD SHALL BE MAINTAINED BY THE OWNER(S).

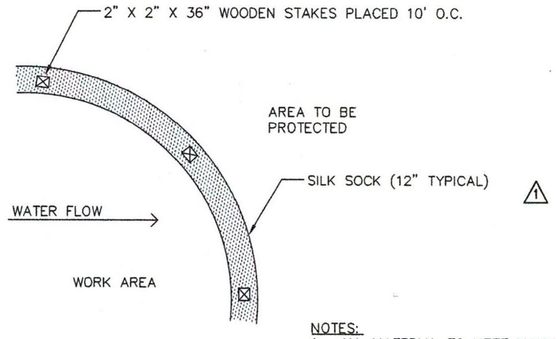
AZAR DESIGN CO
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ECIDA/ILDC
95 Perry Street, Suite 403
Buffalo, New York 14203
Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard
MAINTENANCE JURISDICTION PLAN

Sheet No.
Date April 2025
Scale As Noted
DWG. MJP-1



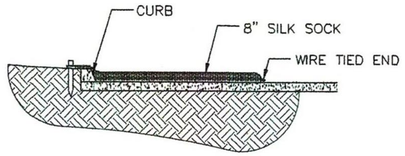
SECTION



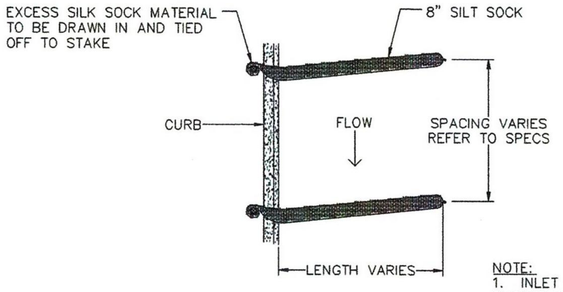
PLAN

NOTES:
1. ALL MATERIAL TO MEET MANUFACTURER SPECIFICATIONS.
2. FILTER MEDIA FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

SILT SOCK INLET PROTECTION
CURB CONTAINMENT
NTS

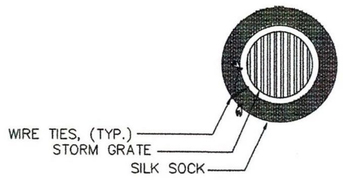


SECTION

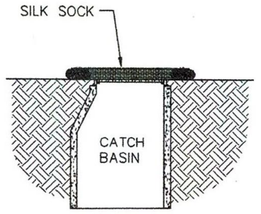


PLAN

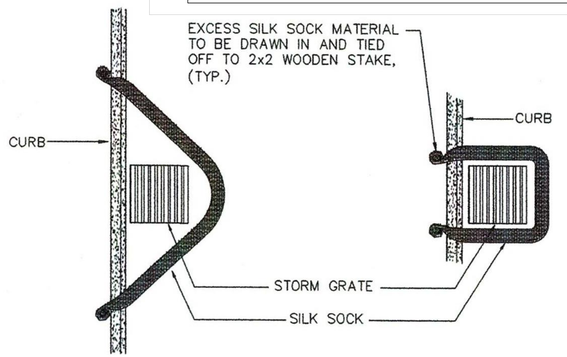
NOTE:
1. INLET PROTECTION SHOULD NOT BE PLACED DIRECTLY UPSLOPE FROM DRAIN INLETS



DRAIN INLET PLAN

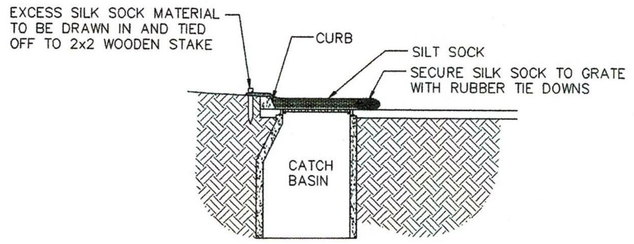


DRAIN INLET SECTION



CURBSIDE OPTION "A" PLAN

CURBSIDE OPTION "B" PLAN

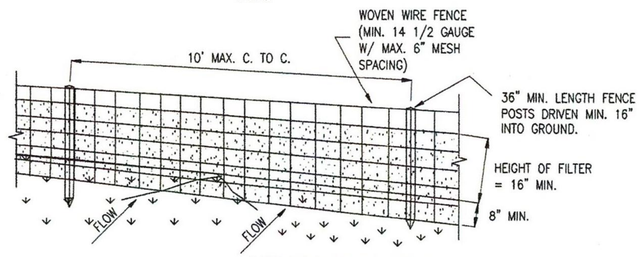


CURBSIDE SECTION

NOTES:
1. ALL MATERIAL TO MEET MANUFACTURER SPECIFICATIONS.
. FILTER MEDIA FILL TO MEET APPLICATION REQUIREMENTS.
. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.
. SILT SOCK SIZES SHALL BE APPROPRIATE FOR FIELD CONDITIONS OR A.O.B.E.

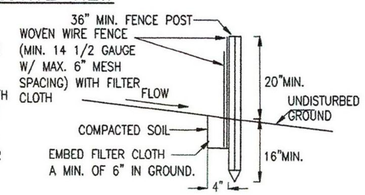
SILT SOCK INLET PROTECTION
NTS

SILT SOCK SEDIMENT CONTROL
NTS



PERSPECTIVE VIEW

CONSTRUCTION SPECIFICATIONS
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.



SECTION VIEW

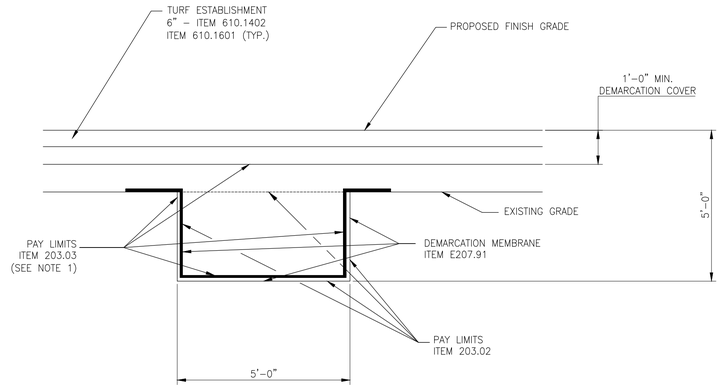
SILT FENCE INSTALLATION DETAIL
N.T.S.

CONSTRUCTION SPECIFICATIONS:
1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARDS CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIOINAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED,WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

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95 Perry Street, Suite 403
Buffalo, New York 14203
Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard
EROSION & SEDIMENT CONTROL DETAILS

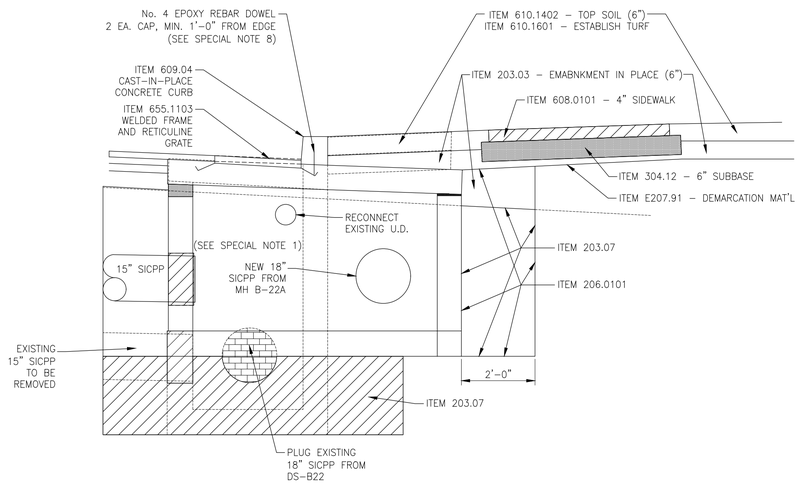
Sheet No.
Date April 2025
Scale As Noted
DWG. ECD-1



UTILITY TRENCH DETAIL
NOT TO SCALE

NOTES:

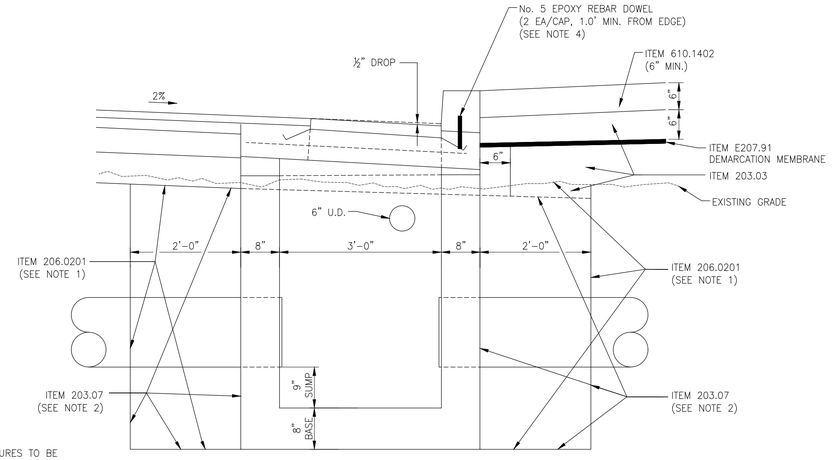
1. CLEAN BACKFILL MATERIAL MUST BE APPROVED BY NYSDEC.
2. SEE PLAN SHEETS FOR LOCATION.



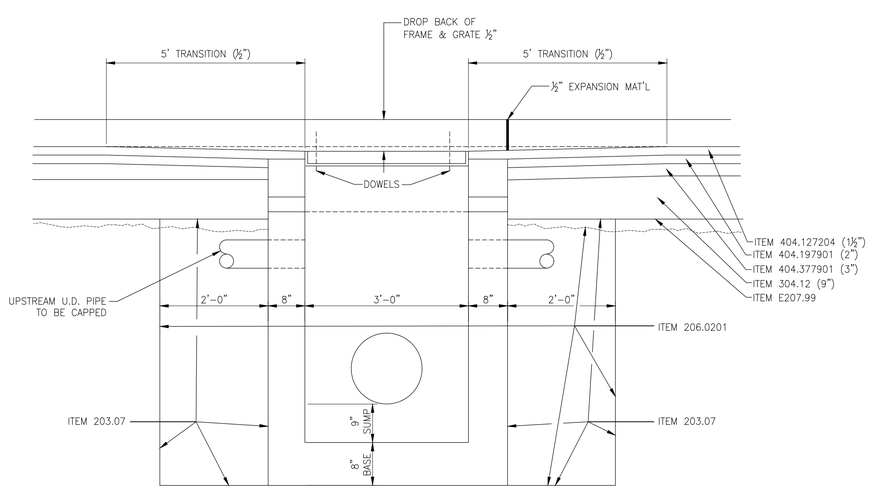
SPECIAL NOTES:

1. CONTRACTOR TO REMOVE EXISTING DS–B24, TYPE I DRAINAGE STRUCTURE IN IT'S ENTIRETY. EXISTING UNDERDRAIN TO BE RECONNECTED TO NEW TYPE M DRAINAGE STRUCTURE.
2. EXISTING 18" SICPP FROM DS–B22 SHALL HAVE BOTH ENDS OF PIPE COMPLETELY PLUGGED. PAYMENT INCLUDED IN ITEM 603.070501.
3. AREA UNDER EXISTING DS–B24 SHALL BE BACKFILLED WITH ITEM 203.07 – SELECT GRANULAR FILL TO BOTTOM OF NEW TYPE M DRAINAGE STRUCTURE.
4. CONTRACTOR TO INSTALL NEW TYPE M DRAINAGE STRUCTURE IN SUCH A WAY THE LONG SIDE IS PERPINDICULAR TO THE CURBLINE.

ITEM 604.300113 – DRAINAGE STRUCTURE (TYPE M)
(NOTE: STRUCTURE TO BE ROTATED 90 DEGREES)
NOT TO SCALE



SIDE VIEW



FRONT VIEW

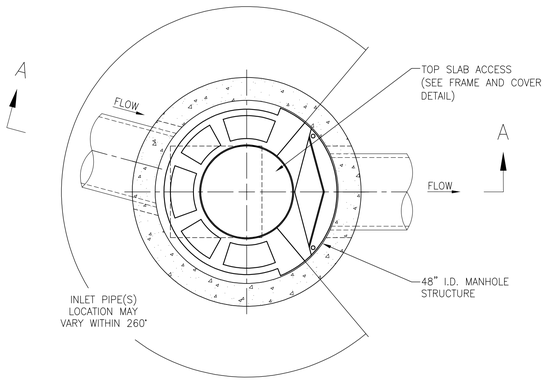
NOTES

1. EXCAVATION FOR DRAINAGE STRUCTURES TO BE PAID UNDER ITEM 206.0201. THE UPPER PAY LIMIT FROM EITHER THE ORIGINAL GROUND SURFACE LESS OVER BURDEN REMOVED UNDER ITEM 203.02 OR THE NEW TOP OF SUBGRADE, WHICH EVER IS AT THE LOWEST ELEVATION.
2. BACKFILL OF DRAINAGE STRUCTURES IS ITEM 203.07 – SELECT GRANULAR STONE. THE UPPER PAYMENT LINE WILL BE TO NEW TOP OF ROADWAY SUBGRADE. THE AREA BEHIND THE CURB FROM PROJECTION OF ROADWAY SUBGRADE TO DEMARCATION MATERIAL WILL BE PAID UNDER ITEM 203.03 REGARDLESS IF SELECT GRANULAR IS USED.
3. SLAG OR RECYCLED CONCRETE MATERIAL IS NOT PERMITTED IN THIS PROJECT.
4. CONTRACTOR HAS OPTION TO DRILL & GROUT EPOXY COATED REBAR IN FIELD OR HAVE IT PRECAST INTO A PRE–CAST TOP.
5. THE TOP OF THE DRAINAGE FRAME SHALL BE SET 1½" ABOVE THE CONCRETE CAP TO FACILITATE PLACEMENT OF THE 1½" ASPHALT TOP COURSE TO THE TOP OF FRAME.
6. SUITABLE EXCAVATED MATERIAL MAY BE USED TO BRING EXISTING GRADE BEHIND CURB TO A ROUGH GRADE OF 1'–0" BELOW FINISH GRADE TO FACILITATE PLACEMENT OF DEMARCATION MATERIAL WITH 6" OF APPROVED CLEAN FILL AND 6" OF APPROVED TOPSOIL.

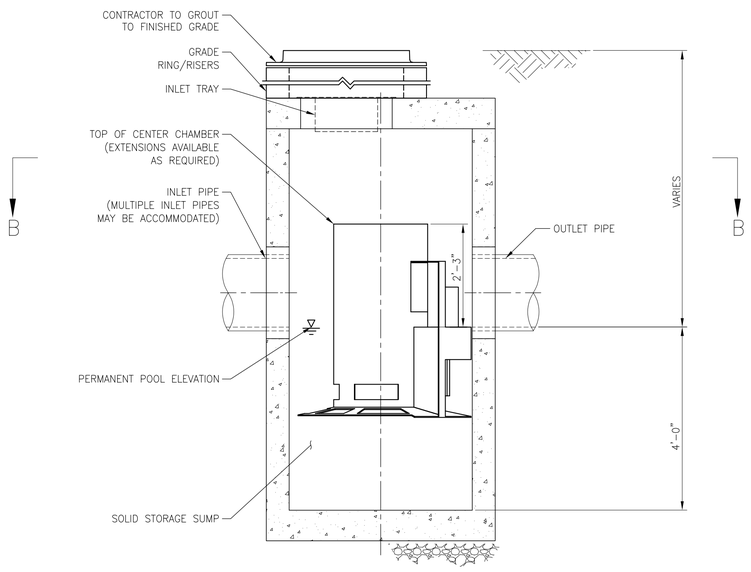
ITEM 604.300103 – DRAINAGE STRUCTURE (TYPE A)
NOT TO SCALE

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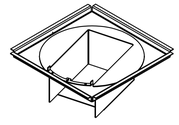
RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 15 OF 41



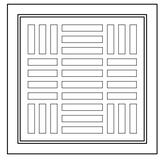
PLAN VIEW B–B
NOT TO SCALE



ELEVATION A–A
NOT TO SCALE

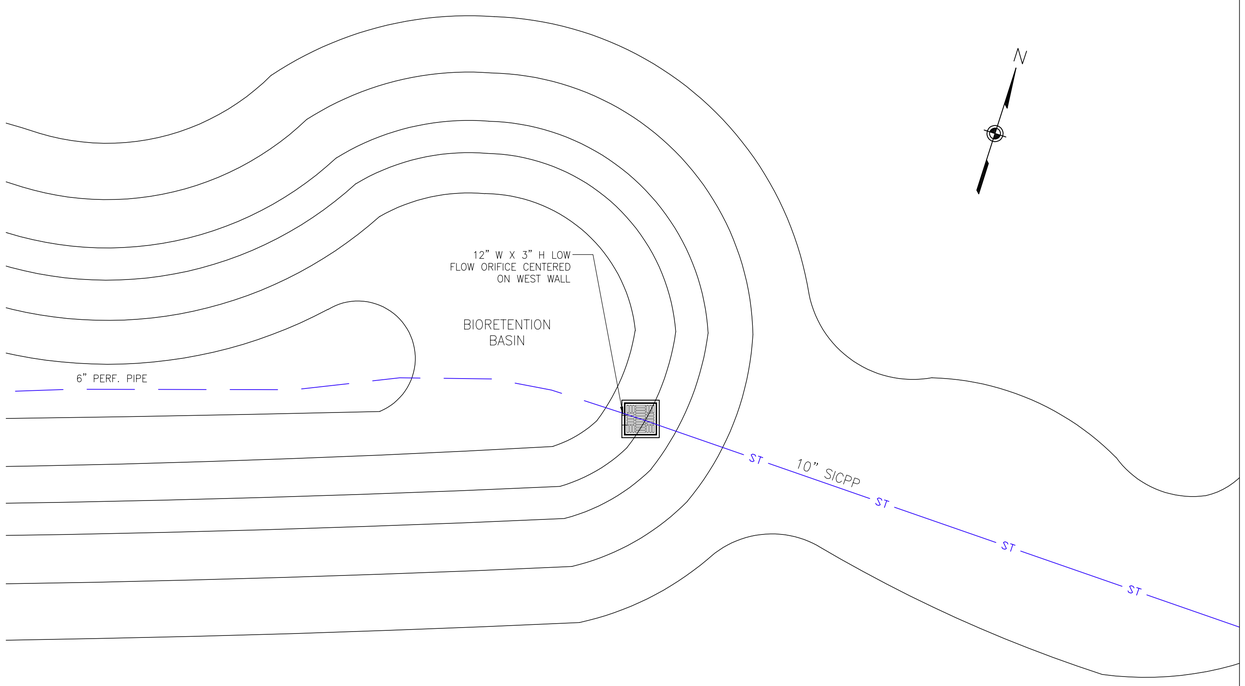


INLET TRAY
NOT TO SCALE

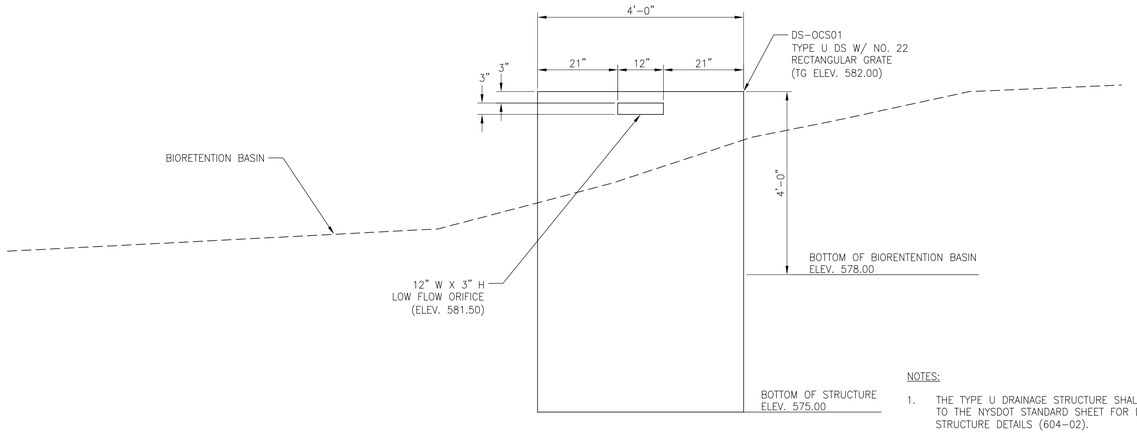


24" X 24" FRAME AND GRATE
(MAY VARY)
NOT TO SCALE

ITEM 208.5202 – STORMWATER CHAMBER INFILTRATION SYSTEM
NOT TO SCALE



PLAN VIEW



ELEVATION VIEW

NOTES:

1. THE TYPE U DRAINAGE STRUCTURE SHALL CONFORM TO THE NYSDOT STANDARD SHEET FOR DRAINAGE STRUCTURE DETAILS (604–02).
2. THE CONTRACTOR SHALL HAVE THE PRECAST TYPE U DRAINAGE INLET FABRICATED WITH A 12" W x 3" H LOW FLOW ORIFICE INCLUDED IN THE UNIT FOR DS–OCS01. THE COST OF INCLUDING THIS LOW FLOW ORIFICE SHALL BE INCLUDED IN THE PRICE BID FOR THE DRAINAGE INLET.

DRAINAGE STRUCTURE DS–OCS01 DETAIL FOR BIORETENTION BASIN
NOT TO SCALE

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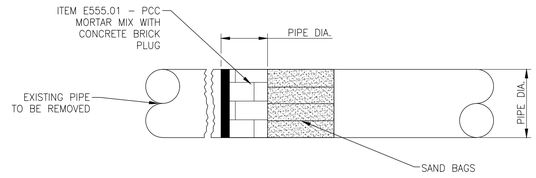
ECIDA/ILDC
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Buffalo, New York 14203

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MISCELLANEOUS DETAILS

Sheet No.
Date April 2025
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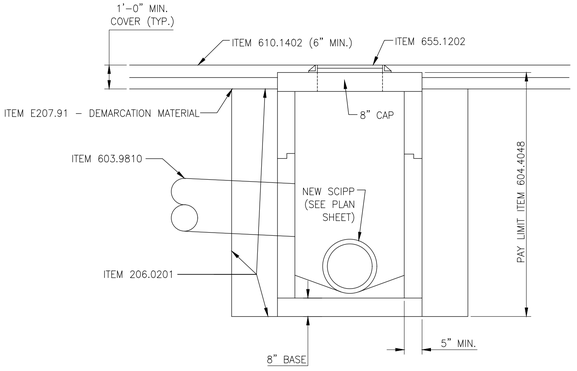
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PLUGGING ABANDON PIPE DETAIL
NOT TO SCALE

NOTE

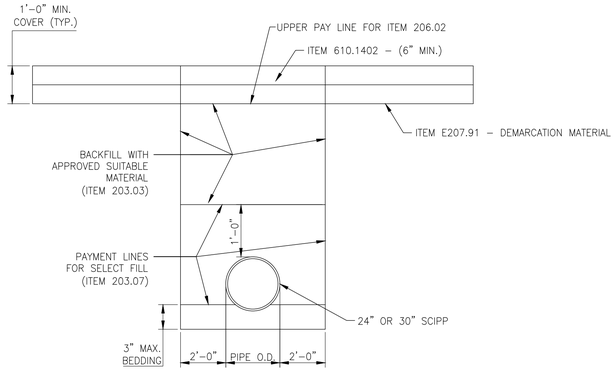
1. PLUG EXISTING PIPE WITH SAND BAGS. FILL REMAINING PORTION OF PIPE WITH CONCRETE BRICK AND TYPE "S" MORTAR. COST OF SAND BAGS, CUTTING OF PIPE, BRICKS, MORTAR AND ANY OTHER MATERIAL OR LABOR TO PLUG THE PIPE TO THE SATISFACTION OF THE E.I.C. IS IINCLUDED IN ITEM E555.01.



PRECAST ROUND MANHOLE DETAIL
NOT TO SCALE

NOTES:

1. DRAINAGE STRUCTURE DETAILS SHALL MEET NYSDOT REQUIREMENTS UNLESS OTHERWISE NOTED.



INSTALLATION OF STORM SEWER TRUNK SCIPP
NOT TO SCALE

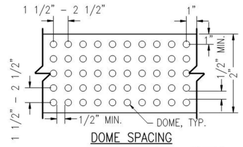
NOTES:

1. BACKFILL OH MANHOLES SHALL BE WITH ITEM 203.07 SELECT GRANULAR MATERIAL TO 1'–0" ABOVE SCIPP TRUNK LINE. REMAINDER OF BACKFILL IS WITH COMPACTED SUITABLE MATERIAL TO TOP OF SUBGRADE. COST OF SUITABLE NACKFILL MATERIAL IS INCLUDED IN ITEM 206.0201.

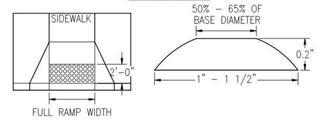
2. BACKFILL OF 15" SCIPP IN PAVEMENT AREA SHALL BE WITH ITEM 203.07 SELECT GRANULAR FILL TO THE NEW SUBGRADE ELEVATION. THE AREA BEHIND THE CURB FROM THE DRAINAGE STRUCTURE TO THE NEW STORM SEWER MANHOLES SHALL BE WITH SELECT GRNAULAR FILL FOR 1'–0" OVER TOP OF THE PIPE. THE REMAINDER OF AREA OVER THE SELECT FILL WILL BE PAID UNDER ITEM 203.03 REGARDLESS IF SELECT GRANULAR FILL IS USED.

3. ITEM 552.17 – SHIELDS AND SHORING USED FOR EXCAVATION PROTECTION AND SHALL BE PAID FROM EXCAVATION BOTTOM TO 4'–0" DOWN FROM EXISTING STABILIZED GROUND SURFACE OR AOBE. PAYMENT WILL BE MADE FOR TWO SIDES BEING PROTECTED.

COLOR: BLACK (PER NYSDOT)

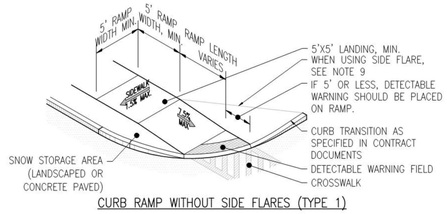


DOME SPACING



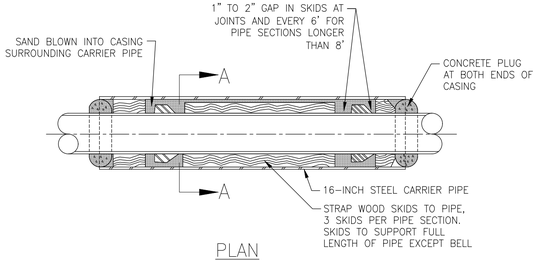
DETECTABLE WARNING AT CURB RAMP

DOME SECTION

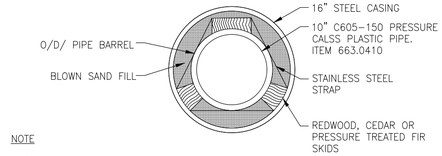


CURB RAMP WITHOUT SIDE FLARES (TYPE 1)

ACCESSIBLE RAMPS WITH DETECTABLE WARNING STRIP DETAILS
N.T.S.



PLAN
NOT TO SCALE

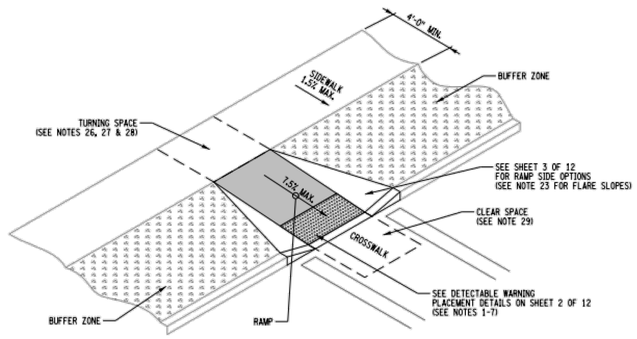


NOTE

BORE CASING DESIGNS TO BE APPROVED BY ENGINEER.

SECTION A–A
NOT TO SCALE

BORE CASING DETAIL



CURB RAMP CONFIGURATION: TYPE 11 MID BLOCK CROSSING OR T INTERSECTION
NOT TO SCALE

NOTES:

1. THE DETECTABLE WARNING DETAILS PROVIDED ARE NOT DRAWN TO SCALE, THE QUANTITY OF DOMES DEPICTED ON THE DETECTABLE WARNING FIELD (THE DOMES AND THE ENTIRE 2' LEVEL SURFACE) IS FOR ILLUSTRATION ONLY.

2. LOCATION OF DETECTABLE WARNINGS. DETECTABLE WARNINGS SHALL BE LOCATED SO THAT THE EDGE OF THE WARNING FIELD NEAREST TO THE ROADWAY OR STREET SURFACE IS 6" TO 9" (1' WHERE TRANSVERSABLE CURB IS USED) FROM THE EDGE OF THE ROADWAY/STREET, OR FROM THE FACE OF THE DROPPED CURB, WHERE A DROPPED CURB CONTINUES ACROSS THE BOTTOM OF THE SIDEWALK CURB RAMP OR FLUSH SURFACE.

3. DOME ALIGNMENT. DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL.

4. PAYMENT LINES ARE THE 2' DIMENSION SHOWN IN THE DETAILS EXTENDING THE FULL WIDTH OF THE CURB RAMP AND/OR APPLICABLE SURFACES. LANDINGS SHALL HAVE A MINIMUM CLEAR DIMENSION OF A 5' BY 5' SQUARE.

5. LANDINGS MAY OVERLAP WITH ADJACENT LANDINGS OR A SINGLE LANDING MAY SERVE MULTIPLE CURB RAMPS OR PARALLEL OR PARALLEL/PERPENDICULAR RAMPS. LANDINGS MAY OVERLAP WITH THE CLEAR GROUND SPACE REQUIRED AT PEDESTRIAN SIGNAL PUCH BUTTONS.

6. CROSS SLOPES: THE MAXIMUM CROSS SLOPE OF CURB RAMPS SHALL BE 2 PERCENT. THE MAXIMUM CROSS SLOPE AT LANDINGS IS 2 PERCENT IN ANY DIRECTION. SURFACES SHALL GENERALLY LIE IN CONTINUOUS PLANES WITH A MINIMUM OF SURFACE WARP.

7. THE RUNNING GRADE OF CURB RAMPS SHOULD BE AS FLAT AS PRACTICABLE. THE MAXIMUM RUNNING GRADE OF ANY PORTION OF ANY CURB RAMP SHALL BE 1:14 (75%). CURB RAMPS ARE NOT REQUIRED TO BE LONGER THAN 15'.

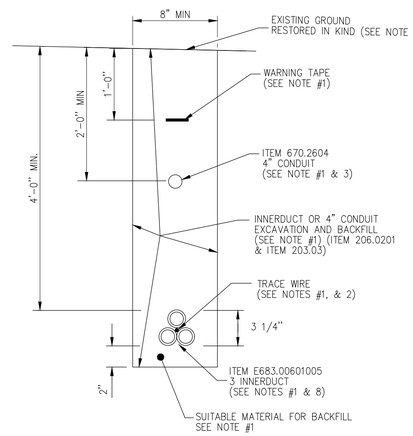
8. THE SURFACE OF ALL CURB RAMPS SHALL BE STABLE, FIRM AND SLIP RESISTANT. A COARSE BROOM FINISH RUNNING PERPENDICULAR TO THE SLOPE IS RECOMMENDED ON CONCRETE RAMP SURFACES, EXCLUSIVE OF THE DETECTABLE WARNING FIELDS.

9. CURB RAMPS LOCATED WHERE PEDESTRIANS MAY WALK ACROSS THE CURB RAMP SHALL HAVE FLARED SIDES. THE LENGTH OF THE FLARES SHALL BE AT LEAST TEN (10) THE TIMES THE CURB HEIGHT, MEASURED ALONG THE CURB LINE. WHEN INFEASIBLE OR IMPRACTICABLE TO PROVIDE A LANDING THAT IS AT LEAST 4' WIDE (MEASURED FROM THE TOP OF THE RAMP TO THE BACK OF THE SIDEWALK), THE LENGTH OF THE FLARES SHALL BE TWELVE (12) TIMES THE CURB HEIGHT MEASURED ALONG THE CURB LINE.

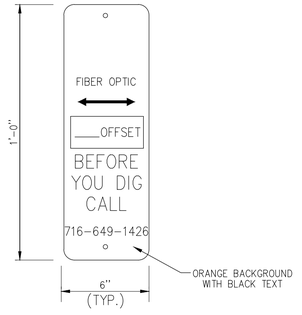
10. COORDINATE ALL TRAFFIC CONTROL DEVICES, UTILITY LOCATIONS, SIGNS, STREET FURNITURE AND DRAINAGE TO ENSURE A CONTINUOUS PEDESTRIAN ACCESS ROUTE AT ALL CURB RAMP LOCATIONS. GUIDANCE FOR CROSSWALK MARKINGS AND TRAFFIC CONTROL DEVICES IS PROVIDED IN THE MUTCD. DRAINAGE GRATES AND UTILITY ACCESS COVERS ARE NOT ALLOWED IN RAMP WALKING SURFACES OR LANDINGS.

11. AT MARKED CROSSINGS, THE FULL WIDTH OF THE RAMP SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS. THE SIDES OF THE RAMPS (THE FLARES) NEED NOT BE WITHIN THE WIDTH OF THE MARKINGS.

12. RAMP TRANSITIONS BETWEEN WALKS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT VERTICAL CHANGES (1/4" MAX.).



INNERDUCT AND 4" CONDUIT INSTALLATION
NOT TO SCALE



INNERDUCT PATH MARKER
NOT TO SCALE
(INCLUDED IN ITEM E683.00601005)

INNERDUCT AND 4" CONDUIT NOTES:

1. ALL INNERDUCT AND 4" CONDUIT, SHALL BE INSTALLED ACCORDING TO THE DTAILS ON THIS PAGE AND CONTRACT SPECIFICATIONS FOR 1–1/2" INNERDUCT AND 4" CONDUIT, BETWEEN THE EXISTING PULLBOXES AND EQUIPMENT CABINETS SHOWN ON THE CONTRACT PLANS. ALL LOCATIONS AND QUANTITIES SHOWN ON THE PLANS ARE THEORETICAL AND MAY CHANGE DUE TO FIELD CONDITIONS, OR METHOD OF WORK, NO ADDITIONAL PAYMENT SHALL BE MADE FOR ANY SUCH CHANGE REQUIRED TO COMPLETE INSTALLATION OF INNERDUCT OR 4" CONDUIT AS SPECIFIED AND DETAILED BETWEEN THE LOCATIONS SHOWN.

2. A TRACE WIRE SHALL BE BUNDLED WITH, BUT OUTSIDE THE INNERDUCT OVER THE LENGTH OF THE INNERDUCT AND EXTENDED INTO EACH PULLBOX THE INNERDUCT ENTERS. TRACE WIRE IS NOT REQUIRED FOR 4" CONDUIT INSTALLATION.

3. 4" CONDUIT SHALL NOT REPLACE ANY SECTION OF INNERDUCT SHOWN ON THE CONTRACT PLANS.

4. THE CONTRACTOR SHALL SAW CUT THE ENTIRE DEPTH OF ALL HARD SURFACES PRIOR TO EXCAVATION. LONGITUDINAL SAW CUTS IN SIDEWALK ARE NOT PERMITTED EXCEPT AS DIRECTED BY THE ENGINEER.

5. TRANSVERSE OPEN PAVEMENT CUTS ARE NOT PERMITTED IN THE ROADWAY SECTION.

6. CONCRETE SHALL NOT BE POURED IN DIRECT CONTACT WITH ANY INNERDUCT OR TRACE WIRE.

7. EACH BANK OF 3 INNERDUCT SHALL CONTAIN THE FOLLOWING COLORS; YELLOW, RED OR WHITE.

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Renaissance Commerce Park Odell Street Extension at Steelworkers Way & Ridge Road Extension at Fuhrmann Boulevard	Sheet No.
	Date April 2025
	Scale As Noted
MISCELLANEOUS DETAILS	DWG. MSD-3

SPECIFICATIONS

LIGHTING POLE:

1. MANUFACTURER: HAPCO 25'
2. MATERIAL: ALUMINUM STAIN ALUMINUM
3. COLOR: GRAY
4. SHAFT: ROUND AND TAPERED
5. MODEL No.: RSA25D8-4-01

ARM:

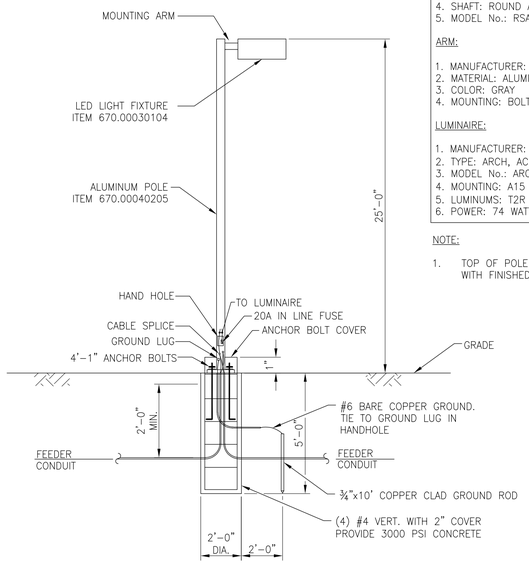
1. MANUFACTURER: STREETWORKS (NO OPTIONS)
2. MATERIAL: ALUMINUM
3. COLOR: GRAY
4. MOUNTING: BOLT

LUMINAIRE:

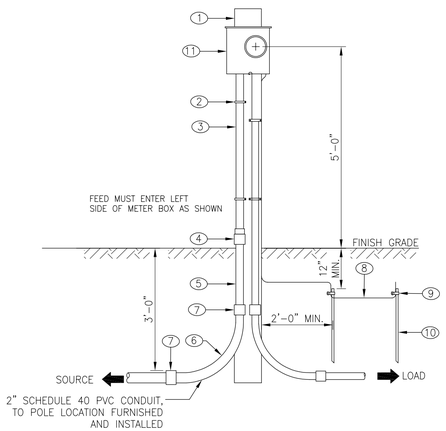
1. MANUFACTURER: STREETWORKS
2. TYPE: ARCH, ACHEON SMALL/LED
3. MODEL No.: ARCH-AF24-70-D-U-T2R-4-AP
4. MOUNTING: A15 (STRAIGHT ARM 15")
5. LUMINUMS: T2R 4000/5000K 8,222 A F24-70
6. POWER: 74 WATTS

NOTE:

1. TOP OF POLE FOUNDATION TO BE SET FLUSH WITH FINISHED GROUND.



LIGHTING POLE FOUNDATION DETAIL
NOT TO SCALE
TO BE PAID UNDER ITEM 670.0105



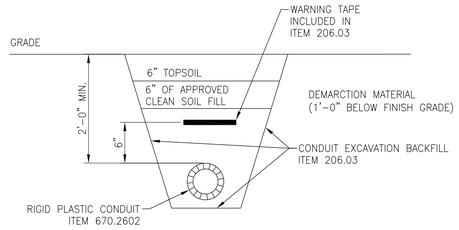
MATERIALS LIST

1. SUPPORT POST 8" x 8" (PRESERVATIVE TREATED) MIN. SQUARE OR 8" DIA. MIN. ROUND
2. PIPE STRAPS
3. 2" CONDUIT SCHEDULE 80 PVC CONDUIT
4. 2" SLIP JOINT FROST HEAVE PROTECTION INSTALLED ABOVE GRADE
5. 2" CONDUIT SCHEDULE 40 PVC BELOW FINISH GRADE
6. 2" 90° SWEEP GALVANIZED STEEL
7. 2" ADAPTER
8. GROUND WIRE NO. 6 COPPER (MIN. SIZE)
9. GROUND ROD CONNECTORS
10. GROUND RODS (2) MIN. 8'-0" x ⅝" DIAMETER COPPER CLAD
11. METER SOCKET TO BE SECURELY ATTACHED TO POST BY CONSUMER

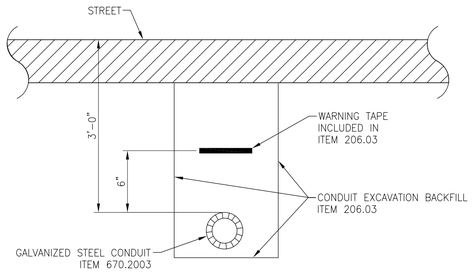
REMOTE METER LOCATION
NOT TO SCALE
TO BE PAID UNDER ITEM 670.53070104

NOTES:

1. ALL CONDUIT AND ACCESSORIES MUST MEET ELECTRICAL GRADE SPECIFICATIONS.
2. ALL SERVICE ENTRANCE WIRING MUST BE COMPLETE AND ALL NECESSARY EXCAVATION AND CONDUIT READY PRIOR TO THE TIME OF INSTALLATION OF THE UNDERGROUND SERVICE LATERAL CONDUCTORS BY THE UTILITY COMPANY.
3. ALL WIRING AND MATERIALS MUST CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE AND TO APPLICABLE LOCAL CODES WHERE CONFLICTS EXISTS, THE MORE STRINGENT CODE WILL APPLY.



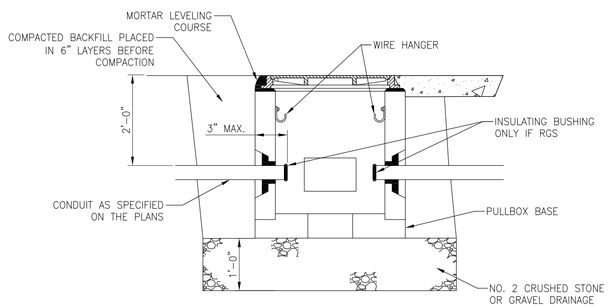
CONDUIT IN DIRECT BURIAL
NOT TO SCALE



CONDUIT UNDER STREET
DRIVEWAY AND PARKING LOTS
DIRECT BURIAL CONDUIT DETAIL
NOT TO SCALE

NOTES:

1. ALL CONDUIT RUNS SHALL DRAIN TO THE PULLBOX.
2. CONDUIT TO BE INLINE WITH LIGHT FOUNDATIONS AND A MINIMUM OF 3'-0" FROM CURB.



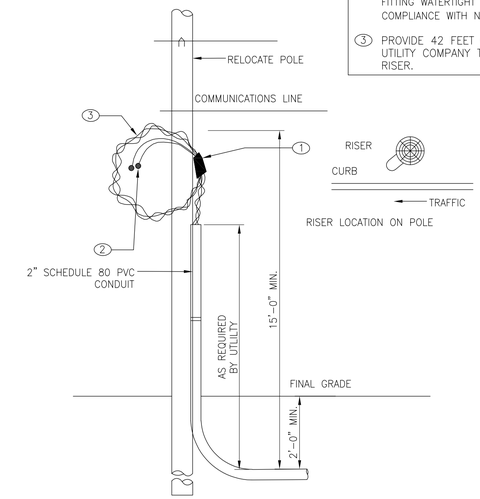
PULLBOX DETAIL
NOT TO SCALE

NOTES:

1. ALL ITEMS INCLUDING EXCAVATION AND BACKFILL AND CRUSHED STONE TO BE PAID UNDER PULLBOX ITEM 670.3001.
2. PULLBOXES SHALL HAVE A CAST FRAME AND COVER MEETING THE REQUIREMENTS OF SECTION 715-02. COVERS SHALL HAVE "LIGHTING" IN RAISED LETTERS.

NOTES:

1. CABLE IS TO BE ATTACHED TO THE POLE WELL ABOVE THE TOP OF THE RISER WITH A KELLUMS GRIP BASKET OR LENGTH OF LINE TIED IN A "ROLLING BEND KNOT" SO AS TO PROTECT THE CABLE FROM MECHANICAL BENDING DAMAGE.
2. ALL CABLE SHALL BE PROPERLY END CAPPED AT BOTH ENDS BY THE CONTRACTOR WITH APPROVED TIGHT FITTING WATERTIGHT SEALING CAPS OR IN STRICT COMPLIANCE WITH NEC §300.5(E).
3. PROVIDE 42 FEET OF CABLE PER PHASE FOR UTILITY COMPANY TO COMPLETE INSTALLATION OF RISER.



SERVICE POINT RISER
NOT TO SCALE
ITEM 680.700606

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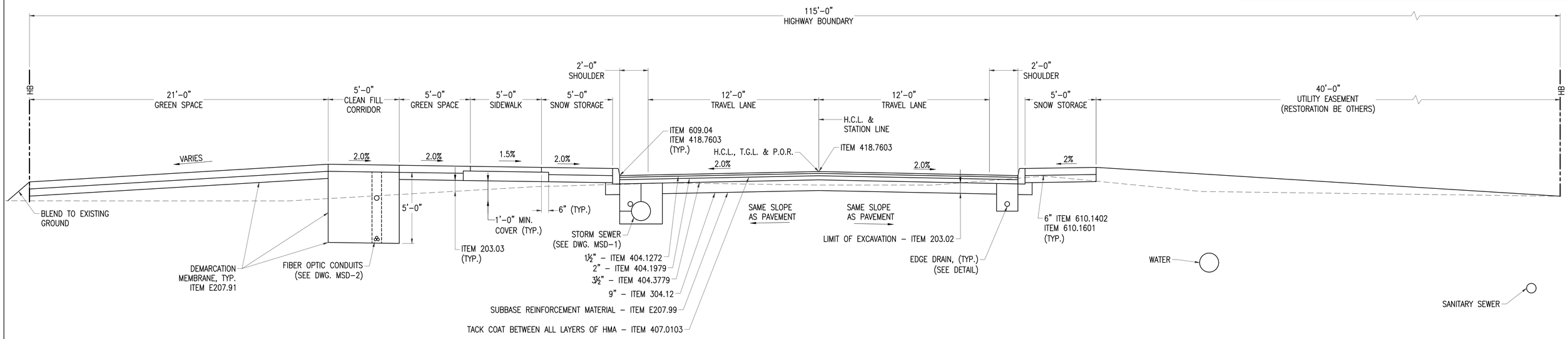
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LIGHTING DETAILS

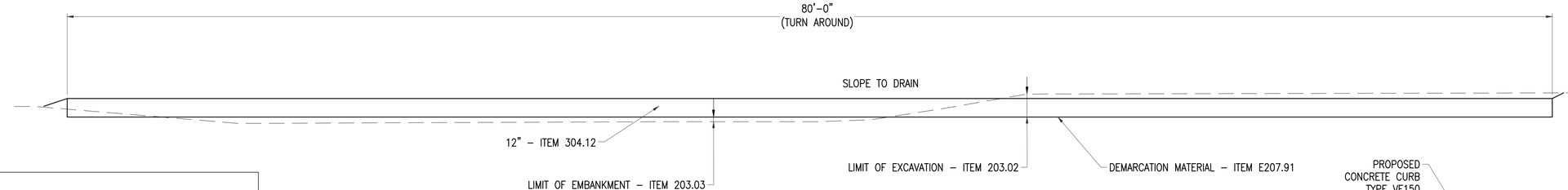
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Date	April 2025
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RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
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TYPICAL SECTION - NORMAL CROWN

NOT TO SCALE



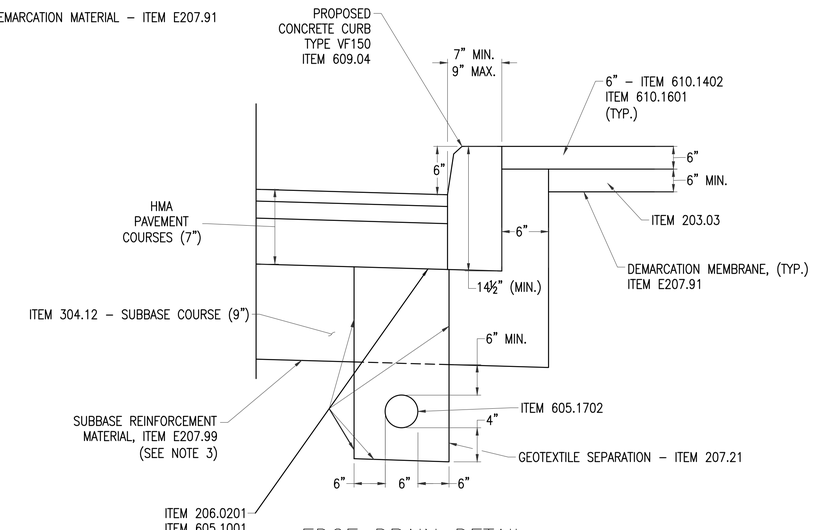
STONE CIRCLE TURN-AROUND

NOT TO SCALE

NOTES

1. BOTTOM OF PROPOSED SUBBASE SHALL MEET THE BOTTOM OF EXISTING SUBBASE AT INTERSECTION OF STEELWORKERS WAY.
2. ITEM 418.7603 - ASPHALT PAVEMENT JOINT SEALER SHALL BE APPLIED FULL DEPTH AT INTERFACE WITH STEELWORKERS WAY ASPHALT, ALONG FACE OF CURB FOR TOP COURSE ASPHALT AND ALONG ALL LONGITUDINAL AND TRANSVERSE PAVEMENT COLD JOINTS IN TOP COURSE.
3. EXCAVATION FOR UNDERDRAINS SHALL BE DONE AFTER SUBBASE HAS BEEN PLACED. THE SUBBASE REINFORCEMENT MATERIAL SHALL BE RESTABLISHED OVER THE UNDER-DRAIN TRENCH. THE CONTRACTOR SHALL DEVELOP THE MEANS AND METHOD TO REMOVE AND REPLACE THE SUBBASE REINFORCEMENT MATERIAL AND BE APPROVED BY THE ENGINEER-IN-CHARGE. NO EXTRA PAYMENT WILL BE MADE FOR REMOVING AND REINSTALLING THE SUBBASE REINFORCEMENT MATERIAL OVER UNDERDRAIN TRENCH.
4. REFER TO INTERIM EXCAVATION WORK PLAN NOTES ON DWG. NO.
5. REFER TO DWG. NO. MSD-1 FOR CLEAN FILL CORRIDOR DETAILS.
6. PAVEMENT SUBGRADE SHALL BE PROOF ROLLED IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SECTION 203. ONLY A CHARRIOT STYLE PROOF ROLLER MEETING THE REQUIREMENTS OF THIS SECTION WILL BE ACCEPTED. ANY AREA FOUND UNACCEPTABLE SHALL BE REMOVED, REPLACED AND RETESTED. COST OF REMOVAL OF UNSUITABLE MATERIAL, REPLACEMENT WITH SUITABLE MATERIAL AND RETESTING WITH PROOF ROLLER AND DENSITY GAGE (AOBE) SHALL BE BORNE BY THE CONTRACTOR REGARDLESS IF APPROVED MATERIAL WAS INITIALLY USED.
7. THE ABOVE SHALL APPLY UNLESS THE DEPTH OF REMOVAL IS GREATER THAN TWO-FEET (2') BELOW ORIGINAL GROUND OR ROAD CUT EXCAVATION LIMITS, WHICH EVER IS AT THE LOWEST ELEVATION AND WAS NOT ASCERTAINABLE AT THE TIME OF ORIGINAL ROADWAY CUT. THEN PAYMENT SHALL BE MADE USING CONTRACT BID ITEMS 203.02 AND EITHER 203.03 OR 204.01 CONTROLLED LOW STRENGTH MATERIAL.
8. THE CONTRACTOR SHALL PROVIDE AT THEIR EXPENSE AN APPROVED CERTIFIED TESTING FIRM THAT IS ACCEPTABLE TO THE EIC FOR ALL MATERIAL TESTING AND COMPACTION TESTING.

ITEM	DESCRIPTION	UNIT
203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY
203.03	EMBANKMENT IN PLACE	CY
206.0201	TRENCH AND CULVERT EXCAVATION	CY
207.21	GEOTEXTILE SEPARATION	SY
E207.91	DEMARCATION MEMBRANE	SY
E207.99	SUBBASE REINFORCEMENT MATERIAL, LAYER 2	SY
304.12	SUBBASE COURSE, TYPE 2	CY
404.1272	12.5 F2 TOP COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.1979	19 F9 BINDER COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.3779	37.5 F9 BASE COURSE ASPHALT, 70 SERIES COMPACTION	TON
407.0103	STRAIGHT TACK COAT	GAL
418.7603	ASPHALT PAVEMENT JOINT ADHESIVE	LF
605.1001	UNDERDRAIN FILTER, TYPE II	CY
605.1702	OPTIONAL UNDERDRAIN PIPE, 6" DIAMETER	LF
608.0101	CONCRETE SIDEWALKS AND DRIVEWAYS	CY
609.04	CAST-IN-PLACE CONCRETE CURB (AS DETAILED)	LF
610.1402	TOPSOIL - ROADSIDE	CY
610.1601	TURF ESTABLISHMENT - ROADSIDE	SY



EDGE DRAIN DETAIL

NOT TO SCALE

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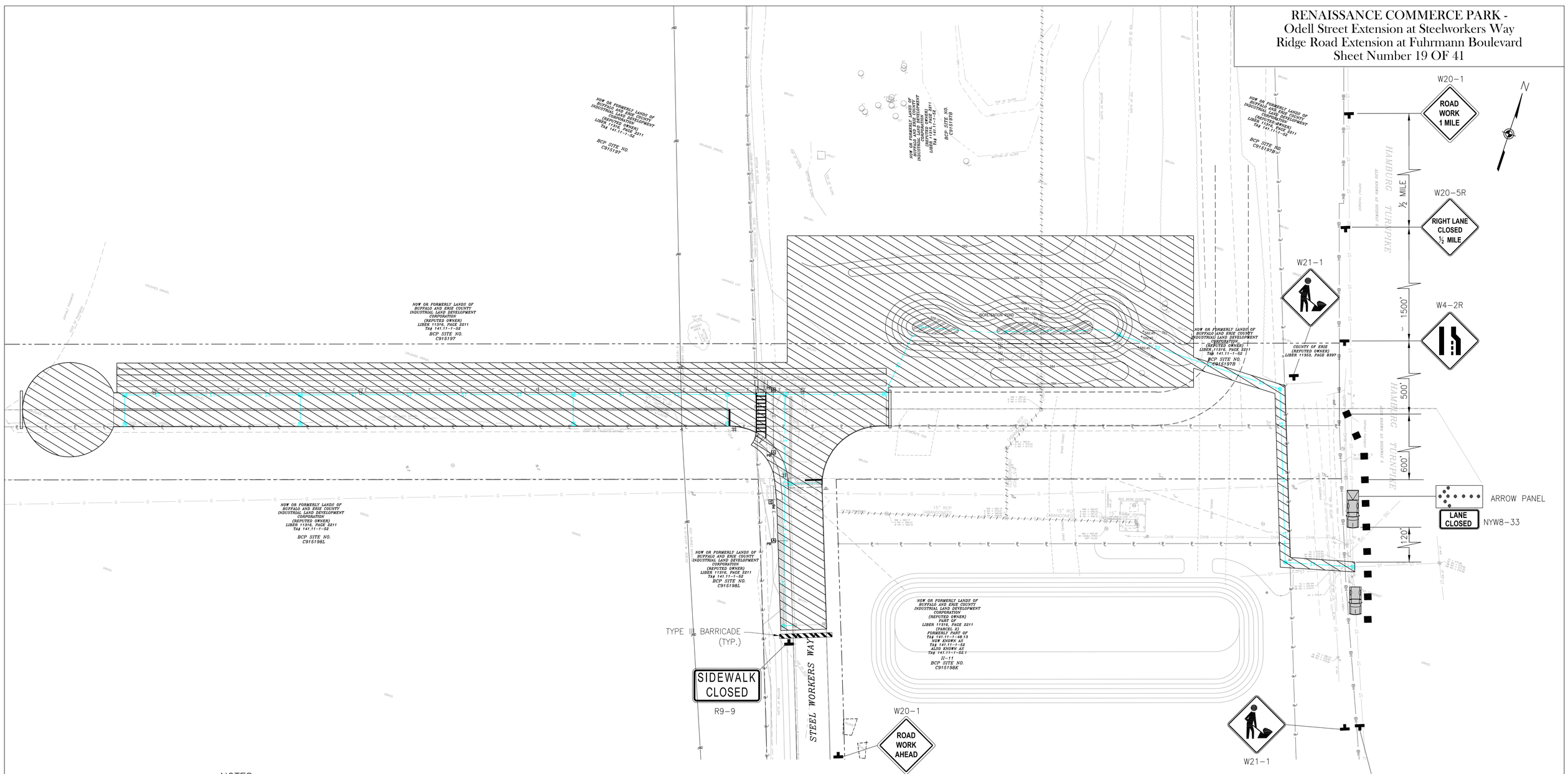
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TYPICAL SECTIONS

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RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
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LEGEND:

- CONSTRUCTION SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- WORK AREA
- PROTECTIVE VEHICLE (W/ TMIA)
- WORK VEHICLE

NOTES:

1. MAINTENANCE AND PROTECTION OF TRAFFIC SHALL BE PROVIDED THROUGHOUT THE LENGTH OF THE CONTRACT IN ACCORDANCE WITH THE PROVISIONS OF SECTION 619 OF THE NYSDOT STANDARD SPECIFICATIONS AND STANDARD SHEETS FOR WORK ZONE TRAFFIC CONTROL, THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND ANY PROVISIONS CONTAINED IN THE CONTRACT DOCUMENTS, AND AS ORDERED BY THE ENGINEER (A.O.B.E.). THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL BE DEFINED AS THE MUTCD, 2009 EDITION AND THE NYS SUPPLEMENT 2010 EDITION, EFFECTIVE MARCH 16, 2011.
2. PRIOR TO THE START OF ANY WORK THAT WILL AFFECT TRAFFIC OR WORKER SAFETY, ALL RELATED WORK FOR PROPOSED WORK ZONE TRAFFIC CONTROL SHALL BE COMPLETE. THIS INCLUDES BUT IS NOT LIMITED TO, ALL SIGNS, SIGNALS, PAVEMENT MARKINGS, BARRIERS, DELINEATION (CONES, DRUMS, ETC.), FLAGGERS, PAVEMENT MODIFICATIONS, TEMPORARY STRIPING, AND ANY OTHER RELATED WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UTILIZING ALL APPLICABLE NYSDOT STANDARD SHEETS, SECTION 619, FOR ALL WORK ZONE TRAFFIC CONTROL, AT THE PROJECT SITE. THIS INCLUDES THE USE OF NOTES, TABLES AND DETAILS WITHIN SECTION 619. THE TYPICAL DETAILS DEPICTED ON THE NYSDOT STANDARD SHEETS, NYSDOT WORK ZONE TRAFFIC CONTROL MANUAL AND IN THE MUTCD, REFLECT THE MINIMUM REQUIREMENTS.
4. THE LOCATIONS OF SIGNS SHOWN ON WORK ZONE TRAFFIC CONTROL DETAILS MAY NEED TO BE ADJUSTED BASED ON SIGHT DISTANCE AND OTHER SITE SPECIFIC CONSIDERATIONS. THE FINAL LOCATIONS ARE SUBJECT TO APPROVAL OF THE ENGINEER.
5. WHERE POSSIBLE, ALL CHANNELIZING AND GUIDING DEVICES ARE TO BE PLACED SO AS TO PROVIDE A MINIMUM 2' LATERAL CLEARANCE TO THE TRAVELED WAY.
6. STOCKPILING OF MATERIALS AND PARKING OF EQUIPMENT IS PROHIBITED DURING NON-WORKING HOURS ON PAVEMENT AND SHOULDERS.
7. THE OPENING OF THE NEW ROAD WILL BE AT THE CITY OF LACKAWANNA'S DIRECTION.
8. PEDESTRIAN/BICYCLIST TRAFFIC MUST BE MAINTAINED AT ALL TIMES.

0 40 80 120 FT

HORIZONTAL SCALE
1" = 40' SCALE BAR

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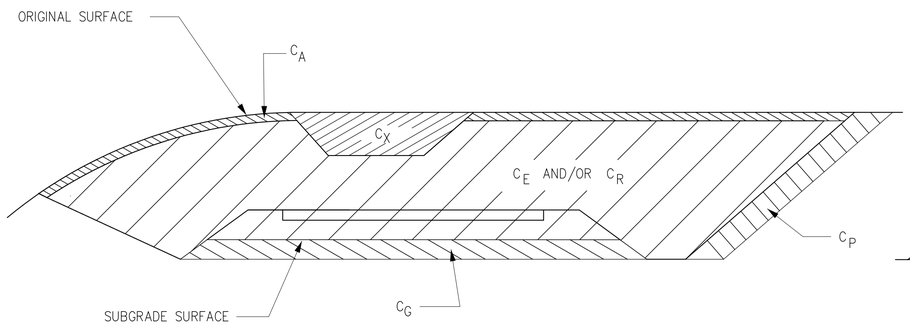
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TRAFFIC CONTROL PLAN

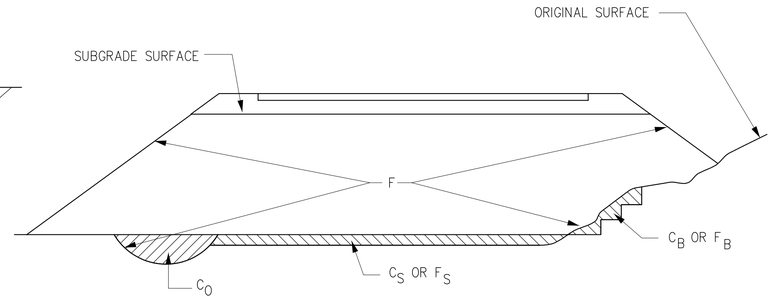
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DWG. TCP-1

SUMMARY OF EARTHWORK (ITEMS 203.02 AND 203.03 ONLY)					
SOURCE	EXCAVATION			ITEM 203.02	ITEM 203.03
	T_E	C_R	T_U	C_T	F_T
0 4+20 TO 0 10+71	907	0	2684	3591	2087
80' DIA. TURNAROUND	2	0	333	335	200
TOTALS	909	0	3017	3926	2287

SUMMARY OF TRENCH AND CULVERT EXCAVATION (ITEM 206.0201 ONLY)			
SOURCE	EXCAVATION		ITEM 206.0201
	ROCK	NON-ROCK	
TOTALS			



CUT SECTION



FILL SECTION

DEFINITIONS:

C_B – EXCAVATION FOR REQUIRED BENCHING, (BOTH LONGITUDINAL AND TRANSVERSE).

C_G – EXCAVATION FOR SUBGRADE IMPROVEMENT.

C_P – EXCAVATION FROM CUT SLOPE NECESSARY TO PLACE SLOPE PROTECTION.

C_E – PORTION OF CUT ASSUMED TO BE EARTH SUITABLE FOR EMBANKMENT CONSTRUCTION, EXCLUDING C_G AND C_P.

T_E – $(C_B + C_G + C_P + C_E)$ TOTAL EARTH EXCAVATION ASSUMED SUITABLE FOR EMBANKMENT CONSTRUCTION.

C_A – EXCAVATION OF TOPSOIL (UNSUITABLE MATERIAL) IN CUT.

C_S – EXCAVATION OF TOPSOIL (UNSUITABLE MATERIAL) UNDER EMBANKMENT.

C_X – EXCAVATION OF UNSUITABLE MATERIAL IN CUT: SWAMP OR DUMP

C_O – EXCAVATION OF UNSUITABLE MATERIAL BENEATH EMBANKMENT: SWAMP OR DUMP

T_U – $(C_A + C_S + C_X + C_O)$ TOTAL EXCAVATION ASSUMED UNSUITABLE FOR EMBANKMENT CONSTRUCTION.

C_R – PORTION OF CUT ASSUMED TO BE ROCK, INCLUDING C_G IF APPLICABLE.

C_T – $(T_E + T_U + C_R)$ TOTAL EXCAVATION.

DEFINITIONS:

F_B – FILL REQUIRED TO REPLACE BENCHES.

F_S – FILL REQUIRED TO REPLACE TOPSOIL REMOVED BENEATH EMBANKMENTS.

F – FILL REQUIRED TO COMPLETE EMBANKMENT TO SUBGRADE SURFACE AND SIDE-SLOPES AFTER FOUNDATION IS PREPARED.

F_T – $(F_B + F_S + F)$ TOTAL FILL REQUIRED.

T_A – $(T_E \times F_E + C_R \times F_R)$ THE VOLUME WHICH THE SUITABLE EXCAVATED MATERIAL COULD OCCUPY IN EMBANKMENT.

F_E – SHRINKAGE FACTOR FOR EARTH

F_R – SWELL FACTOR FOR ROCK

NOTES:

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THESE TABLES ARE ESTIMATED, AND ARE PROVIDED FOR THE PURPOSE OF PREPARING AN ESTIMATE. THEY ARE NOT TO BE CONSTRUED AS BEING EXACT. THEY ARE INTENDED TO QUANTIFY AND QUALIFY THE NATURE OF THE WORK TO BE PERFORMED. SIGNIFICANT DIFFERENCE FROM THIS REPRESENTATION, WHEN ENCOUNTERED DURING THE ACTUAL WORK, WILL BE HANDLED ACCORDING TO THE SPECIFICATIONS GOVERNING THIS PROJECT.

203.02 UNCLASSIFIED EXCAVATION AND DISPOSAL

203.03 EMBANKMENT IN PLACE

206.0201 TRENCH AND CULVERT EXCAVATION

SUBDIVISION NO.	LOCATION STATION TO STATION	SUITABLE EXCAVATION				ROCK	UNSUITABLE MATERIAL					TOTAL EXCAVATION	EMBANKMENT			
		C_B	C_G	C_E	T_E	C_R	C_A	C_S	C_X	C_O	T_U	C_T	F_B	F_S	F	F_T
	0 4+20 – 0 10+71	0	0	907	907	0	2684	0	0	0	2684	3591	0	1757	330	2087
	80' DIA. TURNAROUND	0	0	2	2	0	333	0	0	0	333	335	0	200	0	200

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Buffalo, New York 14203

Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard
EARTHWORK SUMMARY SHEET

Sheet No.
Date April 2025
Scale As Noted
DWG. ESS-2

DRAINAGE QUANTITY TABLE - ODELL STREET EXTENSION

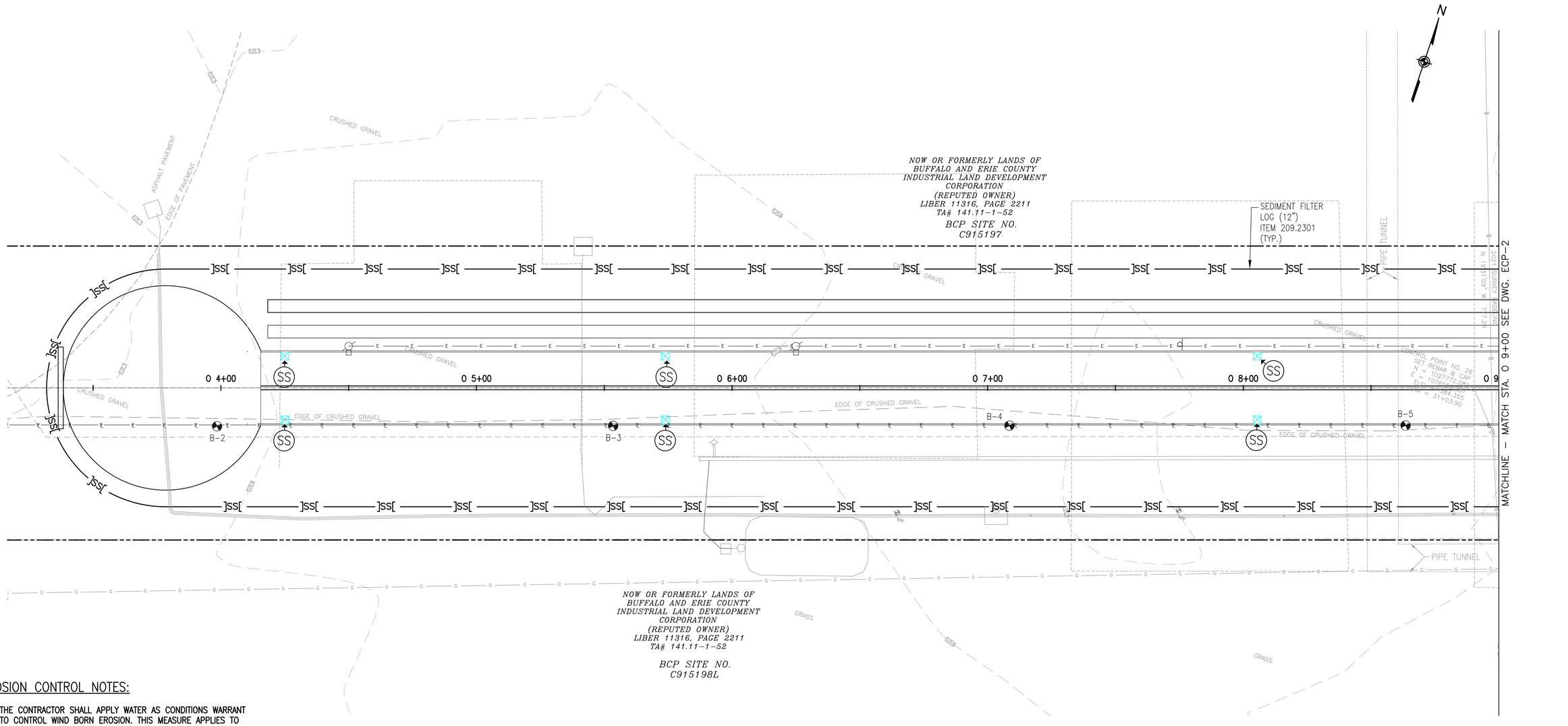
DRAINAGE STRUCTURE NO.	STATION	SIDE	OFFSET	RIM	INVERT	DOWNSTREAM DRAINAGE STRUCTURE NO.	SELECT GRANULAR FILL ITEM 203.07 (CY)	TRENCH AND CULVERT EXCAVATION ITEM NO. 206.0201 (CY)	SHIELDS AND SHORING ITEM 552.17 (SF)	6-INCH CORRUGATED HDPE SINGLE WALL PIPE ITEM NO. 603.0606 (FT)	10-INCH SCH 80 PIPE - SOLID ITEM NO. 603.9810 (FT)	10" PLASTIC WATER PIPE ITEM 693.0410	15-INCH SCH 80 PIPE - SOLID ITEM NO. 603.9815 (FT)	18-INCH SCH 80 PIPE - SOLID ITEM NO. 603.9818 (FT)	DRAINAGE STRUCTURE TYPE A ITEM NO. 604.300103 (FT)	DRAINAGE STRUCTURE TYPE M ITEM NO. 604.300113 (FT)	SWTD - MAXIMUM FLOW RATE OVER 1.0 CFS TO 2.0 CFS ITEM 208.5201 (EA) (SEE NOTE 3)	ROUND PRECAST MANHOLE TYPE 48 ITEM NO. 604.4048 (FT)	WELDED FRAME AND RETICULINE GRATE 3 ITEM NO. 655.1103 (EACH)	MANHOLE FRAME AND COVER ITEM NO. 655.1202 (EACH)	EMBANKMENT IN PLACE ITEM NO. 203.03 (CY)	ALTERING DRAINAGE STRUCTURES ITEM NO. 604.070501 (EA)	ALTERING DRAINAGE STRUCTURES ITEM NO. 604.070502 (EA)	TRENCHLESS INSTALLATION OF CASING UNDER HIGHWAY WITH DIAMETER LESS THAN OR EQUAL TO 24" ITEM NO. 605.1016
DS-1	O 4+25	LT	14	583.74	W 579.83 E 579.83 S 579.83	DS-3	7.5	11.9							5.2					1.0					
DS-2	O 4+25	RT	14	583.74	N 579.87	DS-1	7.4	11.8							5.2					1.0					
DS-1 to DS-2	O 4+25						10.0	11.5					22.0												
DS-1 TO DS-3							103.2	116.6						148.0											
DS-3	O 5+73.87	LT	14	584.15	W 579.65 E 579.65 S 579.65	DS-5	8.6	13.1							5.8					1.0					
DS-4	O 5+73.87	RT	14	584.15	N 579.69	DS-3	8.5	13.0	84.1						5.8					1.0					
DS-3 TO DS-4	O 5+73.87						11.4	12.7	182.2				22.0												
DS-5	O 8+05.38	LT	14	584.14	W 579.38 E 579.38 S 579.38	DS-7	9.1	13.3	84.1						6.1					1.0					
DS-6	O 8+05.38	RT	14	584.14	N 579.41	DS-5	9.1	13.2	85.4						6.0					1.0					
DS-5 TO DS-6	O 8+05.38					DS-5	12.1	12.9	185.0				22.0												
DS-5 TO DS-7						DS-7	101.0	111.9	1343.2					130.0											
DS-7	O 9+36	LT	14	583.90	W 579.22 E 579.22 S 579.22	DS-9	9.0	14.2	91.7						6.0					1.0					
DS-8	O 9+36	RT	14	583.90	N 579.25	DS-7	6.0	8.9	91.2						6.0					1.0					
DS-7 to DS-8	O 9+36					DS-7	11.9	13.7	197.6				22.0												
DS-7 TO DS-9						DS-9	34.5	41.2	494.6					48.0											
DS-9	O 9+84.93	LT	14	583.72	W 579.17 E 579.17 S 579.17	DS-10	8.7	14.8	95.7						5.9					1.0					
DS-10SWTD	O 10+69.35	LT	14	582.68	W 578.75 NE 578.75	BIO-RETENTION POND	18.1	20.5	125.4									1.0							
DS-9 TO DS-10		LT	14	585.34	S 580.00 N 580.00	MH 04	57.7	69.2	830.4					84.0											
DS-B24 TO DS-9							52.5	64.8	777.0					74.0											
DS-B24	B 20+20	LT	14	583.20	N 579.26 E 579.26 S 579.26	DS-9	11.8	21.8	128.7							5.2				1.0					
DS-B22	B STA 19+00	LT																				1.0			
MH-B22A	B 19+00	LT	21.5	584.40	N 579.40 E 579.40	DS-B24	14.7	16.2	98.8									5.8		1.0					
MH-B22A TO DS-24						DS-B24	53.2	111.7	1341.0					120.0							60.6				
DS-B22 TO MH-B22A	B 19+00						2.0	3.8						6.5							2.5				
DS-B23 TO DS-B24	B 20+20					DS-B24	12.2	12.2					22.0												
DS-B23																							1.0		
DS-B24 TO END OF ABANDON PIPE							97.4	97.4																	
DS-10 TO BIO-POND							24.3	39.8						55.0							13.3				
OUTLET CONTROL STR TO MH-1A				584.00	NE 576.08 W 576.08	MH 07	46.6	104.6	2259.9		157.0										58.0				
MH-1A	O 14+17	LT	12.5'	582.6	W 576.00 S 576.00	MH-2A	12.7	14.9	91.3									8		1.0	1.2				
MH-1A TO MH-2A							39.4	126.5	2732.7		135.0										59.3				
MH-2A	O 14+32	RT	122.5	582.16	NW 575.62 SW 573.48	RTE 5 DS	30.9	33.1	202.3									11.5		1.0	5.0				
MH-2A TO RTE 5 DS							18.6	42.5	810.0			58.0									25.2				50
6-INCH SOLID PIPE FROM BIO-POND TO MH-1A		LT	VAR	NA		MH-1A	15.8	64.6	2325.0	157.0											81.4				
						TOTALS	866	1278	14657	157	292	58	110	665	52	5	1	25	10	3	306	1	1	50

NOTE
1. OFFSET IS TO THE FRONT FACE OF CURB. RIM ELEVATION IS FINAL GRADE AT FRONT FACE OF CURB MINUS 1"
2. STRUCTURE QUANTITIES ARE BASED ON THE UPSTREAM STRUCTURE. IF LISTED MORE THAN ONCE QUANTITIES WILL BE ON THE FIRST LISTING OF THE STRUCTURE
3. COST OF EXCAVATION, BACKFILL AND OUTLET CONTROL STRUCTURE INCLUDED IN UNIT BID PRICE FOR ITEM 208.5201

UNDER DRAIN FILTER TABLE

LOCATION	STATION TO STATION	SIDE	OPTIONAL UNDERDRAIN PIPE, 6 INCH DIAMETER ITEM NO. 605.1702 (LF)	UNDERDRAIN FILTER STONE ITEM 605.1001 (CY)
DS-2 TO DS-4	O 4+25 TO O 5+73	RT	148	10.94
DS-4 TO DS-6	O 5+73 TO O 8+05	RT	232	17.14
DS-6 TO DS-8	O 8+05 TO O 9+36	RT	131	9.68
DS-1 TO DS-3	O 4+25 TO O 5+73	LT	148	10.94
DS-3 TO DS-5	O 5+73 TO O 8+05	LT	232	17.14
DS-5 TO DS-7	O 8+05 TO O 9+36	LT	131	9.68
DS-7 TO DS-9	O 9+36 TO O 9+84	LT	48	3.55
DS-9 TO DS-10SEP	O 9+84 TO O 10+69	LT	85	6.28
	TOTALS		**1155**	**85.34**

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 23 OF 41



EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL APPLY WATER AS CONDITIONS WARRANT TO CONTROL WIND BORN EROSION. THIS MEASURE APPLIES TO HAUL ROADS, CUT AND FILL OPERATIONS, SUBBASE AND ANY OTHER EXPOSED SURFACES. COST FOR APPLYING WATER SHALL BE INCLUDED IN THE VARIOUS CONTRACT ITEMS.
2. ANY GRADED AREAS NOT SUBJECT TO FURTHER DISTURBANCE OR CONSTRUCTION TRAFFIC SHALL WITHIN 7 DAYS OF FINAL GRADING, RECEIVE THE APPLICATION OF THE PROPOSED VEGETATIVE COVER.
3. IN ACCORDANCE WITH THE INTERIM EXCAVATION PLAN, EXCAVATED MATERIAL SHALL REMAIN AT THE AREA DESIGNATED FOR DISPOSAL, SITE 11-6. THE CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF THE SPOIL MATERIAL WITH THE OWNER (ECIDA) AND EIC.
4. THE FINAL GRADING OF THE SPOILED MATERIAL SHALL NOT BE GREATER THAN 1-½ FEET IN HEIGHT OVER ORIGINAL GROUND. THE EDGES SHALL BE FEATHER TO BLEND WITH THE EXISTING TERRAIN. HYDRO-SEEDING OF VEGETATED COVER SHALL BE DONE WITHIN 1 CALENDAR DAY OF FINAL GRADING.

LEGEND:

]SS[SEDIMENT FILTER LOG (12") - ITEM 209.2301

SS INLET PROTECTION - ITEM 209.1702

NOTES:

1. REFER TO DWG. NO. ECD-01 FOR EROSION CONTROL DETAILS.
2. ALL AREAS DISTURBED DURING CONSTRUCTION SHOULD BE RESTORED AS SOON AS PRACTICAL. DISTURBED AREAS SHALL BE TEMPORARILY SEEDED AND MULCHED IF NEEDED DURING CONSTRUCTION TO PREVENT EROSION.

AZAR DESIGN CO
FORMERLY FOIT-ALBERT ASSOCIATES

ECIDA/ILDC
95 Perry Street, Suite 403
Buffalo, New York 14203

Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard

EROSION AND SEDIMENT CONTROL PLAN

Sheet No.
Date April 2025
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DWG. ECP-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 24 OF 41

MATCHLINE – MATCH STA. 0 9+00 SEE DWG. ECP-1

BIORETENTION POND

BIORETENTION AREA (SURFACE TREATMENT / DETENTION)

RIVER ROCK LIGHT STONE FILL

OVERFLOW SPILLWAY

NOW OR FORMERLY LANDS OF BUFFALO AND ERIE COUNTY INDUSTRIAL LAND DEVELOPMENT CORPORATION (REPUTED OWNER) LIBER 11316, PAGE 2211 TA# 141.11-1-52 BCP SITE NO. C915197B

COUNTY OF ERIE (REPUTED OWNER) LIBER 11353, PAGE 8397

NOW OR FORMERLY LANDS OF BUFFALO AND ERIE COUNTY INDUSTRIAL LAND DEVELOPMENT CORPORATION (REPUTED OWNER) LIBER 11316, PAGE 2211 TA# 141.11-1-52 BCP SITE NO. C915198L

NOW OR FORMERLY LANDS OF BUFFALO AND ERIE COUNTY INDUSTRIAL LAND DEVELOPMENT CORPORATION (REPUTED OWNER) PART OF LIBER 11316, PAGE 2211 (PARCEL 2) FORMERLY PART OF TA# 141.11-1-48.13 NOW KNOWN AS TA# 141.11-1-52 ALSO KNOWN AS TA# 141.11-1-52.1 II-11 BCP SITE NO. C915198K

SEDIMENT FILTER LOG (12") ITEM 209.2301 (TYP.)

HAMBURG TURNPIKE

ALSO KNOWN AS HIGHWAY 5

LEGEND:

-]SS[SEDIMENT FILTER LOG (12") – ITEM 209.2301
- SS INLET PROTECTION – ITEM 209.1702
- ROADWAY CONSTRUCTION SPOIL MATERIAL AREA

NOTES:

1. REFER TO DWG. NO. ECD-01 FOR EROSION CONTROL DETAILS.
2. ALL AREAS DISTURBED DURING CONSTRUCTION SHOULD BE RESTORED AS SOON AS PRACTICAL. DISTURBED AREAS SHALL BE TEMPORARILY SEEDED AND MULCHED IF NEEDED DURING CONSTRUCTION TO PREVENT EROSION.

0 20 40 60 FT
HORIZONTAL SCALE
1" = 20' SCALE BAR

AZAR DESIGN CO
FORMERLY FOIT-ALBERT ASSOCIATES

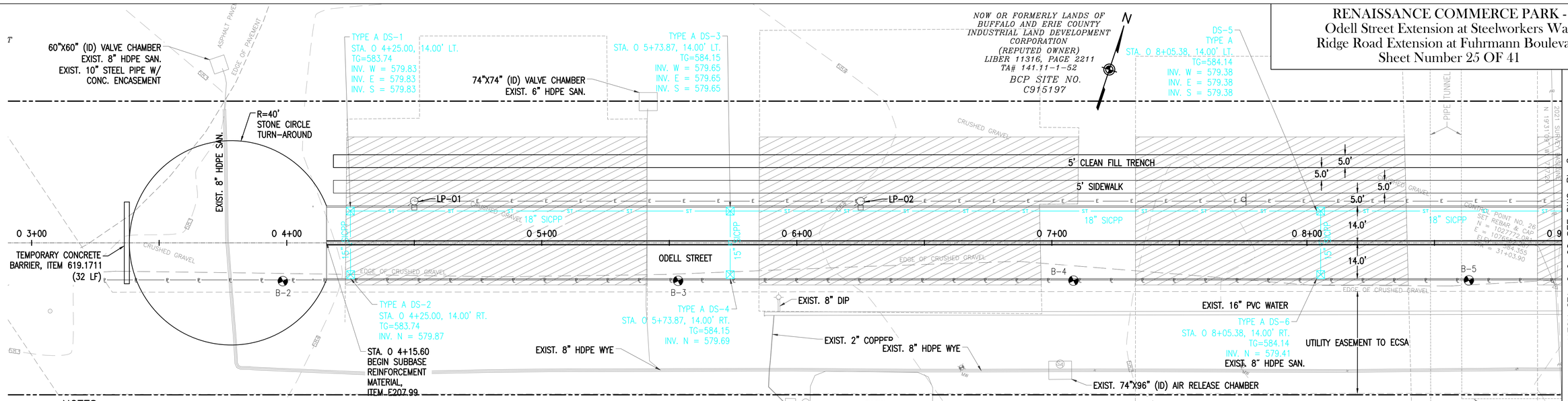
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Buffalo, New York 14203

Renaissance Commerce Park Odell Street Extension at Steelworkers Way & Ridge Road Extension at Fuhrmann Boulevard

EROSION AND SEDIMENT CONTROL PLAN

Sheet No.	
Date	April 2025
Scale	As Noted
DWG.	ECP-2

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
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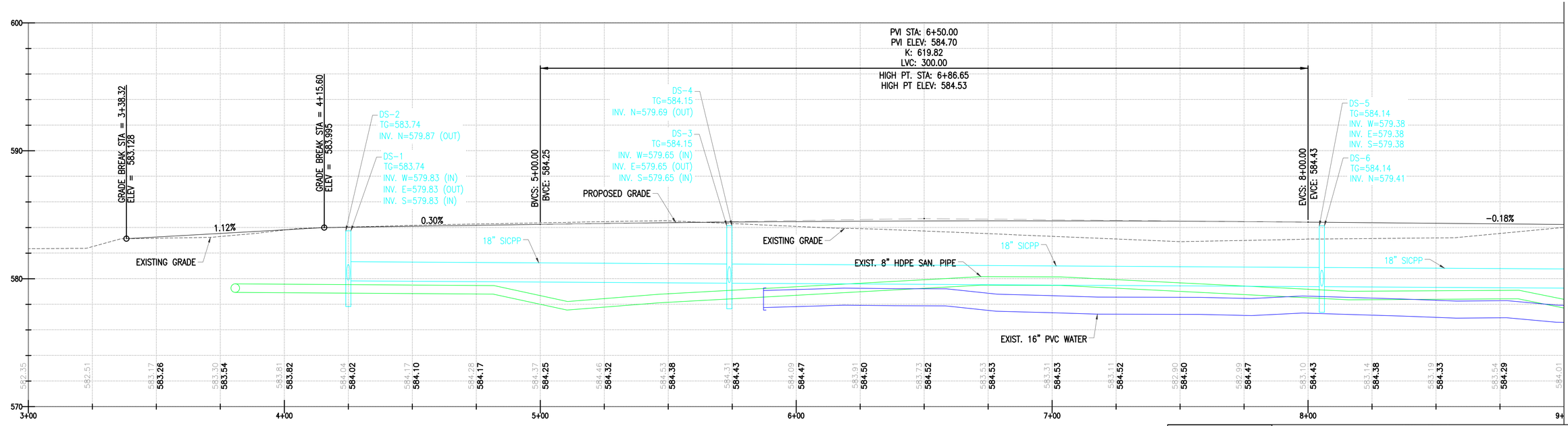


NOTES:

1. REMOVE EXISTING CONCRETE FOUNDATIONS TO A MINIMUM OF 2'-0" BELOW PROPOSED SUBGRADE OR A.O.B.E.
2. ITEM 418.7603 – ASPHALT PAVEMENT JOINT ADHESIVE SHALL BE USED ON VERTICAL FACES FOR ACC JOINTS ON THE SURFACECOURSE.
3. ALL TREES WITHIN THE RIGHT-OF-WAY SHALL BE REMOVED.
4. ALL REQUIRED PERMITS BY THE STATE OF NEW YORK, COUNTY OF ERIE AND THE CITY OF LACKAWANNA ARE THE RESPONSIBILITY OF THE CONTRACTOR.
5. FILL SHALL BE PLACED AND SATISFACTORILY COMPACTED PRIOR TO INSTALLATION OF THE UNDERDRAIN.
6. IN AREAS WHERE A CLEAN FILL OVER EXISTING DEMARCATION MATERIAL EXISTS, THE CONTRACTOR SHALL NOT PLACE ANOTHER LAYER OF DEMARCATION MATERIAL AND CLEAN FILL ATOP. THE EXISTING CLEAN FILL IS TO BE PUSHED ASIDE AND THE 1-FOOT CLEAN COVER OVER THE DEMARCATION MATERIAL SHALL BE ESTABLISHED AS NOTED IN THE CONTRACT DOCUMENTS.

LEGEND:

REMOVAL OF SUBSTRUCTURES
ITEM 202.19 (SEE NOT 1)



0 20 40 60 FT
HORIZONTAL SCALE
1" = 20' SCALE BAR

0 4 8 12 FT
VERTICAL SCALE
1" = 4' SCALE BAR

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Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard
STEEL WORKERS WAY & ODELL STREET GENERAL PLAN AND PROFILE

Sheet No.	
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RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 26 OF 41

MATCHLINE – MATCH STA. O 9+00 SEE DWG. PL-1

TYPE A DS-7
STA. O 9+36.00, 14.00' LT.
TG=583.90
INV. E = 579.22 (OUT)
INV. S = 579.22 (IN)
INV. W = 579.22 (IN)

TYPE A DS-9
STA. O 9+84.93, 14.00' LT.
TG=583.72
INV. E = 579.17 (OUT)
INV. S = 579.17 (IN)
INV. W = 579.17 (IN)

ITEM 208.5202
TYPE A DS-10SWTD
STA. O 10+69.35, 14.00' LT.
TG=582.68
INV. W 578.75
INV. NE 578.75

APPROXIMATE LOCATION OF CONCRETE TUNNEL WALLS

5' CLEAN FILL TRENCH 5.0'
5' SIDEWALK 5.0'
LP-03 5.0'

TYPE 10 CURB RAMP

18" SICPP
15" SICPP
18" SICPP
18" SICPP

ODELL STREET
EDGE OF UNPAVED

EXIST. 16" PVC WATER
8" DIP

TYPE A DS-8
STA. O 9+36.00, 14.00' RT.
TG=583.90
INV. N = 579.25

TYPE 1 CURB RAMP

EXIST. 16" PVC WATER
TYPE M DS-B24
STA. B 20+20.00, 17.00' LT.
TG=583.20
INV. N = 579.26 (OUT)
INV. E = 579.26 (IN)
INV. S = 579.26 (IN)

TO BE REMOVED DS-B24
STA. B 20+20.00, 14.00' LT.
TG=583.20
INV. N = 577.10 (IN)
INV. E = 577.10 (IN)
INV. S = 577.10 (IN)

NOW OR FORMERLY LANDS OF BUFFALO AND ERIE COUNTY INDUSTRIAL LAND DEVELOPMENT CORPORATION (REPUTED OWNER) LIBER 11316, PAGE 2211 TA# 141.11-1-52 BCP SITE NO. C915197B

B-11
LP-B11

OIL PIPE
EX. 18" SICPP TO BE REMOVED
P.I. STA. B 20+83.04 = P.O.L. STA. O 10+00.00
B 21+00
B 20+00
SAWCUT
PLUG EX. PIPE

B-6
R=50'
R=50'

END CURB
STA. O 10+71±
LIMIT OF WORK
STA. O 10+71±
TEMPORARY CONCRETE BARRIER, ITEM 619.1711 (FUTURE ODELL ST. EXT.)
END CURB
STA. O 10+71±

UTILITY EASEMENT TO ECSA
EXIST. 8" HDPE SAN.
EXIST. 16" PVC WATER

AS-BUILT DS-B23
STA. B 20+20.00, 14.00' RT.
TG=583.27
INV. W = 579.42 (OUT)

RESET/REPLACE EX. 15" SICPP

10" SICPP

BIORETENTION POND
BIORETENTION AREA (SURFACE TREATMENT/ DETENTION)
END SECTION
INV. = 578.44
ITEM 603.1718

DS-OCS01
OUTLET CONTROL STRUCTURE
TG=582.00
10" INV. OUT = 577.06

SEE DWG. NO. SWP-1 FOR BIO-RETENTION POND LAYOUT

OVERFLOW SPILLWAY

B-7
B-8

BOX BEAM GUIDE RAIL
PUMP STATION
15" RCP (ABANDONED)

TRNCEHLESS INSTALLATION OF CASING. ITEM 650.1016. SEE NOTE 6

MH-2A (48" DIA.)
STA. 14+09.26, 130.35' RT.
TG=583.00
INV. N = 573.10 (IN)
INV. E = 573.10 (OUT)

ITEM 694.070501
DS-EX1
INV. W = 572.50

COUNTY OF ERIE (REPUTED OWNER) LIBER 11353, PAGE 8397

MH-1A (48" DIA.)
STA. 14+05.84, 16.59' LT.
INV. W = 574.64 (IN)
INV. S = 574.64 (OUT)

HAMBURG TURNPIKE
ALSO KNOWN AS HIGHWAY 5
"W 5 23 4.5 5302 2011"
ASPHALT PAVEMENT
ASPHALT SIDEWALK
EXIST. R.O.W.
TOP OF SLOPE
CONCRETE CURB

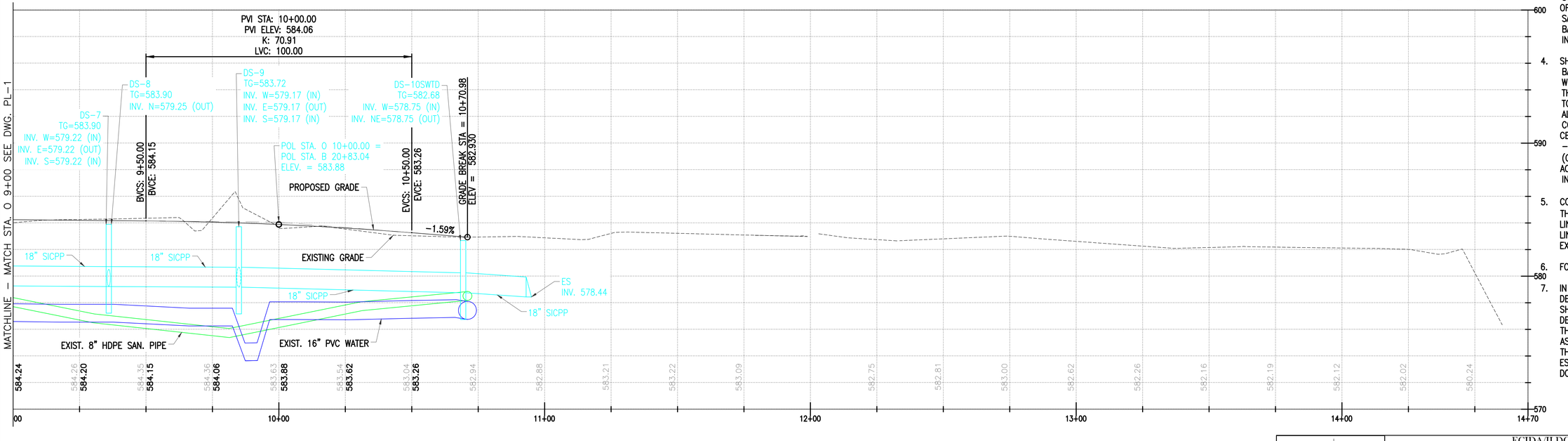
MATCHLINE – MATCH STA. B 19+50 SEE DWG. PL-3

LEGEND:

REMOVAL OF SUBSTRUCTURES ITEM 202.19 (SEE NOT 1)

NOTES:

1. THE LOCATIONS OF SUBSURFACE CONCRETE ARE APPROXIMATE.
2. SUBSURFACE CONCRETE FOUNDATIONS, PIERS, VAULTS, SLABS, ETC. MAY BE ENCOUNTERED DURING EXCAVATION FOR THE CLEAN FILL TRENCH, STA. 15+00 TO STA. 20+07. CONCRETE ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO A DEPTH OF SIX-INCHES (6") BELOW THE BOTTOM OF THE CLEAN FILL TRENCH. REMOVAL OF CONCRETE IS TO BE PAID UNDER ITEM 202.19 – REMOVAL OF SUBSTRUCTURES.
3. BACKFILL OF THE VOID CREATED BY REMOVAL OF CONCRETE SHALL BE BACKFILLED WITH SUITABLE MATERIAL TO THE INVERT ELEVATION OF THE TRENCH AND COMPACTED TO THE SATISFACTION OF THE ENGINEER. COST OF BACKFILL WITH SUITABLE MATERIAL IS INCLUDED IN ITEM 202.19.
4. SHOULD CONDITIONS BE ENCOUNTERED WHERE BACKFILLING OF VOID WITH SUITABLE MATERIAL WILL NOT PRODUCE SATISFACTORY RESULTS, THE ENGINEER MAY DIRECT THE CONTRACTOR TO USE A CEMENTATIOUS FILL TO ENSURE ALL VOIDS OR AREA UNABLE TO GET PROPERLY COMPACTED ARE FILLED. PAYMENT FOR THE CEMENTATIOUS FILL WILL BE WITH ITEM 204.01 – CONTROLLED LOW STRENGTH MATERIAL (CLSM) CONTAINMENT OF CLSM BY MEANS ACCEPTABLE TO THE ENGINEER ARE TO BE INCLUDED IN ITEM 204.01.
5. CONTRACTOR'S ATTENTION IS BEING MADE TO THE EXISTENCE OF A 16" GAS TRANSMISSION LINE NEAR TRAIL WAY. VERIFICATION OF GAS LINE COVER IS TO BE VERIFIED PRIOR TO ANY EXCAVATION OR BORING.
6. FOR DETAILS, SEE DRAWING SWP-1 AND MSD-2.
7. IN AREAS WHERE A CLEAN FILL OVER EXISTING DEMARCATION MATERIAL EXISTS, THE CONTRACTOR SHALL NOT PLACE ANOTHER LAYER OF DEMARCATION MATERIAL AND CLEAN FILL ATOP. THE EXISTING CLEAN FILL IS TO BE PUSHED ASIDE AND THE 1-FOOT CLEAN COVER OVER THE DEMARCATION MATERIAL SHALL BE ESTABLISHED AS NOTED IN THE CONTRACT DOCUMENTS.



HORIZONTAL SCALE
1" = 20' SCALE BAR
0 20 40 60 FT

VERTICAL SCALE
1" = 4' SCALE BAR
0 4 8 12 FT

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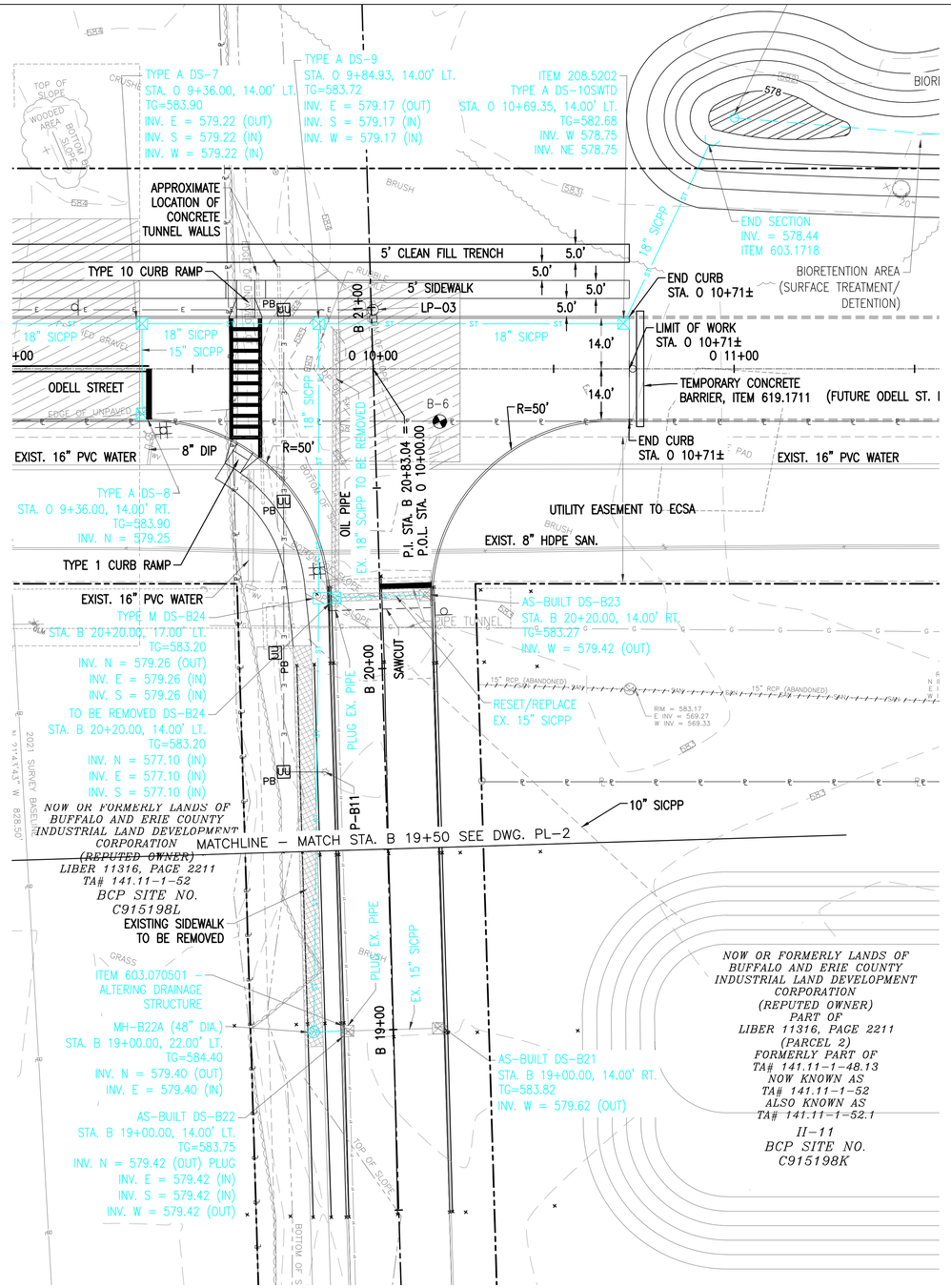
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Renaissance Commerce Park Odell Street Extension at Steelworkers Way & Ridge Road Extension at Fuhrmann Boulevard

STEEL WORKERS WAY & ODELL STREET GENERAL PLAN AND PROFILE

Sheet No.
Date April 2025
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DWG. PL-2

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
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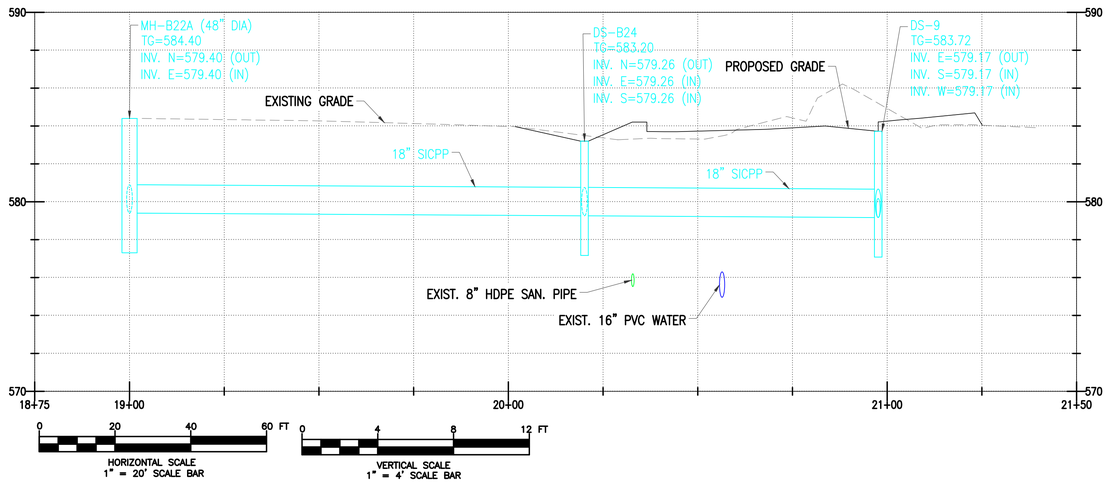


LEGEND:

REMOVAL OF SUBSTRUCTURES
ITEM 202.19 (SEE NOT 1)

NOTES:

1. IN AREAS WHERE A CLEAN FILL OVER EXISTING DEMARCATION MATERIAL EXISTS, THE CONTRACTOR SHALL NOT PLACE ANOTHER LAYER OF DEMARCATION MATERIAL AND CLEAN FILL ATOP. THE EXISTING CLEAN FILL IS TO BE PUSHED ASIDE AND THE 1-FOOT CLEAN COVER OVER THE DEMARCATION MATERIAL SHALL BE ESTABLISHED AS NOTED IN THE CONTRACT DOCUMENTS.



AZAR DESIGN CO
FORMERLY FOIT-ALBERT ASSOCIATES

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STEEL WORKERS WAY & ODELL STREET GENERAL PLAN AND PROFILE

Sheet No.
Date April 2025
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DWG. PL-3

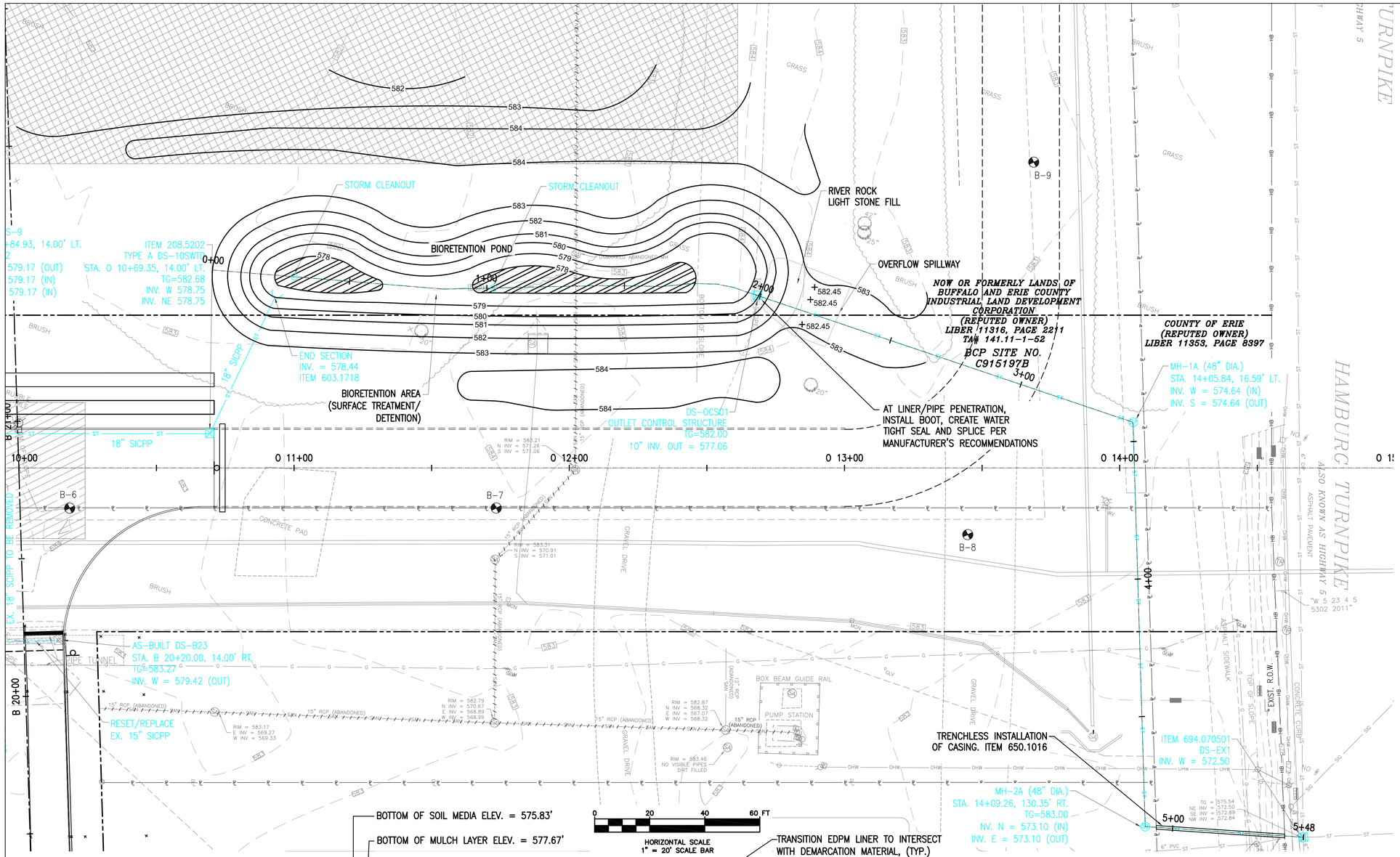
RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 28 OF 41

LEGEND:

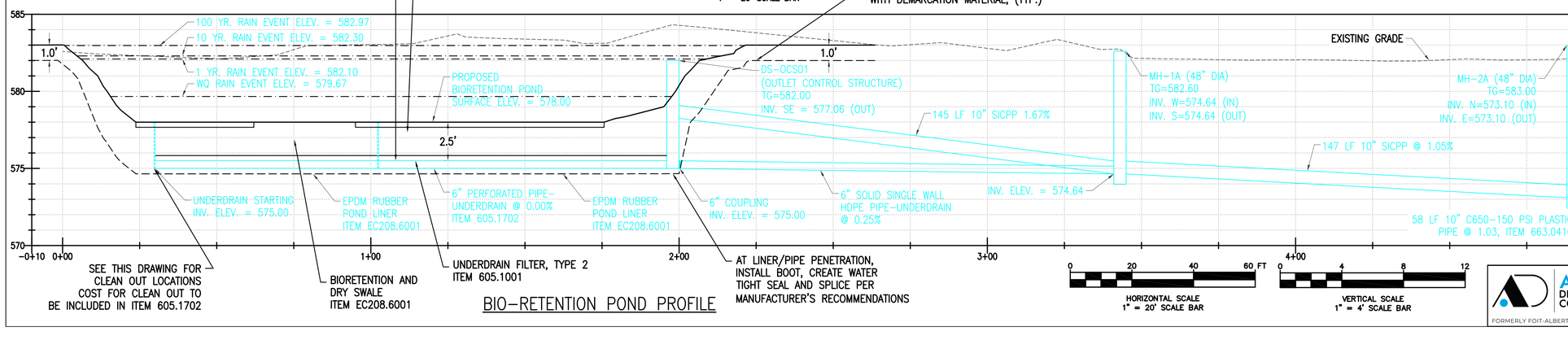
- REMOVAL OF SUBSTRUCTURES ITEM 202.19 (SEE NOT 1)
- ROADWAY CONSTRUCTION SPOIL MATERIAL AREA

NOTES:

1. ALL AREAS OUTSIDE OF PAVED AREAS SHALL HAVE A DEMARCATION MATERIAL PLACED 1'-0" BELOW FINISHED GRADE. THE FINAL 1'-0" OF BACKFILL MATERIAL ABOVE THE DEMARCATION MATERIAL SHALL CONSIST OF 6" APPROVED CLEAN FILL AND 6" OF APPROVED TOP SOIL.



HORIZONTAL SCALE
1" = 20' SCALE BAR
0 20 40 60 FT



SEE THIS DRAWING FOR CLEAN OUT LOCATIONS COST FOR CLEAN OUT TO BE INCLUDED IN ITEM 605.1702

BIORETENTION AND DRY SWALE ITEM EC208.6001

UNDERDRAIN FILTER, TYPE 2 ITEM 605.1001

AT LINER/PIPE PENETRATION, INSTALL BOOT, CREATE WATER TIGHT SEAL AND SPLICE PER MANUFACTURER'S RECOMMENDATIONS

BIO-RETENTION POND PROFILE

HORIZONTAL SCALE
1" = 20' SCALE BAR
0 20 40 60 FT

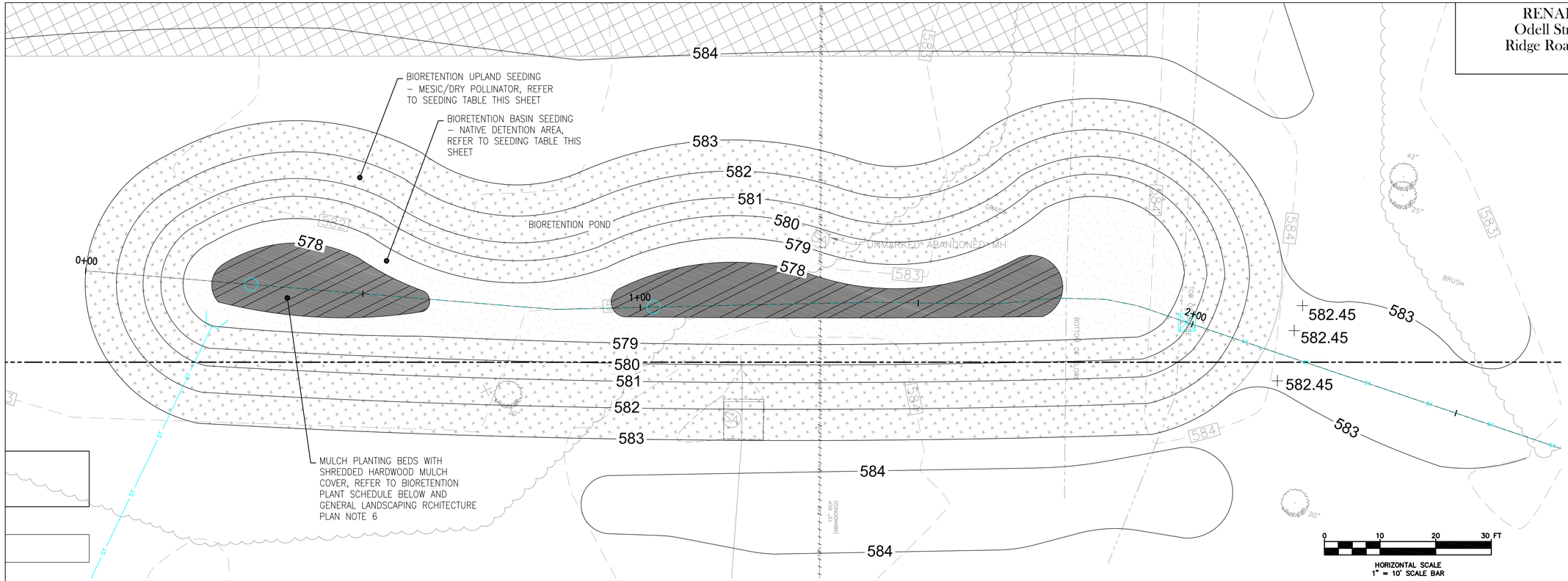
VERTICAL SCALE
1" = 4' SCALE BAR
0 4 8 12

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Buffalo, New York 14203
Renaissance Commerce Park Odell Street Extension at Steelworkers Way & Ridge Road Extension at Fuhrmann Boulevard
ODELL STREET BIORETENTION POND PLAN & PROFILE

Sheet No.	
Date	April 2025
Scale	As Noted
DWG.	SWP-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 29 OF 41





PLANTING LEGEND

- DECIDUOUS SHRUBS ITEM 611.0412
- BIORETENTION BASIN SEEDING ITEM 611.0711 + 610.17
- BIORETENTION UPLAND SEEDING ITEM 611.1606 + 610.17
- MULCH PLANTING BED ITEM 209.1001

GENERAL LANDSCAPING ARCHITECTURE PLAN NOTES

1. REFER TO ENGINEERING INSTRUCTION ED 12-001 FOR SECTIONS 610-615 & 713 OF THE NYSDOT STANDARD SPECIFICATIONS.
2. PLANTING WILL BE LOCATED AS SHOWN ON THE LANDSCAPE PLAN UNLESS REVISIONS ARE REQUIRED AS DETERMINED BY THE ENGINEER.
3. THE CONTRACTOR SHALL CONFIRM WITH THE ENGINEER THE ACTUAL QUANTITY OF PLANTS TO BE PLANTED PRIOR TO ORDERING THE PLANT MATERIAL.
4. ALL PLANTING PITS SHALL HAVE A PERMEABLE WEED CONTROL LANDSCAPE FABRIC (ITEM 610.1201) PLACED OVER THE PANT PIT AND TYPE D SHREDDED BARK MULCH (ITEM 610.1101) PLACED OVER THE LANDSCAPE FABRIC AT A DEPTH OF 4 INCHES.
5. ALL RECOMMENDED PLANT SUBSTITUTIONS AND CHANGES SHALL BE IN WRITING BY THE CONTRACTOR TO THE ENGINEER FOR APPROVAL.
6. ALL SHRUB MATERIALS ARE SHOWN FOR DESIGN INTENT ONLY. REFER TO BIORETENTION PLANTING TABLE FOR QUANTITIES ON THIS DRAWING. INTENT IS TO PROVIDE A NATURALISTIC PLANTING SYSTEM BY GROUPING SAME SPECIES IN GROUPS OF 3, 5, OR 7, AND EVENLY DISTRIBUTING THE GROUPINGS OF PLANTS THROUGHOUT THE CENTER MULCH BED AND SIDE SLOPES. FINAL LAYOUT OF PLANTS TO BE STAKED OUT IN THE FIELD BY PROJECT OR REGIONAL LANDSCAPE ARCHITECT.
7. NO CONSTRUCTION DEBRIS OR ROADWAY MATERIAL (ASPHALT AND/OR SUBBASE MATERIAL – CRUSHED STONE) SHALL BE LEFT IN THE PLANT PIT AT THE TIME OF PLANTING. ALL PLANTS PLANTED IN THE SNOW STORAGE STRIP SHALL BE PLANTED IN OVERSIZED PLANT PITS.

TREE AND VEGETATION PROTECTION NOTES

1. ALL TREES WITH A TRUNK DIAMETER OF 3 INCHES OR GREATER WITHIN THE IMMEDIATE AREA OF THE CONTRACTOR'S WORK OR IN PROXIMITY TO STAGING AND STOCKPILES AREAS OR AS INDENTIFIED IN THE CONTRACT DOCUMENTS SHALL BE PROTECTED BY PLACEMENT OF ITEM 607.41010010 – TEMPORARY PLASTIC BARRIER FENCE, PRIOR TO THE START OF WORK. ADDITIONAL TREES REQUIRING PROTECTION MAY BE DESIGNATED BY THE ENGINEER-IN-CHARGE (EIC) IN CONSULTATION WITH THE REGIONAL LANDSCAPE ARCHITECT.
2. PLASTIC BARRIER FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF A TREE OR AROUND THE PERIMETER OF A GROUP OF TREES, EXTENDING A MINIMUM OF 3' BEYOND THE DRIP LINE (EDGE OF TREE CANOPY) OF THE TREE(S). IF 3' BEYOND THE DRIP LINE CANNOT BE ACHIEVED DUE TO NECESSARY CONSTRUCTION ACTIVITIES, THE PROTECTION BARRIER SHALL BE INSTALLED AT THE FURTHEST POSSIBLE DISTANCE FROM THE TRUNK.

TREE AND VEGETATION PROTECTION NOTES (CONT.)

3. THE CONTRACTOR SHALL NOT BE ALLOWED TO STOCKPILE MATERIAL, STORE EQUIPMENT OR DRIVE AND PARK VEHICLES BENEATH THE DRIP LINE OF ANY TREES DESIGNATED FOR PROTECTION, EXCEPT IN AREAS SHOWN ON THE CONTRACT DOCUMENTS.
4. THE CONTRACTOR SHALL SUBMIT A PLAN TO THE EIC FOR APPROVAL SHOWING THE PROPOSED STAGING, STORAGE AND STOCKPILE AREAS FOR EACH WORK SITE PRIOR TO PLACEMENT OF ANY EQUIPMENT OR STAGING OF MATERIALS AT THE SUBJECT AREA.

PLANTING PLAN NOTES

1. FOR SECTION 611 WORK
   - A. 611-3.01 – LOCATION FOR PLANTS AND OUTLINES OF AREAS SHALL BE STAKED IN FIELD AND APPROVED BY THE ENGINEER PRIOR TO EXCAVATION.
   - B. 611.19040024 POST PLANTING CARE WITH REPLACEMENT: THE CONTRACTOR SHALL PROVIDE POST-PLANTING CARE WITH REPLACEMENT FOR ALL TREES AND SHRUBS INSTALLED BY THIS PROJECT.
   - C. 713-05 MULCH FOR PLANTING: MULCH FOR PLANTING SHALL BE 3" DEPTH, TYPE A MULCH LIMITS SHALL EXTEND TO OUTSIDE EDGE OF PLANTING SAUCER OR PITS AND PLANTING BEDS AS SHOWN IN DRAWINGS.
   - D. NO STAKES SHALL BE PLACED ON ANY TREES.
   - E. PROVIDE FERTILIZER AT A RATE OF 1 LB PER 100 SF OF PLANTING BED OR PLANT PIT AREA. USE TYPE A OR B. DO NOT ALLOW FERTILIZER TO COME IN CONTACT WITH PLANT TRUNKS, STEMS OR LEAVES.
   - F. 611.17 AND 611.18 CONTRACTOR SHALL PROVIDE PORTABLE DRIP IRRIGATION SYSTEM FOR ALL TREES GREATER THAN 5' HEIGHT AND 2" CALIPER AND REMOVE THEM AFTER TREE HAS ESTABLISHED.

PLANTING

1. SEE CONTRACT PLANS FOR LOCATIONS.
2. BALLED AND BURLAP MATERIAL:
   CONTAINERS MAY BE USED FOR THIS ITEM. THE SIZE OF THE ROOT BALL FOR PLANTS GROWN IN CONTAINERS MAY BE 25% LESS IN DIAMETER AND DEPTH THAN THAT SPECIFIED FOR B&B PLANTS. DIMENSIONS MAY VARY PROVIDING EQUIVALENT ROOT VOLUME IS MAINTAINED.

PLANTING (CONT.)

3. CONTAINER GROWN MATERIAL:
   IN ORDER TO DISRUPT CIRCLING ROOTS, RESULTING FROM PLANTS BEING CONTAINER GROWN, ALL CONTAINER GROWN MATERIAL SHALL HAVE THEIR ROOT BALLS CUT, VERTICALLY, APPROXIMATELY 1" DEEP, IN 4 PLACES AT 90° INTERVALS, EVENLY SPACED.

TABLE OF TURF ESTABLISHMENT AND SEEDING

ITEM	DESCRIPTION	SEED DESIGN MIX	NURSE CROP	QTY.
610.17, 610.1606	BIORETENTION BASIN W/ NURSE CROP	ERNMX - 183 NATIVE DETENTION AREA MIX 20 LBS/ACRE	GRAIN RYE (1 SEP TO 30 APR, 30 LBS/ACRE), JAPANESE MILLET (1 MAY TO 31 AUG, 10 LBS/ACRE)	
610.17, 610.1606	BIORETENTION - UPLAND W/ NURSE CROP	ERNMX - 105 MESIC/DRY NATIVE POLLINATOR MIX 20 LBS/ACRE	GRAIN OATS (1 JAN TO 31 JUL) OR GRAIN RYE (1 AUG TO 31 DEC) 30 LBS/ACRE	

PLANT SCHEDULES

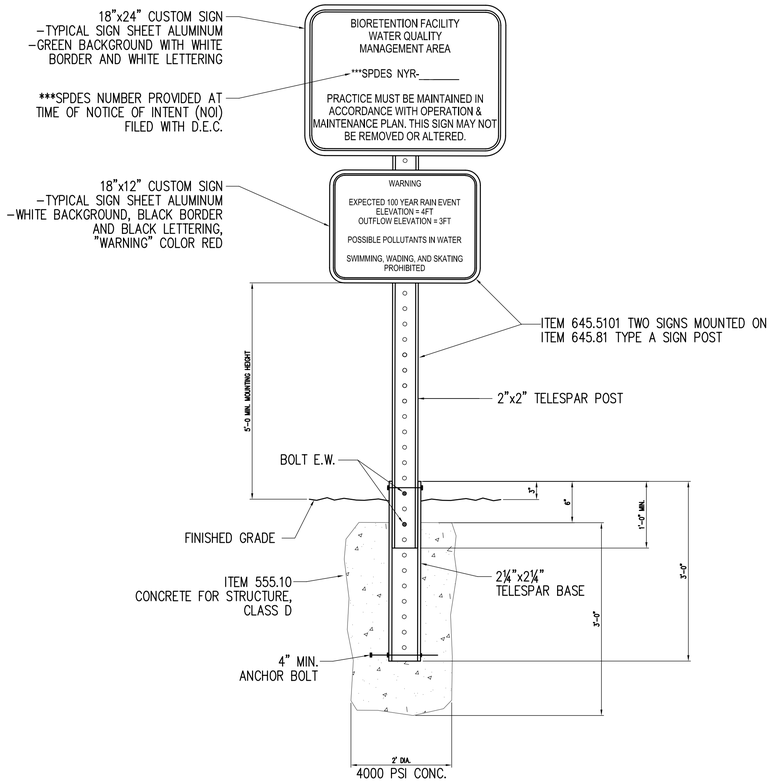
ITEM	SYMBOL	BOTANICAL/COMMON NAME	SIZE	QTY.	SPACING (TRIANGULAR)	NOTES
BIORETENTION PLANT SCHEDULE						
SHRUBS						
611.0412	BH	BACCHARIS HALIMIFOLIA/GROUNSEL TREE 'WHITE CAPS'	#3 CONT		48" O.C.	SEE LAYOUT NOTES ON DRAWING NO.
611.0412	CA	CLETHRA ALNIFOLIA/SUMMERSWEET 'PANICULATA'	#3 CONT		36" O.C.	SEE LAYOUT NOTES ON DRAWING NO.
611.0402	CO	CEPHALANTHUS OCCIDENTALIS/BUTTONBUSH ' SUGAR SHACK'	#3 CONT		36" O.C.	SEE LAYOUT NOTES ON DRAWING NO.

NOTES:
1. SEE SEEDING TABLES ON DRWAGING LAT-1 FOR BIORETENTION
2. PROVIDE POST PLANTING CARE WITH REPLACEMENT FOR ALL PLANTINGS. Item # S. 611.19040024 - POST PLANTING CARE WITH REPLACEMENT - DECIDUOUS SHRUBS

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ODELL STREET BIORETENTION POND PLANTING PLAN

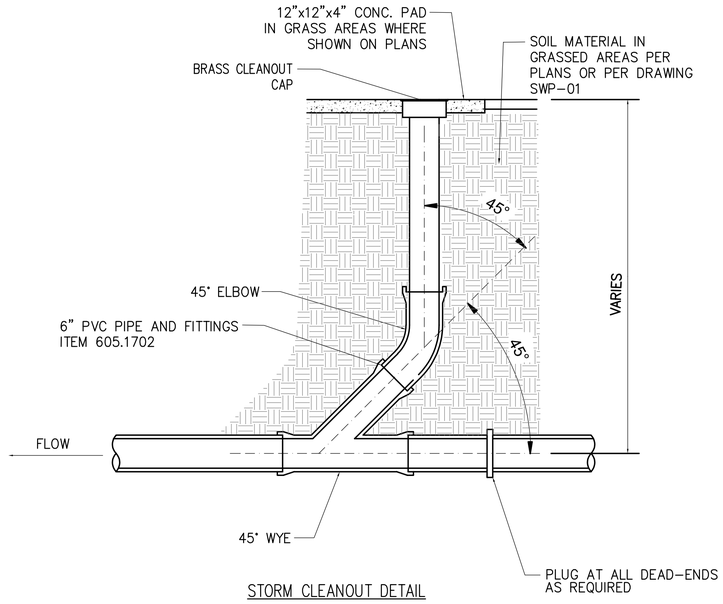
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Date April 2025
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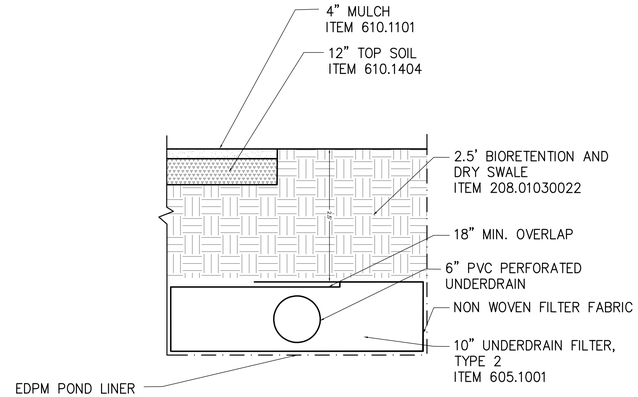
BIORETENTION SIGN DETAIL
NOT TO SCALE

NOTE:

1. PLACEMENT OF THE SIGN SHALL BE AS DIRECTED BY THE REGIONAL LANDSCAPE ARCHITECT.



STORM CLEANOUT DETAIL

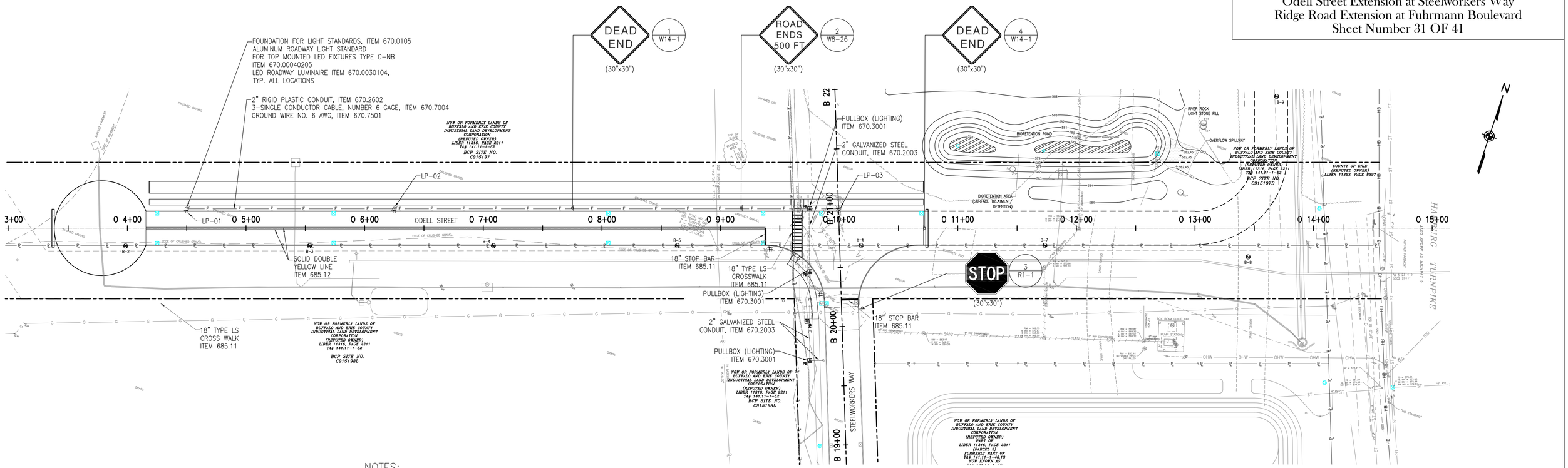


BIORETENTION TYPICAL CROSS SECTION
NOT TO SCALE

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	Date April 2025
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ODELL STREET STORMWATER MANAGEMENT DETAILS	DWG. SWD-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 31 OF 41



LIGHTING TABLE			
FEATURE	STATION	OFFSET (FT.)	SIDE
POWER POINT			
POLE #			
CIRCUIT 2			
LP-01	0 4+50	16.33	LT.
LP-02	0 6+25	16.33	LT.
LP-03	0 10+00	16.33	LT.

LEGEND

L / T	NEW SIGN LOCATION
L	REMOVAL LOCATION
TR	REMOVAL LOCATION

NOTE:

1. REMOVAL OF EXISTING SIGNS SHALL BE INCLUDED IN ITEM 201.06 – CLEARING AND GRUBBING.

NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW IN THE FIELD ALL EXISTING CONDITIONS WHICH MAY BE INVOLVED WITH THE INSTALLATION OF UNDERGROUND STREET LIGHTING FACILITIES.
2. ALL UNDERGROUND CABLE WILL BE INSTALLED IN 2" SCHEDULE 40 PVC CONDUIT RUNNING CONTINUOUS BETWEEN ALL STRUCTURES (PULLBOXES, FOUNDATIONS, ETC.): SPECIFIC CONDUIT ITEM AS NOTED ON PLANS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SAFEGUARD ALL NEW STREET LIGHTING INSTALLATIONS, POLES, CABLE, ETC., FOR THE DURATION OF THE PROJECT. IF ANY DAMAGE OCCURS TO THE NEW CABLE INSTALLATION: SPLICING IS NOT PERMITTED. THE CABLE RUN MUST BE REPLACED IN ITS ENTIRETY FROM, "POINT OF CONNECTION TO POINT OF CONNECTION". THERE WILL BE NO ADDITIONAL COST TO THE CITY OF LACKAWANNA FOR THE ABOVE CONDITIONS.
4. STREET LIGHTING MUST BE MAINTAINED AND ENERGIZED, WHICH WILL INCLUDE THE EXISTING SYSTEM AND/OR THE NEW LIGHTING INSTALLATIONS, FOR THE DURATION OF THE PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL REQUIRED REPAIRS ON THE EXISTING EXISTING AND/OR NEW STREET LIGHTING FACILITIES, AT NO COST TO THE OWNER, FROM THE TIME CONSTRUCTION BEGINS UNTIL FINAL ACCEPTANCE OF THE NEW STREET LIGHTING SYSTEM.
5. THE CONTRACTOR IS REQUIRED TO PROTECT EXISTING UTILITIES AND SHALL REPAIR AND REPLACE ANY DAMAGE CAUSED BY INSTALLATION OF THEIR OWN WORK AT THEIR EXPENSE.
6. NO LIGHT POLE CONDUIT OR WIRING SHALL BE PLACED WITHIN 2 FT. OF ANY GUIDERAIL OR GROUND MOUNTED SIGNS.
7. THE CONTRACTOR SHALL INSTALL CODED WIRING ONLY AND PROVIDE PROPER FUSE KITS, COORDINATED WITH RESPECTIVE WIRE SIZE.
8. ALL NEW LIGHT POLES SHALL BE NUMBERED BY THE CONTRACTOR AS LISTED IN THE LIGHTING PLANS OR AS ORDERED BY THE CITY OF LACKAWANNA.
9. RIGID GALVANIZED STEEL CONDUITS SHALL BE PLACED UNDER ALL ROADWAYS. ALL OTHER LIGHTING CONDUIT TO BE RIGID PLASTIC CONDUIT.
10. INSTALL ALL CONDUITS PER NEC 300.5, AND THE FOLLOWING:
    A) ALL CONDUIT, REGARDLESS OF ITS LOCATION, SHALL BE PLACED A MINIMUM OF 24-INCHES BELOW FINAL GRADE IN NON-PAVEMENT AREAS AND 24-INCHES BELOW SUBGRADE IN PAVEMENT AREAS.
    B) ALL BURIED CONDUIT SHALL HAVE A MAGNETIC TAPE PLACED 8 TO 12-INCHES ABOVE THE CONDUIT.
    C) IN NON-PAVEMENT AREAS, AN APPROVED DEMARCATION MATERIAL SHALL BE INSTALLED/LOCATED 12-INCHES BELOW FINAL GRADE. ANY DISTURBANCE OR DAMAGE OF THE DEMARCATION MATERIAL SHALL BE REPLACED/REPAIRED TO THE SATISFACTION OF THE ENGINEER AND NYSDEC, AT NO ADDITIONAL COST TO THE COUNTY.
    D) CONDUIT IN PAVEMENT AREAS SHALL BE INSTALLED PRIOR TO PLACEMENT OF THE SUBBASE REINFORCEMENT MATERIAL – LAYER 2 (ITEM E207.99).
11. THE POWER SOURCE FOR THE NEW ODELL STREET EXTENSION LED LIGHT STANDARDS WILL UTILIZE THE SERVICE POINT RISER AT UTILITY POLE #2301 AND REMOTE METER FOR STEELWORKERS WAY AT APPROXIMATE STA. B 11+68±, 64 FEET LT. THE CONNECTION FOR THE NEW WIRES WILL BE AT LP-B11, STA. B 19+72±, 16.5 FEET LT.

LEGEND:

	PROPOSED LOCATION OF STREET LIGHTING POLE WITH POST TOP LUMINAIRE MOUNTED ON A CONCRETE FLUSH FOUNDATION
E	PROPOSED NEW 2" SCHEDULE 40 PVC CONDUIT WITH PROPOSED NEW 3#6, 1#6G TYPE RHW-2 UNDERGROUND ELECTRICAL CABLE
*	PROPOSED NEW ELECTRICAL SERVICE RISER ASSEMBLY ON EXISTING WOOD UTILITY POLE

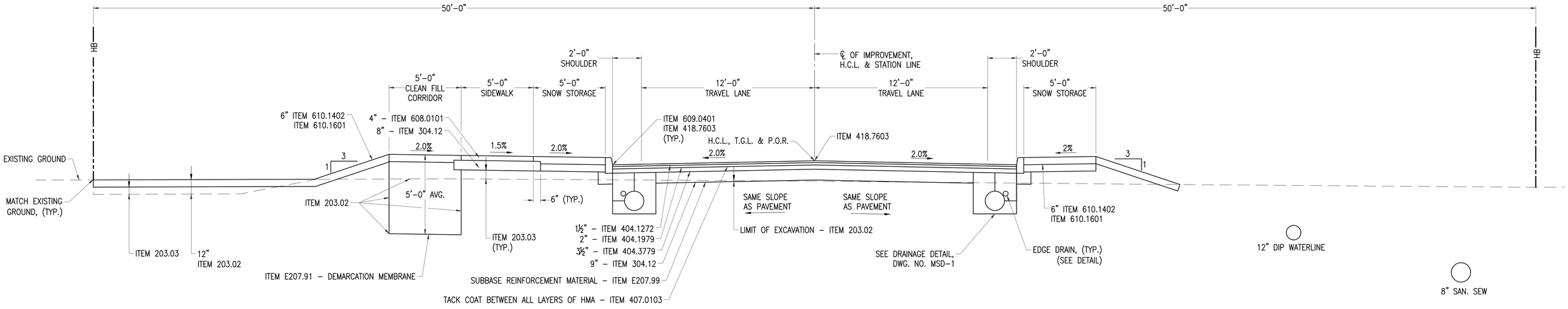
0 40 80 120 FT
HORIZONTAL SCALE
1" = 40' SCALE BAR

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SIGNING, STRIPING AND LIGHTING PLAN

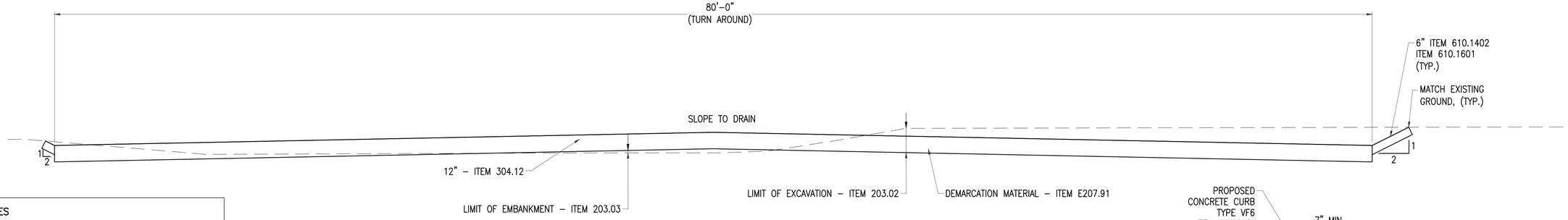
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RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
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TYPICAL SECTION – NORMAL CROWN

NOT TO SCALE



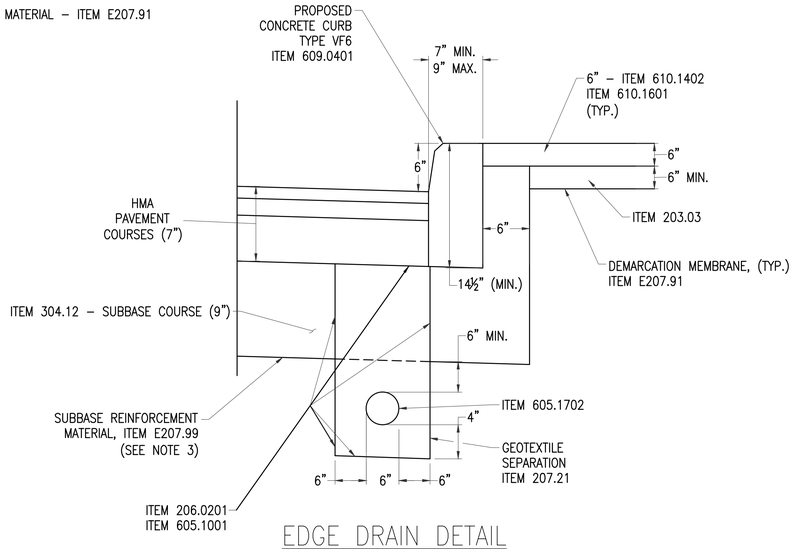
STONE CIRCLE TURN-AROUND

NOT TO SCALE

NOTES

1. BOTTOM OF PROPOSED SUBBASE SHALL MEET THE BOTTOM OF EXISTING SUBBASE AT INTERSECTION OF FUHRMAN BOULEVARD.
2. ITEM 418.7603 – ASPHALT PAVEMENT JOINT SEALER SHALL BE APPLIED FULL DEPTH AT INTERFACE WITH STEELWORKERS WAY ASPHALT, ALONG FACE OF CURB FOR TOP COURSE ASPHALT AND ALONG ALL LONGITUDINAL AND TRANSVERSE PAVEMENT COLD JOINTS IN TOP COURSE.
3. EXCAVATION FOR UNDERDRAINS SHALL BE DONE AFTER SUBBASE HAS BEEN PLACED. THE SUBBASE REINFORCEMENT MATERIAL SHALL BE RESTABLISHED OVER THE UNDER-DRAIN TRENCH. THE CONTRACTOR SHALL DEVELOP THE MEANS AND METHOD TO REMOVE AND REPLACE THE SUBBASE REINFORCEMENT MATERIAL AND BE APPROVED BY THE ENGINEER-IN-CHARGE. NO EXTRA PAYMENT WILL BE MADE FOR REMOVING AND REINSTALLING THE SUBBASE REINFORCEMENT MATERIAL OVER UNDERDRAIN TRENCH.
4. REFER TO INTERIM EXCAVATION WORK PLAN NOTES ON DWG. NO.
5. REFER TO DWG. NO. MSD-1 FOR CLEAN FILL CORRIDOR DETAILS.
6. PAVEMENT SUBGRADE SHALL BE PROOF ROLLED IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SECTION 203. ONLY A CHARRIOT STYLE PROOF ROLLER MEETING THE REQUIREMENTS OF THIS SECTION WILL BE ACCEPTED. ANY AREA FOUND UNACCEPTABLE SHALL BE REMOVED, REPLACED AND RETESTED. COST OF REMOVAL OF UNSUITABLE MATERIAL, REPLACEMENT WITH SUITABLE MATERIAL AND RETESTING WITH PROOF ROLLER AND DENSITY GAGE (AOBE) SHALL BE BORNE BY THE CONTRACTOR REGARDLESS IF APPROVED MATERIAL WAS INITIALLY USED.
7. THE ABOVE SHALL APPLY UNLESS THE DEPTH OF REMOVAL IS GREATER THAN TWO-FEET (2') BELOW ORIGINAL GROUND OR ROAD CUT EXCAVATION LIMITS, WHICH EVER IS AT THE LOWEST ELEVATION AND WAS NOT ASCERTAINABLE AT THE TIME OF ORIGINAL ROADWAY CUT. THEN PAYMENT SHALL BE MADE USING CONTRACT BID ITEMS 203.02 AND EITHER 203.03 OR 204.01 CONTROLLED LOW STRENGTH MATERIAL.
8. THE CONTRACTOR SHALL PROVIDE AT THEIR EXPENSE AN APPROVED CERTIFIED TESTING FIRM THAT IS ACCEPTABLE TO THE EIC FOR ALL MATERIAL TESTING AND COMPACTION TESTING.

ITEM	DESCRIPTION	UNIT
203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY
203.03	EMBANKMENT IN PLACE	CY
206.0201	TRENCH AND CULVERT EXCAVATION	CY
207.21	GEOTEXTILE SEPARATION	SY
E207.91	DEMARCATION MEMBRANE	SY
E207.99	SUBBASE REINFORCEMENT MATERIAL, LAYER 2	SY
304.12	SUBBASE COURSE, TYPE 2	CY
404.1272	12.5 F2 TOP COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.1979	19 F9 BINDER COURSE ASPHALT, 70 SERIES COMPACTION	TON
404.3779	37.5 F9 BASE COURSE ASPHALT, 70 SERIES COMPACTION	TON
407.0103	STRAIGHT TACK COAT	GAL
418.7603	ASPHALT PAVEMENT JOINT ADHESIVE	LF
605.1001	UNDERDRAIN FILTER, TYPE II	CY
605.1702	OPTIONAL UNDERDRAIN PIPE, 6" DIAMETER	LF
608.0101	CONCRETE SIDEWALKS AND DRIVEWAYS	CY
609.0401	CAST-IN-PLACE CONCRETE CURB TYPE VF6	LF
610.1402	TOPSOIL – ROADSIDE	CY
610.1601	TURF ESTABLISHMENT – ROADSIDE	SY



EDGE DRAIN DETAIL

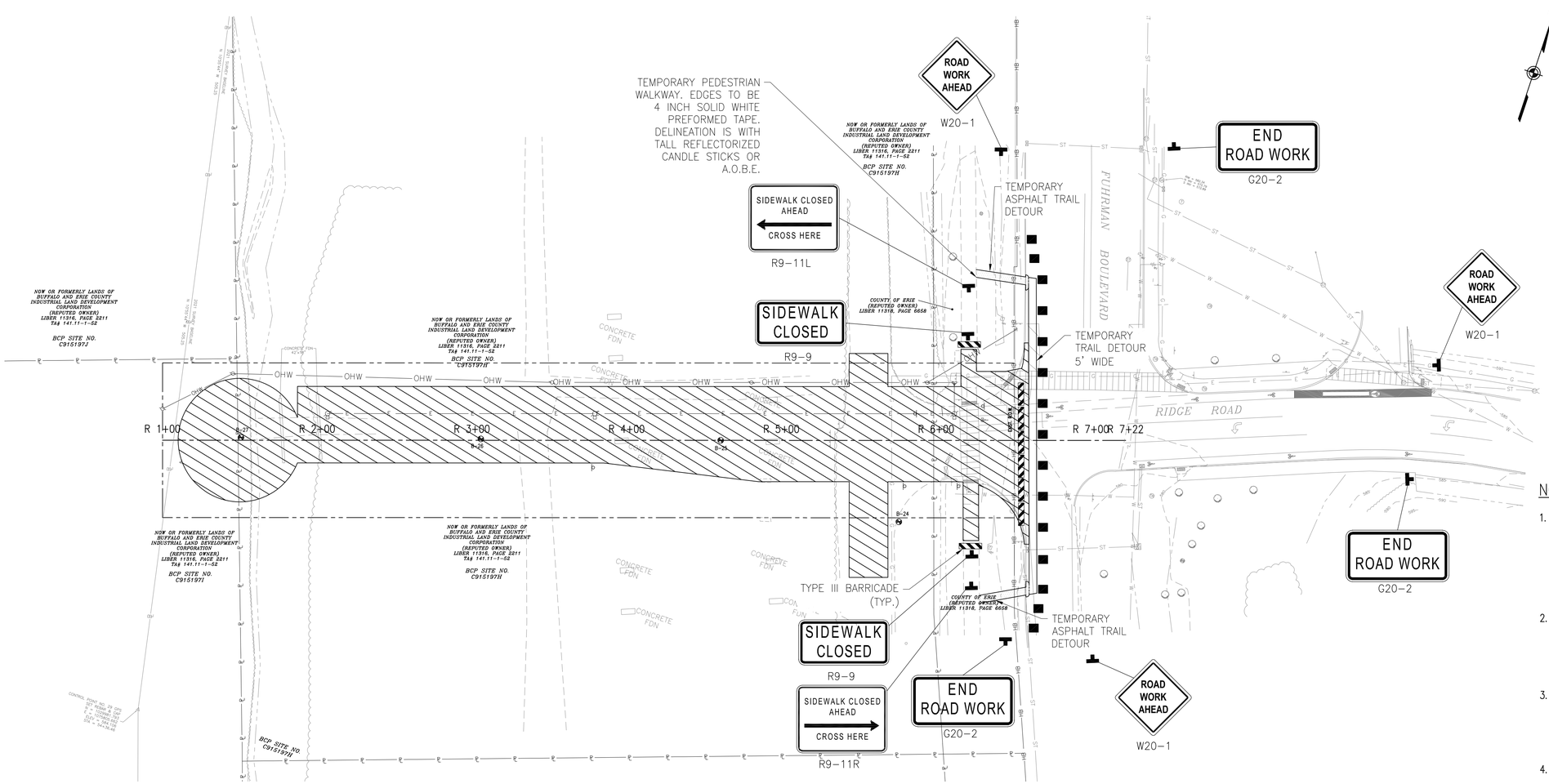
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TYPICAL SECTIONS

Sheet No.
Date April 2025
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RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard



NOTES:

1. MAINTENANCE AND PROTECTION OF TRAFFIC SHALL BE PROVIDED THROUGHOUT THE LENGTH OF THE CONTRACT IN ACCORDANCE WITH THE PROVISIONS OF SECTION 619 OF THE NYSDOT STANDARD SPECIFICATIONS AND STANDARD SHEETS FOR WORK ZONE TRAFFIC CONTROL, THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND ANY PROVISIONS CONTAINED IN THE CONTRACT DOCUMENTS, AND AS ORDERED BY THE ENGINEER (A.O.B.E.). THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL BE DEFINED AS THE MUTCD, 2009 EDITION AND THE NYS SUPPLEMENT 2010 EDITION, EFFECTIVE MARCH 16, 2011.
2. PRIOR TO THE START OF ANY WORK THAT WILL AFFECT TRAFFIC OR WORKER SAFETY, ALL RELATED WORK FOR PROPOSED WORK ZONE TRAFFIC CONTROL SHALL BE COMPLETE. THIS INCLUDES BUT IS NOT LIMITED TO, ALL SIGNS, SIGNALS, PAVEMENT MARKINGS, BARRIERS, DELINEATION (CONES, DRUMS, ETC.), FLAGGERS, PAVEMENT MODIFICATIONS, TEMPORARY STRIPING, AND ANY OTHER RELATED WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UTILIZING ALL APPLICABLE NYSDOT STANDARD SHEETS, SECTION 619, FOR ALL WORK ZONE TRAFFIC CONTROL, AT THE PROJECT SITE. THIS INCLUDES THE USE OF NOTES, TABLES AND DETAILS WITHIN SECTION 619. THE TYPICAL DETAILS DEPICTED ON THE NYSDOT STANDARD SHEETS, NYSDOT WORK ZONE TRAFFIC CONTROL MANUAL AND IN THE MUTCD, REFLECT THE MINIMUM REQUIREMENTS.
4. THE LOCATIONS OF SIGNS SHOWN ON WORK ZONE TRAFFIC CONTROL DETAILS MAY NEED TO BE ADJUSTED BASED ON SIGHT DISTANCE AND OTHER SITE SPECIFIC CONSIDERATIONS. THE FINAL LOCATIONS ARE SUBJECT TO APPROVAL OF THE ENGINEER.
5. WHERE POSSIBLE, ALL CHANNELIZING AND GUIDING DEVICES ARE TO BE PLACED SO AS TO PROVIDE A MINIMUM 2' LATERAL CLEARANCE TO THE TRAVELED WAY.
6. STOCKPILING OF MATERIALS AND PARKING OF EQUIPMENT IS PROHIBITED DURING NON-WORKING HOURS ON PAVEMENT AND SHOULDERS.
7. THE OPENING OF THE NEW ROAD WILL BE AT THE CITY OF LACKAWANNA'S DIRECTION.
8. LONG-TERM IS STATIONARY WORK THAT OCCUPIES A LOCATION MORE THAN 3 CONSECUTIVE DAYS. THIS SETUP CAN ALSO BE USED FOR INTERMEDIATE TERM WORK.
9. ANY ALTERNATE PEDESTRIAN PATHWAY MUST HAVE AT LEAST THE SAME LEVEL OF ACCESSIBILITY AS THE ONE IT IS REPLACING.
10. ONLY THE WORK ZONE TRAFFIC CONTROL DEVICES RELATED TO PEDESTRIANS ARE SHOWN, OTHER DEVICES, SUCH AS LANE/SHOULDER CLOSURE SIGNING, ROAD NARROWS SIGNS (W5-4), OR NO PARKING SIGNS MAY BE USED TO CONTROL VEHICULAR TRAFFIC.
11. TYPE III BARRICADES SHALL BE THE FULL WIDTH OF THE PATH BEING CLOSED.
12. ACCESS TO BUSINESS ENTRANCES AND TRANSIT STOPS WILL NEED TO BE MAINTAINED, IF THE PEDESTRIAN FACILITY CURRENTLY HAS A TRANSIT STOP THAT WILL BE AFFECTED BY THE WORK ZONE, PRACTITIONERS SHOULD CONSULT THE TRANSIT AUTHORITIES THAT SERVICE THE AFFECTED STOP TO DETERMINE HOW TO ACCOMMODATE THE STOP.

LEGEND:

- CONSTRUCTION SIGN
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- WORK AREA

0 40 80 120 FT
HORIZONTAL SCALE
1" = 40' SCALE BAR

TABLE 519-01: REQUIRED SIGN SIZES	
SIGN	NON-FREEWAY
G20-2	36x18
R9-11L/R9-11R**	24x18
R9-9**	24x12
W20-1	36x36
**SIGNS NOT FOR FREEWAY USE	

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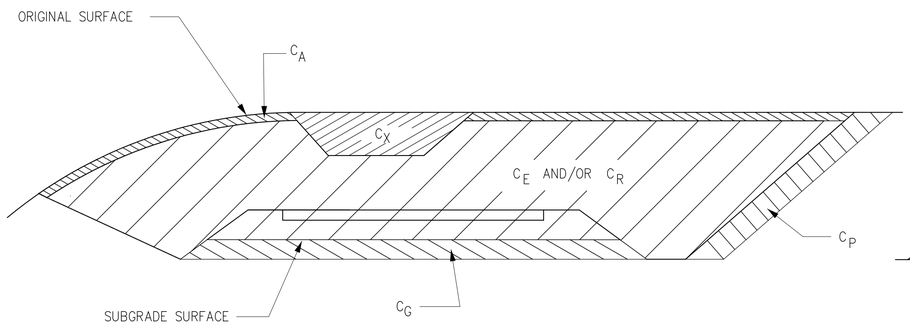
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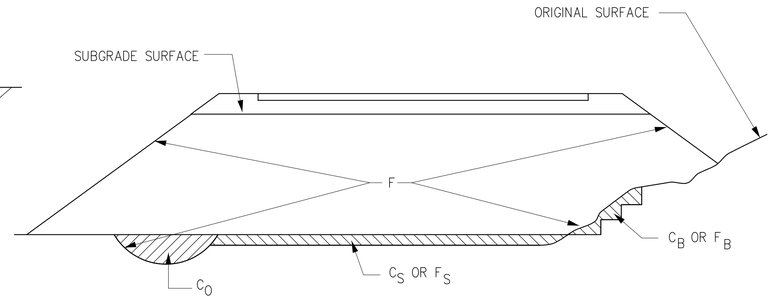
Sheet No.
Date April 2025
Scale As Noted
DWG.

SUMMARY OF EARTHWORK (ITEMS 203.02 AND 203.03 ONLY)					
SOURCE	EXCAVATION			ITEM 203.02	ITEM 203.03
	T_E	C_R	T_U	C_T	F_T
R 1+87.18 TO R 6+59.82	1058	0	1344	2402	521
80' DIA. TURNAROUND	7	0	180	187	30
TOTALS	1065	0	1524	2589	551

SUMMARY OF TRENCH AND CULVERT EXCAVATION (ITEM 206.0201 ONLY)			
SOURCE	EXCAVATION		ITEM 206.0201
	ROCK	NON-ROCK	
TOTALS			



CUT SECTION



FILL SECTION

DEFINITIONS:

C_B – EXCAVATION FOR REQUIRED BENCHING, (BOTH LONGITUDINAL AND TRANSVERSE).

C_G – EXCAVATION FOR SUBGRADE IMPROVEMENT.

C_P – EXCAVATION FROM CUT SLOPE NECESSARY TO PLACE SLOPE PROTECTION.

C_E – PORTION OF CUT ASSUMED TO BE EARTH SUITABLE FOR EMBANKMENT CONSTRUCTION, EXCLUDING C_G AND C_P.

T_E – $(C_B + C_G + C_P + C_E)$ TOTAL EARTH EXCAVATION ASSUMED SUITABLE FOR EMBANKMENT CONSTRUCTION.

C_A – EXCAVATION OF TOPSOIL (UNSUITABLE MATERIAL) IN CUT.

C_S – EXCAVATION OF TOPSOIL (UNSUITABLE MATERIAL) UNDER EMBANKMENT.

C_X – EXCAVATION OF UNSUITABLE MATERIAL IN CUT: SWAMP OR DUMP

C_O – EXCAVATION OF UNSUITABLE MATERIAL BENEATH EMBANKMENT: SWAMP OR DUMP

T_U – $(C_A + C_S + C_X + C_O)$ TOTAL EXCAVATION ASSUMED UNSUITABLE FOR EMBANKMENT CONSTRUCTION.

C_R – PORTION OF CUT ASSUMED TO BE ROCK, INCLUDING C_G IF APPLICABLE.

C_T – $(T_E + T_U + C_R)$ TOTAL EXCAVATION.

DEFINITIONS:

F_B – FILL REQUIRED TO REPLACE BENCHES.

F_S – FILL REQUIRED TO REPLACE TOPSOIL REMOVED BENEATH EMBANKMENTS.

F – FILL REQUIRED TO COMPLETE EMBANKMENT TO SUBGRADE SURFACE AND SIDE-SLOPES AFTER FOUNDATION IS PREPARED.

F_T – $(F_B + F_S + F)$ TOTAL FILL REQUIRED.

T_A – $(T_E \times F_E + C_R \times F_R)$ THE VOLUME WHICH THE SUITABLE EXCAVATED MATERIAL COULD OCCUPY IN EMBANKMENT.

F_E – SHRINKAGE FACTOR FOR EARTH

F_R – SWELL FACTOR FOR ROCK

NOTES:

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THESE TABLES ARE ESTIMATED, AND ARE PROVIDED FOR THE PURPOSE OF PREPARING AN ESTIMATE. THEY ARE NOT TO BE CONSTRUED AS BEING EXACT. THEY ARE INTENDED TO QUANTIFY AND QUALIFY THE NATURE OF THE WORK TO BE PERFORMED. SIGNIFICANT DIFFERENCE FROM THIS REPRESENTATION, WHEN ENCOUNTERED DURING THE ACTUAL WORK, WILL BE HANDLED ACCORDING TO THE SPECIFICATIONS GOVERNING THIS PROJECT.

203.02 UNCLASSIFIED EXCAVATION AND DISPOSAL

203.03 EMBANKMENT IN PLACE

206.0201 TRENCH AND CULVERT EXCAVATION

SUBDIVISION NO.	LOCATION STATION TO STATION	SUITABLE EXCAVATION				ROCK	UNSUITABLE MATERIAL					TOTAL EXCAVATION	EMBANKMENT			
		C_B	C_G	C_E	T_E	C_R	C_A	C_S	C_X	C_O	T_U	C_T	F_B	F_S	F	F_T
	R 1+87.18 – R 6+59.82	0	0	1058	1058	0	1344	0	0	0	1344	2402	0	457	64	521
	80' DIA. TURNAROUND	0	0	7	7	0	180	0	0	0	180	187	0	30	0	30

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EARTHWORK SUMMARY SHEET

Sheet No.
Date April 2025
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DRAINAGE QUANTITY TABLE

UPSTREAM DRAINAGE STRUCTURE NO.	STATION	SIDE	OFFSET	RIM	INVERT	DOWNSTREAM DRAINAGE STRUCTURE NO.	SELECT GRANULAR FILL ITEM 203.07 (CY)	TRENCH AND CULVERT EXCAVATION ITEM NO. 206.0201 (CY)	SHIELDS AND SHORING ITEM 552.17 (SF)	18-INCH SICPP PIPE - SOLID ITEM NO. 603.9818 (FT)	15-INCH SICPP - SOLID ITEM 603.9815	DRAINAGE STRUCTURE TYPE A ITEM NO. 604.300103 (FT)	DRAINAGE STRUCTURE TYPE M ITEM NO. 604.300113 (FT)	WELDED FRAME AND RETICULINE GRATE 3 ITEM 655.1103 (EACH)	ITEM 604.070501 - ALTERING DRAINAGE STRUCTURES
DS-R1	02+00	LT	14	583.33	S579.5	DS-R2	7.4	10.1	65.4			5.1		1.0	
DS-R1 TO DS-R2	02+00						9.9	9.9			22.0				
DS-R2	02+00	RT	14	583.33	N 579.47 E 579.47	DS-R4	9.4	7.4	65.9			5.3		1.0	
DS-R2 TO DS-R4							140.4	150.0	1800.0	184.0					
DS-R3	03+84	LT	14	583.12	S579.28	DS-R4	7.4	9.4				5.3		1.0	
DS-R4	03+84	RT	14	583.12	N 579.24 W577.80 E577.80	DS-R5	10.2	13.2				6.7		1.0	
DS-R3 TO DS-R4	03+84					DS-R4	11.7	11.0			22.0				
DS-R4 TO DS-R5						DS-R5	82.5	80.7		104.0					
DS-R5	04+87	RT	26	582.06	W576.88 E 576.88	DS-R6	9.9	11.7	78.9			6.5		1.0	
DS-R5 TO DS-R6						DS-R6	82.9	83.8		122.0					
DS-R7	06+09	LT	14	580.47	S576.64	DS-R6	10.8	10.1	65.4			5.3		1.0	
DS-R6	06+09	RT	26	580.23	N 576.59 W 575.68 SE 575.68	DS-F1	7.8	12.0	62.7			6.0		1.0	
DS-R7 TO DS-R6	06+09					DS-R6	16.3	17.8			34.0				
DS-R6 TO DS-F1						DS-F1	33.5	37.9		67.0					
DS-F1	06+59	RT	70.7	578.92	W575.17										1.0
						TOTALS	439.9	464.9	2138.3	477.0	78.0	40.11	0	7	1

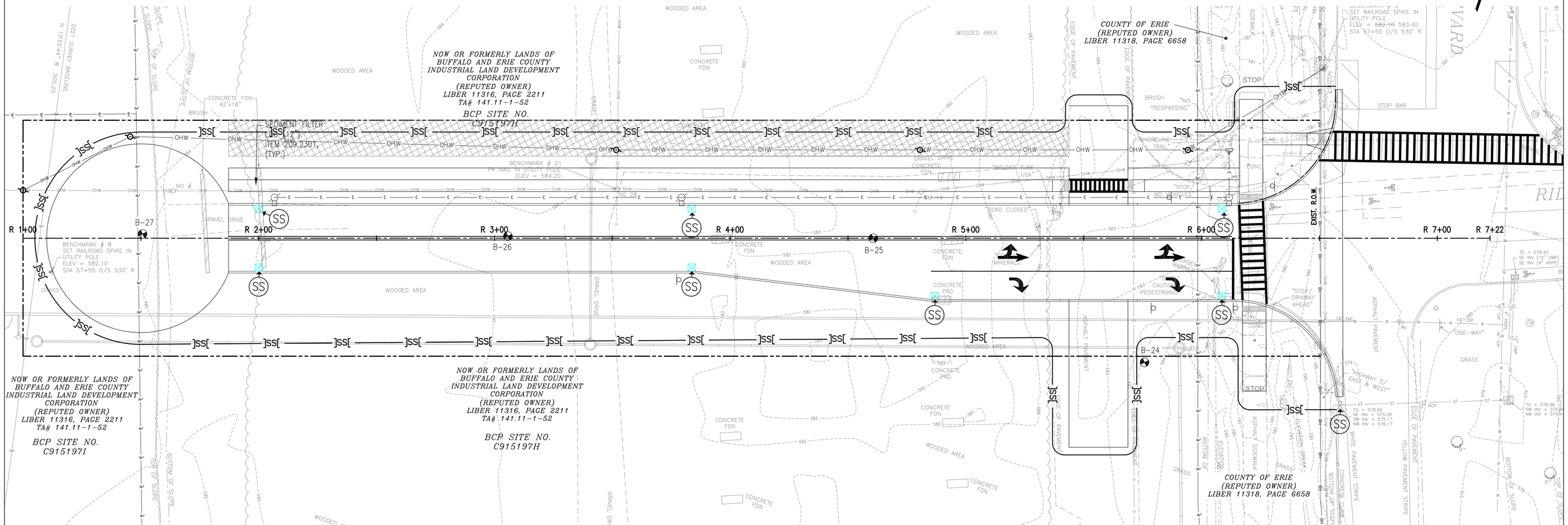
UNDER DRAIN FILTER TABLE

LOCATION	STATION TO STATION	SIDE	OPTIONAL UNDER DRAIN PIPE, 6 INCH DIAMETER ITEM 605.1702 (LF)	IUNDERDRAIN FILTER STONE ITEM 605.1001 (CY)
DS R1 TO DS R3	R2+00 TO R3+84	LT	184	13.59556
DS R3 TO DS R7	R3+84 TO 6+09	LT	225	16.63
DS R2 TO DS R4	R2+00 TO R3+84	RT	184	13.60
DS R4 TO DS R5	R3+84 TO R4+87	RT	103	7.61
DS R5 TO DS R6	R4+87 TO R6+09	RT	122	9.01
DS R6 TO DS F1	R6+09 TO D6+58	LT	75.4	5.57
				0.00
				0.00
				0.00
				0.00
	TOTALS		**893.4**	**66.01**

NOTES:

1. OFFSET IS TO THE FACE OF CURB. RIM ELEVATION IS FINAL GRADE AT FRONT OF CURB MINUS ½".

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 37 OF 41



EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL APPLY WATER AS CONDITIONS WARRANT TO CONTROL WIND BORN EROSION. THIS MEASURE APPLIES TO HAUL ROADS, CUT AND FILL OPERATIONS, SUBBASE AND ANY OTHER EXPOSED SURFACES. COST FOR APPLYING WATER SHALL BE INCLUDED IN THE VARIOUS CONTRACT ITEMS.
2. ANY GRADED AREAS NOT SUBJECT TO FURTHER DISTURBANCE OR CONSTRUCTION TRAFFIC SHALL WITHIN 7 DAYS OF FINAL GRADING, RECEIVE THE APPLICATION OF THE PROPOSED VEGETATIVE COVER.
3. IN ACCORDANCE WITH THE INTERIM EXCAVATION PLAN, EXCAVATED MATERIAL SHALL REMAIN AT THE AREA DESIGNATED FOR DISPOSAL, SITE 11-6. THE CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF THE SPOIL MATERIAL WITH THE OWNER (ECIDA) AND EIC.
4. THE FINAL GRADING OF THE SPOILED MATERIAL SHALL NOT BE GREATER THAN 1-½ FEET IN HEIGHT OVER ORIGINAL GROUND. THE EDGES SHALL BE FEATHER TO BLEND WITH THE EXISTING TERRAIN. HYDRO-SEEDING OF VEGETATED COVER SHALL BE DONE WITHIN 1 CALENDAR DAY OF FINAL GRADING.

0 20 40 60 FT
HORIZONTAL SCALE
1" = 20' SCALE BAR

LEGEND:

]SS[SEDIMENT FILTER LOG (12") – ITEM 209.2301

SS INLET PROTECTION – ITEM 209.1702

ROADWAY CONSTRUCTION SPOIL MATERIAL AREA

NOTES:

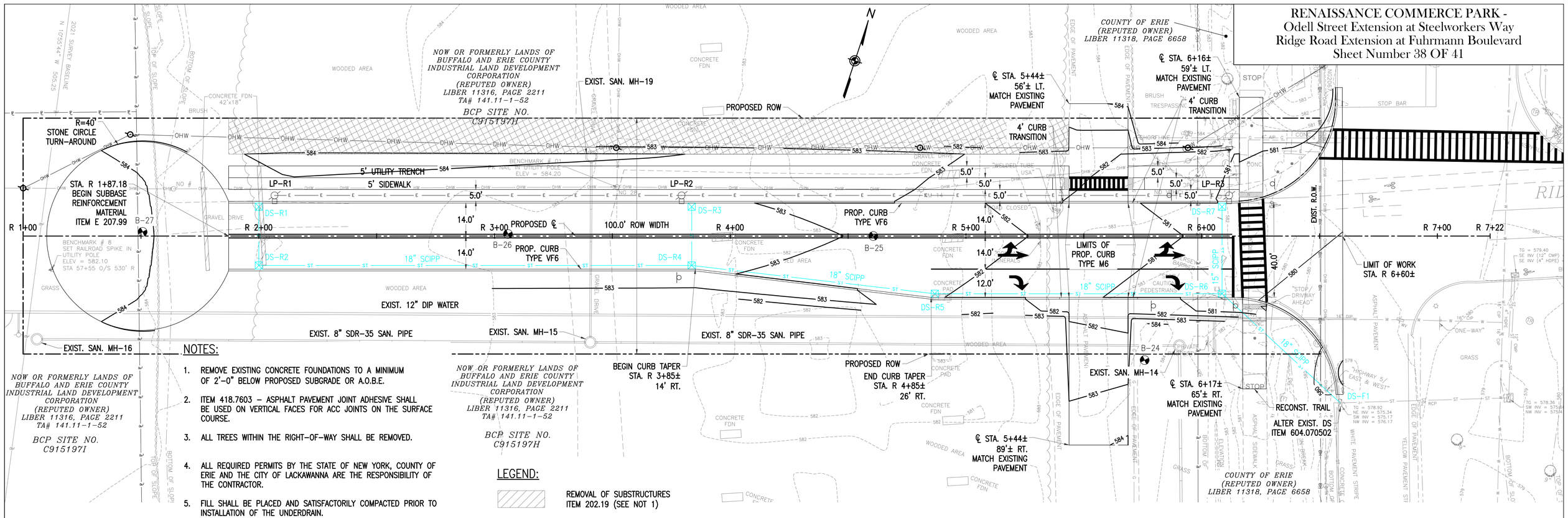
1. REFER TO DWG. NO. ECD-01 FOR EROSION CONTROL DETAILS.
2. ALL AREAS DISTURBED DURING CONSTRUCTION SHOULD BE RESTORED AS SOON AS PRACTICAL. DISTURBED AREAS SHALL BE TEMPORARILY SEEDED AND MULCHED IF NEEDED DURING CONSTRUCTION TO PREVENT EROSION.

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RIDGE ROAD SERVICE ROAD EROSION CONTROL PLAN

Sheet No.
Date April 2025
Scale As Noted
DWG. ECP-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 38 OF 41

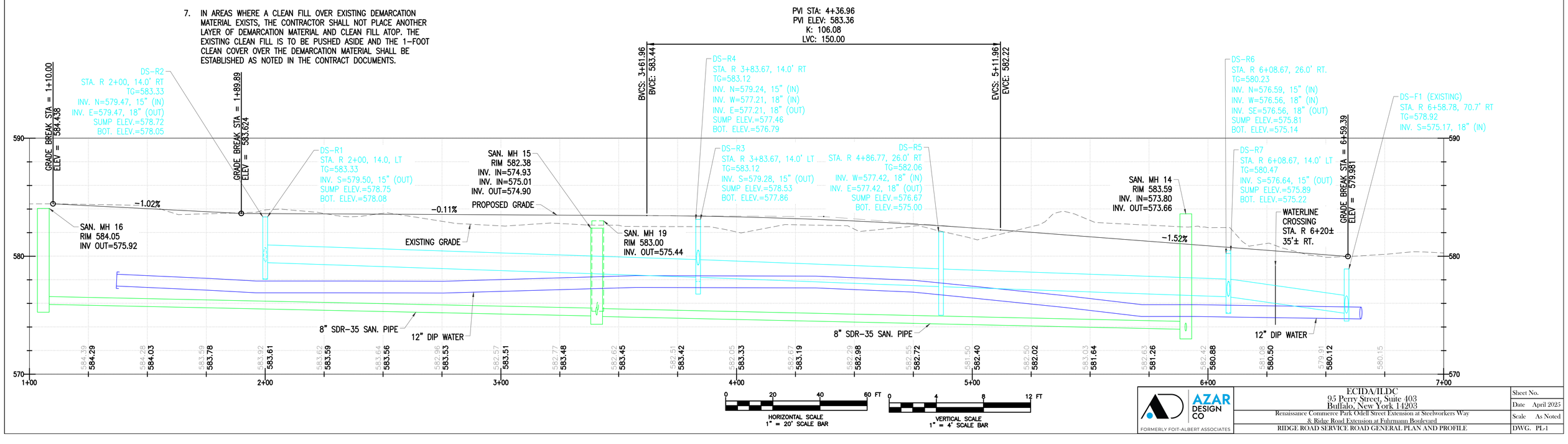


NOTES:

1. REMOVE EXISTING CONCRETE FOUNDATIONS TO A MINIMUM OF 2'-0" BELOW PROPOSED SUBGRADE OR A.O.B.E.
2. ITEM 418.7603 – ASPHALT PAVEMENT JOINT ADHESIVE SHALL BE USED ON VERTICAL FACES FOR ACC JOINTS ON THE SURFACE COURSE.
3. ALL TREES WITHIN THE RIGHT-OF-WAY SHALL BE REMOVED.
4. ALL REQUIRED PERMITS BY THE STATE OF NEW YORK, COUNTY OF ERIE AND THE CITY OF LACKAWANNA ARE THE RESPONSIBILITY OF THE CONTRACTOR.
5. FILL SHALL BE PLACED AND SATISFACTORILY COMPACTED PRIOR TO INSTALLATION OF THE UNDERDRAIN.
6. EXISTING 8" SDR-35 SANITARY SEWER PIPE, MANHOLES AND 12" DIP WATERLINE ARE TO REMAIN. NO WORK IS PROPOSED.
7. IN AREAS WHERE A CLEAN FILL OVER EXISTING DEMARCATION MATERIAL EXISTS, THE CONTRACTOR SHALL NOT PLACE ANOTHER LAYER OF DEMARCATION MATERIAL AND CLEAN FILL ATOP. THE EXISTING CLEAN FILL IS TO BE PUSHED ASIDE AND THE 1-FOOT CLEAN COVER OVER THE DEMARCATION MATERIAL SHALL BE ESTABLISHED AS NOTED IN THE CONTRACT DOCUMENTS.

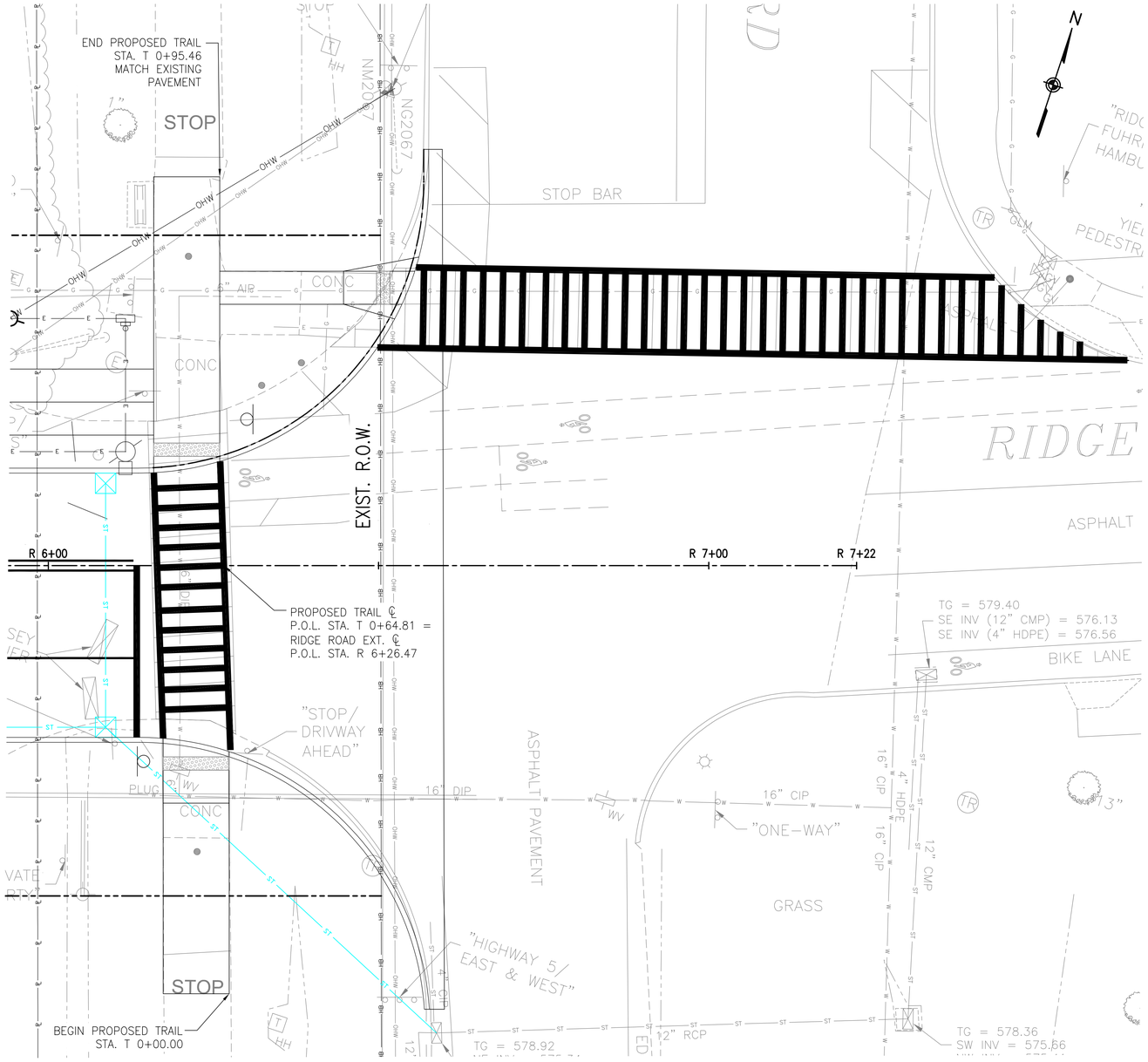
LEGEND:

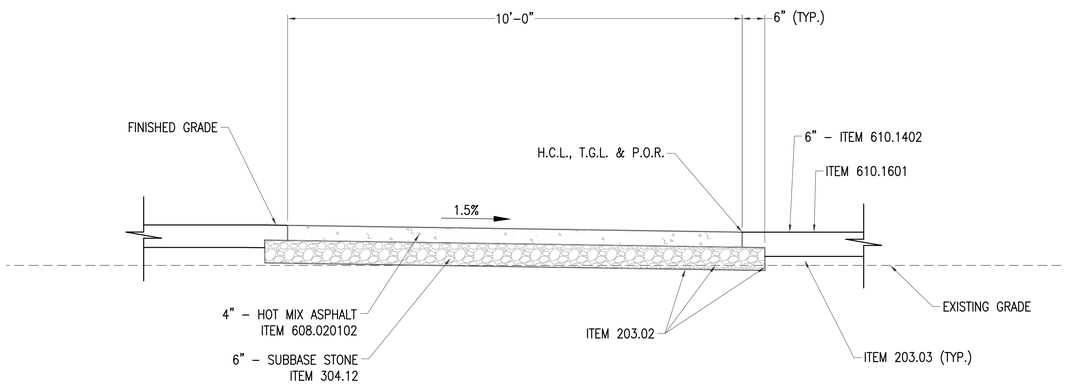
- REMOVAL OF SUBSTRUCTURES ITEM 202.19 (SEE NOT 1)
- ROADWAY CONSTRUCTION SPOIL MATERIAL AREA



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RIDGE ROAD SERVICE ROAD GENERAL PLAN AND PROFILE	
Sheet No.	
Date	April 2025
Scale	As Noted
DWG.	PL-1

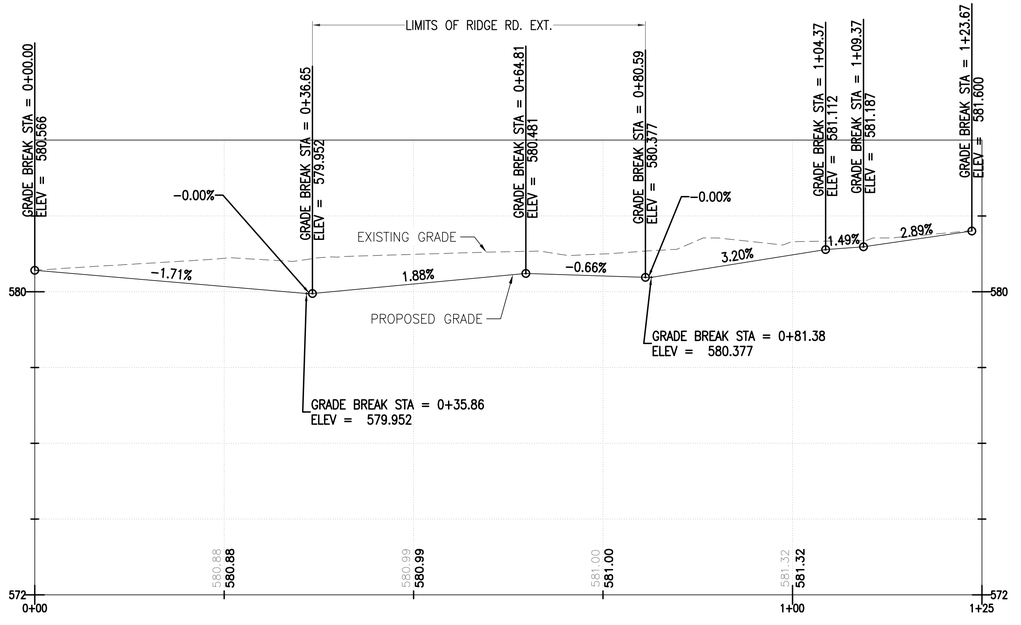
RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 39 OF 41





MULTI–USE TRAIL SECTION

NOT TO SCALE



MULTI–USE TRAIL PROFILE

NOT TO SCALE

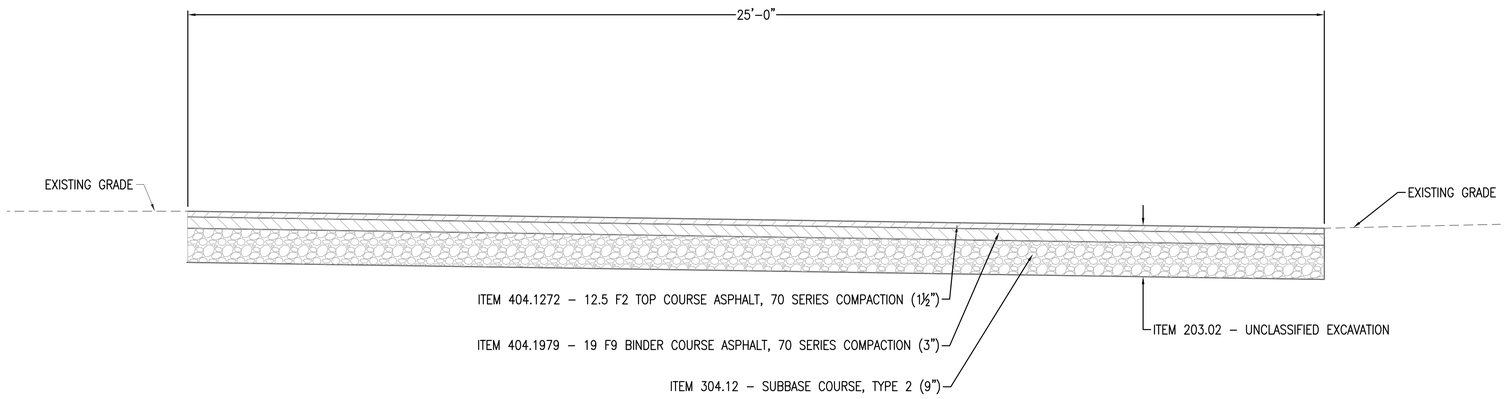
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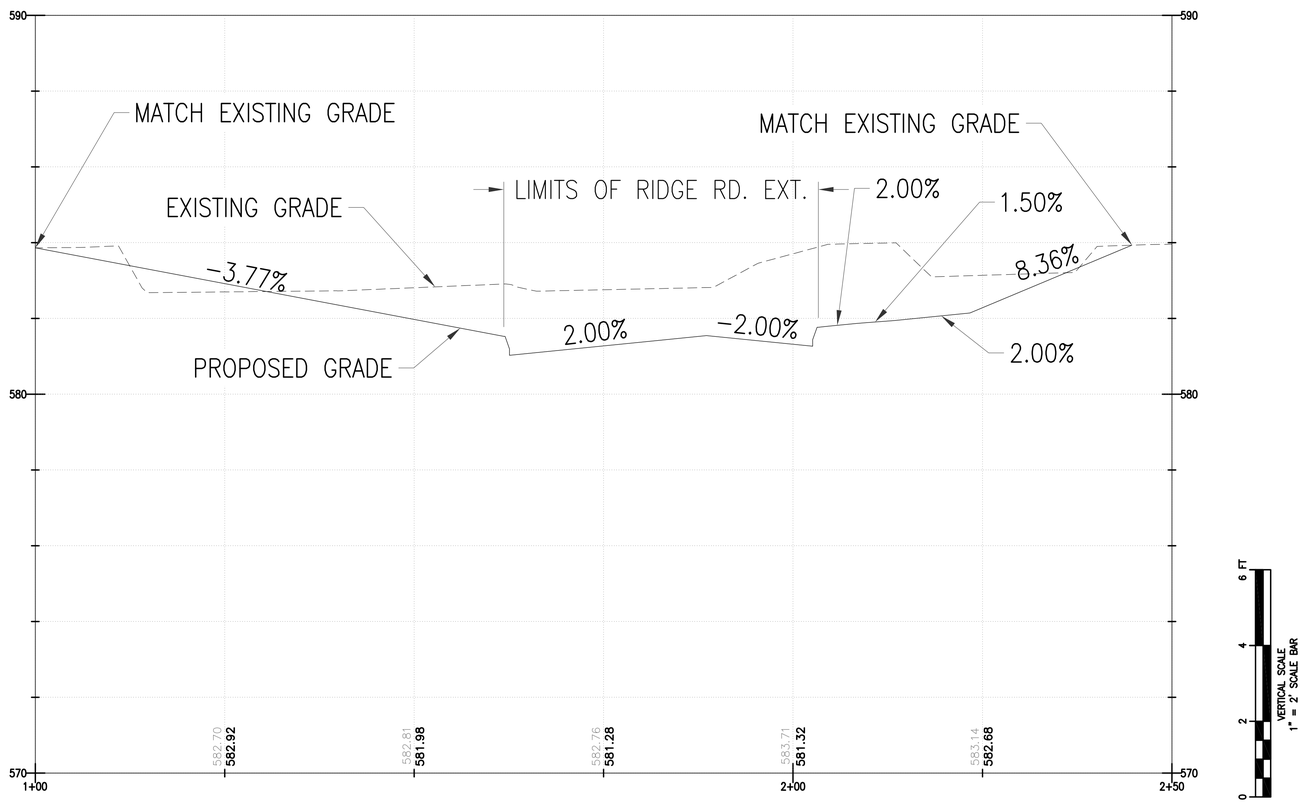
PROPOSED TRAIL GENERAL PLAN, PROFILE AND SECTION

Sheet No.
Date April 2025
Scale As Noted
DWG. TP-1



SERVICE ROAD SECTION

NOT TO SCALE



SERVICE ROAD PROFILE

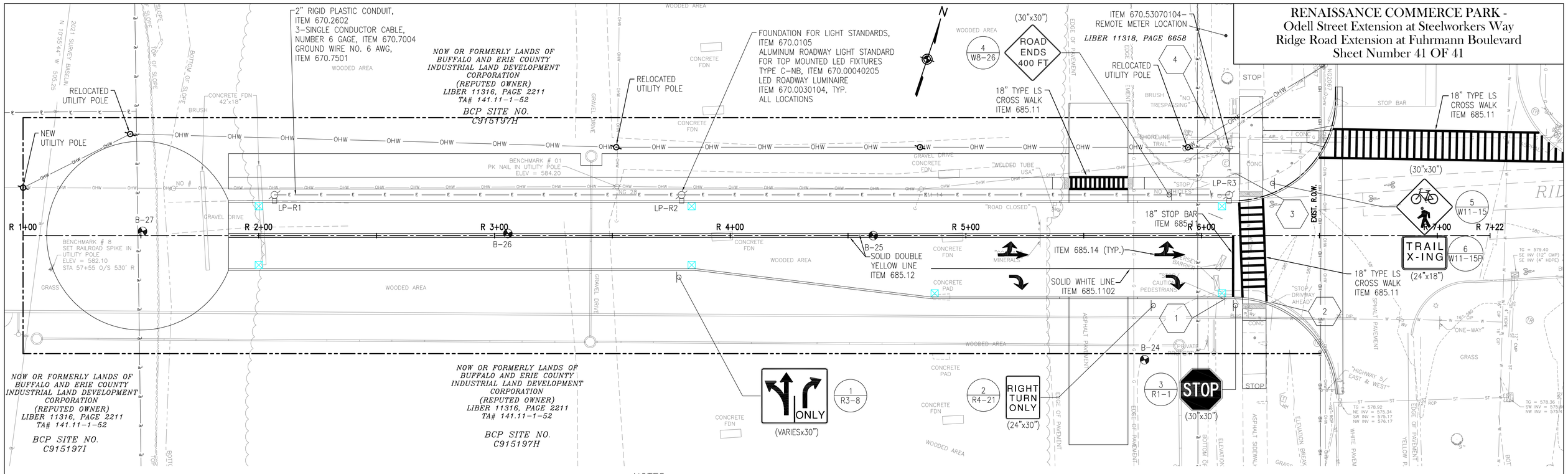
0 10 20 30 FT
HORIZONTAL SCALE
1" = 10' SCALE BAR

AZAR DESIGN CO
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ECIDA/ILDC
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Buffalo, New York 14203
Renaissance Commerce Park Odell Street Extension at Steelworkers Way
& Ridge Road Extension at Fuhrmann Boulevard
SERVICE ROAD PROFILE

Sheet No.	
Date	April 2025
Scale	As Noted
DWG.	PRO-1

RENAISSANCE COMMERCE PARK -
Odell Street Extension at Steelworkers Way
Ridge Road Extension at Fuhrmann Boulevard
Sheet Number 41 OF 41



NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW IN THE FIELD ALL EXISTING CONDITIONS WHICH MAY BE INVOLVED WITH THE INSTALLATION OF UNDERGROUND STREET LIGHTING FACILITIES.
2. ALL UNDERGROUND CABLE WILL BE INSTALLED IN 2" SCHEDULE 40 PVC CONDUIT RUNNING CONTINUOUS BETWEEN ALL STRUCTURES (PULLBOXES, FOUNDATIONS, ETC.): SPECIFIC CONDUIT ITEM AS NOTED ON PLANS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SAFEGUARD ALL NEW STREET LIGHTING INSTALLATIONS, POLES, CABLE, ETC., FOR THE DURATION OF THE PROJECT. IF ANY DAMAGE OCCURS TO THE NEW CABLE INSTALLATION: SPLICING IS NOT PERMITTED. THE CABLE RUN MUST BE REPLACED IN ITS ENTIRETY FROM, "POINT OF CONNECTION TO POINT OF CONNECTION". THERE WILL BE NO ADDITIONAL COST TO THE CITY OF LACKAWANNA FOR THE ABOVE CONDITIONS.
4. STREET LIGHTING MUST BE MAINTAINED AND ENERGIZED, WHICH WILL INCLUDE THE EXISTING SYSTEM AND/OR THE NEW LIGHTING INSTALLATIONS, FOR THE DURATION OF THE PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL REQUIRED REPAIRS ON THE EXISTING EXISTING AND/OR NEW STREET LIGHTING FACILITIES, AT NO COST TO THE OWNER, FROM THE TIME CONSTRUCTION BEGINS UNTIL FINAL ACCEPTANCE OF THE NEW STREET LIGHTING SYSTEM.
5. THE CONTRACTOR IS REQUIRED TO PROTECT EXISTING UTILITIES AND SHALL REPAIR AND REPLACE ANY DAMAGE CAUSED BY INSTALLATION OF THEIR OWN WORK AT THEIR EXPENSE.
6. NO LIGHT POLE CONDUIT OR WIRING SHALL BE PLACED WITHIN 2 FT. OF ANY GUIDERAIL OR GROUND MOUNTED SIGNS.
7. THE CONTRACTOR SHALL INSTALL CODED WIRING ONLY AND PROVIDE PROPER FUSE KITS, COORDINATED WITH RESPECTIVE WIRE SIZE.
8. ALL NEW LIGHT POLES SHALL BE NUMBERED BY THE CONTRACTOR AS LISTED IN THE LIGHTING PLANS OR AS ORDERED BY THE CITY OF LACKAWANNA.
9. RIGID GALVANIZED STEEL CONDUITS SHALL BE PLACED UNDER ALL ROADWAYS. ALL OTHER LIGHTING CONDUIT TO BE RIGID PLASTIC CONDUIT.
10. INSTALL ALL CONDUITS PER NEC 300.5, AND THE FOLLOWING:
    - A) ALL CONDUIT, REGARDLESS OF ITS LOCATION, SHALL BE PLACED A MINIMUM OF 24-INCHES BELOW FINAL GRADE IN NON-PAVEMENT AREAS AND 24-INCHES BELOW SUBGRADE IN PAVEMENT AREAS.
    - B) ALL BURIED CONDUIT SHALL HAVE A MAGNETIC TAPE PLACED 8 TO 12-INCHES ABOVE THE CONDUIT.
    - C) IN NON-PAVEMENT AREAS, AN APPROVED DEMARCATION MATERIAL SHALL BE INSTALLED/LOCATED 12-INCHES BELOW FINAL GRADE. ANY DISTURBANCE OR DAMAGE OF THE DEMARCATION MATERIAL SHALL BE REPLACED/REPAIRED TO THE SATISFACTION OF THE ENGINEER AND NYSDEC, AT NO ADDITIONAL COST TO THE COUNTY.
    - D) CONDUIT IN PAVEMENT AREAS SHALL BE INSTALLED PRIOR TO PLACEMENT OF THE SUBBASE REINFORCEMENT MATERIAL – LAYER 2 (ITEM E207.99).

LEGEND:

- PROPOSED LOCATION OF STREET LIGHTING POLE WITH POST TOP LUMINAIRE MOUNTED ON A CONCRETE FLUSH FOUNDATION
- E — PROPOSED NEW 2" SCHEDULE 40 PVC CONDUIT WITH PROPOSED NEW 3#6, 1#6G TYPE RHW-2 UNDERGROUND ELECTRICAL CABLE
- * PROPOSED NEW ELECTRICAL SERVICE RISER ASSEMBLY ON EXISTING WOOD UTILITY POLE
- PROPOSED REMOTE METER

HORIZONTAL SCALE
1" = 20' SCALE BAR
0 20 40 60 FT

LIGHTING TABLE			
FEATURE	STATION	OFFSET (FT.)	SIDE
POWER POINT			
POLE #			
CIRCUIT 2			
LP-R1	R 2+07	17	LT.
LP-R2	R 3+79	17	LT.
LP-R3	R 6+12	17	LT.

LEGEND

- L / T — NEW SIGN LOCATION
- L — REMOVAL LOCATION
- TR — REMOVAL LOCATION

NOTE:

1. REMOVAL OF EXISTING SIGNS SHALL BE INCLUDED IN ITEM 201.06 – CLEARING AND GRUBBING.

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SIGNING, STRIPING AND LIGHTING PLAN

Sheet No.
Date April 2025
Scale As Noted
DWG. SSL-1

Appendix 2

Site Management Plans (SMP)

Appendix 2A – SMP for Odell Road Extension (Site I-1 C915197, Site I-2 C915197B) and Ridge Road Extension (Site I-8 C915197H and Site C915197I)

Appendix 2B – SMP for Odell Road Extension (Site II-12 C915198L and Site II-11 C915198K)

No Site Specific SMP are published for Odell Road Expansion (Site I-2 C915197B and Site II-13 C915198M) and Ridge Road Expansion (Site I-8 C915197H)

Appendix 2A

SMP for Odell Road Extension (Site I-1 C915197, Site I-2 C915197B) and Ridge Road Extension (Site I-8 C915197H and Site C915197I)

Site Management Plan (SMP)

Brownfield Cleanup Program
Tecumseh Phase I Business Park
NYSDEC Site Nos. C915197 through C915197K
Lackawanna, New York

January 2014 0071-012-322

Prepared By:



2558 Hamburg Turnpike, Suite 300, Buffalo, New York | phone: (716) 856-0599 | fax: (716) 856-0583

BROWNFIELD CLEANUP PROGRAM

SITE MANAGEMENT PLAN

TECUMSEH PHASE I BUSINESS PARK
NYSDEC SITE NUMBERS: C915197 through C915197K
LACKAWANNA, NEW YORK

January 2014 0071-012-322

Prepared by:

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	Various	Addition of Appendix E I-1,3,5,7,9,10&11	11/22/17
2	6/11/19	Addition of Appendix E I-12	07/18/19
3	12/02/19	Corrections to Appendices E1 - E12	12/02/19

SITE MANAGEMENT PLAN
TECUMSEH PHASE I BUSINESS PARK

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SITE MANAGEMENT PLAN
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1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 Introduction

This document is a required element of the remedial program for the New York State Brownfield Cleanup Program (BCP) Sites within and collectively comprising the property referred to as the "Tecumseh Phase I Business Park," located in City of Lackawanna, Erie County, New York (see Figures 1 through 3). These BCP Sites, listed below by name and New York State Department of Environmental Conservation (NYSDEC) Site Number, were remediated or are slated to undergo remediation in accordance with Brownfield Cleanup Agreement (BCA) Index No. B9-0696-05-06(A), which was executed on December 12, 2005 and amended on August 20, 2012:

Site Name:	**NYSDEC Site Number:**
Site I-1	C915197
Site I-2	C915197B
Site I-3	C915197C
Site I-4	C915197D
Site I-5	C915197E
Site I-6	C915197F
Site I-7	C915197G
Site I-8	C915197H
Site I-9	C915197I
Site I-10	C915197J
Site I-11	C915197K

This SMP has been prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement(s) governing the above-listed BCP Sites.

1.1.1 Background

Tecumseh Redevelopment Inc. (Tecumseh) submitted an application to the NYSDEC dated May 20, 2005 requesting a BCA for the approximate 102-acre Phase I Business Park property. The NYSDEC deemed Tecumseh's application complete, and assigned the Phase I Business Park as Site Number C915197. Tecumseh subsequently entered into the BCA with the NYSDEC on December 12, 2005, which required the company to investigate and remediate contaminated media within the Phase I Business Park.

Upon substantial completion of the Remedial Investigation activities described later in this document, Tecumseh prepared a letter to the NYSDEC dated December 22, 2011 requesting division of the Phase I Business Park project area into 11 sub-parcels to stimulate sale and redevelopment of more manageable sized properties and promote "green remediation" by coordinating certain final remedial measures (i.e., cover placement) with associated sub-parcel build-out. The NYSDEC agreed to Tecumseh's request and, in August 2012, the original BCA for Site C915197 was amended to cover the smaller Site I-1, with separate BCAs issued and executed for the remaining 10 BCP Sites (i.e., Sites I-2 through I-11; C915197B through C915197K, respectively). It was further determined that individual Decision Documents, Remedial Action Work Plans (RAWPs), Final Engineering Reports (FERs), and Certificates of Completion (COCs) would be prepared for each of the 11 BCP Sites, with a common Site Management Plan (SMP) and Environmental Easement prepared to cover all of the BCP Sites within the Phase I Business Park[1].

1.1.2 Site Location and Description

The overall boundaries of the Controlled Property as well as the boundaries of the individual Sites contained therein are more fully described in the survey metes and bounds description (see Appendix A-1). The Controlled Property is identified as part of tax parcel number 141.11-1-50 on the Erie County Tax Map, and is comprised of an approximate 102-acre area bounded by property owned by Gateway Trade Center to the north; the Phase II

[1] For clarity and in recognition of the intent of this SMP to address post-remedial requirements applicable to all of the sub-parcels within the Phase I Business Park, the term "Controlled Property" hereafter refers to the collective group of BCP Sites comprising the Phase I Business Park, with the term "Site" used to reference the individual BCP sub-parcels.

Business Park to the south; the Gateway Metroport Ship Canal to the west; and New York State Route 5 (Hamburg Turnpike) to the east (see Figure 2).

1.1.3 Purpose and Organization

After completion of the remedial work described in the Site-specific RAWPs, some contamination will remain in the subsurface, which is hereafter referred to as 'remaining contamination." This Site Management Plan (SMP) was prepared to manage remaining contamination on the Controlled Property until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

Engineering Controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during the use of the Controlled Property to ensure protection of public health and the environment. The Environmental Easement (see Appendix A-2) granted to the NYSDEC, and recorded with the Erie County Clerk, will require compliance with this SMP and all ECs and ICs placed on the Controlled Property. The ICs place restrictions on use of the Controlled Property, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for contamination that remains on the Controlled Property. This SMP has been approved by the NYSDEC, and compliance with this SMP is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination on the Controlled Property after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment, collection, containment, or recovery systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports (PRRs); and (5) defining criteria for termination of any remaining treatment system operations.

To address these needs, this SMP includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring

Plan for implementation of required Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual for complex systems). To the extent these requirements are generic to the Controlled Property they are incorporated within the body of this SMP. Site-specific requirements (e.g., groundwater monitoring; operation and maintenance of ongoing active remediation systems, etc.) are incorporated in Appendix E for Sites where remedial work is substantially complete. Remaining Site-specific requirements will be added or modified by addenda as the remedial work progresses on those Sites.

This SMP also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to the NYSDEC. It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement and is grounds for revocation of the Certificate of Completion (COC).
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375, and the BCA (Index # B9-0696-05-06(A); Site #C951197) for the Controlled Property, and thereby subject to applicable penalties.

1.1.4 Revisions

Revisions to this Plan will be proposed in writing to the NYSDEC's project manager. In accordance with the Environmental Easement for the Controlled Property, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.2 Site Background

1.2.1 Site History

The approximate 102-acre Controlled Property formerly housed several facilities used in Bethlehem Steel Corporation's (BSC's) steel manufacturing processes. These included:

open hearth furnaces; blooming mill; billet preparation mills; roughing mills; rail mills; foundry; and a water treatment plant.

Twelve SWMUs, designated as P-43 through P-53 and P-64, were present within the Controlled Property. BSC performed assessments of these SWMUs during a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) and subsequent RCRA Facility Investigation (RFI). Based on the assessment findings, USEPA Region II issued "No Further Assessment" designations for 11 of the 12 SWMUs in December of 1990; a "No Further Assessment" designation was issued for the final SWMU in September 1991. Accordingly, all 12 SWMUs located within the Controlled Property were excluded from the RFI Order by the USEPA in January 2001.

The Controlled Property contains few structural remnants and other features associated with historic integrated steel-making facilities. These include: numerous slabs and concrete piers from former buildings and foundations; the former plant Fire Department Headquarters building located at the northeast corner of the Controlled Property near Gate 1 at Fuhrman Boulevard; and an active rail spur that traverses the eastern boundary of the Controlled Property adjacent to Route 5 and Fuhrman Boulevard.

Immediately west of the Controlled Property boundary is a man-made drainage channel designated as the North Return Water Trench (NRWT) that begins near the former Pumping Station No. 1 and flows north to the Union Ship Canal (see Figure 2). Historically, the trench collected treated wastewater and non-contact cooling water from SPDES permitted outfalls from BSC operations. Currently, there are no active outfalls into the NRWT from the Controlled Property. Further south and immediately west of the Controlled Property boundary is another man-made drainage channel designated as the South Return Water Trench (SRWT) that begins near the former Blowing Engine House No. 1 and flows south to Smokes Creek (see Figure 2). Historically and currently, the SRWT collects and discharges groundwater and stormwater to Smokes Creek under an active SPDES permit (No. NY-0269310).

1.2.2 BCP Application Process and Remedial Investigations

The BCP application for the Controlled Property was submitted May 20, 2005 and a BCA was executed on December 12, 2005. The application was accompanied by a Remedial Investigation Work Plan that identified characterization requirements to be completed

pursuant to the BCP and NYSDEC DER-10 guidance. Remedial Investigation (RI) activities were initiated in January 2006 and substantially completed in February 2006. The RI Report was submitted to NYSDEC in October 2006, revised, and resubmitted in June 2007. The RI Report recommended remediation of soil/fill with cover placement recommended as the final remedial measure for all areas of the Controlled Property. TurnKey submitted a draft Alternatives Analysis Report (AAR) to the NYSDEC in July 2007 and the revised AAR in May 2010.

1.2.3 Geologic Conditions

The United States Department of Agriculture Soil Survey of Erie County, New York indicates that the Controlled Property is covered by surface soil classified as Urban Land; soil consisting of paved, foreign, or disturbed soils. Boring logs from monitoring wells constructed on or near the Controlled Property indicate that the upper two feet (east side) to eight feet (west side) is typically a soil/fill unit comprised of non-cohesive coal and coke fines, slag, cinders, brick, concrete, metal, railroad ballast etc., which was ubiquitous on the Controlled Property. The fill is underlain by lacustrine clays and silts (i.e., a reworked native sandy clay unit) that are, in turn, underlain by shale or limestone bedrock. Bedrock is about 60 feet below grade near the eastern perimeter of the Controlled Property.

Historically, due to the proximity of Lake Erie and municipal supplied water, groundwater in the area has not been developed for industrial, agricultural, or public supply purposes. There is a deed restriction that prohibits the use of groundwater on the 1,100-acre Tecumseh property; consequently, no groundwater supply wells are present on the Controlled Property.

Groundwater elevation measurements taken on May 6, 2006 from existing and newly installed monitoring wells and piezometers on the Controlled Property indicate that the first water bearing zone (i.e., water table) ranges from approximately 4 to 6 feet below ground surface (fbgs) within the soil/slag-fill unit. Examination of the isopotential map prepared for the fill unit from the June 1, 2006 groundwater elevations (see Figure 4) indicates that shallow groundwater generally flows west/southwest toward the Gateway Metroport Ship Canal and Lake Erie as well as northwest toward the Union Ship Canal and Buffalo Outer Harbor.

1.3 Summary of Remedial Investigation Findings

The RI was performed to characterize the nature and extent of contamination on the Controlled Property. The results of the RI are described in detail in the following reports:

- Remedial Investigation Report, Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York, prepared by TurnKey Environmental Restoration, LLC, October 2006. Revised June 2007.

- Supplemental Remedial Investigation Letter Report for Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York, prepared by TurnKey Environmental Restoration, LLC, June 23, 2008.

Generally, the RI determined that conditions were consistent with the historic use of the Controlled Property for steel-making and finishing operations. Soil/fill concentrations, where identified above 6NYCRR Part 375 commercial-use soil cleanup objectives (SCOs), varied according to the type and nature of the constituents. Specifically, elevated concentrations of petroleum volatile organic compounds (VOCs) were limited to discrete locations of the Controlled Property where visual or olfactory evidence of impact was observed (e.g., UST and oil-stained areas), or where past operational practices indicate an increased potential for releases of these substances (former transformer areas). Certain metals and base-neutral semi-volatiles (i.e., polyaromatic hydrocarbons or PAHs) were detected at several locations above SCOs, including composite sample locations. The detection of these substances in widespread areas is consistent with the observed presence of coal/coke fines and slag within the soil/fill matrix and macadam cover. The RI findings indicate that, as would be expected based on the relatively low solubility of the soil/fill constituents prevalent in the soil/fill matrix, groundwater is not impacted by constituents of concern.

Below is a summary of conditions on the Controlled Property when the RI was performed in January/ February 2006 and supplemented in April 2008. Tables 1a through 1j summarize the soil/fill concentrations detected during the RI with a comparison to the commercial SCOs; Table 2 summarizes the groundwater concentrations detected during the RI with a comparison to Class GA groundwater quality standards and guidance values (GWQS/GVs); and Figures 5 and 6 present the results of the supplemental investigation.

1.3.1 Soil/Fill

Surface and subsurface soil/fill samples were collected in January and February 2006 in accordance with the NYSDEC-approved August 2005 RI Work Plan for the Controlled Property.

As shown on Figure 2, the Controlled Property was broken into 10 Areas of Assessment (AOAs), identified as AOA-1 through AOA-10. The AOAs were developed to focus the soil/fill investigation according to area-specific concerns based on known past uses and potential contaminant releases and to facilitate data presentation. AOAs-1, -4, -5, and -6 comprise the former main operational steel mill area of the Site. AOAs-2 and -3 consist primarily of support buildings located south of the main mill complex as well as several fuel oil tank locations. AOAs-7 and -8 contain the former Open Hearth, Stripper, Foundry, Machine Shop buildings, and portions of the Billet Prep No. 2 Building. AOAs-9 and -10 contain the former rail yard, support buildings (e.g., rigger shop, repair shop), and the fire department headquarters; the only remaining buildings on the Controlled Property.

Surface and subsurface soil/fill was investigated during the RI at 82 test pit locations and an additional 37 surface locations (119 total locations) to evaluate the nature of potential impacts within the 10 AOAs. A total of 49 surface soil samples and 35 subsurface soil samples were collected from those locations during the RI.

Samples were analyzed for constituents of potential concern (COPCs), which were identified in the RI Work Plan based on operational history and Phase I ESA findings. The primary COPCs included base-neutral Target Compound List (TCL) semi-volatile organic compounds (SVOCs) associated with petroleum bulk storage and fossil fuels, and select inorganic compounds (i.e., arsenic, cadmium, chromium, lead, mercury, and cyanide) typically associated with steel manufacturing. Other COPCs analyzed on a location-specific basis included polychlorinated biphenyls (PCBs), which were analyzed at rail yard and former transformer areas, and petroleum-based VOCs analyzed in former gasoline storage locations. Pesticides, herbicides, and dioxins were also added to the list of COPCs at two surface soil sample locations per NYSDEC's request. In addition to the COPCs, an expanded list of parameters was developed as part of the RI Work Plan. The "expanded" list was employed during the RI at a minimum frequency of 1 per 20 samples per matrix to check for the presence of a broad range of other constituents less likely to be encountered.

The RI findings were compared to both commercial and unrestricted use SCOs per 6 NYCRR Part 375. Unrestricted use SCOs are deemed protective of human health and the environment under any future use scenario, including agricultural, residential, and other applications that could involve high contact with soil materials. Accordingly, unrestricted use SCOs are generally not applicable for sites such as the Controlled Property, which has a long (more than 100 years) industrial history in an urban setting. The RI therefore focused on the more meaningful discussion of the data as compared to commercial SCOs.

In general, the data indicated the presence of COPC metals and base-neutral SVOCs above commercial SCOs at several sample locations, including composite sample locations. The frequent detection of these substances above SCOs is consistent with the observed presence of coal/coke fines and slag within the soil/fill matrix and macadam cover. Pesticides, herbicides, and dioxins were reported as not detected or identified at trace levels well below commercial SCOs. With limited exceptions, PCBs were either not detected or at detected at concentrations well below the commercial SCO of 1 part per million (ppm), with no PCB Aroclors detected above 3 ppm.

VOCs were not detected above commercial SCOs; however, field evidence of petroleum impact was observed in discrete locations of the Controlled Property. Specifically, subsurface impacts were identified at 11 test pit locations (i.e., TP-1-6, TP-1-13, TP-5-3, TP-5-7, TP-6-6, TP-6-7, TP-7-2, TP-7-4, TP-9-3, TP-10-1, and TP-10-3). Some of these impacts were described as petroleum in nature with staining and/or visible product, while others were described as potentially indicative of former tar-bound macadam road or floor. Test pit TP-10-6 also uncovered an underground storage tank (UST).

Because the extent of impact at several of the above-described test pit locations was not fully defined during the RI, a pre-IRM investigation was proposed. The pre-IRM field activities were performed during the period of April 2 through 7, 2008. The work generally involved: re-establishing each of these original test pit locations via GPS coordinates recorded during the RI; collecting a representative sample for waste profiling (i.e., for off-site disposal, if deemed necessary); and for those areas not previously delineated, excavating a series of supplemental test pits in each of four compass directions from the original test pit location until the extent of impact was determined. Soil/fill removed from the supplemental test pits was logged for visual/olfactory/PID evidence of petroleum/organic impacts until the approximate area and depth of impact was delineated. In addition, the extent of lead-

impact at TP-6-6 was delineated via sample collection in a grid pattern over the area surrounding the original test pit.

At NYSDEC's request, supplemental metals sampling was also undertaken at three of the RI test pit areas during the pre-IRM investigation to check for potential metal hotspots. These areas included: TP-1-1 through TP-1-5 (an RI composite sample area), which was re-sampled to check for discrete mercury impacts; TP-5-3, which was tested for lead and cadmium impacts concurrent with the additional petroleum delineation described above; and TP-7-1-1(1-3)/8-4 (an RI composite sample area) that was re-sampled to check for discrete arsenic impacts.

In general, the pre-IRM investigation showed that the combined petroleum impacts encompassed several thousand cubic yards of soil/fill. No additional metal hotspots requiring removal were encountered. In addition, it was agreed with the NYSDEC that potential tar impacts originally identified at TP-5-7 were macadam and therefore did not need to be removed.

1.3.2 Site-Related Groundwater

A groundwater monitoring program was conducted at the Controlled Property to assess groundwater quality and potential groundwater contaminant migration pathways. Following completion of soil/fill portion of the RI, seven new piezometers and seven new monitoring wells were installed to better determine shallow groundwater flow direction and upgradient/downgradient groundwater quality on the Controlled Property. Figure 2 presents the groundwater monitoring points used during the RI, including: existing upgradient monitoring well MW-8A; newly installed temporary piezometers P-50S, P-51S, P-52S, P-54S, P-55S, P-56S, and P-57S; and newly installed monitoring wells MW-12A, MW-13A, MW-14A, MW-15A, MW-16A, MW-17A, and MW-18A.

Of the eight groundwater monitoring wells sampled, only one well contained concentrations above NYSDEC Class GA Groundwater Quality Standards/Guidance Values (GWQS/GVs) per 6NYCRR Part 703. Specifically, monitoring well MW-12A contained concentrations of barium, iron, magnesium, manganese, and sodium that exceeded their respective GWQS/GVs. The RI findings indicate that, as would be expected based on the relatively low solubility of the soil/fill constituents prevalent in the soil/fill matrix, groundwater is not impacted by COPCs. Although MW-12A indicated somewhat

elevated concentrations of barium, MW-12A is located near the upgradient side of the Controlled Property, in an area where soils exhibited barium concentrations much less than the corresponding SCO presented in 6NYCRR Part 375-6 for protection of groundwater due to leaching. In addition, barium was not detected above its GWQS/GV at downgradient well locations. As such, the RI concluded that the presence of barium in MW-12A is not indicative of an on-site source of contamination.

1.3.3 Site-Related Soil Vapor Intrusion

Elevated PID readings were recorded during the RI in certain areas exhibiting visible petroleum impact. Therefore, the soil-to-air pathway may be relevant to locations near former petroleum storage tanks and petroleum-impacted soil/fill. However, the sub-slab vapor intrusion pathway does not pose a risk under the reasonably-anticipated (remediated) future use scenario.

1.3.4 Underground Storage Tanks

During excavation of test pit TP-10-6, one UST and suspected petroleum-impacted soil/fill were identified along the west side of the Former Fire Station building. Petroleum impacts were projected to encompass an approximate 30-foot by 40-foot by 10-foot deep area. Historical information indicated additional UST(s) may be located north of the building. Due to the unknown location of suspected underground utilities (i.e., high-pressure natural gas and sewer), further investigation along the north side of the building was not performed. Subsurface soil/fill samples TP-10-6 (0.0-1.0) and TP-10-6 (1.0-5.5) were collected near the UST and analyzed for TCLP VOCs, lead, flashpoint, corrosivity, reactivity, and leachable pH. Comparing the results to the limits contained in 40 CFR Part 261, the soil/fill did not exhibit hazardous waste characteristics.

1.4 Summary of Remedial Actions

An Interim Remedial Measures (IRM) Work Plan was completed in April 2008. IRM activities, substantially complete in August 2009, included: removal of two USTs; excavation and on-site bioremediation of petroleum-impacted soil/fill; and excavation of tar- and lead-impacted soil/fill. Table 3 summarizes the IRMs performed on the Controlled Basis by Site. The IRMs are more fully described in the May 2010 AA Report for the Controlled Property.

Completed remedial actions will be described within the Site-specific appendices (E-1 through E-11), which will be modified via addenda as the work progresses. The following Remedial Actions are common to all Sites:

1. Execution and recording of an Environmental Easement to restrict land use to commercial or industrial applications and prevent future exposure to any contamination remaining at the Site.
2. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting.

1.4.1 Removal of Contaminated Materials from the Site

1.4.1.1 Excavated Materials

Details on the removal of contaminated materials are presented within the Site-specific appendices. Figure 7 shows the approximate extent of these completed excavations.

1.4.1.2 Underground Storage Tanks

Removal of the USTs and impacted soil/fill is described in Appendix E-11 for Site I-11.

1.4.2 Backfill Materials

With NYSDEC concurrence, completed excavations will be backfilled with: steel slag under Beneficial Use Determination (BUD) #555-9-15; bioremediated soil/fill; and non-impacted crushed asphalt or slag/fill generated from the on-site excavation work. Backfill material will be placed into the excavation and compacted/tracked with the excavator/backhoe bucket in 2-foot lifts.

1.4.3 Site-Related Treatment Systems

No long-term treatment systems were installed as part of the remedy on the Controlled Property. Site-specific treatment systems are described in Appendix E.

1.4.4 Remaining Contamination

The remedial work conducted on the Controlled Property has removed all known "source area" soil/fill, which included petroleum-, metal-, and tar-impacted soil/fill. USTs and associated impacted soil/fill were also removed.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs for several ubiquitous constituents. Specifically, nearly all samples collected during the RI exhibited exceedance of the commercial SCOs for carcinogenic PAHs, as well as arsenic, cadmium, lead, and mercury. Other constituents remaining above unrestricted-use SCOs in select areas of the Controlled Property include PCBs (Aroclors 1248, 1254, and 1260) and 4-4' DDT. It is not possible to quantify with any certainty areas that do not exceed one or more of the unrestricted-use SCO criteria; therefore, it is therefore assumed that the entire 102-acre Controlled Property is impacted above the unrestricted-use SCOs to the approximate native soil depth of 8 fbgs.

Remaining soil/fill contamination is described further within the Site-specific appendices.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

2.1.1 General

Since remaining contaminated soil/fill exists beneath the Controlled Property, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

The EC/IC Plan provides:

- A description of all EC/ICs on the Controlled Property.
- The basic implementation and intended role of each EC/IC.
- A description of the key components of the ICs set forth in the Environmental Easement.
- A description of the features to be evaluated during each required inspection and periodic review.
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Excavation Work Plan for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Controlled Property.
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the remedy, as determined by the NYSDEC.

2.2 Engineering Controls

The engineering control common to the Controlled Property is the cover system described below. Other engineering controls (e.g., vapor barriers, sub-slab depressurization systems) specific to Sites are described in Appendix E.

2.2.1 Cover System

Exposure to remaining contamination in soil/fill will be prevented by a cover system placed over the Controlled Property. Ideally the cover system will be placed as each Site is redeveloped, but will otherwise be required before sunset of the NYSDEC BCP to avoid forfeit of BCP tax credits. This cover system will be comprised of a minimum of 12 inches of clean soil, stone, or NYSDEC-approved material, with a demarcation layer (i.e., geotextile fabric, orange poly netting, or similar non-degradable visual demarcation) in all areas that are not paved or covered by concrete or structures. The cover system will be placed to address remaining non-mobile, ubiquitous contaminants (e.g., metals, PAHs, etc.) during the redevelopment stage and prior to occupancy. Paved areas (i.e., buildings, roadways, parking lots) will be covered by asphalt pavement or concrete. The final soil cover shall meet the specifications presented in the Excavation Work Plan (see Appendix B, Section 4.0). The Excavation Work Plan outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10.

The cover system is a permanent control and the quality and integrity of the system will be inspected at defined, regular intervals in perpetuity.

2.3 Institutional Controls

A series of Institutional Controls is required to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination and precluding groundwater use for potable purposes; and, (3) limit the use and development of the Controlled Property to commercial/industrial type uses only. Adherence to these Institutional Controls is required

by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns.
- All Engineering Controls must be installed, operated, and maintained as specified in this SMP.
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP.
- Environmental or public health monitoring must be performed as defined in this SMP.
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The Controlled Property has a series of site-wide Institutional Controls in the form of restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Restrictions for the Controlled Property:

- Allow the use and development of the Controlled Property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- Requires compliance with the Department-approved Site Management Plan; and
- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3.)

Additional Site-specific restrictions (if any) are presented in Appendix E.

2.3.1 Excavation Work Plan

The Controlled Property was remediated for restricted-commercial/industrial use. Any future intrusive work that will penetrate the soil cover or cap, or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover

system, will be performed in compliance with the Excavation Work Plan (EWP) included as Appendix B. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the Controlled Property. Appendix C includes a sample HASP that is in current compliance with DER-10; 29 CFR 1910; 29 CFR 1926; and all other applicable Federal, State, and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification described in Section 1.2 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP, and CAMP, and will be included in the periodic inspection and certification reports described in Section 5.0.

The Site Owners and associated parties preparing the remedial documents for submittal to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The Site Owners will ensure that redevelopment activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP.

2.4 Inspections and Notifications

2.4.1 Inspections

A comprehensive inspection of the Controlled Property will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed.
- If these controls continue to be protective of human health and the environment.
- Compliance with requirements of this SMP and the Environmental Easement.
- Achievement of remedial performance criteria.
- Sampling and analysis of appropriate media during monitoring events.

- If Site records are complete and up to date.
- Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in Section 3.0, Site Monitoring Plan. Reporting requirements are outlined in Section 5.3, Periodic Review Report.

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the affected area of the Controlled Property will be conducted within five days of the event to verify the effectiveness of the EC/ICs implemented at the Site by a Qualified Environmental Professional (QEP) as defined in NYSDEC DER-10.

2.4.2 Notifications

Notifications will be submitted by the Site Owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in use that are required under the terms of the Brownfield Cleanup Agreement (BCA), 6NYCRR Part 375, and/or Environmental Conservation Law. This shall include planned expansions onto any undeveloped portion of the Site that is not already covered with 12 inches of approved cover material.
- 15-day advance notice of any proposed ground-intrusive activities pursuant to the Excavation Work Plan.
- Notice within 48 hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action to be taken to mitigate the damage or defect.
- Notice within 48 hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of any Site within the Controlled Property or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing.

2.5 Contingency Plan

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions. These conditions are addressed in the Emergency Response Plan (ERP) included as Appendix A to the HASP. This Contingency Plan, a summary of the ERP, describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This Contingency Plan also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance, the affected Site Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to the QEP. These emergency contact lists must be maintained in an easily accessible location at the Site. Site-specific contacts will be included in Appendix E.

Table 4: Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3-day notice required for utility mark out)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Table 5: Contact Numbers

Thomas H. Forbes, P.E. Qualified Environmental Professional (QEP)	Work: (716) 856-0599 Mobile: (716) 864-1730
Thomas H. Forbes, P.E. Site Safety and Health Officer (SSHO)	Work: (716) 856-0635 Mobile: (716) 864-1730
Richard L. Dubisz Alternate SSHO	Work: (716) 856-0635 Mobile: (716) 998-4334

* Note: Contact numbers subject to change and should be updated as necessary

2.5.2 Map and Directions to Nearest Health Facility

Site Location: 1951 Hamburg Turnpike, Lackawanna, New York 14218

Nearest Hospital Name: Mercy Hospital

Hospital Location: 565 Abbott Road, Buffalo, NY 14220

Hospital Telephone: (716) 826-7000

Directions to the Hospital (see Figure 8):

1. From the Buffalo Crushed Stone site access drive (or Gate2); turn left onto the Hamburg Turnpike (Route 5).
2. Proceed east on Hamburg Turnpike (Route 5) to the Tifft Street exit; turn right onto Tifft Street.
3. Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.

4. Turn right onto Abbott Road and Mercy Hospital will be on right hand side. Follow signs to emergency room (ER).

Total Distance: 5 miles

Total Estimated Time: 10 minutes

2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be immediately notified of the emergency. Table 4 provides the emergency telephone numbers.

3.0 SITE MONITORING PLAN

3.1 Introduction

3.1.1 General

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of: the remedy to reduce or mitigate contamination on the Controlled Property; the cover system; and all affected media. Monitoring of other Engineering Controls is described in Section 4.0, Operation, Monitoring, and Maintenance Plan. The Site Monitoring Plan may only be revised with the approval of NYSDEC.

Because the RI did not indicate the presence of on-site contamination, and sufficient monitoring data are anticipated to be available for adjoining Business Park Sites to confirm no migration of impacted groundwater onto the Controlled Property, groundwater monitoring is not required by this Site Monitoring Plan.

3.1.2 Purpose and Schedule

The Monitoring Plans presented within the Site-specific appendices describe the methods to be used for:

- Assessing achievement of the remedial performance criteria.
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, the Monitoring Plans provide information on:

- Annual inspection and periodic certification.

3.2 Cover System Monitoring and Maintenance

The cover system is common to the Controlled Property and is therefore discussed herein. All other monitored systems (if any) are discussed within the Site-specific appendices.

Annual visual inspection and maintenance (e.g., filling in ruts with approved cover materials, re-vegetation of soil covered areas, pothole repair, etc.) of the cover systems will be required to assure cover integrity and prevent exposure to underlying soil/fill.

3.3 Annual Inspection

Inspections of the Controlled Property will be performed on a regular schedule at a minimum of once per year. Inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix D). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including usage restrictions.
- An evaluation of the condition and continued effectiveness of ECs.
- General conditions at the time of the inspection.
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection.
- Compliance with permits and schedules included in the Operation and Maintenance Plan.
- Confirm that required records are up to date.

4.0 OPERATION & MAINTENANCE PLAN

The remedy for the Controlled Property does not rely on mechanical systems to protect public health and the environment. Therefore, the operation and maintenance (O&M) of such components is not included in the body of this SMP. To the extent that certain Sites require reliance on such systems, the system descriptions and O&M requirements are included in Appendix E.

Information on non-mechanical Engineering Controls (i.e., cover system) is provided in Section 3.0 - Engineering and Institutional Control Plan.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

5.1 Site Inspections

5.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the Section 3.0 of this SMP. At a minimum, inspections will be conducted annually across the Controlled Property. Inspections of the cover system will also be conducted whenever a severe condition has taken place, such as erosion or a flooding event.

5.1.2 Inspection Forms

Appendix D includes the forms for recording cover system inspections and the annual inspection. Site-specific inspection forms will be mailed by the Department with its standard 45-day notice. A common entity (e.g., Business Park Association) will complete a separate IC/EC inspection form for each Site and include these as an attachment to the Period Review Report discussed in Section 5.3.All applicable inspection forms and system maintenance reports, generated during the reporting period, will be provided in electronic format in the Periodic Review Report described in Section 5.3.

5.1.3 Evaluation of Records & Reporting

The results of the inspections and monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Site Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and, based on the above items;
- The remedy, including Site-specific remedial measures, continues to be protective of public health and the environment and is performing as designed in the Site-specific RAWPs and FERs.

5.2 Certification of Engineering and Institutional Controls

Following the last inspection, a Professional Engineer (P.E.) licensed to practice in New York State or a QEP[2] will complete an IC/EC certification form for each of the Sites having received COCs. The IC/EC forms, which will be signed by the P.E. and the Site Owner or the Owner's representative, will include the following certification:

For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
- The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control;
- Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the Site is compliant with the environmental easement;
- The engineering control systems are performing as designed and are effective;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and
- The information presented in this report is accurate and complete.
- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A"

[2] A Qualified Environmental Professional other than a licensed Professional Engineer (P.E.) may complete the certification if the engineering controls are limited to non-mechanical systems. Active groundwater remediation systems, soil vapor extraction systems, etc. require P.E. certification.

misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] (and if the site consists of multiple properties): [and I have been authorized and designated by all site owners to sign this certification] for the site.

For Sites that the Department has determined do not represent a significant threat to public health or the environment, but where contaminants in groundwater exceed drinking water standards, the following should also be included:

- No new information has come to my attention, including groundwater monitoring data from wells located at the Site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and

Every five years the following certification will be added:

- The assumptions made in the qualitative exposure assessment remain valid.

The signed certification will be included in the common Periodic Review Report described below.

5.3 Periodic Review Report

A Periodic Review Report (PRR) covering all Sites in the Controlled Property for which COCs were issued will be submitted to the Department every year, beginning 16 months after the first COC is issued. A common entity (e.g., Business Park Association) will be designated as the responsible entity for receiving PRR notices, coordinating and arranging for the above-described inspections and certifications, and preparing the PRR deliverables. The PRR will be prepared in accordance with NYSDEC DER-10 and submitted within 45 days of the end of each certification period. Media sampling results will also incorporated into the PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for each Site;
- Results of the required annual inspections and severe condition inspections, if applicable;
- All applicable inspection forms and other records generated during the reporting period in electronic format;

- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media, which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- An evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the Site-specific Decision Documents;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
  - The overall performance and effectiveness of the remedy.
- A performance summary for all treatment systems at the Site during the calendar year, including information such as:
  - The number of days the system was run for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

The PRR will be submitted, in hard-copy format, to the NYSDEC Central Office and Region 9 Office, and in electronic format to NYSDEC Central Office, Region 9 Office, and the NYSDOH Bureau of Environmental Exposure Investigation.

5.4 Corrective Measures Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Plan will be submitted to the NYSDEC for approval. This Plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Plan until it is approved by the NYSDEC.

TABLES

TABLE 1a

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 1

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type							Restricted-Commercial SCO (mg/kg)
	TP-1-(1-5) 0.0 - 2.0 composite	TP-1-(1-5) 2.0 - 5.0 composite	TP-1-(6-10) 0.0 - 2.0 composite	TP-1-(67810) 2.0 - 5.0 composite	TP-1-9 1.0 - 4.8 grab	TP-1-(11-12) 0.0 - 2.0 composite	TP-1-(11-12) 2.0 - 4.5 composite	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]								
Total VOCs	--	5.0 (max)	--	2.8 (max)	1.4	--	0.8 (max)	**--**
PID Field Scans (ppm) - 10.6 eV Lamp								
Total VOCs	0.0 (max)	1.4 (max)	2.4 (max)	5.7 (max)	0.2	2.1 (max)	4.3 (max)	**--**
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg								
Benzene	--	--	--	--	0.0013	--	--	**44**
Naphthalene	--	--	--	--	0.076 J	--	--	**500**
Methylene Chloride	--	--	--	--	--	--	--	**500**
TOTAL VOCs (mg/kg)	0	0	0	0	0.0773	0	0	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg								
Acenaphthene	0.98 J	0.31 J	0.28 J	ND	0.22 J	0.26 J	0.11 J	**500**
Acenaphthylene	2.2	1.5 J	1.4 J	0.17 J	0.44 J	2.9	1.9	**500**
Anthracene	2.9	1.7 J	1.2 J	0.096 J	0.41 J	2.2	1.9	**500**
Benzo(a)anthracene	**7.8**	5.5	2.9	0.45 J	1.2 J	**8.3**	**5.6**	**5.6**
Benzo(b)fluoranthene	**16 J**	**8.4 J**	4.5 J	0.73 J	1.9 J	**11 J**	**7.7 J**	**5.6**
Benzo(k)fluoranthene	5 J	2.3 J	1.8 J	0.25 J	0.61 J	3 J	2.4 J	**56**
Benzo(g,h,i)perylene	6.5	2.7	2.5	0.28 J	0.42 J	3.9	2.7	**500**
Benzo(a)pyrene	**8**	**5.5**	**3.1**	0.47 J	**1.2 J**	**7.7**	**4.9**	**1**
Chrysene	8.8	6.1	3.2	0.44 J	1 J	7.5	5.2	**56**
Dibenzo(a,h)anthracene	**1.9**	**0.8 J**	0.55 J	ND	0.2 J	**1.1 J**	**0.79 J**	**0.56**
Dibenzofuran	0.68 J	0.72 J	0.35 J	ND	0.24 J	0.6 J	0.69 J	**350**
Fluoranthene	19	12	5.9	0.66 J	2.0	17	11	**500**
Fluorene	1.1 J	0.84 J	0.53 J	ND	ND	1 J	1 J	**500**
Indeno(1,2,3-cd)pyrene	**6.3**	2.5	1.8	0.28 J	0.49 J	3.5	2.4	**5.6**
2-Methylnaphthalene	0.34 J	0.43 J	0.18 J	ND	0.23 J	0.31 J	0.32 J	**--**
Phenanthrene	12	7.7	4.1	0.3 J	1.4 J	8.2	7.3	**500**
Pyrene	13	7.7	3.9	0.47 J	1.4 J	11	7.3	**500**
TOTAL SVOCs (mg/kg)	112.5	66.7	38.19	4.596	13.36	89.47	63.21	--
Polychlorinated Biphenyls (PCBs) - mg/kg								
Aroclor 1248	--	--	--	--	--	--	--	**1**
Aroclor 1254	--	--	--	--	--	--	--	**1**
Aroclor 1260	--	--	--	--	--	--	--	**1**
Inorganic Compounds - mg/kg								
Arsenic, Total	**121**	**34.6**	13.1	10.2	12.1	**25.4**	**21.8**	**16**
Cadmium, Total	ND	ND	ND	ND	ND	ND	ND	**9.3**
Chromium, Total	123 J	40.3 J	70.1 J	79.9 J	13.2 J	152 J	128 J	**1,500**
Lead, Total	257 J	126 J	210 J	108 J	59.2 J	240 J	176 J	**1,000**
Mercury, Total	**12**	0.206	0.075	0.051	0.041	0.131	0.082	**2.8**
Cyanide, Total	**123**	14.2	ND	9.2	ND	1.6	ND	**27**

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Soil/fill sample TP-1-22 (2.0 - 6.5) was analyzed for TCL VOCs plus STARS, all other samples were analyzed for STARS VOCs, only.
3. Soil/fill sample TP-1-22 (2.0 - 6.5) was analyzed for TCL SVOCs (BNAs), all other samples were analyzed for BN SVOCs, only.
4. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
5. ND = parameter not detected above laboratory detection limit.
6. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
7. " -- " = not analyzed for this parameter or no individual SCO
8. " * " = Field scan was not obtained due to inclement weather conditions.
9. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= TCL VOC
compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO.

TABLE 1a (continued)

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 1

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type							Restricted-Commercial SCO (mg/kg)
	TP-1-(13-17)	TP-1-(13-17)	TP-1-18	TP-1-19	TP-1-22 [2,3]	SS-06	SS-22	
	0.0 - 2.0	2.0 - 5.0	2.0 - 5.0	2.0 - 7.0	2.0 - 6.5	0.0 - 1.0	0.0 - 1.0	
	composite	composite	grab	grab	grab	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]								
Total VOCs	--	2.3 (max)	0.0	0.0	0.0	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp								
Total VOCs	0.0 (max)	0.0 (max)	*	*	0.0	--	--	**--**
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg								
Benzene	--	--	--	--	ND	--	--	**44**
Naphthalene	--	--	--	--	ND	--	--	**500**
Methylene Chloride	--	--	--	--	0.012	--	--	**500**
TOTAL VOCs (mg/kg)	0	0	0	0	0.012	0	0	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg								
Acenaphthene	0.2 J	ND	ND	0.89 J	ND	--	--	**500**
Acenaphthylene	0.55 J	1.1 J	0.41 J	5.2	1.6 J	--	--	**500**
Anthracene	0.8 J	0.66 J	0.44 J	5.3	0.89 J	--	--	**500**
Benzo(a)anthracene	2.4	2.2	1.6 J	**16**	**5.9 J**	--	--	**5.6**
Benzo(b)fluoranthene	3.3 J	3.2 J	2.1 J	**21 J**	**7.1 J**	--	--	**5.6**
Benzo(k)fluoranthene	1.3 J	1.1 J	0.65 J	7 J	2.4 J	--	--	**56**
Benzo(g,h,i)perylene	1.4 J	1.4 J	0.85 J	6	3.9 J	--	--	**500**
Benzo(a)pyrene	**2.5**	**2.3**	**1.6 J**	**14**	**5.3 J**	--	--	**1**
Chrysene	2.3	2.2	1.4 J	15	5.7 J	--	--	**56**
Dibenzo(a,h)anthracene	0.39 J	0.38 J	0.25 J	**2.1**	**1.3 J**	--	--	**0.56**
Dibenzofuran	0.21 J	ND	0.1 J	1.2 J	ND	--	--	**350**
Fluoranthene	4.8	3.8	2.3	36 J	9.4	--	--	**500**
Fluorene	0.27 J	0.2 J	ND	1.7 J	ND	--	--	**500**
Indeno(1,2,3-cd)pyrene	1.2 J	1.1 J	0.76 J	**6.1**	3.7 J	--	--	**5.6**
2-Methylnaphthalene	0.21 J	ND	ND	0.3 J	ND	--	--	**--**
Phenanthrene	2.9	1.5 J	1.4 J	24	2.7 J	--	--	**500**
Pyrene	3.5	2.7	1.8 J	23	9.8	--	--	**500**
TOTAL SVOCs (mg/kg)	28.23	23.84	15.66	184.8	59.69	0	0	--
Polychlorinated Biphenyls (PCBs) - mg/kg								
Aroclor 1248	**--**	**--**	**--**	**--**	**--**	ND	0.067	**1**
Aroclor 1254	**--**	**--**	**--**	**--**	**--**	0.47	ND	**1**
Aroclor 1260	**--**	**--**	**--**	**--**	**--**	ND	0.19	**1**
Inorganic Compounds - mg/kg								
Arsenic, Total	**21.2**	15.7	--	--	--	--	--	**16**
Cadmium, Total	1.7 J	ND	--	--	--	--	--	**9.3**
Chromium, Total	104 J	46.8 J	--	--	--	--	--	**1,500**
Lead, Total	437 J	231 J	--	--	--	--	--	**1,000**
Mercury, Total	0.146	0.112	--	--	--	--	--	**2.8**
Cyanide, Total	1.3	1.2	--	--	--	--	--	**27**

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Soil/fill sample TP-1-22 (2.0 - 6.5) was analyzed for TCL VOCs plus STARS, all other samples were analyzed for STARS VOCs, only.
3. Soil/fill sample TP-1-22 (2.0 - 6.5) was analyzed for TCL SVOCs (BNAs), all other samples were analyzed for BN SVOCs, only.
4. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
5. ND = parameter not detected above laboratory detection limit.
6. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
7. " -- " = not analyzed for this parameter or no individual SCO
8. " * " = Field scan was not obtained due to inclement weather conditions.
9. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= TCL VOC
compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO.

TABLE 1b

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 2

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type				Restricted-Commercial SCO (mg/kg)
	TP-2-(1-3)	TP-2-(1-3)	SS-23	SS-24	
	0.0 - 2.0	2.0 - 5.5	0.0 - 1.0	0.0 - 1.0	
	composite	composite	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]					
Total VOCs	--	0.0 (max)	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp					
Total VOCs	*	*	--	--	**--**
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg					
Acenaphthene	0.44 J	0.67 J	ND	1.1 J	**500**
Acenaphthylene	0.59 J	20	ND	0.89 J	**500**
Anthracene	1 J	17 J	0.4 J	3.9 J	**500**
Benzo(a)anthracene	**6.7 J**	**50**	1.6 J	**14**	**5.6**
Benzo(b)fluoranthene	**11 J**	**86 J**	2.6 J	**15 J**	**5.6**
Benzo(k)fluoranthene	3.7 J	25 J	0.53 J	6 J	**56**
Benzo(g,h,i)perylene	3.3 J	34	1.3 J	7 J	**500**
Benzo(a)pyrene	**6.8 J**	**62**	**1.5 J**	**12**	**1**
Chrysene	8	52	1.5 J	11	**56**
Dibenzo(a,h)anthracene	**1 J**	**8.6**	ND	**2.3 J**	**0.56**
Dibenzofuran	ND	3.8 J	ND	1 J	**350**
Fluoranthene	14	95 J	3.5 J	28	**500**
Fluorene	0.38 J	4.2 J	ND	1.5 J	**500**
Indeno(1,2,3-cd)pyrene	3 J	**30**	1.1 J	**6.9 J**	**5.6**
2-Methylnaphthalene	ND	1.6 J	ND	ND	**--**
Naphthalene	ND	4.2 J	ND	ND	**500**
Phenanthrene	6.5 J	52 J	1.4 J	16	**500**
Pyrene	11	94	3.3 J	20	**500**
TOTAL SVOCs (mg/kg)	77.41	640.07	18.73	146.59	--
Inorganic Compounds - mg/kg					
Arsenic, Total	10	7.4	7.8	--	**16**
Cadmium, Total	2.8	1.4	2.9	--	**9.3**
Chromium, Total	136 J	15.9 J	95.6	--	**1,500**
Lead, Total	267 J	103 J	198	--	**1,000**
Mercury, Total	**2.9 J**	1.8 J	1.9	--	**2.8**
Cyanide, Total	11.5	ND	14.7 J	--	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds reported
2. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
3. ND = parameter not detected above laboratory detection limit.
4. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final Decemt
5. " -- " = not analyzed for this parameter or no individual SCO
6. " * " = Field scan was not obtained due to inclement weather conditions.
7. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO.

TABLE 1c

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 3

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type				Restricted-Commercial SCO (mg/kg)
	TP-3-(1-2)	TP-3-(1-2)	SS-(19-21)	MW-13A	
	0.0 - 1.0	1.0 - 3.0	0.0 - 1.0	0.0 - 1.0	
	composite	composite	composite	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]					
Total VOCs	--	0.0 (max)	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp					
Total VOCs	0.0 (max)	0.0 (max)	--	--	**--**
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg					
Acenaphthene	ND	0.68 J	2.5 J	--	**500**
Acenaphthylene	3.9 J	4.8 J	3.1 J	--	**500**
Anthracene	1.9 J	4.8 J	9.3	--	**500**
Benzo(a)anthracene	**10**	**23**	**24**	--	**5.6**
Benzo(b)fluoranthene	**15 J**	**32 J**	**26 J**	--	**5.6**
Benzo(k)fluoranthene	5.2 J	8.5 J	7.5 J	--	**56**
Benzo(g,h,i)perylene	9.2	14	12	--	**500**
Benzo(a)pyrene	**12**	**24**	**21**	--	**1**
Chrysene	10	22	20	--	**56**
Dibenzo(a,h)anthracene	**2.5 J**	**4.4 J**	**3.7 J**	--	**0.56**
Dibenzofuran	ND	0.65 J	3.6 J	--	**350**
Fluoranthene	18	48	50	--	**500**
Fluorene	ND	1.5 J	4.6 J	--	**500**
Indeno(1,2,3-cd)pyrene	**8.3**	**14**	**11**	--	**5.6**
2-Methylnaphthalene	ND	0.4 J	2.6 J	--	**--**
Naphthalene	ND	0.38 J	6.1 J	--	**500**
Phenanthrene	4 J	19	33	--	**500**
Pyrene	14 J	37	38	--	**500**
TOTAL SVOCs (mg/kg)	114	259	278	--	--
Polychlorinated Biphenyls (PCBs) - mg/kg					
Aroclor 1254	--	--	0.29	--	**1**
Aroclor 1260	--	--	0.22 J	--	**1**
Inorganic Compounds [2] - mg/kg					
Aluminum, Total	--	13800	--	--	**--**
Arsenic, Total	11.6 J	**36.7 J**	11.8	--	**16**
Barium, Total	--	166 J	--	--	**400**
Beryllium, Total	--	2.1	--	--	**590**
Cadmium, Total	1.3	4.1	1.2	--	**9.3**
Calcium, Total	--	87000 J	--	--	**--**
Chromium, Total	175 J	59.1 J	35.8	--	**1,500**
Cobalt, Total	--	6.8	--	--	**--**
Copper, Total	--	119 J	--	--	**270**
Iron, Total	--	45300 J	--	--	**--**
Lead, Total	141 J	280 J	151	--	**1,000**
Magnesium, Total	--	19400	--	--	**--**

TABLE 1c

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 3

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type				Restricted-Commercial SCO (mg/kg)
	TP-3-(1-2)	TP-3-(1-2)	SS-(19-21)	MW-13A	
	0.0 - 1.0	1.0 - 3.0	0.0 - 1.0	0.0 - 1.0	
	composite	composite	composite	grab	
Manganese, Total	--	3710	--	--	**10,000**
Inorganic Compounds [2] - mg/kg					
Mercury, Total	0.161	0.08	0.217	--	**2.8**
Nickel, Total	--	18.6	--	--	**310**
Potassium, Total	--	1090	--	--	**--**
Sodium, Total	--	633	--	--	**--**
Vanadium, Total	--	33.2	--	--	**--**
Zinc, Total	--	452	--	--	**10,000**
Cyanide, Total	ND	ND	ND	--	**27**
Dioxins - mg/kg					
2,3,7,8-TCDD	--	--	--	ND	**--**
Herbicides - mg/kg					
2,4-D	--	--	--	ND	**--**
Pentachlorophenol	--	--	--	ND	**--**
Pesticides - mg/kg					
4,4'-DDT	--	--	--	0.094	**47**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Sample TP-3-(1-2) (1.0 - 3.0) analyzed for TAL Metals, all other samples analyzed for arsenic, cadmium, chromium, cyanide, lead, & mercury, only.
3. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
4. ND = parameter not detected above laboratory detection limit.
5. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
6. " -- " = not analyzed for this parameter or no individual SCO
7. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
compound	= TAL Metal
BOLD	= Value exceeds Restricted-Commerical SCO

TABLE 1d

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 4

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type						Restricted-Commerical SCO (mg/kg)
	TP-4 (1-5)	TP-4 (1-5)	SS-04	SS-05	SS-25	SS-26	
	0.0 - 1.0	1.0 - 3.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	composite	composite	grab	grab	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]							
Total VOCs	--	0.0 (max)	--	--	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp							
Total VOCs	*	*	--	--	--	--	**--**
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg							
Acenaphthene	ND	ND	--	--	0.16 J	--	**500**
Acenaphthylene	ND	0.68 J	--	--	0.27 J	--	**500**
Anthracene	1.2 J	0.61 J	--	--	0.78	--	**500**
Benzo(a)anthracene	4.4 J	1.9	--	--	1.6	--	**5.6**
Benzo(b)fluoranthene	5.5 J	3.1 J	--	--	2.2 J	--	**5.6**
Benzo(k)fluoranthene	1.8 J	0.99 J	--	--	0.61 J	--	**56**
Benzo(g,h,i)perylene	2.4 J	1.6 J	--	--	0.81	--	**500**
Benzo(a)pyrene	**4.2 J**	**2.2**	--	--	**1.6**	--	**1**
Chrysene	4.4 J	2	--	--	1.6	--	**56**
Dibenzo(a,h)anthracene	**0.72 J**	0.5 J	--	--	0.23 J	--	**0.56**
Dibenzofuran	ND	0.13 J	--	--	0.24 J	--	**350**
Fluoranthene	9	3.3	--	--	4	--	**500**
Fluorene	ND	0.2 J	--	--	0.42	--	**500**
Indeno(1,2,3-cd)pyrene	2.1 J	1.4 J	--	--	0.78	--	**5.6**
2-Methylnaphthalene	ND	ND	--	--	0.068 J	--	**--**
Naphthalene	ND	0.11 J	--	--	0.065 J	--	**500**
Phenanthrene	3.3 J	2	--	--	3.2	--	**500**
Pyrene	8.1 J	2.8	--	--	2.8	--	**500**
TOTAL SVOCs (mg/kg)	47.12	23.52	0	0	21.43	0	--
Polychlorinated Biphenyls (PCBs) - mg/kg							
Aroclor 1248	--	--	**1.2**	0.54	--	--	**1**
Aroclor 1254	--	--	**3.0**	ND	--	--	**1**
Aroclor 1260	--	--	ND	0.38	--	--	**1**
Inorganic Compounds - mg/kg							
Arsenic, Total	9.3 J	7	--	--	7.6	12.6	**16**
Cadmium, Total	3.2 J	2.1	--	--	1.4	5.8	**9.3**
Chromium, Total	114 J	82.3 J	--	--	67.8	245	**1,500**
Lead, Total	642 J	800 J	--	--	166	355	**1,000**
Mercury, Total	1.5 J	0.559 J	--	--	0.148	**3.8**	**2.8**
Cyanide, Total	ND	ND	--	--	3.5 J	8.2 J	**27**
Wet Chemistry - units shown parenthentically							
pH (S.U.)	--	--	--	--	--	8.40	**--**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds reported as non-detect.
2. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
3. ND = parameter not detected above laboratory detection limit.
4. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
5. " -- " = not analyzed for this parameter or no individual SCO
6. " * " = Field scan was not obtained due to inclement weather conditions.
7. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1e

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 5

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type						Restricted-Commercial SCO (mg/kg)
	TP-5-(1-5)	TP-5-(1245)	TP-5-3	TP-5-(6-10)	TP-5-(6-10)	TP-5-11	
	0.0 - 1.0	1.0 - 4.5	1.0 - 4.5	0.0 - 1.0	1.0 - 4.0	0.0 - 1.0	
	composite	composite	grab	composite	composite	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]							
Total VOCs	--	0.0 (max)	0.0	--	0.0 (max)	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp							
Total VOCs	0.0 (max)	0.0 (max)	0.0	0.0 (max)	0.0 (max)	0.0	**--**
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg							
Naphthalene	--	--	1.6	--	--	--	**500**
TOTAL VOCs (mg/kg)	--	--	1.6	--	--	--	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg							
Acenaphthene	4.4 J	2.1 J	2.2 J	0.54 J	0.19 J	0.039 J	**500**
Acenaphthylene	5.6 J	10	6.2 J	0.65 J	0.18 J	0.15 J	**500**
Anthracene	24	20	15	1.9 J	0.52 J	0.17 J	**500**
Benzo(a)anthracene	**36**	**41**	**31**	4.6 J	1.3 J	0.68	**5.6**
Benzo(b)fluoranthene	**40 J**	**48 J**	**36 J**	**6.2 J**	2.3 J	1.2 J	**5.6**
Benzo(k)fluoranthene	13 J	18 J	9.8 J	2.1 J	0.83 J	0.31 J	**56**
Benzo(g,h,i)perylene	17	22	17	2.7 J	1 J	0.44	**500**
Benzo(a)pyrene	**32**	**40**	**29**	**4.4 J**	**1.5**	0.75	**1**
Chrysene	33	37	27	4.1 J	1.3 J	0.71	**56**
Dibenzo(a,h)anthracene	**4.8 J**	**5.8 J**	**4.4 J**	**0.86 J**	0.31 J	0.12 J	**0.56**
Dibenzofuran	7.7	6.6 J	4.3 J	ND	0.21 J	0.079 J	**350**
Fluoranthene	100	130 D	94	10	2.5	1.1	**500**
Fluorene	13	12	9	0.66 J	0.29 J	0.047 J	**500**
Indeno(1,2,3-cd)pyrene	**16**	**20**	**16**	2.4 J	0.92 J	0.4	**5.6**
2-Methylnaphthalene	2.8 J	1.4 J	0.99 J	ND	0.16 J	0.087 J	**--**
Naphthalene	18	2.9 J	2.5 J	ND	0.41 J	0.078 J	**500**
Phenanthrene	82	92	66	5.5 J	1.9	0.6	**500**
Pyrene	72	84	68	7.3 J	1.9	0.86	**500**
TOTAL SVOCs (mg/kg)	521.3	592.8	438.4	53.9	17.7	7.8	--
Polychlorinated Biphenyls (PCBs) - mg/kg							
TOTAL PCBs (mg/kg)	--	--	--	--	--	--	--
Inorganic Compounds [2] - mg/kg							
Aluminum, Total	6630	--	--	--	--	--	**--**
Arsenic, Total	12.8 J	2.8 J	**103 J**	**23.5**	12.8	7.5	**16**
Barium, Total	73 J	--	--	--	--	--	**400**
Beryllium, Total	0.99	--	--	--	--	--	**590**
Cadmium, Total	8.2	ND	**94.9**	**16 J**	9.3 J	0.52 J	**9.3**
Calcium, Total	84300 J	--	--	--	--	--	**--**
Chromium, Total	299 J	3.3 J	161 J	138 J	75.1 J	47.7 J	**1,500**
Cobalt, Total	6.9	--	--	--	--	--	**--**
Copper, Total	126 J	--	--	--	--	--	**270**
Iron, Total	78700 J	--	--	--	--	--	**--**
Lead, Total	535 J	6.4 J	**10200 J**	814 J	427 J	50.8 J	**1,000**
Magnesium, Total	18600	--	--	--	--	--	**--**
Manganese, Total	**14500**	--	--	--	--	--	**10,000**
Mercury, Total	1.9	0.591	0.375	2.0	5.9	0.068	**2.8**
Nickel, Total	27.4	--	--	--	--	--	**310**
Potassium, Total	639 J	--	--	--	--	--	**--**
Selenium, Total	4.7	--	--	--	--	--	**1,500**
Sodium, Total	225 J	--	--	--	--	--	**--**
Vanadium, Total	211	--	--	--	--	--	**--**
Zinc, Total	905	--	--	--	--	--	**10,000**
Cyanide, Total	ND	ND	ND	ND	ND	ND	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Sample TP-5-(1-5) (0.0 - 1.0) was analyzed for TAL Metals, all other samples were analyzed for arsenic, cadmium, chromium, cyanide, lead, and mercury, only.
3. D = Analyzed at the secondary dilution factor.
4. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
5. ND = parameter not detected above laboratory detection limit.
6. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
7. " -- " = not analyzed for this parameter or no individual SCO
8. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
compound	= TAL Metal
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1e (continued)

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 5

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type					Restricted-Commercial SCO (mg/kg)
	TP-5-11	TP-5-12	SS-(1-2)	SS-03	SS-27	
	1.0 - 4.0	1.0 - 3.5	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	grab	grab	composite	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]						
Total VOCs	0.0	0.0	--	--	--	--
PID Field Scans (ppm) - 10.6 eV Lamp						
Total VOCs	0.0	0.0	--	--	--	--
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg						
Naphthalene	--	--	--	--	--	500
TOTAL VOCs (mg/kg)	--	--	--	--	--	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg						
Acenaphthene	0.16 J	--	ND	--	0.58 J	500
Acenaphthylene	0.31 J	--	ND	--	ND	500
Anthracene	0.54 J	--	0.35 J	--	1.4 J	500
Benzo(a)anthracene	1.9	--	1.6 J	--	**11**	**5.6**
Benzo(b)fluoranthene	2.4 J	--	2.4 J	--	**23 J**	**5.6**
Benzo(k)fluoranthene	0.87 J	--	0.78 J	--	25 J	56
Benzo(g,h,i)perylene	1.1	--	0.93 J	--	8.9	500
Benzo(a)pyrene	**1.9**	--	**1.7 J**	--	**12**	**1**
Chrysene	1.8	--	1.7 J	--	12	56
Dibenzo(a,h)anthracene	0.32 J	--	0.27 J	--	**2.6 J**	**0.56**
Dibenzofuran	0.19 J	--	ND	--	ND	350
Fluoranthene	3.3	--	3 J	--	24	500
Fluorene	0.22 J	--	ND	--	0.55 J	500
Indeno(1,2,3-cd)pyrene	0.98	--	0.93 J	--	**7.9**	**5.6**
2-Methylnaphthalene	0.17 J	--	ND	--	ND	--
Naphthalene	0.29 J	--	ND	--	ND	500
Phenanthrene	1.6	--	1 J	--	11	500
Pyrene	2.8	--	2.6 J	--	19	500
TOTAL SVOCs (mg/kg)	20.85	0	17.26	0	158.9	--
Polychlorinated Biphenyls (PCBs) - mg/kg						
TOTAL PCBs (mg/kg)	--	--	--	ND	--	1
Inorganic Compounds [2] - mg/kg						
Aluminum, Total	--	--	--	--	--	--
Arsenic, Total	7.7	**43.7**	13.2	--	--	**16**
Barium, Total	--	--	--	--	--	400
Beryllium, Total	--	--	--	--	--	590
Cadmium, Total	3 J	**45.3 J**	**11.2**	--	--	**9.3**
Calcium, Total	--	--	--	--	--	--
Chromium, Total	141 J	98.7 J	39.5	--	--	1,500
Cobalt, Total	--	--	--	--	--	--
Copper, Total	--	--	--	--	--	270
Iron, Total	--	--	--	--	--	--
Lead, Total	157 J	**1340 J**	574	--	--	1,000
Magnesium, Total	--	--	--	--	--	--
Manganese, Total	--	--	--	--	--	15,000
Mercury, Total	0.045	0.349	2.5	--	--	2.8
Nickel, Total	--	--	--	--	--	310
Potassium, Total	--	--	--	--	--	--
Selenium, Total	--	--	--	--	--	1,500
Sodium, Total	--	--	--	--	--	--
Vanadium, Total	--	--	--	--	--	--
Zinc, Total	--	--	--	--	--	89,000
Cyanide, Total	ND	ND	ND	--	--	27

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Sample TP-5-(1-5) (0.0 - 1.0) was analyzed for TAL Metals, all other samples were analyzed for As, Cd, Cr, CN, Pb, & Hg, only.
3. D = Analyzed at the secondary dilution factor.
4. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
5. ND = parameter not detected above laboratory detection limit.
6. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
7. " -- " = not analyzed for this parameter or no individual SCO
8. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
compound	= TAL Metal
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1f

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 6

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type										Restricted-Commercial SCO (mg/kg)
	TP-6-(1-5)	TP-6-(1-5)	TP-6-6	TP-6-7	TP-6-10	SS-07	SS-08	SS-28	SS-29	SS-30	
	0.0 - 2.0	2.0 - 6.0	2.0 - 6.0	2.0 - 4.0	2.0 - 6.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	composite	composite	grab	grab	grab	grab	grab	grab	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]											
Total VOCs	--	0.0 (max)	0.0	0.0	0.0	--	--	--	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp											
Total VOCs	1.0 (max)	1.1 (max)	0.0	0.0	0.0	--	--	--	--	--	**--**
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg											
Acenaphthene	5.4 J	6.8 J	0.84 J	--	--	--	--	--	0.31 J	--	**500**
Acenaphthylene	ND	ND	2 J	--	--	--	--	--	0.23 J	--	**500**
Anthracene	14 J	14 J	3.8 J	--	--	--	--	--	0.94 J	--	**500**
Benzo(a)anthracene	**30 J**	**28 J**	**17**	--	--	--	--	--	2.4 J	--	**5.6**
Benzo(b)fluoranthene	**36 J**	**27 J**	**16 J**	--	--	--	--	--	3.2 J	--	**5.6**
Benzo(k)fluoranthene	41 J	6.8 J	6 J	--	--	--	--	--	1.1 J	--	**56**
Benzo(g,h,i)perylene	15 J	14 J	9	--	--	--	--	--	1.7 J	--	**500**
Benzo(a)pyrene	**22 J**	**22 J**	**14**	--	--	--	--	--	**2.5 J**	--	**1**
Chrysene	28 J	25 J	17	--	--	--	--	--	2.5 J	--	**56**
Dibenzo(a,h)anthracene	**4.5 J**	**4.1 J**	**2.7 J**	--	--	--	--	--	0.4 J	--	**0.56**
Dibenzofuran	3.1 J	3.6 J	0.5 J	--	--	--	--	--	0.32 J	--	**350**
Fluoranthene	71	65	40	--	--	--	--	--	5.6	--	**500**
Fluorene	5.8 J	6.4 J	0.95 J	--	--	--	--	--	0.45 J	--	**500**
Indeno(1,2,3-cd)pyrene	**13 J**	**12 J**	**8.2**	--	--	--	--	--	1.4 J	--	**5.6**
Naphthalene	ND	2.2 J	0.4 J	--	--	--	--	--	0.57 J	--	**500**
Phenanthrene	52	51	15	--	--	--	--	--	4.1	--	**500**
Pyrene	55	51	35	--	--	--	--	--	4.6	--	**500**
TOTAL SVOCs (mg/kg)	395.8	338.9	188.4	0	0	0	0	0	32.32	0	--
Polychlorinated Biphenyls (PCBs) - mg/kg											
Aroclor 1254	--	--	--	--	0.58	ND	0.88	ND	--	--	**1**
Aroclor 1260	--	--	--	--	ND	**1.6**	ND	0.35	--	--	**1**
Inorganic Compounds - mg/kg											
Arsenic, Total	14.7 J	**22.6 J**	**152 J**	**39.2 J**	--	--	--	--	**17.7**	**18.5**	**16**
Cadmium, Total	5.3 J	5.1 J	7.9 J	3 J	--	--	--	--	8	6.7	**9.3**
Chromium, Total	123	99.1	242	52.8	--	--	--	--	171	97.5	**1,500**
Lead, Total	454	474	774	**1660**	--	--	--	--	440	549	**1,000**
Mercury, Total	1.2	1.1	0.429	0.362	--	--	--	--	0.389	**3**	**2.8**
Cyanide, Total	ND	ND	ND	2.0	--	--	--	--	ND	ND	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
3. ND = parameter not detected above laboratory detection limit.
4. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
5. " -- " = not analyzed for this parameter or no individual SCO
6. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1g

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 7

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type									Restricted-Commercial SCO (mg/kg)
	TP-7-(1-3)/8-4	TP-7-(1,3)/8-4	TP-7-2	TP-7-(4-7)	TP-7-(4-7)	SS-15	SS-16	SS-17	SS-31	
	0.0 - 2.0	1.5 - 5.5	2.0 - 5.0	0.0 - 1.0	2.0 - 7.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	composite	composite	grab	composite	composite	grab	grab	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]										
Total VOCs	--	0.0 (max)	3123	--	0.0 (max)	--	--	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp										
Total VOCs	0.0 (max)	0.0 (max)	12.8	0.0 (max)	0.0 (max)	--	--	--	--	**--**
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg										
n-Butylbenzene	--	--	7.6	--	--	--	--	--	--	**500**
Ethylbenzene	--	--	1.8	--	--	--	--	--	--	**390**
Isopropylbenzene	--	--	0.48	--	--	--	--	--	--	**--**
p-Cymene	--	--	1.4	--	--	--	--	--	--	**--**
n-Propylbenzene	--	--	1.6	--	--	--	--	--	--	**500**
1,2,4-Trimethylbenzene	--	--	26	--	--	--	--	--	--	**190**
m-Xylene	--	--	3.1	--	--	--	--	--	--	**500**
Xylenes, Total	--	--	3.1	--	--	--	--	--	--	**500**
Naphthalene	--	--	120	--	--	--	--	--	--	**500**
TOTAL VOCs (mg/kg)	0	0	162.0	0	0	0	0	0	0	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg										
Acenaphthylene	1.6 J	0.25 J	3.8 J	0.68 J	0.9 J	--	--	--	0.2 J	**500**
Anthracene	1 J	ND	2.7 J	0.48 J	1.4 J	--	--	--	0.072 J	**500**
Benzo(a)anthracene	**6 J**	1 J	**9.3**	2.2 J	4.3 J	--	--	--	0.33 J	**5.6**
Benzo(b)fluoranthene	**8.7 J**	1.1 J	**12 J**	2.8 J	5.1 J	--	--	--	0.78 J	**5.6**
Benzo(k)fluoranthene	2.2 J	0.46 J	3 J	1 J	1.6 J	--	--	--	0.23 J	**56**
Benzo(g,h,i)perylene	5.8 J	0.65 J	6.8 J	1.1 J	2.7 J	--	--	--	0.62	**500**
Benzo(a)pyrene	**6.4 J**	0.87 J	**9.7**	**2 J**	**3.6 J**	--	--	--	0.51	**1**
Chrysene	6.2 J	0.96 J	10	2.1 J	4.3 J	--	--	--	0.37 J	**56**
Dibenzo(a,h)anthracene	**1.5 J**	0.2 J	**1.7 J**	0.35 J	**0.81 J**	--	--	--	0.18 J	**0.56**
Dibenzofuran	ND	ND	1 J	ND	ND	--	--	--	0.04 J	**350**
Fluoranthene	9.3	1.5 J	16	3.2 J	8.1	--	--	--	0.35 J	**500**
Fluorene	ND	ND	2.9 J	ND	0.59 J	--	--	--	ND	**500**
Indeno(1,2,3-cd)pyrene	4.7 J	0.59 J	5.4 J	0.98 J	2.2 J	--	--	--	0.53	**5.6**
2-Methylnaphthalene	ND	ND	15	ND	ND	--	--	--	0.099 J	**--**
Naphthalene	0.83 J	ND	7.5 J	ND	0.44 J	--	--	--	0.063 J	**500**
Phenanthrene	4.2 J	0.45 J	13	1.7 J	5.2 J	--	--	--	0.15 J	**500**
Pyrene	8.5	1.4 J	17	2.8 J	7.1 J	--	--	--	0.35 J	**500**
TOTAL SVOCs (mg/kg)	66.93	9.43	136.8	21.39	48.34	0	0	0	4.874	--
Polychlorinated Biphenyls (PCBs) - mg/kg										

TABLE 1g

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 7

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type									Restricted-Commercial SCO (mg/kg)
	TP-7-(1-3)/8-4	TP-7-(1,3)/8-4	TP-7-2	TP-7-(4-7)	TP-7-(4-7)	SS-15	SS-16	SS-17	SS-31	
	0.0 - 2.0	1.5 - 5.5	2.0 - 5.0	0.0 - 1.0	2.0 - 7.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	composite	composite	grab	composite	composite	grab	grab	grab	grab	
Aroclor 1260	--	--	--	--	--	ND	0.017 J	0.14	--	**1**
Inorganic Compounds - mg/kg										
Arsenic, Total	**116 J**	15.8 J	4.2 J	10 J	10.1 J	--	--	--	--	**16**
Cadmium, Total	7.6 J	1.4 J	0.75 J	4.4 J	2.7 J	--	--	--	--	**9.3**
Chromium, Total	315	124	52.1	118	34.4	--	--	--	--	**1,500**
Lead, Total	728	61.5	171	628	318	--	--	--	--	**1,000**
Mercury, Total	2.1	0.141	0.086	0.637	0.757	--	--	--	--	**2.8**
Cyanide, Total	ND	ND	ND	ND	ND	--	--	--	--	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. B = Analyte was detected in the associated blank as well as in the sample.
3. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
4. ND = parameter not detected above laboratory detection limit.
5. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
6. " -- " = not analyzed for this parameter or no individual SCO
7. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1h

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 8

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type						Restricted-Commercial SCO (mg/kg)
	TP-8-(1-3) 0.0 - 1.0 composite	TP-8-(1-3) 1.0 - 7.0 composite	TP-8-6 1.0 - 3.0 grab	SS-18 0.0 - 1.0 grab	SS-(32-33) 0.0 - 1.0 composite	SS-34 0.0 - 1.0 grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]							
Total VOCs	--	0.0 (max)	0.0	--	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp							
Total VOCs	0.0 (max)	0.0 (max)	0.0	--	--	--	**--**
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg							
Acenaphthene	0.62 J	ND	--	--	0.41 J	0.67 J	**500**
Acenaphthylene	0.36 J	ND	--	--	0.22 J	ND	**500**
Anthracene	1.4 J	ND	--	--	0.83 J	1.6 J	**500**
Benzo(a)anthracene	3.7 J	0.81 J	--	--	2.4	**6.7 J**	**5.6**
Benzo(b)fluoranthene	4.2 J	1.4 J	--	--	3.2 J	**9.2 J**	**5.6**
Benzo(k)fluoranthene	1.6 J	1.6 J	--	--	1.1 J	3.2 J	**56**
Benzo(g,h,i)perylene	2.3 J	0.7 J	--	--	1.3 J	4.3 J	**500**
Benzo(a)pyrene	**3.1 J**	0.85 J	--	--	**2.3**	**7.2 J**	**1**
Chrysene	3.8 J	0.82 J	--	--	2.5	6.6 J	**56**
Dibenzo(a,h)anthracene	**0.62 J**	ND	--	--	0.4 J	**1.2 J**	**0.56**
Dibenzofuran	0.31 J	ND	--	--	0.27 J	ND	**350**
Di-n-butyl phthalate	ND	ND	--	--	0.18 J	ND	**--**
Fluoranthene	8.6	1.2 J	--	--	4.9	13	**500**
Fluorene	0.49 J	ND	--	--	0.35 J	0.48 J	**500**
Indeno(1,2,3-cd)pyrene	1.9 J	0.55 J	--	--	1.2 J	4.1 J	**5.6**
2-Methylnaphthalene	ND	ND	--	--	0.2 J	ND	**--**
Naphthalene	0.27 J	ND	--	--	0.24 J	ND	**500**
Phenanthrene	5.4	0.54 J	--	--	3.5	6.2 J	**500**
Pyrene	7.5	1.1 J	--	--	4	10	**500**
TOTAL SVOCs (mg/kg)	46.2	9.57	0	0	29.5	74.5	--
Polychlorinated Biphenyls (PCBs) - mg/kg							
Aroclor 1248	--	--	--	**3.4**	--	--	**1**
Inorganic Compounds - mg/kg							
Arsenic, Total	11.5 J	6.3 J	**17.3**	--	4.6 J	**17.8**	**16**
Cadmium, Total	2.6 J	0.71 J	6.3	--	2.9 J	4.8	**9.3**
Chromium, Total	84	101	180 J	--	71.5 J	95.3	**1,500**
Lead, Total	286	57.9	**2180 J**	--	**1250 J**	510	**1,000**
Mercury, Total	0.293	0.033	0.473 J	--	**5.7 J**	**4.2**	**2.8**
Cyanide, Total	2.2	ND	ND	--	7.7 J	10.5 J	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. B = Analyte was detected in the associated blank as well as in the sample.
3. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
4. ND = parameter not detected above laboratory detection limit.
5. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
6. " -- " = not analyzed for this parameter or no individual SCO
7. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1i

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 9

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type											Restricted-Commercial SCO (mg/kg)
	TP-9-1	TP-9-2	TP-9-3	TP-9-3	TP-9-5	TP-9-(125)	TP-9-(125)	SS-09	SS-(10-13)	SS-35	SS-36	
	1.0 - 3.5	1.0 - 7.0	0.0 - 1.0	1.0 - 4.5	1.0 - 4.5	0.0 - 1.0	1.0 - 7.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	grab	grab	grab	grab	grab	composite	composite	grab	composite	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]												
Total VOCs	0.0	0.0	0.0	328	0.0	--	0.0 (max)	--	--	--	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp												
Total VOCs	0.0	0.0	0.0	25.8	0.0	0.0 (max)	0.0 (max)	--	--	--	--	**--**
STARS Volatile Organic Compounds (VOCs - Method 8021) [2] - mg/kg												
n-Butylbenzene	ND	ND	--	8.2	ND	--	--	--	--	--	--	**500**
sec-Butylbenzene	ND	ND	--	6.0	ND	--	--	--	--	--	--	**500**
tert-Butylbenzene	ND	ND	--	2.0	ND	--	--	--	--	--	--	**500**
Isopropylbenzene	ND	ND	--	0.75	ND	--	--	--	--	--	--	**--**
p-Cymene	ND	ND	--	2.3	ND	--	--	--	--	--	--	**--**
n-Propylbenzene	ND	ND	--	3.4	ND	--	--	--	--	--	--	**500**
Toluene	ND	ND	--	0.16	ND	--	--	--	--	--	--	**500**
1,2,4-Trimethylbenzene	ND	ND	--	7.9	ND	--	--	--	--	--	--	**190**
1,3,5-Trimethylbenzene	ND	ND	--	1.6	ND	--	--	--	--	--	--	**190**
o-Xylene	ND	ND	--	2.1	ND	--	--	--	--	--	--	**500**
m-Xylene	ND	ND	--	0.23	ND	--	--	--	--	--	--	**500**
Xylenes, Total	ND	ND	--	2.3	ND	--	--	--	--	--	--	**500**
Naphthalene	ND	ND	--	16	ND	--	--	--	--	--	--	**500**
Methylene Chloride	0.007	--	--	--	--	--	--	--	--	--	--	**500**
TOTAL VOCs (mg/kg)	0.007	0	0	50.6	0	0	0	0	0	0	0	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) [3] - mg/kg												
Acenaphthene	--	--	0.096 J	5.1	--	ND	ND	--	0.18 J	--	ND	**500**
Acenaphthylene	--	--	0.4 J	ND	--	0.62 J	ND	--	0.69 J	--	0.38 J	**500**
Anthracene	--	--	0.57 J	3.2	--	0.62 J	ND	--	0.62 J	--	0.24 J	**500**
Benzo(a)anthracene	--	--	1.3	0.21 J	--	1.6 J	0.5 J	--	2.9	--	1.1 J	**5.6**
Benzo(b)fluoranthene	--	--	2 J	ND	--	3.2 J	0.75 J	--	**6.1 J**	--	2.4 J	**5.6**
Benzo(k)fluoranthene	--	--	0.64 J	ND	--	1 J	0.2 J	--	1.7 J	--	0.87 J	**56**
Benzo(g,h,i)perylene	--	--	1.2	ND	--	1.6 J	0.38 J	--	4.4	--	1.3 J	**500**
Benzo(a)pyrene	--	--	**1.2**	ND	--	**2 J**	0.46 J	--	**4.2**	--	**1.7 J**	**1**
Chrysene	--	--	1.3	0.4 J	--	1.8 J	0.51 J	--	3	--	1.2 J	**56**
Dibenzo(a,h)anthracene	--	--	0.28 J	ND	--	0.48 J	ND	--	**1.1 J**	--	0.29 J	**0.56**
Dibenzofuran	--	--	0.17 J	1.3 J	--	0.27 J	ND	--	0.13 J	--	ND	**350**
Fluoranthene	--	--	2.4	0.55 J	--	2.6 J	0.87 J	--	3.8	--	1.6 J	**500**
Fluorene	--	--	0.16 J	9	--	0.2 J	ND	--	0.1 J	--	ND	**500**
Indeno(1,2,3-cd)pyrene	--	--	0.89	ND	--	1.4 J	0.37 J	--	3.6	--	1 J	**5.6**
2-Methylnaphthalene	--	--	0.5 J	35	--	0.29 J	ND	--	0.17 J	--	ND	**--**
Naphthalene	--	--	0.32 J	ND	--	0.42 J	ND	--	0.25 J	--	ND	**500**
Phenanthrene	--	--	1.9	23	--	1.4 J	0.75 J	--	1.5	--	0.49 J	**500**
Pyrene	--	--	2	2.4	--	2.4 J	0.79 J	--	3.5	--	1.5 J	**500**
TOTAL SVOCs (mg/kg)	0	0	17.33	80.16	0	21.9	5.58	0	37.94	0	14.07	--

TABLE 1i

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 9

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type											Restricted-Commercial SCO (mg/kg)
	TP-9-1	TP-9-2	TP-9-3	TP-9-3	TP-9-5	TP-9-(125)	TP-9-(125)	SS-09	SS-(10-13)	SS-35	SS-36	
	1.0 - 3.5	1.0 - 7.0	0.0 - 1.0	1.0 - 4.5	1.0 - 4.5	0.0 - 1.0	1.0 - 7.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	
	grab	grab	grab	grab	grab	composite	composite	grab	composite	grab	grab	
Polychlorinated Biphenyls (PCBs) - mg/kg												
Aroclor 1248	--	--	--	--	--	--	--	0.088	ND	--	--	**1**
Aroclor 1260	--	--	--	--	--	--	--	0.78	0.033	--	--	**1**
Inorganic Compounds - mg/kg												
Arsenic, Total	--	--	**26.8**	4.8	--	**19.5 J**	5.4 J	--	**79.8 J**	--	--	**16**
Cadmium, Total	--	--	5.5 J	ND	--	2.8	0.41	--	3.5 J	--	--	**9.3**
Chromium, Total	--	--	249 J	6.3 J	--	174 J	23.7 J	--	90.6 J	--	--	**1,500**
Lead, Total	--	--	620 J	73.7 J	--	207 J	126 J	--	389 J	--	--	**1,000**
Mercury, Total	--	--	0.144	0.031	--	0.155 J	0.037 J	--	0.421 J	--	--	**2.8**
Cyanide, Total	--	--	ND	ND	--	1.8 J	1.9 J	--	3 J	--	--	**27**
Dioxins - mg/kg												
2,3,7,8-TCDD	--	--	--	--	--	--	--	--	--	ND	--	**--**
Herbicides - mg/kg												
2,4-D	--	--	--	--	--	--	--	--	--	0.083 J	--	**--**
Pentachlorophenol	--	--	--	--	--	--	--	--	--	0.12	--	**--**
Pesticides - mg/kg												
4,4'-DDT	--	--	--	--	--	--	--	--	--	0.023	--	**47**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Soil/fill sample TP-9-1 (1.0 - 3.5) was analyzed for TCL VOCs plus STARS, all other samples were analyzed for STARS VOCs, only.
3. Soil/fill sample TP-9-(125) (1.0 - 7.0) was analyzed for TCL SVOCs (BNAs), all other samples were analyzed for BN SVOCs, only.
4. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
5. ND = parameter not detected above laboratory detection limit.
6. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
7. " -- " = not analyzed for this parameter or no individual SCO
8. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= TCL VOC
compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 1j

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 10

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type									Restricted-Commercial SCO (mg/kg)
	TP-10-1	TP-10-(1-3)	TP-10-(2-3)	TP-10-(4-5)	TP-10-(4-5)	TP-10-6	TP-10-6	TP-10-7	SS-14	
	1.0 - 4.5	0.0 - 1.0	1.0 - 4.0	0.0 - 1.0	1.0 - 2.5	0.0 - 1.0	1.0 - 5.5	1.0 - 2.5	0.0 - 1.0	
	grab	composite	composite	composite	composite	grab	grab	grab	grab	
Headspace Determination (ppm) - 10.6 eV Lamp [subsurface samples only]										
Total VOCs	216	--	0.0 (max)	--	0.0 (max)	0.5	410	0.0	--	**--**
PID Field Scans (ppm) - 10.6 eV Lamp										
Total VOCs	10.2	0.0 (max)	0.0 (max)	0.0 (max)	0.0 (max)	25.3	3002	0.0	--	**--**
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg										
n-Butylbenzene	ND	--	--	--	--	ND	19	--	--	**500**
sec-Butylbenzene	5.5	--	--	--	--	ND	22	--	--	**500**
tert-Butylbenzene	ND	--	--	--	--	ND	16	--	--	**500**
Isopropylbenzene	0.29	--	--	--	--	ND	ND	--	--	**--**
p-Cymene	2.1	--	--	--	--	ND	16	--	--	**--**
n-Propylbenzene	ND	--	--	--	--	ND	30	--	--	**500**
Toluene	ND	--	--	--	--	ND	25	--	--	**500**
1,2,4-Trimethylbenzene	ND	--	--	--	--	ND	77	--	--	**190**
1,3,5-Trimethylbenzene	2.2	--	--	--	--	ND	13	--	--	**190**
o-Xylene	ND	--	--	--	--	ND	21	--	--	**500**
m-Xylene	ND	--	--	--	--	ND	14	--	--	**500**
Xylenes, Total	ND	--	--	--	--	ND	34	--	--	**500**
Naphthalene	4.7	--	--	--	--	ND	9.1	--	--	**500**
Methyl tert butyl ether	ND	--	--	--	--	ND	0.93	--	--	**500**
TOTAL VOCs (mg/kg)	14.79	0	0	0	0	0	263.0	0	0	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg										
Acenaphthene	2.9 J	1.7 J	0.056 J	ND	ND	--	--	ND	--	**500**
Acenaphthylene	0.63 J	ND	ND	0.2 J	ND	--	--	ND	--	**500**
Anthracene	0.61 J	3.3 J	0.12 J	0.14 J	ND	--	--	ND	--	**500**
Benzo(a)anthracene	1.4 J	**7.7**	0.3 J	0.72 J	0.077 J	--	--	0.042 J	--	**5.6**
Benzo(b)fluoranthene	1.5 J	**9.7 J**	0.33 J	1.1 J	0.19 J	--	--	0.05 J	--	**5.6**
Benzo(k)fluoranthene	0.69 J	2.3 J	0.12 J	0.39 J	0.19 J	--	--	ND	--	**56**
Benzo(g,h,i)perylene	0.89 J	3.6 J	0.12 J	0.59 J	0.099 J	--	--	0.034 J	--	**500**
Benzo(a)pyrene	**1.1 J**	**6.4 J**	0.25 J	0.81	0.092 J	--	--	0.04 J	--	**1**
Chrysene	1 J	7 J	0.26 J	0.72 J	0.08 J	--	--	0.034 J	--	**56**
Dibenzo(a,h)anthracene	ND	**1.2 J**	0.043 J	0.16 J	0.025 J	--	--	ND	--	**0.56**
Dibenzofuran	ND	0.71 J	ND	0.047 J	ND	--	--	ND	--	**350**
Fluoranthene	4.5 J	15	0.62	1.1	0.14 J	--	--	0.056 J	--	**500**
Fluorene	1.2 J	1.4 J	0.042 J	ND	ND	--	--	ND	--	**500**
Indeno(1,2,3-cd)pyrene	0.76 J	3 J	0.11 J	0.5 J	0.083 J	--	--	0.029 J	--	**5.6**
2-Methylnaphthalene	0.48 J	ND	ND	0.073 J	ND	--	--	ND	--	**--**
Naphthalene	ND	0.41 J	ND	0.068 J	ND	--	--	ND	--	**500**
Phenanthrene	0.48 J	11	0.39	0.51 J	0.051 J	--	--	0.028 J	--	**500**
Pyrene	3.3 J	12	0.45	0.92	0.12 J	--	--	0.057 J	--	**500**
TOTAL SVOCs (mg/kg)	21.44	86.42	3.211	8.048	1.147	0	0	0.37	0	--
Polychlorinated Biphenyls (PCBs) - mg/kg										
TOTAL PCBs (mg/kg)	--	--	--	--	--	--	--	--	ND	**1**

TABLE 1j

SOIL ANALYTICAL SUMMARY FOR AREA OF ASSESSMENT 10

SITE MANAGEMENT PLAN

Phase I Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type									Restricted-Commercial SCO (mg/kg)
	TP-10-1	TP-10-(1-3)	TP-10-(2-3)	TP-10-(4-5)	TP-10-(4-5)	TP-10-6	TP-10-6	TP-10-7	SS-14	
	1.0 - 4.5	0.0 - 1.0	1.0 - 4.0	0.0 - 1.0	1.0 - 2.5	0.0 - 1.0	1.0 - 5.5	1.0 - 2.5	0.0 - 1.0	
	grab	composite	composite	composite	composite	grab	grab	grab	grab	
Inorganic Compounds - mg/kg										
Arsenic, Total	**18 J**	**29.5 J**	2.4 J	**18.4 J**	2.7 J	--	--	--	--	**16**
Cadmium, Total	1.2	3.3	0.38	2.7	ND	--	--	--	--	**9.3**
Chromium, Total	28.8 J	167 J	9.8 J	29 J	7.5 J	--	--	--	--	**1,500**
Lead, Total	421 J	234 J	26.2 J	260 J	91.1 J	--	--	--	--	**1,000**
Mercury, Total	0.113 J	0.092 J	ND	0.356 J	0.043 J	--	--	--	--	**2.8**
Cyanide, Total	ND	10.3 J	ND	ND	ND	--	--	--	--	**27**
TCLP - (units shown parenthetically)										
2-Butanone (mg/L)	--	--	--	--	--	ND	0.026 J	--	--	**--**
Lead, Total (mg/L)	--	--	--	--	--	0.0167	0.0653	--	--	**--**
Flashpoint (°F)	--	--	--	--	--	> 200	> 200	--	--	**--**
H_2S Released from Waste (mg/kg)	--	--	--	--	--	ND	ND	--	--	**--**
HCN Released from Waste (mg/kg)	--	--	--	--	--	ND	ND	--	--	**--**
Leachable pH (S.U.)	--	--	--	--	--	8.39	9.04	--	--	**--**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
3. ND = parameter not detected above laboratory detection limit.
4. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.
5. " -- " = not analyzed for this parameter or no individual SCO
6. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Restricted-Commercial SCO

TABLE 2

GROUNDWATER ANALYTICAL SUMMARY

SITE MANAGEMENT PLAN

Tecumseh Phase I Business Park
Lackawanna, New York

Parameter [1]	Monitoring Well Location																GWQS/ GV [5]
	MW-8A		MW-12A [2]		MW-13A		MW-14A [3]		MW-15A [4]		MW-16A		MW-17A		MW-18A		
Field Measurements (units as indicated)																	
pH (units)	7.47	7.73	**9.69**	**9.46**	7.07	7.28	7.81	7.80	7.51	7.91	7.14	7.27	7.47	7.72	7.64	7.81	**6.5 - 8.5**
Temperature (°C)	9.1	7.6	7.7	5.6	8.0	7.1	6.9	6.2	7.2	6.2	6.9	4.7	7.1	6.5	7.4	8.8	**--**
Specific Conductance (uS)	2447	2410	507	483	843	1037	783	783	1331	1251	794	792	851	846	1129	1209	**--**
Turbidity	19.2	19.2	15.7	21.4	21.1	13.4	19	12.3	**82.1**	40.3	12.3	8.3	14.9	4.52	37	58.3	**50****
ORP (mV)	85	84	-79	-79	-28	-15	-51	-67	-107	-87	-4	8	-18	14	67	86	**--**
Volatile Organic Compounds (VOCs) [7] - ug/L																	
Acetone	--		3 J		--		--		--		--		--		--		**50***
n-Butylbenzene	ND		ND		ND		ND		0.97		ND		ND		ND		**5**
1,2,4-Trichlorobenzene	--		1.9 J		--		--		--		--		--		--		**10***
TOTAL VOCs (ug/L)	0		4.9		0		0		0.97		0		0		0		--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) [8] - ug/L																	
TOTAL SVOCs (ug/L)	ND		ND		ND		ND		ND		ND		ND		ND		--
Polychlorinated Biphenyls (PCBs) - ug/L																	
TOTAL PCBs (ug/L)	ND		ND		ND		ND		ND		ND		ND		ND		--
Total Inorganic Compounds [9] - mg/L																	
Aluminum, Total	--		307		--		--		--		--		--		--		**--**
Barium, Total	--		**8.7**		--		--		--		--		--		--		**1**
Calcium, Total	--		57,200		--		--		--		--		--		--		**--**
Iron, Total	--		**248**		--		--		--		--		--		--		**0.3**
Magnesium, Total	--		**2,260**		--		--		--		--		--		--		**35***
Manganese, Total	--		**74.3**		--		--		--		--		--		--		**0.3**
Potassium, Total	--		7,390		--		--		--		--		--		--		**--**
Sodium, Total	--		**44,000**		--		--		--		--		--		--		**20**
Cyanide, Total	ND		ND		ND		ND		0.013 J		0.024 J		0.16 J		ND		**0.2**
Dissolved Inorganic Compounds - mg/L																	
Arsenic, Dissolved	--		--		--		--		ND		--		--		--		**0.025**
Cadmium, Dissolved	--		--		--		--		ND		--		--		--		**0.005**
Chromium, Dissolved	--		--		--		--		ND		--		--		--		**0.05**
Lead, Dissolved	--		--		--		--		ND		--		--		--		**0.025**
Mercury, Dissolved	--		--		--		--		ND		--		--		--		**0.0007**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. MS/MSD collected at monitoring well MW-12A.
3. Blind Duplicate collected at monitoring well MW-14A.
4. Due to turbidity greater than 50 NTU, a filtered sample was submitted for soluble metal analysis at this location.
5. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) as per 6 NYCRR Part 703.
6. Groundwater collected from well MW-12A was analyzed for TCL VOCs plus STARS, all other wells were only analyzed for STARS VOCs.
7. Groundwater collected from well MW-12A was analyzed for TCL SVOCs (BNAs), all other wells were only analyzed for BN SVOCs.
8. Groundwater collected from well MW-12A was analyzed for TAL Metals, all other wells were only analyzed for arsenic, cadmium, chromium, cyanide, lead, and mercury.
9. J = Estimated value; result is less than the sample quantitation limit but greater than zero.
10. ND = parameter not detected above laboratory detection limit.
11. " -- " = not analyzed for this parameter
12. " * " = Groundwater Quality Guidance Value
13. " ** " = field threshold value; when exceeded, field filtered metals sample is collected (i.e., dissolved metals).
14. " RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Scheme:

BOLD = value exceeds individual GWQS/GV concentration

TABLE 3

SUMMARY OF COMPLETED REMEDIAL ACTIONS BY SITE

SITE MANAGEMENT PLAN

Tecumseh Phase I Business Park
Lackawanna, New York

Site No.	BCP Site No.	Acreage	Remedial Work [1,2]	Monitoring Wells	Piezometers	Post-Remedial Groundwater Monitoring Program
I-1	C915197	5.57	No areas of impact identified.	None	None	None
I-2	C915197B	6.23	No areas of impact identified.	MW-13A	P-57S	None
I-3	C915197C	7.63	Excavated approximately 668 cubic yards of petroleum-impacted soil/fill from test pit TP-1-6 for on-site bioremediation. Excavated approximately 300 cubic yards of petroleum-impacted soil/fill from composite test pit grids 7/ 8 for on-site bioremediation.	MW-17A	P-50S	None
I-4	C915197D	10.37	Excavated approximately 100 cubic yards of tar-impacted soil/fill from test pit TP-5-3 for off-site disposal.	None	None	None
I-5	C915197E	10.05	Excavated approximately 251 cubic yards of petroleum-impacted soil/fill from test pit TP-1-13 for on-site bioremediation.	None	P-51S, P-55S	None
I-6	C915197F	10.02	No areas of impact identified.	MW-12A	None	None
I-7	C915197G	10.03	Excavated approximately 251 cubic yards of petroleum-impacted soil/fill from test pit TP-6-7 for on-site bioremediation.	B-2, MW-16A	None	None
I-8	C915197H	10.24	Excavated approximately 1,850 cubic yards of petroleum-impacted soil/fill from test pits TP-9-3 and TP-9-4 for on-site bioremediation.	MW-8A/8B	P-56S	None
I-9	C915197I	10.01	Excavated approximately 202 cubic yards of lead-impacted soil/fill from test pit TP-6-6 for off-site disposal.	None	P-45S, P-52S	None
I-10	C915197J	9.98	Excavated approximately 1,850 cubic yards of petroleum-impacted soil/fill from test pits TP-9-3 and TP-9-4 for on-site bioremediation. Excavated approximately 15 cubic yards of petroleum-impacted soil/fill from test pit TP-1-6 for on-site bioremediation. Excavated approximately 4,500 cubic yards of petroleum-impacted soil/fill from test pit TP-7-2 for on-site bioremediation.	MW-14A	None	None
I-11	C915197K	12.36	Removed two USTs and excavated approximately 2,000 cubic yards of petroleum-impacted soil/fill from test pit TP-10-6 for on-site bioremediation.	MW-15A, MW-18A	P-54S	None
TOTAL ACREAGE =		**102.49**				

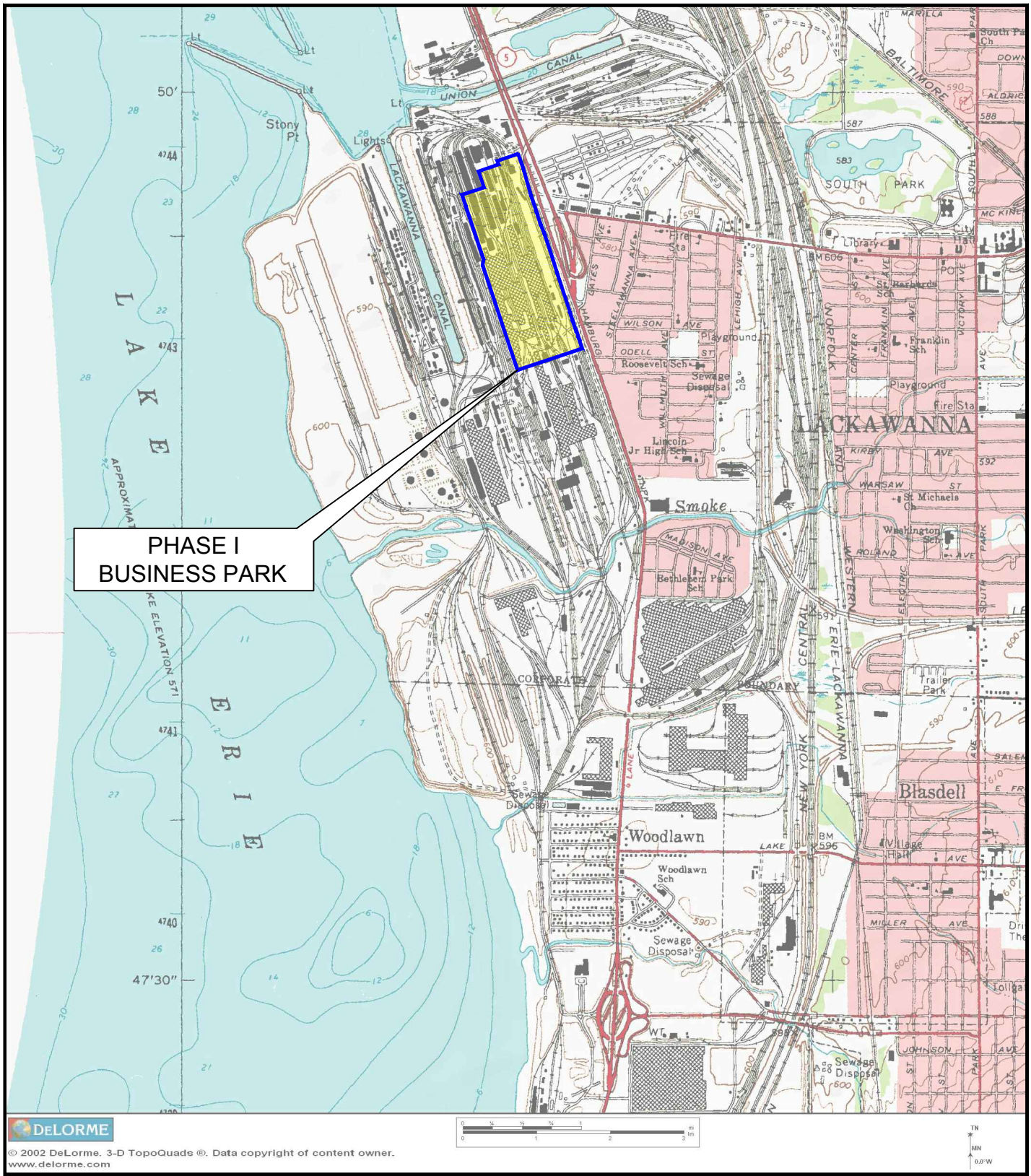
Notes:

1. All Sites to receive a minimum 1 foot of NYSDEC-approved clean cover material or 6 inches structural cover (pavement, building, etc.) in addition to listed remedial work.
2. On-site bioremediation refers to use of the Bioremediation Pads #1-#3 constructed on Sites I-8, I-10, and I-11.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 1; Site Location and Vicinity Map2.dwg

FIGURE 1



TurnKey Environmental Restoration, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

SITE LOCATION & VICINITY MAP

SITE MANAGEMENT PLAN

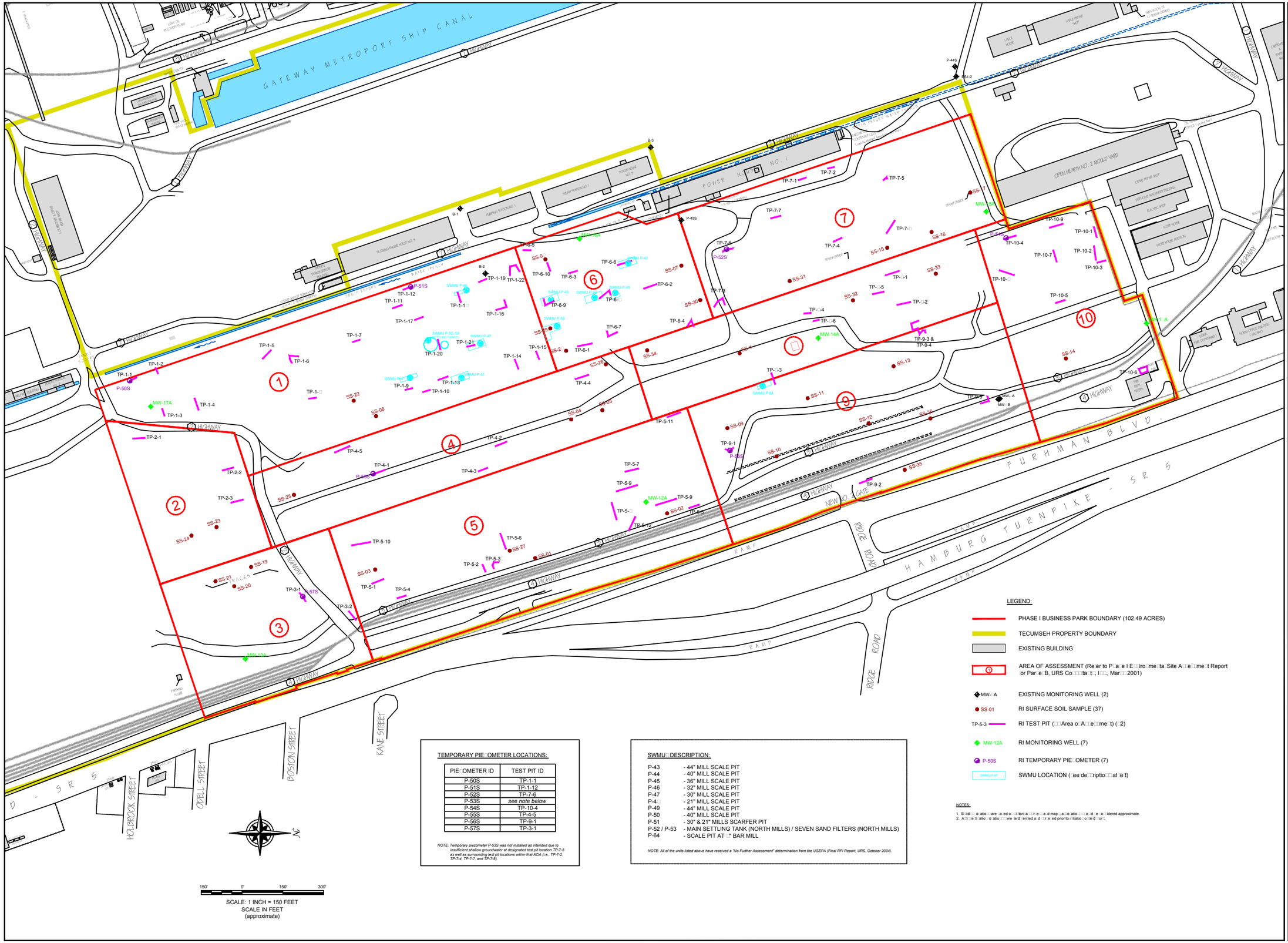
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

PROJECT NO.: 0071-012-322

DATE: DECEMBER 2013

DRAFTED BY: BLR

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 2; Site Plan.dwg



TEMPORARY PIEZOMETER LOCATIONS:

PIEZOMETER ID	TEST PIT ID
P-50S	TP-1-1
P-51S	TP-1-12
P-52S	TP-7-6
P-53S	*see note below*
P-54S	TP-10-4
P-55S	TP-4-5
P-56S	TP-9-1
P-57S	TP-3-1

NOTE: Temporary piezometer P-53S was not installed as intended due to insufficient shallow groundwater at designated test pit location TP-7-5 as well as surrounding test pit locations within that AOA (i.e., TP-7-2, TP-7-4, TP-7-7, and TP-7-8).

SWMU DESCRIPTION:

P-43 - 44" MILL SCALE PIT
P-44 - 40" MILL SCALE PIT
P-45 - 36" MILL SCALE PIT
P-46 - 32" MILL SCALE PIT
P-47 - 30" MILL SCALE PIT
P-48 - 21" MILL SCALE PIT
P-49 - 44" MILL SCALE PIT
P-50 - 40" MILL SCALE PIT
P-51 - 30" & 21" MILLS SCARFER PIT
P-52 / P-53 - MAIN SETTLING TANK (NORTH MILLS) / SEVEN SAND FILTERS (NORTH MILLS)
P-64 - SCALE PIT AT 21" BAR MILL

NOTE: All of the units listed above have received a "No Further Assessment" determination from the USEPA (Final RFI Report, URS, October 2004).

LEGEND:

- PHASE I BUSINESS PARK BOUNDARY (102.49 ACRES)
- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING
- AREA OF ASSESSMENT (Refer to Phase I Environmental Site Assessment Report for Parcel B, URS Corporation, March 2001)
- MW-1A — EXISTING MONITORING WELL (2)
- SS-01 — RI SURFACE SOIL SAMPLE (37)
- TP-5-3 — RI TEST PIT (Area of Attempt) (12)
- MW-12A — RI MONITORING WELL (7)
- P-50S — RI TEMPORARY PIEZOMETER (7)
- SWMU P-47 — SWMU LOCATION (see description at left)

NOTES:

1. Building locations are based on historical aerial map locations and should be considered approximate.
2. Additional test locations were identified and investigated prior to initial collection.

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

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DATE: AUGUST 2009
CHECKED BY: THF
APPROVED BY:

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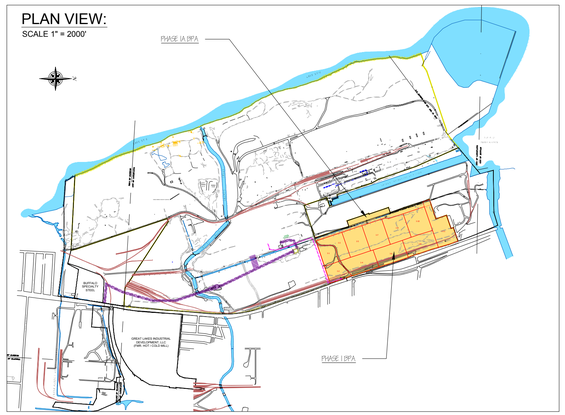
SITE PLAN

SITE MANAGEMENT PLAN
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 2

F:\CAD\Turnkey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Preset\Site Management Plan\Figure 3- Site Delineation Map.dwg

PLAN VIEW:
SCALE 1" = 2000'



PHASE IA BUSINESS PARK
± 12.27 ACRES

PHASE I BUSINESS PARK
± 101.85 ACRES

I-1
I-2
I-3
I-4
I-5
I-6
I-7
I-8
I-9
I-10
I-11

Parcel Identification	Total Acreage	Encumbered Acreage	Developable Acreage	Percent Developable
I-1	5.57	1.27	4.30	77.14%
I-2	6.23	1.04	5.19	83.25%
I-3	7.63	1.42	6.21	81.39%
I-4	10.37	2.60	7.77	74.92%
I-5	10.05	0.74	9.31	92.67%
I-6	10.01	2.37	7.64	76.33%
I-7	10.04	0.76	9.28	92.42%
I-8	10.22	2.02	8.20	80.20%
I-9	10.03	0.88	9.15	91.21%
I-10	9.98	0.87	9.11	91.24%
I-11	12.37	1.26	11.11	89.78%
BP-I Totals	**102.50**	**15.25**	**87.25**	**85.12%**

150' 0' 150' 300'
SCALE: 1 INCH = 150 FEET
SCALE IN FEET
(approximate)

LEGEND:
- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- PHASE I BUSINESS PARK BOUNDARY (± 101.85 ACRES)
- RAILROAD TRACK
- SOUTH BUFFALO RAILROAD EASEMENT
- PUBLIC UTILITY EASEMENT
- STEEL WINDS I FACILITY ABOVE-GROUND ELECTRIC UTILITY
- STEEL WINDS I FACILITY BURIED ELECTRIC UTILITY
- PLANNED STEEL WINDS II ABOVE GROUND ELECTRICAL EASEMENT
- PLANNED STEEL WINDS II BURIED ELECTRICAL EASEMENT
- INDUSTRIAL WATER SYSTEM EASEMENT
- SANITARY SEWER EASEMENT
- APPROXIMATE LOCATION OF OVERHEAD HIGH-TENSION ELECTRIC TRANSMISSION LINES WITH TOWERS & 60' EASEMENT(APPROX.)
- ROADWAY ENCUMBRANCES

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

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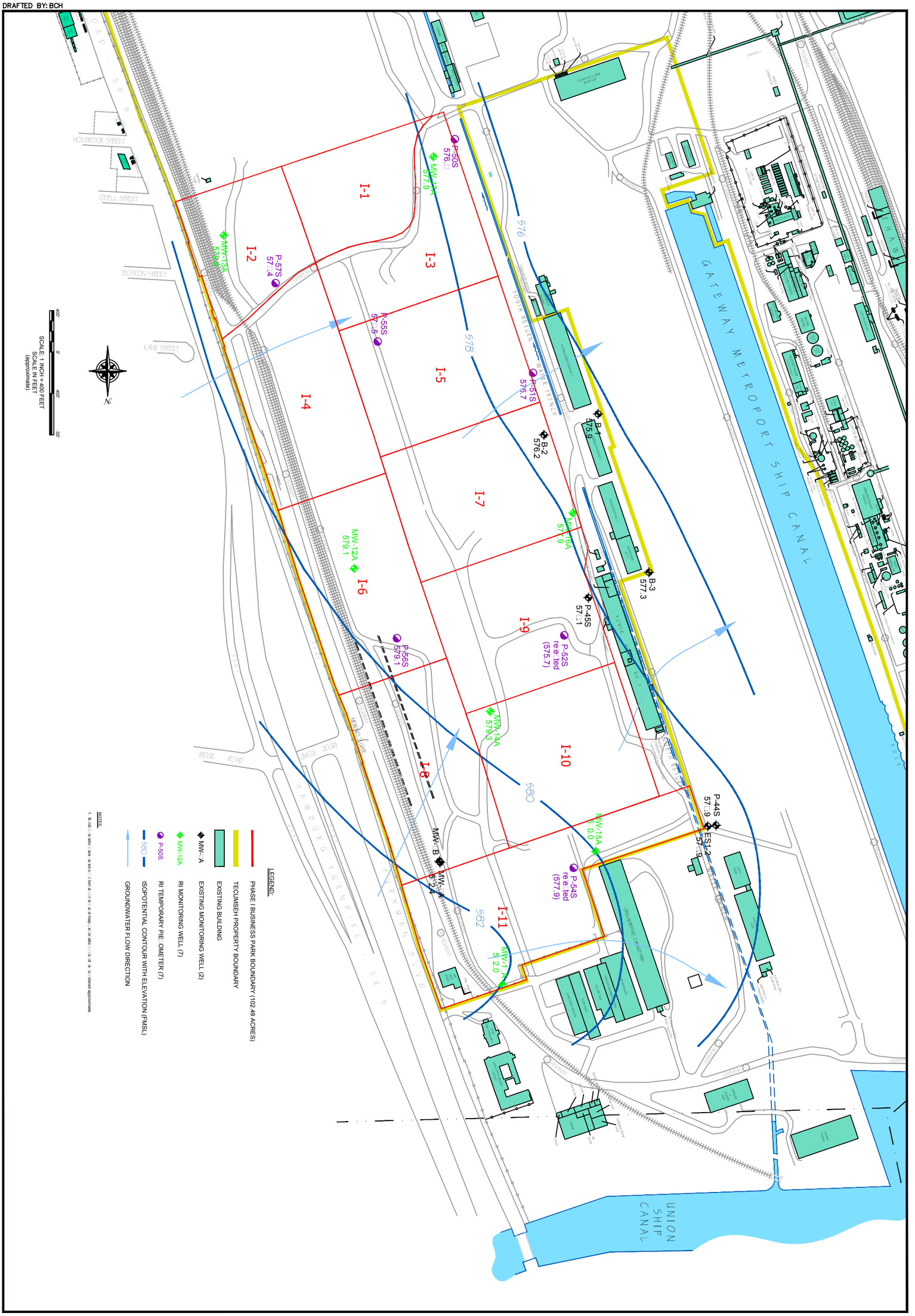
SITE DELINEATION MAP

SITE MANAGEMENT PLAN
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 3

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 4; Shallow Groundwater Isopotential Map - June 1, 2006.dwg

DATE: AUGUST 2009
DRAFTED BY: BCH



SHALLOW GROUNDWATER ISOPOTENTIAL MAP (JUNE 1, 2006)

SITE MANAGEMENT PLAN

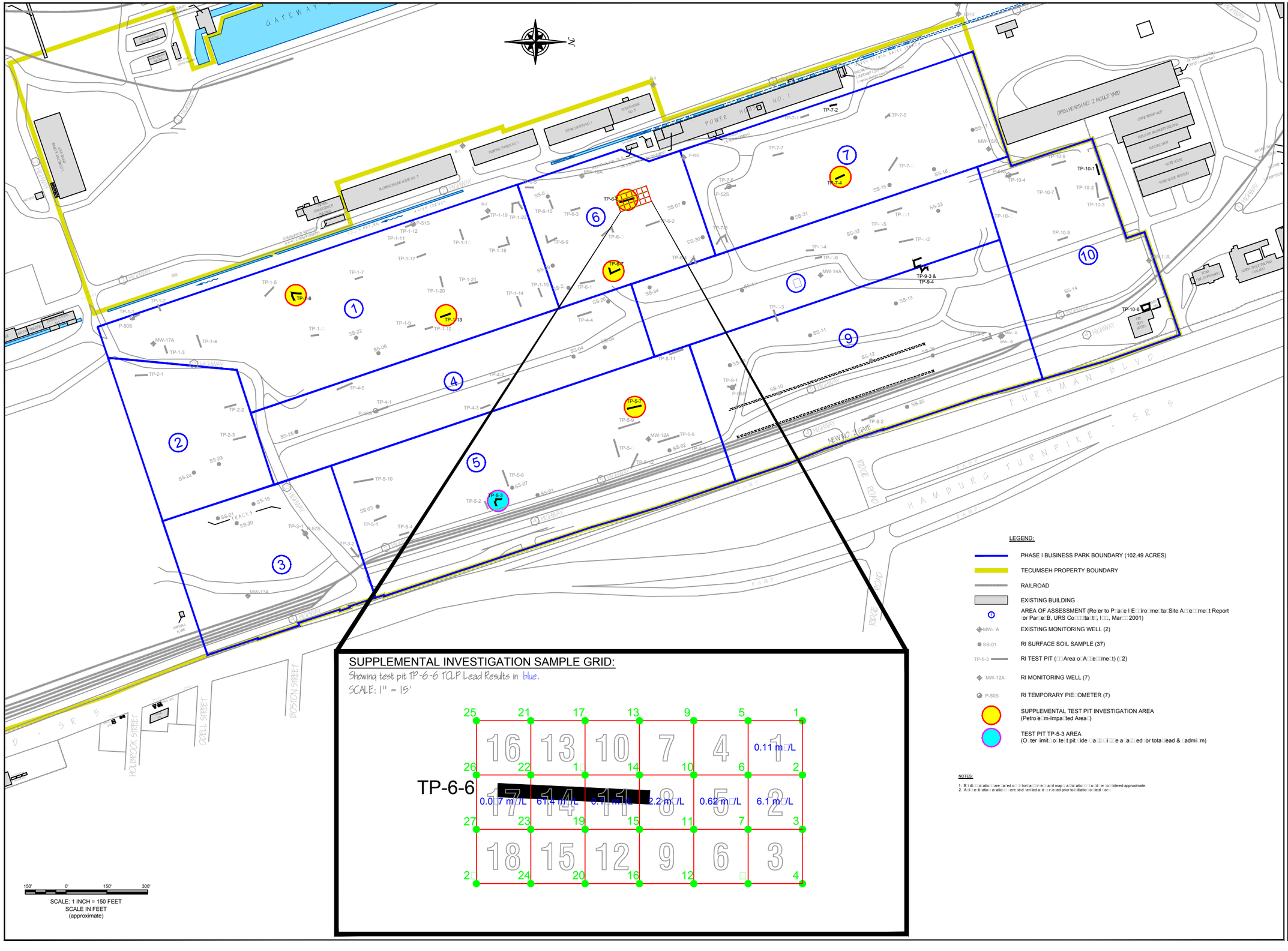
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 4

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

JOB NO.: 0071-012-322

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 5; Supplemental TCLP Lead Analytical Data Summary.dwg



LEGEND:

- PHASE I BUSINESS PARK BOUNDARY (102.49 ACRES)
- TECUMSEH PROPERTY BOUNDARY
- RAILROAD
- EXISTING BUILDING
- AREA OF ASSESSMENT (Refer to Phase I Environmental Site Assessment Report for Parcel B, URS Corporation, 2001)
- MW-A EXISTING MONITORING WELL (2)
- SS-01 RI SURFACE SOIL SAMPLE (37)
- TP-5-3 RI TEST PIT (Area of Assessment) (2)
- MW-12A RI MONITORING WELL (7)
- P-50S RI TEMPORARY PIEZOMETER (7)
- SUPPLEMENTAL TEST PIT INVESTIGATION AREA (Petroleum-Impacted Area)
- TEST PIT TP-5-3 AREA (Overlimit soil test pit include all excavated for total lead & administrative)

NOTES:

1. Building locations are based on digital mapping data and are considered approximate.
2. All test pit locations were verified and marked prior to illustration and are considered approximate.

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

JOB NO.: 0071-012-322

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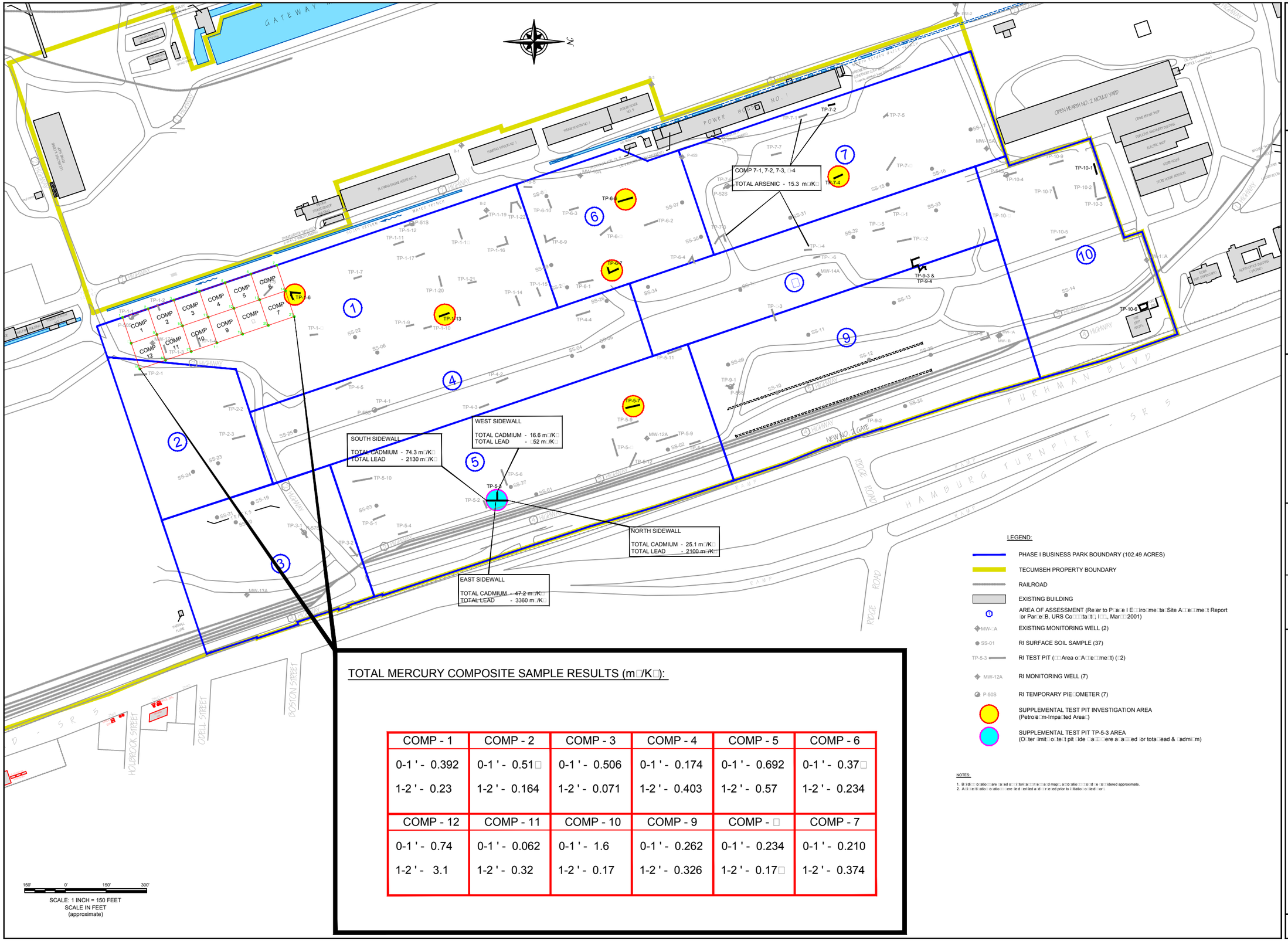
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SUPPLEMENTAL TCLP LEAD ANALYTICAL DATA SUMMARY

PHASE I BUSINESS PARK
LACKAWANA, NEW YORK

FIGURE 5

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 6; Supplemental Metals Investigation Analytical Data Summary.dwg



TOTAL MERCURY COMPOSITE SAMPLE RESULTS (mg/Kg):

COMP - 1	COMP - 2	COMP - 3	COMP - 4	COMP - 5	COMP - 6
0-1 ' - 0.392	0-1 ' - 0.51	0-1 ' - 0.506	0-1 ' - 0.174	0-1 ' - 0.692	0-1 ' - 0.37
1-2 ' - 0.23	1-2 ' - 0.164	1-2 ' - 0.071	1-2 ' - 0.403	1-2 ' - 0.57	1-2 ' - 0.234
COMP - 12	**COMP - 11**	**COMP - 10**	**COMP - 9**	**COMP - 8**	**COMP - 7**
0-1 ' - 0.74	0-1 ' - 0.062	0-1 ' - 1.6	0-1 ' - 0.262	0-1 ' - 0.234	0-1 ' - 0.210
1-2 ' - 3.1	1-2 ' - 0.32	1-2 ' - 0.17	1-2 ' - 0.326	1-2 ' - 0.17	1-2 ' - 0.374

LEGEND:

- PHASE I BUSINESS PARK BOUNDARY (102.49 ACRES)
- TECUMSEH PROPERTY BOUNDARY
- RAILROAD
- EXISTING BUILDING
- AREA OF ASSESSMENT (Refer to Phase I ESA Environmental Site Assessment Report for Parcel B, URS Corporation, Inc., Mar 2001)
- MW-A EXISTING MONITORING WELL (2)
- SS-01 RI SURFACE SOIL SAMPLE (37)
- TP-5-3 RI TEST PIT (Area of Assessment) (12)
- MW-12A RI MONITORING WELL (7)
- P-50S RI TEMPORARY PIEZOMETER (7)
- SUPPLEMENTAL TEST PIT INVESTIGATION AREA (Petroleum-Impacted Area)
- SUPPLEMENTAL TEST PIT TP-5-3 AREA (Outer limits of test pit slide area were analyzed for total lead & cadmium)

NOTES:

1. Building locations are based on historical aerial maps; all locations should be considered approximate.
2. All excavation locations were backfilled and covered prior to installation of soil cover.

150' 0' 150' 300'

SCALE: 1 INCH = 150 FEET
SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
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SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

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SUPPLEMENTAL METALS INVESTIGATION ANALYTICAL DATA SUMMARY

SITE MANAGEMENT PLAN
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 6

F:\GAT\Turnkey\Tecumseh Redevelopment\Remedial Closeout Program (RCP)\Phase I Parcel\Site Management Plan\Figure 7 - Completed Remedial Measures.dwg

GATEWAY METROPORT SHIP CANAL

GATEWAY TRADE CENTER PROPERTY

FURHMAN BLVD.

HAMBURG TURNPIKE - SR 5

RIDGE ROAD

KANE STREET

BOSTON STREET

ODELL STREET

HOLBROOK STREET

I-1

I-2

I-3

I-4

I-5

I-6

I-7

I-8

I-9

I-10

I-11

TP-7-2 APPROX. 15 CY EXCAVATED

TP-7-4 APPROX. 4,500 CY EXCAVATED

TP-6-6 APPROX. 202 CY EXCAVATED

TP-6-7 APPROX. 251 CY EXCAVATED

TP-1-6 APPROX. 66□ CY EXCAVATED

TP-1-13 APPROX. 251 CY EXCAVATED

TP GRID COMP 8 APPROX. 300 CY EXCAVATED

TP-9-3 & TP-9-4 APPROX. 3,700 CY EXCAVATED

APPROX. 2,000 CY EXCAVATED

TP-10-1 NO IMPACTS ENCOUNTERED DURING IRM EXCAVATION WORK

APPROX. 100 CY EXCAVATED

TP-5-7

TEMPORARY PIE□OMETER LOCATIONS:

PIE□OMETER ID	TEST PIT ID
P-50S	TP-1-1
P-51S	TP-1-12
P-52S	TP-7-6
P-53S	*see note below*
P-54S	TP-10-4
P-55S	TP-4-5
P-56S	TP-9-1
P-57S	TP-3-1

NOTE: Temporary piezometer P-53S was not installed as intended due to insufficient shallow groundwater at designated test pit location TP-7-5 as well as surrounding test pit locations within that AOA (i.e., TP-7-2, TP-7-4, TP-7-7, and TP-7-8).

LEGEND:

- PHASE I BUSINESS PARK BOUNDARY (102.49 ACRES)
- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING
- MW-□A — EXISTING MONITORING WELL (2)
- SS-01 — RI SURFACE SOIL SAMPLE (37)
- TP-5-3 — RI TEST PIT (□□ Area o□A□□e□□me□t) (□2)
- MW-12A — RI MONITORING WELL (7)
- P-50S — RI TEMPORARY PIE□OMETER (7)
- IMPACTED SOIL/FILL EXCAVATED (i□□□de□□□a□tit□i□ □□□i□□ard□, CY)

NOTES:

1. B□ id□□ o□atio□□are□a□ed o□□□l□tion□a□□r□e□□a□d map□,a□□o□atio□□□□o□id□e□o□□dered approximate.
2. A□□a□e□tiatio□ o□atio□□□ere□e□d□er□ed□a□d□□r□e□ed prior to i□□tiatio□o□□a□d□or□.
3. TBD = □□a□tit□to□e determi□ed□o□er□ati□e e□timate o□500 CY□a□□□ed. Additio□a□i□□e□tiatio□i□re□□ired to determi□e t□e exte□t o□impa□t.

SCALE: 1 INCH = 150 FEET
SCALE IN FEET
(approximate)

150' 0' 150' 300'

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

JOB NO.: 0071-012-322

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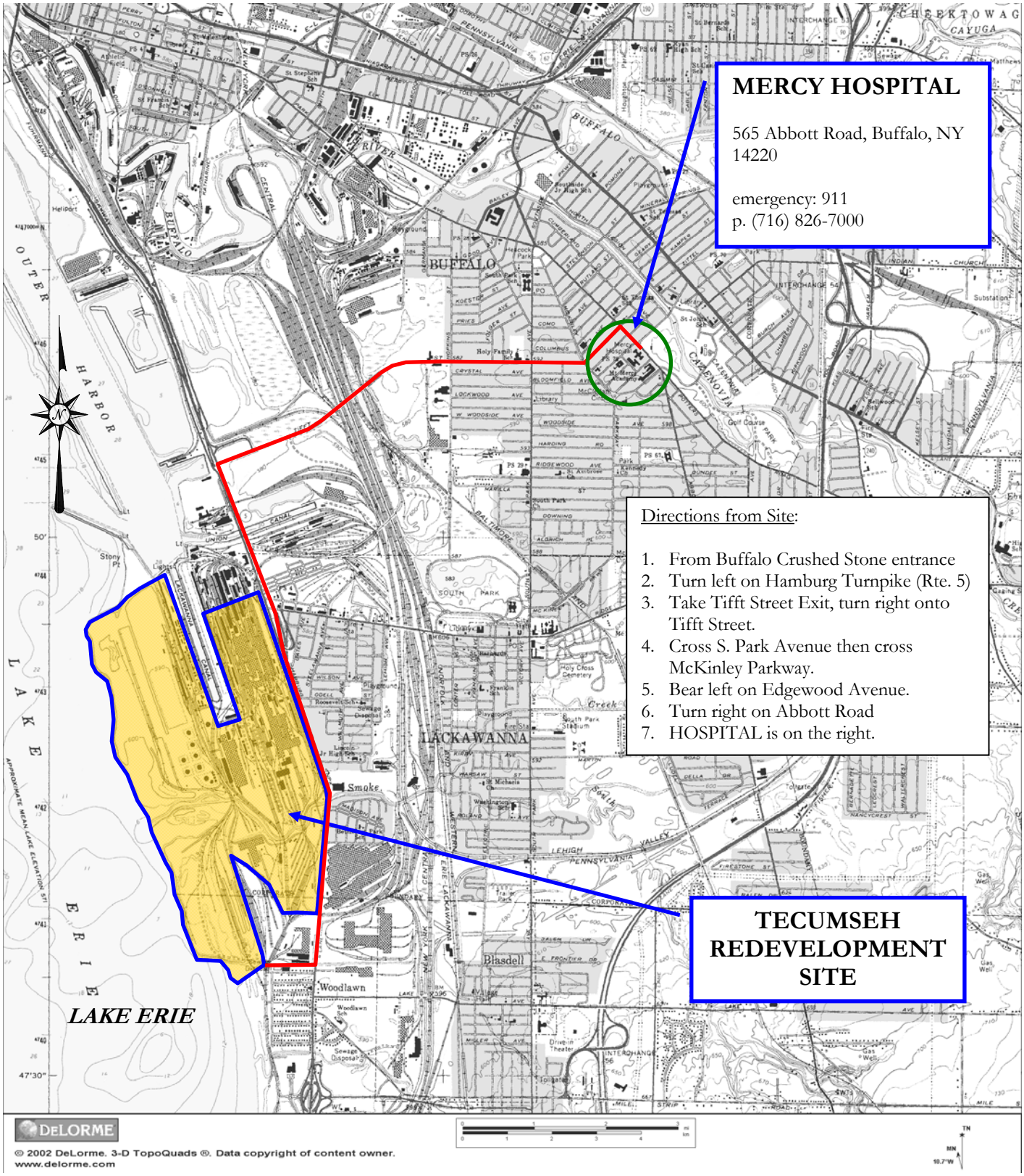
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COMPLETED REMEDIAL MEASURES

SITE MANAGEMENT PLAN
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 7

FIGURE 8



TurnKey Environmental Restoration, LLC
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SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

PROJECT NO.: 0071-012-322

DATE: AUGUST 2009

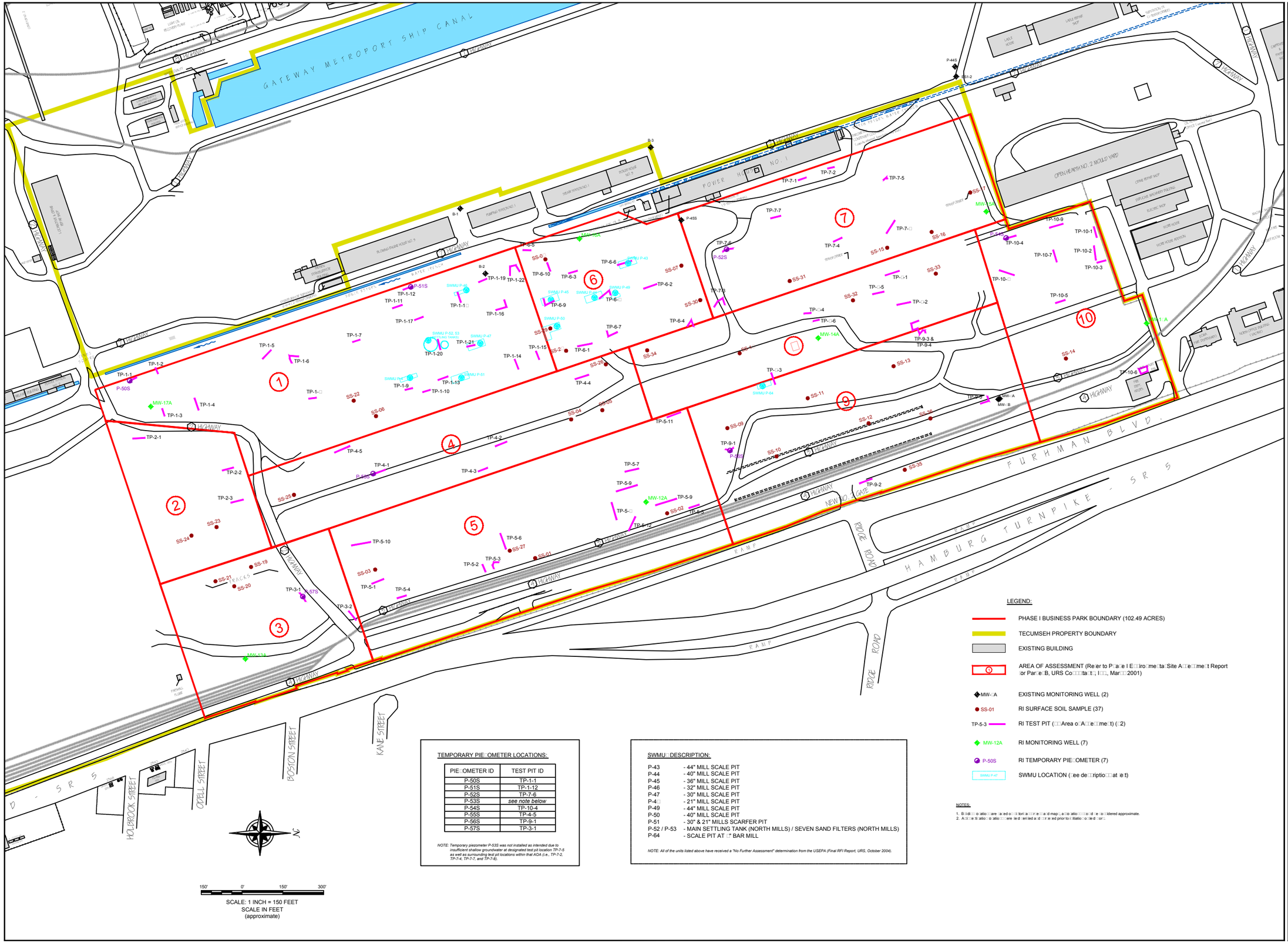
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HOSPITAL ROUTE MAP

SITE MANAGEMENT PLAN

PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 2; Site Plan.dwg



TEMPORARY PIE□OMETER LOCATIONS:

PIE□OMETER ID	TEST PIT ID
P-50S	TP-1-1
P-51S	TP-1-12
P-52S	TP-7-6
P-53S	*see note below*
P-54S	TP-10-4
P-55S	TP-4-5
P-56S	TP-9-1
P-57S	TP-3-1

NOTE: Temporary piezometer P-53S was not installed as intended due to insufficient shallow groundwater at designated test pit location TP-7-5 as well as surrounding test pit locations within that AOA (i.e., TP-7-2, TP-7-4, TP-7-7, and TP-7-8).

SWMU □ DESCRIPTION:

P-43 - 44" MILL SCALE PIT
P-44 - 40" MILL SCALE PIT
P-45 - 36" MILL SCALE PIT
P-46 - 32" MILL SCALE PIT
P-47 - 30" MILL SCALE PIT
P-4□ - 21" MILL SCALE PIT
P-49 - 44" MILL SCALE PIT
P-50 - 40" MILL SCALE PIT
P-51 - 30" & 21" MILLS SCARFER PIT
P-52 / P-53 - MAIN SETTLING TANK (NORTH MILLS) / SEVEN SAND FILTERS (NORTH MILLS)
P-64 - SCALE PIT AT □" BAR MILL

NOTE: All of the units listed above have received a "No Further Assessment" determination from the USEPA (Final RFI Report, URS, October 2004).

LEGEND:

- PHASE I BUSINESS PARK BOUNDARY (102.49 ACRES)
- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING
- AREA OF ASSESSMENT (Re□er to P□a□e I E□□iro□me□ta□ Site A□□e□me□t Report □or Par□e□B, URS Co□□□ta□t□, I□□, Mar□□ 2001)
- MW-□A — EXISTING MONITORING WELL (2)
- SS-01 — RI SURFACE SOIL SAMPLE (37)
- TP-5-3 — RI TEST PIT (□□Area o□ A□□e□me□t) (□2)
- MW-12A — RI MONITORING WELL (7)
- P-50S — RI TEMPORARY PIE□OMETER (7)
- SWMU P-47 — SWMU LOCATION (□ee de□□riptio□□at □e□t)

NOTES:

1. Bi□di□□ o□atio□□ are □a□ed o□ □□tori□a□ □r□e□□□a□d map□,□o□atio□□□□ o□ d□□e□ o□□idered approximate.
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SITE PLAN

SITE MANAGEMENT PLAN
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 2

APPENDIX A

METES AND BOUNDS / ENVIRONMENTAL EASEMENT

ENVIRONMENTAL EASEMENT DESCRIPTION FOR BUSINESS PARK PHASE I
TITLE No. 1313-25072 (AMENDED)
FOR BCP SITES C915197, C915197B, C915197C, C915197D, C915197E C915197F, C915197G, C915197H, C915197I, C915197J, & C915197K

ALL THAT TRACT OF PARCEL OF LAND, SITUATE IN THE CITY OF LACKAWANNA, COUNTY OF ERIE, STATE OF NEW YORK, BEING PART OF LOTS 20, 21, 22, 23, 24, & 25 OF THE OGDEN GORE TRACT AND PART OF LOT 36, TOWNSHIP 10, RANGE 8 OF THE BUFFALO CREEK RESERVATION, AND MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE WESTERLY HIGHWAY BOUNDARY OF HAMBURG TURNPIKE, (ALSO KNOWN AS STATE ROUTE NO. 5) AND THE SOUTHERLY LINE OF LANDS CONVEYED TO GATEWAY TRADE CENTER, INC. BY DEED RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 10886 OF DEEDS AT PAGE 1115, SAID POINT BEING 547.89 FEET FROM THE INTERSECTION OF THE WESTERLY HIGHWAY BOUNDARY OF HAMBURG TURNPIKE AND THE NORTHERLY LINE OF THE CITY OF LACKAWANNA (ALSO BEING THE SOUTHERLY LINE OF THE CITY OF BUFFALO);

THENCE S 19°-33'-00"E ALONG THE WESTERLY HIGHWAY BOUNDARY OF HAMBURG TURNPIKE A DISTANCE OF 279.01 FEET;

THENCE S 16°-04'-57"E ALONG THE WESTERLY HIGHWAY BOUNDARY OF THE HAMBURG TURNPIKE ARTERIAL HIGHWAY (MAP NUMBER 303, PARCEL 303), A DISTANCE 482.30 FEET TO AN ANGLE POINT THEREIN;

THENCE S 18°-29'-00" E AND CONTINUING ALONG THE SAID WESTERLY HIGHWAY BOUNDARY (MAP NUMBER 303, PARCEL 303), A DISTANCE OF 30.00 FEET TO A POINT;

THENCE CONTINUING ALONG THE WESTERLY HIGHWAY BOUNDARY OF HAMBURG TURNPIKE AS APPROPRIATED BY THE NEW YORK STATE DEPARTMENT OF PUBLIC WORKS AS SHOWN ON MAP NO. 40-R2, PARCEL NO. 44 RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 5650 OF DEEDS AT PAGE 388, THE FOLLOWING 18 COURSES AND DISTANCES:

1. S 18°-28'-38" E, A DISTANCE OF 355.00 FEET;
2. S 71°-39'-20" W, A DISTANCE OF 2.00 FEET;
3. S 18°-28'-44" E, A DISTANCE OF 223.00 FEET;
4. S 22°-17'-43" E, A DISTANCE OF 150.35 FEET;
5. S 18°-28'-39" E, A DISTANCE OF 512.00 FEET;
6. S 16°-37'-53" E, A DISTANCE OF 260.12 FEET;
7. S 18°-22'-18" E, A DISTANCE OF 793.00 FEET;
8. S 71°-35'-29" W, A DISTANCE OF 4.00 FEET;
9. S 18°-01'-20" E, A DISTANCE OF 132.00 FEET;
10. N 71°-35'-29" E, A DISTANCE OF 4.67 FEET;
11. S 18°-17'-48" E, A DISTANCE OF 38.00 FEET;
12. S 71°-35'-29" W, A DISTANCE OF 4.86 FEET;
13. S 18°-01'-20" E, A DISTANCE OF 160.00 FEET;
14. N 71°-35'-29" E, A DISTANCE OF 9.80 FEET;
15. S 18°-24'-31" E, A DISTANCE OF 159.00 FEET;
16. S 71°-35'-29" W, A DISTANCE OF 3.89 FEET;
17. S 18°-22'-14" E, A DISTANCE OF 180.00 FEET;
18. S 20°-44'-09" E, A DISTANCE OF 8.40 FEET TO A POINT;

THENCE S 71°-31'-33" W, A DISTANCE OF 1251.00 FEET TO THE OUTLINE BCP SITE NUMBER C915218;

THENCE N 18°-22'-06" W ALONG SAID EAST LINE, A DISTANCE OF 2030.00 FEET TO AN ANGLE POINT THEREIN;

THENCE N 09°-40'-30" E AND CONTINUING ALONG SAID EAST LINE, A DISTANCE OF 106.50 FEET TO AN ANGLE POINT THEREIN;

THENCE N 18°-23'-42" W AND CONTINUING ALONG SAID LINE, A DISTANCE OF 1051.55 FEET TO NORTHEAST CORNER OF SAID BCP SITE NUMBER C915218;

THENCE S 71°-00'-00" W AND ALONG THE SAID NORTH LINE OF BCP SITE NUMBER C915218, A DISTANCE OF 143.38 FEET TO A POINT IN THE EAST LINE OF SAID LANDS CONVEYED TO GATEWAY TRADE CENTER, INC. BY DEED RECORDED IN LIBER 10886 OF DEEDS AT PAGE 1064;

THENCE NORTHERLY AND EASTERLY ALONG SAID LANDS CONVEYED TO GATEWAY TRADE CENTER, INC. AFORESAID THE FOLLOWING 2 COURSES AND DISTANCES:

1. N 18°-42'-30" W, A DISTANCE OF 199.75 FEET TO AN ANGLE POINT THEREIN;
2. N 71°-29'-21" E, A DISTANCE OF 519.24 FEET TO THE SOUTHWEST CORNER OF LANDS CONVEYED TO GATEWAY TRADE CENTER, INC. BY DEED RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 10886 OF DEEDS AT PAGE 1115;

THENCE EASTERLY AND NORTHERLY ALONG SAID LANDS CONVEYED TO GATEWAY TRADE CENTER, INC. BY LAST DEED AFORESAID, THE FOLLOWING 5 COURSES AND DISTANCES:

1. N 71°-29'-21" E, A DISTANCE OF 50.00 FEET TO A POINT TO AN ANGLE POINT THEREIN;
2. N 18°-30'-39" W, A DISTANCE OF 314.71 FEET TO A POINT TO AN ANGLE POINT THEREIN;
3. N 70°-59'-36" E, A DISTANCE OF 386.47 FEET TO A POINT TO AN ANGLE POINT THEREIN;
4. N 18°-30'-39" W, A DISTANCE OF 70.00 FEET TO A POINT TO AN ANGLE POINT THEREIN;
5. N 70°-59'-36" E, A DISTANCE OF 400.00 FEET TO THE POINT OF BEGINNING; CONTAINING 102.49 ACRES OF LAND, MORE OR LESS.

BEING PART OF THE PIECE OR PARCEL OF LAND IN A BARGAIN AND SALE DEED DATED 5/06/2003 AND RECORDED 5/22/2003 IN LIBER 11040 OF DEEDS AT PAGE 8953 IN THE ERIE COUNTY CLERK'S OFFICE. THIS PARCEL OF LAND IS PART OF THE OVERALL DEED.

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW.

THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM THE NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@GW.DEC.STATE.NY.US.

ENVIRONMENTAL EASEMENT AREA ACCESS

THE DEC OR THEIR AGENT MAY ACCESS THE ENVIRONMENTAL EASEMENT AREA AS SHOWN HEREON THROUGH ANY EXISTING STREET ACCESS OR BUILDING INGRESS/EGRESS ACCESS POINT

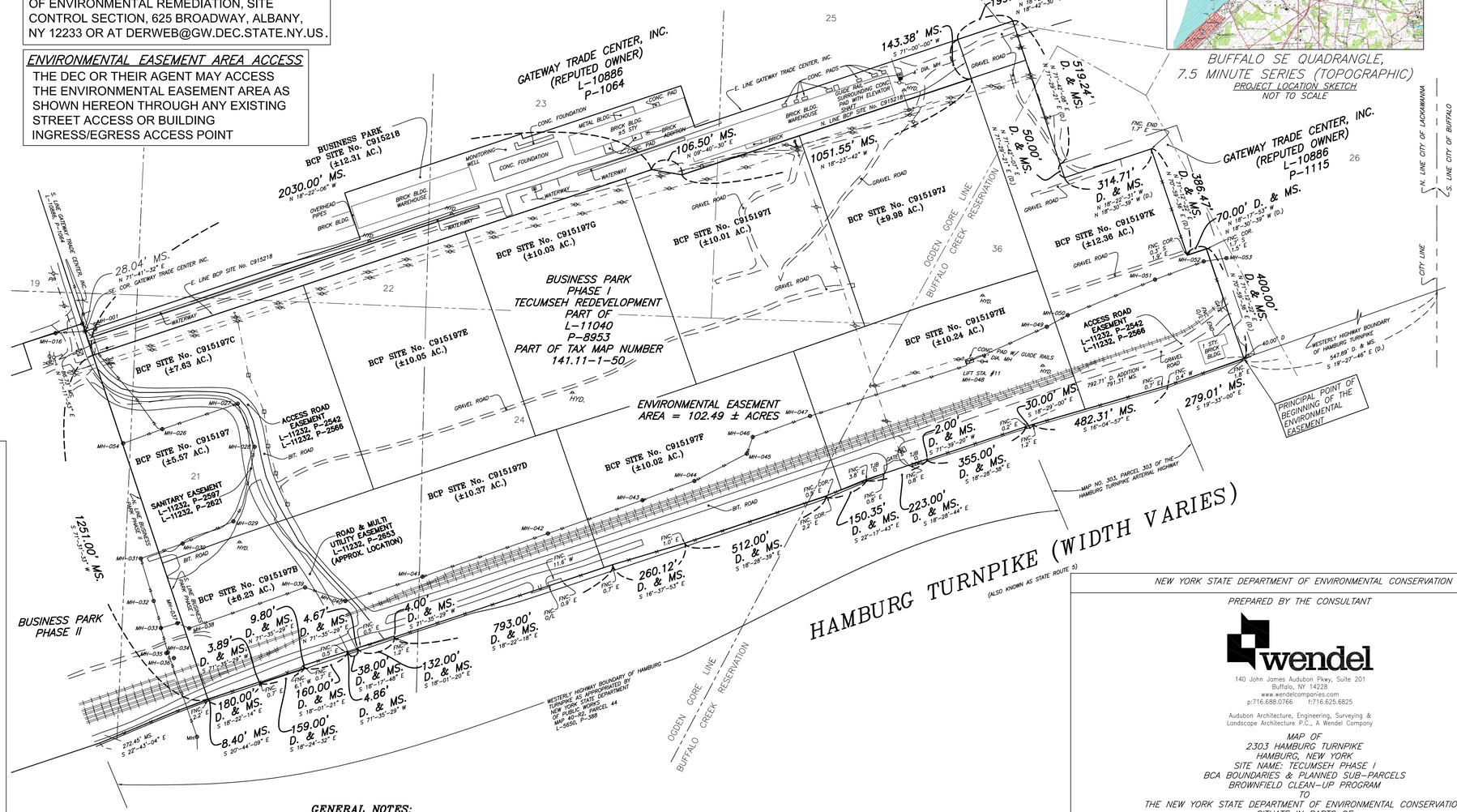
ENGINEERING / INSTITUTIONAL CONTROLS

- COVER SYSTEM THE COVER SYSTEM IS A PERMANENT CONTROL. PROCEDURES FOR THE INSPECTION AND MAINTENANCE OF THIS COVER ARE PROVIDED IN THE MONITORING PLAN IN SECTION 4 OF THE SITE MANAGEMENT PLAN (SMP).
- COMPLIANCE WITH THE ENVIRONMENTAL EASEMENT AND THE SMP BY THE GRANTOR AND THE GRANTOR'S SUCCESSORS AND ASSIGNS;
- ALL ENGINEERING CONTROLS MUST BE OPERATED AND MAINTAINED AS SPECIFIED IN THE SMP;
- ALL ENGINEERING CONTROLS ON THE CONTROLLED PROPERTY MUST BE INSPECTED AT A FREQUENCY AND IN A MANNER DEFINED IN THE SMP;
- GROUNDWATER, SOIL VAPOR AND OTHER ENVIRONMENTAL OR PUBLIC HEALTH MONITORING MUST BE PERFORMED AS DEFINED IN THE SMP;
- DATA AND INFORMATION PERTINENT TO SITE MANAGEMENT OF THE CONTROLLED PROPERTY MUST BE REPORTED AT THE FREQUENCY AND IN A MANNER DEFINED IN THE SMP;
- THE USE AND DEVELOPMENT OF THE SITE IS LIMITED TO COMMERCIAL AND INDUSTRIAL USES ONLY AS DESCRIBED IN 6NYCRR PART 375-1.8(G)(2) (III) & (IV).
- THE PROPERTY MAY NOT BE USED FOR A HIGHER LEVEL OF USE, SUCH AS RESTRICTED RESIDENTIAL USE WITHOUT ADDITIONAL REMEDIATION AND AMENDMENT OF THE ENVIRONMENTAL EASEMENT AS APPROVED BY THE NYSDEC;
- ALL FUTURE ACTIVITIES ON THE PROPERTY THAT WILL DISTURB REMAINING CONTAMINATED MATERIAL MUST BE CONDUCTED IN ACCORDANCE WITH THE SMP;
- THE USE OF THE GROUNDWATER UNDERLYING THE PROPERTY IS PROHIBITED WITHOUT TREATMENT RENDERING IT SAFE FOR INTENDED USE;
- THE SITE OWNER OR REMEDIAL PARTY WILL SUBMIT TO NYSDEC A WRITTEN STATEMENT THAT CERTIFIES, UNDER PENALTY OF PERJURY, THAT: (1) CONTROLS EMPLOYED AT THE CONTROLLED PROPERTY ARE UNCHANGED FROM THE PREVIOUS CERTIFICATION OR THAT ANY CHANGES TO THE CONTROLS WERE APPROVED BY THE NYSDEC; AND, (2) NOTHING HAS OCCURRED THAT IMPAIRS THE ABILITY OF THE CONTROLS TO PROTECT PUBLIC HEALTH AND ENVIRONMENT OR THAT CONSTITUTE A VIOLATION OR FAILURE TO COMPLY WITH THE SMP.

SCHEDULE B, SECTION 2:
CHICAGO TITLE INSURANCE COMPANY
COMMITMENT FOR TITLE INSURANCE #1313-25072 (AMENDED):

EXCEPTION NUMBER:

2. EASEMENT GRANTED TO NATIONAL FUEL GAS DISTRIBUTION CORPORATION RECORDED IN LIBER 11220 OF DEEDS AT PAGE 2359 ON MARCH 28, 2012. (DOES NOT AFFECT PREMISES)
3. EASEMENT GRANTED TO NIAGARA MOHAWK POWER CORPORATION AND VERIZON NEW YORK, LLC. RECORDED IN LIBER 11228 OF DEEDS AT PAGE 3555 ON AUGUST 21, 2012. (DOES NOT AFFECT PREMISES)
4. EASEMENT GRANTED TO KB BUSINESS PARK REDEVELOPMENT, LLC. RECORDED IN LIBER 11232 OF DEEDS AT PAGE 2542 ON OCTOBER 29, 2012. (PLOTTED HEREON)
5. EASEMENT GRANTED TO KB BUSINESS PARK REDEVELOPMENT, LLC. RECORDED IN LIBER 11232 OF DEEDS AT PAGE 2597 ON OCTOBER 29, 2012. (PLOTTED HEREON)
6. EASEMENT GRANTED TO KB BUSINESS PARK REDEVELOPMENT, LLC. RECORDED IN LIBER 11232 OF DEEDS, AT PAGE 2653 ON OCTOBER 29, 2012. (PLOTTED HEREON)
7. AGREEMENT FOR MAINTENANCE OF ROAD BETWEEN TECUMSEH REDEVELOPMENT INC. AND KB BUSINESS PARK REDEVELOPMENT, LLC. RECORDED IN LIBER 11232 OF DEEDS AT PAGE 2566 ON OCTOBER 29, 2012. (PLOTTED HEREON)
8. AGREEMENT FOR SANITARY SEWER LINE BETWEEN TECUMSEH REDEVELOPMENT, INC. AND KB BUSINESS PARK REDEVELOPMENT, LLC. RECORDED IN LIBER 11232 OF DEEDS AT PAGE 2621 ON OCTOBER 29, 2012. (PLOTTED HEREON)
9. EASEMENT FROM BETHLEHEM STEEL CORPORATION TO NIAGARA MOHAWK CORPORATION RECORDED IN LIBER 10500 OF DEEDS AT PAGE 613 ON AUGUST 28, 1992. (DOES NOT AFFECT PREMISES)
10. EASEMENT GRANTED TO NIAGARA MOHAWK POWER CORPORATION RECORDED IN LIBER 11242 OF DEEDS AT PAGE 6455 ON MARCH 20, 2013. (DOES NOT AFFECT PREMISES)
11. RIGHT OF WAY GRANTED TO NATIONAL FUEL GAS DISTRIBUTION CORPORATION RECORDED IN LIBER 11242 OF DEEDS AT PAGE 7560 ON MARCH 28, 2013. (UNABLE TO PLOT)
12. WATER LINE AND EASEMENT AGREEMENT BETWEEN TECUMSEH REDEVELOPMENT INC. AND WELDED TUBE USA REALTY LLC. RECORDED IN LIBER 11244 OF DEEDS AT PAGE 7853 ON APRIL 26, 2013. (DOES NOT AFFECT PREMISES)



BUFFALO SE QUADRANGLE, 7.5 MINUTE SERIES (TOPOGRAPHIC)
PROJECT LOCATION SKETCH
NOT TO SCALE

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83), WESTERN ZONE, US SURVEY FEET.
2. MONUMENTS ACQUIRED:
   NGS MONUMENT "LEHR" PID: AE2177
   NORTHING: 1030094.885
   EASTING: 1076447.880
   SITE CONTROL MONUMENT PIN WITH ALUMINUM CAP "BSP2"
   NORTHING: 1024721.330
   EASTING: 1076610.356
3. BUFFALO CREEK RESERVATION & OGDEN GORE TRACT INFORMATION IS SHOWN IN ITS APPROXIMATE LOCATION FROM MAPS FILED IN THE ERIE COUNTY CLERKS OFFICE.
4. REFER TO NEW YORK STATE DEPARTMENT OF TRANSPORTATION APPROPRIATION MAPS FOR MAP DISTANCES & BEARINGS.
5. THIS PROPERTY IS LOCATED WITHIN THE AREA HAVING A ZONE DESIGNATION "C" BY FEDERAL EMERGENCY AGENCY (FEMA) OF FLOOD INSURANCE RATE MAP NO. 36029700018, WITH AN EFFECTIVE DATE JULY 2, 1980 FOR COMMUNITY NO. 360247, IN THE CITY OF LACKAWANNA, ERIE COUNTY AND THE STATE OF NEW YORK.
6. PROPERTY CORNERS TO BE STAKED AT A LATER DATE.
7. BCP SITE NO. ##### = PARCEL DESIGNATION
8. REFERENCE MAPS: MAP PREPARED BY BERGMANN ASSOCIATES 10/16/00, MAP NO. 303, PARCEL 303 OF THE HAMBURG TURNPIKE ARTERIAL HIGHWAY, DATED APRIL 15, 1960, PREPARED BY THE NEW YORK STATE DEPARTMENT OF PUBLIC WORKS AND BUSINESS PARK PHASE I, PREPARED BY WENDEL, JUNE 2012, PROJECT NO. 411107.
9. THIS SURVEY HAS BEEN REVISED WITH THE BENEFIT OF TITLE REPORT No. 1313-25072 (AMENDED) AS PREPARED BY CHICAGO TITLE INSURANCE COMPANY, DATED SEPTEMBER 18, 2013.

Legend:

AC. = ACRES; APPROX. = APPROXIMATE; AVE. = AVENUE; BIT. = BITUMINOUS; CB = CATCH BASIN; CH. = CHAIN; CONC. = CONCRETE; COR. = CORNER; C.T.V. = CABLE TV BOX; ℄ = CENTERLINE; D. = DEED; DIA. = DIAMETER; DIST. = DISTANCE; E = EAST; ELEV. = ELEVATION; EJB = ELECTRICAL JUNCTION BOX; ESMT. = EASEMENT; EX. = EXISTING; FNC. = FENCE; GLM = GAS LINE MARKER; HYDRANT; L = LIBER; LS = LIFT STATION; MH = MANHOLE; MP. = MAP P = PAGE; METAL POWER POLE; MS. = MEASURED; MW = MONITORING WELL; N = NORTH; NTS = NOT TO SCALE; O/H = OVERHEAD; O/L = ON LINE; ℄ = PROPERTY LINE; POWER POLE; 24 = LOT NO.; R = RADIUS; RD. = ROAD; S = SOUTH; ST. = STREET; STA. = STATION; SMH = SANITARY MANHOLE; T.M.# = TAX MAP NO.; TJB = TELEPHONE JUNCTION BOX; TYP. = TYPICAL; W = WEST; W/ = WITH; WD. = WOOD; W.F. = WOODFRAME; APPROXIMATE LOCATION LOT LINE; RAILROAD TRACKS; OVERHEAD WIRES; EDGE OF VEGETATION/WOODS; EDGE OF ROADWAY; PROPERTY LINES; SUB-PARCELS; FENCE (TYPE NOTED); SANITARY SEWER LINE

WENDEL JOB NO.: 411107

NOTES:
-ONLY COPIES FROM THE ORIGINAL OF THIS SURVEY MAP MARKED WITH THE SIGNATURE AND AN ORIGINAL OF THE LAND SURVEYOR'S SEAL SHALL BE CONSIDERED TO BE VALID TRUE COPIES.
-UNAUTHORIZED ALTERATION OR ADDITION TO ANY SURVEY DRAWING, DESIGN, SPECIFICATION, PLAN OR REPORT IS A VIOLATION OF SECTION 7209, PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PREPARED BY THE CONSULTANT

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MAP OF
2303 HAMBURG TURNPIKE
HAMBURG, NEW YORK
SITE NAME: TECUMSEH PHASE I
BCA BOUNDARIES & PLANNED SUB-PARCELS
BROWNFIELD CLEAN-UP PROGRAM
TO
THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITUATE IN PARTS OF
LOTS 20,21,22,23,24 AND 25 OF THE OGDEN GORE TRACT AND
PART OF LOT 36, TOWNSHIP 10, RANGE 8 OF THE
BUFFALO CREEK RESERVATION
CITY OF LACKAWANNA, COUNTY OF ERIE
STATE OF NEW YORK
T.M.# PART OF 141.11-1-50

200' 100' 50' 0' 200' 400' 600'
60.96 30.48 0 60.96 121.92 182.88
METERS
1 INCH = 200 FEET 1:2400

I HEREBY CERTIFY TO (1) THE PEOPLE OF THE STATE OF NEW YORK ACTING THROUGH THEIR COMMISSIONER OF THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, (2) TECUMSEH REDEVELOPMENT INC., (3) CHICAGO TITLE INSURANCE COMPANY, THAT THIS IS AN ACCURATE SURVEY MAP UNDER MY DIRECTION, OF AN ACTUAL SURVEY, AND THAT THE SURVEY WAS PERFORMED IN ACCORDANCE TO THE STANDARDS AND PROCEDURES ADOPTED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, SEPTEMBER 14, 2012. FIELD SURVEY COMPLETED JUNE 12, 2012

CHRISTOPHER J. SCOTT, LAND SURVEYOR #050708 DATE

BRIAN S. SMITH, CST 3, SURVEY DRAFTER DATE

SHEET 1 of 1

BCP SITE NUMBERS: C915197, C915197B, C915197C, C915197D, C915197E, C915197F, C915197G, C915197H, C915197I, C915197J, AND C915197K

APPENDIX B

EXCAVATION WORK PLAN

BROWNFIELD CLEANUP PROGRAM

APPENDIX B
EXCAVATION WORK PLAN

TECUMSEH PHASE I BUSINESS PARK
NYSDEC SITE NUMBERS: C915197 through C915197K
LACKAWANNA, NEW YORK

December 2013 0071-012-322

Prepared By:

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

EXCAVATION WORK PLAN
TECUMSEH PHASE I BUSINESS PARK

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EXCAVATION WORK PLAN
TECUMSEH PHASE I BUSINESS PARK

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1.0 INTRODUCTION

1.1 Purpose and Scope

This document is a required element of the remedial program for the New York State Brownfield Cleanup Program (BCP) Sites within and collectively comprising the property referred to as the "Tecumseh Phase I Business Park," located in City of Lackawanna, Erie County, New York (hereinafter referred to as the "Controlled Property") under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Controlled Property is comprised of an approximate 102-acre area bounded by property owned by the Gateway Trade Center to the north; Tecumseh Phase II Business Park to the south; Gateway Metroport Ship Canal to the west; and New York State Route 5 (Hamburg Turnpike) to the east (see Figures 1 and 2). As shown on Figure 2, the Controlled Property collectively includes Sites I-1 through I-11 (C915197 through C915197K).

This Excavation Work Plan (EWP) has been prepared by TurnKey Environmental Restoration, LLC (TurnKey) in accordance with NYSDEC Program Policy DER-10 (Ref. 1). An Interim EWP was followed during all ground intrusive activities conducted during preparation work (e.g., excavation for utility lines, grading work performed in advance of cover placement, etc.) as remedial measures proceeded toward final cleanup and issuance of the Certificate of Completion (COC). In accordance with DER-10 Section 6.1(b)2, the Interim EWP was modified for post-remedial use and has been incorporated into this Excavation Work Plan component of the SMP.

1.2 Notification

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the Site Owner or their representative will notify the NYSDEC. Currently, this notification will be made to:

Mr. Maurice Moore
Engineering Geologist I
NYSDEC – Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent; plans for re-grading, intrusive elements or utilities to be installed below the soil cover; estimated volumes of contaminated soil to be excavated; and any work that may impact an existing engineering control. Appropriate locations for staging and stockpiling of non-impacted and impacted (if encountered) soil/fill materials will also be identified.
- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling.
- A schedule for the work, detailing the start and completion of all intrusive work.
- A summary of the applicable components of this EWP.
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120.
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the Site-Wide Health and Safety Plan (HASP).
- Identification of disposal facilities for potential waste streams.
- Identification of sources of any anticipated backfill, along with all required analytical testing results.

2.0 SCREENING, SEGREGATION AND STOCKPILING

Requirements for screening, segregation, and stockpiling of excavated soil/fill materials are presented below. As further discussed in Section 3.0, all soil and fill excavated from the Site is to be treated as regulated contaminated material regardless of field evidence of impact. If any such material is removed from the Site it must be transported by a licensed hauler and either treated or disposed at a permitted facility in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations or reused, with NYSDEC pre-approval subject to a 6 NYCRR Part 360 Beneficial Use Determination (BUD), at another regulated cleanup site having an Environmental Easement and Site Management Plan.

2.1 Soil Screening and Segregation Methods

Visual, olfactory, and/or instrument (photoionization detector or equivalent)-based, soil screening will be performed by a qualified environmental professional (QEP), as defined by NYSDEC in DER-10 Section 1.3(b)49, or a person under their supervision, during all intrusive activities, as necessary.

Non-impacted soil/fill may be replaced in the excavation or reused on-site in accordance with Section 3.4. If field evidence of potentially impacted soil/fill is encountered during intrusive work, the NYSDEC Project Manager will be contacted and the contractor will be directed to stockpile the material on polyethylene sheeting in an accessible location near the impacted area. The location of staged materials will be coordinated with the Site Owner, but will remain within the same Site as the source to avoid administrative issues associated with import/export of these materials among differing BCP Sites. Field evidence of impact is defined as having readily identifiable visual or olfactory signs of contamination, including product, tars, or elevated photoionization detector (PID) readings (i.e., sustained readings >5 ppm). All impacted soil/fill removal work will be directed by an experienced QEP. Removal and stockpiling will continue until visually impacted soil/fill is removed from the limits of the planned excavation or NYSDEC agrees that no further removal of soil/fill is required. If the impact extends beyond the proposed limits of the excavation the Site Owner will be consulted and a plan for delineation and remediation of the remaining impacted material will be developed.

2.2 Stockpile Methods

Excavated soil/fill will be segregated, based on field screening and its status at the time of the excavation work, into material that can be reused as cover (i.e., if cover soil or slag has been placed), non-impacted material that can be returned to the subsurface, and impacted material that requires treatment or off-site disposal. A continuous berm and/or silt fence will be placed around soil/fill stockpiles. Hay bales will be used as needed near catch basins, surface waters, and other discharge points. Stockpiles will be covered at all times with appropriately anchored tarps or poly sheeting. Stockpiles will be routinely inspected at a minimum once each week and after every storm event. Damaged tarp covers will be promptly replaced.

Results of inspections will be recorded in a logbook, maintained with the Site Owner or Owner's representative, and made available for inspection by NYSDEC.

3.0 EXCAVATION, TRANSPORT, DISPOSAL, AND REUSE

3.1 Materials Excavation and Load Out

A QEP, or person under their supervision, will monitor all intrusive work and the excavation and load-out of all excavated material. The Site Owner and its contractors are responsible for safe execution of all intrusive and other work performed under this EWP; however, any entity performing intrusive work on the Site is required to abide by the requirements identified herein. The QEP will investigate the presence of utilities and easements on the Site and determine whether they pose a risk or impediment to the planned work under this EWP.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State (NYSDOT), local, and all other applicable transportation requirements.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking. The QEP will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. If truck tires will be in contact with impacted materials and/or ground conditions result in mud carryout on vehicles a truck wash will be operated on-site. Truck wash waters will be collected and disposed off-site in an appropriate manner. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

3.2 Material Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with tight-fitting covers; loose-fitting canvas-type truck covers are prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes will be pre-determined for wastes designated as hazardous and requiring off-site transport to a secure landfill (RCRA Subtitle C facility) or other RCRA-

permitted Treatment Storage and Disposal Facility (TSDF). The truck transport route to the nearest Subtitle C facility from the Controlled Property is as follows:

To Model City Landfill, 4746 Model City Rd., Model City, NY

- From the Site, turn left (north) onto Route 5
- Exit onto I-190 north
- Take Exit 25A/RT 265
- Turn left on RT 265
- Turn right onto Upper Mountain Rd.
- Turn left onto Indian Hill Rd.
- End at 4746 Model City Rd.

All trucks loaded with Site materials will exit the vicinity of the Site using only approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. If an alternate RCRA Subtitle C facility or TSDF is employed the corresponding truck transport route shall be provided to the NYSDEC for approval.

Trucks will be prohibited from stopping and idling in the neighborhood outside the Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials. Queuing of trucks will be performed on-site in order to minimize off-site disturbance; off-site queuing will be prohibited.

3.3 Materials Disposal Off-Site

All soil/fill/solid waste excavated and removed from the Site will be considered contaminated, regulated material to be transported and treated or disposed at a permitted facility in accordance with all local, State (including 6NYCRR Part 360), and Federal regulations. If alternate off-site disposal of soil/fill from this Site is proposed (e.g., at another regulated brownfield site), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal

facility (i.e., hazardous waste facility, solid waste landfill, permitted petroleum treatment facility, C/D recycling facility, etc.), if appropriate. The disposal documentation submitted to NYSDEC will include: a summary of disposal quantities, waste profiles, test results, facility acceptance letters, manifests, bills of lading, and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a municipal solid waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

3.4 Materials Reuse On-Site

3.4.1 Soil/Fill

On-site reuse of soil/fill material, including slag material, is acceptable provided that the material does not exhibit visual or olfactory evidence of contamination and PID measurements of the atmosphere at the soil/fill interface do not exceed 5 parts per million (ppm) above background. The QEP will ensure that procedures defined for materials reuse are followed and that unacceptable material does not remain on-site. On-site material, including historic fill, that is acceptable for re-use on-site will be placed below the engineered cover demarcation layer or impervious surface (if in place at the time of excavation), and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

3.4.2 Petroleum-Impacted Soil/Fill

Petroleum-impacted soil/fill suitable for on-site bioremediation (e.g., materials impacted by non-tarry petroleum hydrocarbons) may be transported, with NYSDEC approval, to a designated portion of the Tecumseh property (specifically one of the Business Parks) for biotreatment. Qualitative assessment of treatment performance will be made based on field assessment of visual and olfactory conditions, with the goal of eliminating gross impacts. Once the soil/fill is considered treated, confirmatory samples will be collected at a frequency of no less than one per 1,000 cubic yards of treated soil/fill. The samples will be analyzed for USEPA Target Compound List (TCL) volatile organic compounds (VOCs) and base-neutral semi-volatile organic compounds (SVOCs) and compared to restricted

(Industrial) health-based SCOs consistent with other on-site soil/fill materials. Once the samples meet these SCOs, the treated soil/fill will be removed and preferably transferred back to the original excavated Site as subgrade material; bioremediated soils will not be considered suitable for use as cover soil. No bioremediated soil/fill will be transported off-site unless deemed necessary due to poor treatment response. In such instance the material will be disposed, with NYSDEC approval, in accordance with Section 3.3.

3.4.3 Debris

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site without prior NYSDEC approval.

3.5 Fluids Management

All liquids to be removed from the Site, including excavation dewatering and truck wash water, will be verified to be visually free of any product, non-aqueous phase liquid, odor, or other visual indications of impact. In such instance it may be acceptable to discharge such water back to subgrade with prior NYSDEC approval. Generated water exhibiting signs of impact will not be recharged back to the land surface or subsurface of the Site unless treated to render it acceptable for discharge as approved by the NYSDEC.

Water generated during large-scale construction activities proposed for discharge to surface waters (i.e., a local pond, stream, or river) will require a NY State Pollutant Discharge Elimination System (SPDES) permit.

4.0 BACKFILL AND RESTORATION

4.1 Cover Materials

A minimum of 12 inches of NYSDEC-approved cover material (e.g., vegetated soil, stone, or Beneficial Use Determination [BUD]-approved steel slag), where appropriate, will be placed over any unpaved areas of the Site as a component of the final remedy. The upper 6 inches of any soil cover must be of suitable quality to support vegetation. In general, this would be well-graded topsoil with a pH of 5.5 to 7.6, a minimum organic content of 2.5%, and a soluble salt content not greater than 500 ppm. Vegetation must be comprised of grasses or other plantings sufficiently dense to prevent wind and surface water erosion. All imported cover must also meet the criteria identified in Section 4.2.

After the completion of soil removal and any other invasive activities, the cover system will be restored in a manner that complies with the Site Management Plan (SMP) and Final Engineering Report (FER). The demarcation layer will be replaced to provide a visual reference to the top of the remaining in-place material. A change in the type of cover system that existed prior to the excavation (e.g., a soil cover is replaced by asphalt) constitutes a modification of the cover element of the remedy, and a figure showing the modified surface will be included in the subsequent Periodic Review Report (PRR) and in any updates to the SMP.

4.2 Backfill from Off-Site Sources

The criteria under which off-site material may be imported for use as backfill are presented below.

- **Off-Site Soil/Fill:** Off-site soil/fill may be used as backfill provided that it originates from: 1) an NYSDEC-approved borrow site; or 2) a known source having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes, or petroleum. In both instances the imported soil must be tested and demonstrated to meet the criteria shown on Table B-1 in accordance with Appendix 5 of DER-10. In addition, no off-site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2 (a) shall be used as backfill. The criteria presented in Table 1 represent the lesser of the Commercial Soil Cleanup Objectives (SCOs) or levels protective of groundwater quality as published in 6NYCRR Part 375-6.7(d)(c) and 375-6.8.

- **Other Off-Site Material:** Certain material may be imported as backfill, without chemical testing, provided it contains less than 10% (by weight) material that would pass through a size 80 sieve: 1) Rock or stone, consisting of virgin material from a permitted mine or quarry; 2) steel slag under BUD #555-9-152; 3) Recycled concrete, brick, or asphalt from a NYSDEC-registered or permitted C&D debris processing facility (as specified in Section 360-16.1 of 6 NYCRR Part 360) that conforms to Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2002). As stated in Section 360-16.4(b)(2), the facility may only accept recognizable, uncontaminated, non-pulverized C&D debris or C&D debris from other authorized C&D processing facilities. According to Section 360-16.2(c), "uncontaminated" means C&D debris that is not mixed or commingled with other solid waste at the point of generation, processing, or disposal, and that is not contaminated with spills of a petroleum product, hazardous waste, or industrial waste.

As indicated above, off-site borrow soils shall be tested to assure conformance with the criteria identified on Table B-1. A tiered approach based on the volume of impacted soil/fill being excavated will be used to determine the frequency of characterization sampling in accordance with DER-10 or as pre-approved by the NYSDEC.

Grab samples will be collected for VOC analysis. For all other required analyses, a minimum of four grab samples will be collected to form a single composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (e.g., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed for USEPA Target Compound List (TCL) VOCs, TCL SVOCs, pesticides, and PCBs, as well as select metals[1] and cyanide in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory. Analytical results will be compared to Table 1 criteria and provided to the NYSDEC as part of the approval process and reported in the PRR. Analytical results must be maintained on file for review in support of the periodic Institutional and Engineering Control (IC/EC) certification required as part of the final SMP.

[1] Metals shall include those regulated under 6NYCRR Part 375-6.8, which presently include: Arsenic; Barium; Beryllium; Cadmium; Chromium (total and hexavalent forms); Copper; Lead; Manganese; Mercury; Nickel; Selenium; Silver; and Zinc.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

All materials proposed for import onto the Site will be approved by the QEP and in compliance with the provisions of this EWP prior to receipt at the Site. Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

4.3 Backfill from On-Site Sources

On-site soil/fill may be used as subgrade backfill beneath existing approved cover provided that it does not exhibit field evidence of impact. Soil/fill that is bioremediated on-site, or within another designated and approved area within the Tecumseh Business Parks, may be similarly used as subgrade backfill provided that it meets the treatment criteria discussed in Section 3.4.2. Backfill material will be compacted with the excavator/backhoe bucket in maximum 2-foot lifts to minimize settling.

5.0 MONITORING AND INSPECTIONS

5.1 Stormwater Pollution Prevention

If construction activities disturb more than 1 acre of land, the Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. seq.) and the New York State Environmental Conservation Law (Article 17, Titles 7 and 8, and Article 70) would apply.

With some exceptions, operators of construction activities and property development that will result in the disturbance of 1 or more acres of land must obtain coverage under SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001, expires 01/28/15) prior to the commencement of soil disturbance. (In the case of a remediation site, such as the Controlled Property, soil disturbances associated with remedial activities are exempt from State-issued permits; however, functional equivalent approvals, mitigation and compliance measures are required). Also requiring a permit are construction activities disturbing less than 1 acre if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than 1 acre, or activities that are designated by the NYSDEC. The NYSDEC can require a permit for construction activities disturbing less than 1 acre based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

To obtain coverage under the General Permit, the operator of a construction activity must file a completed Notice of Intent (NOI) with the NYSDEC. Submitting a NOI is an affirmation that a Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the site and will be implemented prior to the commencement of construction activities. Coverage under the General Permit will begin either 5 or 60 business days after receipt of a completed NOI by the NYSDEC. Appendix B-1 includes the NOI application form and SPDES General Permit GP-0-10-001.

For smaller disturbances not subject to SPDES General Permit requirements, erosion controls must be installed as necessary to mitigate impacted stormwater and sediment runoff. These controls (which may include silt fencing around stockpiles, berms, and hay bale checks) will be required in areas of disturbance proximate to surface water bodies and drainage structures, and will also be required if disturbances occur in areas where the surrounding slag/fill is not sufficiently permeable to allow re-infiltration. Erosion and

sediment controls shall be installed in accordance with the standards and specifications presented in Appendix B-2.

The controls will be installed and inspected once a week and after every storm event. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the controls functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Results of inspections will be recorded in a logbook, maintained by the Site Owner or Owner's representative, and made available for inspection by NYSDEC.

5.2 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during intrusive activities, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment, and surrounding soils as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a comprehensive list of analytes (RCRA metals, TCL VOCs, SVOCs, and PCBs, and cyanide), unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval.

Identification of unknown or unexpected contaminated media identified by screening during intrusive activities will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline.

5.3 Community Air Monitoring Plan

As detailed in Appendix B-3, the following criteria shall also be adhered to during intrusive activities for the protection of the nearby community.

5.3.1 Organic Vapor Community Air Monitoring:

Community air monitoring will be performed at the downwind perimeter of the exclusion zone on a continuous basis during intrusive activities performed outdoors that may be reasonably expected to potentially release organic vapors, or when sustained readings are detected in the work zone (i.e., proximate to the source of the intrusive activity). Otherwise, the monitoring will be performed on an hourly basis. A photoionization detector (PID), or other equipment suitable to the types of contaminants known or suspected to be present, capable of calculating 15-minute running average concentrations will be used. All air monitoring equipment will be calibrated at least daily and an upwind concentration will be taken at least daily to establish background conditions. The 15-minute average concentrations will be compared to the levels specified below.

- If the 15-minute ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the organic vapor decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If the ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone persists at levels above 5 ppm over background but less than 25 ppm, activities must be halted, the source of vapors identified, corrective actions to abate the emissions taken, and monitoring continued. After these steps, work activities can resume provided that: the organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest off-site potential receptor or residential or commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the exclusion zone, work activities must be shut down and the following activities will be performed:
  - All Emergency Response Contacts as listed in the HASP (Ref. 2) and the Emergency Response Plan (an appendix to the HASP) will be advised.
  - The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.
  - Air monitoring will be continued at ½ the distance from the exclusion zone to the nearest receptor.

All readings will be recorded and will be available for NYSDEC and NYSDOH personnel to review.

5.3.2 Explosive Vapor Community Air Monitoring

Explosive vapor community air monitoring will be performed at the downwind perimeter of the site on a continuous basis whenever sustained atmospheric concentrations of greater than 10% of the LEL are recorded in the exclusion zone. If sustained atmospheric concentrations of greater than 10% LEL are recorded at the downwind site perimeter, the local Fire Department will be contacted.

5.3.3 Airborne Particulate Community Air Monitoring

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

If after implementation of dust suppression techniques, downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

Air sampling stations will be located based on generally prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

5.4 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis are described below. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the associated Site Owner, and any measures that are implemented will be documented.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

5.5 Dust Control Plan

Particulate monitoring will be performed along the downwind perimeter of the Site during subgrade excavation, grading, and handling activities in accordance with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under DER-10 Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring) both included as Appendix B-3.

Dust suppression techniques will be employed as necessary to mitigate fugitive dust from non-vegetated or disturbed soil/fill during post-remediation construction and redevelopment.

A dust suppression plan that addresses dust management during intrusive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Covering or proof-rolling excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum.

5.6 Other Nuisances

A plan will be developed and used by the contractor for all remedial work to ensure compliance with local noise control ordinances. At a minimum, this shall include limiting construction to typical daylight work hours.

6.0 REFERENCES

1. New York State Department of Environmental Conservation. *DEC Program Policy DER-10/Technical Guidance for Site Investigation and Remediation.* May 3, 2010.
2. TurnKey Environmental Restoration, LLC in affiliation with Benchmark Environmental Engineering & Science, PLLC, *Site-Wide Health and Safety Plan (HASP). Tecumseh Redevelopment Site, Lackawanna, NY*. April 2010.

TABLES

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase I Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase I Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase I Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[2]	19
Chromium, Trivalent[2]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.002
Beta-BHC	0.009
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase I Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
PCBs/Pesticides (mg/kg)	
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Notes:

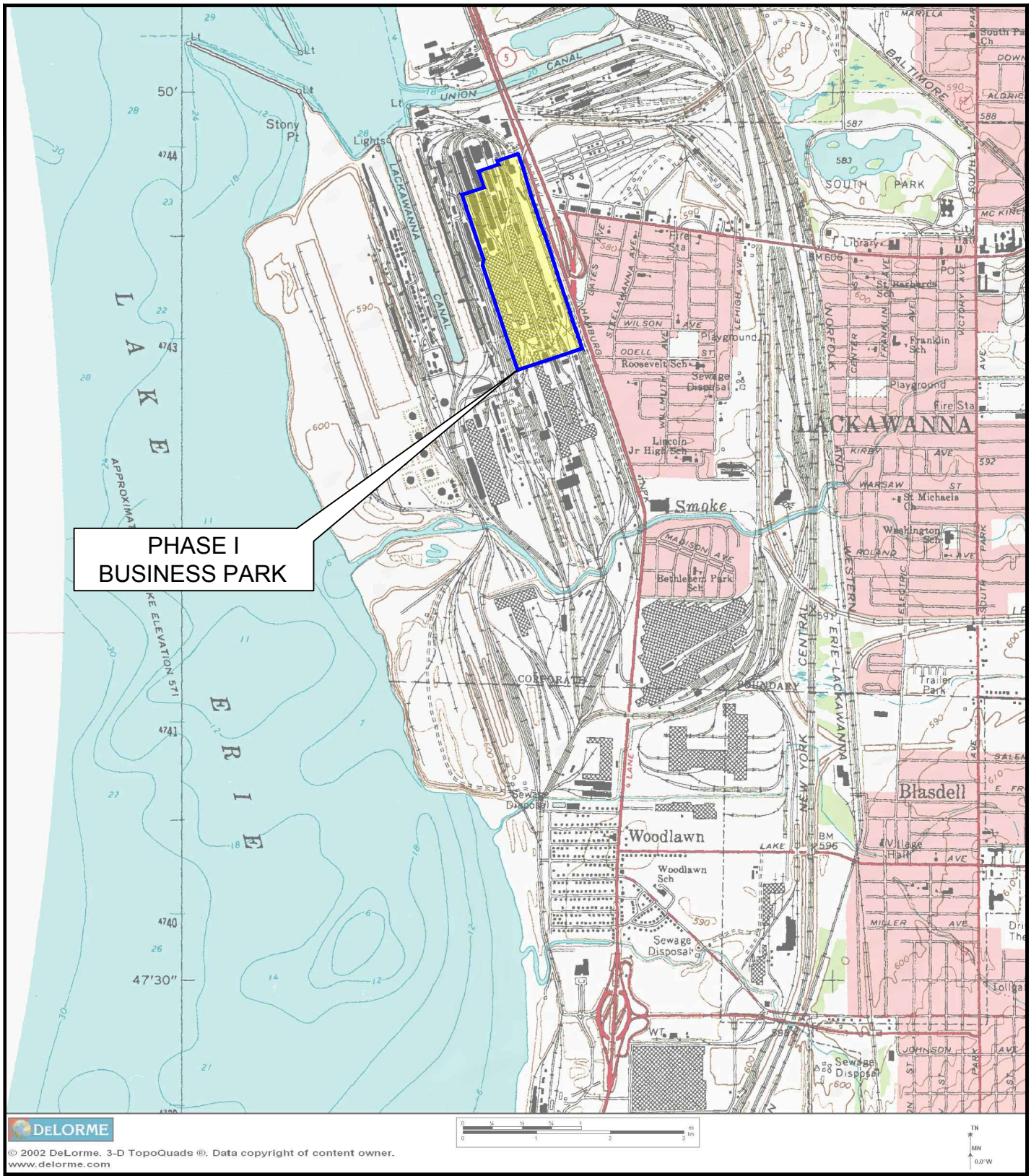
[1] Soil criteria are lesser of concentrations protective of groundwater or commercial health-based soil cleanup objectives per 6 NYCRR 375-6.8(b).

[2] The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Figure 1; Site Location and Vicinity Map2.dwg

FIGURE 1



TurnKey Environmental Restoration, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

SITE LOCATION & VICINITY MAP

SITE MANAGEMENT PLAN

PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

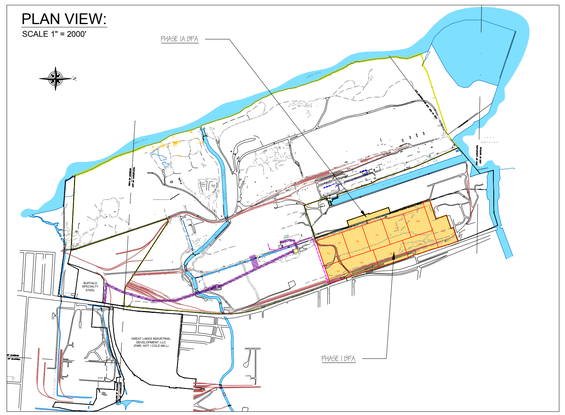
PROJECT NO.: 0071-012-322

DATE: DECEMBER 2013

DRAFTED BY: BLR

F:\CAD\Turnkey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Phase IIIa Management Plan\Figure 2- Site Delineation Map.dwg

PLAN VIEW:
SCALE 1" = 2000'



PHASE IA BUSINESS PARK
± 12.27 ACRES

PHASE I BUSINESS PARK
± 101.85 ACRES

I-1
I-2
I-3
I-4
I-5
I-6
I-7
I-8
I-9
I-10
I-11

Parcel Identification	Total Acreage	Encumbered Acreage	Developable Acreage	Percent Developable
I-1	5.57	1.27	4.30	77.14%
I-2	6.23	1.04	5.19	83.25%
I-3	7.63	1.42	6.21	81.39%
I-4	10.37	2.60	7.77	74.92%
I-5	10.05	0.74	9.31	92.67%
I-6	10.01	2.37	7.64	76.33%
I-7	10.04	0.76	9.28	92.42%
I-8	10.22	2.02	8.20	80.20%
I-9	10.03	0.88	9.15	91.21%
I-10	9.98	0.87	9.11	91.24%
I-11	12.37	1.26	11.11	89.78%
BP-I Totals	**102.50**	**15.25**	**87.25**	**85.12%**

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- PHASE I BUSINESS PARK BOUNDARY (± 101.85 ACRES)
- RAILROAD TRACK
- SOUTH BUFFALO RAILROAD EASEMENT
- PUBLIC UTILITY EASEMENT
- STEEL WINDS I FACILITY ABOVE-GROUND ELECTRIC UTILITY
- STEEL WINDS I FACILITY BURIED ELECTRIC UTILITY
- PLANNED STEEL WINDS II ABOVE GROUND ELECTRICAL EASEMENT
- PLANNED STEEL WINDS II BURIED ELECTRICAL EASEMENT
- INDUSTRIAL WATER SYSTEM EASEMENT
- SANITARY SEWER EASEMENT
- APPROXIMATE LOCATION OF OVERHEAD HIGH-TENSION ELECTRIC TRANSMISSION LINES WITH TOWERS & 60' EASEMENT(APPROX.)
- ROADWAY ENCUMBRANCES

N
150' 0' 150' 300'
SCALE: 1 INCH = 150 FEET
SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

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DATE: MAY 2011
CHECKED BY:
APPROVED BY:

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SEAL

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
PHASE I BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 2

APPENDIX B-1

STORM WATER POLLUTION PREVENTION

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

from

CONSTRUCTION ACTIVITY

Permit No. GP-0-10-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2010 Expiration Date: January 28, 2015

William R. Adriance
Chief Permit Administrator

William R. Adriance — January 28, 2010
Authorized Signature — Date

Address: NYS DEC
Div. Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL").*

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:

http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES

FROM CONSTRUCTION ACTIVITIES

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Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application - This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

B. Maintaining Water Quality - It shall be a violation of this permit and the *ECL* for any *discharge* to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

C. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph D. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater discharges from *construction activities*.

(Part I. C)

3. Notwithstanding paragraphs C.1 and C.2 above, the following non-stormwater *discharges* may be authorized by this permit: discharges from fire fighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated groundwater or spring water; uncontaminated discharges from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who discharge as noted in this paragraph, and with the exception of flows from fire fighting activities, these discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with water quality standards in Part I.B.

D. <u>Activities Which Are Ineligible for Coverage Under This General Permit</u> - All of the following are **<u>not</u>** authorized by this permit:

1. *Discharges* after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharges* that are mixed with sources of non-stormwater other than those expressly authorized under subsection C.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII, subparagraph K of this permit;

4. *Discharges* from *construction activities* that adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects that:

    a. are tributary to waters of the state classified as AA or AA-s; and

(Part I. D. 6)

b. disturb one or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects that:
   a. are tributary to waters of the state classified as AA or AA-s; and

   b. disturb two or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

8. *Construction activities* that adversely affect a property that is listed or is eligible for listing on the State or National Register of Historic Places (Note: includes Archeological sites), unless there are written agreements in place with the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) or other governmental agencies to mitigate the effects, or there are local land use approvals evidencing the same.

Part II. OBTAINING PERMIT COVERAGE

A. Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the address below in order to be authorized to *discharge* under this permit. The NOI form shall be one which is associated with this permit, signed in accordance with Part VII.H. of this permit.

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4*, or by a duly authorized representative of that person, and then submit that form along with the NOI to the address referenced under "Notice of Intent (NOI) Submittal".

(Part II. A.2)

This requirement does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of Owner or Operator).

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. <u>Permit Authorization</u>

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied <u>all</u> of the following criteria:

    a. project review pursuant to the State Environmental Quality Review Act (SEQRA) have been satisfied, when SEQRA is applicable,

    b. where required, all necessary Department permits subject to the *Uniform Procedures Act (UPA)* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Regional Office in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

    c. the final SWPPP has been prepared, and

    d. an NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

(Part II. B. 3)

a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

i. Five (5) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 and/or 3, or

ii. Sixty (60) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 or 3.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

i. Five (5) business days from the date the Department receives a complete NOI and signed "MS4 SWPPP Acceptance" form,

4. The Department may suspend or deny an *owner's or operator's* coverage under this permit if the Department determines that the SWPPP does not meet the permit requirements.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department.

C. <u>General Requirements For Owners or Operators With Permit Coverage</u>

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination (NOT) has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-10-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form and inspection reports at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department.

(Part II. C. 2)

The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the MS4 (provided the MS4 is not the *owner or operator* of the construction activity). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

    a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

    b. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

    c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

    d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

    e. The *owner or operator* shall include the requirements above in their SWPPP.

4. The Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements.

(Part II. C)

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4,* the *owner or operator* shall notify the *MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *MS4* prior to commencing construction of the post-construction stormwater management practice.

D. Permit Coverage for Discharges Authorized Under GP-0-08-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001), a*n owner or operator* of *construction activity* with coverage under GP-0-08-001, as of the effective date of GP-0-10-001, shall be authorized to *discharge* in accordance with GP-0-10-001 unless otherwise notified by the Department.

E. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1.. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

   Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*.

(Part III. A)

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the pollutants in stormwater discharges and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

    a. whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater *discharges* from the site;

    b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the discharge of pollutants; and

    c. to address issues or deficiencies identified during an inspection by the *qualified inspector*, the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP.

(Part III. A. 6)

The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

> "I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

8. The SWPPP must include documentation supporting the determination of permit eligibility with regard to Part I.D.8. (Historic Places or Archeological Resource). At a minimum, the supporting documentation shall include the following:

(Part III. A. 8)

a. Information on whether the stormwater discharge or *construction activities* would have an effect on a property (historic or archeological resource) that is listed or eligible for listing on the State or National Register of Historic Places;

b. Results of historic resources screening determinations conducted. Information regarding the location of historic places listed, or eligible for listing, on the State or National Registers of Historic Places and areas of archeological sensitivity that may indicate the need for a survey can be obtained online by viewing the New York State Office of Parks, Recreation and Historic Places (OPRHP) online resources located on their web site at: http://nysparks.state.ny.us/shpo/online-tools/ (using The Geographic Information System for Archeology and National Register). OPRHP can also be contacted at: NYS OPRHP, State Historic Preservation Office, Peebles Island Resources Center, P.O. Box 189, Waterford, NY 12188-0189, phone: 518-237-8643;

c. A description of measures necessary to avoid or minimize adverse impacts on places listed, or eligible for listing, on the State or National Register of Historic Places. If the *owner or operator* fails to describe and implement such measures, the stormwater *discharge* is ineligible for coverage under this permit; and

d. Where adverse effects may occur, any written agreements in place with OPRHP or other governmental agency to mitigate those effects, or local land use approvals evidencing the same.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Where erosion and sediment control practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

    a. Background information about the scope of the project, including the location, type and size of project;

(Part III. B. 1)

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s), wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater discharge(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each construction activity that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of final stabilization;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

(Part III. B. 1)

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6., to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards.

2. Post-construction stormwater management practice component - All construction projects identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual ("Design Manual"). If the Design Manual is revised during the term of this permit, an *owner or operator* must begin using the revised version of the Design Manual to prepare their SWPPP six (6) months from the final revision date of the Design Manual.

   Where post-construction stormwater management practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard.

   At a minimum, the post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project;

(Part III. B. 2)

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. The dimensions, material specifications and installation details for each post-construction stormwater management practice;

d. Identification of any elements of the design that are not in conformance with the Design Manual. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards;

e. A hydrologic and hydraulic analysis for all structural components of the stormwater management control system;

f. A detailed summary (including calculations) of the sizing criteria that was used to design all post-construction stormwater management practices. At a minimum, the summary shall address the required design criteria from the applicable chapter of the Design Manual; including the identification of and justification for any deviations from the Design Manual, and identification of any design criteria that are not required based on the design criteria or waiver criteria included in the Design Manual; and

g. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.g. above.

(Part III. C)

C. Required SWPPP Components by Project Type - Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices and all post-construction stormwater management practices identified in the SWPPP are maintained in effective operating condition at all times.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Owner or Operator Maintenance Inspection Requirements

1. The *owner or operator* shall inspect, in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, the erosion and sediment controls identified in the SWPPP to ensure that they are being maintained in effective operating condition at all times.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *owner or operator* can stop conducting the maintenance inspections. The *owner or operator* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *owner or operator* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

(Part IV. C)

C. <u>Qualified Inspector Inspection Requirements</u> - The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- Licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- Someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

    a. the construction of a single family residential subdivision with 25% or less impervious cover at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

    b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

    c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

    d. construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

    a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

(Part IV. C. 2)

b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the Regional Office stormwater contact person (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the MS4 (provided the MS4 is not the *owner or operator* of the construction activity) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the Regional Office stormwater contact person (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the MS4 (provided the MS4 is not the *owner or operator* of the construction activity). in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization*, and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1..

(Part IV. C. 3)

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization*, all points of discharge to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of discharge from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

    a. Date and time of inspection;

    b. Name and title of person(s) performing inspection;

    c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

    d. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

    e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

    f. Identification of all erosion and sediment control practices that need repair or maintenance;

    g. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

    h. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

k. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2., the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1. The NOT form shall be one which is associated with this general permit, signed in accordance with Part VII.H.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

(Part V. A. 2)

a. Total project completion - All construction activity identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT, certify that all disturbed areas have achieved *final stabilization;* and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall also have the MS4 sign the "MS4 Acceptance" statement on the NOT. The *owner or operator* shall have the principal executive officer, ranking elected official, or duly authorized representative from the *regulated, traditional land use control MS4*, sign the "MS4 Acceptance" statement. The MS4 official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The MS4 can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector's* final site inspection certification(s) required in Part V.3.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

(Part V. A. 5)

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has modified their deed of record to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention - The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the site achieves *final stabilization*. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

B. Addresses - With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate Department Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply - The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied.

(Part VII. A)

The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

B. <u>Continuation of the Expired General Permit</u> - This permit expires five (5) years from the effective date. However, coverage may be obtained under the expired general permit, which will continue in force and effect, until a new general permit is issued. Unless otherwise notified by the Department in writing, an *owner or operator* seeking authorization under the new general permit must submit a new NOI in accordance with the terms of such new general permit.

C. <u>Enforcement</u> - Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. <u>Need to Halt or Reduce Activity Not a Defense</u> - It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. <u>Duty to Mitigate</u> - The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to minimize or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. <u>Duty to Provide Information</u> - The *owner or operator* shall make available to the Department for review and copying or furnish to the Department within five (5) business days of receipt of a Department request for such information, any information requested for the purpose of determining compliance with this permit. This can include, but is not limited to, the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form, executed maintenance agreement, and inspection reports. Failure to provide information requested by the Department within the request timeframe shall be a violation of this permit.

The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review the NOI, SWPPP or inspection reports. Copying of documents will be done at the requester's expense.

G. <u>Other Information</u> - When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any other report, or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s)

changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or impervious area), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. <u>Signatory Requirements</u>

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        i. a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

        ii. the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

    b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

    c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

        i. the chief executive officer of the agency, or

(Part VII. H. 1. c)

ii. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. or by a duly authorized representative of that person. A person is a duly authorized representative only if:

    a. The authorization is made in writing by a person described in Part VII.H.1.;

    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

    c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

    It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. <u>Property Rights</u> - The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity.*

J. <u>Severability</u> - The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

(Part VII. K)
K. <u>Denial of Coverage Under This Permit</u>

1. At its sole discretion, the Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Regional Water Engineer, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. Any *owner or operator* authorized by this permit may request to be excluded from the coverage under this permit by applying for an individual permit or another general permit. In such cases, the *owner or operator* shall submit an individual application or an alternative general permit application in accordance with the requirements of this general permit, 40 CFR 122.26(c)(1)(ii) and 6 NYCRR Part 621, with reasons supporting the request, to the Department at the address for the appropriate Department Office (see addresses in Appendix F).The request may be granted by issuance of an individual permit or another general permit at the discretion of the Department.

3. When an individual SPDES permit is issued to a discharger authorized to discharge under a general SPDES permit for the same discharge(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. <u>Proper Operation and Maintenance</u> - The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. <u>Inspection and Entry</u> - The *owner or operator* shall allow the Department or an authorized representative of EPA, the State, or, in the case of a construction site which discharges through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

(Part VII. M)

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

N. Permit Actions - At the Department's sole discretion, this permit may, at any time, be modified, suspended, revoked, or renewed. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions - Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports – Article 17 of the ECL provides for a civil penalty of $37,500 per day per violation of this permit. Articles 175 and 210 of the New York State Penal Law provide for a criminal penalty of a fine and/or imprisonment for falsifying forms and reports required by this permit.

R. Other Permits – Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "Construction Activity(ies)" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 authorizing a category of discharges.

Groundwater - means waters in the saturated zone. The saturated zone is a subsurface zone in

which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct construction activities are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that construction activities may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
ii. Designed or used for collecting or conveying stormwater;
iii. Which is not a *combined sewer*; and
iv. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from construction activity.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the construction activity is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in Parts 700 et seq of this Title.

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics in order to prepare a SWPPP that conforms to the Department's technical standard. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means construction activity that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* will be responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B

Required SWPPP Components by Project Type

Table 1
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other agricultural building, silo, stock yard or pen.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Bike paths and trails
- Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover*, and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* and *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4

Figure 1 - New York City Watershed East of the Hudson

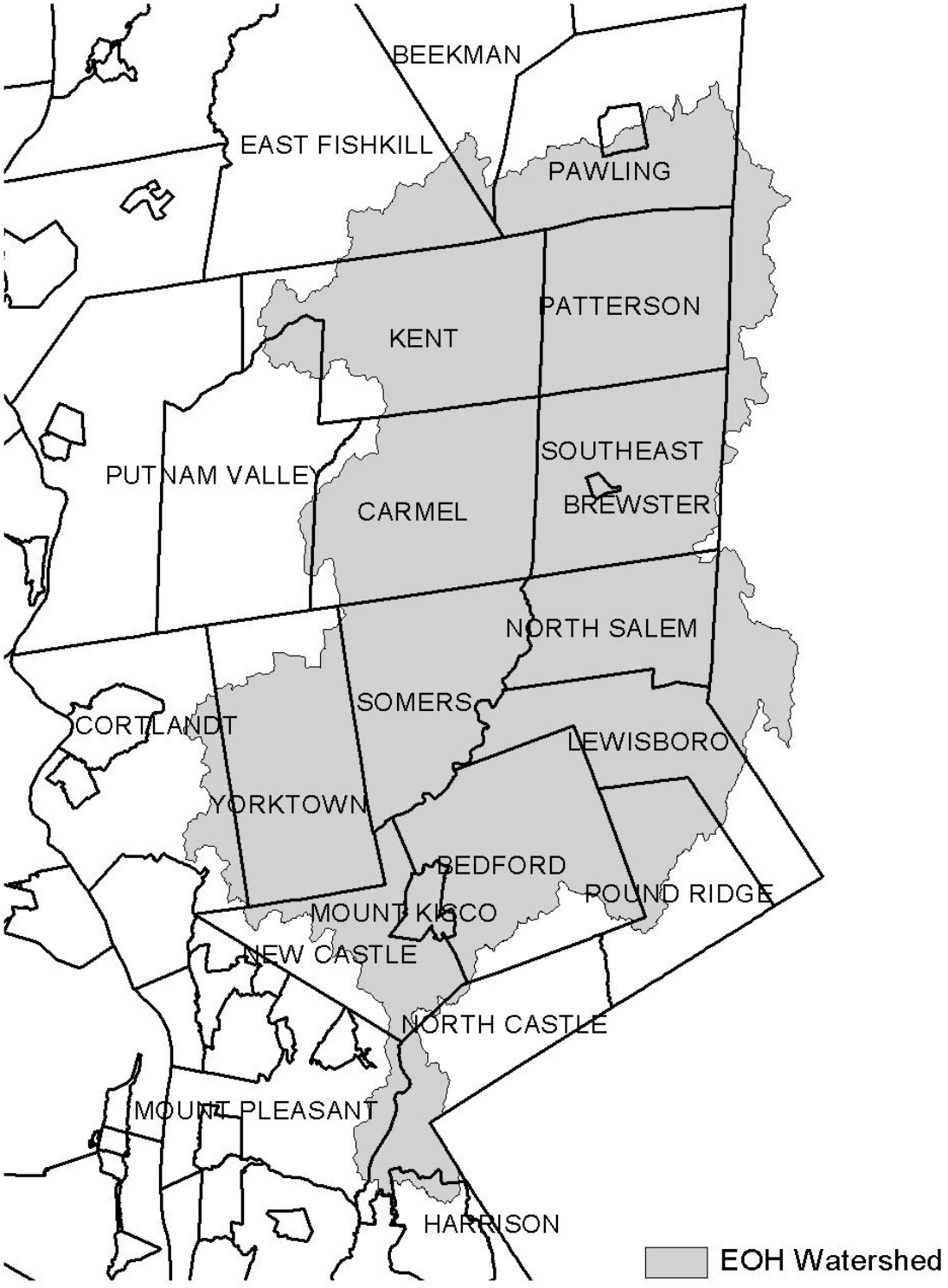


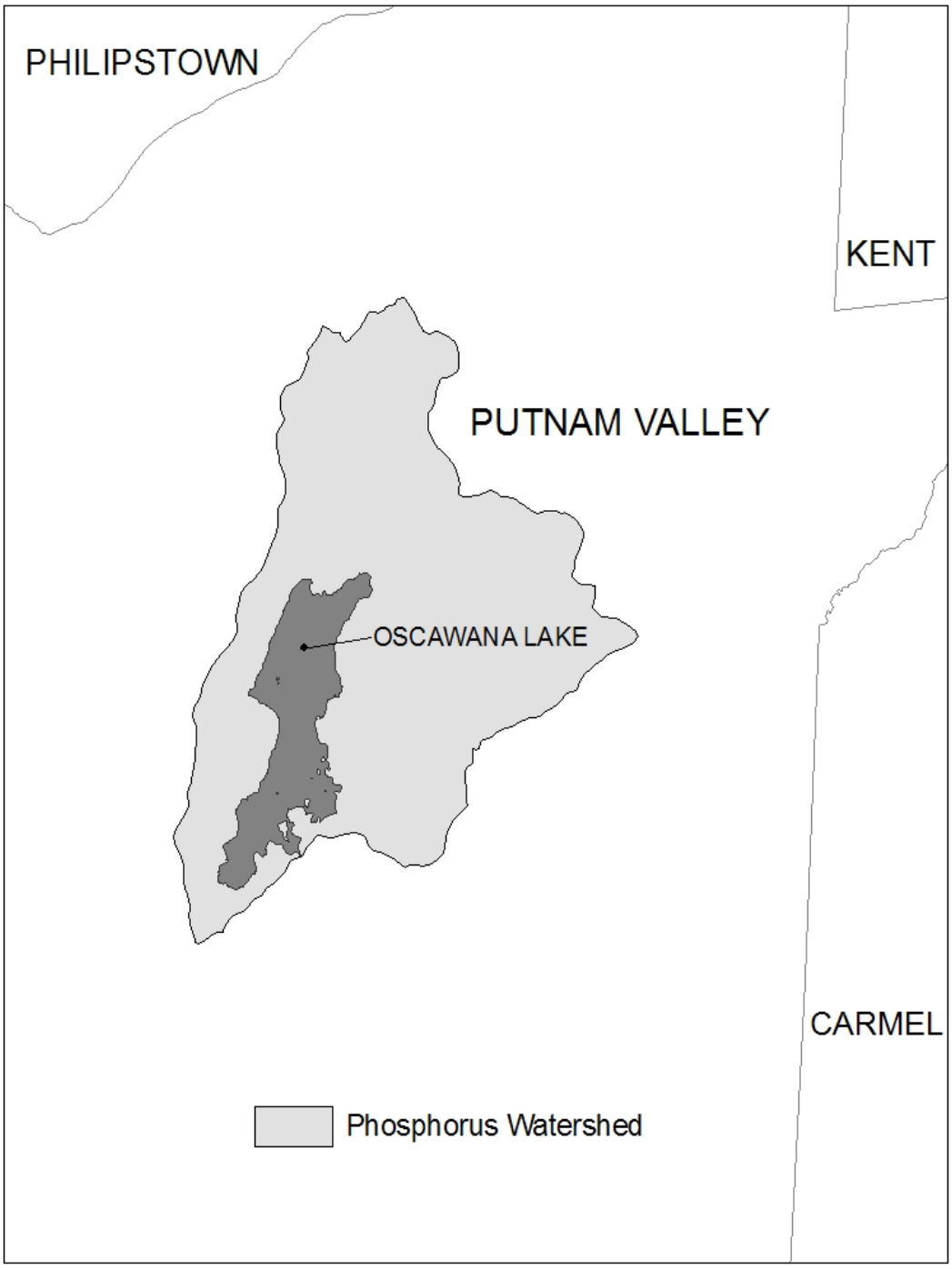
Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed



Figure 4 - Oscawana Lake Watershed



APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivision construction activities that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond
Albany	Basic Creek Reservoir
Bronx	Van Cortlandt Lake
Broome	Whitney Point Lake/Reservoir
Broome	Beaver Lake
Broome	White Birch Lake
Chautauqua	Chautauqua Lake, North
Chautauqua	Chautauqua Lake, South
Chautauqua	Bear Lake
Chautauqua	Chadakoin River and tribs
Chautauqua	Lower Cassadaga Lake
Chautauqua	Middle Cassadaga Lake
Chautauqua	Findley Lake
Clinton	Great Chazy River, Lower, Main Stem
Columbia	Kinderhook Lake
Columbia	Robinson Pond
Dutchess	Hillside Lake
Dutchess	Wappinger Lakes
Dutchess	Fall Kill and tribs
Dutchess	Rudd Pond
Erie	Rush Creek and tribs
Erie	Ellicott Creek, Lower, and tribs
Erie	Beeman Creek and tribs
Erie	Murder Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs
Erie	Little Sister Creek, Lower, and tribs
Essex	Lake George (primary county listed as Warren)
Genesee	Black Creek, Upper, and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem
Genesee	Tonawanda Creek, Upper, and minor tribs
Genesee	Little Tonawanda Creek, Lower, and tribs
Genesee	Oak Orchard Creek, Upper, and tribs
Genesee	Bowen Brook and tribs
Genesee	Bigelow Creek and tribs
Greene	Schoharie Reservoir
Greene	Sleepy Hollow Lake
Herkimer	Steele Creek tribs
Kings	Hendrix Creek
Lewis	Mill Creek/South Branch and tribs
Livingston	Conesus Lake
Livingston	Jaycox Creek and tribs
Livingston	Mill Creek and minor tribs
Monroe	Genesee River, Lower, Main Stem
Monroe	Genesee River, Middle, Main Stem
Monroe	Black Creek, Lower, and minor tribs
Monroe	Buck Pond
Monroe	Long Pond
Monroe	Cranberry Pond
Monroe	Mill Creek and tribs
Monroe	Shipbuilders Creek and tribs
Monroe	Minor tribs to Irondequoit Bay
Monroe	Thomas Creek/White Brook and tribs
Nassau	Glen Cove Creek, Lower, and tribs
Nassau	LI Tribs (fresh) to East Bay
Nassau	East Meadow Brook, Upper, and tribs
Nassau	Hempstead Bay
Nassau	Hempstead Lake
Nassau	Grant Park Pond
Niagara	Bergholtz Creek and tribs
Oneida	Ballou, Nail Creeks
Onondaga	Ley Creek and tribs
Onondaga	Onondaga Creek, Lower and tribs
Onondaga	Onondaga creek, Middle and tribs
Onondaga	Onondaga Creek, Upper, and minor tribs
Onondaga	Harbor Brook, Lower, and tribs
Onondaga	Ninemile Creek, Lower, and tribs
Onondaga	Minor tribs to Onondaga Lake
Ontario	Honeoye Lake
Ontario	Hemlock Lake Outlet and minor tribs
Ontario	Great Brook and minor tribs
Oswego	Lake Neatahwanta
Putnam	Oscawana Lake
Putnam	Lake Carmel
Queens	Jamaica Bay, Eastern, and tribs (Queens)
Queens	Bergen Basin
Queens	Shellbank Basin
Rensselaer	Snyders Lake
Richmond	Grasmere, Arbutus and Wolfes Lakes
Saratoga	Dwaas Kill and tribs
Saratoga	Tribs to Lake Lonely
Saratoga	Lake Lonely
Saratoga	Schuyler Creek and tribs
Schenectady	Collins Lake

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Schoharie	Engleville Pond		
Schoharie	Summit Lake		
St. Lawrence	Black Lake Outlet/Black Lake		
Steuben	Lake Salubria		
Steuben	Smith Pond		
Suffolk	Millers Pond		
Suffolk	Mattituck (Marratooka) Pond		
Suffolk	Tidal tribs to West Moriches Bay		
Suffolk	Canaan Lake		
Suffolk	Lake Ronkonkoma		
Tompkins	Cayuga Lake, Southern End		
Tompkins	Owasco Inlet, Upper, and tribs		
Ulster	Ashokan Reservoir		
Ulster	Esopus Creek, Upper, and minor tribs		
Warren	Lake George		
Warren	Tribs to L.George, Village of L George		
Warren	Huddle/Finkle Brooks and tribs		
Warren	Indian Brook and tribs		
Warren	Hague Brook and tribs		
Washington	Tribs to L.George, East Shore of Lake George		
Washington	Cossayuna Lake		
Wayne	Port Bay		
Wayne	Marbletown Creek and tribs		
Westchester	Peach Lake		
Westchester	Mamaroneck River, Lower		
Westchester	Mamaroneck River, Upper, and minor tribs		
Westchester	Sheldrake River and tribs		
Westchester	Blind Brook, Lower		
Westchester	Blind Brook, Upper, and tribs		
Westchester	Lake Lincolndale		
Westchester	Lake Meahaugh		
Wyoming	Java Lake		
Wyoming	Silver Lake		

Note: The list above identifies those waters from the final New York State "2008 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated May 26, 2008, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD, PO BOX 220 WARRENSBURG, NY 12885-0220 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

1358331598

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR ☐☐☐☐☐☐
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-10-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State ☐☐ Zip ☐☐☐☐☐ - ☐☐☐☐

Phone (Owner/Operator) ☐☐☐ - ☐☐☐ - ☐☐☐☐

Fax (Owner/Operator) ☐☐☐ - ☐☐☐ - ☐☐☐☐

Email (Owner/Operator)

FED TAX ID ☐☐ - ☐☐☐☐☐☐☐ (not required for individuals)

Project Site Information

Project/Site Name

Street Address (NOT P.O. BOX)

Side of Street
○ **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

State N Y Zip - County DEC Region

Name of Nearest Cross Street

Distance to Nearest Cross Street (Feet)

Project In Relation to Cross Street
○ **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)

Y Coordinates (Northing) 4

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in imperviousness**

○ **Redevelopment with no increase in imperviousness**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***note: for gas well drilling, non-high volume hydraulic fractured wells only**

4. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law ? ○ **Yes** ○ **No**

5. Is this a project which does not require coverage under the General Permit (e.g. Project done under an Individual SPDES Permit, or department approved remediation)? ○ **Yes** ○ **No**

6. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ○ **No**

7. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area. Round to the nearest tenth of an acre.

Total Site Acreage	**Acreage To Be Disturbed**	**Existing Impervious Area Within Disturbed**	**Future Impervious Area Within Disturbed**
.	.	.	.

8. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ○ **No**

9. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	**B**	**C**	**D**
%	%	%	%

10. Is this a phased project? ○ **Yes** ○ **No**

11. Enter the planned start and end dates of the disturbance activities

Start Date __/__/____ - **End Date** __/__/____

12. Identify the nearest, natural, surface waterbody(ies) to which construction site runoff will discharge.

Name

12a. Type of waterbody identified in Question 12?

- ○ Wetland / State Jurisdiction On Site (Answer 12b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 12b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

12b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

13. Has the surface waterbody(ies) in question 12 been identified as a 303(d) segment in Appendix E of GP-0-10-001? ○ **Yes** ○ **No**

14. Is this project located in one of the Watersheds identified in Appendix C of GP-0-10-001? ○ **Yes** ○ **No**

15. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? **If no, skip question 16.** ○ **Yes** ○ **No**

16. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? **If Yes, what is the acreage to be disturbed?** ◯ **Yes** ◯ **No**

.

17. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ◯ **Yes** ◯ **No**

18. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ◯ **Yes** ◯ **No** ◯ **Unknown**

19. What is the name of the municipality/entity that owns the separate storm sewer system?

20. Does any runoff from the site enter a sewer classified as a Combined Sewer? ◯ **Yes** ◯ **No** ◯ **Unknown**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book) ? ◯ **Yes** ◯ **No**

22. Does this construction activity require the development of a SWPPP that includes Water Quality and Quantity Control components (Post-Construction Stormwater Management Practices) **(If No, skip questions 23 and 27-35)** ◯ **Yes** ◯ **No**

23. Have the Water Quality and Quantity Control components of the SWPPP been developed in comformance with the current NYS Stormwater Management Design Manual ? ◯ **Yes** ◯ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ○ **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer

Contact Name (Last, Space, First)

Mailing Address

City

State Zip -

Phone - - Fax - -

Email

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-10-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name **MI**

Last Name

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ○ Silt Fence
- ○ Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ○ Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Water Quality and Quantity Control

Important: Completion of Questions 27-35 is not required if response to Question 22 is No.

Post-Construction Stormwater Management Practices

27. Indicate **all** Stormwater Management Practice(s) that will be installed/constructed on this site:

Ponds
- ○ **Micropool Extended Detention (P-1)**
- ○ **Wet Pond (P-2)**
- ○ **Wet Extended Detention (P-3)**
- ○ **Multiple Pond System (P-4)**
- ○ **Pocket Pond (P-5)**

Filtering
- ○ **Surface Sand Filter (F-1)**
- ○ **Underground Sand Filter (F-2)**
- ○ **Perimeter Sand Filter (F-3)**
- ○ **Organic Filter (F-4)**
- ○ **Bioretention (F-5)**
- ○ **Other**

Alternative Practice
- ○ **Rain Garden**
- ○ **Cistern**
- ○ **Green Roof**
- ○ **Stormwater Planters**
- ○ **Permeable Paving (Modular Block)**

Wetlands
- ○ **Shallow Wetland (W-1)**
- ○ **Extended Detention Wetland (W-2)**
- ○ **Pond/Wetland System (W-3)**
- ○ **Pocket Wetland (W-4)**

Infiltration
- ○ **Infiltration Trench (I-1)**
- ○ **Infiltration Basin (I-2)**
- ○ **Dry Well (I-3)**
- ○ **Underground Infiltration System**

Open Channels
- ○ **Dry Swale (O-1)**
- ○ **Wet Swale (O-2)**

Verified Proprietary Practice
- ○ **Hydrodynamic**
- ○ **Wet Vault**
- ○ **Media Filter**

28. Describe other stormwater management practices not listed above or explain any deviations from the technical standards.

29. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

30. Provide the total water quality volume required and the total provided for the site.

WQv Required ☐☐☐.☐☐☐ **acre-feet**

WQv Provided ☐☐☐.☐☐☐ **acre-feet**

31. Provide the following Unified Stormwater Sizing Criteria for the site.

Total Channel Protection Storage Volume (CPv) - Extended detention of post-developed 1 year, 24 hour storm event

CPv Required ☐☐☐.☐☐☐ **acre-feet**

CPv Provided ☐☐☐.☐☐☐ **acre-feet**

31a. The need to provide for channel protection has been waived because:

○ **Site discharges directly to fourth order stream or larger**

Total Overbank Flood Control Criteria (Qp) - Peak discharge rate for the 10 year storm

Pre-Development ☐☐☐.☐☐☐ **CFS**

Post-development ☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf) - Peak discharge rate for the 100 year storm

Pre-Development ☐☐☐.☐☐☐ **CFS**

Post-development ☐☐☐.☐☐☐ **CFS**

31b. The need to provide for flood control has been waived because:

○ **Site discharges directly to fourth order stream or larger**

○ **Downstream analysis reveals that flood control is not required**

IMPORTANT: For questions 31 and 32, impervious area should be calculated considering the project site and all offsite areas that drain to the post-construction stormwater management practice(s). (Total Drainage Area = Project Site + Offsite areas)

32. Pre-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the existing impervious areas before construction begins. ☐☐☐%

33. Post-Construction Impervious Area - As a percent of the Total Drainage Area, enter the percentage of the future impervious areas that will be created/remain on the site after completion of construction. ☐☐☐%

34. Indicate the total number of post-construction stormwater management practices to be installed/constructed. ☐☐

35. Provide the total number of stormwater discharge points from the site. (include discharges to either surface waters or to separate storm sewer systems) ☐☐

36. Identify other DEC permits that are required for this project.

DEC Permits

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Other SPDES
- ○ Solid Waste
- ○ None
- ○ Other
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15

37. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ○ **No**
If Yes, Indicate Size of Impact. _____.__

38. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ○ **No**
(If No, skip question 39)

39. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

40. If this NOI is being submitted for the purpose of continuing coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. NYR_____

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date __ / __ / ____

APPENDIX B-2

EROSION AND SEDIMENT CONTROLS

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

New York State Standards and Specifications for Erosion and Sediment Control

August 2005



New York State
Department of Environmental Conservation

George E. Pataki, Governor

STANDARD AND SPECIFICATIONS FOR TEMPORARY CRITICAL AREA PLANTINGS



Definition

Providing erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.

Purpose

To provide temporary erosion and sediment control. Temporary control is achieved by covering all bare ground areas that exist as a result of construction or a natural event.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).
IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding.

STANDARD AND SPECIFICATIONS FOR MULCHING



Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8” x 100” 2-sided plastic, 48” x 180” 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3” pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3”	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 3.8
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR TEMPORARY SWALE



Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary swales are constructed:

1. to divert flows from entering a disturbed area.

2. intermittently across disturbed areas to shorten overland flow distances.

3. to direct sediment laden water along the base of slopes to a trapping device.

4. to transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.5 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specification for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 7 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A (<5 Ac.)	Flow Channel B (5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with RECP, Sod, or lined with plastic or 2 in. stone
3	5.1-8.0%	Seed and cover with RECP, Sod, or line with plastic or 2 in. stone	Line with 4-8 in. or stone or Recycled Concrete Equivalent[2] or geotextile
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2] or geotextile	Site Specific Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.
[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

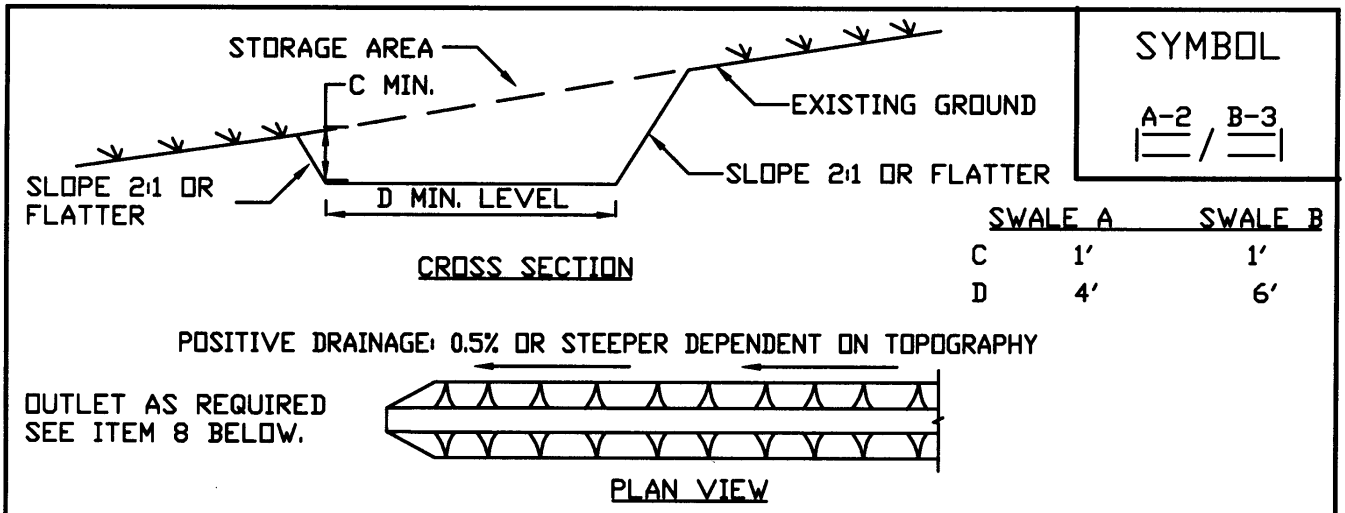
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If a swale is used to divert clean water flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale



CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC -10AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE
4	8.1-20.%	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TEMPORARY SWALE

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE



Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.3 on page 5A.8 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or temporary swale; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike – 2 feet minimum.

Width of swale – 2 feet minimum.

Grade – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

Stabilization – The disturbed area of the dike and swale shall be stabilized within 7 days of installation, in accordance with the standard and specifications for temporary swales.

Outlet

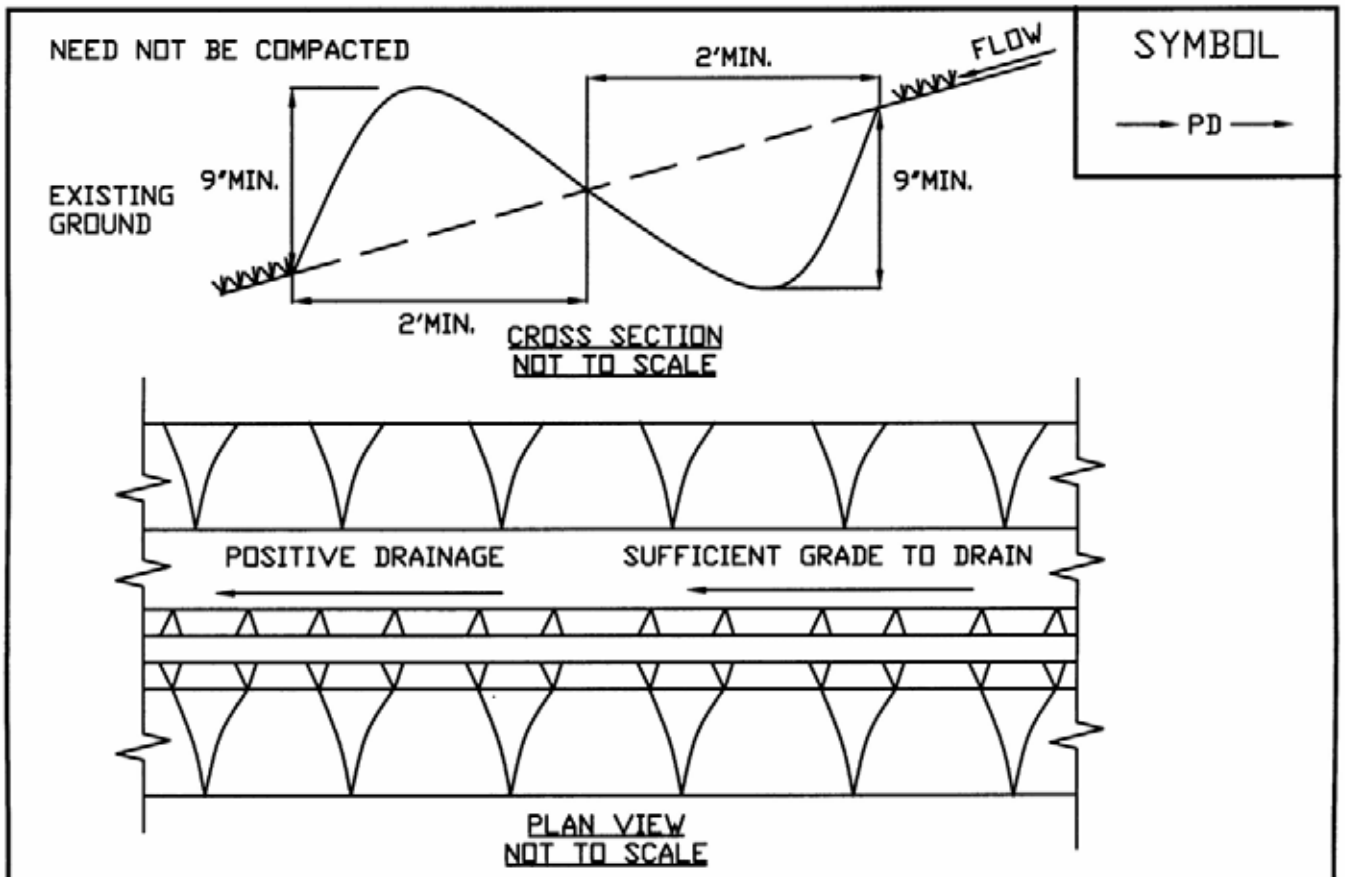
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 5A.3
Perimeter Dike/Swale



CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

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NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE



Definition

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

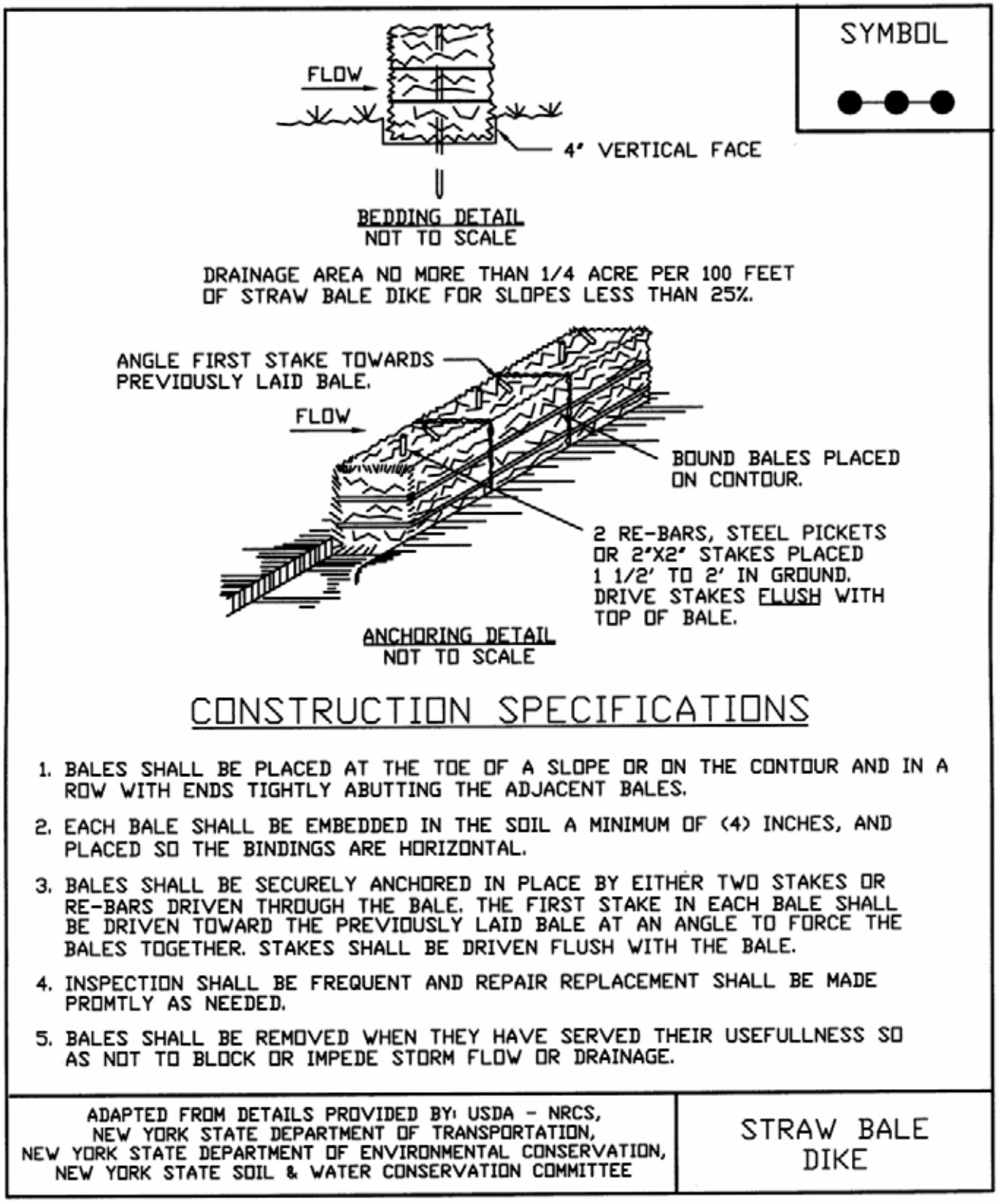
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of fence and the length of slope above the dike shall be less than 200 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.7 on page 5A.18 or details.

Figure 5A.7
Straw Bale Dike



STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

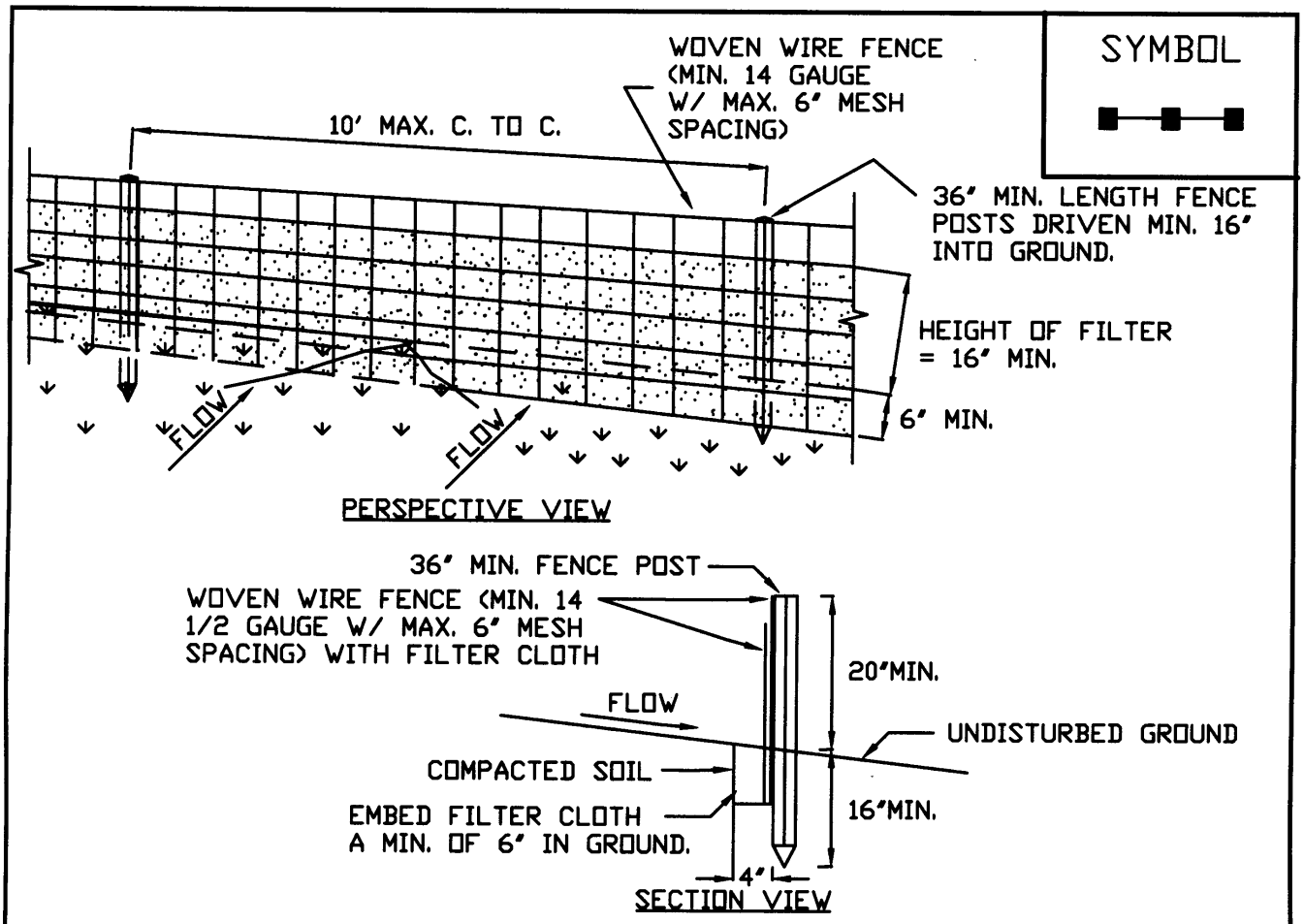
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP



Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment.

Purpose

The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainage way, at a storm drain inlet, or other points of collection from a disturbed area.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specification for Sediment Basin on page 5A.49.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through V).

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of the trap. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are five (5) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Grass Outlet Sediment Trap
III. Catch Basin Sediment Trap
IV. Stone Outlet Sediment Trap
V. Riprap Outlet Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or

2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment traps may be interchangeable in the field with stone outlet or riprap sediment traps provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter.

See details for Pipe Outlet Sediment Trap ST-I in Figure 5A.16 (1) and 5A.16 (2) on pages 5A.38 and 5A.39.

II. Grass Outlet Sediment Trap

A Grass Outlet Sediment Trap consists of a trap formed by excavating the earth to create a holding area. The trap has a discharge point over natural existing grass. The outlet crest width (feet) shall be equal to four (4) times the drainage area (acres) with a minimum width of four (4) feet. The outlet shall be free of any restrictions to flow. The outlet lip must remain undisturbed and level. The volume of this trap shall be computed at the elevation of the crest of the outlet. Grass outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Grass Outlet Sediment Trap ST-II in Figure 5A.17 on page 5A.40.

III. Catch Basin Sediment Trap

A Catch Basin Sediment Trap consists of a basin formed by excavation on natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet.

A yard drain inlet or an inlet in the median strip of a dual highway could use the inlet opening for the type outlet. The trap should be out of the roadway so as not to interfere with future compaction or construction. Placing the trap on the opposite side of the opening and diverting water from the roadway to the trap is one means of doing this. Catch basin sediment traps shall be limited to a three (3) acre maximum drainage area. The volume of this trap is measured at the elevation of the crest of the outlet (invert of the inlet opening).

See details for Catch Basin Sediment Trap ST-III in Figure 5A.18 on page 5A.41.

IV. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe or riprap outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-IV in Figure 5A.19 on page 5A.42.

V. Riprap Outlet Sediment Trap

A Riprap Outlet Sediment Trap consists of a trap formed by an excavation and embankment. The outlet for this trap shall be through a partially excavated channel lined with riprap. This outlet channel shall discharge onto a stabilized area or to a stable watercourse. The riprap outlet sediment trap may be used for drainage areas of up to a maximum of 15 acres.

Design Criteria for Riprap Outlet Sediment Trap

1. The total contributing drainage area (disturbed or undisturbed either on or off the developing property) shall not exceed 15 acres.
2. The storage needs for this trap shall be computed using 3600 cubic feet of required storage for each acre of drainage area. The storage volume provided can be figured by computing the volume of storage area available behind the outlet structure up to an elevation of one (1) foot below the level weir crest.
3. The maximum height of embankment shall not exceed five (5) feet.
4. The elevation of the top of any dike directing water to a riprap outlet sediment trap will equal or exceed the minimum elevation of the embankment along the entire length of this trap.

Riprap Outlet Sediment Trap ST-V
(for Stone Lined Channel)

Contributing Drainage Area (ac.)	Depth of Channel (a) (ft.)	Length of Weir (b) (ft.)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0
11	2.0	14.0
12	2.0	14.0
13	2.0	16.0
14	2.0	16.0
15	2.0	18.0

See details for Riprap Outlet Sediment Trap ST-V on Figures 5A.20(1) and 5A.20(2) on pages 5A.43 and 5A.44.

Optional Dewatering Methods

Optional dewatering devices may be designed for use with sediment traps. Included are two methods, which may be used. See Figure 5A.21 on page 5A.45 for details.

Figure 5A.16(1)
Pipe Outlet Sediment Trap: ST-I

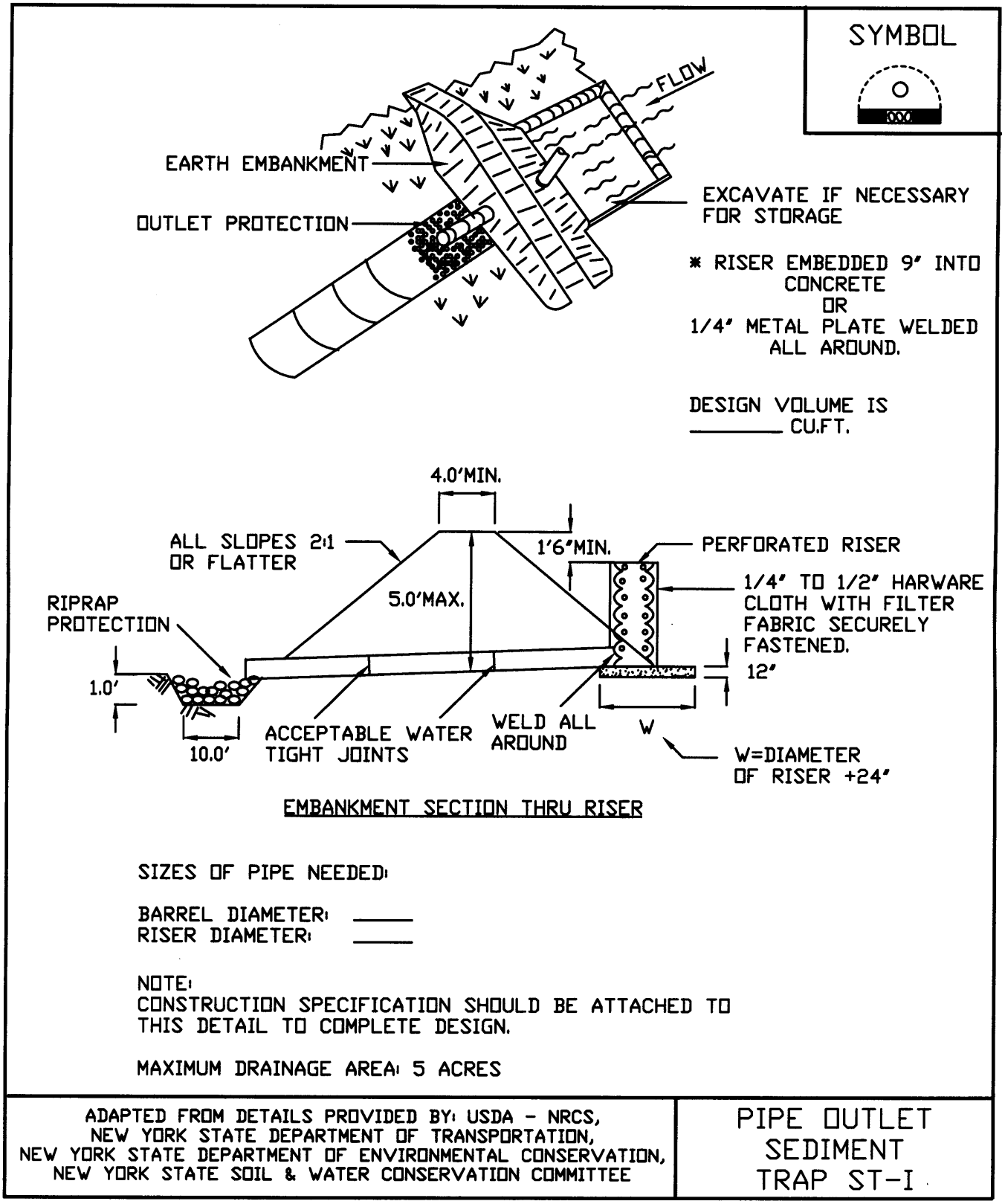


Figure 5A.16(2)
Pipe Outlet Sediment Trap: ST-I—Construction Specifications

SYMBOL

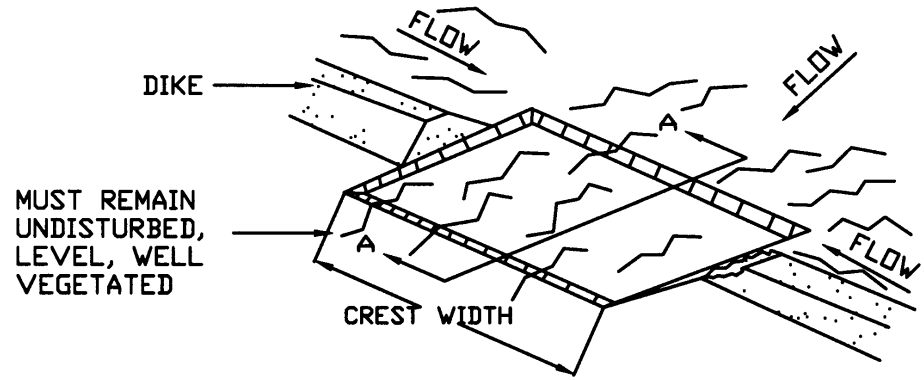


CONSTRUCTION SPECIFICATIONS

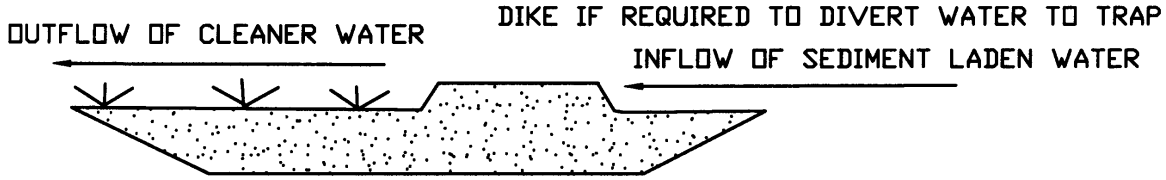
1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PIPE OUTLET SEDIMENT TRAP ST-I

Figure 5A.17
Grass Outlet Sediment Trap: ST-II



SYMBOL



CREST WIDTH (FT)=4xDRAINAGE AREA (ACRES)

SECTION A - A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

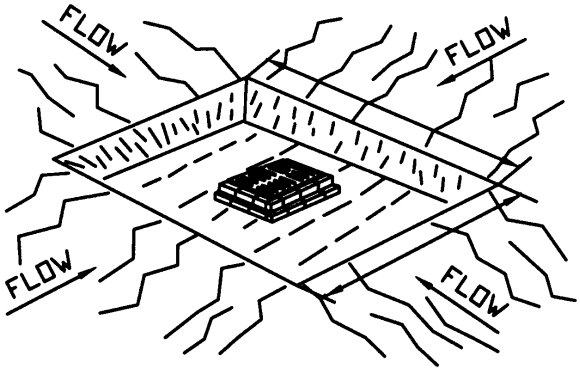
CONSTRUCTION SPECIFICATIONS

1. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 5 ACRES

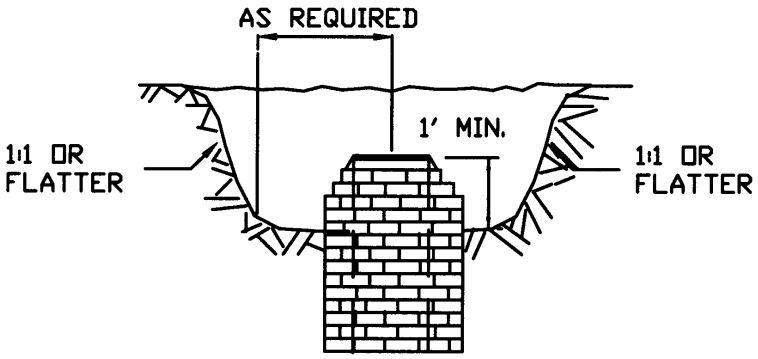
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASS OUTLET SEDIMENT TRAP ST-II

Figure 5A.18
Catch Basin Sediment Trap: ST-III



SYMBOL

YARD DRAIN



CROSS SECTION

CONSTRUCTION SPECIFICATIONS

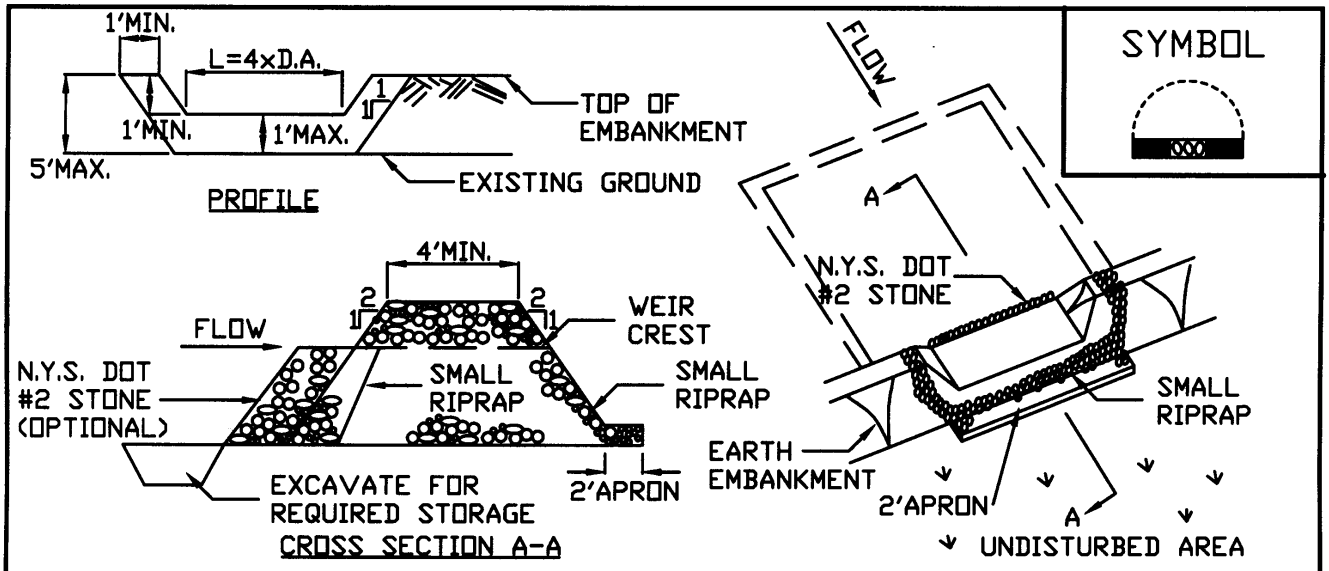
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 3 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

CATCH BASIN
SEDIMENT TRAP
ST-III

Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.20(1)
Riprap Outlet Sediment Trap: ST-V

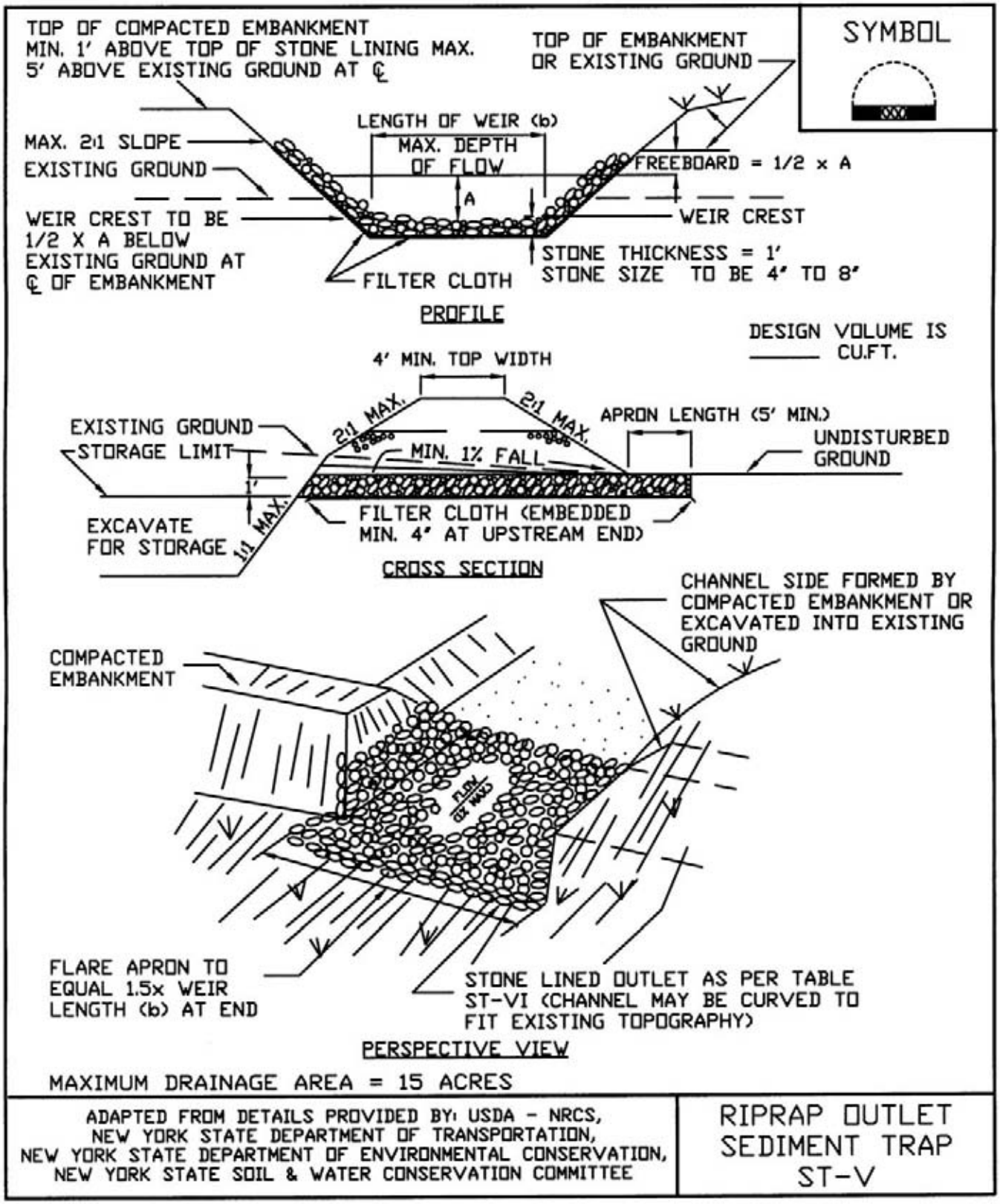


Figure 5A.202)
Riprap Outlet Sediment Trap: ST-V—Construction Specifications

SYMBOL



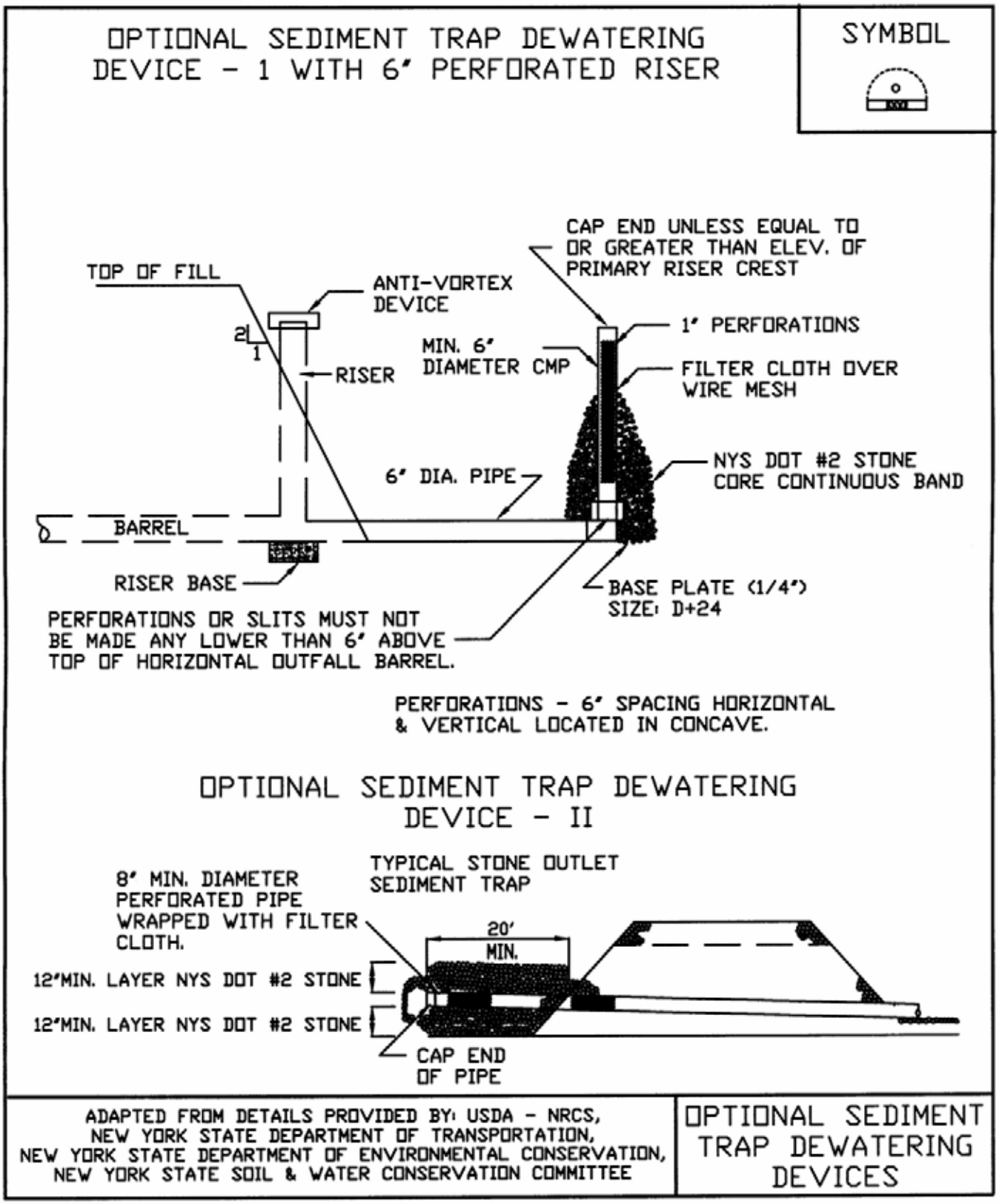
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

RIPRAP OUTLET
SEDIMENT TRAP
ST-V

Figure 5A.21
Optional Sediment Trap Dewatering Devices



APPENDIX B-3

NYSDOH'S GENERIC COMMUNITY AIR MONITORING PLAN
FUGITIVE DUST AND PARTICULATE MONITORING

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX C

EXAMPLE
HEALTH & SAFETY PLAN (HASP)
&
COMMUNITY AIR MONITORING PLAN (CAMP)

Site-Wide Health and Safety Plan (HASP)

Tecumseh Redevelopment BCP Sites
Lackawanna, New York

April 2010
Revised July 2013

0071-012-322

Prepared By:

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Benchmark Environmental Engineering & Science, PLLC

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TECUMSEH REDEVELOPMENT SITE
SITE-WIDE HEALTH AND SAFETY PLAN

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: _____

Project Manager: _____

Designated Site Safety and Health Officer: _____

Acknowledgement:
I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

TECUMSEH REDEVELOPMENT BCP SITES
SITE-WIDE HEALTH AND SAFETY PLAN

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1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by TurnKey Environmental Restoration, LLC and Benchmark Environmental Engineering & Science, PLLC employees (referred to jointly hereafter as "TurnKey-Benchmark") during Brownfield Cleanup Program (BCP) activities on the Tecumseh Redevelopment Site (former Bethlehem Steel Lackawanna Works), located in the City of Lackawanna, New York. This HASP presents procedures for TurnKey-Benchmark employees who will be involved with investigation and remedial field activities; it does not cover the activities of other contractors, subcontractors, or other individuals on the Site. These firms will be required to develop and enforce their own HASPs as discussed in Section 2.0. TurnKey-Benchmark accepts no responsibility for the health and safety of contractor, subcontractor, or other personnel.

This HASP presents information on known Site health and safety hazards using available historical information, and identifies the equipment, materials, and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards.

1.2 Background

Tecumseh Redevelopment Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast. Figure 2 provides an overview of the Tecumseh Property, including major leased or licensed parcels, and adjacent parcels owned by others.

The Tecumseh property is located on a portion of the Site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was

formerly used for the production of steel, coke, and related products by Bethlehem Steel Corporation (BSC). According to the Real Estate Records, in 1937, Bethlehem Steel Company owned the subject Site. In 1964, Bethlehem Steel Company merged into Bethlehem Steel Corporation. Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in January 2005. In September 2006, USEPA approved the RFI and terminated Bethlehem Steel's (and in turn Tecumseh's) obligation under the 1990 Administrative Order. Tecumseh has entered into an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) to undertake a corrective measures study (CMS) at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property.

Outside of the CMS Area, Tecumseh designated five parcels for redevelopment under the New York State Brownfield Cleanup Program (BCP). These include: The Phase I, IA, II, and III Business Park, which are at various points of investigation and cleanup under the BCP and are slated for commercial/industrial redevelopment, and the Steel Winds Site, which was remediated under the BCP and redeveloped as a commercial wind farm.

This Site-Wide Health and Safety Plan (HASP) applies to the Business Park Sites under the BCP.

1.3 Known and Suspected Environmental Conditions

The Phase I, IA, II, and III Business Parks were formerly used to house portions of BSC's steelmaking operations. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as semi-volatile and volatile organic compounds (SVOCs and VOCs). In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX) in groundwater.

1.4 Parameters of Interest

Constituents of potential concern (COPCs) at the BCP Sites include:

- **Volatile Organic Compounds (VOCs)** – VOCs present at elevated concentration may include benzene, toluene, ethylbenzene, and xylene (i.e., BTEX). These VOCs are typically associated with storage and handling of petroleum products such as gasoline.
- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs present at elevated concentrations may include base-neutral semi-volatile organic compounds (SVOCs) from oils, greases, and fuels associated with the operation of locomotive engines, steel mills, petroleum bulk storage, and other historic steel manufacturing operations. Specifically, polycyclic aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Although PAHs are commonly found in urban soil environments, they may be present at the Site at concentrations that are elevated compared to typical "background" levels. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned.
- **Polychlorinated Biphenyls (PCBs)** – The potential impact of surface and subsurface soils by PCBs in discrete areas associated with former substations, rail yards, and hydraulic pump houses.
- **Inorganic Compounds** – Inorganic COPCs potentially present at elevated concentrations due to steel making activities may include arsenic, cadmium, chromium, lead, and mercury. Several of these parameters are components of coke and slag which are prevalent in the planned work area.

In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX).

1.5 Overview of BCP Activities

TurnKey-Benchmark personnel will be on-site to observe BCP investigation and remedial activities. General field activities to be completed are described below. Detailed BCP activities are more fully described in the individual work plans for each property.

1. **Soil/Fill Excavation:** TurnKey-Benchmark will monitor all soil/fill excavations (e.g., wind turbine foundation excavation, test pit investigations) and related activities to visually inspect soil/fill for evidence of contamination.

2. **Soil/Fill Documentation Sampling:** TurnKey-Benchmark will collect surface and subsurface soil/fill documentation samples following excavation.
3. **Surface Water Management:** During excavation, surface water and/or perched groundwater infiltration may occur. TurnKey-Benchmark will direct the contractor to collect and characterize the surface water for proper disposal.
4. **Subgrade Work:** Significant grading may be required before implementation of remedial measures (e.g., cover system placement).
5. **Cover Soil Placement:** A soil cover system will be placed over select portions of the Site to reduce potential contact with impacted soil/fill. TurnKey-Benchmark will oversee installation of the cover system.
6. **Groundwater Monitoring Well Installation and Sampling:** TurnKey-Benchmark will install groundwater monitoring wells and collect samples for the long-term groundwater monitoring program.
7. **Groundwater Remediation:** TurnKey-Benchmark personnel will oversee the potential groundwater remediation at the Site, which may include installation of treatment (ORC/HRC) filter socks in groundwater monitoring wells.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility, and communication as they pertain to health and safety functions at the BCP Sites. The purpose of this chapter is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations, and establishes the lines of communications among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at the BCP Sites.

2.1 Roles and Responsibilities

All Turnkey-Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety, and health, and other personnel on this site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The TurnKey-Benchmark Corporate Health and Safety Director is ***Mr. Michael M. Yount, CESCO.*** The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates TurnKey-Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for these Sites is ***Thomas H. Forbes, P.E.*** The Project Manager has the responsibility and authority to direct all TurnKey-Benchmark work operations at the site. The Project Manager coordinates safety and health functions with the

Site Safety and Health Officer, and bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the site work plan.
- Providing TurnKey-Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this site is ***Mr. Richard L. Dubisz***. The qualified alternate SSHO is ***Mr. Thomas Behrendt.*** The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for TurnKey-Benchmark personnel on the site.
- Serving as the point of contact for safety and health matters.
- Ensuring that TurnKey-Benchmark field personnel working on the site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP
- Maintaining site-specific safety and health records as described in this HASP
- Coordinating with the Project Manager, Site Workers, and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other site personnel who will have health and safety responsibilities will include the Remedial Contractor, who will be responsible for developing, implementing, and enforcing a Health and Safety Plan equally stringent or more stringent than TurnKey-Benchmark's HASP. TurnKey-Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. Each Contractor's HASP shall cover all non-TurnKey/ Benchmark site personnel. Each Contractor shall assign a SSHO who will coordinate with TurnKey-Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to TurnKey-Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the BCP Sites, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of soil/fill, and through the inhalation of contaminated particles or vapors, during test pit completion, monitoring well installation, and soil/fill excavation. In addition, the use of heavy construction equipment (e.g., dozer) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

As discussed in Section 1.3, historic activities related to the former steel-manufacturing operations and facilities have resulted in elevated concentrations of VOCs, SVOCs, PCBs, and inorganic compounds in soil/fill and groundwater. Table 1 identifies maximum concentrations of COPCs detected throughout the Tecumseh property. Table 2 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent constituents of potential concern and related health and safety guidance and criteria are provided below.

- **Arsenic (CAS #7440-38-2)** is a naturally occurring element and is usually found combined with one or more elements, such as oxygen or sulfur. Inhalation is a more important exposure route than ingestion. First phase exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.
- **Benzene (CAS #71-43-2)** poisoning occurs most commonly through inhalation of the vapor; however, benzene can also penetrate the skin and poison in that way. Locally, benzene has a comparatively strong irritating effect, producing

erythema and burning and, in more severe cases, edema and blistering. Exposure to high concentrations of the vapor (i.e., 3,000 ppm or higher) may result in acute poisoning characterized by the narcotic action of benzene on the central nervous system. In acute poisoning, symptoms include confusion, dizziness, tightening of the leg muscles, and pressure over the forehead. Chronic exposure to benzene (i.e., long-term exposure to concentrations of 100 ppm or less) may lead to damage of the blood-forming system. Benzene is very flammable when exposed to heat or flame and can react vigorously with oxidizing materials.

- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride, or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.
- **Chromium (CAS #7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.
- **Ethylbenzene (CAS #100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin liver and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, headache. Narcosis and coma may result in more severe cases.
- **Lead (CAS #7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect memory. Lead may cause anemia.
- **Mercury (CAS #7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Over-exposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue, and salivation. Mercury is a skin and eye irritant.
- **Naphthalene (CAS #91-20-3)** is a white solid with a strong smell; is also called mothballs, moth flakes, white tar, and tar camphor. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned. Acute exposure to naphthalene can cause systemic reactions, including nausea, headache,

diaphoresis, hematuria, fever, anemia, liver damage, vomiting, convulsions, and coma. Acute exposure can also cause eye irritation, confusion, excitement, malaise, abdominal pain, irritation to the bladder, profuse sweating, jaundice, hematopoietic, hemoglobinuria, renal shutdown, and dermatitis. Exposure to a large amount of naphthalene can cause red blood cells to be damaged or destroyed, a condition called hemolytic anemia, which leads to fatigue, lack of appetite, restlessness, and a pale appearance. Poisoning may occur by ingestion of large doses, skin and/or eye contact, inhalation, or skin absorption.

- **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAHs are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.
- **Polychlorinated Biphenyls (PCBs)** are associated with former substations, rail yards, and hydraulic pump houses on the Site. PCBs can be absorbed into the body by inhalation of its aerosol, through the skin, and by ingestion. Repeated or prolonged contact with skin may cause dermatitis. PCBs may have effects on the liver. Animal tests show that PCBs possibly cause toxic effects in human reproduction. In the food chain, bioaccumulation takes place, specifically in aquatic organisms. A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.
- **Toluene (CAS #108-88-3)** is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.
- **Xylenes (o, m, and p) (CAS #95-47-6, 108-38-3, and 106-42-3)** are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue,

muscular weakness, drowsiness, and coordination loss. Repeated exposures may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure of high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

With respect to the anticipated BCP activities discussed in Section 1.5, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

BCP investigation and remedial activities at the Tecumseh site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as grading equipment, excavators, and tandem trucks.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may be present during investigation and remedial activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing investigation and remedial activities at the Site (such as, but not limited to, equipment operators, general laborers, and supervisors) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the Site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and site control.
- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.

- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at TurnKey-Benchmark's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for site safety and health.
- Safety, health and other hazards present on the Site.
- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.
- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.

- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (i.e., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix A of this HASP, Emergency Response Plan.

4.4 Site Visitors

Each Contractor's SSHO will provide a site-specific briefing to all site visitors and other non-TurnKey/Benchmark personnel who enter the Site beyond the site entry point. The site-specific briefing will provide information about site hazards, the site layout including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to TurnKey-Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all TurnKey-Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured; received a health impairment; developed signs or symptoms of over-exposure to hazardous substances; or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by Health Works WNY, an occupational health care provider under contract with TurnKey-Benchmark. Health Works WNY's local facility is located at 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the TurnKey-Benchmark Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).
- Medical certification of physical requirements (i.e., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

In conformance with OSHA regulations, TurnKey-Benchmark will maintain and

preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All TurnKey-Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the site as required by the HASP or as modified by the site safety officer. Excessive facial hair (i.e., beards, long mustaches, or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the TurnKey-Benchmark occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during the workday.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for TurnKey-Benchmark employees, as requested and required.

The recommended specific safety practices for working around the contractor's equipment (e.g., backhoes, bulldozers, excavators, etc.) are as follows:

- Although the Contractor and subcontractors are responsible for their equipment and safe operation of the site, TurnKey-Benchmark personnel are also

responsible for their own safety.

- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots, and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the site.
- Proper lighting must be provided when working at night.
- Construction activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories designated A through D consistent with USEPA Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.
- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.
- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured, and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.
- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in

conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training, and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based on current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the investigation and remedial activities, the minimum required Levels of Protection for these tasks shall be as identified in Table 4.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exists that organic vapors and/or particulates may be released to the air during intrusive construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

TurnKey-Benchmark personnel will conduct routine, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by TurnKey-Benchmark personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Air Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined by NYSDOH Appendix 1A Generic Community Air Monitoring Plan (Reference 4) and attached as Appendix C. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and

the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community because of site investigation work.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, explosimeter, or other appropriate instrument(s), will be used by TurnKey-Benchmark personnel to monitor organic vapor concentrations as specified in this HASP. In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion using a real-time particulate monitor as specified in this plan. In the absence of such monitoring, appropriate respiratory protection for particulates shall be donned. Sustained readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for TurnKey-Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID - Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during RD activities involving deep excavation, if required. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.
- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.
- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.
- 19.5-21% oxygen - Proceed with extreme caution; attempt to determine potential source of oxygen displacement.
- Less than 19.5% oxygen - Leave work zone immediately.
- 21-25% oxygen - Continue engineering operations with caution.
- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of site soil/fill. Action levels based on the instrument readings shall be as follows:

- Less than 50 $\mu g/m^3$ - Continue field operations.
- 50-150 $\mu g/m^3$ - Don dust/particulate mask or equivalent
- Greater than 150 $\mu g/m^3$ - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (i.e., wetting of excavated soils or tools at discretion of SSHO).

Readings with the organic vapor analyzer, combustible gas meter, and particulate monitor will be recorded and documented on the appropriate Project Field Forms. All instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume but more frequent intervals of monitoring, as directed by the SSHO, must be conducted.
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the SSHO, are conducted.
  - If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone, the SSHO must be notified and work activities shut down. The SSHO will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) personnel to review.

- **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**
  - If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.
  - If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be

monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).

- If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

o ***Major Vapor Emission Response Plan*:**

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.
2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.
3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the SSHO.

The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

o **EXPLOSIVE VAPORS:**

- Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
- Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **Airborne Particulate Community Air Monitoring**

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and that visible dust is not migrating from the work area.
- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 $\mu g/m^3$ above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding RQ.
- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding RQ.

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes

that could form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.
- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on site history and decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during Remedial efforts.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented as Appendix A of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be

roped, ribboned, or otherwise blocked off to prevent unauthorized access.

- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Contractor will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (NYSDEC approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the site. The response contractor may use heavy equipment (i.e., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Op-Tech: (716) 873-7680
- Environmental Products and Services, Inc.: (716) 447-4700

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and

procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Site will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to TurnKey-Benchmark employees. The SSHO and/or his or her designee will be responsible for monitoring TurnKey-Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.
- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.
- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet, and abdomen.
- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.
- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same. If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.
- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No TurnKey-Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frost nip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions; removal of boots and gloves; soaking the injured part in warm water (102 to 108 degrees Fahrenheit); and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue, which will be firm to the touch but will yield little pain. The treatment is identical for Frost nip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frost nip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering
  2) Apathy (i.e., a change to an indifferent or uncaring mood)
  3) Unconsciousness
  4) Bodily freezing

  Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

  1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)
  2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).
  3) Perform passive re-warming with a blanket or jacket wrapped around

the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated area, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
    - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
    - At a workers request.
    - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).
    - As a screening measure whenever anyone worker on site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established on a daily basis and communicated to all employees and other site users by the SSHO. It shall be each Contractor's SSHO's responsibility to ensure that all site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone"): The area where contaminated materials may be exposed, excavated, or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.
- Contamination Reduction Zone: The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment, and samples must remain in the Contamination Reduction Zone until decontaminated.
- Support Zone: The part of the site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation and construction activities involving disruption or handling of site soils or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling/construction activity.
- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling/construction activity.
- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the completion of the task will be allowed access to these areas if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO.

The SSHO will maintain a Health and Safety Logbook containing the names of TurnKey-Benchmark workers and their level of protection. The zone boundaries may be

changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for TurnKey-Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions that may arise at the site. All TurnKey-Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves.

Station 3 - Tape, Outer Boot, and Glove Removal: Remove tape, outer boots, and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face, and forearms with absorbent wipes. If field activities proceed for six consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

Decontamination of heavy equipment will be conducted by the Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

Decontamination of all tools used for sample collection purposes will be conducted by TurnKey-Benchmark personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal), which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment.
- Wash with water to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.
- Wrap all parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by TurnKey-Benchmark employees is not anticipated to be necessary to complete the investigation and remedial activities identified in Section 2.0. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by TurnKey-Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through TurnKey-Benchmark's corporate Health and Safety Director. TurnKey-Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by each Contractor and are required on all heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling, or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the NFPA.

14.4 Hot Work

If the scope of work necessitates welding or blowtorch operation, the hot work permit presented in Appendix B will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix A. The hospital route map is presented as Figure A-1.

16.0 REFERENCES

1. New York State Department of Health. 2002. *Generic Community Air Monitoring Plan, Appendix 1A, DER-10 Technical Guidance for Site Investigation and Remediation.* May 2010.

TABLES

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Parameter[1]	CAS No.	Maximum Detected Concentration [2]			
		Groundwater [3] (mg/L)	Surface Soil/Fill (mg/kg)	Sub-Surface Soil/Fill (mg/kg)	LNAPL (mg/kg)
Volatile Organic Compounds (VOCs):					
Benzene	71-43-2	570	0.0047	2800	14,000
Ethylbenzene	100-41-4	25	*Note 4*	170	4,600
Toluene	108-88-3	77	0.001	1700	5,700
Xylene, Total	1330-20-7	390	0.0017	1100	31,000
Polycyclic Aromatic Hydrocarbons (PAHs):					
Acenaphthene	83-32-9	0.36	*Note 4*	*Note 4*	400
Acenaphthylene	208-96-8	0.09	*Note 4*	*Note 4*	570
Anthracene	120-12-7	0.27	0.23	*Note 4*	240
Benz(a)anthracene	56-55-3	0.28	0.7	*Note 4*	27
Benzo(a)pyrene	50-32-8	0.23	0.56	*Note 4*	ND
Benzo(b)fluoranthene	205-99-2	0.069	0.86	*Note 4*	12
Benzo(ghi)perylene	191-24-2	0.033	0.35	*Note 4*	ND
Benzo(k)fluoranthene	207-08-9	0.071	0.38	*Note 4*	ND
Chrysene	218-01-9	0.26	0.67	*Note 4*	17
Dibenz(ah)anthracene	53-70-3	0.022	0.08	*Note 4*	ND
Fluoranthene	206-44-0	0.76	1.3	*Note 4*	200
Fluorene	86-73-7	1.7	*Note 4*	*Note 4*	9,600
Indeno(1,2,3-cd)pyrene	193-39-5	0.04	0.36	*Note 4*	ND
Naphthalene	91-20-3	280	0.29	1100	49,000
Phenanthrene	85-01-8	0.94	0.87	*Note 4*	800
Pyrene	129-00-0	0.41	0.87	*Note 4*	220
Inorganic Compounds:					
Arsenic	7440-38-2	70.6	30.5	17.7	28.2
Cadmium	7440-43-9	20.6	9.7	3.7	0.03
Chromium	7440-47-3	306	1190	508	1.7
Lead	7439-92-1	26.3	160	224	0.34
Mercury	7439-97-6	0.22	4.2	0.99	ND
Polychlorinated Biphenyls (PCBs):					
Aroclor 1242	53469-21-9	*Note 4*	*Note 4*	*Note 4*	2
Aroclor 1260	11096-82-5	*Note 4*	*Note 4*	*Note 4*	3.3

Notes:

1. Constituents were identified as parameters of interest during the RFI for the Benzol Plant Tank Storage Area (SWMU P-11).
2. Maximum detected concentrations as presented in the Final RFI Report for the Benzol Plant Tank Storage Area (SWMU P-11).
3. Groundwater analytical data collected from the Coke Oven Area of the Former Bethlehem Steel Lackawanna Coke Division Site.
4. Compounds with a detection frequency greater than 5% and a maximum concentration greater than the screening criteria were retained as potential parameters of interest during the RFI (Reference 1).

Acronyms:

NA = Not analyzed.
ND = Parameter not detected above method detection limits.

TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs): ppm						
Benzene	Benzol, Phenyl hydride	71-43-2	Ca	1	0.5	500
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Toluene	Methyl benzene, Methyl benzol	108-88-3	C-300	200	50	500
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Polycyclic Aromatic Hydrocarbons (PAHs) [2] : ppm						
Acenaphthene	*none*	83-32-9	*none*	--	--	--
Acenaphthylene	*none*	208-96-8	*none*	--	--	--
Anthracene	*none*	120-12-7	*none*	--	--	--
Benz(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(ghi)perylene	*none*	191-24-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Chrysene	*none*	218-01-9	*none*	--	--	--
Dibenz(ah)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--
Polychlorinated Inorganic Compounds: mg/m [3]						
Aroclor 1242	Chlorodiphenyl, 42% chlorine	53469-21-9	Ca	--	--	--
Aroclor 1260	Chlorodiphenyl, 60% chlorine	11096-82-5	*none*	--	--	--
Inorganic Compounds: mg/m [3]						
Arsenic	*none*	7440-38-2	Ca	0.01	0.01	5
Cadmium	*none*	7440-43-9	Ca	0.005	0.01	9
Chromium	*none*	7440-47-3	*none*	1	0.5	250
Lead	*none*	7439-92-1	*none*	0.05	0.15	100
Mercury	*none*	7439-97-6	C-0.1	0.1	0.05	10

Notes:

1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. Individual parameters listed are those most commonly detected at steel/coke manufacturing sites.
3. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:

Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hours/day @ 40 hours/week.
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-STEL or Short Term Exposure Limits are 15 minute exposures that should not be exceeded for even an instant. It is not a stand alone value but is accompanied by the TLV-TWA.
It indicates a higher exposure that can be tolerated for a short time without adverse effect as long as the total time weighted average is not exceded.
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximium exposure conconcentration allowable for 8 hours per day @ 40 hours per week

TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
1. Soil/Fill Excavation	x	x	
2. Soil/Fill Documentation Sampling	x	x	
3. Surface Water Management			x
4. Slag/Fill Subgrade Preparation	x	x	
5. Cover Soil Placement	x	x	
6. Groundwater Monitoring Well Installation/Sampling	x	x	x
7. Groundwater Remediation	x	x	x

Notes:
1. Activity as described in Section 1.5 of the Health and Safety Plan.

TABLE 4

REQUIRED LEVELS OF PROTECTION
FOR BCP INVESTIGATION AND REMEDIAL ACTIVITIES

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
1. Soil/Fill Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
2. Soil/Fill Documentation Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
3. Surface Water Management	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
4. Slag/Fill Subgrade Preparation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
5. Cover Soil Placement	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
6. Groundwater Monitoring Well Installation/Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
7. Groundwater Remediation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS

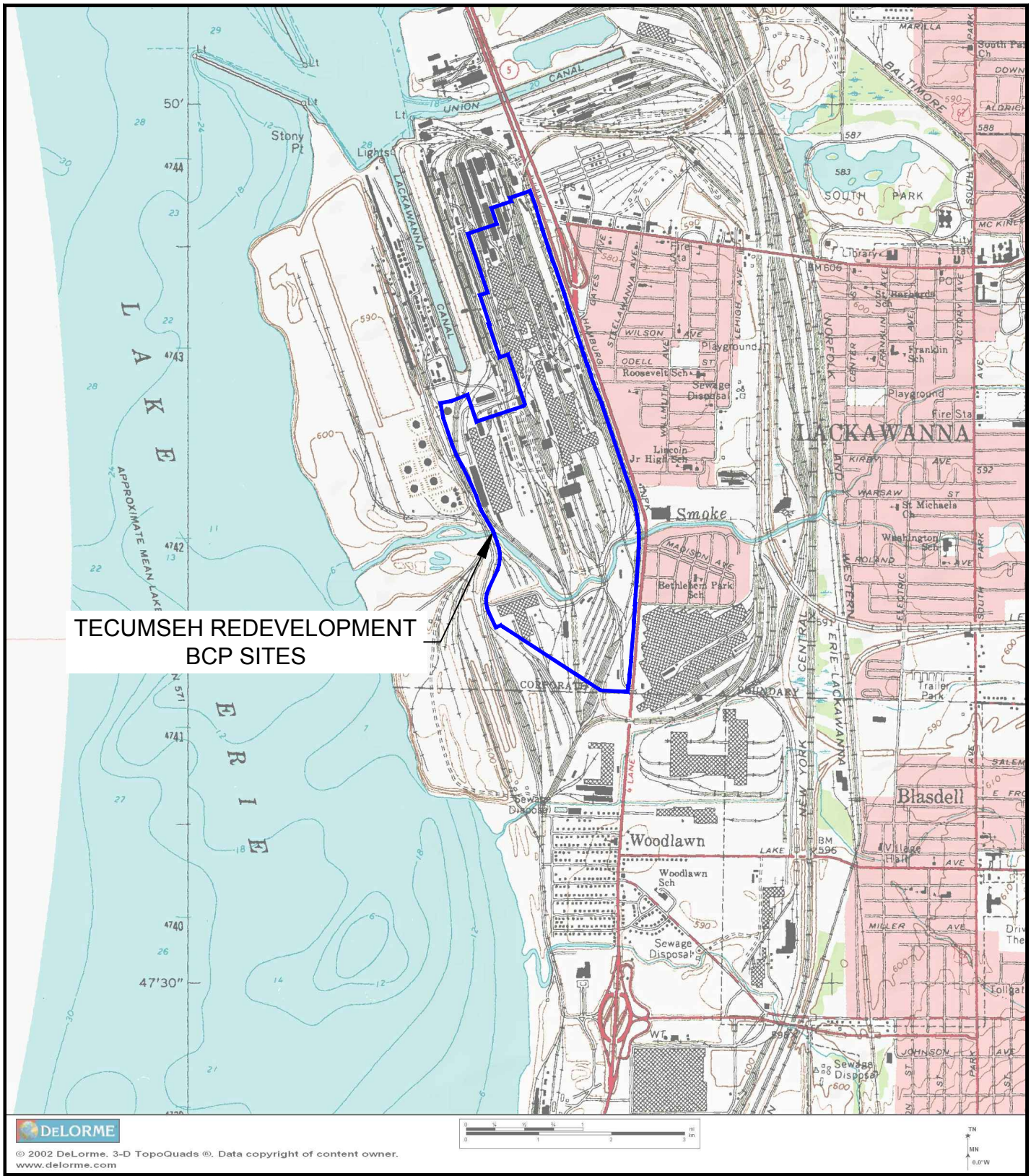
Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes.
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

F:\CAD\Tr Ke\Te m e\Rede eopme t\Bro ile d Cea p Pro ram (BCP)\Site-Wide HASP Fi re 1\Site Lo atio a d Vi it Map.d

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

DATE: JULY 2013

DRAFTED BY: BLR

SITE LOCATION & VICINITY MAP

SITE-WIDE HEALTH AND SAFETY PLAN

TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

STEEL WINDS I
± 29.01 ACRES

PHASE IA BUSINESS PARK
± 12.92 ACRES

PHASE I BUSINESS PARK
± 101.85 ACRES

PHASE III BUSINESS PARK
± 150.18 ACRES

PHASE II BUSINESS PARK
± 142.17 ACRES

U.S.A.C.E.
SEDIMENT DISPOSAL AREA

GATEWAY TRADE
CENTER (G.T.C.)

SOUTH BUFFALO
RAILROAD COMPANY

BUFFALO
SPECIALTY
STEEL

REPUBLIC ENGINEERED
PRODUCTS, INC.
(BAR MILL)

SOUTH BUFFALO
RAILROAD COMPANY

BUFFALO CRUSHED STONE

LAKE ERIE

OPEN WATER

LAND

BUFFALO
OUTER HARBOR

GATEWAY METROPORT SHIP CANAL

SMOKES CREEK

TOWN OF HAMBURG
CITY OF LACKAWANNA

CITY OF LACKAWANNA
CITY OF BUFFALO

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK
- SWMU P-07 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - RE□UIRES FURTHER ASSESSMENT
- SWMU P-64 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - RE□UIRES NO FURTHER ACTION
- CMS SITE BOUNDARY
- BROWNFIELD CLEANUP PROGRAM AREAS
- APPROXIMATE BOUNDARY OF SWMU
- WT-0□ — EXISTING STEEL WINDS I FACILITY WIND TURBINE (WT)

500' 0' 500' 1000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BLR
DATE: JULY 2013
CHECKED BY:
APPROVED BY:

DISCLAIMER:
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SITE PLAN

SITE-WIDE HEALTH AND SAFETY PLAN
TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

FIGURE 2

APPENDIX A

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM

TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

April 2010 0071-012-322
Revised July 2013

TECUMSEH REDEVELOPMENT BCP SITES
SITE-WIDE HEALTH AND SAFETY PLAN
APPENDIX A: EMERGENCY RESPONSE PLAN

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Figure A-1 Hospital Route Map

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site-Wide Health and Safety Plan (HASP) prepared for BCP investigation and remedial activities conducted at the Tecumseh Redevelopment BCP Sites (former Bethlehem Steel Lackawanna Works), Lackawanna, New York. This appendix of the Site-Wide HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury
2. Fire

Source of Emergency:

1. Slip/trip/fall
2. Fire

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
Spill Response Kit	2	Benzol Yard ICM Treatment Building; Wastewater Treatment Plant Garage (Phase III parcel)
First Aid Kit	3	Site Vehicle; Benzol Yard ICM Treatment Building; Field Office in Coke Oven Office Building
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Tecumseh Redevelopment Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features; however, the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the TurnKey personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: ***Thomas H. Forbes, P.E.***
Work: (716) 856-0599
Mobile: (716) 864-1730

Corporate Health and Safety Director: ***Michael M. Yount, CESCO***
Work: (716) 856-0599
Mobile: (716) 983-3143

Site Safety and Health Officer (SSHO): ***Richard L. Dubisz***
Work: (716) 856-0635
Mobile: (716) 998-4334

Alternate SSHO: ***Thomas A. Behrendt***
Work: (716) 856-0635
Mobile: (716) 818-8358

MERCY HOSPITAL (ER):	(716) 826-7000
FIRE:	911
AMBULANCE:	911
BUFFALO POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:
Tecumseh Redevelopment Inc.
1951 Hamburg Turnpike
Lackawanna, New York 14218
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's SSHO to ensure an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site evacuation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction SSHO to review evacuation routes and procedures as necessary and to inform all TurnKey-Benchmark workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the SSHO (***Thomas Behrendt*** or ***Richard Dubisz***) so that appropriate action can be initiated. Contractors and subcontractors on this Site have coordinated their emergency response plans to ensure that

these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the SSHO in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (i.e., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Mercy Hospital.
- Inhalation: Move to fresh air and, if necessary, transport to Mercy Hospital.
- Ingestion: Decontaminate and transport to Mercy Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Mercy Hospital via ambulance. The SSHO will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Mercy Hospital (see Figure A-1):

The following directions describe the best route to Mercy Hospital:

- From Gate 2, proceed onto the Hamburg Turnpike (SR 5).
- Proceed east on Hamburg Turnpike (SR 5) to the Tifft Street Exit and turn right onto Tifft Street.
- Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.
- Turn right on Abbott Road and Mercy Hospital will be on right hand side. Follow signs to emergency room (ER).

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control, and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal, and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

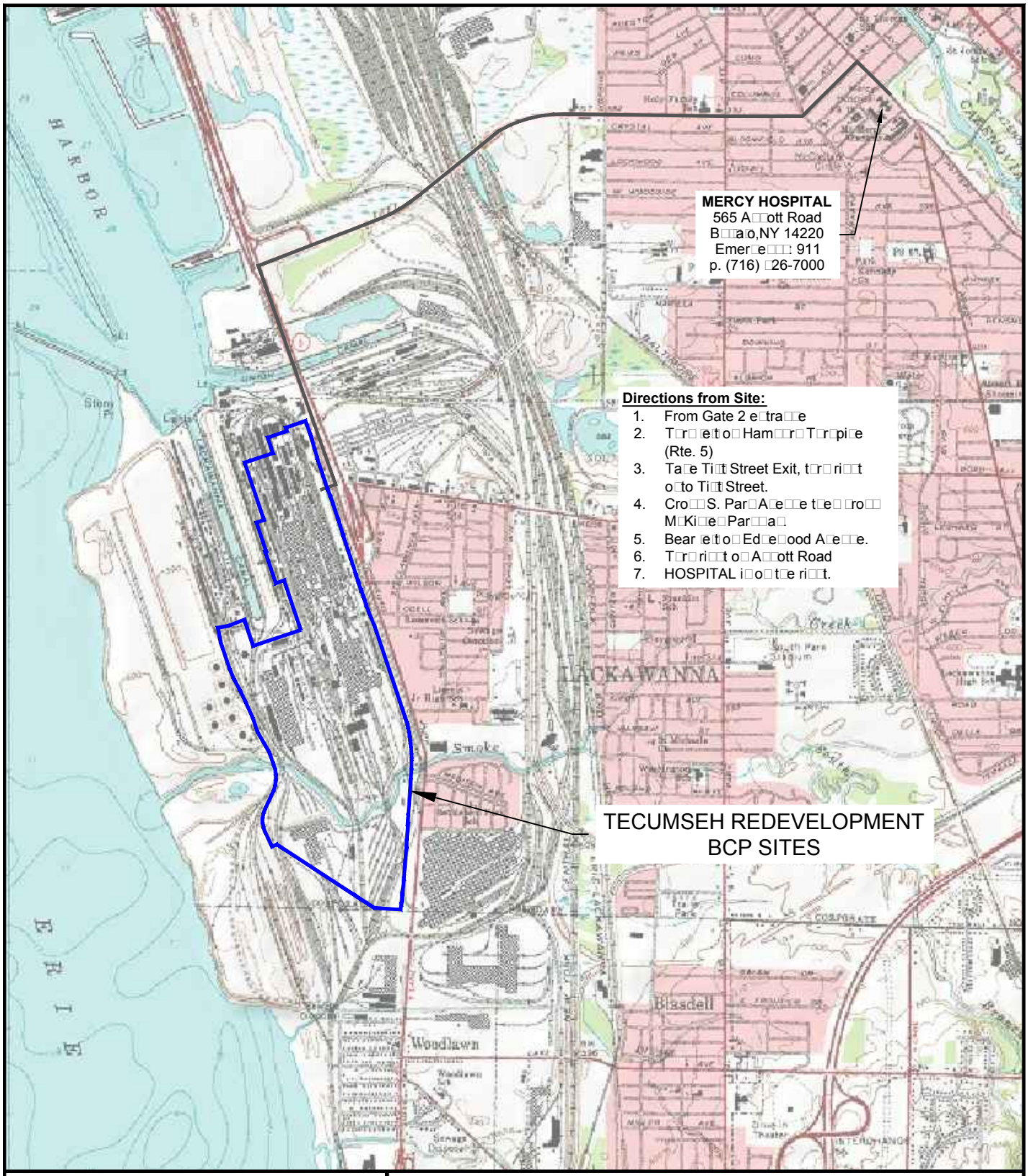
10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES

F:\CAD\Turnkey\Tecumseh Redevelopment\BCP\Site-Wide HASP\Figure A-1 Hospital Route Map.dwg

FIGURE A-1



TurnKey Environmental Restoration, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

DATE: JULY 2013

DRAFTED BY: BLR

HOSPITAL ROUTE MAP

SITE-WIDE HEALTH AND SAFETY PLAN

TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

APPENDIX B

HOT WORK PERMIT FORM

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

Prepared By: _____

APPENDIX C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX D

INSPECTION FORM FOR THE CONTROLLED PROPERTY

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site Nos.: **C915197 through C915197K**

Site Name: **Phase I Business Park ("Controlled Property")**

Site Address: **2303 Hamburg Turnpike** Zip Code: **14218**

City/Town: **Lackawanna**

County: **Erie**

Current Use: **Industrial**

Intended Use: **Industrial/Commercial Business Park**

Verification of Site Details **Box 2**

		YES	NO
1.	Are the Site Details above, correct?	☐	☐
	If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4.	Has a change-of-use occurred since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
	If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NOs. C915197 through C915197K

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NOs. C915197 through C915197K

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

APPENDIX E

SITE-SPECIFIC SMP REQUIREMENTS

APPENDIX E-1

SITE I-1 (C915197)

Also Appendix E-3

BROWNFIELD CLEANUP PROGRAM

APPENDIX E-1/E-3
SITE MANAGEMENT PLAN

TECUMSEH PHASE I BUSINESS PARK
NYSDEC SITE NOS. C915197 (I-1) & C915197C (I-3)
LACKAWANNA, NEW YORK

November 2017 0071-017-327

Prepared for:

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Revisions to Addenda of Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

PHASE I BUSINESS PARK
SITE MANAGEMENT PLAN: APPENDIX E-1/E-3
NYSDEC SITE NOS. C915197 (I-1) & C915197C (I-3)

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PHASE I BUSINESS PARK
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1.0 INTRODUCTION

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase I Business Park (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMP (Ref. 1) for the Controlled Property was prepared by TurnKey Environmental Restoration, LLC (TurnKey), on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2) and the guidelines provided by NYSDEC. Since the Controlled Property was divided into 11 BCP Sites designated as Sites I-1 through I-11 (BCP Site Nos. C915197 through C915199K), the main body of the SMP includes the site management components common to all 11 Sites. Site-specific requirements are included as Appendix E to the SMP.

1.1 Site Location and Description

As shown on Figure 2, Sites I-1 (approx. 5.57 acres) and I-3 (approx. 7.63 acres) is bounded by Business Park IA to the west; BCP Site I-5 to the north; BCP Sites I-2/I-4 and Fuhrmann Blvd. to the east; and Business Park II to the south.

The NYSDEC issued the Decision Document for Business Park I in January 2012 (Ref. 3). The Decision Document specifies, among other requirements, placement of acceptable cover material in areas not otherwise covered by rail lines, etc. Engineering controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during use of the Sites to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC by Tecumseh for the entire Business Park I has been recorded with the Erie County Clerk and requires compliance with this SMP and all ECs and institutional controls (ICs) placed on the Site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for Sites I-1 and I-3 of the Controlled Property.

This Appendix is not to be used as stand-alone documents but as a component document of the January 2014 SMP for the Controlled Property.

1.2 Remedial Investigation

The August 2005 Remedial Investigation (RI) Work Plan (Ref. 4) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance across all 11 Sites within the Controlled Property. The RI was designed to provide defensible data to identify areas of the Controlled Property potentially requiring remediation, define chemical constituent migration pathways, and qualitatively assess human health and ecological risks to allow for performance of a remedial alternatives evaluation.

Investigative activities on Business Park I were performed January-February 2006. Specific to Sites I-1 and I-3, test pits were completed (three on Site I-1 and seven on Site I-3) as well as surface soil sampling (two on Site I-1 and one on Site I-3). In April 2008, a supplemental test pit program was performed to further delineate petroleum-impacted soil/fill in support of interim remedial measures. Monitoring well MW-17A and temporary piezometer P-50S were installed on Site I-3 as part of the RI. Attachment A includes the monitoring well construction log. Soil and groundwater samples were collected as detailed in the Work Plan.

Groundwater samples were collected from monitoring well MW-7A during the RI (March 2006) and again in February 2016 during a site-wide groundwater sampling event. No parameters exceeded the groundwater quality standards/guidance values (GWQS/GVs). Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

The RI Report was submitted to NYSDEC in October 2006, revised, and finalized in June 2007 (Ref. 5). Based on the RI findings, remediation of soil/fill was warranted.

1.3 Interim Remedial Measures

A pre-Interim Remedial Measures (IRM) investigation was proposed (Ref. 6) and performed in April 2008 since the extent of impacts at several test pit locations were not fully defined during the RI. The IRM completed on Business Park I involved petroleum-, tar-, and metals-impacted soil/fill removal in accordance with the NYSDEC-approved August 2008 IRM Work Plan (Ref. 7). A Construction Closeout Report (CCR) was not

prepared for these IRM activities; however, a summary of the IRM was presented in NYSDEC-approved May 2010 Alternatives Analysis (AA) Report for Business Park I (Ref. 8). The AA Report recommended deferred soil cover system placement during redevelopment as well as ECs and ICs to limit future use of the Controlled Property to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes (see Section 2.0).

The following remedial work was performed between April and June 2009 on Sites I-1 and I-3 (see Figure 3):

- Construction of temporary on-site biotreatment pads on paved areas in the northern portion of Business Park I.
- Excavation of petroleum-impacted soil/fill on Site I-3; approximately 668 cubic yards in the vicinity of test pit TP-1-6 and 300 cubic yards in the vicinity of test pit grid composite 7/8. The impacted soil/fill was placed in the bioremediation area for on-site treatment (tilling). The treated soils were stockpiled for use as on-site, subgrade fill during future backfill and site grading work.
- Backfill of excavations with BUD #555-9-15 material; bioremediated slag/fill; and non-impacted crushed asphalt. Backfill material was placed into the excavation and compacted/tracked with the excavator/backhoe bucket in 2-foot lifts.

1.4 Summary of Remedial Actions

The final remedial measures for these Sites involved placement of the cover system in accordance with the NYSDEC-approved June 2017 Remedial Action Work Plan (RAWP) (Ref. 9). Details of cover system placement are provided in the November 2017 Final Engineering Report (Ref. 10).

1.5 Remaining Contamination

1.5.1 Soil

The IRM conducted on Sites I-1 and I-3 has removed all known "source area" (i.e., petroleum-impacted) slag/fill. The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs (USCOs) for several ubiquitous constituents. Specifically, nearly all samples collected during the RI exhibited exceedance of the USCOs for carcinogenic polyaromatic hydrocarbons (PAHs), as well as

arsenic, cadmium, chromium, lead, mercury and, at one sample location, cyanide. Tables 1 and 2 summarize the results of all soil samples remaining on Sites I-1 and I-3 that exceed USCOs following completion of the remedial actions. It is not possible to quantify with any certainty areas that do not exceed one or more of the USCO criteria; therefore, it is assumed that the entire 5.57 acres constituting Site I-1 and 7.63 acres constituting I-3 are impacted above the USCOs to the approximate native soil depth of 8 fbgs.

Following grading of these Sites, demarcation was constructed and placed so as to easily identify the existing sub-grade from the cover system material, and prevent the potential for inadvertent removal of sub-grade material during future intrusive work. The demarcation layer is comprised of an orange ¾-inch plastic industrial netting material was rolled across the sub-grade and overlapped by approximately one foot at the seams.

1.5.2 Groundwater

The groundwater quality on Site I-3 has been assessed by sampling monitoring well MW-17A in March 2006 during the RI and again in February 2016 during a site-wide groundwater sampling event. The groundwater was analyzed for VOCs, SVOCs, and inorganic parameters. As indicated on Table 3, groundwater concentrations were non-detect or below NYSDEC Class GA GWQS/GVs. Groundwater monitoring well MW-17A will be retained for future monitoring in the event NYSDEC requests groundwater quality monitoring on the larger Business Park I.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

Since contaminated soil/fill remains beneath the Sites, Engineering Controls and Institutional Controls (EC/ICs) are required to protect public health and the environment. The EC/IC Plan in the Phase I BP SMP describes the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to Sites I-1 and I-3 are described below.

2.2 Engineering Control Systems

The cover system for Sites I-1 and I-3 is described in the Final Engineering Report (Ref. 10). Figure 4 shows the approximate locations and types of cover system materials placed on the Sites. In the event this cover system is breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the SMP and Section 4.0 of the Excavation Work Plan (SMP Appendix B).

2.3 Institutional Controls

The Institutional Controls described in Section 2.3 of the SMP (i.e., Environmental Easement and Excavation Work Plan) must be implemented. There are no site-specific Institutional Control requirements for Sites I-1 and I-3.

2.4 Inspections and Notifications

The Inspections and Notifications described in Section 2.4 of the SMP must be implemented for Sites I-1 and I-3. There are no site-specific inspection and notification requirements.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (SMP Appendix C). The following emergency contact numbers are specific to Sites I-1 and I-3:

Table 4: Emergency Contact Numbers

Name: John Cappellino Title: Executive Vice President, Buffalo and Erie County Industrial Land Development Corporation	Work: (716) 856-6525 Mobile: (716) 472-6667
Name: Thomas Forbes Title: Principal Engineer, Benchmark Environmental	Work: (716) 856-0599 Mobile: (716) 864-1730

Note: Contact numbers subject to change and should be updated as necessary

3.0 SITE MONITORING PLAN

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The cover system; and
- All affected Site media.

Monitoring of the cover system is described in the SMP. No site-specific monitoring is required.

4.0 OPERATION & MAINTENANCE PLAN

The remedy for Sites I-1 and I-3 does not rely on any mechanical systems, such as sub-slab depressurization or soil vapor extraction, to protect public health and the environment. Therefore, a site-specific Operation and Maintenance Plan is not required.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

All inspection, reporting, and certification requirement are described in Section 3.0 of the SMP. Attachment B includes sample EC/IC Certification Forms to be completed for Sites I-1 and I-3.

6.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Site Management Plan for BCP Tecumseh Phase I Business Park, NYSDEC Site No. C915197 through C915197K, Lackawanna, New York*. January 2014.
2. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation.* May 3, 2010.
3. New York State Department of Environmental Conservations. *Decision Document, Tecumseh Phase I Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915197*. January 2012.
4. TurnKey Environmental Restoration, LLC. *Remedial Investigation Work Plan, Phase I Business Park Area, Lackawanna, New York*. August 2005.
5. TurnKey Environmental Restoration, LLC. *Remedial Investigation Report, Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York*. June 2007.
6. TurnKey Environmental Restoration, LLC. *Correspondence to Mr. Maurice Moore of the NYSDEC Re: Phase I Business Park Area, Supplemental Remedial Investigation*. March 27, 2008.
7. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures Work Plan, Phase I Business Park Area, Lackawanna, New York, BCP Site No. C915197*. August 2008.
8. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Alternatives Analysis Report (AAR) Phase I Business Park, ArcelorMittal Tecumseh Redevelopment, Inc., Lackawanna, New York, BCP Site No. C915197*. May 2010.
9. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Remedial Action Work Plan, Tecumseh Business Parks I and II, Lackawanna, New York*. June 2017.
10. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Final Engineering Report, Tecumseh Business Park I, Sub-Parcels I-1 and I-3, Lackawanna, New York*. November 2017.

TABLES

TABLE 1
SUMMARY OF SOIL/FILL CONTAMINATION ABOVE USCOs

SITE MANAGEMENT PLAN

Phase I Business Park, Site I-1
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	USCOs (mg/kg)[2]	Sample Location, Depth Interval (fbgs), and Type			
		TP-2-(1-3)	TP-2-(1-3)	SS-23	SS-24
		0.0 - 2.0	2.0 - 5.5	0.0 - 1.0	0.0 - 1.0
		composite	composite	grab	grab
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg					
Acenaphthene	**20**	0.44 J	0.67 J	ND	1.1 J
Acenaphthylene	**100**	0.59 J	20	ND	0.89 J
Anthracene	**100**	1 J	17 J	0.4 J	3.9 J
Benzo(a)anthracene	**1**	**6.7 J**	**50**	**1.6 J**	**14**
Benzo(b)fluoranthene	**1**	**11 J**	**86 J**	**2.6 J**	**15 J**
Benzo(k)fluoranthene	**0.8**	**3.7 J**	**25 J**	0.53 J	**6 J**
Benzo(g,h,i)perylene	**100**	3.3 J	34	1.3 J	7 J
Benzo(a)pyrene	**1**	**6.8 J**	**62**	**1.5 J**	**12**
Chrysene	**1**	**8**	**52**	**1.5 J**	**11**
Dibenz(a,h)anthracene	**0.33**	**1 J**	**8.6**	ND	**2.3 J**
Dibenzofuran	**7**	ND	3.8 J	ND	1 J
Fluoranthene	**100**	14	95 J	3.5 J	28
Fluorene	**30**	0.38 J	4.2 J	ND	1.5 J
Indeno(1,2,3-cd)pyrene	**0.5**	**3 J**	**30**	**1.1 J**	**6.9 J**
2-Methylnaphthalene	**--**	ND	1.6 J	ND	ND
Naphthalene	**12**	ND	4.2 J	ND	ND
Phenanthrene	**100**	6.5 J	52 J	1.4 J	16
Pyrene	**100**	11	94	3.3 J	20
TOTAL SVOCs (mg/kg)	--	77.41	640.1	18.73	146.6
Inorganic Compounds - mg/kg					
Arsenic, Total	**13**	10	7.4	7.8	--
Cadmium, Total	**2.5**	**2.8**	1.4	**2.9**	--
Chromium, Total	**30**	**136 J**	15.9 J	**95.6**	--
Lead, Total	**63**	**267 J**	**103 J**	**198**	--
Mercury, Total	**0.18**	**2.9 J**	**1.8 J**	**1.9**	--
Cyanide, Total	**27**	11.5	ND	14.7 J	--

Notes:

1. Only those parameters detected at a min. of one sample location presented; all other compounds reported as non-detect.
2. USCO = Unrestricted-Use Soil Cleanup Objective per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

J = estimated value; result is less than the sample quantitiation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
"--" = not analyzed for this parameter or no individual SCO.
" RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Part 375 Unrestricted Soil Cleanup Objectives.

TABLE 2
SUMMARY OF SOIL/FILL CONTAMINATION ABOVE USCOs

SITE MANAGEMENT PLAN

Phase I Business Park, Site I-3
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	USCOs (mg/kg)[2]	Sample Location, Depth Interval (fbgs), and Type					
		TP-1-(1-5)	TP-1-(1-5)	TP-1-(6-10)	TP-1-(678910)	TP-1-9	SS-25
		0.0 - 2.0	2.0 - 5.0	0.0 - 2.0	2.0 - 5.0	1.0 - 4.8	0.0 - 1.0
		composite	composite	composite	composite	grab	grab
STARS Volatile Organic Compounds (VOCs - Method 8021) - mg/kg							
Benzene	**0.06**	--	--	--	--	0.0013	--
Naphthalene	**12**	--	--	--	--	0.076 J	0.065 J
TOTAL VOCs (mg/kg)	--	0	0	0	0	0.077	0.065
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg							
Acenaphthene	**20**	0.98 J	0.31 J	0.28 J	ND	0.22 J	0.16 J
Acenaphthylene	**100**	2.2	1.5 J	1.4 J	0.17 J	0.44 J	0.27 J
Anthracene	**100**	2.9	1.7 J	1.2 J	0.096 J	0.41 J	0.78
Benzo(a)anthracene	**1**	**7.8**	**5.5**	**2.9**	0.45 J	**1.2 J**	**1.6**
Benzo(b)fluoranthene	**1**	**16 J**	**8.4 J**	**4.5 J**	0.73 J	**1.9 J**	**2.2 J**
Benzo(k)fluoranthene	**0.8**	**5 J**	**2.3 J**	**1.8 J**	0.25 J	0.61 J	0.61 J
Benzo(g,h,i)perylene	**100**	6.5	2.7	2.5	0.28 J	0.42 J	0.81
Benzo(a)pyrene	**1**	**8**	**5.5**	**3.1**	0.47 J	**1.2 J**	**1.6**
Chrysene	**1**	**8.8**	**6.1**	**3.2**	0.44 J	**1 J**	**1.6**
Dibenz(a,h)anthracene	**0.33**	**1.9**	**0.8 J**	**0.55 J**	ND	0.2 J	0.23 J
Dibenzofuran	**7**	0.68 J	0.72 J	0.35 J	ND	0.24 J	0.24 J
Fluoranthene	**100**	19	12	5.9	0.66 J	2.0	4
Fluorene	**30**	1.1 J	0.84 J	0.53 J	ND	ND	0.42
Indeno(1,2,3-cd)pyrene	**0.5**	**6.3**	**2.5**	**1.8**	0.28 J	0.49 J	**0.78**
2-Methylnaphthalene	**--**	0.34 J	0.43 J	0.18 J	ND	0.23 J	0.068 J
Phenanthrene	**100**	12	7.7	4.1	0.3 J	1.4 J	3.2
Pyrene	**100**	13	7.7	3.9	0.47 J	1.4 J	2.8
TOTAL SVOCs (mg/kg)	--	113	66.7	38.2	4.60	13.4	21.4
Inorganic Compounds - mg/kg							
Arsenic, Total	**13**	**121**	**34.6**	**13.1**	10.2	12.1	7.6
Cadmium, Total	**2.5**	ND	ND	ND	ND	ND	1.4
Chromium, Total	**30**	**123 J**	**40.3 J**	**70.1 J**	**79.9 J**	13.2 J	**67.8**
Lead, Total	**63**	**257 J**	**126 J**	**210 J**	**108 J**	59.2 J	**166**
Mercury, Total	**0.18**	**12**	**0.206**	0.075	0.051	0.041	0.148
Cyanide, Total	**27**	**123**	14.2	ND	9.2	ND	3.5 J

Notes:
1. Only those parameters detected at a min. of one sample location presented; all other compounds reported as non-detect.
2. USCO = Unrestricted-Use Soil Cleanup Objective per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:
J = estimated value; result is less than the sample quantitiation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
"--" = not analyzed for this parameter or no individual SCO.
" RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

Color Code:

compound	= Polycyclic Aromatic Hydrocarbon (PAH)
BOLD	= Value exceeds Unrestricted SCO.
	= TP-1-6 Soil Removed through 2009 IRM activities

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase I Business Park, Site I-3
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Well ID, Location, & Sampling Date				GWQS/GV [3]
	MW-17A		MW-17A		
	Site 1-3				
	3/7/06 [2]		2/23/16		
Field Measurements (units as indicated)					
pH (units)	7.47	7.72	7.56	7.60	**6.5 - 8.5**
Temperature (°C)	7.1	6.5	6.9	6.6	**NA**
Specific Conductance (uS)	851.0	846.3	835.8	836.4	**NA**
Turbidity	14.9	4.52	4.28	1.32	**50****
Dissolved Oxygen (mg/L)	--	--	6.58	8.35	**NA**
ORP (mV)	-18	14	-2	5	**NA**
Volatile Organic Compounds (VOCs) - ug/L					
Acetone	--		ND		**50***
n-Butylbenzene	ND		ND		**5**
1,2,4-Trichlorobenzene	--		ND		**5*** [4]
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - ug/L [5]					
TOTAL SVOCs (ug/L)	ND		ND		**NA**
Polychlorinated Biphenyls (PCBs) - ug/L					
TOTAL PCBs (ug/L)	ND		--		**NA**
Total Inorganic Compounds - mg/L [6]					
Barium, Total	--		0.046 J		**1**
Cadmium, Total	ND		ND		**0.005**
Chromium, Total	ND		0.0032 J		**0.05**
Copper, Total	--		0.0035 J		**0.2**
Cyanide, Total	0.16 J		0.12 F1		**0.2**
Manganese, Total	--		0.0063 B		**0.3**
Nickel, Total	--		ND		**0.1**
Zinc, Total	0.16 J		0.0016 JB		**0.2**

Notes:
1. Only those parameters detected at a min. of 1 sample location are presented; all other compounds were reported as N
2. Groundwater collected from March 2006 event were only analyzed for parameters listed in August 2005 RIWP.
3. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) as per 6 NYCRR Part 703.
4. A Guidance Value limit of 10 ug/L applies to the sum of 1,2,3-, 1,2,4-, and 1,3,5-Trichlorobenzene.
5. Groundwater collected from wells were only analyzed for BN SVOCs.
6. Groundwater collected from wells were only analyzed for arsenic, cadmium, chromium, cyanide, lead, and mercury.

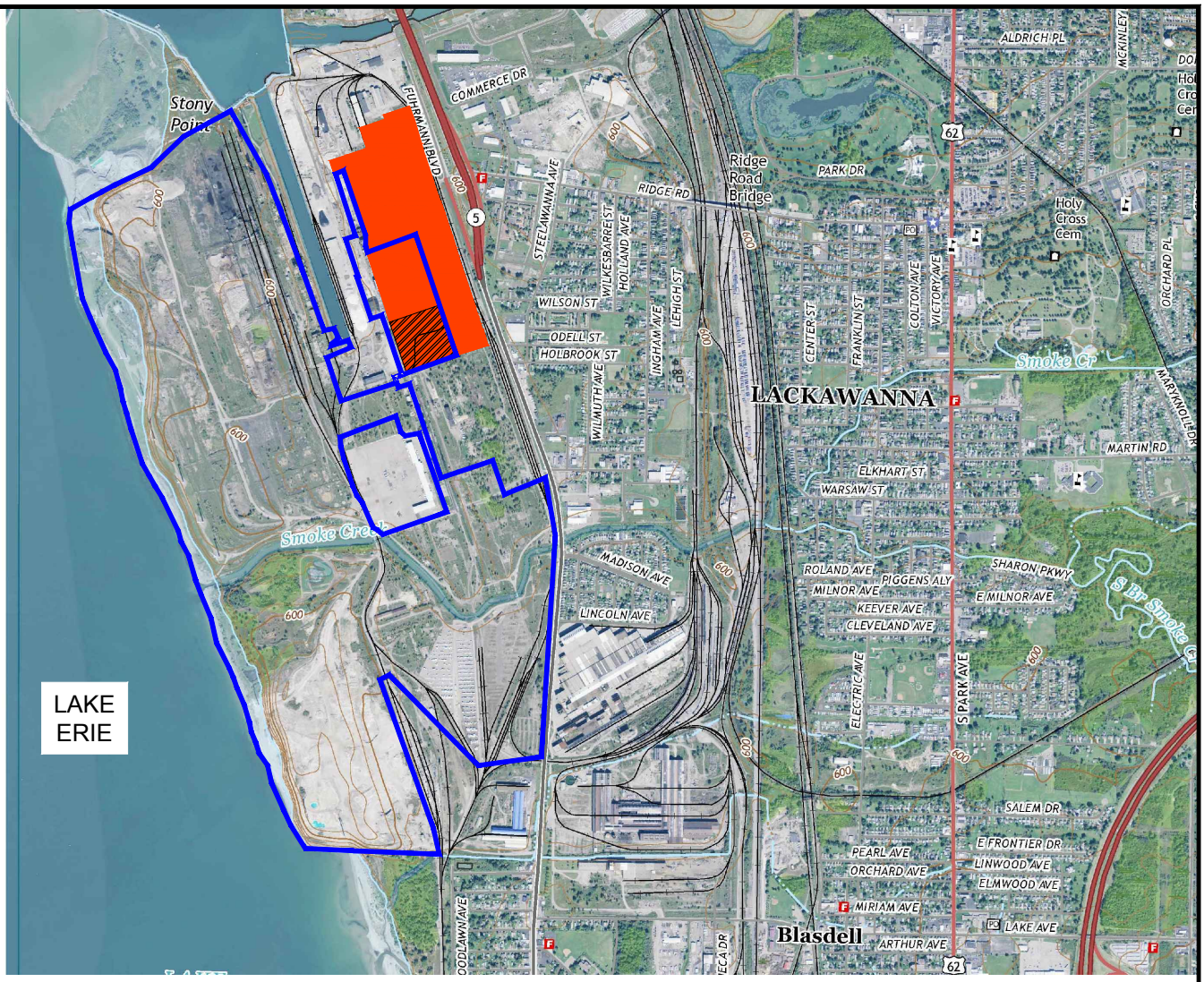
Definitions:
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
" -- " = not analyzed for this parameter
" * " = Groundwater Quality Guidance Value
" ** " = field threshold value; when exceeded, field filtered metals sample is collected (i.e., dissolved metals).
NA = No groundwater quality standard or guidence value is available at this time.
" RED TEXT " = Data was qualified per the third party Data Usability Summary Report (DUSR).

BOLD = Result is above the GWQS/GV.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Site 1-1, I-3\Figure 1; Site Location and Vicinity Map.dwg, DWG To PDF.pc3

FIGURE 1





N

2,500' 0' 2,500' 5,000'

SCALE: 1 INCH = 2,500 FEET
SCALE IN FEET
(approximate)

LEGEND:

- APPROXIMATE TECUMSEH PROPERTY BOUNDARY
- TECUMSEH BUSINESS PARK I
- SITES I-1 & I-3

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-017-327

DATE: NOVEMBER 2017

DRAFTED BY: RFL

SITE LOCATION AND VICINITY MAP

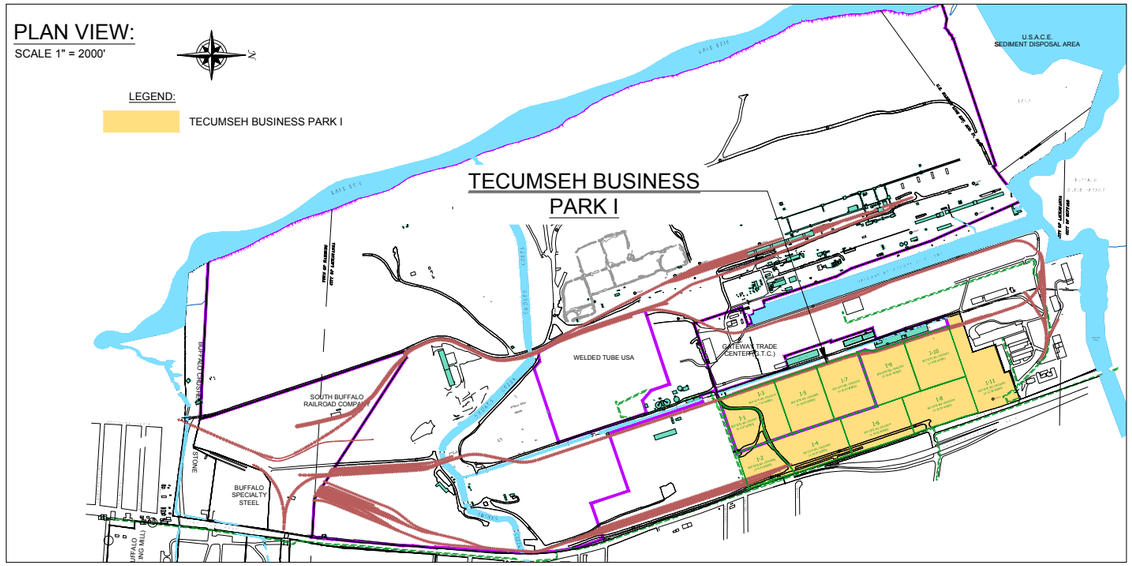
SITE MANAGEMENT PLAN

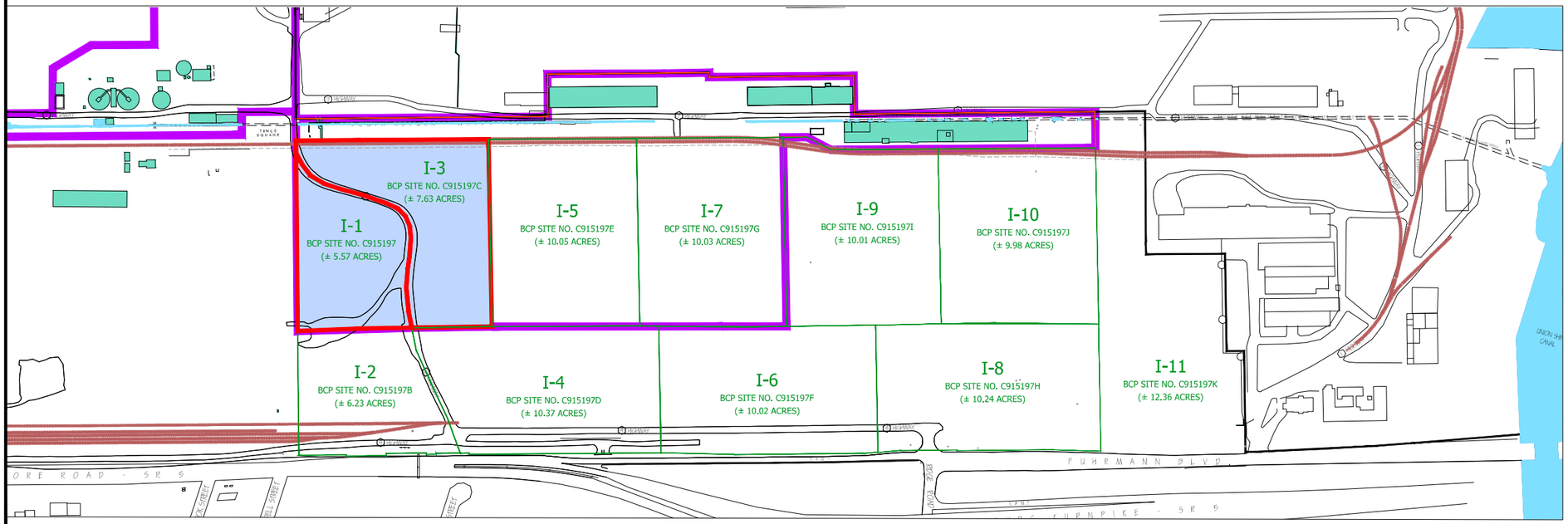
TECUMSEH PHASE I BUSINESS PARK
BCP SITE NOS. C915197 (I-1) & C91519C (I-3)
LACKAWANNA, NEW YORK

PREPARED FOR

TECUMSEH REDEVELOPMENT INC.

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DATE: NOVEMBER 2017
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Site I-1, I-3\Figure 2_Site Delineation Map.dwg, DWG To PDF.pc3

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

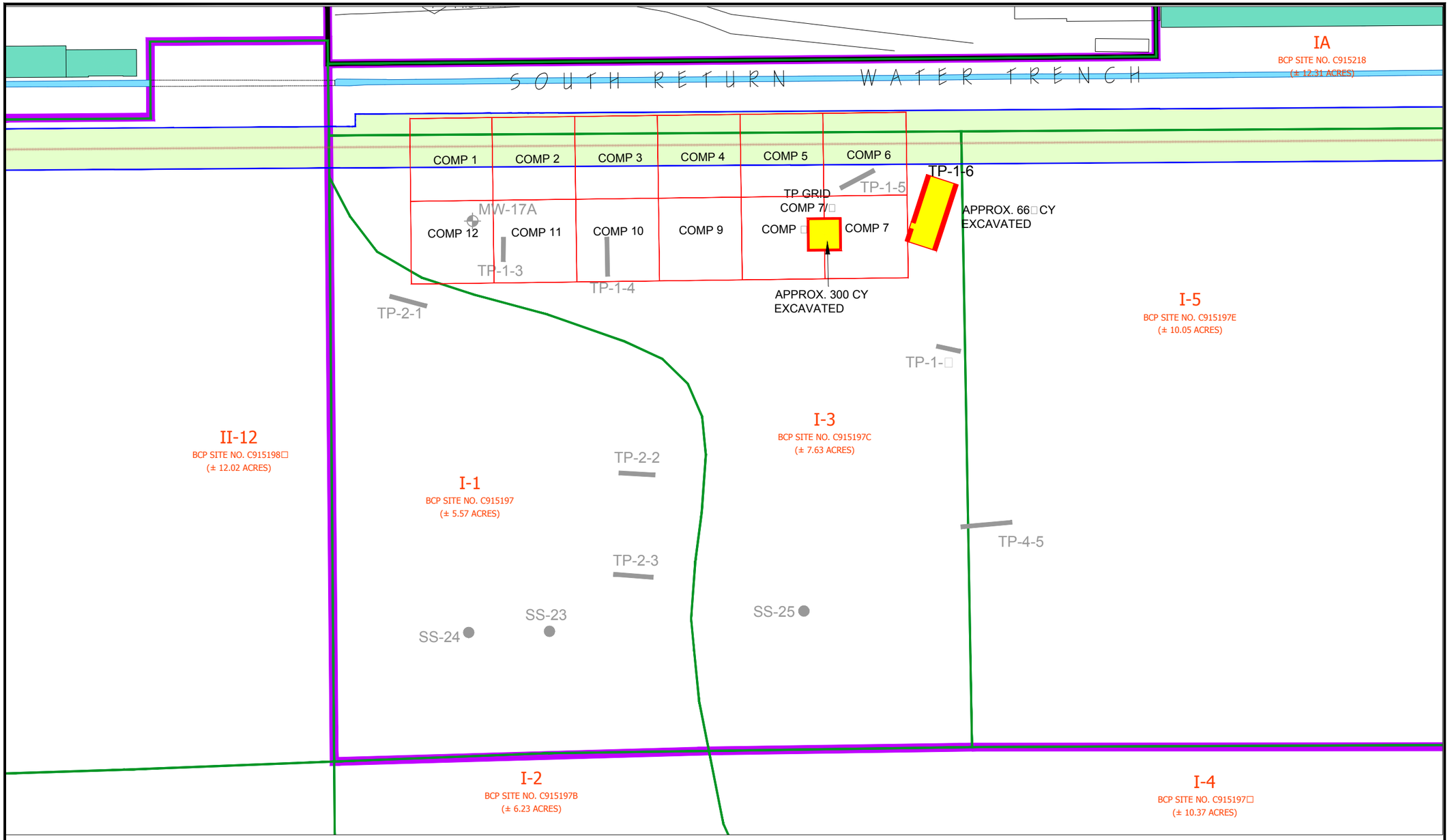
JOB NO.: 0071-017-327

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
TECUMSEH PHASE I BUSINESS PARK
BCP SITE NOS. C915197 (I-1) & C915197C (I-3)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 2

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC *IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.*



F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Site I-1.1-3\Figure 3: Completed Remedial Measures.dwg, DWG To PDF.pc3

DATE: NOVEMBER 2017
DRAFTED BY: RFL

COMPLETED REMEDIAL MEASURES

SITE MANAGEMENT PLAN
TECUMSEH PHASE I BUSINESS PARK
BCP SITE NOS. C915197 (I-1) & C915197C (I-3)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 3

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

JOB NO.: 0071-017-327

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. *IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.*

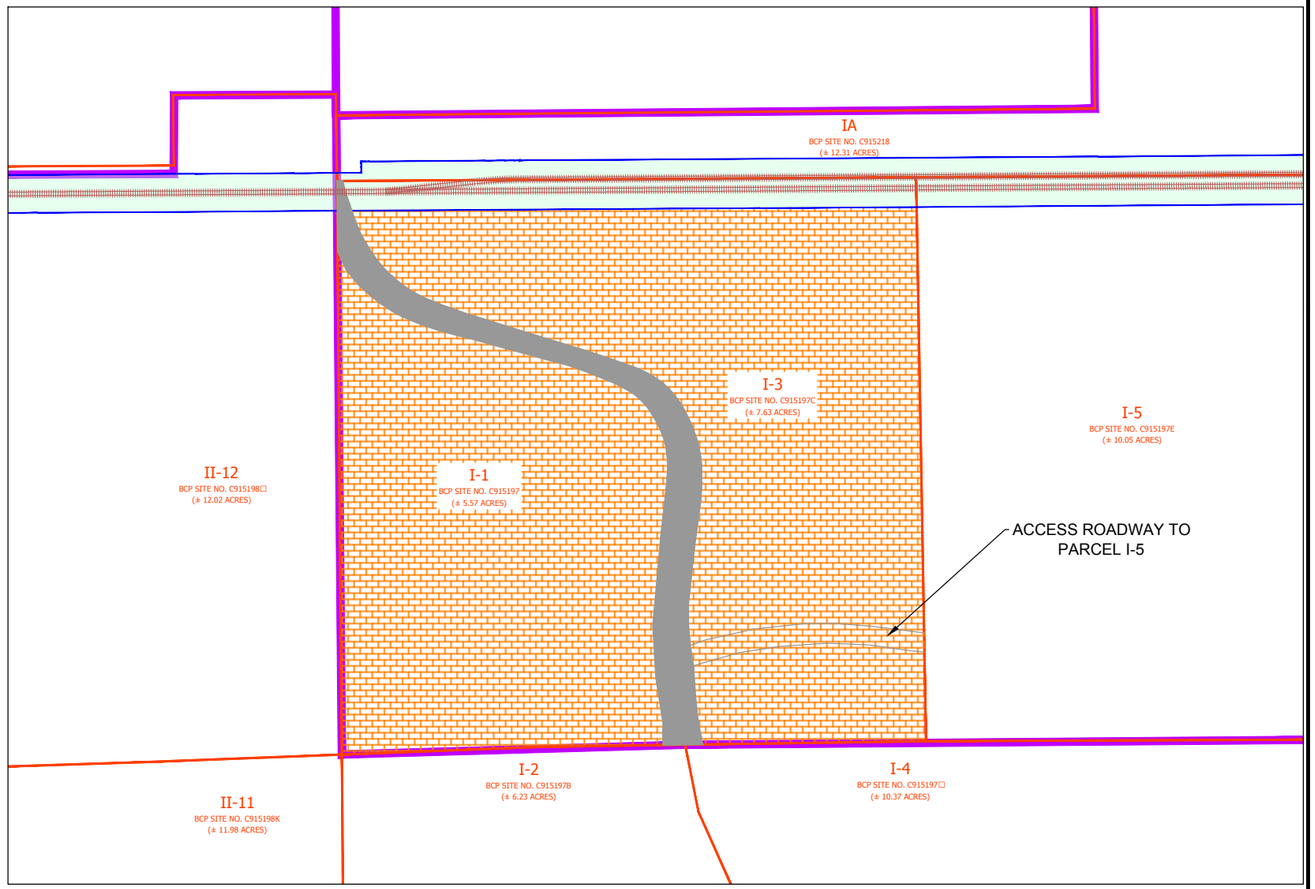
LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- SITE BOUNDARIES
- BUD □555-9-15 COVER MATERIAL
- EXISTING ASPHALT ROADWAY COVER SYSTEM
- EXISTING EAST HARBOR LEAD RAILROAD TRACK AND ROW

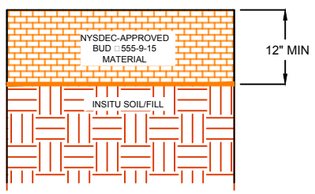
NOTES:
1. HORI□ONTAL DATUM NAD □3□VERTICAL DATUM NAVD □□.
2. ALL MEASURMENTS IN FEET.

200' 0' 200' 400'

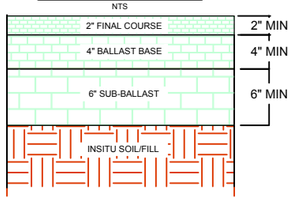
SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)



COVER SYSTEM DETAIL
NTS

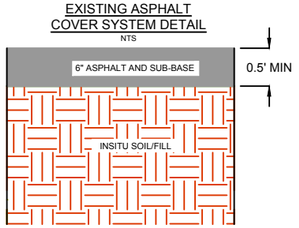


COVER SYSTEM BENEATH TRACKS
COVER SYSTEM DETAIL□
NTS

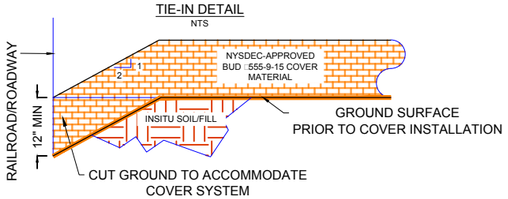


□BASED ON DESIGN BY OTHERS.

EXISTING ASPHALT
COVER SYSTEM DETAIL
NTS



TIE-IN DETAIL
NTS



DATE: NOVEMBER 2017
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase I Parcel\Site Management Plan\Site I-1, I-3\Figure 4; Cover System 1-1 1-3.dwg, DWG To PDF.pc3

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

JOB NO.: B0071-017-327

APPROXIMATE LOCATION AND TYPES OF COVER SYSTEM MATERIALS

SITE MANAGEMENT PLAN

TECUMSEH PHASE I BUSINESS PARK
BCP SITE NOS. C915197 (I-1) & C915197C (I-3)
LACKAWANNA, NEW YORK

PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 4

DISCLAIMER: *PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.*

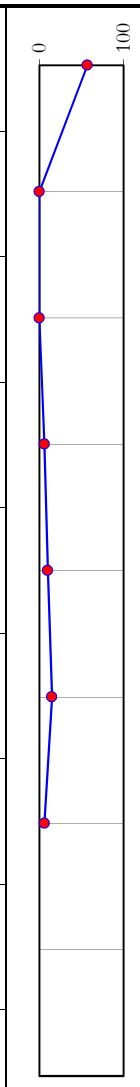
ATTACHMENT A

MONITORING WELL BORING AND CONSTRUCTION LOG

FIELD BOREHOLE/MONITORING INSTALLATION LOG

Project Name:	Phase 1 BPA	**BORING NUMBER:**	**MW-17A**
Project Number:	0071-006-102	**Location:**	Phase I BPA
Client:	Tecumseh Redevelopment, Inc.	**Start Date/Time:**	01/29/06 08:00 AM
Drilling Company:	Earth Dimensions, Inc.	**End Date/Time:**	01/29/06 10:20 AM
Driller:	Brian Bartran	**Logged By:**	TAB
Helper:	Harold	**Drilling Method:**	4.25 HSA
Rig Type:	CME 85	**Weather:**	overcast, cool, sl. breeze, Low 40's F

Elevation (fmsl)	Depth (fbgs)	Sample No.	Blows (per 6")	SPT N-Value	Recovery	SAMPLE DESCRIPTION USCS Classification: Color, Moisture Condition, Percentage of Soil Type, Texture, Plasticity, Fabric, Bedding, Weathering/Fracturing, Odor, Other	USCS Code	PID Scan (ppm)	PID HDSP (ppm)	Soil Unit	Well Construction Details
582.48	0	S1	17 28 29 12	57	1.0	**SOIL/FILL:** Black/Dark Brown, moist, 80% NPF, 20% slag, 20% FS, medium dense, LWD	FILL	0.0	--	FILL	concrete; Bentonite Chips; 2" Sch. 40 PVC riser
580.48	2	S2	100-5 -- -- --	0	1.5	Same as S1 above, wet	FILL	0.0	--	FILL	
578.48	4	S3	7 100-2 -- --	0	0.4	**FILL:** Medium grey, wet, 90% Concrete, 10% FS, SA, LWD	FILL	0.0	--	FILL	
576.48	6	S4	2 2 4 4	6	1.2	(0.0 - 0.7) **SANDY LEAN CLAY:** Medium grey, stiff, wet, 60% MPF, 40% Fine Sand, slow dialatency (0.7 - 1.2) **ORGANIC SOIL:** Dark brown, wet, 60% LPF, 40% FS, LWD, slow dilatencey, w/ rootletts and wood chips	CL OL/OH	0.0	--	CLAY PEAT	
574.48	8	S5	4 5 5 7	10	1.3	Same as S4 (0.0 - 0.7) w/ lenses of Peat	CL	0.0	--	CLAY	sand pack - #00N (14.0 - 3.0 fbgs); 2" Sch. 40 PVC screen, 0.010" slot
572.48	10	S6	4 7 8 8	15	1.5	Same as S4 (0.0 - 0.7); clay is softer from 0.0 - 0.8 w/ rapid dilatencey. Clay stiffens from 0.5 - 1.5	Cl	0.0	--	CLAY	
570.48	12	S7	3 3 3 7	6	2.0	**SANDY ORGANIC SOIL:** Dark brown to brownish grey, wet, firm, 60% LPF, 40% FS w/ rootlets and wood fibers, LWD	OL/OH	0.0	--	PEAT	
568.48	14	S8				EOB @ 14.0 fbgs					
566.48	16	S9									
564.48	18										



ABREVIATIONS:

C = coarse	fbgs = feet below ground surface	HSA = hollow stem auger	MS = medium sand
CG = coarse gravel	FG = fine gravel	LP = low plasticity	NA = not applicable
CS = coarse sand	fmsl = feet above mean sea level	LWD = loose when disturbed	NPF = not plastic fines
EOB = end of boring	FS = fine sand	M = medium	SA = sub-angular
F = fines or fine	HP = high plasticity	MP = medium plasticity	SR = sub-rounded
			SS = split spoon

ATTACHMENT B

SAMPLE EC/IC CERTIFICATION FORMS

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No.C915197

Site Name: Site I-1 Tecumseh Phase I Business Park

Site Address: 2303 Hamburg Turnpike Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915197 **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915197

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No.C915197C

Site Name: Site I-3 Tecumseh Phase I Business Park

Site Address: 2303 Hamburg Turnpike Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915197C **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915197C

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

APPENDIX E-2

SITE I-2 (C915197B)

As the remedial actions are completed on Site I-2 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix E-2 as an addendum.

APPENDIX E-3

SITE I-3 (C915197C)

See Appendix E-1

APPENDIX E-11

SITE I-11 (C915197K)

See Appendix E-9

APPENDIX E-8

SITE I-8 (C915197H)

As the remedial actions are completed on Site I-8 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix E-8 as an addendum.

APPENDIX E-12

SITE I-12 (C915197L)

ERIE COUNTY SHORELINE TRAIL BETHLEHEM STEEL PHASE 1

ERIE COUNTY, NEW YORK

APPENDIX E-12
SITE MANAGEMENT PLAN

NYSDEC BCP Site Number: C915197L
Lackawanna, New York

MAY 2019

Prepared for:

Erie County Department of Environment and Planning
95 Franklin Street
Room 1064
Buffalo, NY 14202

Prepared by:

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

403 Main Street
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LIST OF FIGURES & ATTACHMENTS

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2 – Site Location Map
3 – Source of Contaminated Soil/Fill
4 – Aerial Extents of Soil Cover System
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Attachment A - Sample EC/IC Certification Form

1.0 INTRODUCTION

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase I & Phase II Business Parks (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMPs for the Controlled Property were prepared by TurnKey Environmental Restoration, LLC (TurnKey), on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC. The Erie County Department of Environment and Planning (ECDEP) elected to pursue cleanup and redevelopment of NYSDEC Brownfield Cleanup Program (BCP) Site No. C915197L (comprised of multiple BCP parcels from the Tecumseh Phase I and Phase II Business Parks) which involved the construction of the Erie County Shoreline Trail Bethlehem Steel Phase I. The January 2014 SMPs prepared for the Tecumseh Phase I and Phase II Business Parks include the site management components common to all the BCP sites that comprise the Phase I and II Business Parks. Site-specific requirements for BCP Site No. C915197L are included as Appendix E-12 to the SMP.

1.1 Site Location and Description

The Erie County Shoreline Trail Bethlehem Steel Phase I was constructed on BCP Site No. C915197L which was divested and formed from the easterly fifty-foot (50') widths of BCP Sites C915198H, C915198K, C915197B, C915197D, C915197F and C915197H located in Lackawanna, New York (see Figures 1 and 2).

The Erie County Shoreline Trail Bethlehem Steel Phase I involved the construction of a 10-foot wide, 7,550' asphalt pedestrian/bicycle trail along the west side of NYS Route 5 and Hamburg Turnpike in Lackawanna from the proposed access road opposite Dona Street north to the Buffalo city line. The total length of the trail is approximately 5,140' within the aforementioned NYSDEC BCP site.

The site is located in the County of Erie, State of New York and is identified as a six (6)-acre fifty-foot wide parcel bounded by the Gateway property to the north, County of Erie to the south, NY State Route 5 and Hamburg Turnpike to the east, and County of Erie to

the west. It should be noted that while the site is depicted within BCP site No. C915197K this project did not include any remedial work on BCP site No. C915197K. The northern most extent of project activities within the BCP site terminated at the southerly line of BCP site No. C915197K.

The SMPs indicate that contaminated soil/fill is assumed to occur within the upper 8 to 12 feet of the former Bethlehem Steel Corporation (BSC) site. The SMPs also define the screening, segregation, stockpiling, excavation, transportation, disposal and reuse requirements to manage soil/fill on the BSC site.

The SMPs state that exposure to remaining contamination in soil/fill will be prevented by a cover system. The cover system is to be comprised of a minimum of 12 inches of clean soil, stone or NYSDEC-approved materials, with a demarcation layer (i.e., geotextile fabric, orange poly netting, or similar nondegradable visual demarcation) in all areas that are not paved or covered by concrete or structures. Areas within the trail right-of-way to be impacted by project construction included a cover system complying with the SMPs. Environmental Easements granted to the NYSDEC by Tecumseh for both the Phase I and Phase II Business Parks have been recorded with the Erie County Clerk and require compliance with this SMP and all engineering controls (ECs) and institutional controls (ICs) placed on the Site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for BCP Site No. C915197L of the Controlled Property. This Appendix is not to be used as stand-alone documents but as a component document of the January 2014 SMPs for the Controlled Property.

1.2 Remedial Investigations

Phase I Business Park

The RI was performed to characterize the nature and extent of contamination on the Controlled Property. The results of the RI are described in detail in the following reports:

- Remedial Investigation Report, Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York, prepared by TurnKey Environmental Restoration, LLC, October 2006. Revised June 2007.

- Supplemental Remedial Investigation Letter Report for Phase I Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York, prepared by TurnKey Environmental Restoration, LLC, June 23, 2008.

Generally, the RI determined that conditions were consistent with the historic use of the Controlled Property for steel-making and finishing operations. Soil/fill concentrations, where identified above 6NYCRR Part 375 commercial-use soil cleanup objectives SCOs), varied according to the type and nature of the constituents. Specifically, elevated concentrations of petroleum volatile organic compounds (VOCs) were limited to discrete locations of the Controlled Property where visual or olfactory evidence of impact was observed (e.g., UST and oil-stained areas), or where past operational practices indicate an increased potential for releases of these substances (former transformer areas). Certain metals and base-neutral semi-volatiles (i.e., polyaromatic hydrocarbons or PAHs) were detected at several locations above SCOs, including composite sample locations. The detection of these substances in widespread areas is consistent with the observed presence of coal/coke fines and slag within the soil/fill matrix and macadam cover. The RI findings indicate that, as would be expected based on the relatively low solubility of the soil/fill constituents prevalent in the soil/fill matrix, groundwater is not impacted by constituents of concern.

<u>Phase II Business Park</u>
Remedial Investigation (RI) was performed to characterize the nature and extent of contamination on the Controlled Property. The results of the RI are described in detail in the following report:

- Remedial Investigation/Alternatives Analysis Report (RI/AAR), Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York prepared by TurnKey Environmental Restoration, LLC, Revised March 2012.

Generally, the RI determined that conditions were consistent with the historic use of the Controlled Property for steel-making and finishing operations, with the widespread presence of fill material containing dark brown, non-plastic fines with fine to medium sand, slag, cinders, ash, gravel, cobbles, brick, metal debris, and concrete, all of which are ubiquitous on the Controlled Property. Soil/fill concentrations, where identified above 6NYCRR Part 375 commercial-use soil cleanup objectives (SCOs), varied according to the type and nature of the constituents. Specifically, elevated concentrations of volatile petroleum compounds (i.e., elevated PID readings) were observed at two test pit locations where field evidence of impact was observed (e.g., odor, sheen, and staining). Base-neutral semi-volatiles (i.e., polyaromatic hydrocarbons or PAHs) were detected at several

locations above commercial SCOs; however, only three total SVOC concentrations were reported above 500 parts per million (ppm), which was deemed a site-specific SCO based on NYSDEC CP-51 guidance for non-residential sites where a cover system will be employed. Certain metals (total arsenic, mercury, and lead) were detected above commercial SCOs at several locations. Smear zone impact was present in several locations as indicated by sheen and/or product on the water within the test pit, odor and staining. Field evidence of groundwater impact was observed within the South Linde Area.

The RI findings indicate conditions consistent with the historic use of the Controlled Property for steel-making and finishing operations, and the widespread presence of fill materials containing slag and cindery ash.

The RI findings indicate that, as would be expected based on the relatively low solubility of the soil/fill constituents prevalent in the soil/fill matrix, groundwater is generally not impacted by metal constituents of concern or PCBs.

1.3 Summary Of Remedial Actions

The site was remediated in accordance with the remedy described in the RAWP dated February 2018, approved by NYSDEC which included the placement of a cover system. The cover system consists of a demarcation layer atop the remaining soil/fill followed by a 12-inch soil cover, obtained from a NYSDEC approved stockpile, in areas of the Site not covered by the 10-foot wide asphalt trail to prevent human exposure to remaining contaminated soil/fill.

1.4 Remaining Contamination

Phase I Business Park

The remedial work conducted on the Controlled Property has removed all known "source area" soil/fill, which included petroleum-, metal-, and tar-impacted soil/fill. USTs and associated impacted soil/fill were also removed.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs for several ubiquitous constituents. Specifically, nearly all samples collected during the RI exhibited exceedance of the commercial SCOs for carcinogenic PAHs, as well as arsenic, cadmium, lead, and mercury. Other constituents remaining above unrestricted-use SCOs in select areas of the Controlled Property include

PCBs (Aroclors 1248, 1254, and 1260) and 4-4' DDT. It is not possible to quantify with any certainty areas that do not exceed one or more of the unrestricted-use SCO criteria; therefore, it is therefore assumed that the entire 102-acre Controlled Property is impacted above the unrestricted-use SCOs to the approximate native soil depth of 8 fbgs.

Phase II Business Park

The remedial work conducted on the Controlled Property has or will: remove all known "source area" soil/fill (i.e., petroleum- and metal-impacted soil/fill); treat weathered petroleum-impacted saturated soil/fill in-situ; and remediate isolated groundwater impacts.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs for several ubiquitous constituents. Specifically, nearly all samples collected during the RI exhibited exceedance of the commercial SCOs for PAHs, as well as arsenic, lead, and mercury. Other constituents remaining above unrestricted-use SCOs in select areas of the Controlled Property include PCBs (Aroclors 1248, 1254, and 1260) and inorganic compounds (i.e., cadmium, chromium, manganese, nickel, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the unrestricted-use SCO criteria; therefore, it is assumed that the entire 142-acre Controlled Property is impacted above the unrestricted-use SCOs to the approximate native soil depth of 12 fbgs.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

Since contaminated soil/fill remains beneath the Sites, Engineering Controls and Institutional Controls (EC/ICs) are required to protect public health and the environment. The EC/IC Plan in the Phase I & II BP SMPs describe the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to BCP Site No. C915197L are described below.

2.2 Engineering Control Systems

The cover system for BCP Site No. C915197L consists of a cover system. The cover system consists of a demarcation layer atop the remaining soil/fill followed by a 12-inch soil cover, obtained from a NYSDEC approved stockpile, in areas of the Site not covered by the 10-foot wide asphalt trail to prevent human exposure to remaining contaminated soil/fill. Figures 4 and 5 depict the approximate aerial extents and the typical section of the cover system placed on the Site. In the event these cover systems are breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the SMP and Section 4.0 of the Excavation Work Plan (SMP Appendix B).

2.3 Institutional Controls

The site remedy requires that an environmental easement be placed on the property to (1) implement, maintain and monitor the Engineering Controls; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to recreational trail uses only.

There are two environmental easements for the project site which encompasses the overall Phase I & II Business Parks. The environmental easements for the site were executed by the NYSDEC and filed with the Erie County Clerk in 2014. Copies of the easements and proof of filing are included in the Final Engineering Report. There are no site-specific Institutional Control requirements for BCP Site No. C915197L.

2.4 Inspections and Notifications

The Inspections and Notifications described in Section 2.4 of the SMPs must be implemented for BCP Site No. C915197L. There are no site-specific inspection and notification requirements.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (SMP Appendix C). The following emergency contact numbers are specific to BCP Site No. C915197L:

Table 1: Emergency Contact Numbers

Name: **Title:**	**Work:** **Mobile:**
Name: **Title:**	**Work:** **Mobile:**

Note: Contact numbers subject to change and should be updated as necessary

3.0 SITE MONITORING PLAN

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The soil cover system; and
- All affected Site media.

Annual visual inspection and maintenance (e.g., filling in ruts with approved cover materials, re-vegetation of soil covered areas, pothole repair, etc.) of the cover systems will be required to assure cover integrity and prevent exposure to underlying soil/fill.

The cover system shall be observed by traversing the cover on foot and making appropriate observations, notes and photographic records as necessary, for inclusion with the Periodic Review Report (PRR). The inspection should at minimum make note of areas with settled or uneven surfaces, seepage or flooding. The following characteristics shall be looked for during the observation of the cover system:

- Sloughing
- Cracks
- Settlement
- Distressed vegetation/turf

Sloughing, cracks and settlement features such as depressions or areas of ponding on the cover may occur over time, most likely resulting for weather related impacts. The locations of these features on the cover should be noted on an inspection log and site map, including width, length and depth of the feature. In addition, routine maintenance will include regular inspection of the cover for cracks or stressed vegetation. Areas of the cover which may have been damaged will be repaired. Also, eroded or settled areas shall be repaired by adding compacted soil and/or topsoil and then reseeding. Except in the case of emergency situations heavy equipment and vehicular traffic should not be operated on the site. Equipment/vehicle operation should be limited to that necessary for routine maintenance to prevent damage to the cap. In areas with more than six inches of settlement, compacted clay fill will be used to fill the depression to within six inches

below grade, then six inches of topsoil would be added and re-seeded. Areas of distressed turf shall be re-seeded.

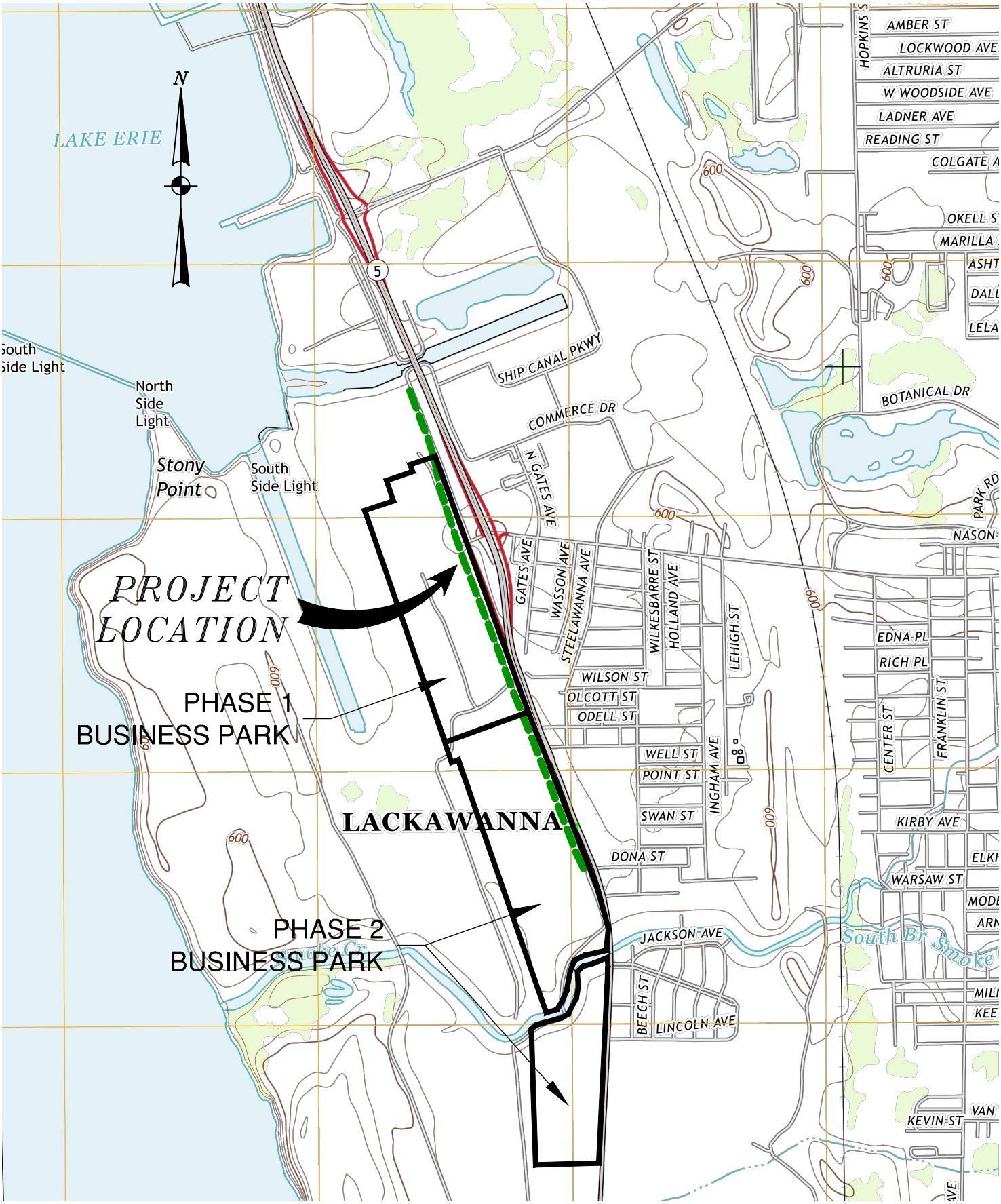
4.0 OPERATION & MAINTENANCE PLAN

The remedy for BCP Site No. C915197L does not rely on any mechanical systems, such as sub-slab depressurization or soil vapor extraction, to protect public health and the environment. Therefore, a site-specific Operation and Maintenance Plan is not required.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

All inspection, reporting, and certification requirement are described in Section 5.0 of the SMPs. Attachment A includes sample EC/IC Certification Form to be completed for BCP Site No. C915197L.

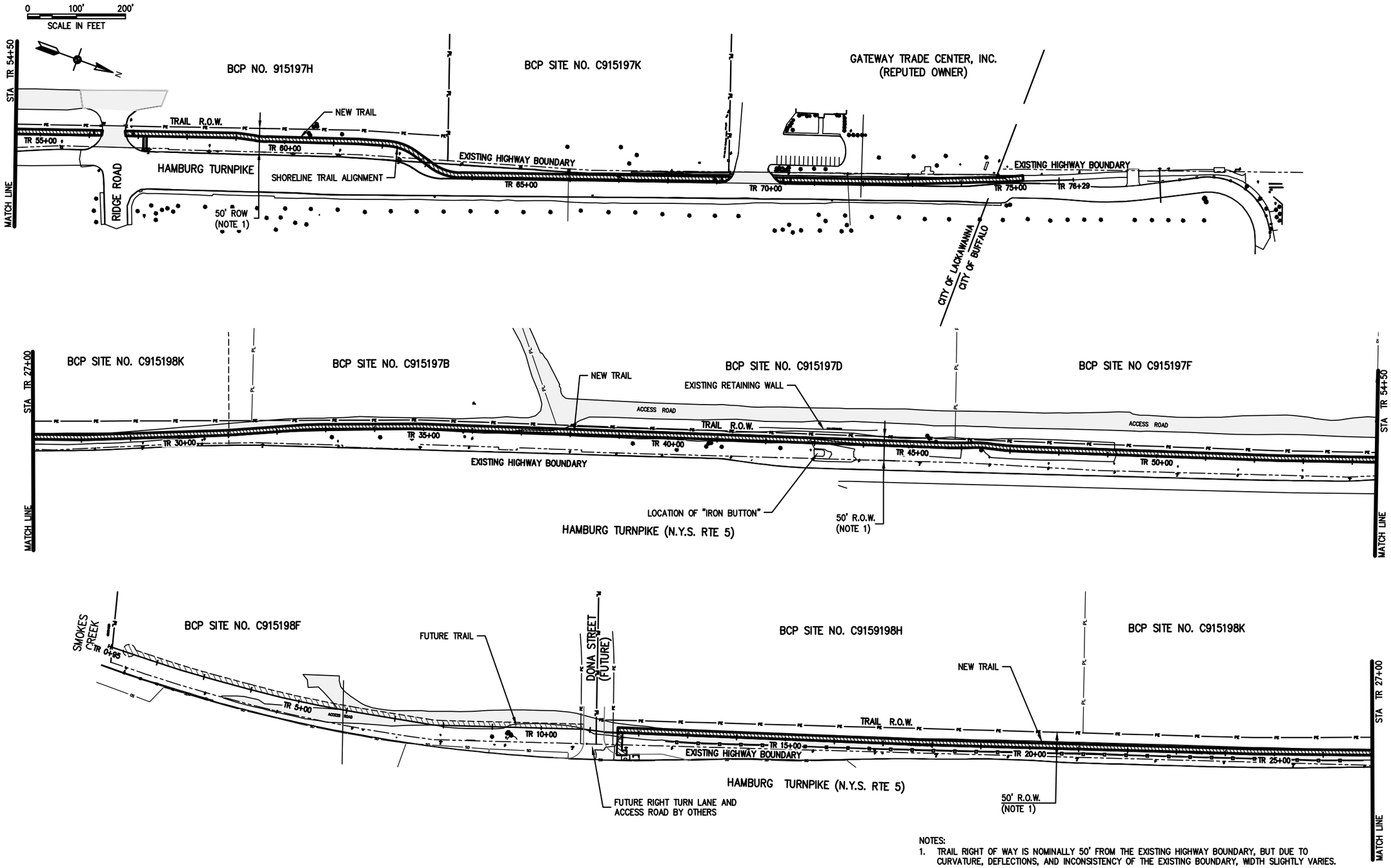
FIGURES



GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
Surveying Services Performed By GPI Engineering and Surveying, LLP
4950 Genesee Street, Buffalo, NY 14225
Tel: (716) 633-4844 Fax: (716) 633-4940

PROJECT NO.: 2015100.00		PROJECT: FIGURE 1	
SCALE: N.T.S.		TITLE: BETHLEHEM SHORELINE TRAIL CITY OF LACKAWANNA, ERIE COUNTY, NEW YORK	
DRAWN BY: DV			
CHECKED BY: JM		DATE: MARCH, 2016	DWG. NO. LOC-1

SHORELINE TRAIL BETHLEHEM STEEL PHASE 1



NOTES:
1. TRAIL RIGHT OF WAY IS NOMINALLY 50' FROM THE EXISTING HIGHWAY BOUNDARY, BUT DUE TO CURVATURE, DEFLECTIONS, AND INCONSISTENCY OF THE EXISTING BOUNDARY, WIDTH SLIGHTLY VARIES.

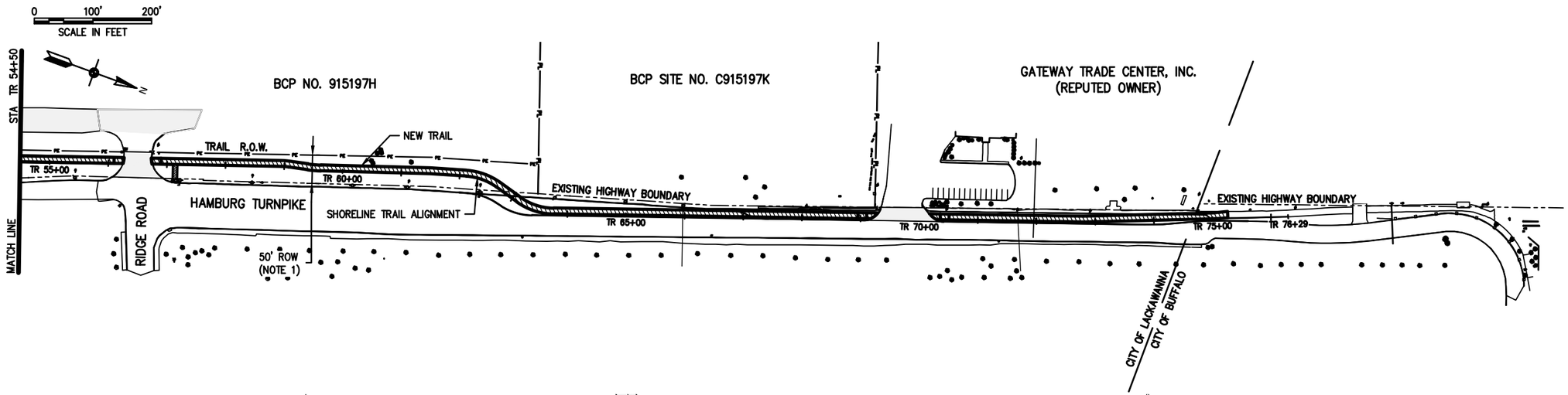
SITE LOCATION MAP

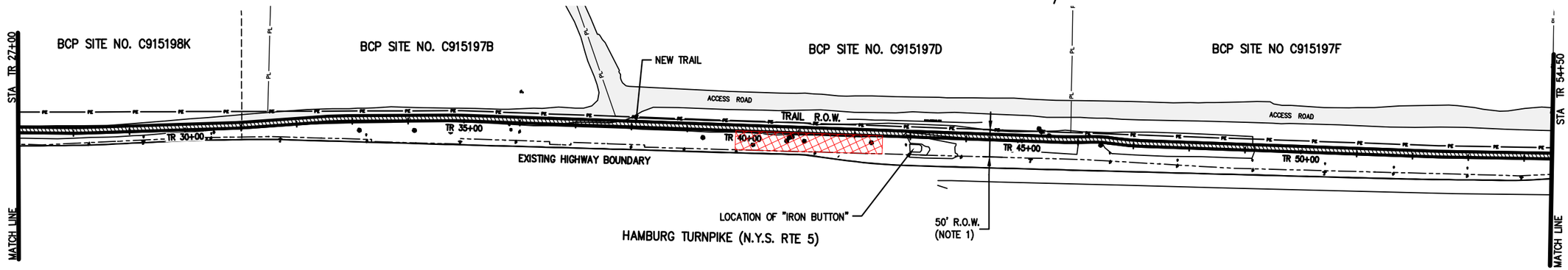
GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
Services Performed by GPI Engineering and Services, LLC
4950 Genesee Street, Buffalo, NY 14225
Tel: (716) 633-4144 Fax: (716) 633-4940

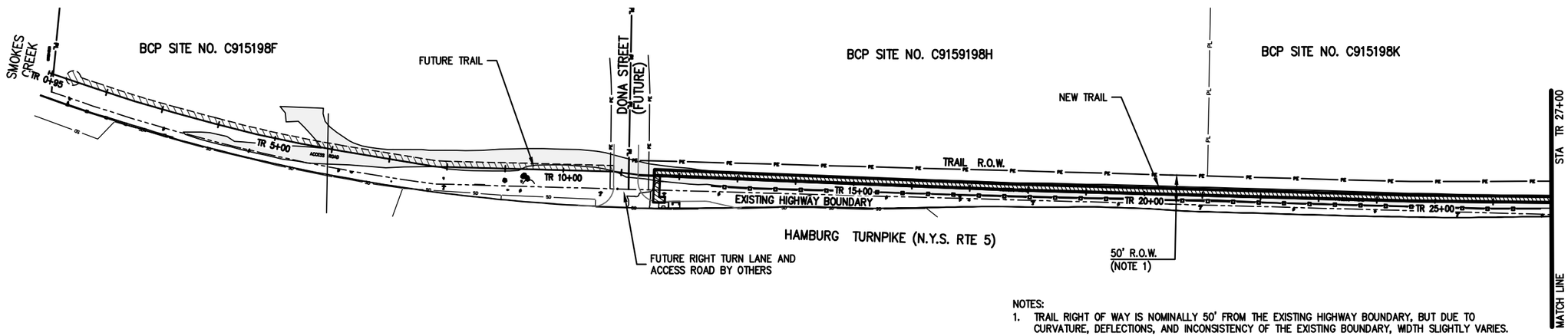
FIGURE 2

N:\2015\BUF-2015100 BETHLEHEM STEEL SHORELINE TRAIL - PHASE I\CAD\Contract Plans PS&E\2015100_FIG1 - figure 2.dwg Monday, 5 November 2018 11:29AM

SHORELINE TRAIL BETHLEHEM STEEL PHASE 1







NOTES:
1. TRAIL RIGHT OF WAY IS NOMINALLY 50' FROM THE EXISTING HIGHWAY BOUNDARY, BUT DUE TO CURVATURE, DEFLECTIONS, AND INCONSISTENCY OF THE EXISTING BOUNDARY, WIDTH SLIGHTLY VARIES.

KEY:

APPROXIMATE LOCATION OF AREA WHERE CONTAMINATED SOIL / FILL WAS EXCAVATED FROM SITE FOR OFF-SITE DISPOSAL

SOURCE OF CONTAMINATED SOIL / FILL

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
Services performed by GPI Engineering and Services, LLC
4950 Genesee Street, Buffalo, NY 14225
Tel: (716) 633-4144 Fax: (716) 633-4940

FIGURE 3

N:\2015\BUF-2015100 BETHLEHEM STEEL SHORELINE TRAIL - PHASE I\CADD\Contract Plans PS&E\2015100_FIG - figure 3.dwg Monday, 5 November 2018 11:38AM

SHORELINE TRAIL BETHLEHEM STEEL PHASE 1

0 100' 200'
SCALE IN FEET

STA TR 54+50
MATCH LINE
BCP NO. 915197H
BCP SITE NO. C915197K
GATEWAY TRADE CENTER, INC.
(REPUTED OWNER)
TRAIL R.O.W.
NEW TRAIL
TR 55+00
TR 60+00
HAMBURG TURNPIKE
SHORELINE TRAIL ALIGNMENT
EXISTING HIGHWAY BOUNDARY
TR 65+00
TR 70+00
TR 75+00
TR 76+29
EXISTING HIGHWAY BOUNDARY
RIDGE ROAD
50' ROW
(NOTE 1)
CITY OF LACKAWANNA
CITY OF BUFFALO

STA TR 27+00
MATCH LINE
BCP SITE NO. C915198K
BCP SITE NO. C915197B
BCP SITE NO. C915197D
BCP SITE NO C915197F
NEW TRAIL
EXISTING RETAINING WALL
ACCESS ROAD
TRAIL R.O.W.
ACCESS ROAD
TR 30+00
TR 35+00
TR 40+00
TR 45+00
TR 50+00
EXISTING HIGHWAY BOUNDARY
LOCATION OF "IRON BUTTON"
HAMBURG TURNPIKE (N.Y.S. RTE 5)
50' R.O.W.
(NOTE 1)
STA TR 54+50
MATCH LINE

SMOKES CREEK
TR 01+85
BCP SITE NO. C915198F
FUTURE TRAIL
DONA STREET
(FUTURE)
BCP SITE NO. C9159198H
BCP SITE NO. C915198K
NEW TRAIL
TRAIL R.O.W.
TR 5+00
ACCESS ROAD
TR 10+00
TR 15+00
TR 20+00
TR 25+00
EXISTING HIGHWAY BOUNDARY
HAMBURG TURNPIKE (N.Y.S. RTE 5)
FUTURE RIGHT TURN LANE AND
ACCESS ROAD BY OTHERS
50' R.O.W.
(NOTE 1)
STA TR 27+00
MATCH LINE

NOTES:
1. TRAIL RIGHT OF WAY IS NOMINALLY 50' FROM THE EXISTING HIGHWAY BOUNDARY, BUT DUE TO CURVATURE, DEFLECTIONS, AND INCONSISTENCY OF THE EXISTING BOUNDARY, WIDTH SLIGHTLY VARIES.

KEY:

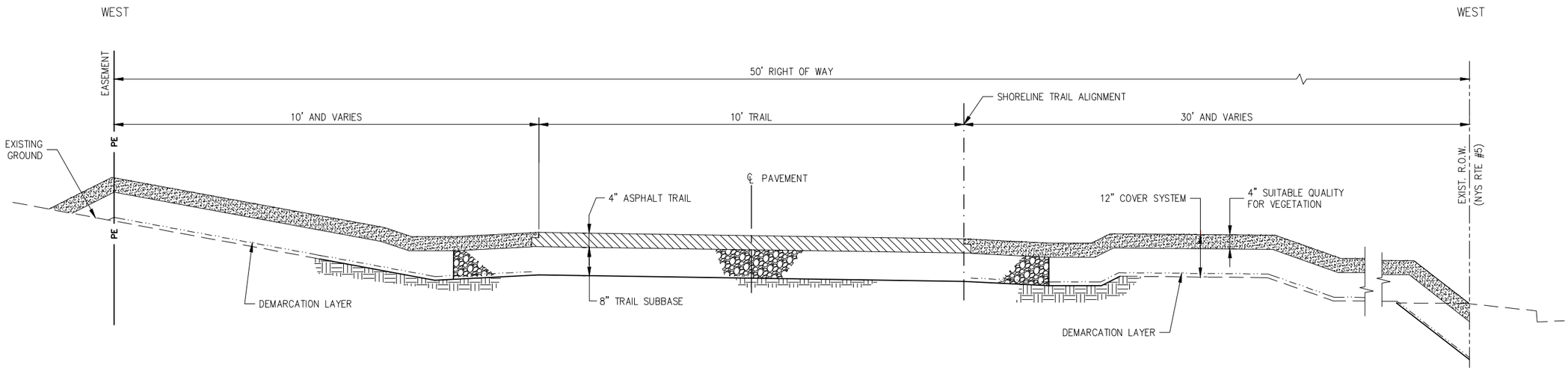
APPROXIMATE AERIAL EXTENTS OF THE SOIL COVER SYSTEM OVER THE ENTIRE SITE

SOIL COVER SYSTEM OVER ENTIRE SITE

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
Services performed by GPI Environmental Services, LLC
4950 Genesee Street, Buffalo, NY 14225
Tel: (716) 633-4344 Fax: (716) 633-4940

FIGURE 4

N:\2015\BUF-2015100 BETHLEHEM STEEL SHORELINE TRAIL - PHASE I\CAD\Contract Plans PS&E\2015100_FIG1 - figure 6.dwg Monday, 5 November 2018 1:57PM



TYPICAL SECTION OF COVER SYSTEM

SCALE: 3/4" = 1'-0"

N:\2015\BUF-2015100 BETHLEHEM STEEL SHORELINE TRAIL - PHASE 1\CADD\Contract Plans PS&E\2015100_FER - figure 5.dwg Monday, 5 November 2018 12:00PM

TYPICAL SECTION OF COVER SYSTEM

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
Engineering - Surveying - Planning
4950 Genesee Street, Buffalo, NY 14225
Tel.: (716) 633-4144 Fax: (716) 633-4940

FIGURE 5

ATTACHMENT A – SAMPLE EC/IC CERTIFICATION FORM

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details	**Box 1**
Site No.	
Site Name:	
Site Address: :	Zip Code:
City/Town: Lackawanna	
County: Erie	
Current Use: Commercial	
Intended Use: Commercial	

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	☐	☐
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	☐	☐
3. Groundwater monitoring as specified in the SMP:	☐	☐
4. Operation and maintenance of the ASD system as specified in the SMP:	☐	☐

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	☐	☐

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO.

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification Stamp (if Required) Date

BROWNFIELD CLEANUP PROGRAM

APPENDIX H-12
SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK

August 2017 0071-017-327
Revised December 2020
Revised July 2021

Prepared for:

Tecumseh Redevelopment Inc.
4020 Kinross Lakes Parkway
Richfield, OH, 44286

Prepared By:

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

In Association With:

Benchmark Environmental Engineering & Science, PLLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
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Revisions to Addenda of Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	12/8/2020	Removed Site II-10 from appendix	
2	4/29/2021	Addressed NYSDEC comments	7/28/2021
	7/29/2021	Finalized document	

PHASE II BUSINESS PARK
SITE MANAGEMENT PLAN: APPENDIX H-12
SITE II-12

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PHASE II BUSINESS PARK
SITE MANAGEMENT PLAN: APPENDIX H-12
SITE II-12

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Attachment B	Sample EC/IC Certification Form

1.0 INTRODUCTION

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase II Business Park (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMP (Ref. 1) for the Controlled Property was prepared by TurnKey Environmental Restoration, LLC (TurnKey), on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2) and the guidelines provided by NYSDEC. Since the Controlled Property was divided into 12 BCP Sites designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915199L), the main body of the SMP includes the site management components common to all 12 Sites. Site-specific requirements are included as Appendix H to the SMP.

Originally, Site II-10 (C915198J) was included with Site II-12 (C915198L) in Appendix H-10/H-12 (dated August 2017); however, with the purchase of Site II-9 and II-10 by Time Release Properties, LLC (TRP), combining Sites II-9 and II-10 into one appendix was necessary from an operational standpoint. Therefore, Site II-10 was removed from the August 2017 Appendix H-10/H-12 creating this Appendix H-12.

1.1 Site Location and Description

As shown on Figure 2, Site II-12 (approx. 12.02 acres) is bounded by BCP Site III-9 to the west; BCP Site II-10 to the south; BCP Site II-11 to the east; and BCP Sites I-1 and I-2 to the north. The Niagara Wind Substation 11A consists of approximately 0.3 acres of land between Sites II-10 and II-12. An existing natural gas line and easement traverses the property as shown on Figure 3.

The NYSDEC issued the Decision Document for Site II-12 on January 6, 2017 (Ref. 3). The Decision Document specifies, among other requirements, placement of acceptable cover material in areas not otherwise covered by rail lines, etc. Engineering controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during use of the Site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC by Tecumseh for the entire Phase II

Business Park has been recorded with the Erie County Clerk and requires compliance with this SMP and all ECs and institutional controls (ICs) placed on the Site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for Site II-12 of the Controlled Property. This Appendix is not to be used as stand-alone documents but as a component document of the January 2014 SMP for the Controlled Property.

1.2 Remedial Investigation

The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan (Ref. 4) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance across all 12 Sites within the Controlled Property. The RI was designed to provide defensible data to identify areas of the Controlled Property potentially requiring remediation, define chemical constituent migration pathways, and qualitatively assess human health and ecological risks to allow for performance of a remedial alternatives evaluation.

As shown on Figure 3, investigative activities specific to Site II-12 were performed in March/April 2010 and included the completion of 24 RI test pits and four railroad corridor test pits. Four supplemental test pits were completed to delineate Hotspot E (TP-93) and two supplemental test pits were completed to delineate Hotspot F (TP-95); no supplemental test pits were necessary to define Hotspot B. Monitoring well MWN-64A was installed on Site II-12 as part of the RI. Soil and groundwater samples were collected as detailed in the Work Plan.

The nature and extent of contamination at the Site is consistent with the former site use as a steel manufacturing facility. Polyaromatic hydrocarbons (PAHs) and arsenic, and to a lesser extent copper and mercury, concentrations exceeded commercial soil cleanup objectives (SCOs). Arsenic was found in 13 test pit samples at concentrations ranging from 17.3 to 72.7 ppm, which exceeds the commercial SCO of 16 ppm. Total PAHs exceeded the SSAL of 500 ppm in two samples (TP-80 and TP-93), with field evidence of gross petroleum/organic impact observed in test pits TP-93 and TP-95.

Groundwater samples were collected from the on-site monitoring well during the RI (April 2010) and again in February 2016 during a site-wide groundwater sampling event. The

groundwater sampling on Site II-12 indicated there were no exceedances of GWQSs in well MWN-64A for either sampling event. Attachment A includes the monitoring well construction log for MWN-64A. Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

The RI/AA Report was submitted to NYSDEC in May 2011, revised, and finalized in March 2012 (Ref. 5). The RI/AA Report recommended remediation of hotspot slag/fill with deferred soil cover system placement during redevelopment as well as ECs and ICs to limit future use of the Controlled Property to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes (see Section 2.0).

1.3 Interim Remedial Measures

The remediation of Site II-12 included an Interim Remedial Measure (IRM) to expedite remedial activities and facilitate redevelopment. In April 2017, Tecumseh submitted to NYSDEC an IRM Work Plan for Phase II Business Park Sites II-10, II-11, and II-12 (Ref. 6). Site II-12 was remediated between February 9 and May 17, 2017 in accordance with the NYSDEC-approved IRM Work Plan. The following remedial work performed is documented in the Final Engineering Report (Ref. 7) and shown on Figure 4:

- **Excavations:** Hotspots B, E, and F were excavated during the IRM. Except for Hotspot B, which was associated with shallow PAH impacts, non-impacted overburden slag/fill on Hotspots E and F that exhibited no visual (i.e., sheen product) or olfactory (i.e., nuisance odors) evidence of impact was removed and stockpiled for use as backfill in the excavations following the removal of petroleum/organic-impacted slag/fill. All other excavated materials were transported to the biotreatment pad constructed on Site II-9.
- **On-Site Biotreatment:** Petroleum-impacted slag/fill designated for biotreatment was transported to the pad using front end loaders and a tandem dump truck. The impacted materials were spread across the pad to an average thickness of 1.5 to 2 feet. Slag/fill determined by visual and olfactory observation to be adequately treated remained on the biotreatment pad until analytical results confirmed slag/fill met site-specific action levels (SSALs), including commercial SCOs for petroleum VOCs and less than 500 mg/kg total PAHs. Following biotreatment, the material was used as backfill to bring Business Park excavations up to grade. Since all soil/fill was biotreated, off-site disposal was not required.
- **Backfill:** Following replacement of clean overburden materials and receipt of passing confirmatory results, where applicable, excavations were re-graded with

surrounding slag/fill. In the case of Hotspot E, the backfill was supplemented with biotreated soils from other locations within the Tecumseh BCP Business Park Sites that were treated to meet SSALs and approved for use by the NYSDEC as subgrade backfill.

1.4 Summary of Remedial Actions

The final remedial measures for Site II-12 involved placement of the cover system in accordance with the NYSDEC-approved June 2017 Remedial Action Work Plan (RAWP) (Ref. 8). The remedial work is document in the Final Engineering Report (Ref. 7).

1.5 Remaining Contamination

The remedial work conducted on Site II-12 has removed all known "source area" (i.e., arsenic- and petroleum/organic-impacted) slag/fill and treated residual petroleum-impacted "smear zone" slag/fill in-situ.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs (USCOs) for several ubiquitous constituents; specifically, PAHs and inorganic compounds (i.e., arsenic, cadmium, chromium, lead, and mercury). Other constituents remaining above USCOs in select areas of the Site include benzene, PCBs (Aroclor 1254 and 1260) and inorganic compounds (i.e., copper, manganese, nickel, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the USCO criteria; therefore, it is assumed that the entire 12.02-acre Site II-12 is impacted above the USCOs to the approximate native soil depth of 12 fbgs. Table 1 summarizes the sample locations remaining above USCOs.

Following grading of Site II-12, a demarcation was constructed and placed to easily identify the existing Site sub-grade from the cover system material and prevent the potential for inadvertent removal of sub-grade material during future intrusive work. The demarcation layer is comprised of an orange ¾-inch plastic industrial netting material was rolled across the sub-grade and overlapped by approximately one foot at the seams.

The groundwater quality on Site II-12 has been assessed by sampling monitoring well MWN-64A in April 2010 during the RI and again in February 2016 during a site-wide groundwater sampling event. The groundwater was analyzed for VOCs, SVOCs, and inorganic parameters. Table 2 presents the groundwater data with a comparison to NYSDEC Class GA GWQS. As indicated, analytical results from this monitoring well indicates concentration

levels as non-detect or below GWQS. This well will be retained for future monitoring in the event NYSDEC requests groundwater quality monitoring on the larger Business Park II.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

Since remaining contaminated soil/fill and groundwater exists beneath the Phase II Business Park, Engineering Controls and Institutional Controls (EC/ICs) are required to protect public health and the environment. The EC/IC Plan in the January 2014 SMP describes the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to Site II-12 are described below.

2.2 Engineering Control Systems

As described in the December 2013 Construction Completion Report (CCR; Ref. 9), construction of the railroad bed cover system occurred in April 2013 and involved placement of a minimum 1-foot layer comprised of ballast material, meeting the requirements of the specification in the IRM Work Plan (Ref. 10), and embedded wood rail ties. A woven geotextile was installed on the prepared subgrade prior to placement of the ballast layer and rail ties as a demarcation layer. Ballast material was compacted in accordance with rail construction contract requirements to mitigate potential for settlement. TurnKey personnel were on-site to observe placement of ballast material.

The cover system for Site II-12 is described in the August 2017 Final Engineering Report (Ref. 7). Figure 5 shows the approximate locations and types of cover system materials placed on Site II-12. In the event these cover systems are breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the 2014 SMP and Section 4.0 of the Excavation Work Plan (2014 SMP Appendix B).

Although chlorinated organic compounds were not identified as constituents of concern at the Site, the 2014 SMP requires that a vapor barrier be placed beneath any future structures designated for occupancy as a conservative measure to protect building occupants against potential sub-slab vapor intrusion.

2.3 Institutional Controls

The Institutional Controls described in Section 2.3 of the 2014 SMP (i.e., Environmental Easement and Excavation Work Plan) must be implemented for Site II-12. There are no Site-specific institutional control requirements for Site II-12.

2.4 Inspections and Notifications

The annual inspections and notifications described in Section 2.4 of the 2014 SMP must be implemented for Site II-12. There are no other Site-specific inspection and notification requirements for Site II-12.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (2014 SMP Appendix C). The following emergency contact numbers are specific to Site II-12:

Table 3: Emergency Contact Numbers

Name: John Cappellino Title: Executive Vice President, Buffalo and Erie County Industrial Land Development Corporation	Work: (716) 856-6525 Mobile: (716) 472-6667
Name: Thomas Forbes Title: President, Benchmark Environmental	Work: (716) 856-0599 Mobile: (716) 864-1730

Note: Contact numbers subject to change and should be updated as necessary

3.0 SITE MONITORING PLAN

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The soil cover system; and
- All affected Site media.

Monitoring of the cover system is described in Section 3.2 of the January 2014 SMP. No additional site-specific monitoring is required.

4.0 OPERATION & MAINTENANCE PLAN

The remedy for Site II-12 does not rely on any mechanical systems, such as sub-slab depressurization or soil vapor extraction, to protect public health and the environment. Therefore, a Site-specific Operation and Maintenance Plan is not required.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

All inspection, reporting, and certification requirement are described in Section 5.0 of the January 2014 SMP. Attachment B includes a sample EC/IC Certification Form to be completed for Site II-12.

6.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Site Management Plan for BCP Tecumseh Phase II Business Park, NYSDEC Site No. C915198 through C915198L, Lackawanna, New York*. January 2014.
2. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation*. May 3, 2010.
3. New York State Department of Environmental Conservations. *Decision Document, Site II-12 Tecumseh Phase II Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915198l*. January 2017.
4. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan, Phase II Business Park Area, Lackawanna, New York*. July 2009.
5. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis (RI/AA) Report for Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York*. Revised March 2012.
6. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Phase II Business Park, Sites II-10, II-11 and II-12, BCP Site Nos. C915198J, C915198K & C915198L, Lackawanna, New York*. February 2017, revised April 2017.
7. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Final Engineering Report, Tecumseh Business Park II, Sub-Parcels II-10 and II-12, Lackawanna, New York*. August 2017.
8. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Remedial Action Work Plan, Tecumseh Business Parks I and II, Lackawanna, New York*. June 2017.
9. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Construction Completion Report, Railroad Realignment, Tecumseh Phase I-III Business Park, Lackawanna, New York, BCP Site Nos. C915197-C915199*. December 2013.
10. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Railroad Realignment, Phase I-III Business Park Areas, Lackawanna, New York, BCP Site Nos. C915197-C915199*. October 2010.

TABLES

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Site No; Test Pit Location; and Depth Interval (fbgs)									Unrestricted SCO [2] (mg/kg)
	II-10 & II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	
	TP-57	TP-64	TP-66	TP-67	TP-69	TP-71	TP-74	TP-75	TP-76	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg										
Benzene	--	0.013	**0.077**	--	ND	--	ND	--	ND	**0.06**
Ethylbenzene	--	ND	0.1	--	ND	--	ND	--	ND	**1**
n-Butylbenzene	--	0.064	0.069	--	ND	--	ND	--	ND	**12**
sec-Butylbenzene	--	0.027 J	0.027 J	--	ND	--	ND	--	ND	**11**
tert-Butylbenzene	--	ND	ND	--	ND	--	ND	--	ND	**5.9**
Isopropylbenzene	--	0.025	0.026	--	ND	--	ND	--	ND	**--**
p-Cymene	--	ND	ND	--	ND	--	ND	--	ND	**--**
n-Propylbenzene	--	0.018	0.018	--	ND	--	ND	--	ND	**3.9**
Toluene	--	0.098 B	0.4 B	--	ND	--	ND	--	ND	**0.7**
1,2,4-Trimethylbenzene	--	0.11	0.11	--	ND	--	ND	--	ND	**3.6**
1,3,5-Trimethylbenzene	--	0.034	0.037	--	ND	--	ND	--	ND	**8.4**
o-Xylene	--	0.14	0.13	--	ND	--	ND	--	ND	**0.26**
Xylenes, Total	--	0.28	0.28	--	ND	--	ND	--	ND	**--**
Naphthalene	--	0.42 BJ	0.26 B	--	ND	--	ND	--	0.093 BD	**--**
Methyl tert butyl ether	--	0.01 J	0.05	--	ND	--	ND	--	ND	**0.93**
Methylene Chloride	--	--	--	--	0.0036 J	--	ND	--	--	**0.05**
TOTAL VOCs (mg/kg)	--	*1.2*	*1.6*	--	*0.0036*	--	*0*	--	*0.093*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg										
Acenaphthylene	0.68 DJ	0.44 DJ	1.1 DJ	1.3 DJ	ND	2.4 DJ	1.2 DJ	ND	0.51 DJ	**100**
Anthracene	1.3 DJ	0.55 DJ	1.1 DJ	7.7 DJ	ND	3.5 DJ	0.81 DJ	ND	0.38 DJ	**100**
Benzo(a)anthracene	**4.5 D**	**2.7 DJ**	**3.3 DJ**	**24 BD**	0.91 DJB	**9.9 BD**	**5 BD**	**2.6 TDJB**	**2 DJ**	**1**
Benzo(b)fluoranthene	**6.3 D**	**4.5 D**	**6.4 D**	**31 D**	**1.6 D,ID4,J**	**12 D**	**6 D**	**5.2 T,D,ID4,J**	**3.3 DJ**	**1**
Benzo(k)fluoranthene	**2 DJ**	**1.4 DJ**	**1.8 DJ**	**14 D**	ND	**5.4 DJ**	**2.8 DJ**	ND	**1.2 DJ**	**0.8**
Benzo(g,h,i)perylene	5.1 D	2.7 DJ	4 D	24 BD	0.8 DJB	7.6 DJB	3.4 DJ	2.6 TDJB	2.7 DJ	**100**
Benzo(a)pyrene	**5 D**	**3.1 DJ**	**3.5 DJ**	**29 D**	0.93 DJ	**9.4 DJ**	**4.6 DJ**	**2.3 T,D,J,B**	**2.7 DJ**	**1**
Chrysene	**4.5 D**	**2.8 DJ**	**3.7 DJ**	**26 D**	0.48 DJ	**11 D**	**4.6 BD**	ND	**2.1 DJ**	**1**
Dibenzo(a,h)anthracene	**1.2 DJ**	**0.68 DJ**	**0.96 DJ**	ND	ND	**2 DJB**	**0.86 DJ**	ND	**0.62 DJ**	**0.33**
Dibenzofuran	ND	0.37 DJ	0.33 DJ	2.3 DJ	ND	2 DJ	ND	ND	ND	**--**
Fluoranthene	9.7 D	4.4 D	5.4 D	55 D	1.5 DJ	29 D	8.6 BD	ND	4.4 D	**100**
Fluorene	ND	ND	ND	3.7 DJ	ND	3.4 DJ	ND	ND	ND	**30**
Indeno(1,2,3-cd)pyrene	**4.1 D**	**2.5 DJ**	**3.5 DJ**	**20 D**	**0.6 DJ**	**6.6 DJ**	**2.8 DJ**	**2.1 T,D,J**	**2.2 DJ**	**0.5**
2-Methylnaphthalene	ND	0.81 DJ	0.63 DJ	0.45 DJ	ND	0.54 DJ	ND	ND	ND	**--**
Naphthalene	ND	0.99 DJ	0.54 DJ	1.3 DJ	ND	**2.1 DJ**	ND	ND	ND	**12**
Phenanthrene	3.4 DJ	2.2 DJ	1.7 DJ	29 D	0.46 DJ	28 D	2.8 DJB	ND	1.7 DJ	**100**
Pyrene	7.2 D	4.2 D	5.2 D	50 D	1.6 DJ	23 D	7.4 D	2.4 TDJ	3.4 DJ	**100**
TOTAL SVOCs (mg/kg)	*55*	*34*	*43*	*319*	*9*	*158*	*51*	*17*	*27*	--

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Site No; Test Pit Location; and Depth Interval (fbgs)									Unrestricted SCO [2] (mg/kg)
	II-10 & II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	
	TP-57	TP-64	TP-66	TP-67	TP-69	TP-71	TP-74	TP-75	TP-76	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Polychlorinated Biphenyls (PCBs) - mg/kg										
Aroclor 1254	ND	--	ND	0.35 QSU,D,J	ND	--	ND	--	ND	--
Aroclor 1260	ND	--	ND	ND	ND	--	ND	--	0.13 QSU	--
TOTAL PCBs (mg/kg)	*0*	*--*	*0*	***0.35***	*0*	*0*	*0*	*--*	***0.13***	***0.1***
Inorganic Compounds - mg/kg										
Aluminum	--	--	--	--	5530	--	7760	--	--	--
Arsenic, Total	**46.4**	**24.1**	**39.9**	**17.3**	**25.3**	**72.7**	**47.4**	**14.3**	**13.8**	**13**
Barium, Total	116	94	163	125	63.6 J	120	88.8	66.9	73.3	**350**
Beryllium	--	--	--	--	0.725	--	0.97	--	--	**7.2**
Cadmium, Total	**3**	1.73	**2.93**	2.21	**3.48**	**3.39**	1.87	**3.18**	**2.81**	**2.5**
Calcium	--	--	--	--	36500 D	--	52900	--	--	--
Chromium, Total	**55**	**61.8 J**	**174 J**	**54.8 J**	**73.4 J**	**44.1 J**	**91.4**	**67.8 J**	**277**	**1**
Cobalt	--	--	--	--	7.95	--	4.51	--	--	--
Copper	--	--	--	--	**779**	--	**120**	--	--	**50**
Iron	--	--	--	--	71400 D	--	45100	--	--	--
Lead, Total	**357**	**384**	**647**	**518**	**303**	**460**	**290**	**942**	**325**	**63**
Magnesium	--	--	--	--	4210 J	--	9020	--	--	--
Manganese	--	--	--	--	**3270 D**	--	**3770 D**	--	--	**1600**
Mercury, Total	0.152	**4.05 D**	**0.35**	**5.51 D**	**5.68 D**	**0.738 D**	0.116	**0.284**	**0.518**	**0.18**
Nickel	--	--	--	--	**71.1 J**	--	20	--	--	**30**
Potassium	--	--	--	--	408 J	--	900	--	--	--
Silver	--	--	--	--	ND	--	0.508	--	--	**2**
Sodium	--	--	--	--	166 J	--	234	--	--	--
Vanadium	--	--	--	--	44.2	--	39.7	--	--	--
Zinc	--	--	--	--	**409**	--	**380**	--	--	**109**
Cyanide, Total	1.6	4 J	ND	12 J	2.3 J	1.6 J	ND	--	ND	**27**

Notes:

1. Only parameters detected at a min. of one location are presented; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective; Unrestricted Use per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

B = Analyte was detected in associated Method Blank.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
ID4 = Benzo(b)fluoranthene coelutes with Benzo(k)fluoranthene. The reported result is a summation of the isomers and the concentration is based on the response factor of Benzo(b)fluoranthene.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
QSU = Sulfur (EPA 3660) clean-up performed on extract.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or imprecise.
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Use Soil Cleanup Objectives.

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Test Pit Location and Depth Interval (fbgs)			Unrestricted SCO [2] (mg/kg)
	II-12	II-12	II-10 & II-12	
	TP-86	TP-92	TP-96	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg				
Methylene Chloride	0.0065	ND	0.0036 J	**0.05**
TOTAL VOCs (mg/kg)	*0.0065*	*0*	*0.0036*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg				
Acenaphthylene	ND	0.15 DJ	0.23 DJ	**100**
Anthracene	0.84 DJ	ND	0.34 DJ	**100**
Benzo(a)anthracene	**2.7 DJ**	0.7 DJ	**1.7 DJ**	**1**
Benzo(b)fluoranthene	**3.7 DJ**	0.92 DJ	**2.7 D**	**1**
Benzo(k)fluoranthene	**1.2 DJ**	**0.88 DJ**	**0.89 DJ**	**0.8**
Benzo(g,h,i)perylene	2.8 DJ	0.69 DJ	2 D	**100**
Benzo(a)pyrene	**2.9 DJ**	0.83 DJ	**2.2 D**	**1**
Carbazole	ND	ND	0.12 DJ	--
Chrysene	**2.5 DJ**	**1 DJ**	**1.7 DJ**	**1**
Dibenzo(a,h)anthracene	ND	0.27 DJ	**0.52 DJ**	**0.33**
Fluoranthene	6.1 DJ	0.91 DJ	3 D	**100**
Indeno(1,2,3-cd)pyrene	**2.1 DJ**	0.48 DJ	**1.7 DJ**	**0.5**
Phenanthrene	3.5 DJ	0.35 DJ	1.4 DJ	**100**
Pyrene	4.6 DJ	0.93 DJ	2.3 D	**100**
TOTAL SVOCs (mg/kg)	*33*	*8.1*	*21*	--
Polychlorinated Biphenyls (PCBs) - mg/kg				
Aroclor 1242	0.015 QSU, J	ND	ND	--
Aroclor 1260	0.063 QSU	ND	ND	--
TOTAL PCBs (mg/kg)	*0.078*	*0*	*0*	***0.1***
Inorganic Compounds - mg/kg				
Aluminum	19100	--	--	--
Antimony	91.3	--	--	--
Arsenic, Total	**42.8**	**26.7**	**15.4**	**13**
Barium, Total	141	10.4	150	**350**
Beryllium	2.71	--	--	**7.2**
Cadmium, Total	1.86	0.914	1.49	**2.5**
Calcium	109000 D	--	--	--
Chromium, Total	**73.2**	**26.3**	**671**	**1**
Cobalt	13.1	--	--	--
Copper	**655**	--	--	**50**

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs
SITE MANAGEMENT PLAN
Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Test Pit Location and Depth Interval (fbgs)			Unrestricted SCO [2] (mg/kg)
	II-12	II-12	II-10 & II-12	
	TP-86	TP-92	TP-96	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Inorganic Compounds - mg/kg				
Iron	135000 D	--	--	--
Lead, Total	0.62	**543**	**148**	**63**
Magnesium	16100	--	--	--
Manganese	**3630 D**	--	--	**1600**
Mercury, Total	**0.508 D**	0.035	0.168	**0.18**
Nickel	**157**	--	--	**30**
Potassium	1880	--	--	--
Sodium	512	--	--	--
Vanadium	24	--	--	--
Zinc	**376 D**	--	--	**109**
Cyanide, Total	1.1	--	--	**27**

Notes:

1. Only parameters detected at a min. of one location are presented; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective; Unrestricted Use per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or viscosity.

J = Estimated value; result is less than the sample quantitation limit but greater than zero.

ND = parameter not detected above laboratory detection limit.

QSU = Sulfur (EPA 3660) clean-up performed on extract.

" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Soil Cleanup Objectives.

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

PARAMETER [1]	GWQS [2]	SITE II-12			
		MWN-64A		MWN-64A	
		4/30/2010		2/25/2016	
Field Measurements [3]:					
Sample No.	--	initial	final	initial	final
pH (units)	**6.5 - 8.5**	7.84	7.82	7.77	7.75
Temperature (°C)	**NA**	11.4	12.4	8.0	7.8
Sp. Conductance (uS)	**NA**	635.9	632.3	747.1	744.9
Turbidity (NTU)	**NA**	140	107	8.56	5.12
Dissolved Oxygen (mg/L)	**NA**	--	--	2.26	1.70
Eh (mV)	**NA**	-113	-119	-149	-139
Total Inorganic Compounds (mg/L) [4]:					
Barium - Total	**1**	0.043		0.042	
Manganese - Total	**0.3**	--		0.24	
Cyanide - Total	**0.2**	--		0.018	
Soluble Inorganic Compounds (mg/L) [4,5]:					
Barium - Soluble	**1**	0.0293		--	
Semi-Volatile Organic Compounds (ug/L) [5]:					
Pyrene	**50***	0.35 J		ND	

Notes:

1. Only those compounds detected above the method detection limit at a minimum of one sample location are reported in this table.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) per TOGS 1.1.1 (June 1998, January 1999 Errata, April 2000 Addendum, and June 2004 Addendum).
3. Field measurements were collected immediately before and after groundwater sample collection.
4. A soluble metals sample was collected if the sample turbidity was above 50 NTUs.
5. Groundwater collected from April 2010 monitoring event were only analyzed for those parameters listed in the July 2009 Remedial Investigation Work Plan.

Definitions:

J = Estimated Value; result is less than the sample quantitation limit but greater than zero.

"--" = Not analyzed for.

* = Guidance Value

NA = No standard available at this time.

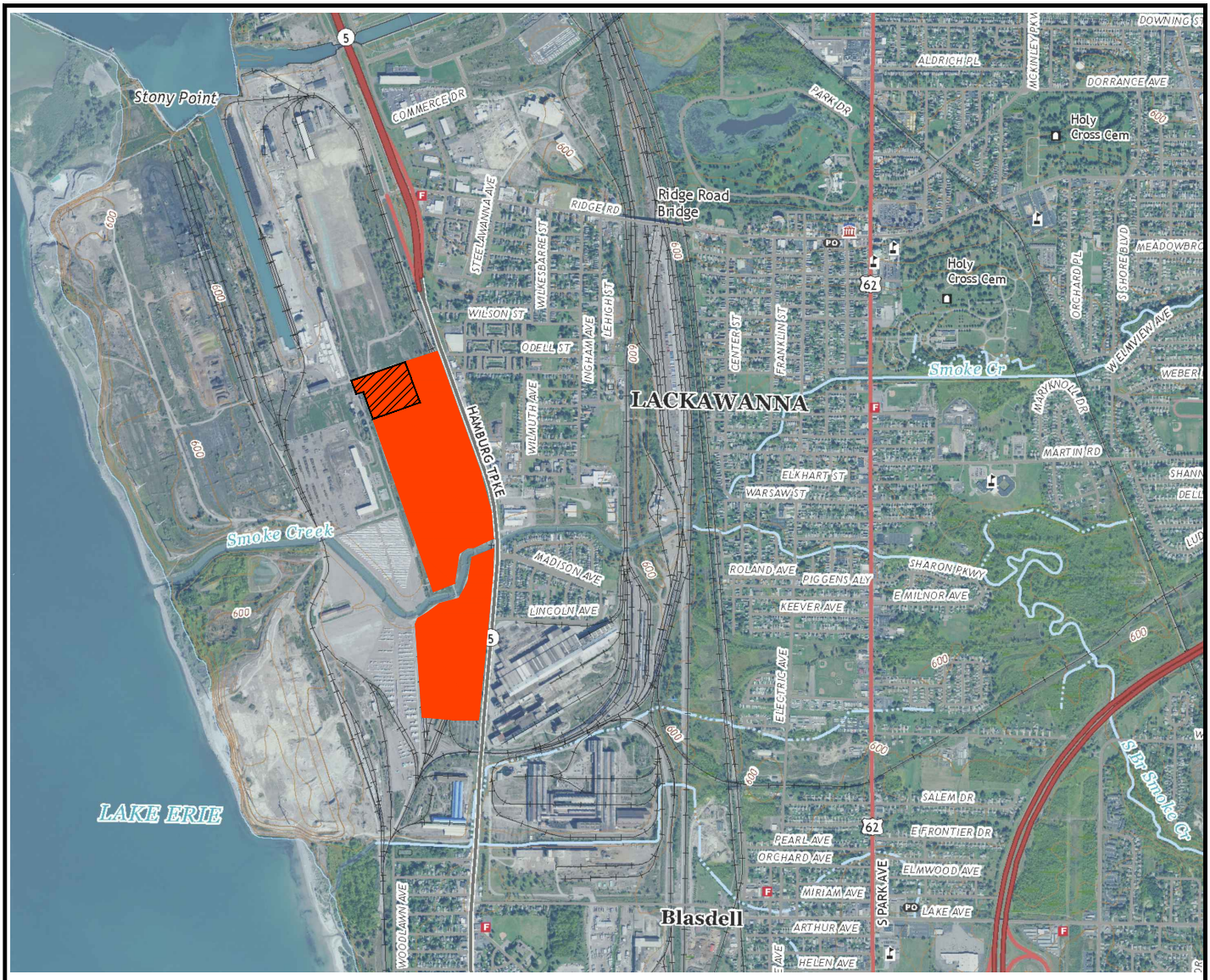
ND = Indicates parameter was not detected above method detection limit.

BOLD = Result exceeds the GWQS/GV.

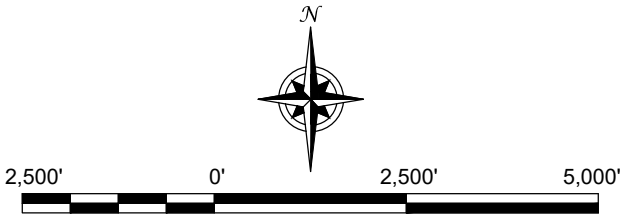
FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 1; Site Location and Vicinity Map.dwg, 12/8/2020 1:03:30 PM

FIGURE 1







SCALE: 1 INCH = 2,500 FEET
SCALE IN FEET
(approximate)

LEGEND:

- TECUMSEH BUSINESS PARK II
- SITE II-12

NOTE: BASEMAP USGS BUFFALO SE QUADRANGLE 2019

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-017-327

DATE: DECEMBER 2020

DRAFTED BY: RFL

SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK

PREPARED FOR

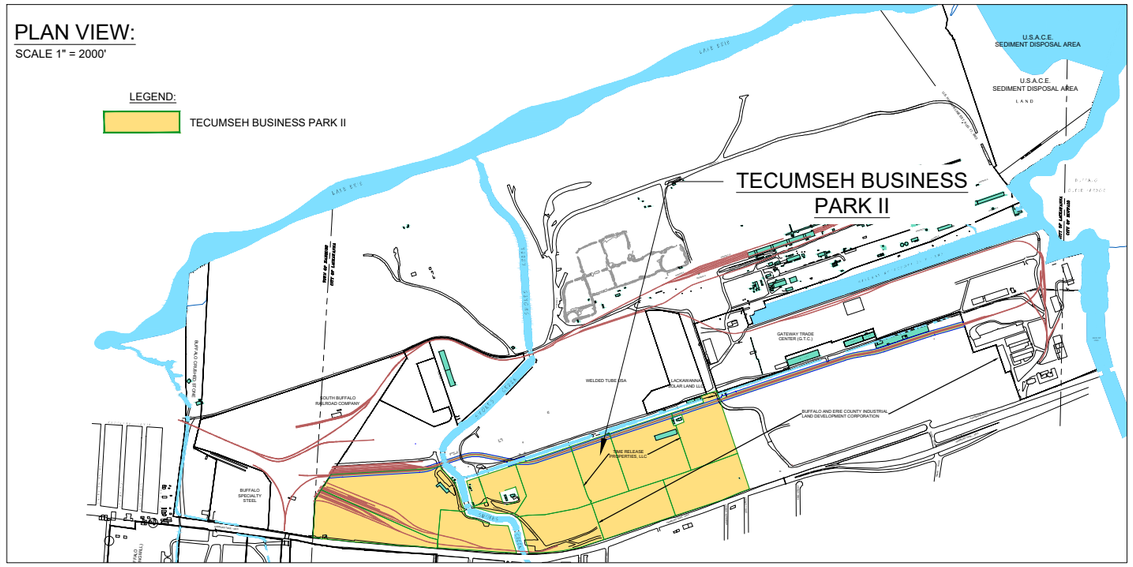
TECUMSEH REDEVELOPMENT INC.

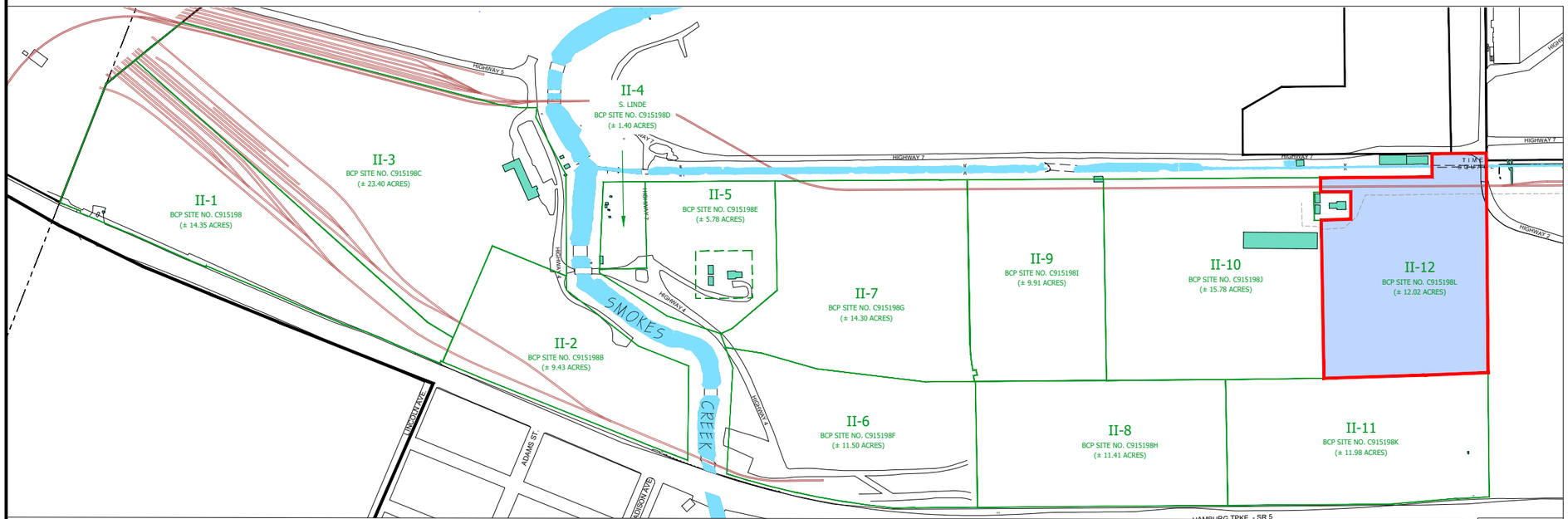
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F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 2- Site Delineation Map.dwg, 12/8/2020 3:20:06 PM

PLAN VIEW:

SCALE 1" = 2000'





LEGEND:

- SITE II-12
- EXISTING BUILDING / STRUCTURE
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- RAILROAD TRACK

500' 0' 500' 1,000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

DATE: DECEMBER 2020
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

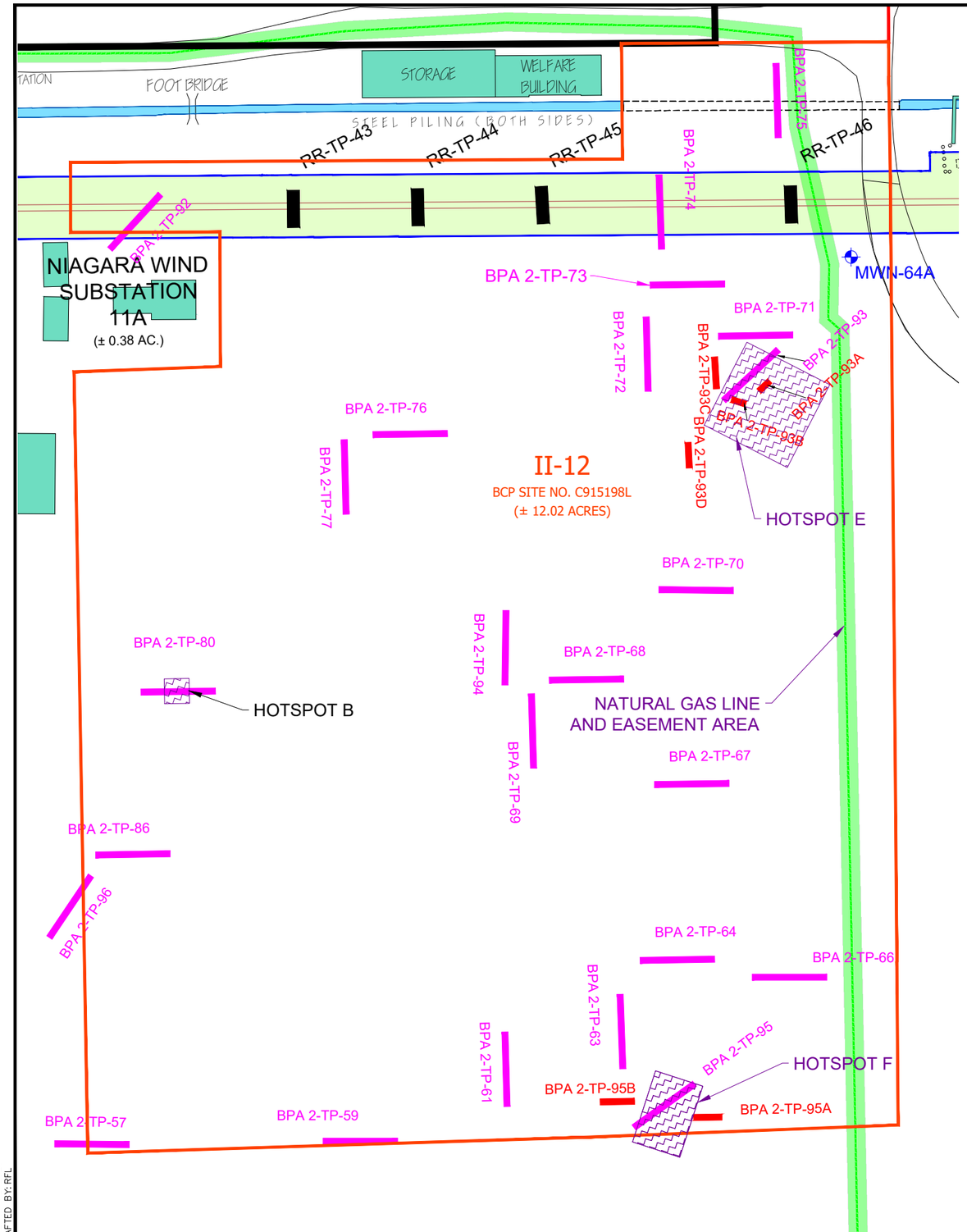
JOB NO.: 0071-017-327

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 2

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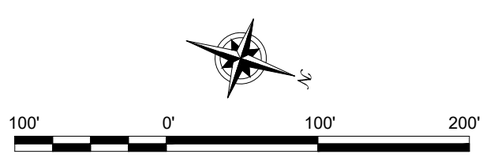
- EXISTING BUILDING / STRUCTURE
- BCP SITE II-12 BOUNDARY
- RAILROAD TRACK
- MWS-64A — EXISTING PHASE II BPA OVERBURDEN MONITORING WELL
- BPA 2-TP-72 — PHASE II BPA TEST PIT
- BPA 2-TP-72 — SUPPLEMENTAL PHASE II BPA TEST PIT (LOGS NOT CREATED)
- RR-TP-18 — RAILROAD CORRIDOR TEST PIT (SEE 2010 IRM WORK PLAN)

RI Test Pits
- BPA2-TP-57
- BPA2-TP-59
- BPA2-TP-61
- BPA2-TP-63
- BPA2-TP-64
- BPA2-TP-66
- BPA2-TP-67
- BPA2-TP-68
- BPA2-TP-69
- BPA2-TP-70
- BPA2-TP-71
- BPA2-TP-72
- BPA2-TP-73
- BPA2-TP-74
- BPA2-TP-75
- BPA2-TP-76
- BPA2-TP-77
- BPA2-TP-80 (Hotspot B)
- BPA2-TP-86
- BPA2-TP-92
- BPA2-TP-93 (Hotspot E)
- BPA2-TP-94
- BPA2-TP-95 (Hotspot F)
- BPA2-TP-96

Railroad Realignment Test Pits
- RR-TP-43
- RR-TP-44
- RR-TP-45
- RR-TP-46

Supplemental Test Pits (Hotspot E)
- BPA2-TP-93A
- BPA2-TP-93B
- BPA2-TP-93C
- BPA2-TP-93D

Supplemental Test Pits (Hotspot F)
- BPA2-TP-95A
- BPA2-TP-95B



SCALE: 1 INCH = 100 FEET
SCALE IN FEET
(approximate)

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-017-327

TEST PIT LOCATIONS SITE II-12

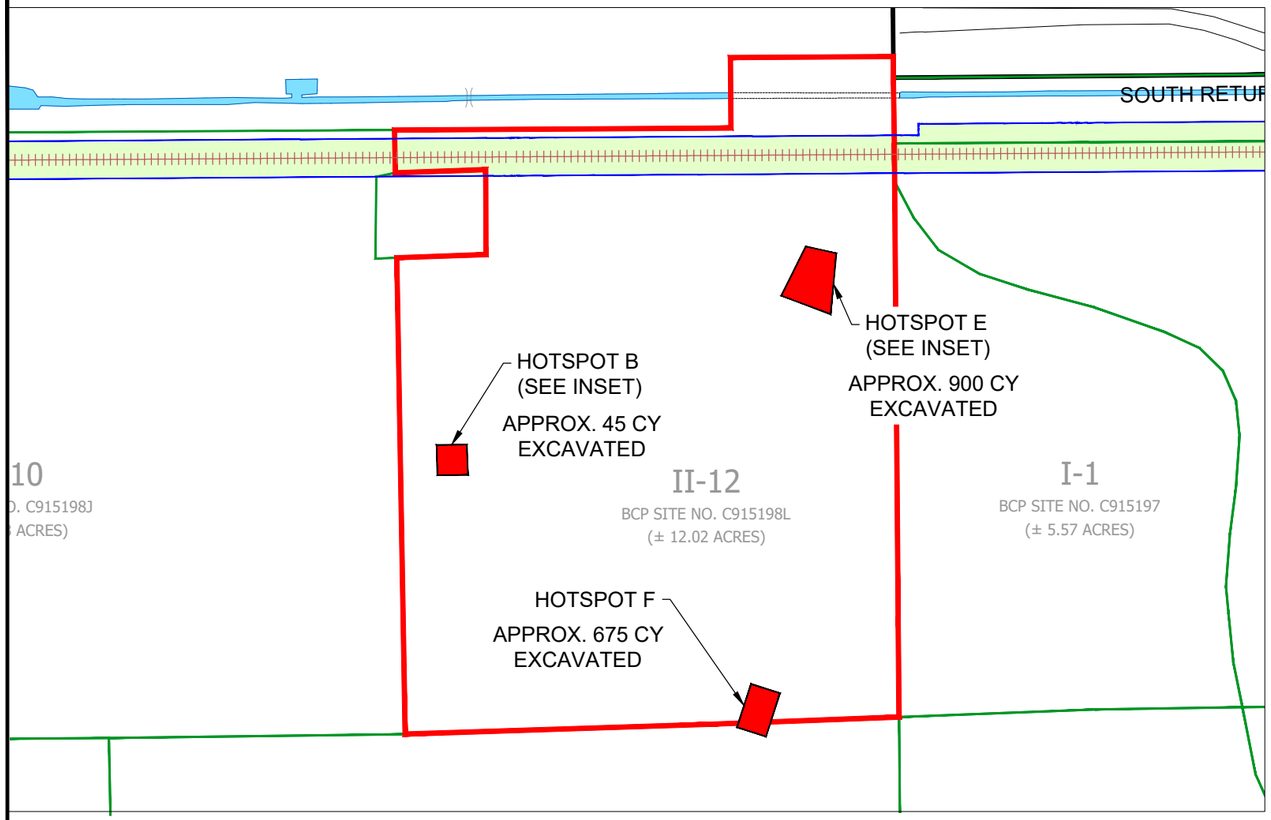
SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915189L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

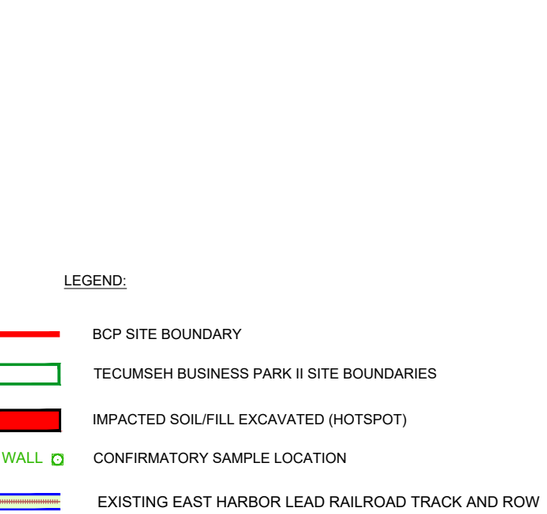
FIGURE 3

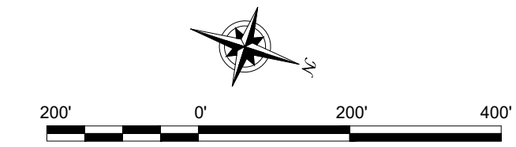
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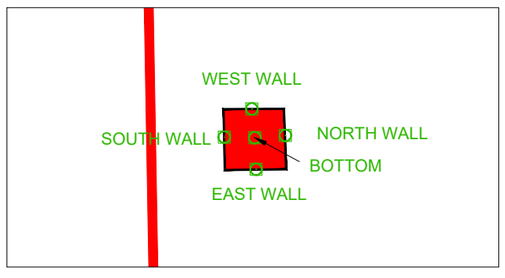
F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 3; Test Pits on II-12.dwg, 4/21/2021 11:46:29 AM



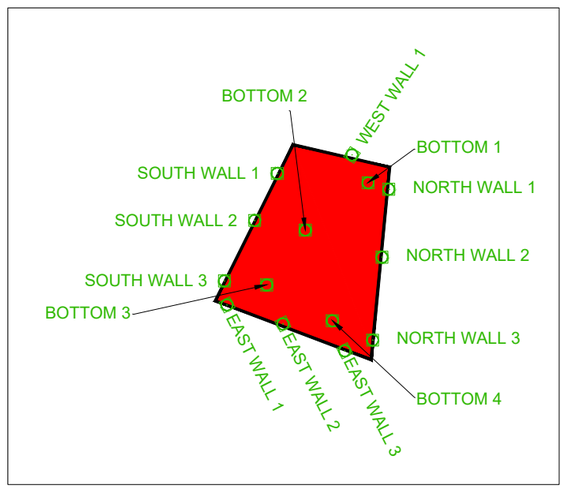




SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)



HOTSPOT B
NTS



HOTSPOT E
NTS'

DATE: DECEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 4; Completed RM.dwg, 4/20/2021 2:34:17 PM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

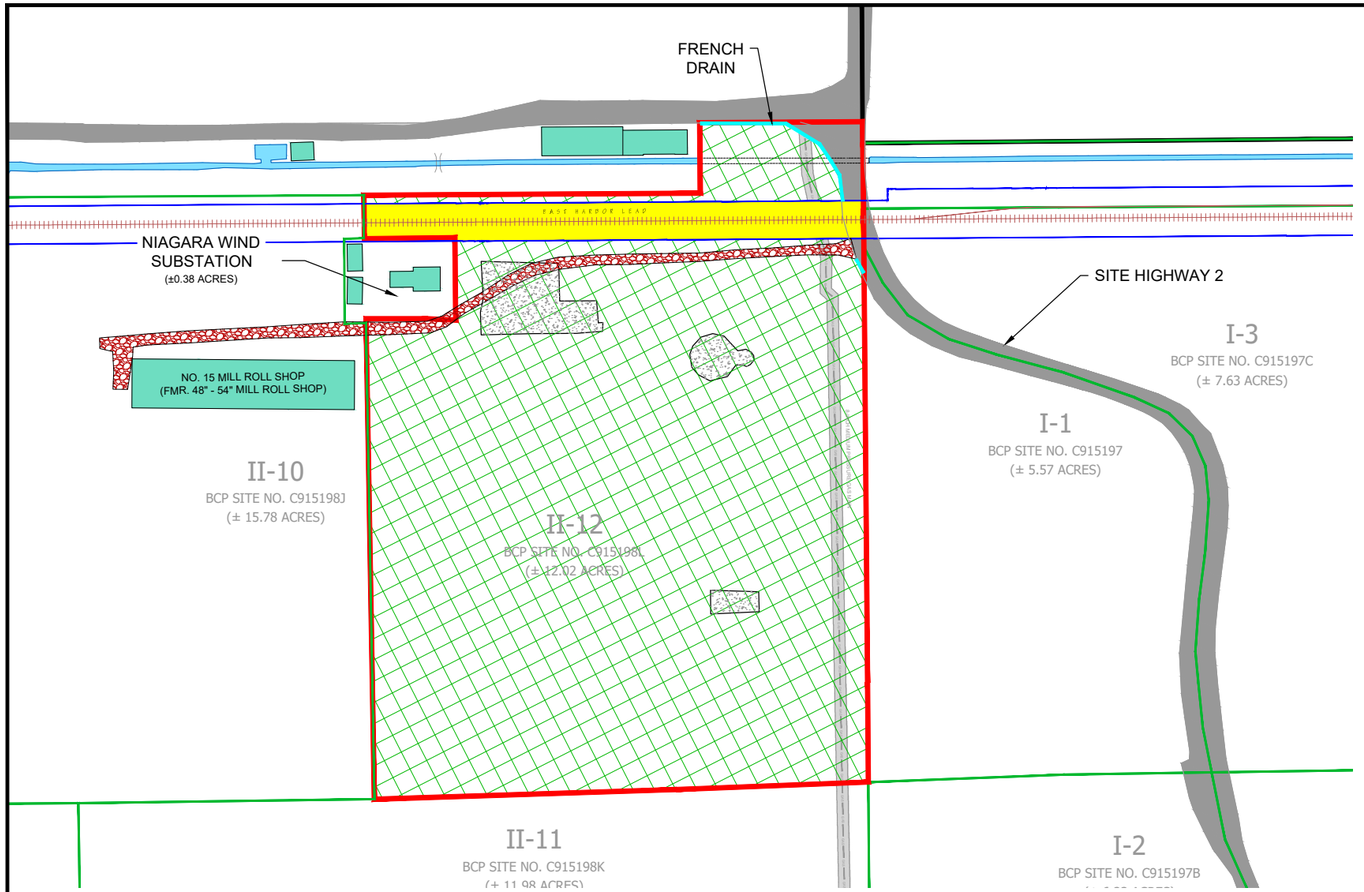
JOB NO.: 0071-017-327

COMPLETED REMEDIAL MEASURES

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 4

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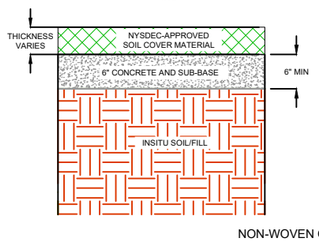
200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

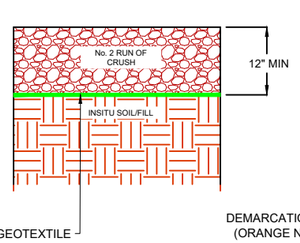
LEGEND:

- BCP BOUNDARY (SITE II-12)
- SITE BOUNDARIES
- EXISTING BUILDING / STRUCTURE
- SITE II-12 SOIL COVER SYSTEM
- ASPHALT PAVED ACCESS ROADS FINAL COVER
- EXISTING EAST HARBOR LEAD RAILROAD TRACK AND ROW
- ACCESS DRIVE (RUN OF CRUSH) FINAL COVER
- CONCRETE SLAB FINAL COVER
- NATURAL GAS LINE AND EASEMENT AREA

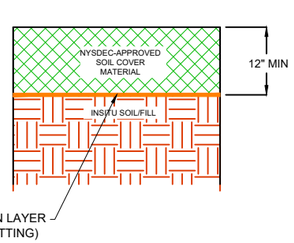
EXISTING CONCRETE COVER SYSTEM DETAIL[1]
NTS



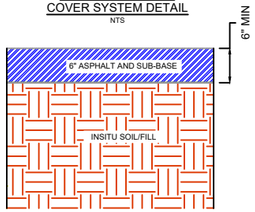
ACCESS DRIVE COVER SYSTEM DETAIL
NTS



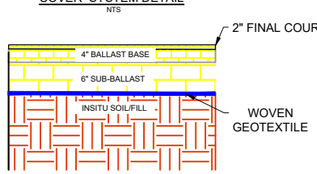
SOIL COVER SYSTEM DETAIL
NTS



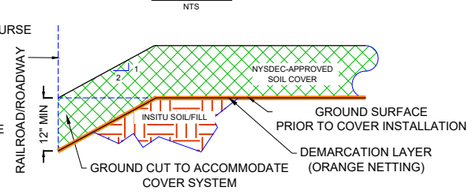
EXISTING ASPHALT COVER SYSTEM DETAIL
NTS



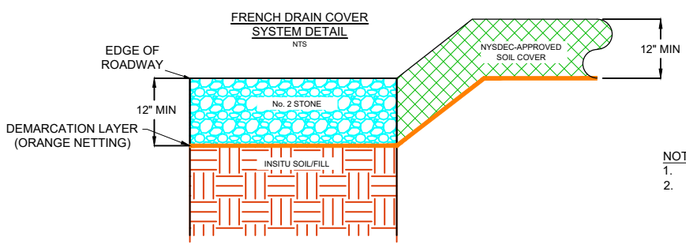
COVER SYSTEM BENEATH TRACKS COVER SYSTEM DETAIL[2]
NTS



TIE-IN DETAIL
NTS



FRENCH DRAIN COVER SYSTEM DETAIL
NTS



NOTES:
1. CONCRETE COVERED WITH VARYING AMOUNTS OF SOIL OR STONE.
2. BASED ON RECORD DRAWINGS PROVIDED BY C&S COMPANIES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

JOB NO.: 0071-017-327

APPROXIMATE LOCATIONS AND TYPES OF COVER SYSTEM MATERIALS

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 5

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.

DATE: DECEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 5; Cover System PlanSMP.dwg, 4/29/2021 9:15:41 AM

ATTACHMENT A

MONITORING WELL BORING AND CONSTRUCTION LOG

Project No: 0071-009-311

Borehole Number: MWN-64A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

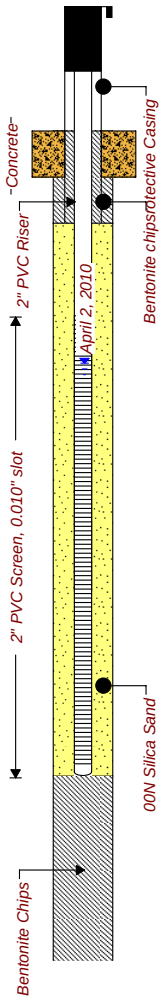
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Grey brown, moist, non-plastic fines with some fine sand, slag, medium dense.	S1	16	1.1		0.0		
	-2.0 2.0	As above, black, coal and coke fines, orange brick, loose.	S2	8	1.0		0.3		
2.0	-4.0 4.0	As above.	S3	3	1.0		0.3		
	-5.0 5.0	***Poorly Graded Sand with Silt*** Brown, wet, mostly medium sand, few non plastic fines, few fine sub rounded gravel, loose, rapid dilatancy.							
	-6.0 6.0	***Slag/Fill*** Grey, wet, coarse slag with trace non plastic fines and fine sand, medium dense.	S4	16	1.7		0.0		
7.0	-8.0 8.0	As above.	S5	17	1.2		0.0		
	-10.0 10.0	***Concrete*** No recovery concrete sluff, rig chatter (10.0 - 12.0 fbgs).	S6	NA	0.0		0.0		
12.0	-12.0 12.0	No Recovery.	S7	NA	0.0		0.0		
	-14.0 14.0	***Silty Sand*** Grey, wet, mostly fine sand, with some non plastic fines, soft, no odor.	S8	WR	0.6		0.0		
	-15.0 15.0								
	-16.0 16.0	***Sandy Organic Soil*** Brown, wet, mostly organic, some fine sand, low plasticity fines, soft.	S9	WH	0.8		0.3		
17.0	-18.0 18.0	as above.							
		End of Borehole							
22.0									



Drilled By: Eart Dimensions, Inc.
Drill Rig Type: Diedrich D120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 4 2 10

Hole Size: 8 1/2 -inch
Stick-up: 2.58 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

ATTACHMENT B

SAMPLE EC/IC CERTIFICATION FORM

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. C915198L

Site Name: Site II-12 Tecumseh Phase II Business Park

Site Address: 2303 Hamburg Turnpike Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915198L **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915198L

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

Appendix 2B

SMP for Odell Road Extension (Site II-12 C915198L and Site II-11 C915198K)

BROWNFIELD CLEANUP PROGRAM

APPENDIX H-12
SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK

August 2017 0071-017-327
Revised December 2020
Revised July 2021

Prepared for:

Tecumseh Redevelopment Inc.
4020 Kinross Lakes Parkway
Richfield, OH, 44286

Prepared By:

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

In Association With:

Benchmark Environmental Engineering & Science, PLLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0599

Revisions to Addenda of Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	12/8/2020	Removed Site II-10 from appendix	
2	4/29/2021	Addressed NYSDEC comments	7/28/2021
	7/29/2021	Finalized document	

PHASE II BUSINESS PARK
SITE MANAGEMENT PLAN: APPENDIX H-12
SITE II-12

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SITE II-12

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ATTACHMENTS

Attachment A	Monitoring Well Boring and Construction Log
Attachment B	Sample EC/IC Certification Form

1.0 INTRODUCTION

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase II Business Park (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMP (Ref. 1) for the Controlled Property was prepared by TurnKey Environmental Restoration, LLC (TurnKey), on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2) and the guidelines provided by NYSDEC. Since the Controlled Property was divided into 12 BCP Sites designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915199L), the main body of the SMP includes the site management components common to all 12 Sites. Site-specific requirements are included as Appendix H to the SMP.

Originally, Site II-10 (C915198J) was included with Site II-12 (C915198L) in Appendix H-10/H-12 (dated August 2017); however, with the purchase of Site II-9 and II-10 by Time Release Properties, LLC (TRP), combining Sites II-9 and II-10 into one appendix was necessary from an operational standpoint. Therefore, Site II-10 was removed from the August 2017 Appendix H-10/H-12 creating this Appendix H-12.

1.1 Site Location and Description

As shown on Figure 2, Site II-12 (approx. 12.02 acres) is bounded by BCP Site III-9 to the west; BCP Site II-10 to the south; BCP Site II-11 to the east; and BCP Sites I-1 and I-2 to the north. The Niagara Wind Substation 11A consists of approximately 0.3 acres of land between Sites II-10 and II-12. An existing natural gas line and easement traverses the property as shown on Figure 3.

The NYSDEC issued the Decision Document for Site II-12 on January 6, 2017 (Ref. 3). The Decision Document specifies, among other requirements, placement of acceptable cover material in areas not otherwise covered by rail lines, etc. Engineering controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during use of the Site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC by Tecumseh for the entire Phase II

Business Park has been recorded with the Erie County Clerk and requires compliance with this SMP and all ECs and institutional controls (ICs) placed on the Site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for Site II-12 of the Controlled Property. This Appendix is not to be used as stand-alone documents but as a component document of the January 2014 SMP for the Controlled Property.

1.2 Remedial Investigation

The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan (Ref. 4) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance across all 12 Sites within the Controlled Property. The RI was designed to provide defensible data to identify areas of the Controlled Property potentially requiring remediation, define chemical constituent migration pathways, and qualitatively assess human health and ecological risks to allow for performance of a remedial alternatives evaluation.

As shown on Figure 3, investigative activities specific to Site II-12 were performed in March/April 2010 and included the completion of 24 RI test pits and four railroad corridor test pits. Four supplemental test pits were completed to delineate Hotspot E (TP-93) and two supplemental test pits were completed to delineate Hotspot F (TP-95); no supplemental test pits were necessary to define Hotspot B. Monitoring well MWN-64A was installed on Site II-12 as part of the RI. Soil and groundwater samples were collected as detailed in the Work Plan.

The nature and extent of contamination at the Site is consistent with the former site use as a steel manufacturing facility. Polyaromatic hydrocarbons (PAHs) and arsenic, and to a lesser extent copper and mercury, concentrations exceeded commercial soil cleanup objectives (SCOs). Arsenic was found in 13 test pit samples at concentrations ranging from 17.3 to 72.7 ppm, which exceeds the commercial SCO of 16 ppm. Total PAHs exceeded the SSAL of 500 ppm in two samples (TP-80 and TP-93), with field evidence of gross petroleum/organic impact observed in test pits TP-93 and TP-95.

Groundwater samples were collected from the on-site monitoring well during the RI (April 2010) and again in February 2016 during a site-wide groundwater sampling event. The

groundwater sampling on Site II-12 indicated there were no exceedances of GWQSs in well MWN-64A for either sampling event. Attachment A includes the monitoring well construction log for MWN-64A. Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

The RI/AA Report was submitted to NYSDEC in May 2011, revised, and finalized in March 2012 (Ref. 5). The RI/AA Report recommended remediation of hotspot slag/fill with deferred soil cover system placement during redevelopment as well as ECs and ICs to limit future use of the Controlled Property to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes (see Section 2.0).

1.3 Interim Remedial Measures

The remediation of Site II-12 included an Interim Remedial Measure (IRM) to expedite remedial activities and facilitate redevelopment. In April 2017, Tecumseh submitted to NYSDEC an IRM Work Plan for Phase II Business Park Sites II-10, II-11, and II-12 (Ref. 6). Site II-12 was remediated between February 9 and May 17, 2017 in accordance with the NYSDEC-approved IRM Work Plan. The following remedial work performed is documented in the Final Engineering Report (Ref. 7) and shown on Figure 4:

- **Excavations:** Hotspots B, E, and F were excavated during the IRM. Except for Hotspot B, which was associated with shallow PAH impacts, non-impacted overburden slag/fill on Hotspots E and F that exhibited no visual (i.e., sheen product) or olfactory (i.e., nuisance odors) evidence of impact was removed and stockpiled for use as backfill in the excavations following the removal of petroleum/organic-impacted slag/fill. All other excavated materials were transported to the biotreatment pad constructed on Site II-9.
- **On-Site Biotreatment:** Petroleum-impacted slag/fill designated for biotreatment was transported to the pad using front end loaders and a tandem dump truck. The impacted materials were spread across the pad to an average thickness of 1.5 to 2 feet. Slag/fill determined by visual and olfactory observation to be adequately treated remained on the biotreatment pad until analytical results confirmed slag/fill met site-specific action levels (SSALs), including commercial SCOs for petroleum VOCs and less than 500 mg/kg total PAHs. Following biotreatment, the material was used as backfill to bring Business Park excavations up to grade. Since all soil/fill was biotreated, off-site disposal was not required.
- **Backfill:** Following replacement of clean overburden materials and receipt of passing confirmatory results, where applicable, excavations were re-graded with

surrounding slag/fill. In the case of Hotspot E, the backfill was supplemented with biotreated soils from other locations within the Tecumseh BCP Business Park Sites that were treated to meet SSALs and approved for use by the NYSDEC as subgrade backfill.

1.4 Summary of Remedial Actions

The final remedial measures for Site II-12 involved placement of the cover system in accordance with the NYSDEC-approved June 2017 Remedial Action Work Plan (RAWP) (Ref. 8). The remedial work is document in the Final Engineering Report (Ref. 7).

1.5 Remaining Contamination

The remedial work conducted on Site II-12 has removed all known "source area" (i.e., arsenic- and petroleum/organic-impacted) slag/fill and treated residual petroleum-impacted "smear zone" slag/fill in-situ.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs (USCOs) for several ubiquitous constituents; specifically, PAHs and inorganic compounds (i.e., arsenic, cadmium, chromium, lead, and mercury). Other constituents remaining above USCOs in select areas of the Site include benzene, PCBs (Aroclor 1254 and 1260) and inorganic compounds (i.e., copper, manganese, nickel, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the USCO criteria; therefore, it is assumed that the entire 12.02-acre Site II-12 is impacted above the USCOs to the approximate native soil depth of 12 fbgs. Table 1 summarizes the sample locations remaining above USCOs.

Following grading of Site II-12, a demarcation was constructed and placed to easily identify the existing Site sub-grade from the cover system material and prevent the potential for inadvertent removal of sub-grade material during future intrusive work. The demarcation layer is comprised of an orange ¾-inch plastic industrial netting material was rolled across the sub-grade and overlapped by approximately one foot at the seams.

The groundwater quality on Site II-12 has been assessed by sampling monitoring well MWN-64A in April 2010 during the RI and again in February 2016 during a site-wide groundwater sampling event. The groundwater was analyzed for VOCs, SVOCs, and inorganic parameters. Table 2 presents the groundwater data with a comparison to NYSDEC Class GA GWQS. As indicated, analytical results from this monitoring well indicates concentration

levels as non-detect or below GWQS. This well will be retained for future monitoring in the event NYSDEC requests groundwater quality monitoring on the larger Business Park II.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

Since remaining contaminated soil/fill and groundwater exists beneath the Phase II Business Park, Engineering Controls and Institutional Controls (EC/ICs) are required to protect public health and the environment. The EC/IC Plan in the January 2014 SMP describes the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to Site II-12 are described below.

2.2 Engineering Control Systems

As described in the December 2013 Construction Completion Report (CCR; Ref. 9), construction of the railroad bed cover system occurred in April 2013 and involved placement of a minimum 1-foot layer comprised of ballast material, meeting the requirements of the specification in the IRM Work Plan (Ref. 10), and embedded wood rail ties. A woven geotextile was installed on the prepared subgrade prior to placement of the ballast layer and rail ties as a demarcation layer. Ballast material was compacted in accordance with rail construction contract requirements to mitigate potential for settlement. TurnKey personnel were on-site to observe placement of ballast material.

The cover system for Site II-12 is described in the August 2017 Final Engineering Report (Ref. 7). Figure 5 shows the approximate locations and types of cover system materials placed on Site II-12. In the event these cover systems are breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the 2014 SMP and Section 4.0 of the Excavation Work Plan (2014 SMP Appendix B).

Although chlorinated organic compounds were not identified as constituents of concern at the Site, the 2014 SMP requires that a vapor barrier be placed beneath any future structures designated for occupancy as a conservative measure to protect building occupants against potential sub-slab vapor intrusion.

2.3 Institutional Controls

The Institutional Controls described in Section 2.3 of the 2014 SMP (i.e., Environmental Easement and Excavation Work Plan) must be implemented for Site II-12. There are no Site-specific institutional control requirements for Site II-12.

2.4 Inspections and Notifications

The annual inspections and notifications described in Section 2.4 of the 2014 SMP must be implemented for Site II-12. There are no other Site-specific inspection and notification requirements for Site II-12.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (2014 SMP Appendix C). The following emergency contact numbers are specific to Site II-12:

Table 3: Emergency Contact Numbers

Name: John Cappellino Title: Executive Vice President, Buffalo and Erie County Industrial Land Development Corporation	Work: (716) 856-6525 Mobile: (716) 472-6667
Name: Thomas Forbes Title: President, Benchmark Environmental	Work: (716) 856-0599 Mobile: (716) 864-1730

Note: Contact numbers subject to change and should be updated as necessary

3.0 SITE MONITORING PLAN

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The soil cover system; and
- All affected Site media.

Monitoring of the cover system is described in Section 3.2 of the January 2014 SMP. No additional site-specific monitoring is required.

4.0 OPERATION & MAINTENANCE PLAN

The remedy for Site II-12 does not rely on any mechanical systems, such as sub-slab depressurization or soil vapor extraction, to protect public health and the environment. Therefore, a Site-specific Operation and Maintenance Plan is not required.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

All inspection, reporting, and certification requirement are described in Section 5.0 of the January 2014 SMP. Attachment B includes a sample EC/IC Certification Form to be completed for Site II-12.

6.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Site Management Plan for BCP Tecumseh Phase II Business Park, NYSDEC Site No. C915198 through C915198L, Lackawanna, New York*. January 2014.
2. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation*. May 3, 2010.
3. New York State Department of Environmental Conservations. *Decision Document, Site II-12 Tecumseh Phase II Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915198l*. January 2017.
4. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan, Phase II Business Park Area, Lackawanna, New York*. July 2009.
5. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis (RI/AA) Report for Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York*. Revised March 2012.
6. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Phase II Business Park, Sites II-10, II-11 and II-12, BCP Site Nos. C915198J, C915198K & C915198L, Lackawanna, New York*. February 2017, revised April 2017.
7. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Final Engineering Report, Tecumseh Business Park II, Sub-Parcels II-10 and II-12, Lackawanna, New York*. August 2017.
8. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Remedial Action Work Plan, Tecumseh Business Parks I and II, Lackawanna, New York*. June 2017.
9. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Construction Completion Report, Railroad Realignment, Tecumseh Phase I-III Business Park, Lackawanna, New York, BCP Site Nos. C915197-C915199*. December 2013.
10. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Railroad Realignment, Phase I-III Business Park Areas, Lackawanna, New York, BCP Site Nos. C915197-C915199*. October 2010.

TABLES

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Site No; Test Pit Location; and Depth Interval (fbgs)									Unrestricted SCO [2] (mg/kg)
	II-10 & II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	
	TP-57	TP-64	TP-66	TP-67	TP-69	TP-71	TP-74	TP-75	TP-76	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg										
Benzene	--	0.013	**0.077**	--	ND	--	ND	--	ND	**0.06**
Ethylbenzene	--	ND	0.1	--	ND	--	ND	--	ND	**1**
n-Butylbenzene	--	0.064	0.069	--	ND	--	ND	--	ND	**12**
sec-Butylbenzene	--	0.027 J	0.027 J	--	ND	--	ND	--	ND	**11**
tert-Butylbenzene	--	ND	ND	--	ND	--	ND	--	ND	**5.9**
Isopropylbenzene	--	0.025	0.026	--	ND	--	ND	--	ND	**--**
p-Cymene	--	ND	ND	--	ND	--	ND	--	ND	**--**
n-Propylbenzene	--	0.018	0.018	--	ND	--	ND	--	ND	**3.9**
Toluene	--	0.098 B	0.4 B	--	ND	--	ND	--	ND	**0.7**
1,2,4-Trimethylbenzene	--	0.11	0.11	--	ND	--	ND	--	ND	**3.6**
1,3,5-Trimethylbenzene	--	0.034	0.037	--	ND	--	ND	--	ND	**8.4**
o-Xylene	--	0.14	0.13	--	ND	--	ND	--	ND	**0.26**
Xylenes, Total	--	0.28	0.28	--	ND	--	ND	--	ND	**--**
Naphthalene	--	0.42 BJ	0.26 B	--	ND	--	ND	--	0.093 BD	**--**
Methyl tert butyl ether	--	0.01 J	0.05	--	ND	--	ND	--	ND	**0.93**
Methylene Chloride	--	--	--	--	0.0036 J	--	ND	--	--	**0.05**
TOTAL VOCs (mg/kg)	--	*1.2*	*1.6*	--	*0.0036*	--	*0*	--	*0.093*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg										
Acenaphthylene	0.68 DJ	0.44 DJ	1.1 DJ	1.3 DJ	ND	2.4 DJ	1.2 DJ	ND	0.51 DJ	**100**
Anthracene	1.3 DJ	0.55 DJ	1.1 DJ	7.7 DJ	ND	3.5 DJ	0.81 DJ	ND	0.38 DJ	**100**
Benzo(a)anthracene	**4.5 D**	**2.7 DJ**	**3.3 DJ**	**24 BD**	0.91 DJB	**9.9 BD**	**5 BD**	**2.6 TDJB**	**2 DJ**	**1**
Benzo(b)fluoranthene	**6.3 D**	**4.5 D**	**6.4 D**	**31 D**	**1.6 D,ID4,J**	**12 D**	**6 D**	**5.2 T,D,ID4,J**	**3.3 DJ**	**1**
Benzo(k)fluoranthene	**2 DJ**	**1.4 DJ**	**1.8 DJ**	**14 D**	ND	**5.4 DJ**	**2.8 DJ**	ND	**1.2 DJ**	**0.8**
Benzo(g,h,i)perylene	5.1 D	2.7 DJ	4 D	24 BD	0.8 DJB	7.6 DJB	3.4 DJ	2.6 TDJB	2.7 DJ	**100**
Benzo(a)pyrene	**5 D**	**3.1 DJ**	**3.5 DJ**	**29 D**	0.93 DJ	**9.4 DJ**	**4.6 DJ**	**2.3 T,D,J,B**	**2.7 DJ**	**1**
Chrysene	**4.5 D**	**2.8 DJ**	**3.7 DJ**	**26 D**	0.48 DJ	**11 D**	**4.6 BD**	ND	**2.1 DJ**	**1**
Dibenzo(a,h)anthracene	**1.2 DJ**	**0.68 DJ**	**0.96 DJ**	ND	ND	**2 DJB**	**0.86 DJ**	ND	**0.62 DJ**	**0.33**
Dibenzofuran	ND	0.37 DJ	0.33 DJ	2.3 DJ	ND	2 DJ	ND	ND	ND	**--**
Fluoranthene	9.7 D	4.4 D	5.4 D	55 D	1.5 DJ	29 D	8.6 BD	ND	4.4 D	**100**
Fluorene	ND	ND	ND	3.7 DJ	ND	3.4 DJ	ND	ND	ND	**30**
Indeno(1,2,3-cd)pyrene	**4.1 D**	**2.5 DJ**	**3.5 DJ**	**20 D**	**0.6 DJ**	**6.6 DJ**	**2.8 DJ**	**2.1 T,D,J**	**2.2 DJ**	**0.5**
2-Methylnaphthalene	ND	0.81 DJ	0.63 DJ	0.45 DJ	ND	0.54 DJ	ND	ND	ND	**--**
Naphthalene	ND	0.99 DJ	0.54 DJ	1.3 DJ	ND	**2.1 DJ**	ND	ND	ND	**12**
Phenanthrene	3.4 DJ	2.2 DJ	1.7 DJ	29 D	0.46 DJ	28 D	2.8 DJB	ND	1.7 DJ	**100**
Pyrene	7.2 D	4.2 D	5.2 D	50 D	1.6 DJ	23 D	7.4 D	2.4 TDJ	3.4 DJ	**100**
TOTAL SVOCs (mg/kg)	*55*	*34*	*43*	*319*	*9*	*158*	*51*	*17*	*27*	--

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Site No; Test Pit Location; and Depth Interval (fbgs)									Unrestricted SCO [2] (mg/kg)
	II-10 & II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	
	TP-57	TP-64	TP-66	TP-67	TP-69	TP-71	TP-74	TP-75	TP-76	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Polychlorinated Biphenyls (PCBs) - mg/kg										
Aroclor 1254	ND	--	ND	0.35 QSU,D,J	ND	--	ND	--	ND	--
Aroclor 1260	ND	--	ND	ND	ND	--	ND	--	0.13 QSU	--
TOTAL PCBs (mg/kg)	*0*	*--*	*0*	***0.35***	*0*	*0*	*0*	*--*	***0.13***	***0.1***
Inorganic Compounds - mg/kg										
Aluminum	--	--	--	--	5530	--	7760	--	--	--
Arsenic, Total	**46.4**	**24.1**	**39.9**	**17.3**	**25.3**	**72.7**	**47.4**	**14.3**	**13.8**	**13**
Barium, Total	116	94	163	125	63.6 J	120	88.8	66.9	73.3	**350**
Beryllium	--	--	--	--	0.725	--	0.97	--	--	**7.2**
Cadmium, Total	**3**	1.73	**2.93**	2.21	**3.48**	**3.39**	1.87	**3.18**	**2.81**	**2.5**
Calcium	--	--	--	--	36500 D	--	52900	--	--	--
Chromium, Total	**55**	**61.8 J**	**174 J**	**54.8 J**	**73.4 J**	**44.1 J**	**91.4**	**67.8 J**	**277**	**1**
Cobalt	--	--	--	--	7.95	--	4.51	--	--	--
Copper	--	--	--	--	**779**	--	**120**	--	--	**50**
Iron	--	--	--	--	71400 D	--	45100	--	--	--
Lead, Total	**357**	**384**	**647**	**518**	**303**	**460**	**290**	**942**	**325**	**63**
Magnesium	--	--	--	--	4210 J	--	9020	--	--	--
Manganese	--	--	--	--	**3270 D**	--	**3770 D**	--	--	**1600**
Mercury, Total	0.152	**4.05 D**	**0.35**	**5.51 D**	**5.68 D**	**0.738 D**	0.116	**0.284**	**0.518**	**0.18**
Nickel	--	--	--	--	**71.1 J**	--	20	--	--	**30**
Potassium	--	--	--	--	408 J	--	900	--	--	--
Silver	--	--	--	--	ND	--	0.508	--	--	**2**
Sodium	--	--	--	--	166 J	--	234	--	--	--
Vanadium	--	--	--	--	44.2	--	39.7	--	--	--
Zinc	--	--	--	--	**409**	--	**380**	--	--	**109**
Cyanide, Total	1.6	4 J	ND	12 J	2.3 J	1.6 J	ND	--	ND	**27**

Notes:

1. Only parameters detected at a min. of one location are presented; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective; Unrestricted Use per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

B = Analyte was detected in associated Method Blank.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
ID4 = Benzo(b)fluoranthene coelutes with Benzo(k)fluoranthene. The reported result is a summation of the isomers and the concentration is based on the response factor of Benzo(b)fluoranthene.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
QSU = Sulfur (EPA 3660) clean-up performed on extract.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or imprecise.
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Use Soil Cleanup Objectives.

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Test Pit Location and Depth Interval (fbgs)			Unrestricted SCO [2] (mg/kg)
	II-12	II-12	II-10 & II-12	
	TP-86	TP-92	TP-96	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg				
Methylene Chloride	0.0065	ND	0.0036 J	**0.05**
TOTAL VOCs (mg/kg)	*0.0065*	*0*	*0.0036*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg				
Acenaphthylene	ND	0.15 DJ	0.23 DJ	**100**
Anthracene	0.84 DJ	ND	0.34 DJ	**100**
Benzo(a)anthracene	**2.7 DJ**	0.7 DJ	**1.7 DJ**	**1**
Benzo(b)fluoranthene	**3.7 DJ**	0.92 DJ	**2.7 D**	**1**
Benzo(k)fluoranthene	**1.2 DJ**	**0.88 DJ**	**0.89 DJ**	**0.8**
Benzo(g,h,i)perylene	2.8 DJ	0.69 DJ	2 D	**100**
Benzo(a)pyrene	**2.9 DJ**	0.83 DJ	**2.2 D**	**1**
Carbazole	ND	ND	0.12 DJ	--
Chrysene	**2.5 DJ**	**1 DJ**	**1.7 DJ**	**1**
Dibenzo(a,h)anthracene	ND	0.27 DJ	**0.52 DJ**	**0.33**
Fluoranthene	6.1 DJ	0.91 DJ	3 D	**100**
Indeno(1,2,3-cd)pyrene	**2.1 DJ**	0.48 DJ	**1.7 DJ**	**0.5**
Phenanthrene	3.5 DJ	0.35 DJ	1.4 DJ	**100**
Pyrene	4.6 DJ	0.93 DJ	2.3 D	**100**
TOTAL SVOCs (mg/kg)	*33*	*8.1*	*21*	--
Polychlorinated Biphenyls (PCBs) - mg/kg				
Aroclor 1242	0.015 QSU, J	ND	ND	--
Aroclor 1260	0.063 QSU	ND	ND	--
TOTAL PCBs (mg/kg)	*0.078*	*0*	*0*	***0.1***
Inorganic Compounds - mg/kg				
Aluminum	19100	--	--	--
Antimony	91.3	--	--	--
Arsenic, Total	**42.8**	**26.7**	**15.4**	**13**
Barium, Total	141	10.4	150	**350**
Beryllium	2.71	--	--	**7.2**
Cadmium, Total	1.86	0.914	1.49	**2.5**
Calcium	109000 D	--	--	--
Chromium, Total	**73.2**	**26.3**	**671**	**1**
Cobalt	13.1	--	--	--
Copper	**655**	--	--	**50**

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs
SITE MANAGEMENT PLAN
Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Test Pit Location and Depth Interval (fbgs)			Unrestricted SCO [2] (mg/kg)
	II-12	II-12	II-10 & II-12	
	TP-86	TP-92	TP-96	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Inorganic Compounds - mg/kg				
Iron	135000 D	--	--	--
Lead, Total	0.62	**543**	**148**	**63**
Magnesium	16100	--	--	--
Manganese	**3630 D**	--	--	**1600**
Mercury, Total	**0.508 D**	0.035	0.168	**0.18**
Nickel	**157**	--	--	**30**
Potassium	1880	--	--	--
Sodium	512	--	--	--
Vanadium	24	--	--	--
Zinc	**376 D**	--	--	**109**
Cyanide, Total	1.1	--	--	**27**

Notes:

1. Only parameters detected at a min. of one location are presented; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective; Unrestricted Use per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or viscosity.

J = Estimated value; result is less than the sample quantitation limit but greater than zero.

ND = parameter not detected above laboratory detection limit.

QSU = Sulfur (EPA 3660) clean-up performed on extract.

" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Soil Cleanup Objectives.

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

PARAMETER [1]	GWQS [2]	SITE II-12			
		MWN-64A		MWN-64A	
		4/30/2010		2/25/2016	
Field Measurements [3]:					
Sample No.	--	initial	final	initial	final
pH (units)	**6.5 - 8.5**	7.84	7.82	7.77	7.75
Temperature (°C)	**NA**	11.4	12.4	8.0	7.8
Sp. Conductance (uS)	**NA**	635.9	632.3	747.1	744.9
Turbidity (NTU)	**NA**	140	107	8.56	5.12
Dissolved Oxygen (mg/L)	**NA**	--	--	2.26	1.70
Eh (mV)	**NA**	-113	-119	-149	-139
Total Inorganic Compounds (mg/L) [4]:					
Barium - Total	**1**	0.043		0.042	
Manganese - Total	**0.3**	--		0.24	
Cyanide - Total	**0.2**	--		0.018	
Soluble Inorganic Compounds (mg/L) [4,5]:					
Barium - Soluble	**1**	0.0293		--	
Semi-Volatile Organic Compounds (ug/L) [5]:					
Pyrene	**50***	0.35 J		ND	

Notes:

1. Only those compounds detected above the method detection limit at a minimum of one sample location are reported in this table.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) per TOGS 1.1.1 (June 1998, January 1999 Errata, April 2000 Addendum, and June 2004 Addendum).
3. Field measurements were collected immediately before and after groundwater sample collection.
4. A soluble metals sample was collected if the sample turbidity was above 50 NTUs.
5. Groundwater collected from April 2010 monitoring event were only analyzed for those parameters listed in the July 2009 Remedial Investigation Work Plan.

Definitions:

J = Estimated Value; result is less than the sample quantitation limit but greater than zero.

"--" = Not analyzed for.

* = Guidance Value

NA = No standard available at this time.

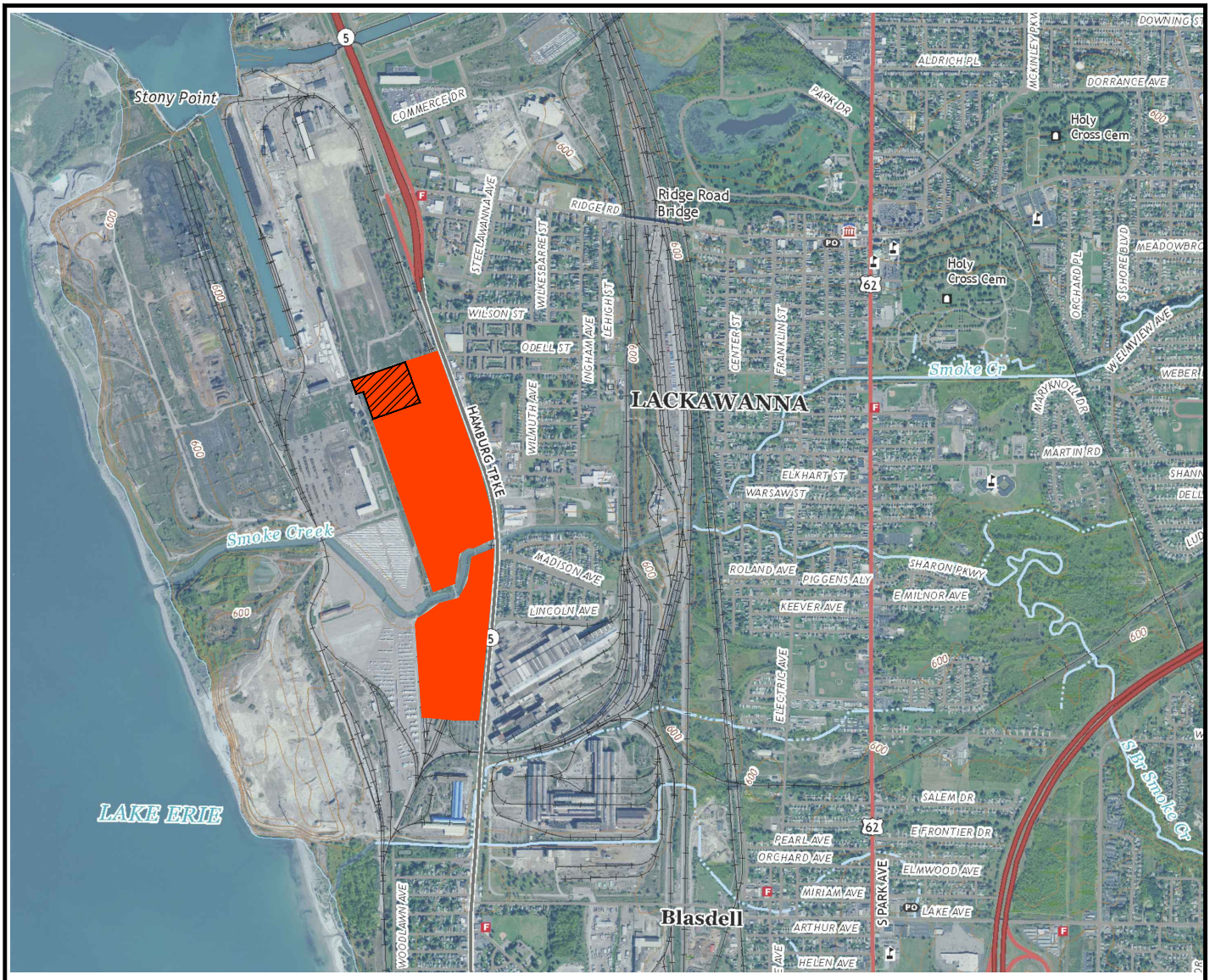
ND = Indicates parameter was not detected above method detection limit.

BOLD = Result exceeds the GWQS/GV.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 1; Site Location and Vicinity Map.dwg, 12/8/2020 1:03:30 PM

FIGURE 1





N

2,500' 0' 2,500' 5,000'

SCALE: 1 INCH = 2,500 FEET
SCALE IN FEET
(approximate)

LEGEND:

TECUMSEH BUSINESS PARK II

SITE II-12

NOTE: BASEMAP USGS BUFFALO SE QUADRANGLE 2019

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK

PREPARED FOR

TECUMSEH REDEVELOPMENT INC.

PROJECT NO.: 0071-017-327

DATE: DECEMBER 2020

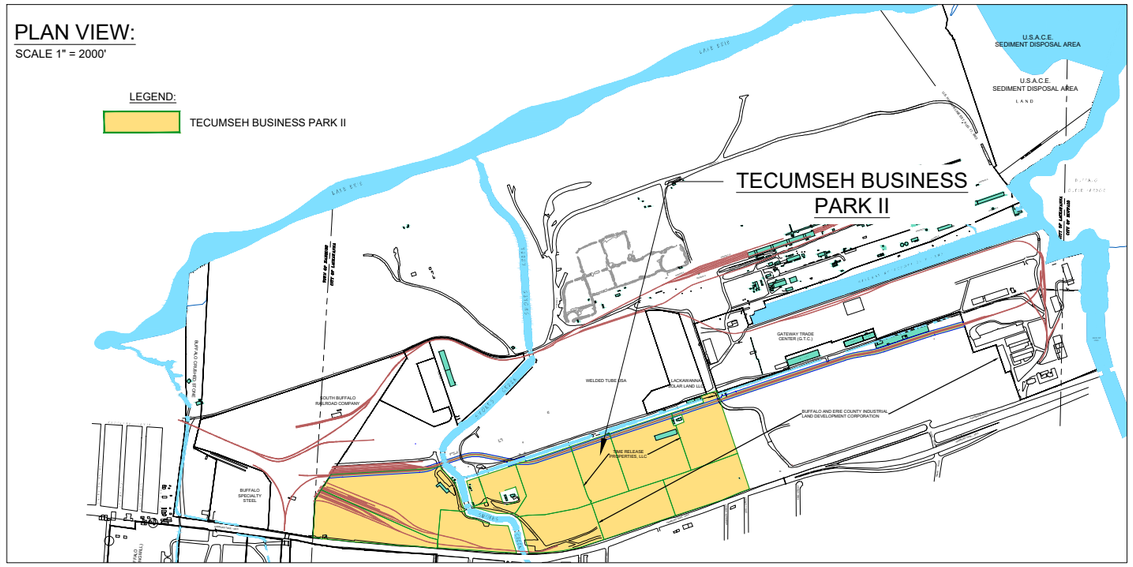
DRAFTED BY: RFL

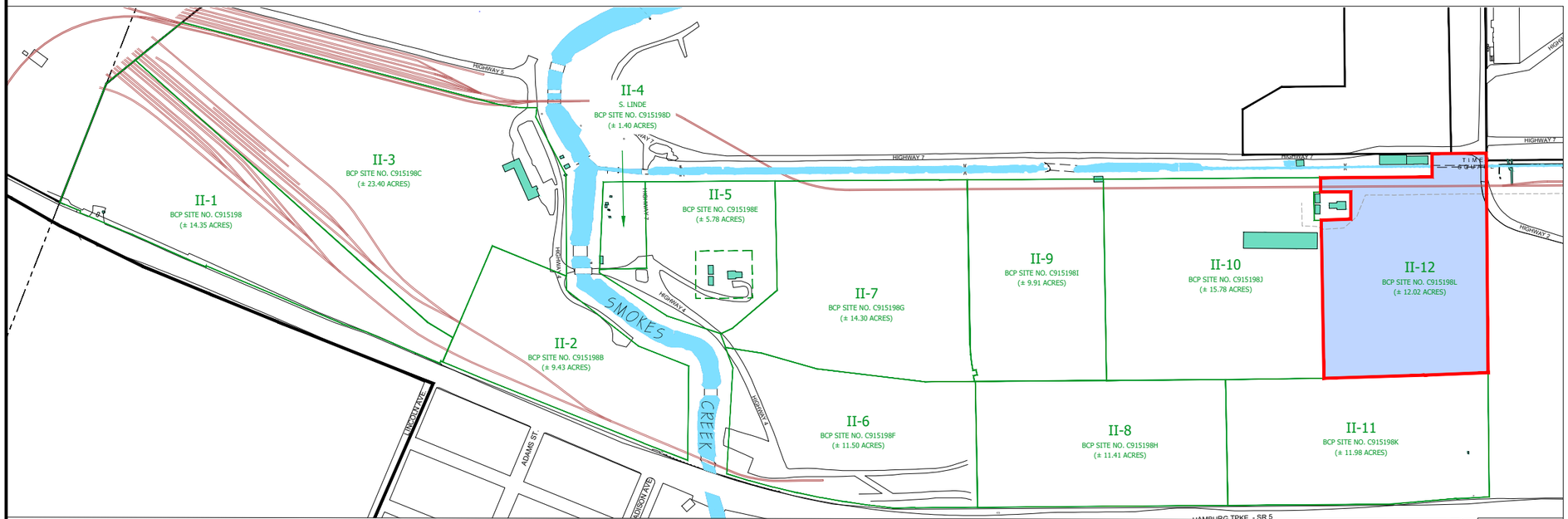
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F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 2- Site Delineation Map.dwg, 12/8/2020 3:20:06 PM

PLAN VIEW:

SCALE 1" = 2000'





LEGEND:

- SITE II-12
- EXISTING BUILDING / STRUCTURE
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- RAILROAD TRACK

500' 0' 500' 1,000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

DATE: DECEMBER 2020
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

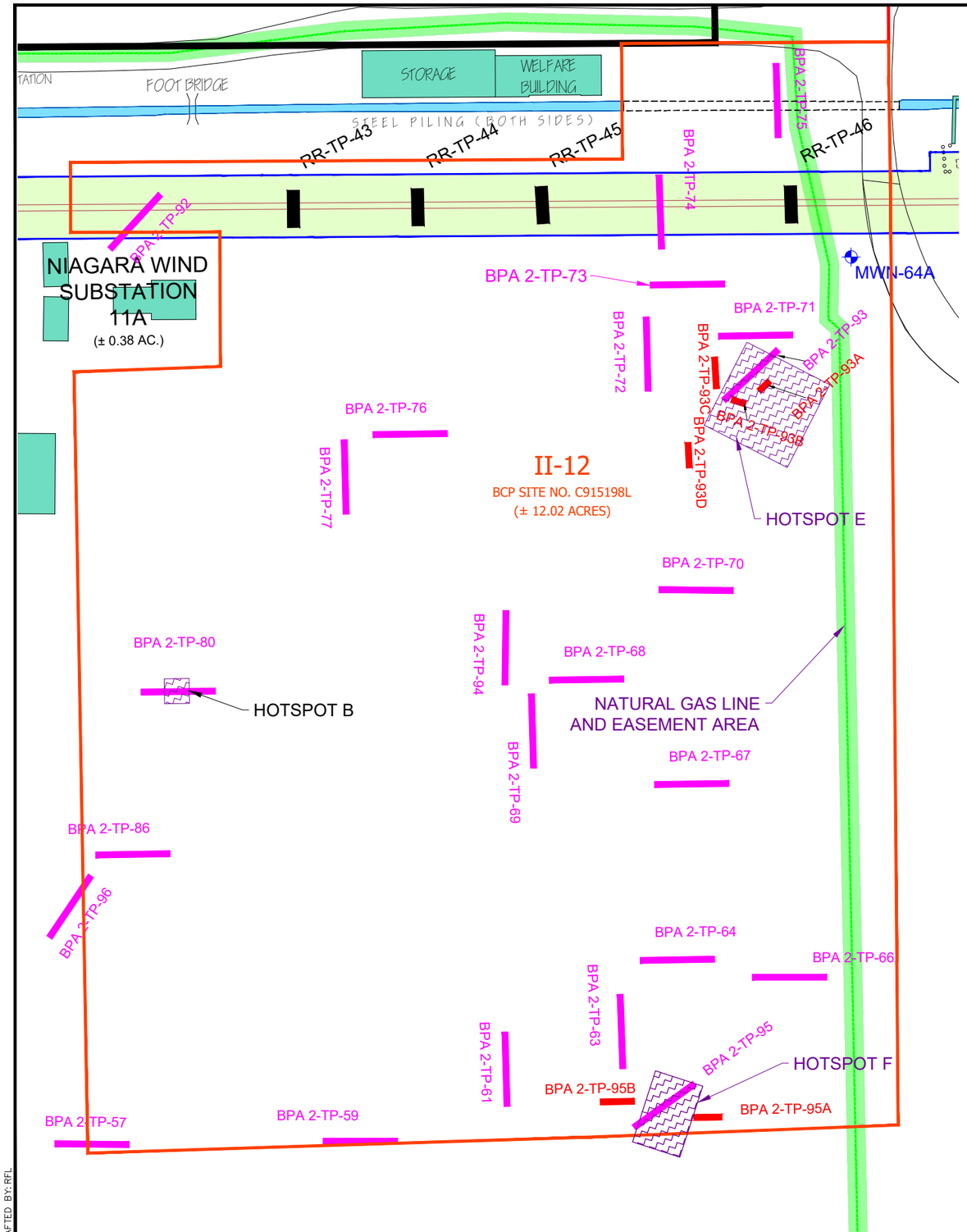
JOB NO.: 0071-017-327

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 2

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.



LEGEND:

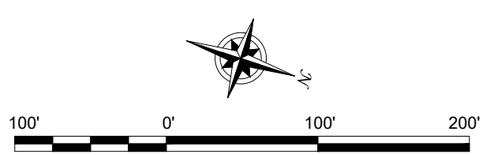
- EXISTING BUILDING / STRUCTURE
- BCP SITE II-12 BOUNDARY
- RAILROAD TRACK
- MWS-64A — EXISTING PHASE II BPA OVERBURDEN MONITORING WELL
- BPA 2-TP-72 — PHASE II BPA TEST PIT
- BPA 2-TP-72 — SUPPLEMENTAL PHASE II BPA TEST PIT (LOGS NOT CREATED)
- RR-TP-18 — RAILROAD CORRIDOR TEST PIT (SEE 2010 IRM WORK PLAN)

RI Test Pits
- BPA2-TP-57
- BPA2-TP-59
- BPA2-TP-61
- BPA2-TP-63
- BPA2-TP-64
- BPA2-TP-66
- BPA2-TP-67
- BPA2-TP-68
- BPA2-TP-69
- BPA2-TP-70
- BPA2-TP-71
- BPA2-TP-72
- BPA2-TP-73
- BPA2-TP-74
- BPA2-TP-75
- BPA2-TP-76
- BPA2-TP-77
- BPA2-TP-80 (Hotspot B)
- BPA2-TP-86
- BPA2-TP-92
- BPA2-TP-93 (Hotspot E)
- BPA2-TP-94
- BPA2-TP-95 (Hotspot F)
- BPA2-TP-96

Railroad Realignment Test Pits
- RR-TP-43
- RR-TP-44
- RR-TP-45
- RR-TP-46

Supplemental Test Pits (Hotspot E)
- BPA2-TP-93A
- BPA2-TP-93B
- BPA2-TP-93C
- BPA2-TP-93D

Supplemental Test Pits (Hotspot F)
- BPA2-TP-95A
- BPA2-TP-95B



SCALE: 1 INCH = 100 FEET
SCALE IN FEET
(approximate)

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-017-327

TEST PIT LOCATIONS SITE II-12

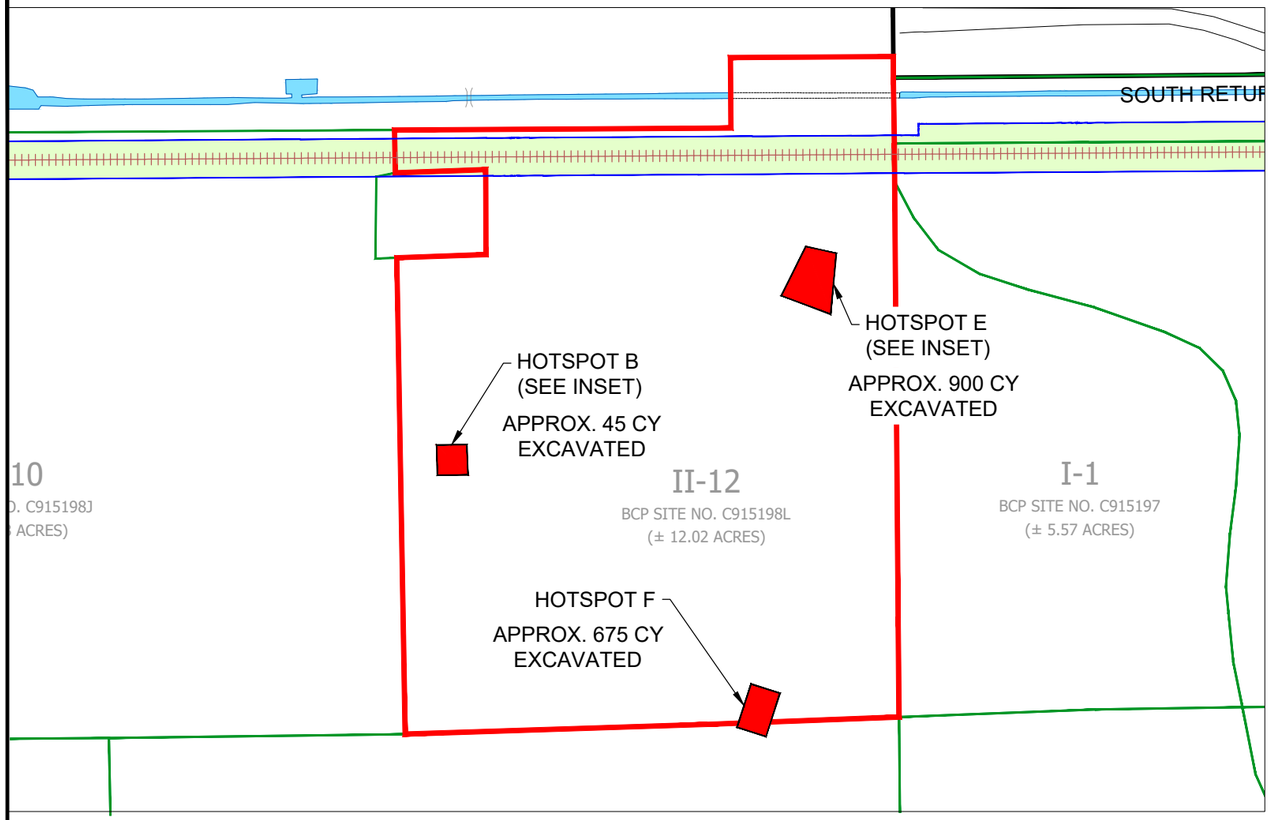
SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915189L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

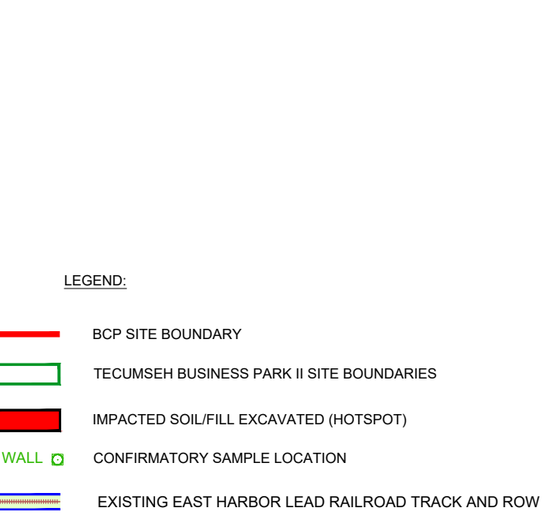
FIGURE 3

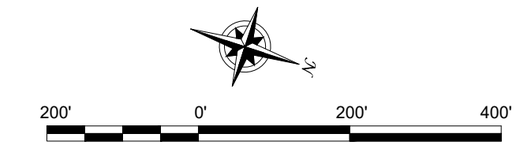
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DATE: APRIL 2021
DRAFTED BY: RFL

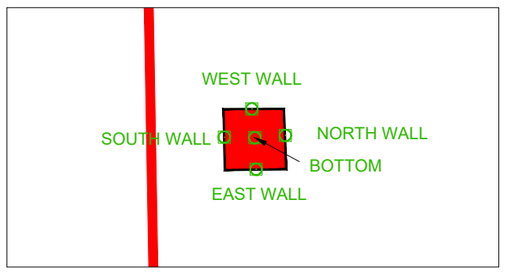
F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 3; Test Pits on II-12.dwg, 4/21/2021 11:46:29 AM



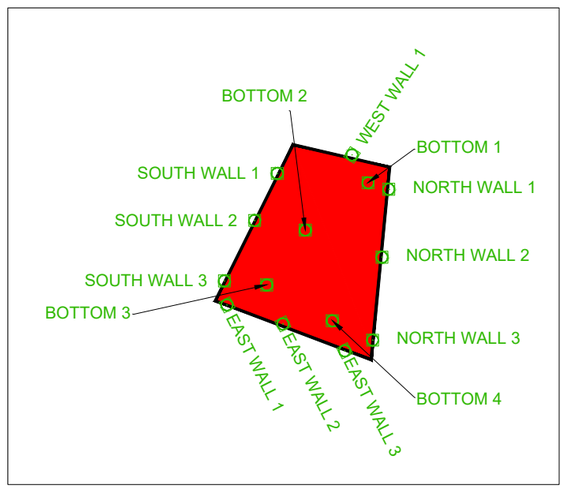




SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)



HOTSPOT B
NTS



HOTSPOT E
NTS'

DATE: DECEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 4; Completed RM.dwg, 4/20/2021 2:34:17 PM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

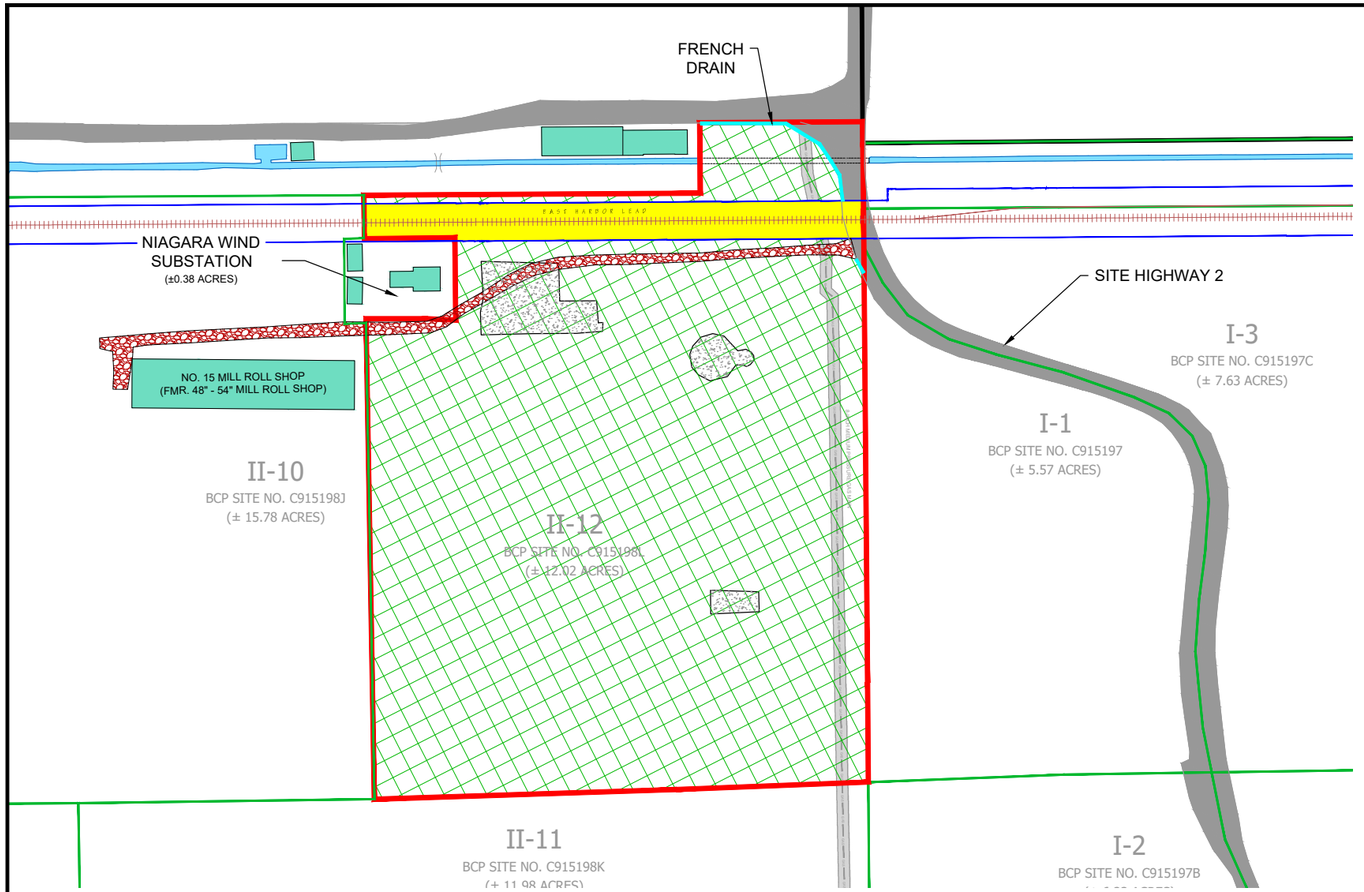
JOB NO.: 0071-017-327

COMPLETED REMEDIAL MEASURES

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 4

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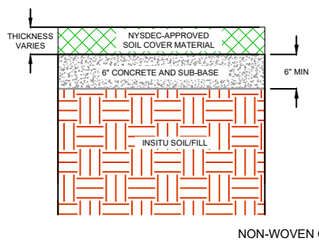
200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

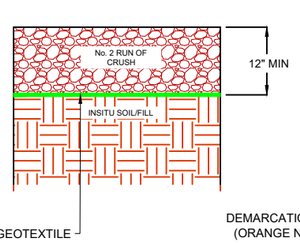
LEGEND:

- BCP BOUNDARY (SITE II-12)
- SITE BOUNDARIES
- EXISTING BUILDING / STRUCTURE
- SITE II-12 SOIL COVER SYSTEM
- ASPHALT PAVED ACCESS ROADS FINAL COVER
- EXISTING EAST HARBOR LEAD RAILROAD TRACK AND ROW
- ACCESS DRIVE (RUN OF CRUSH) FINAL COVER
- CONCRETE SLAB FINAL COVER
- NATURAL GAS LINE AND EASEMENT AREA

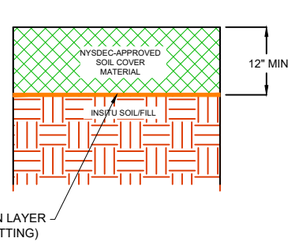
EXISTING CONCRETE COVER SYSTEM DETAIL[1]
NTS



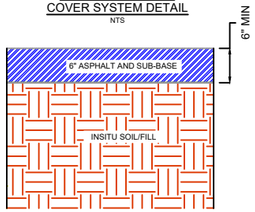
ACCESS DRIVE COVER SYSTEM DETAIL
NTS



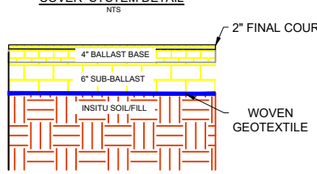
SOIL COVER SYSTEM DETAIL
NTS



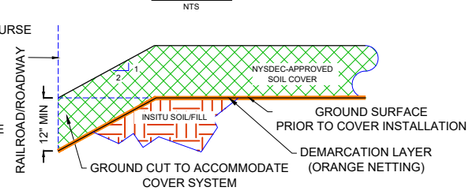
EXISTING ASPHALT COVER SYSTEM DETAIL
NTS



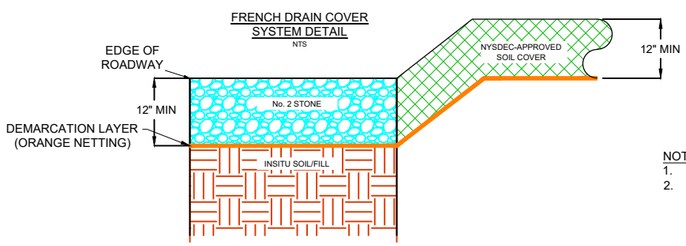
COVER SYSTEM BENEATH TRACKS COVER SYSTEM DETAIL[2]
NTS



TIE-IN DETAIL
NTS



FRENCH DRAIN COVER SYSTEM DETAIL
NTS



NOTES:
1. CONCRETE COVERED WITH VARYING AMOUNTS OF SOIL OR STONE.
2. BASED ON RECORD DRAWINGS PROVIDED BY C&S COMPANIES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

JOB NO.: 0071-017-327

APPROXIMATE LOCATIONS AND TYPES OF COVER SYSTEM MATERIALS

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 5

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.

DATE: DECEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 5; Cover System PlanSMP.dwg, 4/29/2021 9:15:41 AM

ATTACHMENT A

MONITORING WELL BORING AND CONSTRUCTION LOG

Project No: 0071-009-311

Borehole Number: MWN-64A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

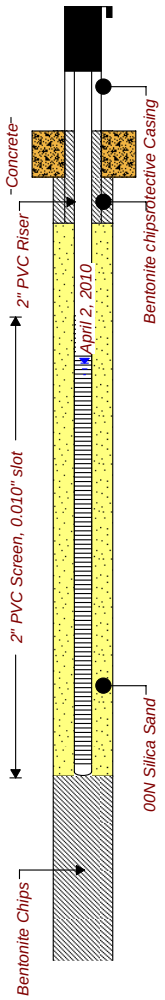
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Grey brown, moist, non-plastic fines with some fine sand, slag, medium dense.	S1	16	1.1		0.0		
	-2.0 2.0	As above, black, coal and coke fines, orange brick, loose.	S2	8	1.0		0.3		
2.0	-4.0 4.0	As above.	S3	3	1.0		0.3		
	-5.0 5.0	***Poorly Graded Sand with Silt*** Brown, wet, mostly medium sand, few non plastic fines, few fine sub rounded gravel, loose, rapid dilatancy.							
	-6.0 6.0	***Slag/Fill*** Grey, wet, coarse slag with trace non plastic fines and fine sand, medium dense.	S4	16	1.7		0.0		
7.0	-8.0 8.0	As above.	S5	17	1.2		0.0		
	-10.0 10.0	***Concrete*** No recovery concrete sluff, rig chatter (10.0 - 12.0 fbgs).	S6	NA	0.0		0.0		
12.0	-12.0 12.0	No Recovery.	S7	NA	0.0		0.0		
	-14.0 14.0	***Silty Sand*** Grey, wet, mostly fine sand, with some non plastic fines, soft, no odor.	S8	WR	0.6		0.0		
	-15.0 15.0								
	-16.0 16.0	***Sandy Organic Soil*** Brown, wet, mostly organic, some fine sand, low plasticity fines, soft.	S9	WH	0.8		0.3		
17.0	-18.0 18.0	as above.							
		End of Borehole							
22.0									



Drilled By: Eart Dimensions, Inc.
Drill Rig Type: Diedrich D120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 4 2 10

Hole Size: 8 1/2 -inch
Stick-up: 2.58 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

ATTACHMENT B

SAMPLE EC/IC CERTIFICATION FORM

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. C915198L

Site Name: Site II-12 Tecumseh Phase II Business Park

Site Address: 2303 Hamburg Turnpike Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915198L **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915198L

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

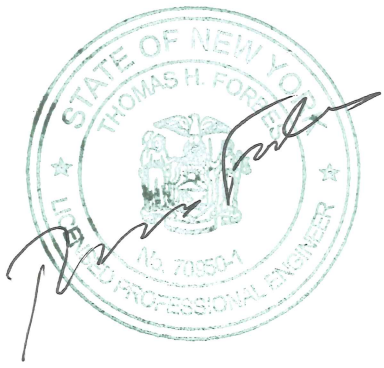
Site Management Plan (SMP)

Brownfield Cleanup Program
Tecumseh Phase II Business Park
NYSDEC Site Nos. C915198 through C915198L
Lackawanna, New York

January 2014 0071-012-322

Prepared By:





2558 Hamburg Turnpike, Suite 300, Buffalo, New York | phone: (716) 856-0599 | fax: (716) 856-0583

BROWNFIELD CLEANUP PROGRAM

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NUMBERS: C915198 through C915198L
LACKAWANNA, NEW YORK

January 2014 0071-012-322

Prepared by:

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Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK

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1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 Introduction

This document is a required element of the remedial program for the New York State Brownfield Cleanup Program (BCP) Sites within and collectively comprising the property referred to as the "Tecumseh Phase II Business Park," located in City of Lackawanna, Erie County, New York (see Figures 1 through 3). These BCP Sites, listed below by name and New York State Department of Environmental Conservation (NYSDEC) Site Number, were remediated or are slated to undergo remediation in accordance with Brownfield Cleanup Agreement (BCA) Index No. B9-0696-05-06(B), which was executed on March 14, 2007 and amended on August 20, 2012:

Site Name:	NYSDEC Site Number:
Site II-1	C915198
Site II-2	C915198B
Site II-3	C915198C
Site II-4	C915198D
Site II-5	C915198E
Site II-6	C915198F
Site II-7	C915198G
Site II-8	C915198H
Site II-9	C915198I
Site II-10	C915198J
Site II-11	C915198K
Site II-12	C915198L

This SMP has been prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement(s) governing the above-listed BCP Sites.

1.1.1 Background

Tecumseh Redevelopment Inc. (Tecumseh) submitted an application to the NYSDEC dated May 20, 2005 requesting a BCA for the approximate 143-acre Phase II Business Park property. The NYSDEC deemed Tecumseh's application complete, and assigned the Phase II Business Park as Site Number C915198. Tecumseh subsequently entered into the BCA with the NYSDEC on May 14, 2007, which required the company to investigate and remediate contaminated media within the Phase II Business Park.

Upon substantial completion of the Remedial Investigation activities described later in this document, Tecumseh prepared a letter to the NYSDEC dated December 22, 2011 requesting division of the Phase II Business Park project area into 12 sub-parcels to stimulate sale and redevelopment of more manageable sized properties and promote "green remediation" by coordinating certain final remedial measures (i.e., cover placement) with associated sub-parcel build-out. The NYSDEC agreed to Tecumseh's request and, in August 2012, the original BCA for Site C915198 was amended to cover the smaller Site II-1, with separate BCAs issued and executed for the remaining 11 BCP Sites (i.e., Sites II-2 through II-12; C915198B through C915198L, respectively). It was further determined that individual Decision Documents, Remedial Action Work Plans (RAWPs), Final Engineering Reports (FERs), and Certificates of Completion (COCs) would be prepared for each of the 12 BCP Sites, with a common Site Management Plan (SMP) and Environmental Easement prepared to cover all of the BCP Sites within the Phase II Business Park[1].

1.1.2 Site Location and Description

The overall boundaries of the Controlled Property as well as the boundaries of the individual Sites contained therein are more fully described in the survey metes and bounds description (see Appendix A-1). The Controlled Property is identified as part of tax parcel number 141.11-1-50 on the Erie County Tax Map, and is comprised of an approximate 143-acre area bounded by the Phase I and IA Business Park sites to the north; South Buffalo Railroad Company to the south; Phase III Business Park and the South Return Water

[1] For clarity and in recognition of the intent of this SMP to address post-remedial requirements applicable to all of the sub-parcels within the Phase II Business Park, the term "Controlled Property" hereafter refers to the collective group of BCP Sites comprising the Phase II Business Park, with the term "Site" used to reference the individual BCP sub-parcels.

Trench (SRWT) to the west; and Route 5 to the east (see Figure 2). The Controlled Property is transected by Smokes Creek, which is specifically excluded from the BCP.

1.1.3 Purpose and Organization

After completion of the remedial work described in the Site-specific RAWPs, some contamination will remain in the subsurface, which is hereafter referred to as 'remaining contamination." This Site Management Plan (SMP) was prepared to manage remaining contamination on the Controlled Property until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. All reports associated with the Controlled Property can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

Engineering Controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during the use of the Controlled Property to ensure protection of public health and the environment. The Environmental Easement (see Appendix A-2) granted to the NYSDEC, and recorded with the Erie County Clerk, will require compliance with this SMP and all ECs and ICs placed on the Controlled Property. The ICs place restrictions on use of the Controlled Property, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for contamination that remains on the Controlled Property. This SMP has been approved by the NYSDEC, and compliance with this SMP is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination on the Controlled Property after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment, collection, containment, or recovery systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports (PRRs); and (5) defining criteria for termination of any remaining treatment system operations.

To address these needs, this SMP includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring

Plan for implementation of required monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual for complex systems). To the extent these requirements are generic to the Controlled Property they are incorporated within the body of this SMP. Site-specific requirements (e.g., groundwater monitoring; operation and maintenance of ongoing active remediation systems, etc.) are incorporated in Appendix H for Sites where remedial work is substantially complete. Remaining Site-specific requirements will be added or modified by addenda as the remedial work progresses on those Sites.

This SMP also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement and is grounds for revocation of the Certificate of Completion (COC).
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375, and the BCA (Index # B9-0696-05-06(B); Site #C951198) for the Controlled Property, and thereby subject to applicable penalties.

1.1.4 Revisions

Revisions to this Plan will be proposed in writing to the NYSDEC's project manager. In accordance with the Environmental Easement for the Controlled Property, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.2 Site Background

1.2.1 Site History

The approximate 143-acre Controlled Property formerly housed several facilities used in Bethlehem Steel Corporation's (BSC's) steel manufacturing processes. These included a pure oxygen generating station (known as South Linde Area); various mills; structural

shipping yard; car repair shop; metal storage; and miscellaneous office production support buildings. Five historical Solid Waste Management Units (SWMUs) (i.e., P-38 through P-42) are present within the Controlled Property. BSC performed assessments for these SWMUs during a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) and subsequent RCRA Facility Investigation (RFI). Based on the findings, USEPA Region II issued "No Further Action" determination for the identified SWMUs within the Controlled Property.

The Controlled Property contains few structural remnants and other features associated with historic integrated steel-making facilities. These include the former 54" Bar Mill building; two separate electrical transformer stations; a former storage/welfare building to the south of Smokes Creek; the South Linde Area groundwater treatment system; and remnants of overhead lines, access roads, electrical power lines, and railroad tracks. Immediately east of the Controlled Property boundary is a man-made drainage channel designated as the SRWT that begins near WQCS No. 3 and flows south to Smokes Creek (see Figure 2). Historically and currently, the SRWT collects and discharges groundwater and storm water to Smokes Creek under active SPDES Permit No. NY-0269310. With the exception of treated groundwater discharges from the South Linde pump and treat system, there are no active outfalls into the SRWT from the Controlled Property.

1.2.2 BCP Application Process and Remedial Investigations

The BCP application for the Controlled Property was submitted May 20, 2005 and approved January 9, 2007. The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan identified characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance. Remedial Investigation (RI) activities were initiated in March 2010 and completed in April 2010. A supplemental test pit investigation was conducted in February 2012 to determine the lateral and vertical extent of arsenic impacts in test pits BPA2-TP-10, -21, -40, -52, -58, and -103. Following subdivision of the Controlled Property, NYSDEC determined that due to the limited nature of the soil analytical work on Site II-1, a supplemental test pit investigation would be necessary to support the pending Decision Document. In March 2013, three supplemental test pits were advanced to native soil, field-screened with a PID, and sampled for laboratory analysis.

The RI/AA Report was submitted to NYSDEC in May 2011, revised, and finalized in March 2012. The RI/AA Report recommended remediation of hotspot slag/fill, localized saturated slag/fill (smear zone), and isolated groundwater (affecting only Site II-4), with cover placement recommended as the final remedial measure for all areas of the Controlled Property. Results of the March 2013 supplemental test pit investigation on Site II-1 were submitted in a letter report to NYSDEC on April 17, 2013.

1.2.3 Interim Remedial Measures Investigation

In order to maximize the redevelopment potential in the Business Parks along NYS Route 5 and improve the currently limited access to and from the Tecumseh property, active rail lines along NYS Route 5 were to be relocated to the western edge of the Phase I Business Park and the Controlled Property as well as into a portion of the Phase III Business Park. Because the rail relocation was to precede final cleanup and redevelopment activities in the Business Parks, it was agreed with the NYSDEC that an Interim Remedial Measure (IRM) would be performed involving removal of hotspot soil/fill from the new corridor area and placement of cover beneath the newly constructed tracks. As part of the remedial work on the Controlled Property, a pre-IRM investigation was undertaken in May 2009 along the planned location for the railroad realignment. The work involved excavation of 48 test pits along the proposed railroad realignment area to allow for visual/olfactory and PID assessment of subsurface conditions and to obtain representative samples for chemical characterization. Although 52 test pits were originally planned, four of these test pits were not completed as the locations fell at the center of the SRWT or the existing railroad track. The test pit locations were focused on the portion of the planned rail realignment that fell within the Controlled Property and Phase III Business Park, since the RI and required hotspot soil removal activities in the Phase I Business Park were already complete. The test pits, which were spaced at approximate 100-foot intervals, were excavated to native soils or the top of the water table with the majority of the samples collected from the shallow (0-2 feet below grade) slag/fill to characterize the interval of greatest potential exposure. Upon completion of each test pit, the associated slag/fill material was returned to the excavation in the opposite order in which it was removed and compacted to match existing grade.

Results of the rail corridor IRM investigation are presented in the NYSDEC-approved October 2010 IRM Work Plan for Railroad Realignment.

1.2.4 Geologic Conditions

The United States Department of Agriculture Soil Survey of Erie County, New York indicates that the Controlled Property is covered by surface soil classified as Urban Land; soil consisting of paved, foreign, or disturbed soils. Subsurface lithology observed during test pit excavation generally consisted of a soil/fill unit comprised of non-cohesive coal and coke fines; slag; cindery ash and brick; concrete; gravel; silt; reddish silt (precipitator dust); and sand, all of which are ubiquitous on the Controlled Property. Boring logs from monitoring wells constructed on the Controlled Property indicate that the thickness of the soil/fill unit ranges from approximately four feet (west side) to 12 feet (east side). Below the soil/fill unit is a native silty clay or clayey silt layer; a peat layer was noted at some test pits immediately below the soil/fill unit. The clay/silt/peat layers are underlain by Dolomitic limestone with shale bedding. This bedrock was encountered at 34 feet below ground surface (fbgs) along the western perimeter of the Controlled Property.

Historically, due to the proximity of Lake Erie and municipal supplied water, groundwater in the area has not been developed for industrial, agricultural, or public supply purposes. There is a deed restriction that prohibits the use of groundwater on the 1,100-acre Tecumseh property; consequently, no groundwater supply wells are present on the Controlled Property.

Groundwater elevation measurements taken on April 30, 2010 from existing and newly installed wells/ monitoring wells on the Controlled Property indicate that the first water bearing zone (i.e., water table) ranges from approximately 6 to 13 feet below ground surface (fbgs) within the soil/slag-fill unit. Examination of the isopotential map prepared for the fill unit from the April 2010 groundwater elevations (see Figure 4), indicates that shallow groundwater generally flows toward the minor water bodies of the Controlled Property (e.g., Smokes Creek and the SRWT) in conjunction with a westerly component (northwest portion of the Controlled Property) toward major water body Lake Erie. The SRWT is in hydraulic connection with the shallow groundwater on the Controlled Property and flows south into Smokes Creek, which then flows westerly ultimately discharging into Lake Erie. The three recovery wells in the South Linde area (Site II-4) create an inward localized gradient.

1.3 Summary of Remedial Investigation Findings

A Remedial Investigation (RI) was performed to characterize the nature and extent of contamination on the Controlled Property. The results of the RI are described in detail in the following report:

- Remedial Investigation/Alternatives Analysis Report (RI/AAR), Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York prepared by TurnKey Environmental Restoration, LLC, Revised March 2012.

Generally, the RI determined that conditions were consistent with the historic use of the Controlled Property for steel-making and finishing operations, with the widespread presence of fill material containing dark brown, non-plastic fines with fine to medium sand, slag, cinders, ash, gravel, cobbles, brick, metal debris, and concrete, all of which are ubiquitous on the Controlled Property. Soil/fill concentrations, where identified above 6NYCRR Part 375 commercial-use soil cleanup objectives (SCOs), varied according to the type and nature of the constituents. Specifically, elevated concentrations of volatile petroleum compounds (i.e., elevated PID readings) were observed at two test pit locations where field evidence of impact was observed (e.g., odor, sheen, and staining). Base-neutral semi-volatiles (i.e., polyaromatic hydrocarbons or PAHs) were detected at several locations above commercial SCOs; however, only three total SVOC concentrations were reported above 500 parts per million (ppm), which was deemed a site-specific SCO based on NYSDEC CP-51 guidance for non-residential sites where a cover system will be employed. Certain metals (total arsenic, mercury, and lead) were detected above commercial SCOs at several locations. Smear zone impact was present in several locations as indicated by sheen and/or product on the water within the test pit, odor and staining. Field evidence of groundwater impact was observed within the South Linde Area.

Below is a summary of conditions on the Controlled Property when the RI was performed in 2010. Table 1 summarizes the soil/fill concentrations detected during the RI. Tables 2 and 3 summarize the soil/fill concentrations for the supplemental test pit investigations in February 2012 and March 2013. Tables 1 and 3 compare the data to Part 375 restricted-commercial SCOs. Table 4 summarizes the groundwater concentrations detected during the RI with a comparison to Class GA groundwater quality standards and guidance values (GWQS/GVs).

Soil/Fill

Surface and subsurface soil/fill samples were collected from the Controlled Property in March and April 2010 in accordance with the NYSDEC-approved July 2009 RI/AAR Work Plan. The 2010 soil/fill investigation involved excavation of 105 test pits. A total of 56 surface soil/fill samples (typically collected from 0-2 fbgs) and 16 subsurface soil samples were collected from those test pit locations during the RI. One surface soil sample [SS-1(0-0.5)] was collected near the electrical transformer for analysis of PCBs. Water samples were collected from two test pits for the following reasons:

- BPA2-TP-36 for analysis of SVOCs and PCBs at the request of NYSDEC since the test pit was excavated near an electrical transformer and sheen was observed on the water at approximately 3 fbgs.
- BPA2-TP-81B for analysis of VOCs, SVOCs, and PCBs at the request of NYSDEC due to sheen observed on the water at approximately 5 fbgs. In addition, a slight odor was detected and the remains of a drum were found.

RI soil/fill samples collected from test pits BPA2-TP-10, -21, -40, -52, -58, and -103 exceeded the site-specific action level (SSAL) for arsenic of 118 ppm. On February 27 and 28, 2012, TurnKey sampling personnel revisited these locations to determine the lateral and vertical extent of arsenic impact. Tests pits were excavated at distances of 10 and 20 feet in each compass direction from the original test pit sample location. Surface soil/fill samples were collected using a dedicated stainless steel spoon to scrape a representative sample from the test pit sidewall to a maximum depth of 2 fbgs. The 10-foot samples were analyzed immediately upon receipt by TestAmerica Laboratory and the 20-foot samples were placed on hold pending the results of the 10-foot samples. The original test pit sample result was confirmed by collection and analysis of a sample adjacent to the original RI test pit sample (designated as "R"). Due to the discrepancy between the lead concentration in the sample collected from BPA2-TP-58 (12,300 ppm) and its blind field duplicate (216 ppm), the supplemental test pit samples collected were also analyzed for lead.

The RI findings indicate conditions consistent with the historic use of the Controlled Property for steel-making and finishing operations, and the widespread presence of fill materials containing slag and cindery ash. Key observations and findings from the soil/fill and groundwater investigations are listed below:

- Field observation of potential subsurface impact by petroleum was recorded at certain test pit locations. However, samples from the associated depth intervals yielded VOC concentrations below commercial SCOs and, with the exception of test pits BPA2-TP-80 and BPA2-TP-93, SVOC concentrations at levels less than 500 ppm, suggesting that the observations are representative of residual, weathered organics that do not constitute a remaining source area. Floating product was observed on the water table in test pits BPA2-TP-53 (5 fbgs), BPA2-TP-89 (4.5 fbgs), BPA2-TP-93 (6.5 fbgs), and BPA2-TP-95 (8 fbgs). Elevated PID readings were noted in test pits BPA2-TP-16, and BPA2-TP-99, -99A, and -99B.
- The remains of a drum were found within test pit BPA2-TP-81B; the drum fragment was removed. Sheen was observed on the water at approximately 9 fbgs, a slight odor was detected, and the soil/fill was noted to be a little greasy. The soil/fill sample collected from 9-9.5 fbgs yielded SVOCs at a total concentration of 204 ppm
- Base-neutral SVOCs (i.e., PAHs) were detected above the commercial SCOs at several test pit locations across the Controlled Property. NYSDEC's CP-51/Soil Cleanup Guidance Policy (October 21, 2010) provides for an alternative SCO (i.e., in lieu of individual SCOs) for soils of 500 ppm total SVOCs where: end use of the site will be for commercial or industrial purposes; a cover system (1 foot of clean soil, building and/or pavement) will be constructed; and institutional controls and an SMP will be implemented. Total PAH concentrations were reported at less than 500 ppm, with the exception of BPA2-TP-80 (0-2 fbgs) where total SVOCs were reported at 663 ppm; BPA2-TP-85 (0-2 fbgs), where total SVOCs were reported at 1,577 ppm; and BPA2-TP-93 (4-6 fbgs) where total SVOCs were reported at 3,958 ppm. Test pit BPA2-TP-93 also showed associated evidence of visual or olfactory impact (i.e., slight sheen, slight odor, and product on the water).
- Arsenic was detected above the commercial SCO of 16 mg/kg at the majority of the test pit locations. Arsenic is a ubiquitous metal with urban background soils in New York State frequently containing concentrations in excess of the commercial SCO, particularly at active and former industrial properties characterized by historic slag fill deposition and coal burning, such as that which occurred on the subject property. Accordingly, comparison of the arsenic data to site-specific background or average concentrations is considered appropriate. To determine the site background concentration, all surface (0-2 fbgs) soil/fill arsenic data for the Controlled Property was tabulated and the 95% upper confidence limit (95% UCL) on the mean was calculated. Based on this analysis and further discussions with the NYSDEC, a site-specific action level (SSAL) of 118 ppm was established as the screening criteria for hotspot identification. The following six test pit areas

exceeded this SSAL: BPA2-TP-10 (est. 245 ppm), BPA2-TP-21 (est. 119 ppm), BPA2-TP-40 (est. 152 ppm), BPA2-TP-52 (141 ppm), BPA2-TP-58 (122 ppm), and BPA2-TP-104 (est. 198 ppm). The supplemental test pit investigation surrounding these six test pit locations undertaken in February 2012 provided a more definitive delineation of these hotspot areas.

- Elevated lead was detected in the shallow fill (0-2 fbgs) of BPA2-TP-58 (former Oil Pump House). Due to the disparity between the concentrations detected in the sample (12,300 mg/kg) and its blind duplicate (216 mg/kg), the data was qualified as estimated and suspect. This means that lead was present but the quantitative value was unknown. No visual evidence of impact was noted. The supplemental surface soil/fill samples collected surrounding BPA2-TP-58 indicated results below the commercial SCO for lead, suggesting that the original result was anomalous.
- Mercury was identified at elevated levels above the commercial SCO in shallow fill at BPA2-TP-64 (near former repair shop/sump), BPA2-TP-67 (near former transformer vault), and BPA2-TP-69 (near former 54" Blooming Mill, pump house, and pit). These test pits were concentrated in one area; however, their locations were selected to determine the potential impact from three different former activities on the Controlled Property. These findings suggest potential localized shallow releases from one of these former operations. The mercury concentrations were all below the industrial SCO of 5.7 mg/kg.
- Other inorganic compounds (barium, cadmium, manganese, and cyanide) were sporadically detected at concentrations slightly above the commercial SCOs but below the industrial SCOs, with the exception of manganese. The industrial SCO for manganese is capped at a maximum value of 10,000 ppm, which is not based on health risk concerns but instead on factors such as appearance, olfactory impacts, and saturation levels.
- PCB Aroclor 1254 exceeded the commercial SCO for PCBs of 1 mg/kg in the surface fill at test pit sample locations BPA2-TP-33 (former transformer Substation 8F) and BPA2-TP-48 (former Car Repair Shop); however, in both instances the total PCB concentrations fall below the industrial SCO of 25 mg/kg. Railroad Realignment test pit RR-TP-30, located in the vicinity of BPA2-TP-33 (PCB concentration of 2.37 ppm), was excavated due to a PCB concentration of 52 ppm (twice the industrial SCO). To define the lateral extent of this hotspot area, TurnKey conducted a supplemental investigation of this test pit. On August 19, 2010, a TurnKey project scientist excavated shallow test pits (approximately 25 feet in each compass direction) from the original test pit. Sidewall samples (0-2 foot) were collected and analyzed for PCBs. In addition, a composite sample was collected from the floor of the supplemental test pit to verify that a 2-foot excavation depth was sufficient. PCB concentrations at the supplemental

locations surrounding RR-TP-30 and at the 2-foot depth interval were all below the commercial SCO of 1 ppm.

- PCB Aroclor 1242 was detected above the GWQS of 0.09 ug/L in the unfiltered water sample collected from test pit BPA2-TP-81B; the remains of a drum were found and removed during excavation of this test pit located within the former 48"-54" Roughing Mill. The concentration of PCBs in the associated soil/fill sample was estimated at 0.602 mg/kg, which is well below the commercial SCO of 1 mg/kg.

Railroad Realignment IRM

In accordance with the NYSDEC-approved October 2010 IRM Work Plan for Railroad Realignment, four hotspot soil/fill areas with elevated arsenic and/or PCB levels were identified and delineated. These hotspot areas were excavated and disposed at permitted off-site disposal facilities in December 2010. A total of 1,280.55 tons of arsenic-impacted soil material was excavated from Test Pits (TP-4, TP-12, and TP-42) and disposed at the Chautauqua County Landfill in Ellery, New York. A total of 258.27 tons of PCB-impacted soil material was excavated from Test Pit TP-30 and disposed at CWM Chemical Services, LLC in Model City, NY as regulated hazardous waste. The removal activities were observed by the NYSDEC and will be documented in a separate IRM Construction Completion Report (CCR). The CCR will be referenced in the FERs for the Sites.

Site-Related Groundwater

Following completion of the soil/fill portion of the investigation, five new shallow overburden monitoring wells and two new bedrock monitoring wells were installed to better determine groundwater flow direction and upgradient/downgradient groundwater quality on the Controlled Property. The groundwater monitoring points sampled during the RI include: existing monitoring wells MW-01, MW-07A, and MW-07B; newly installed overburden wells MWS-32A, MWS-36A, MWS-37A, MWN-63A, and MWN-64A; and newly installed bedrock wells MWN-63D and MWN-65D.

Field evidence of groundwater impact (LNAPL) was identified in monitoring well MW-01 (located in the South Linde Area, Site II-4), but the analytical data indicated no exceedances of the GWQS/GVs. Although pH and arsenic levels exceeded the GWQS at certain well locations, pH was within one unit of the standard and, with the exception of MW-01, arsenic was at the same order of magnitude as the GWQS/GV and/or exhibited

soluble arsenic below the GWQS/GV. Sheen observed in newly installed well MWN-64 may be a result of the elevated levels of SVOCs in the subsurface at test pit location BPA2-TP-93. With these limited exceptions, the groundwater investigation findings indicate that, as would be expected based on the relatively low solubility of the soil/fill constituents prevalent in the soil/fill matrix, widespread groundwater impact by COPCs is not evident. However, clearly discernible sheens in test pits combined with petroleum odor, free product, and/or elevated PID readings are indicative of potential localized impact to the saturated soil/fill (i.e., smear zone) due to past operations on the Controlled Property.

The RI findings indicate that, as would be expected based on the relatively low solubility of the soil/fill constituents prevalent in the soil/fill matrix, groundwater is generally not impacted by metal constituents of concern or PCBs.

Site-Related Soil Vapor Intrusion

Based on the Qualitative Human Health Exposure Assessment (Section 6.0 of the RI/AAR), it appears that the sub-slab vapor intrusion pathway does not pose a risk under the current or reasonably-anticipated future use scenario.

1.4 Summary of Remedial Actions

Table 4 summarizes the remedial actions performed or to be performed on the Controlled Property by Site. Completed remedial actions will be described within the Site-specific appendices (H-1 through H-12), which will be modified via addenda as the work progresses. The following Remedial Actions are common to all Sites:

1. Execution and recording of an Environmental Easement to restrict land use to commercial or industrial applications and prevent future exposure to any contamination remaining at the Site.
2. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting.

1.4.1 Removal of Contaminated Materials from the Site

1.4.1.1 Excavated Materials

Details on the removal of contaminated materials are presented within the Site-specific appendices. Figure 5 shows the approximate extent of these planned and completed excavations.

1.4.2 Backfill Materials

With NYSDEC concurrence, completed excavations will be backfilled with: steel slag under Beneficial Use Determination (BUD) #555-9-15; bioremediated soil/fill; and/or non-impacted slag/fill generated from the on-site excavation work. Backfill material will be placed into the excavation and compacted/tracked with the excavator/backhoe bucket in 2-foot lifts.

1.4.3 Site-Related Treatment Systems

The treatment systems to be installed on the Controlled Property are described within the Site-specific appendices.

1.4.4 Remaining Contamination

The remedial work conducted on the Controlled Property has or will: remove all known "source area" soil/fill (i.e., petroleum- and metal-impacted soil/fill); treat weathered petroleum-impacted saturated soil/fill in-situ; and remediate isolated groundwater impacts.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs for several ubiquitous constituents. Specifically, nearly all samples collected during the RI exhibited exceedance of the commercial SCOs for PAHs, as well as arsenic, lead, and mercury. Other constituents remaining above unrestricted-use SCOs in select areas of the Controlled Property include PCBs (Aroclors 1248, 1254, and 1260) and inorganic compounds (i.e., cadmium, chromium, manganese, nickel, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the unrestricted-use SCO criteria; therefore, it is assumed that the entire 142-acre Controlled Property is impacted above the unrestricted-use SCOs to the approximate native soil depth of 12 fbgs.

Remaining soil/fill and groundwater contamination is described further within the Site-specific appendices.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

2.1.1 General

Since remaining contaminated soil/fill and groundwater exists beneath the Controlled Property, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Controlled Property. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

The EC/IC Plan provides:

- A description of all EC/ICs on the Controlled Property.
- The basic implementation and intended role of each EC/IC.
- A description of the key components of the ICs set forth in the Environmental Easement.
- A description of the features to be evaluated during each required inspection and periodic review.
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Excavation Work Plan for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Controlled Property.
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the remedy, as determined by the NYSDEC.

2.2 Engineering Controls

The engineering control common to the Controlled Property is the cover system described below. Other engineering controls (e.g., vapor barriers, sub-slab depressurization systems) specific to Sites are described in Appendix H.

2.2.1 Cover System

Exposure to remaining contamination in soil/fill will be prevented by a cover system placed over the Controlled Property. The cover system will be placed following measures to address hotspots and saturated soil/groundwater impact (where present). Ideally the cover system will be placed as each Site is redeveloped, but will otherwise be required before sunset of the NYSDEC BCP to avoid forfeit of BCP tax credits. This cover system will be comprised of a minimum of 12 inches of clean soil, stone or NYSDEC-approved materials, with a demarcation layer (i.e., geotextile fabric, orange poly netting, or similar non-degradable visual demarcation) in all areas that are not paved or covered by concrete or structures. The cover system will be placed to address remaining non-mobile, ubiquitous contaminants (e.g., metals, PAHs, etc.) during the redevelopment stage and prior to occupancy. Paved areas (i.e., buildings, roadways, parking lots) will be covered by asphalt pavement or concrete. The final soil cover shall meet the specifications presented in the Excavation Work Plan (see Appendix B, Section 4.0). The Excavation Work Plan outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the Remedial Action Objectives identified by the Decision Document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10.

The cover system is a permanent control and the quality and integrity of the system will be inspected at defined, regular intervals in perpetuity.

2.3 Institutional Controls

A series of Institutional Controls is required to: (1) implement, maintain, and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination and precluding groundwater use

for potable purposes; and, (3) limit the use and development of the Controlled Property to commercial/industrial type uses only. Adherence to these Institutional Controls is required by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns.
- All Engineering Controls must be operated and maintained as specified in this SMP.
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP.
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP.
- Data and information pertinent to site management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The Controlled Property has a series of site-wide Institutional Controls in the form of restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Restrictions for the Controlled Property:

- Allow the use and development of the Controlled Property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- Requires compliance with the Department-approved Site Management Plan; and
- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3.)

Additional Site-specific restrictions (if any) are presented in Appendix H.

2.3.1 Excavation Work Plan

The Controlled Property will be remediated for restricted-commercial/industrial use. Any future intrusive work that will penetrate the soil cover or cap, or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover system, will be performed in compliance with the Excavation Work Plan (EWP) included as Appendix B. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the Controlled Property. Appendix C includes a sample HASP that is in current compliance with DER-10; 29 CFR 1910; 29 CFR 1926; and all other applicable Federal, State, and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification described in Section 1.2 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP, and CAMP, and will be included in the periodic inspection and certification reports described in Section 5.0.

The Site Owners and associated parties preparing the remedial documents for submittal to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The Site Owners will ensure that redevelopment activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP.

2.4 Inspections and Notifications

2.4.1 Inspections

A comprehensive inspection of the Controlled Property will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed.
- If these controls continue to be protective of human health and the environment.

- Compliance with requirements of this SMP and the Environmental Easement.
- Achievement of remedial performance criteria.
- Sampling and analysis of appropriate media during monitoring events.
- If Site records are complete and up to date.
- Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in Section 3.0, Site Monitoring Plan. Reporting requirements are outlined in Section 5.3, Periodic Review Report.

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the affected area of the Controlled Property will be conducted by a Qualified Environmental Professional (QEP) as defined in NYSDEC DER-10 within five days of the event to verify the effectiveness of the EC/ICs implemented.

2.4.2 Notifications

Notifications will be submitted by the Site Owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in use that are required under the terms of the BCA, 6NYCRR Part 375, and/or Environmental Conservation Law. This shall include planned expansions onto any undeveloped portion of the Site that is not already covered with 12 inches of approved cover material.
- 15-day advance notice of any proposed ground-intrusive activities pursuant to the EWP.
- Notice within 48 hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action to be taken to mitigate the damage or defect.
- Notice within 48 hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of any Site within the Controlled Property or responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the BCA, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing.

2.5 Contingency Plan

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions. These conditions are addressed in the Emergency Response Plan (ERP) included as Attachment C-1 to the HASP. This Contingency Plan, a summary of the ERP, describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This Contingency Plan also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance, the affected Site Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to the QEP. These emergency contact lists must be maintained in an easily accessible location at the Site. Site-specific contacts will be included in Appendix H.

Table 6: Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3-day notice required for utility mark out)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Table 7: Contact Numbers

Thomas H. Forbes, P.E. Qualified Environmental Professional (QEP)	Work: (716) 856-0599 Mobile: (716) 864-1730
Thomas H. Forbes, P.E. Site Safety and Health Officer (SSHO)	Work: (716) 856-0599 Mobile: (716) 864-1730
Richard L. Dubisz Alternate SSHO	Work: (716) 856-0635 Mobile: (716) 998-4334

* Note: Contact numbers subject to change and should be updated as necessary

2.5.2 Map and Directions to Nearest Health Facility

Site Location: 1951 Hamburg Turnpike, Lackawanna, New York 14218

Nearest Hospital Name: Mercy Hospital

Hospital Location: 565 Abbott Road, Buffalo, NY 14220

Hospital Telephone: (716) 826-7000

Directions to the Hospital (see Figure 6):

1. From the Buffalo Crushed Stone site access drive (or Gate2); turn left onto the Hamburg Turnpike (Route 5).
2. Proceed east on Hamburg Turnpike (Route 5) to the Tifft Street exit; turn right onto Tifft Street.
3. Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.

4. Turn right onto Abbott Road and Mercy Hospital will be on right hand side. Follow signs to emergency room (ER).

Total Distance: 5 miles

Total Estimated Time: 10 minutes

2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be immediately notified of the emergency. Table 6 provides the emergency telephone numbers.

3.0 SITE MONITORING PLAN

3.1 Introduction

3.1.1 General

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of: the remedy to reduce or mitigate contamination on the Controlled Property; the cover system; and all affected media. Monitoring of other Engineering Controls is described in Section 4.0, Operation, Monitoring, and Maintenance Plan. The Site Monitoring Plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

The Monitoring Plans presented within the Site-specific appendices describe the methods to be used for:

- Sampling and analysis of applicable Site media.
- Assessing compliance with applicable NYSDEC standards, criteria and guidance, particularly ambient groundwater standards and Part 375 SCOs for soil.
- Assessing achievement of the remedial performance criteria.
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, the Monitoring Plans provide information on:

- Sampling locations, protocol, and frequency.
- Information on all designed monitoring systems (e.g., well logs).
- Analytical sampling program requirements.
- Reporting requirements.
- Quality assurance/quality control (QA/QC) requirements (see Appendix G).
- Inspection and maintenance requirements for monitoring wells.
- Monitoring well decommissioning procedures.
- Annual inspection and periodic certification.

3.2 Cover System Monitoring

The cover system is common to the Controlled Property and is therefore discussed herein. All other monitored systems are discussed within the Site-specific appendices.

Annual visual inspection and maintenance (e.g., filling in ruts with approved cover materials, re-vegetation of soil covered areas, pothole repair, etc.) of the cover systems will be required to assure cover integrity and prevent exposure to underlying soil/fill.

3.3 Annual Inspection

Inspections of the Controlled Property will be performed on a regular schedule at a minimum of once per year. Inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix F). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including usage restrictions.
- An evaluation of the condition and continued effectiveness of ECs.
- General conditions at the time of the inspection.
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection.
- Compliance with permits and schedules included in the Operation and Maintenance Plan.
- Confirm that required records are up to date.

4.0 OPERATION & MAINTENANCE PLAN

The remedy for the Controlled Property does not rely on mechanical systems to protect public health and the environment. Therefore, the operation and maintenance (O&M) of such components is not included in the body of this SMP. To the extent that certain Sites require reliance on such systems, the system descriptions and O&M requirements are included in Appendix H.

Information on non-mechanical Engineering Controls (i.e., cover system) is provided in Section 3.0 - Engineering and Institutional Control Plan.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

5.1 Site Inspections

5.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the Section 3.0 of this SMP. At a minimum, inspections will be conducted annually across the Controlled Property. Inspections of the cover system will also be conducted whenever a severe condition has taken place, such as erosion or a flooding event.

5.1.2 Inspection Forms

Appendix F includes the forms for recording cover system inspections and the annual inspection. Site-specific inspection forms will be mailed by the Department with its standard 45-day notice. A common entity (e.g., Business Park Association) will complete a separate IC/EC inspection form for each Site and include these as an attachment to the Period Review Report discussed in Section 5.3.

All applicable inspection forms and system maintenance reports, generated during the reporting period, will be provided in electronic format in the Periodic Review Report described in Section 5.3.

5.1.3 Evaluation of Records & Reporting

The results of the inspections and monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Site Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and, based on the above items;
- The remedy, including Site-specific remedial measures, continues to be protective of public health and the environment and is performing as designed in the Site-specific RAWPs and FERs.

5.2 Certification of Engineering and Institutional Controls

Following the last inspection of the reporting period, a Professional Engineer (P.E.) licensed to practice in New York State or a QEP[2] will complete an IC/EC certification form for each of the Sites having received COCs. The IC/EC forms, which will be signed by the P.E. and the Site Owner or the Owner's representative, will include the following certification:

For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
- The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control;
- Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the Site is compliant with the environmental easement;
- The engineering control systems are performing as designed and are effective;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and
- The information presented in this report is accurate and complete.

[2] A Qualified Environmental Professional other than a licensed Professional Engineer (P.E.) may complete the certification if the engineering controls are limited to non-mechanical systems. Active groundwater remediation systems, soil vapor extraction systems, etc., require P.E. certification.

- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] (and if the site consists of multiple properties): [and I have been authorized and designated by all site owners to sign this certification] for the Site.

For Sites that the Department has determined do not represent a significant threat to public health or the environment, but where contaminants in groundwater exceed drinking water standards, the following should also be included:

- No new information has come to my attention, including groundwater monitoring data from wells located at the Site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and

Every five years the following certification will be added:

- The assumptions made in the qualitative exposure assessment remain valid.

The signed certification will be included in the common Periodic Review Report described below.

5.3 Periodic Review Report

A Periodic Review Report (PRR) covering all Sites in the Controlled Property for which COCs were issued will be submitted to the Department every year, beginning 16 months after the first COC is issued. A common entity (e.g., Business Park Association) will be designated as the responsible entity for receiving PRR notices, coordinating and arranging for the above-described inspections and certifications, and preparing the PRR deliverables. The PRR will be prepared in accordance with NYSDEC DER-10 and submitted within 45 days of the end of each certification period. Media sampling results will also incorporated into the PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for each Site;
- Results of the required annual inspections and severe condition inspections, if applicable;

- All applicable inspection forms and other records generated during the reporting period in electronic format;
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- An evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the Site-specific Decision Documents;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
  - The overall performance and effectiveness of the remedy.
- A performance summary for all treatment systems at the Site during the calendar year, including information such as:
  - The number of days the system was run for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

The PRR will be submitted, in hard-copy format, to the NYSDEC Central Office and Region 9 Office, and in electronic format to NYSDEC Central Office, Region 9 Office, and the NYSDOH Bureau of Environmental Exposure Investigation.

5.4 Corrective Measures Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Plan will be submitted to the NYSDEC for approval. This Plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Plan until it is approved by the NYSDEC.

TABLES

TABLE 1

SUMMARY OF RI SOIL/FILL ANALYTICAL DATA COMPARED TO RESTRICTED-COMMERCIAL SCOs

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type																					Restricted-Commercial SCO[2] (mg/kg)
	TP-85	TP-86	TP-89	TP-90	TP-91	TP-92	TP-93	TP-94	TP-95	TP-95B	TP-96	TP-97	TP-98	Blind 5	TP-99	TP-99	TP-99B	TP-100	TP-103	TP-104	TP-105	SS-1	
	0.0 - 2.0	0.0 - 2.0	4.0 - 6.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	4.0 - 6.0	0.0 - 2.0	6.0 - 8.0	3.0 - 4.0	0.0 - 2.0	0.0 - 2.0	0.0 - 0.5	(TP-98)	0.0-0.5	5.0-8.0	6.0-8.0	0.0-2.0	0.0-2.0	0.0-2.0	0.0-2.0	0.0-0.5	
Volatile Organic Compounds (VOCs) - mg/kg																							
Acetone	--	ND	ND	--	--	ND	--	--	ND	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Benzene	--	ND	ND	--	--	ND	ND	ND	0.25 DWNJ	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**44**
2-Butanone	--	ND	ND	--	--	ND	--	--	ND	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
Chlorobenzene	--	ND	ND	--	--	ND	--	--	0.2 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Chlorohexane	--	ND	ND	--	--	ND	--	--	0.42 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
Cyclohexane	--	ND	ND	--	--	ND	--	--	0.42 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
1,2-Dichlorobenzene	--	ND	ND	--	--	ND	--	--	34 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
1,3-Dichlorobenzene	--	ND	ND	--	--	ND	--	--	0.46 DWNJ	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**280**
1,4-Dichlorobenzene	--	ND	ND	--	--	ND	--	--	3.9 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**130**
Ethylbenzene	--	ND	ND	--	--	ND	ND	ND	0.25 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**390**
n-Butylbenzene	--	ND	ND	--	--	ND	ND	ND	0.53 DWNJ	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
sec-Butylbenzene	--	ND	ND	--	--	ND	ND	ND	0.24 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Isopropylbenzene	--	ND	ND	--	--	ND	ND	ND	0.12 DWJ	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
p-Cymene	--	ND	ND	--	--	ND	ND	ND	0.37 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
n-Propylbenzene	--	ND	ND	--	--	ND	ND	ND	0.36 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Toluene	--	ND	ND	--	--	ND	ND	ND	0.34 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
1,2,4-Trichlorobenzene	--	ND	ND	--	--	ND	--	--	0.15 DWJ	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
1,2,4-Trimethylbenzene	--	ND	0.22 W	--	--	ND	ND	ND	5.2 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**190**
1,3,5-Trimethylbenzene	--	ND	ND	--	--	ND	ND	ND	1.8 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**190**
o-Xylene	--	ND	ND	--	--	ND	ND	ND	0.75 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
m-Xylene	--	ND	ND	--	--	ND	--	--	1.5 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Xylenes, Total	--	ND	ND	--	--	ND	ND	ND	2.2 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Naphthalene	--	ND	ND	--	--	ND	0.063	0.066	ND	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Methylcyclohexane	--	ND	0.11 WJ	--	--	ND	--	--	1.1 DW	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**--**
Methyl tert butyl ether	--	ND	ND	--	--	ND	ND J	ND	ND	--	ND	--	--	--	--	ND	ND	ND	--	--	ND	--	**500**
Methylene Chloride	--	0.0065	0.09 WJ	--	--	ND	--	--	ND	--	0.0036 J	--	--	--	--	0.0064	0.0076	ND	--	--	0.0082	--	**500**
TOTAL VOCs (mg/kg)	--	*0.007*	*0.420*	--	--	*0*	*0.063*	*0.066*	*52.4*	--	*0.004*	--	--	--	--	*0.006*	*0.008*	*0*	--	--	*0.008*	--	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg																							
Acenaphthene	27 D	ND	1.4 TDJ	ND	ND	ND	4.4 DT	0.19 DJ	ND	--	ND	2.6 DJ	--	--	--	--	--	0.29 DJ	ND	ND	0.41 DJ	--	**500**
Acenaphthylene	3.7 DJ	ND	ND	0.4 DJ	0.32 DJ	0.15 DJ	89 TDJ	ND	1.9 TDJ	--	0.23 DJ	ND	--	--	--	--	--	2.4 D	ND	5.3 DJ	0.24 DJ	--	**500**
Acetophenone	ND	ND	ND	ND	ND	ND	ND	ND	3.6 TDJ	--	ND	ND	--	--	--	--	--	ND	ND	ND	ND	--	**--**
Anthracene	7.1 D	0.84 DJ	6 TDJ	1.5 DJ	0.3 DJ	ND	120 DT	0.46 DJ	4.7 TDJ	--	0.34 DJ	13 D	--	--	--	--	--	3 D	0.2 DJ	7.6 DJ	1.1 DJ	--	**500**
Benzo(a)anthracene	**120 D**	2.7 DJ	4.4 TDJ	4.8 D	1.3 DJ	0.7 DJ	**370 DTB**	3.1 DJB	**9.2 TDJ**	--	1.7 DJ	**35 D**	--	--	--	--	--	**11 D**	1 DJ	**30 D**	2.4 D	--	**5.6**
Benzo(b)fluoranthene	**120 D**	3.7 DJ	1.8 TDJ	**5.9 D**	2.4 D	0.92 DJ	**320 DT**	5.5 D, ID4	**14 TDJ**	--	2.7 D	**37 D**	--	--	--	--	--	**12 D**	1.2 DJ	**26 D**	3 D	--	**5.6**
Benzo(k)fluoranthene	**57 D**	1.2 DJ	0.66 TDJ	2.4 D	0.8 DJ	0.88 DJ	**160 DT**	ND	15 TDJ	--	0.89 DJ	17 D	--	--	--	--	--	5.8 DJ	0.58 DJ	12 D	0.98 DJ	--	**56**
Benzo(g,h,i)perylene	78 D	2.8 DJ	2.4 TDJ	3.4 D	1.7 DJ	0.69 DJ	180 DTB	3.4 DJB	7.5 TDJ	--	2 D	25 D	--	--	--	--	--	7.5 D	0.97 DJ	12 D	1.7 DJ	--	**500**
Benzo(a)pyrene	**110 D**	**2.9 DJ**	**3.6 TDJ**	**4.9 D**	**1.7 DJ**	0.83 DJ	**280 DT**	**3.2 DJ**	ND	--	**2.2 D**	**35 D**	--	--	--	--	--	**11 D**	0.93 DJ	**23 D**	**2.4 D**	--	**1**
Bis(2-ethylhexyl) phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	--	--	--	--	--	ND	ND	ND	ND	--	**--**
Biphenyl	2.8 DJ	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	--	--	--	--	--	ND	ND	ND	ND	--	**--**
Carbazole	--	ND	ND	--	--	ND	--	--	ND	--	0.12 DJ	--	--	--	--	--	--	0.84 DJ	--	--	0.42 DJ	--	**--**
Chrysene	**99 D**	2.5 DJ	5.1 TDJ	4.5 D	1.2 DJ	1 DJ	**320 DT**	2.2 DJ	8.1 TDJ	--	1.7 DJ	31 D	--	--	--	--	--	9.1 D	1.1 DJB	26 BD	2.4 DJ	--	**56**
Dibenzo(a,h)anthracene	**20 D**	ND	**1 TDJ**	**0.89 DJ**	0.38 DJ	0.27 DJ	**58 TDJB**	**0.78 DJB**	ND	--	0.52 DJ	**6.6 DJ**	--	--	--	--	--	**1.9 DJ**	**2.1 D**	**11 D**	0.44 DJ	--	**0.56**
Dibenzofuran	23 D	ND	ND	ND	ND	ND	23 TDJ	ND	5.5 TDJ	--	ND	1.8 DJ	--	--	--	--	--	0.66 DJ	ND	ND	0.38 DJ	--	**350**
Fluoranthene	300 D	6.1 DJ	3.6 TDJ	11 D	2.8 D	0.91 DJ	**750 DT**	4.8 D	21 TDJ	--	3 D	77 D	--	--	--	--	--	25 D	1.1 DJ	60 D	5 D	--	**500**
Fluorene	39 D	ND	2.4 TDJ	0.19 DJ	ND	ND	49 TDJ	ND	23 TDJ	--	ND	3.3 DJ	--	--	--	--	--	1.5 DJ	ND	2.4 D	0.43 DJ	--	**500**
Indeno(1,2,3-cd)pyrene	**69 D**	2.1 DJ	1.2 TDJ	3.2 D	1.5 DJ	0.48 DJ	**170 DT**	2.7 DJ	**6.5 TDJ**	--	1.7 DJ	**23 D**	--	--	--	--	--	**6.7 D**	0.79 DJ	**12 D**	1.6 DJ	--	**5.6**
2-Methylnaphthalene	10 DJ	ND	ND	ND	ND	ND	5.2 TDJ	ND	8.4 TDJ	--	ND	ND	--	--	--	--	--	0.24 DJ	ND	ND	0.25 DJ	--	**--**
Naphthalene	31 D	ND	ND	ND	ND	ND	9.6 TDJ	ND	13 TDJ	--	ND	1.7 DJ	--	--	--	--	--	0.32 DJ	ND	ND	0.44 DJ	--	**500**
Phenanthrene	250 D	3.5 DJ	12 DT	4.5 D	1 DJ	0.35 DJ	480 DT	2.2 DJ	20 TDJ	--	1.4 DJ	42 D	--	--	--	--	--	13 D	0.58 DJ	26 D	4.1 D	--	**500**
Pyrene	210 D	4.6 DJ	12 DT	7.6 D	2 D	0.93 DJ	**570 DT**	5 D	15 TDJ	--	2.3 D	54 D	--	--	--	--	--	16 D	1 DJ	51 D	3.8 D	--	**500**
TOTAL SVOCs (mg/kg)	***1577***	*32.9*	*57.6*	*55.2*	*17.4*	*8.11*	***3958***	*33.5*	*176*	--	*20.8*	*405*	--	--	--	--	--	*128*	*11.6*	*304*	*31.5*	--	--
Polychlorinated Biphenyls (PCBs) - mg/kg																							
Aroclor 1242	0.068 QSU	0.015 QSU, J	ND	ND	ND	ND	--	--	ND	--	ND	--	ND	ND	ND	--	--	--	ND	--	--	ND	**--**
Aroclor 1248	ND	ND	ND	ND	ND	ND	--	--	0.24 QSU	--	ND	--	ND	ND	ND	--	--	--	ND	--	--	ND	**--**
Aroclor 1254	ND	ND	ND	ND	ND	ND	--	--	ND	--	ND	--	0.011 QSU, J	ND	0.04 QSU,D,J	--	--	--	ND	--	--	0.057	**--**
Aroclor 1260	0.13 QSU	0.063 QSU	ND	ND	0.13 J	ND	--	--	ND	--	ND	--	ND	ND	ND	--	--	--	0.063 QSU, J	--	--	ND	**--**
TOTAL PCBs (mg/kg)	*0.198*	*0.078*	*ND*	*ND*	*0.13*	*0*	--	--	*0.24*	--	*ND*	--	*0.011*	*0*	*0.043*	--	--	--	*0.063*	--	--	*0.057*	***1***
Inorganic Compounds - mg/kg																							
Aluminum	--	19100 J	33800 J	--	--	--	--	--	--	8260	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Antimony	--	91.3 J	ND J	--	--	--	--	--	--	ND J	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Arsenic, Total	**20.1 J**	**42.8 J**	3.1 J	**55.5 J**	**37.1 J**	**26.7**	**33.9**	**44.2**	11.8	**71.9**	15.4 J	4.7 J	--	--	--	--	--	**117 J**	**198 J**	--	14 J	--	**16**
Barium, Total	124 J	141 J	223 J	172 J	35.4 J	10.4	151	83.1	137	255 J	150 J	73.2 J	--	--	--	--	--	92.4 J	202	--	131	--	**400**
Beryllium	--	2.71 J	4.45 J	--	--	--	--	--	--	1.28	--	--	--	--	--	--	--	--	--	--	--	--	**590**
Cadmium, Total	4.06 J	1.86 J	ND J	2.65 J	1.13 J	0.914	2.92	2.53	2.55	0.533	1.49 J	1.31 J	--	--	--	--	--	0.886 J	**54.5**	--	0.983	--	**9.3**
Calcium	--	109000 D	250000 D	--	--	--	--	--	--	43300 D	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Chromium, Total	93.4	73.2 J	3.57 J	122 J	67.4 J	26.3	13.4 J	78.1 J	52.2 J	87.8 J	671 J	95.6 J	--	--	--	--	--	63.5 J	29.2 J	--	235 J	--	**1,500**
Cobalt	--	13.1 J	1.38 J	--	--	--	--	--	--	3.21	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Copper	--	**655 J**	5.7 J	--	--	--	--	--	--	65.4	--	--	--	--	--	--	--	--	--	--	--	--	**270**
Iron	--	135000 DJ	7570 J	--	--	--	--	--	--	32900 D	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Lead, Total	603	0.62	6.9	235	162	543	605	485	365	127	148	463	--	--	--	--	--	92.9 J	301 J	--	107 J	--	**1,000**
Magnesium	--	16100 J	5080 J	--	--	--	--	--	--	5590 J	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Manganese	--	3630 DJ	4390 DJ	--	--	--	--	--	--	3040 D	--	--	--	--	--	--	--	--	--	--	--	--	**10,000**
Mercury, Total	0.314 D	0.508	ND	0.104 D	0.0833 D	0.035	0.724	2.71 D	0.452 D	0.209 D	0.168	0.671	--	--	--	--	--	0.265 J	0.229	--	0.538	--	**2.8**
Nickel	--	157 J	ND J	--	--	--	--	--	--	12.8 J	--	--	--	--	--	--	--	--	--	--	--	--	**310**
Potassium	--	1880 J	4080 J	--	--	--	--	--	--	1640 J	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Selenium	--	ND J	ND J	--	--	--	--	--	--	ND J	--	--	--	--	--	--	--	--	--	--	--	--	**1,500**
Silver	--	ND	ND	--	--	--	--	--	--	ND J	--	--	--	--	--	--	--	--	--	--	--	--	**8.3**
Sodium	--	512 J	998 J	--	--	--	--	--	--	206 J	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Vanadium	--	24 J	12.8 J	--	--	--	--	--	--	68.6	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Zinc	--	376 J	12.3 J	--	--	--	--	--	--	103	--	--	--	--	--	--	--	--	--	--	--	--	**10,000**
Cyanide, Total	1.2	1.1	ND	ND	--	--	--	--	ND J	--	--	--	--	--	--	--	--	--	--	--	--	--	**27**

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Color Code:
BOLD = Value exceeds Restricted-Commercial SCO (and Unrestricted SCO)

Definitions:
B = Analyte was detected in associated Method Blank.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
ID4 = Benzo(b)fluoranthene coelutes with Benzo(k)fluoranthene. The reported result is a summation of the isomers and the concentration is based on the response factor of Benzo(b)fluoranthene.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
NJ = The detection is tentative in identification and estimated in value.
QSU = Sulfur (EPA 3660) clean-up performed on extract.
T = Sample had an adjusted final volume during extraction due to extract matrix and / or viscosity.
U = The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or imprecise.
W = Sample was prepared and analyzed utilizing a medium level extraction.
" -- " = Not analyzed for this parameter or no individual SCO.

TABLE 2

SUMMARY OF SUPPLEMENTAL METALS ANALYTICAL DATA
(FEBRUARY 2012)

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

Original Sample ID	Supplemental Sample IDs [1]	Arsenic Result (ppm)	Lead Result (ppm)
BPA2-TP-10 (0-2)		**245 J**	345 J
	TP10R (0-2)	**360**	NA
	TP10N10 (0-2)	45.2	NA
	TP10S10 (0-2)	96.2	NA
	TP10E10 (0-2)	58	NA
	TP10W10 (0-2)	**131**	NA
	TP10W20 (0-2)	102	NA
BPA2-TP-21 (0-2)		**119 J**	120 J
	TP21R (0-2)	89.7	NA
	TP21N10 (0-1)	42.2	NA
	TP21S10 (0-2)	49.2	NA
	TP21E10 (0-2)	**167**	NA
	TP21E20 (0-2)	26.8	NA
	TP21W10 (0-2)	23.2	NA
BPA2-TP-40 (0-2)		**152 J**	656 J
	TP40R (0-2)	32.2	NA
	TP40N10 (0-1)	11.4	NA
	TP40S10 (0-2)	34.9	NA
	TP40E10 (0-1)	4.7	NA
	TP40W10 (0-2)	88.2	NA
BPA2-TP-52 (0-2)		**141**	456
	TP52R (0-2)	66	NA
	TP52N10 (0-2)	22.7	NA
	TP52S10 (0-2)	47.8	NA
	TP52E10 (0-2)	**164**	NA
	TP52W10 (0-2)	20.4	NA

TABLE 2

SUMMARY OF SUPPLEMENTAL METALS ANALYTICAL DATA (FEBRUARY 2012)

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

Original Sample ID	Supplemental Sample IDs [1]	Arsenic Result (ppm)	Lead Result (ppm)
BPA2-TP-58 (0-2)		**122**	**12,300 DJ**
BLIND 4		*57 J*	*216 J*
	TP58R (0-2)	46.5	97.2
	TP58N10 (0-2)	23.2	207
	TP58S10 (0-2)	**127**	314
	TP58S20 (0-2)	112	NA
	TP58E10 (0-2)	31.5	175
	TP52W10 (0-2)	44.2	285
BPA2-TP-103 (0-2)		**198 J**	54.5
	TP103R (0-2)	29.2	NA
	TP103N10 (0-2)	NS	NA
	TP103S10 (0-2)	68.5	NA
	TP103E10 (0-2)	15.3	NA
	TP103W10 (0-2)	46.5	NA

Notes:

1. "R" designation refers to a re-sample collected adjacent to original test pit location to confirm 0-2' depth interval.

Acronyms:

NA = Not analyzed for parameter
NS = Not sampled
J = Estimated value
D = Analyzed at dilution

BOLD	= Value exceeds arsenic site-specific SCO of 120 ppm.
BOLD	= Value exceeds lead commerical SCO of 1,000 ppm.

TABLE 3

SUMMARY OF SUPPLEMENTAL SOIL/FILL ANALYTICAL DATA COMPARED TO COMMERCIAL USE SCOs

SITE MANAGEMENT PLAN

Phase II Business Park - Site II-1
Lackawanna, New York

Parameter [1]	Date, Sample Location, Depth Interval (fbgs)			Commercial SCOs[2,3] (mg/kg)
	3/1/13			
	BPAII-TP-106	BPAII-TP-107	BPAII-TP-108	
	0.0 - 2.0	0.0 - 2.0	0.0-2.0	
Semi-Volatile Organic Compounds (SVOCs) - mg/kg				
Acenaphthene	ND	0.44 J	0.45 J	**500**
Acenaphthylene	0.62 J	4.5	0.16 J	**500**
Anthracene	0.55	3 J	1.8 J	**500**
Benzo(a)anthracene	2.4 J	22	4.8	**5.6**
Benzo(b)fluoranthene	3.8 J	37	5.6	**5.6**
Benzo(k)fluoranthene	1.5 J	13	2.3	**56**
Benzo(g,h,i)perylene	0.89 J	7.5	1.1 J	**500**
Benzo(a)pyrene	2.7 J	26	3.6	**1**
Carbazole	ND	1 J	0.51	**--**
Chrysene	2.3 J	24	4.1	**56**
Dibenzo(a,h)anthracene	ND	2.3 J	ND	**1.1**
Dibenzofuran	ND	0.25 J	0.47 J	**--**
Fluoranthene	3.1 J	34	8.9	**500**
Fluorene	ND	0.81 J	0.51 J	**500**
Indeno(1,2,3-cd)pyrene	0.92 J	**7.6**	1.1 J	**5.6**
2-Methylnaphthalene	ND	0.37 J	0.25 J	**--**
Naphthalene	ND	0.53 J	0.29 J	**500**
Phenanthrene	0.94 J	6.9	6.1	**500**
Pyrene	*2.9 J*	32	5.7	**500**
TOTAL SVOCs (mg/kg)	*23*	*223*	*55*	**500**
Polychlorinated Biphenyls (PCBs) - mg/kg				
TOTAL PCBs (mg/kg)	*ND*	--	--	**1**
Inorganic Compounds - mg/kg				
Aluminum, Total	5730	--	--	**--**
Arsenic, Total	37.3	35.8	94.2	**16**
Barium, Total	80.3	--	--	**400**
Beryllium, Total	0.71	--	--	**590**
Cadmium, Total	5.3	0.83	2.8	**9**
Calcium, Total	25100	--	--	**--**
Chromium, Total	37.9	46.6	**813**	**400**
Cobalt, Total	5.2	--	--	**--**
Copper, Total	**51.6**	--	--	**270**
Iron, Total	32100	--	--	**--**
Lead, Total	316	57.6	374	**1,000**
Magnesium, Total	3550	--	--	**--**
Manganese, Total	1600	--	--	**10,000**
Mercury, Total	0.024	0.048	0.034	**3**
Nickel, Total	36	--	--	**310**
Potassium, Total	383 B	--	--	**--**
Silver, Total	0.7	--	--	**1,500**
Vanadium, Total	25.1	--	--	**--**
Zinc, Total	436	--	--	**10,000**
Cyanide, Total	1.9	--	--	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective (Protection of Public Health - Industrial, Commercial and Unrestricted), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2
3. Soil Clean up guidence for subsurface soil/fill at non-residential sites Per NYSDEC CP-51.

Definitions:

B = Analyte was detected in associated Method Blank.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Commercial Use Soil Cleanup Objectives.

TABLE 4

SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

PARAMETER [1]	GWQS [2]	MW-01		MW-07A [4]		MW-07B		MWN-63A		MWN-63D [3,4]		MWN-64A		MWN-65D		MWS-32A		MWS-36A		MWS-37A		Trip Blank		Equipment Blank 1 [4,6]		Equipment Blank 2 [4,6]		Blind Dup[3]		BPA2-TP-36	BPA2-TP-81B
Field Measurements [5]**:**																															
Sample No.	--	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	NA	NA	NA	NA	NA	NA	1	2	NA	NA
pH (units)	**6.5 - 8.5**	**9.20**	**9.28**	7.19	7.19	6.75	6.81	6.65	6.67	**6.28**	6.52	7.84	7.82	6.54	6.63	8.39	8.15	7.90	7.88	7.06	7.26	NA	NA	NA	NA	NA	NA	**6.28**	6.52	NA	NA
Temperature (^{o}C)	**NA**	12.3	13.5	11.4	12.3	12.7	13.1	11.0	12.2	11.7	12.7	11.4	12.4	12.5	13.3	11.4	12.8	10.5	10.7	11.5	12.2	NA	NA	NA	NA	NA	NA	11.7	12.7	NA	NA
Sp. Conductance (uS)	**NA**	435.0	433.3	596.1	591.0	889.7	890.9	1150	1141	1410	1402	635.9	632.3	1712	1707	325.4	336.4	872.1	869	805.5	708.7	NA	NA	NA	NA	NA	NA	1410	1402	NA	NA
Turbidity (NTU)	**NA**	12.9	10.2	7.12	7.14	33.6	24.1	480.0	252.0	36.2	23.0	140	107	48.0	68.0	40.7	10.0	32.6	17.3	>1000	651	NA	NA	NA	NA	NA	NA	36.2	23.0	NA	NA
Eh (mV)	**NA**	-113	-119	29	46	-51	-55	-81	-93	41	28	-113	-119	25	29	-93	-127	-19	-14	41	-43	NA	NA	NA	NA	NA	NA	41	28	NA	NA
Total Inorganic Compounds (mg/L):																															
Aluminum - Total	**--**	ND		ND		ND		ND		0.878		ND		ND		ND		ND		ND		NA		ND		ND		0.82		NA	NA
Arsenic - Total	**0.025**	**0.491**		**0.0319**		ND		ND		ND		ND		ND		**0.0323**		ND		**0.0795**		NA		ND		ND		ND		NA	NA
Barium - Total	**1**	0.0222		0.014		0.0643		0.206		0.87		0.043		0.388		0.0173		0.0407		0.226		NA		ND		ND		0.893		NA	NA
Cadmium - Total	**0.005**	ND		ND		ND		ND		ND		ND		ND		ND		ND		0.001		NA		ND		ND		ND		NA	NA
Calcium - Total	**--**	ND		106		ND		ND		167		ND		ND		ND		ND		ND		NA		ND		ND		170		NA	NA
Chromium - Total	**0.05**	ND		ND		ND		0.006		ND		ND		ND		ND		ND		0.0477		NA		ND		ND		ND		NA	NA
Iron - Total	**0.3**	ND		0.1		ND		ND		1.43		ND		ND		ND		ND		ND		NA		ND		ND		1.44		NA	NA
Lead - Total	**0.025**	ND		ND		ND		0.005		ND		ND		ND		ND		ND		0.038		NA		ND		ND		ND		NA	NA
Magnesium - Total	**35***	ND		12.7		ND		ND		58.2		ND		ND		ND		ND		ND		NA		ND		ND		58.9		NA	NA
Manganese - Total	**0.3**	ND		0.00101		ND		ND		0.105		ND		ND		ND		ND		ND		NA		ND		ND		0.107		NA	NA
Potassium - Total	**--**	ND		2.54		ND		ND		15.2		ND		ND		ND		ND		ND		NA		ND		ND		15.6		NA	NA
Sodium - Total	**20**	ND		9.6		ND		ND		91.4		ND		ND		ND		ND		ND		NA		ND		ND		91.7		NA	NA
Soluble Inorganic Compounds (mg/L):																															
Arsenic -Soluble	**0.025**	NA		NA		NA		ND		NA		ND		NA		NA		NA		0.0177		NA		ND		ND		NA		NA	NA
Barium - Soluble	**1**	NA		NA		NA		0.133		NA		0.0293		NA		NA		NA		0.0625		NA		ND		ND		NA		NA	NA
Volatile Organic Compounds (ug/L):																															
1,2,4-Trimethylbenzene	**5**	ND		ND		ND		ND		1.8		ND		1.6		ND		ND		ND		ND		ND		ND		2.1		NA	ND
1,3,5 - Trimethylbenzene	**5**	ND		ND		ND		ND		ND		ND		0.48		ND		ND		ND		ND		ND		ND		0.79 J		NA	ND
Benzene	**1**	0.58 B		ND		ND		ND		ND		ND		0.31 B		ND		ND		ND		ND		ND		ND		ND		NA	ND
sec-Butylbenzene	**5**	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA	ND
Bromomethane	**5**	ND		0.79 J		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		1.3		NA	ND
Cyclohexane	**--**	ND		ND		ND		ND		3.3		ND		ND		ND		ND		ND		ND		ND		ND		3.8		NA	ND
Ethylbenzene	**5**	ND		ND		ND		ND		ND		ND		0.25		ND		ND		ND		ND		ND		ND		ND		NA	ND
Methyl-t-Butyl Ether (MTBE)	**10**	ND		ND		ND		ND		ND		ND		0.72		ND		ND		ND		ND		ND		ND		ND		NA	ND
Methylcyclohexane	**--**	ND		ND		ND		ND		8.8		ND		ND		ND		ND		ND		ND		ND		ND		9.6		NA	ND
p-Cymene	**5**	ND		ND		ND		ND		ND		ND		ND		ND		0.14 J		ND		ND		ND		ND		ND		NA	ND
m-Xylene & p-Xylene	**10**	ND		ND		ND		ND		1 J		ND		1.6		ND		0.063 J		0.069 J		ND		ND		ND		1.1 J		NA	0.055 J
o-Xylene	**5**	ND		ND		ND		ND		ND		ND		0.67		ND		ND		ND		ND		ND		ND		ND		NA	ND
n-Butylbenzene	**5**	ND		ND		ND		ND		ND		ND		0.31 J		ND		ND		ND		ND		ND		ND		ND		NA	ND
Toluene	**5**	ND		ND		ND		ND		ND		ND		1.6 B		ND		ND		ND		ND		ND		ND		ND		NA	ND
Xylenes, total	**15**	ND		ND		ND		ND		1 J		ND		2.3		ND		0.063 J		0.069 J		ND		ND		ND		1.1 J		NA	0.055 J
Semi-Volatile Organic Compounds (ug/L):																															
Acenaphthene	**20***	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		5 D10, J	ND
Anthracene	**50***	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		6.2 D10, J	1.5 D10, J
Benzo(a)anthracene	**0.002***	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		**13 D10, J**	**5.5 D10, J**
Benzo(a)pyrene	**ND**	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		**13 D10, J**	**5.5 D10, J**
Benzo(b)fluoranthene	**0.002***	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		**23 D10, J**	**8.2 D10, J**
Benzo(ghi)perylene	--	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		11 D10, J	4.2 D10, J
Benzo(k)fluoranthene	**0.002***	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		**7.3 D10, J**	ND
Carbazole	**--**	0.43 J		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		7.5 D10, J	ND
Chrysene	**0.002**	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		**14 D10, J**	**5 D10, J**
Fluoranthene	**50***	0.52 J		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		23 D10, J	12 D10, J
Indeno(1,2,3-cd)pyrene	**0.002***	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NA		ND		ND		ND		**9.3 D10, J**	**3.6 D10, J**
Phenanthrene	**50***	1 J		ND		ND		ND		ND		ND		ND		ND		0.67 J		ND		NA		ND		ND		ND		21 D10, J	6.7 D10, J
Pyrene	**50***	0.49 J		ND		ND		ND		ND		0.35 J		ND		ND		ND		ND		NA		ND		ND		ND		19 D10, J	9.1 D10, J

TABLE 4

SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

PARAMETER [1]	GWQS [2]	MW-01	MW-07A [4]	MW-07B	MWN-63A	MWN-63D [3,4]	MWN-64A	MWN-65D	MWS-32A	MWS-36A	MWS-37A	Trip Blank	Equipment Blank 1 [4,6]	Equipment Blank 2 [4,6]	Blind Dup[3]	BPA2-TP-36	BPA2-TP-81B
Polychlorinated Biphenyls (ug/L):																	
Aroclor 1242	**0.09****	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	**0.56**

Notes:
1. Only those compounds detected above the method detection limit at a minimum of one sample location are reported in this table.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) as per Technical & Operational Guidance Series 1.1.1 (June 1998, January 1999 Errata, April 2000 Addendum, and June 2004 Addendum).
3. Blind Duplicate and Matrix Spike/Matrix SpikeDuplicate (MS/MSD) analysis performed on groundwater sample collected from MWN-63D.
4. MW-7A, MWN-63D, EQB-1 and EQB-2 were sampled for expanded parmeters for 8260 TCL + STARS VOCs, TAL Metals, Total Cyanide, 8270 TCL SVOCs.
5. Field measurements were collected immediately before and after groundwater sample collection.
6. EQB-1 was collected on 4/29/10 and EQB-2 was collected on 4/30/10.

Definitions:
J = Estimated Value; result is less than the sample quantitation limit but greater than zero.
B = Analyte was detecded in the associated method blank.
"--" or NA = Not available
ND = Indicates parameter was not detected above laboratory reporting limit.
D10 = Dilution required due to sample color.

* = Guidance Value
** = Applies to the sum of PCB Aroclors.
BOLD = Result exceeds the GWQS/GV.

TABLE 5

SUMMARY OF PLANNED AND COMPLETED REMEDIAL ACTIONS BY SITE

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

Site No.	BCP Site No.	Acreage	Remedial Work [1,3]	Monitoring Wells	Piezometers	Post-Remedial Groundwater Monitoring Program [2]
No Remedial Actions Planned						
II-1	C915198	14.36	No areas of impact identified; former location of the NDS lumberyard relocated to Site III-1.	MWS-32A	None	TBD
II-6	C915198F	11.5	No areas of impact identified.	MW-07A/B	None	TBD
II-7	C915198G	12.23	No areas of impact identified.	None	None	TBD
II-9	C915198I	11.98	No additional areas of impact identified.	None	None	TBD
Remedial Actions Planned						
II-2	C915198B	9.43	Hotspot I (test pit BPA2-TP-16): direct injection of a fast-acting chemical oxidant and a slow release product to stimulate aerobic bioremediation. Delivery points will be equally spaced in a grid pattern across the approximate 30-foot by 30-foot area. The product will be delivered via high-capacity hydraulic injection pump between 5 and 9 fbgs (i.e., the smear zone). Hotspot O (test pit BPA2-TP-103): excavation and off-site disposal of an estimated 45 cubic yards of arsenic-impacted soil/fill.	MWS-37A	None	TBD
II-3	C915198C	23.53	Hotspot J (test pit BPA2-TP-10): excavation and off-site disposal of an estimated 70 cubic yards of arsenic-impacted soil/fill.	MWS-36A	None	TBD
II-4	C915198D	1.40	South Linde Area: Construct 6-inch recovery well at PZ-2 and operate belt skimmer for continuous oil removal. Continue operation and monitoring groundwater collection, treatment, and oil recovery system.	MW-01, -03, -05, MWN-65D	None	TBD
II-5	C915198E	6.49	Hotspot H (test pits BPA2-TP-99 and -99B): direct injection of a fast-acting chemical oxidant and a slow release product to stimulate aerobic bioremediation. Delivery points will be equally spaced in a grid pattern across the approximate 120-foot by 50-foot area. The product will be delivered via high-capacity hydraulic injection pump between 5 and 9 fbgs (i.e., the smear zone). Hotspot K (test pit BPA2-TP-21): excavation and off-site disposal of an estimated 70 cubic yards of arsenic-impacted soil/fill.	None	None	TBD
II-11	C915198K	11.97	Hotspot C (test pit BPA2-TP-53): excavation of an estimated 360 CY of petroleum-impacted soil/fill followed by on-site bioremediation; groundwater management may be required. Hotspot M (test pit BPA2-TP-52): excavation and off-site disposal of an estimated 70 cubic yards of arsenic-impacted soil/fill. Hotspot N (test pit BPA2-TP-58): excavation and off-site disposal of an estimated 70 cubic yards of arsenic-impacted soil/fill.	None	None	TBD
II-10	C915198J	15.79	Hotspot A (test pit BPA2-TP-85): excavation of an estimated 45 CY of PAH-impacted soil/fill followed by on-site bioremediation. Hotspot D (test pit BPA2-TP-89): excavation of an estimated 2,250 CY of petroleum-impacted soil/fill followed by on-site bioremediation; groundwater management may be required. Hotspot G (test pit BPA2-TP-81B): direct injection of a fast-acting chemical oxidant and a slow release product to stimulate aerobic bioremediation. Delivery points will be equally spaced in a grid pattern across the approximate 20-foot by 20-foot area. The product will be delivered via high-capacity hydraulic injection pump between 5 and 9 fbgs (i.e., the smear zone).	MWN-63A/D	None	TBD

TABLE 5

SUMMARY OF PLANNED AND COMPLETED REMEDIAL ACTIONS BY SITE

SITE MANAGEMENT PLAN

Phase II Business Park
Lackawanna, New York

Site No.	BCP Site No.	Acreage	Remedial Work [1,3]	Monitoring Wells	Piezometers	Post-Remedial Groundwater Monitoring Program [2]
Remedial Actions Planned						
II-12	C915198L	12.08	Hotspot B (test pit BPA2-TP-80): excavation of an estimated 45 CY of PAH-impacted soil/fill followed by on-site bioremediation. Hotspot E (test pit BPA2-TP-93): excavation of an estimated 940 CY of petroleum-impacted soil/fill followed by on-site bioremediation; groundwater management may be required. Hotspot F (test pit BPA2-TP-95): excavation of an estimated 675 CY of petroleum-impacted soil/fill followed by on-site bioremediation; groundwater management may be required.	MWN-64A	None	TBD
Completed Remedial Actions						
II-3	C915198C	(see above)	Excavated arsenic-impacted soil/fill from test pits RR-TP-4 and RR-TP-12 as part of the Railroad Realignment IRM and disposed 739.78 tons at Chautauqua County Landfill, Jamestown, NY under active CCLF Permit No. CC1201.10S1.	Refer to Site II-3 above		
II-8	C915198H	11.41	Excavated arsenic-impacted soil/fill from Hotspot L (test pit BPA2-TP-40) and disposed 49.9 tons at Chautauqua County Landfill, Jamestown, NY under active CCLF Permit No. CC1201.10S1.	None	None	TBD
II-9	C915198I	(see above)	Excavated PCB-impacted soil/fill from test pit RR-TP-30 as part of the Railroad Realignment IRM and disposed 258.27 tons at Chautauqua County Landfill, Jamestown, NY under active CCLF Permit No. CC1201.10S1.	Refer to Site II-9 above		
II-10	C915198J	(see above)	Excavated arsenic-impacted soil/fill from test pit RR-TP-42 as part of the Railroad Realignment IRM and disposed 541.77 tons at Chautauqua County Landfill, Jamestown, NY under active CCLF Permit No. CC1201.10S1.	Refer to Site II-10 above		
TOTAL PHASE II ACREAGE =		**142.17**				

Notes:

1. All Sites to receive a minimum 1 foot of NYSDEC-approved clean cover material or 6 inches structural cover (pavement, building, etc.) in addition to listed remedial work.
2. TBD - To be determined pending implementation of final remedial measures.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\Figure 1; Site Location and Vicinity Map.dwg

FIGURE 1



TurnKey Environmental Restoration, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

DATE: JULY 2012

DRAFTED BY: HAA

SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK

P:\CAD\Turnkey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Permit\Site Management Plan\Figure 2 - Site Plan.dwg

N

STEEL WINDS I
± 29.01 ACRES

PHASE IA BUSINESS PARK
± 12.92 ACRES

PHASE I BUSINESS PARK
± 101.85 ACRES

PHASE III BUSINESS PARK
± 150.18 ACRES

PHASE II BUSINESS PARK
± 142.17 ACRES

U.S.A.C.E.
SEDIMENT DISPOSAL AREA

GATEWAY TRADE
CENTER (G.T.C.)

SOUTH BUFFALO
RAILROAD COMPANY

BUFFALO
SPECIALTY
STEEL

REPUBLIC ENGINEERED
PRODUCTS, INC.
(BAR MILL)

SOUTH BUFFALO
RAILROAD COMPANY

BUFFALO CRUSHED STONE

LAKE ERIE

OPEN WATER

LAND

BUFFALO
OUTER HARBOR

SMOKES CREEK

GATEWAY METROPORT SHIP CANAL

U.S. HARBOR LINE BOUNDARY

TOWN OF HAMBURG
CITY OF LACKAWANNA

CITY OF LACKAWANNA
CITY OF BUFFALO

VILLAGE OF BLASDELL
CITY OF LACKAWANNA

WT-01 WT-02 WT-03 WT-04 WT-05 WT-06 WT-07 WT-08

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK
- SWMU P-07 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - REQUIRES FURTHER ASSESSMENT
- SWMU P-64 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - REQUIRES NO FURTHER ACTION
- CMS SITE BOUNDARY
- BROWNFIELD CLEANUP PROGRAM AREAS
- APPROXIMATE BOUNDARY OF SWMU
- WT-08 — EXISTING STEEL WINDS I FACILITY WIND TURBINE (WT)

500' 0' 500' 1000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

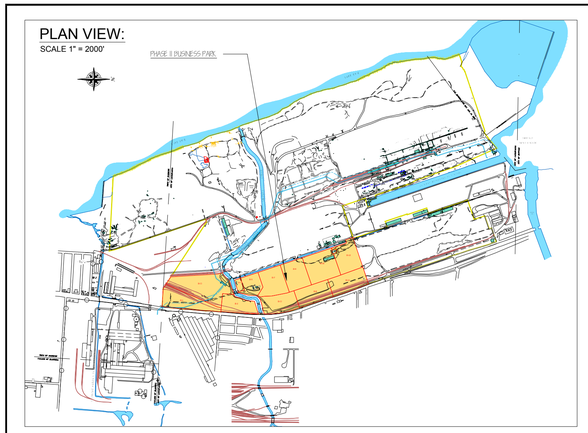
DRAWN BY: BCH (REV. JCT)
DATE: MAY 2012
CHECKED BY:
APPROVED BY:

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SITE PLAN

SITE MANAGEMENT PLAN
PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 2



SMOKES CREEK

SOUTH RETREN WATER TREATMENT

SMOKES CREEK

II-1

II-2

II-3

II-4

II-5

II-7

II-8

II-9

II-10

II-11

II-12

II-□

II-□

HIGHWAY

LAKE SHORE ROAD - SR 5

LINCOLN AVE.

ADAMS ST.

MADISON AVE.

2nd STREET

PONA STREET

ODELL STREET

HIDDENBROOK STREET

WQCS # 5A

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- PHASE II BUSINESS PARK BOUNDARY (+/- 144.11 ACRES)
- RAILROAD TRACK

Parcel Identification	Total Acreage	Encumbered Acreage	Developable Acreage	Percent Developable
II-1	14.36	6.29	8.07	56.17%
II-2	9.43	2.88	6.55	69.48%
II-3	23.53	6.91	16.62	70.65%
II-4	1.40	0.21	1.19	84.84%
II-5	6.49	2.19	4.30	66.23%
II-6	11.50	3.48	8.03	69.78%
II-7	12.23	1.58	10.65	87.11%
II-8	11.41	4.12	7.29	63.91%
II-9	11.98	3.54	8.44	70.45%
II-10	15.79	2.17	13.62	86.23%
II-11	11.97	3.83	8.14	68.01%
II-12	12.08	1.24	10.84	89.73%
BP-II Totals	**142.17**	**38.44**	**103.73**	**72.96%**

N

200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

DRAWN BY: BLR
DATE: MAY 2011
CHECKED BY:
APPROVED BY:

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SEAL

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 3

F:\CAD\Turnkey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\Figure 3- Site Delineation Map.dwg

F:\GIS\Turnkey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Permit\Site Management Plan\Figure 4 - Isopotential Map.dwg

SOUTH BUFFALO
RAILROAD COMPANY

SMOKES CREEK

SOUTHERN WATER TRENCH

PHASE II BUSINESS PARK

II-1
II-2
II-□
II-5
II-7
II-8
II-9
II-10
II-11
II-12

577
576
578
575
574

MWN-24A
MWN-24B
MWS-03
MWS-04
MWS-31A
MWS - 35A
MWS - 34A
MWN - 59A
MWN-61A
MWN - 57A
MWN-10
MWN - 56A
P-50S
MW-17A
MWN-64A
P-46S
P-47S
P-48S
P-49S
MWS - 33A
MWN - 58A
P-39S
P-38S
MWS - 30A
MWN - 60A
P-40S
P-41S
MW-05
MW-01
MW-02R
MW-03
MWS-36A
MW-18A
MWS-32A
MWS-37A
MW-07B
MW-07A
MWN-63A
MWN-63D

LAKE SHORE ROAD - SR 5
HOLBROOK STREET
CHILD STREET
LINCOLN AVE.
ADAMS ST.
MADISON AVE.
2nd STREET
DONA STREET

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- PHASE II BUSINESS PARK BOUNDARY (+/- 174 ACRES)
- MWN-25A — EXISTING OVERBURDEN MONITORING WELL
- MW-7B — EXISTING BEDROCK MONITORING WELL
- P-40S — EXISTING OVERBURDEN PIEZOMETER
- MWN-56A — PHASE III BUSINESS PARK DOWNGRADIENT OVERBURDEN MONITORING WELL
- MWS-63A — PHASE II BUSINESS PARK OVERBURDEN MONITORING WELL (5)
- MWS-63D — PHASE II BUSINESS PARK BEDROCK MONITORING WELL (2)
- 578 — GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

N

200' 0' 200' 400'

SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 007-012-322

REVISIONS

NO.	BY	DATE	REMARKS

DRAWN BY: BCH
DATE: OCTOBER 2010
CHECKED BY:
APPROVED BY:

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SEAL

SHALLOW GROUNDWATER ISOPOTENTIAL MAP FOR 04/29/10 & 04/30/10

SITE MANAGEMENT PLAN
PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK

FIGURE 4

F:\GIS\Turnkey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\Figure 5 Remedial Measures - REVISED.mxd

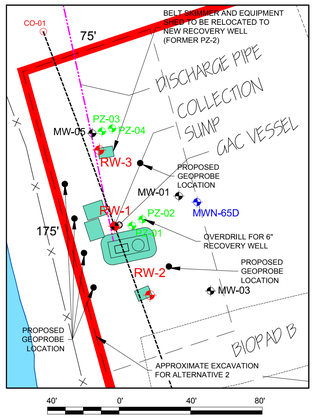
LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- PHASE II BUSINESS PARK BOUNDARY (± 174 ACRES)
- RAILROAD TRACK
- MWN-29A — OVERBURDEN MONITORING WELL
- MW-76 — BEDROCK MONITORING WELL
- P-40S — OVERBURDEN PIEZOMETER
- MWS-65A — EXISTING PHASE II BUSINESS PARK OVERBURDEN MONITORING WELL (5)
- MWS-65D — EXISTING PHASE II BUSINESS PARK BEDROCK MONITORING WELL (2)
- COMPLETED REMEDIAL EXCAVATIONS
- HOT SPOT AREAS TO BE EXCAVATED

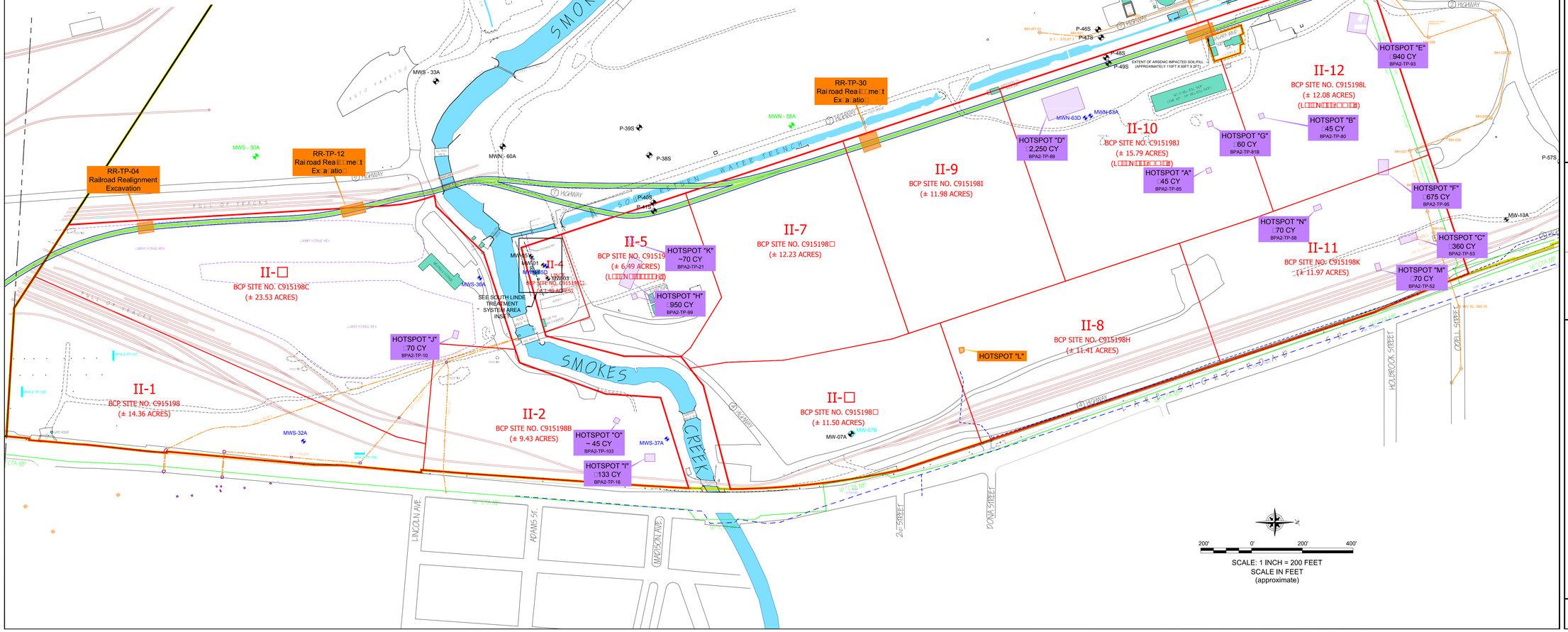
NOTES:

1. [illegible]

SOUTH LINDE TREATMENT SYSTEM AREA

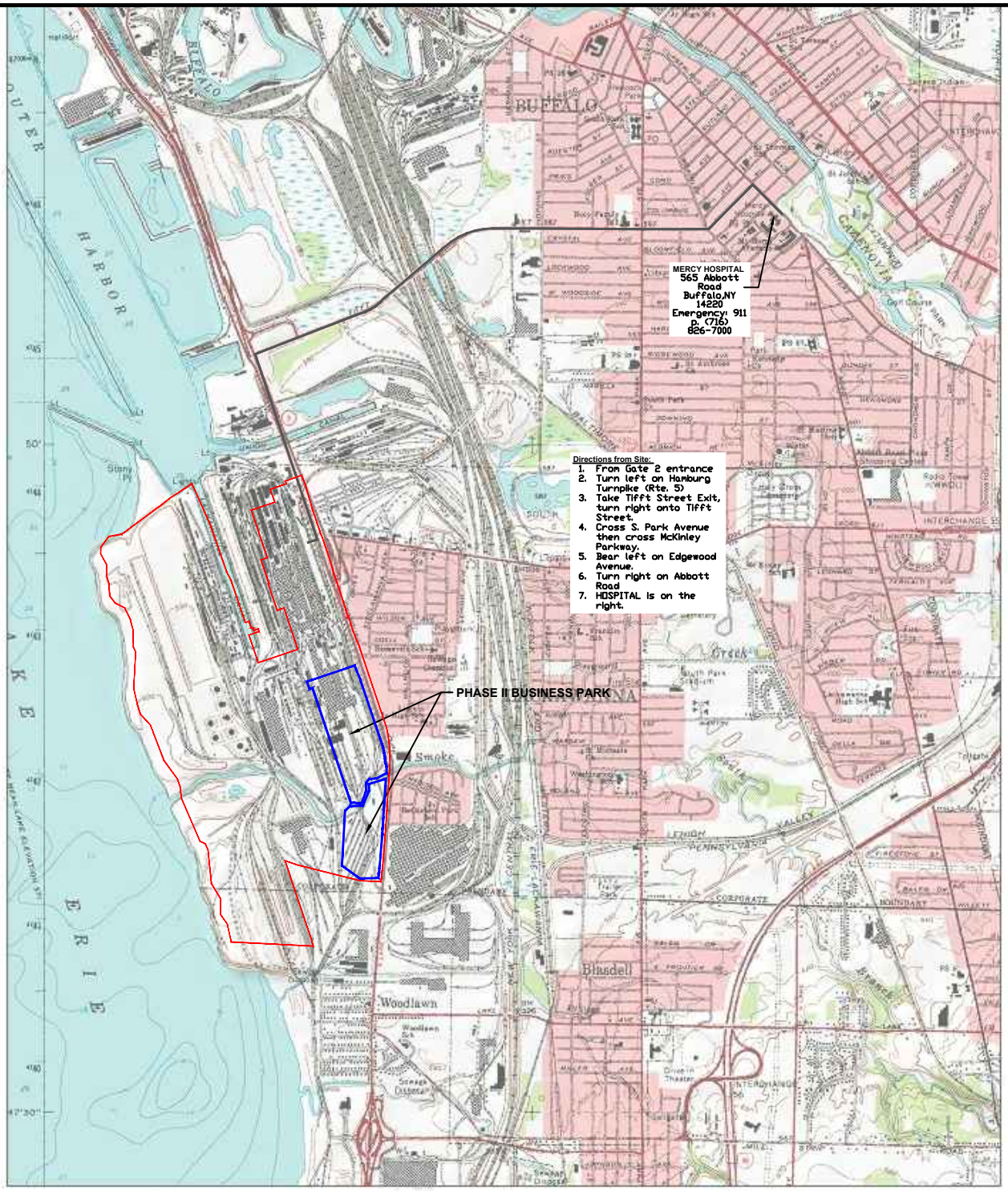


SCALE: 1 INCH = 40 FEET
SCALE IN FEET
(approximate)


SMOKES CREEK
MWS-20A
MWS-20B
P-36S
MWN-44A
MWN-24A
MWN-24B
MWS-03
MWN-62D
MWN - 57A
MWN-61A
MWN-10
MWN - 56A
MWN-55A
P-18S
MWN-47A
MWN-46A
MWN-45A
P-50S
MW-17A
MWN-64A
RR-TP-42 Railroad Realignment Excavation
WOCS #5A
P-46S
P-47S
P-48S
P-49S
EXTENT OF ARSENIC IMPACTED SOIL/FILL (APPROXIMATELY 110FT X 50FT X 2FT)
HOTSPOT "E" 940 CY BPA2-TP-93
II-12
BCP SITE NO. C915198L
(± 12.08 ACRES)
(L[illegible])
MWN-63D
MWN-63A
HOTSPOT "D" 2,250 CY BPA2-TP-89
II-10
BCP SITE NO. C915198J
(± 15.79 ACRES)
(L[illegible])
HOTSPOT "B" 45 CY BPA2-TP-60
HOTSPOT "C" 60 CY BPA2-TP-81B
HOTSPOT "A" 45 CY BPA2-TP-85
II-9
BCP SITE NO. C915198I
(± 11.98 ACRES)
HOTSPOT "F" 675 CY BPA2-TP-95
MW-13A
HOTSPOT "N" 70 CY BPA2-TP-58
HOTSPOT "C" 360 CY BPA2-TP-53
II-11
BCP SITE NO. C915198K
(± 11.97 ACRES)
HOTSPOT "M" 70 CY BPA2-TP-52
RR-TP-30 Railroad Realignment Excavation
MWN - 58A
P-39S
P-38S
MWN- 60A
MWS - 30A
RR-TP-12 Railroad Realignment Excavation
RR-TP-04 Railroad Realignment Excavation
P-40S
P-41S
MWS-36A
SEE SOUTH LINDE TREATMENT SYSTEM AREA INSET
MW-01
MW-05
MW-03
II-4
BCP SITE NO. C915198[illegible]
(± 1.40 ACRES)
II-5
BCP SITE NO. C91519[illegible]
(± 6.49 ACRES)
(L[illegible])
HOTSPOT "K" ~70 CY BPA2-TP-21
HOTSPOT "H" 950 CY BPA2-TP-99
II-7
BCP SITE NO. C915198[illegible]
(± 12.23 ACRES)
II-8
BCP SITE NO. C915198H
(± 11.41 ACRES)
HOTSPOT "L"
II-□
BCP SITE NO. C915198C
(± 23.53 ACRES)
HOTSPOT "J" 70 CY BPA2-TP-10
II-1
BCP SITE NO. C915198
(± 14.36 ACRES)
II-2
BCP SITE NO. C915198B
(± 9.43 ACRES)
HOTSPOT "O" ~ 45 CY BPA2-TP-103
HOTSPOT "I" 133 CY BPA2-TP-16
MWS-32A
MWS-37A
MWS - 33A
II-□
BCP SITE NO. C915198□
(± 11.50 ACRES)
MW-07A
MW-07B
SMOKES CREEK
LINCOLN AVE.
ADAMS ST.
MADISON AVE.
24th STREET
DONA STREET
HOLBROOK STREET
OPAL STREET
RAILROAD
SOUTH LINDE WATER TRENCH
FILL OF TRACKS
LUMBER STORAGE AREA
AUTO PARKING
GAS HOUSE
16" CIA MP
12" CIA MP
BPA 2-TP-107
BPA 2-TP-106
BPA 2-TP-108
MH-WT-01
MH-WT-02
MH-WT-03
MH-WT-04
MH-WT-05
MH-WT-06
MH-WT-07
MH-WT-08
MH-WT-09
MH-WT-10
MH-WT-11
MH-WT-12
MH-WT-13
MH-WT-14
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MH-WT-32
MH-WT-33
MH-WT-34
MH-WT-35
MH-WT-36
MH-WT-37
MH-WT-38
MH-WT-39
MH-WT-40

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\Figure 6; Hospital Route Plan.dwg

FIGURE 6



TurnKey Environmental Restoration, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

DATE: JULY 2012

DRAFTED BY: HAA

HOSPITAL ROUTE MAP

SITE MANAGEMENT PLAN

PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK

APPENDIX A

METES AND BOUNDS / ENVIRONMENTAL EASEMENT

ENGINEERING / INSTITUTIONAL CONTROLS

- COVER SYSTEM THE COVER SYSTEM IS A PERMANENT CONTROL. PROCEDURES FOR THE INSPECTION AND MAINTENANCE OF THIS COVER ARE PROVIDED IN THE MONITORING PLAN IN SECTION 4 OF THE SITE MANAGEMENT PLAN (SMP).
- COMPLIANCE WITH THE ENVIRONMENTAL EASEMENT AND THE SMP BY THE GRANTOR AND THE GRANTOR'S SUCCESSORS AND ASSIGNS;
- ALL ENGINEERING CONTROLS MUST BE OPERATED AND MAINTAINED AS SPECIFIED IN THE SMP;
- ALL ENGINEERING CONTROLS ON THE CONTROLLED PROPERTY MUST BE INSPECTED AT A FREQUENCY AND IN A MANNER DEFINED IN THE SMP;
- GROUNDWATER, SOIL VAPOR AND OTHER ENVIRONMENTAL OR PUBLIC HEALTH MONITORING MUST BE PERFORMED AS DEFINED IN THE SMP;
- DATA AND INFORMATION PERTINENT TO SITE MANAGEMENT OF THE CONTROLLED PROPERTY MUST BE REPORTED AT THE FREQUENCY AND IN A MANNER DEFINED IN THE SMP;
- THE USE AND DEVELOPMENT OF THE SITE IS LIMITED TO COMMERCIAL AND INDUSTRIAL USES ONLY AS DESCRIBED IN 6NYCRR PART 375-1.8(G) (2) (III) & (IV).
- THE PROPERTY MAY NOT BE USED FOR A HIGHER LEVEL OF USE, SUCH AS RESTRICTED RESIDENTIAL USE WITHOUT ADDITIONAL REMEDIATION AND AMENDMENT OF THE ENVIRONMENTAL EASEMENT AS APPROVED BY THE NYSDEC;
- ALL FUTURE ACTIVITIES ON THE PROPERTY THAT WILL DISTURB REMAINING CONTAMINATED MATERIAL MUST BE CONDUCTED IN ACCORDANCE WITH THE SMP;
- THE USE OF THE GROUNDWATER UNDERLYING THE PROPERTY IS PROHIBITED WITHOUT TREATMENT RENDERING IT SAFE FOR INTENDED USE;
- THE SITE OWNER OR REMEDIAL PARTY WILL SUBMIT TO NYSDEC A WRITTEN STATEMENT THAT CERTIFIES, UNDER PENALTY OF PERJURY, THAT: (1) CONTROLS EMPLOYED AT THE CONTROLLED PROPERTY ARE UNCHANGED FROM THE PREVIOUS CERTIFICATION OR THAT ANY CHANGES TO THE CONTROLS WERE APPROVED BY THE NYSDEC; AND, (2) NOTHING HAS OCCURRED THAT IMPAIRS THE ABILITY OF THE CONTROLS TO PROTECT PUBLIC HEALTH AND ENVIRONMENT OR THAT CONSTITUTE A VIOLATION OR FAILURE TO COMPLY WITH THE SMP.

PROPOSED DESCRIPTION FOR BUSINESS PARK PHASE II, PARCEL A

ALL THAT TRACT OR PARCEL OF LAND SITUATE IN THE CITY OF LACKAWANNA, COUNTY OF ERIE AND STATE OF NEW YORK, BEINGS PART OF LOT 15 OF THE OGDEN GORE TRACT AND PART OF LOT 23 OF THE BUFFALO CREEK RESERVATION, TOWNSHIP 10, RANGE 8 OF THE HOLLAND LAND COMPANY'S SURVEY, AND MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE WESTERLY HIGHWAY BOUNDARY OF THE HAMBURG TURNPIKE (ALSO KNOWN AS STATE ROUTE NO. 5) AS APPROPRIATED BY THE NEW YORK STATE DEPARTMENT OF PUBLIC WORKS AS SHOWN ON MAP NO. 1, PARCEL 1 AND RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 5650 OF DEEDS AT PAGE 404 AND THE MUNICIPAL BOUNDARY LINE BETWEEN THE CITY OF LACKAWANNA (TO THE NORTH) AND THE TOWN OF HAMBURG (TO THE SOUTH). SAID POINT ALSO BEING ALONG THE NORTHERLY BOUNDARY OF LANDS CONVEYED TO THE SOUTH BUFFALO RAILWAY COMPANY BY DEED RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 10119 OF DEEDS AT PAGE 131;

THENCE WESTERLY ALONG THE NORTHERLY LINE OF SAID SOUTH BUFFALO RAILWAY COMPANY'S LAND N 86°–32'–54" W, A DISTANCE OF 507.02 FEET TO AN ANGLE POINT;

THENCE NORTHWESTERLY CONTINUING ALONG SOUTH BUFFALO RAILWAY COMPANY'S LAND N 56°–55'–40" W, A DISTANCE OF 386.48 FEET TO A POINT;

THENCE NORTHERLY N 03°–25'–27" W, A DISTANCE OF 1284.41 FEET TO A POINT OF CURVATURE OF A TANGENT CURVE;

THENCE ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 518.00 FEET, AN ARC LENGTH OF 168.84 FEET, A CHORD BEARING OF N 12°–45'–43" W AT A DISTANCE OF 168.10 FEET, TO A POINT APPROXIMATELY 25 FEET SOUTH FROM THE EXISTING SOUTHERLY TOP OF HIGH BANK OF SMOKES CREEK;

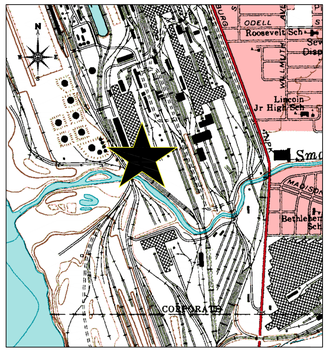
THENCE NORTHEASTERLY CONTINUING APPROXIMATELY 25 FEET SOUTH FROM THE EXISTING SOUTHERLY TOP OF HIGH BANK THE FOLLOWING 6 COURSES AND DISTANCES;

1. N 80°–39'–39" E, A DISTANCE OF 37.52 FEET;
2. N 44°–31'–00" E, A DISTANCE OF 261.86 FEET;
3. N 71°–51'–20" E, A DISTANCE OF 455.12 FEET;
4. N 20°–01'–37" E, A DISTANCE OF 360.67 FEET;
5. N 03°–49'–42" E, A DISTANCE OF 217.94 FEET;
6. N 72°–45'–22" E, A DISTANCE OF 373.92 FEET TO A POINT ON THE WESTERLY HIGHWAY BOUNDARY OF THE HAMBURG TURNPIKE AS ACQUIRED BY THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION UNDER S.H. NO. FAC 49–10 MAP 305, PARCEL 306 AND RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 10960 OF DEEDS AT PAGE 2028;

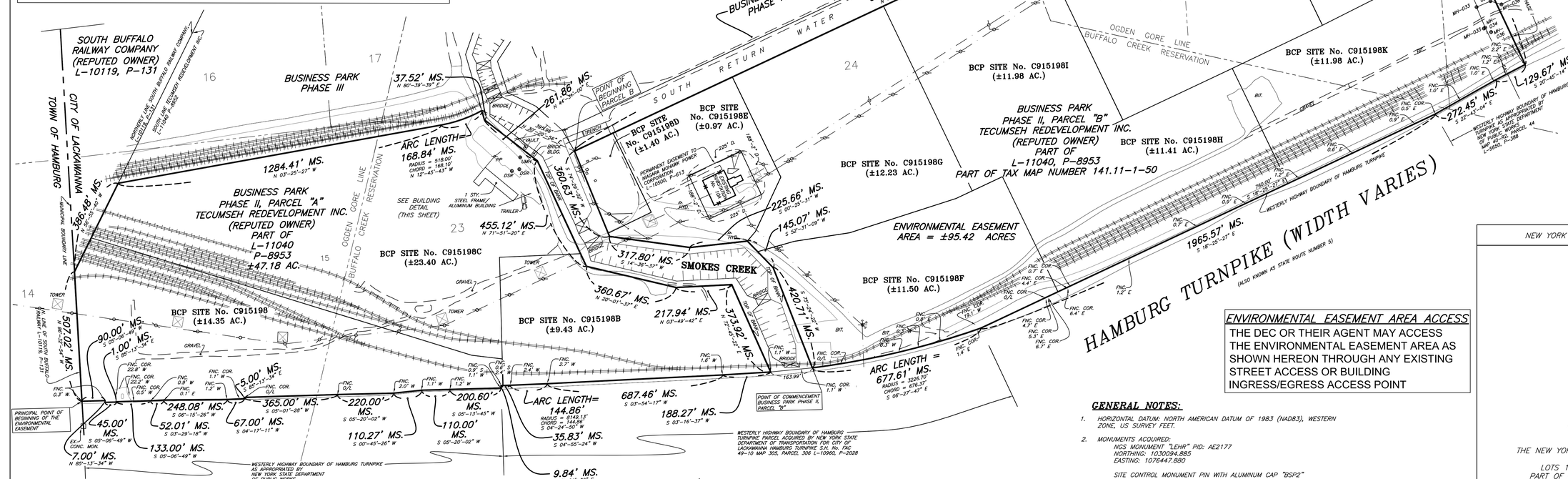
THENCE CONTINUING ALONG SAID WESTERLY HIGHWAY BOUNDARY THE FOLLOWING 19 COURSES AND DISTANCES;

1. S 03°–16'–37" W, A DISTANCE OF 188.27 FEET;
2. S 03°–54'–17" W, A DISTANCE OF 687.46 FEET TO THE POINT OF CURVATURE OF A TANGENT CURVE;
3. THENCE ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 8149.13 FEET, AN ARC LENGTH OF 144.86 FEET, A CHORD BEARING OF S 04°–24'–50" W AT A DISTANCE OF 144.86 FEET;
4. S 04°–55'–24" W, A DISTANCE OF 35.83 FEET;
5. S 85°–04'–36" E, A DISTANCE OF 9.84 FEET;
6. S 05°–13'–45" W, A DISTANCE OF 200.60 FEET;
7. S 05°–20'–02" W, A DISTANCE OF 110.00 FEET;
8. S 00°–45'–26" W, A DISTANCE OF 110.27 FEET;
9. S 05°–20'–02" W, A DISTANCE OF 220.00 FEET;
10. S 05°–01'–28" W, A DISTANCE OF 365.00 FEET;
11. S 85°–13'–34" E, A DISTANCE OF 5.00 FEET;
12. S 04°–17'–11" W, A DISTANCE OF 67.00 FEET;
13. S 06°–15'–26" W, A DISTANCE OF 248.08 FEET;
14. S 03°–29'–18" W, A DISTANCE OF 52.01 FEET;
15. S 05°–06'–49" W, A DISTANCE OF 133.00 FEET;
16. S 85°–13'–34" E, A DISTANCE OF 1.00 FEET;
17. S 05°–06'–49" W, A DISTANCE OF 45.00 FEET;
18. N 85°–13'–34" W, A DISTANCE OF 7.00 FEET;
19. S 05°–06'–49" W, A DISTANCE OF 90.00 FEET TO THE POINT OF BEGINNING, CONTAINING 47.18 ACRES OF LAND MORE OR LESS.

BEING PART OF THE PIECE OR PARCEL OF LAND IN A BARGAIN AND SALE DEED DATED 5/06/2003 AND RECORDED 5/22/2003 IN LIBER 11040 OF DEEDS AT PAGE 8953 IN THE ERIE COUNTY CLERK'S OFFICE. THIS PARCEL OF LAND IS PART OF THE OVERALL DEED.



BUFFALO SE QUADRANGLE,
7.5 MINUTE SERIES (TOPOGRAPHIC)
PROJECT LOCATION SKETCH
NOT TO SCALE



PROPOSED DESCRIPTION FOR BUSINESS PARK PHASE II, PARCEL B

ALL THAT TRACT OR PARCEL OF LAND SITUATE IN THE CITY OF LACKAWANNA, COUNTY OF ERIE AND STATE OF NEW YORK, BEINGS PART OF LOTS 18, 20, 21 OF THE OGDEN GORE TRACT AND PART OF LOTS 24 OF THE BUFFALO CREEK RESERVATION, TOWNSHIP 10, RANGE 8 OF THE HOLLAND LAND COMPANY'S SURVEY, AND MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE WESTERLY HIGHWAY BOUNDARY OF THE HAMBURG TURNPIKE (ALSO KNOWN AS STATE ROUTE NO. 5) AS APPROPRIATED BY THE NEW YORK STATE DEPARTMENT OF PUBLIC WORKS AS SHOWN ON MAP NO. 1, PARCEL 1 AND RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 5650 OF DEEDS AT PAGE 404 AND THE MUNICIPAL BOUNDARY LINE BETWEEN THE CITY OF LACKAWANNA (TO THE NORTH) AND THE TOWN OF HAMBURG (TO THE SOUTH). SAID POINT ALSO BEING ALONG THE NORTHERLY BOUNDARY OF LANDS CONVEYED TO THE SOUTH BUFFALO RAILWAY COMPANY BY DEED RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 10119 OF DEEDS AT PAGE 131;

THENCE WESTERLY CONTINUING ALONG THE MUNICIPAL BOUNDARY LINE AND THE NORTHERLY LINE OF SAID SOUTH BUFFALO RAILWAY COMPANY'S LAND N 86°–32'–54" W, A DISTANCE OF 507.02 FEET TO A POINT;

THENCE NORTHWESTERLY CONTINUING ALONG SOUTH BUFFALO RAILWAY COMPANY'S LAND N 56°–55'–40" W, A DISTANCE OF 386.48 FEET TO A POINT;

THENCE NORTHERLY N 03°–25'–27" W, A DISTANCE OF 1284.41 FEET TO A POINT OF CURVATURE OF A TANGENT CURVE TO THE LEFT HAVING A RADIUS OF 518.00 FEET, ARC LENGTH OF 168.84 FEET, A CHORD BEARING OF N 12°–45'–43" W, A DISTANCE OF 168.10 FEET;

THENCE NORTHEASTERLY CROSSING SMOKES CREEK N 30°–20'–56" E, A DISTANCE OF 395.96 FEET TO A POINT APPROXIMATELY 25 FEET NORTH FROM THE EXISTING NORTHERLY TOP OF HIGH BANK OF SMOKES CREEK AND THE POINT OF BEGINNING;

THENCE NORTHERLY N 18°–20'–36" W, A DISTANCE OF 3292.99 FEET TO A POINT;

THENCE WESTERLY S 71°–34'–47" W, A DISTANCE OF 93.00 FEET TO A POINT;

THENCE NORTHERLY N 18°–20'–36" W, A DISTANCE OF 214.85 FEET TO A POINT ON THE SOUTHERLY LINE OF LANDS CONVEYED TO GATEWAY TRADE CENTER INC. BY DEED RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 10886 OF DEEDS AT PAGE 1064;

THENCE EASTERLY N 71°–41'–32" E, A DISTANCE OF 28.04 FEET TO A SOUTHEAST CORNER OF SAID GATEWAY TRADE CENTER INC. LANDS;

THENCE EASTERLY N 71°–11'–53" E, A DISTANCE OF 86.73 FEET TO A SOUTHWEST CORNER OF "BUSINESS PARK, PHASE I" AS SHOWN ON A MAP PREPARED BY WENDEL, DATED JUNE 2012, PROJECT NUMBER 411107;

THENCE EASTERLY CONTINUING ALONG THE SOUTHERLY LINE OF SAID BUSINESS PARK PHASE I, N 71°–31'–33" E, A DISTANCE OF 1251.00 FEET TO A POINT ON THE WESTERLY HIGHWAY BOUNDARY OF HAMBURG TURNPIKE AS APPROPRIATED BY THE NEW YORK STATE DEPARTMENT OF PUBLIC WORKS AS SHOWN ON MAP NO. 40–R2, PARCEL 44 AND RECORDED IN THE ERIE COUNTY CLERK'S OFFICE IN LIBER 5650 OF DEEDS AT PAGE 588;

THENCE SOUTHERLY CONTINUING ALONG THE WESTERLY HIGHWAY BOUNDARY OF HAMBURG TURNPIKE THE FOLLOWING 4 COURSES AND DISTANCES:

1. S 20°–45'–14" E, A DISTANCE OF 129.67 FEET;
2. S 22°–43'–04" E, A DISTANCE OF 272.45 FEET;
3. S 18°–25'–27" E, A DISTANCE OF 1965.57 FEET TO THE POINT OF CURVATURE OF A NON–TANGENT CURVE;
4. THENCE ALONG A CURVE TO THE RIGHT, HAVING A RADIUS OF 3226.70 FEET, AS ARC LENGTH OF 677.61 FEET, A CHORD BEARING OF S 06°–27'–47" E AT A DISTANCE OF 676.37 FEET, TO A POINT WHICH IS APPROXIMATELY 25 FEET NORTH FROM THE EXISTING NORTHERLY TOP OF HIGH BANK OF SMOKES CREEK;

THENCE WESTERLY & SOUTHERLY CONTINUING APPROXIMATELY 25 FEET NORTH FROM THE EXISTING NORTHERLY TOP OF HIGH BANK OF SMOKES CREEK THE FOLLOWING 5 COURSES AND DISTANCES;

1. S 75°–24'–22" W, A DISTANCE OF 420.71 FEET;
2. S 52°–31'–09" W, A DISTANCE OF 145.07 FEET;
3. S 00°–25'–31" W, A DISTANCE OF 225.66 FEET;
4. S 14°–36'–37" W, A DISTANCE OF 317.80 FEET;
5. S 74°–29'–02" W, A DISTANCE OF 360.63 FEET TO THE POINT OF BEGINNING

CONTAINING 95.42 ACRES OF LAND MORE OR LESS.

BEING PART OF THE PIECE OR PARCEL OF LAND IN A BARGAIN AND SALE DEED DATED 5/06/2003 AND RECORDED 5/22/2003 IN LIBER 11040 OF DEEDS AT PAGE 8953 IN THE ERIE COUNTY CLERK'S OFFICE. THIS PARCEL OF LAND IS PART OF THE OVERALL DEED.

SCHEDULE B, SECTION 2: CHICAGO TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE #1213–25117:

EXCEPTION NUMBER:

10A. PERMANENT EASEMENT TO NIAGARA MOHAWK POWER CORPORATION FOR STATION 10A 188°–2" X 225" L–10500, P–613 (SHOWN HEREON)

10B. 25.0' WIDE EASEMENT FOR INGRESS AND EGRESS FROM PUBLIC HIGHWAY TO STATION 10A TRUCK GATE. L–10500, P–613 (UNABLE TO PLOT)

11A. AIRSPACE AND EASEMENT RIGHTS SETTLEMENT. LIBER 11145, PAGE 2422, (PLOTTED HEREON)

11B. RE–PURCHASE RIGHTS & EASEMENT TO BQ ENERGY LIBER 11145, PAGE 2733, (PLOTTED HEREON)

12. EASEMENT TO GREAT LAKES INDUSTRIAL DEVELOPMENT, LLC., LIBER 11194, PAGE 6243, (UNABLE TO PLOT)

13. EASEMENT TO NATIONAL FUEL GAS DISTRIBUTION CORPORATION LIBER 11220, PAGE 2359 (DOES NOT AFFECT PREMISES)

14. EASEMENT FOR ACCESS, INGRESS AND EGRESS TO ERIE WIND, LLC LIBER 11214, PAGE 4899 & LIBER 11216 PAGE 7305 (PLOTTED HEREON)

20. PUBLIC AND PRIVATE RIGHTS OF OTHERS TO THE BED AND WATERS OF SMOKES CREEK; INCLUDING ANY REGULATORY STATUES AFFECTING THE SAME: (UNABLE TO PLOT)

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW.

THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM THE NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@GW.DEC.STATE.NY.US.

ENVIRONMENTAL EASEMENT AREA ACCESS

THE DEC OR THEIR AGENT MAY ACCESS THE ENVIRONMENTAL EASEMENT AREA AS SHOWN HEREON THROUGH ANY EXISTING STREET ACCESS OR BUILDING INGRESS/EGRESS ACCESS POINT

GENERAL NOTES:

1. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83), WESTERN ZONE, US SURVEY FEET.
2. MONUMENTS ACQUIRED:
   NGS MONUMENT "LEHR" PID: AE2177
   NORTHING: 1030094.885
   EASTING: 1076447.880

   SITE CONTROL MONUMENT PIN WITH ALUMINUM CAP "BSP2"
   NORTHING: 1024721.330
   EASTING: 1076610.356
3. BUFFALO CREEK RESERVATION & OGDEN GORE TRACT INFORMATION IS SHOWN IN ITS APPROXIMATE LOCATION FROM MAPS FILED IN THE ERIE COUNTY CLERKS OFFICE.
4. REFER TO NEW YORK STATE DEPARTMENT OF TRANSPORTATION APPROPRIATION MAPS FOR MAP DISTANCES & BEARINGS.
5. PROPERTY CORNERS TO BE STAKED AT A LATER DATE.
6. BCP SITE No. #### = PARCEL DESIGNATION
7. REFERENCE MAPS:
   MAP PREPARED BY BERGMANN ASSOCIATES 10/16/00, MAP NO. 303, PARCEL 303 OF THE HAMBURG TURNPIKE ARTERIAL HIGHWAY, DATED APRIL 15, 1960, PREPARED BY THE NEW YORK STATE DEPARTMENT OF PUB

HSE

Harter Secrest & Emery LLP

ATTORNEYS AND COUNSELORS

WWW.HSELAW.COM

August 15, 2014

Mr. Benjamin Conlon
New York State Department of Environmental Conservation
Office of the General Counsel, 14th floor
625 Broadway
Albany, New York 12233-1010

Re: Tecumseh Redevelopment Inc. Business Park II
2303 Hamburg Turnpike, Hamburg, New York
Recorded Environmental Easement Package for
Index No.: B9-0696-05-06(B); NYSDEC Site Nos. C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, C915198L

Dear Mr. Conlon:

With regard to the above-captioned matter, enclosed herewith please find the following:

1. Copy of the Environmental Easement recorded with the Erie County Clerk's Office on July 15, 2014 in Liber 11266 of Deeds at page 5455.

2. Affidavit of Service by Mail of the Municipal Notice, together with copies of the cover letter and enclosures sent to the City of Lackawanna and County of Erie and certified mail return receipts as exhibits attached thereto.

3. Affidavit of Service by Mail to parties identified as having an interest in the property, as set forth in Schedule "B" of the Title Commitment, together with copies of the notice delivered to such parties and certified mail return receipts as exhibits attached thereto.

Please do not hesitate to contact me should you have any questions or require anything further.

Very truly yours,

Harter Secrest & Emery LLP

Michael L. Nisengard

DIRECT DIAL: 716.844.3715
E-MAIL: MNISENGARD@HSELAW.COM

MLN:lks
Enclosures

cc: Tom Forbes (via email)
Patrick Foster, Esq. (via email)
Marc A. Romanowski, Esq. (via email)

ERIE COUNTY CLERK'S OFFICE

County Clerk's Recording Page

Return to:
BOX 29

Party 1:
TECUMSEH REDEVELOPMENT INC

Party 2:
NEW YORK STATE DEPT OF
ENVIRONMENTAL CONSERVATION

Recording Fees:

RECORDING	$80.00
COE CO $1 RET	$1.00
COE STATE $14.25 GEN	$14.25
COE STATE $4.75 RM	$4.75
TP584	$10.00

Book Type: D Book: 11266 Page: 5455
Page Count: 12
Doc Type: EASEMENT/RTWY
Rec Date: 07/15/2014
Rec Time: 09:21:59 AM
Control #: 2014137591
UserID: Donna
Trans #: 14107868
Document Sequence Number
TT2013021927

Consideration Amount: 1.00

BASIC MT	$0.00
SONYMA MT	$0.00
ADDL MT/NFTA	$0.00
SP MT/M-RAIL	$0.00
NY STATE TT	$0.00
ROAD FUND TT	$0.00

Total: $110.00

STATE OF NEW YORK
ERIE COUNTY CLERK'S OFFICE

WARNING – THIS SHEET CONSTITUTES THE CLERK'S ENDORSEMENT REQUIRED BY SECTION 319&316-a (5) OF THE REAL PROPERTY LAW OF THE STATE OF NEW YORK. DO NOT DETACH. THIS IS NOT A BILL.

Christopher L. Jacobs
County Clerk

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

Boy 29

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 21st day of June, 2019 between Owner(s) Tecumseh Redevelopment Inc., having an office at 4020 Kinross Lakes Parkway, County of Summit, State of Ohio (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 2303 Hamburg Turnpike in the City of Lackawanna, County of Erie and State of New York, known and designated on the tax map of the County Clerk of Erie as tax map parcel numbers: Section 141.11 Block 1 Lot 50, being a portion of that certain plot, piece or parcel of land conveyed to Grantor by deed dated May 6, 2003 and recorded in the Erie County Clerk's Office in Liber 11040 and Page 8953. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 141.25 +/- acres, and is hereinafter more fully described in the Land Title Survey, which includes parcels recognized under Brownfield Cleanup Agreement Amendments dated August 22, 2012 ("Sites"), dated September 14, 2012, field survey completed June 12, 2012 and prepared by Wendel, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

2P-LKW 785, 11 137591

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: B9-0696-05-06(B), Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Erie County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5 the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a

defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Site within the Controlled Property on or about which the violation pertains.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to: Site Numbers: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L

Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

[10/12]

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Grantor: Tecumseh Redevelopment Inc.

By: Keith A. Nagel

Print Name: Keith A. Nagel

Title: VP - Envir Affairs & Real Estate Date: May 29, 2014

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

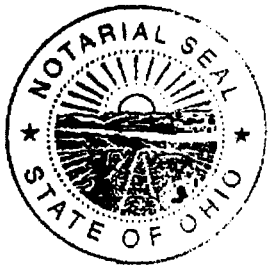
Grantor's Acknowledgment

STATE OF ~~NEW YORK~~ Ohio)
) ss:
COUNTY OF Summit)

On the 29th day of May, in the year 20 14, before me, the undersigned, personally appeared Keith Nagel, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person ~~upon~~ behalf of which the individual(s) acted, executed the instrument.

Susan E. Dick
Notary Public - State of ~~New York~~ Ohio

Commission expires:
Nov. 6, 2017
Susan E. Dick



[10/12]

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 26th day of June, in the year 2014, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

[10/12]

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

SCHEDULE "A" PROPERTY DESCRIPTION

PARCEL A

ALL THAT TRACT OR PARCEL OF LAND situate in the City of Lackawanna, County of Erie and State of New York, being part of Lot 15 of the Ogden Gore Tract and part of Lot 23, Township 10, Range 8 of the Buffalo Creek Reservation, described as follows:

Beginning at the intersection of the westerly highway boundary of the Hamburg Turnpike (also known as State Route No. 5) as appropriated by the New York State Department of Public Works as shown on Map No. 1, Parcel 1 and recorded in the Erie County Clerk's Office in Liber 5650 of Deeds at Page 404 and the municipal boundary line between the City of Lackawanna (to the north) and the Town of Hamburg (to the south), said point also being along the northerly boundary of lands conveyed to the South Buffalo Railway company by deed recorded in the Erie County Clerk's Office in Liber 10119 of Deeds at Page 131; running thence N 86°-32'-54" W along the northerly line of said South Buffalo Railway Company's land, a distance of 507.02 feet to an angle point therein; Thence N 56°-55'-40" W, and continuing along said South Buffalo Railway Company's land a distance of 386.48 feet to a point; thence N 03°-25'-27" W, a distance of 1,284.41 feet to a point of curvature of a tangent curve; thence along a curve to the left having a radius of 518.00 feet, an arc length of 168.84 feet to a point approximately 25 feet south from the existing southerly top of high bank of Smokes Creek; thence easterly and northerly approximately 25 feet south from the existing southerly top of the high bank of Smokes Creek the following 6 courses and distances;

1. Thence N 80°-39'-39" E, a distance of 37.52 feet to a point;
2. Thence N 44°-31'-00" E, a distance of 261.86 feet to a point;
3. Thence N 71°-51'-20" E, a distance of 455.12 feet to a point;
4. Thence N 20°-01'-37" E, a distance of 360.67 feet to a point;
5. Thence N 03°-49'-42" E, a distance of 217.94 feet to a point;
6. Thence N 72°-45'-22" E, a distance of 373.92 feet to a point on the westerly highway boundary of the Hamburg Turnpike as acquired by the New York State Department of Transportation under S. H. No. FAC 49-10 Map 305, Parcel 306 and recorded in the Erie County Clerk's Office in Liber 10960 of Deeds at page 2028; thence southerly along said westerly highway boundary the following 19 courses and distances;

1. Thence S 03°-16'-37" W, a distance of 188.27 feet to a point;
2. Thence S 03°-54'-17" W, a distance of 687.46 feet to the point of curvature of a tangent curve;
3. Thence along a curve to the right having a radius of 8,149.13 feet, an arc length of 144.86 feet to a point;
4. Thence S 04°-55'-24" W, a distance of 35.83 feet to a point;
5. Thence S 85°-04'-36" W, a distance of 9.84 feet to a point;
6. Thence S 05°-13'-45" W, a distance of 200.60 feet to a point;
7. Thence S 05°-20'-02" W, a distance of 110.00 feet to a point;
8. Thence S 00°-45'-26" W, a distance of 110.27 feet to a point;
9. Thence S 05°-20'-02" W, a distance of 220.00 feet to a point;
10. Thence S 05°-01'-28" W, a distance of 365.00 feet to a point;
11. Thence S 85°-13'-34" E, a distance of 5.00 feet to a point;

12. Thence S 04°-17'-11" W, a distance of 67.00 feet to a point;
13. Thence S 06°-15'-26" W, a distance of 248.08 feet to a point;
14. Thence S 03°-29'-18" W, a distance of 52.01 feet to a point;
15. Thence S 05°-06'-49" W, a distance of 133.00 feet to a point;
16. Thence S 85°-13'-34" W, a distance of 1.00 feet to a point;
17. Thence S 05°-06'-49" W, a distance of 45.00 feet to a point;
18. Thence S 85°-13'-34" W, a distance of 7.00 feet to a point;
19. Thence S 05°-06'-49" W, a distance of 90.00 feet to the point of beginning, containing 47.18 acres of land more or less.

Being part of the piece or parcel of land in a bargain and sale deed dated 5/06/2003 and recorded 5/22/2003 in Liber 11040 of Deeds at page 8953 in the Erie County Clerk's Office. This parcel of land is part of the overall deed.

PARCEL B

ALL THAT TRACT OR PARCEL OF LAND situated in the City of Lackawanna, County of Erie and State of New York, being part of lots 18, 20 and 21 of the Ogden Gore Tract and part of Lot 24, Township 10, Range 8 of the Buffalo Creek Reservation, bounded and described as follows:

Commencing at the intersection of the westerly highway boundary of the Hamburg Turnpike (also known as State Route No. 5) as appropriated by the New York State Department of Public Works as shown on Map No. 1, Parcel 1 and recorded in the Erie County Clerk's Office in Liber 5650 of Deeds at page 404 and the municipal boundary line between the City of Lackawanna (to the north) and the Town of Hamburg (to the south). Said point also being along the northerly boundary of lands conveyed to the South Buffalo Railway Company by deed recorded in the Erie County Clerk's Office in Liber 10119 of Deeds at page 131; thence N 86°-32'-54" W along said municipal boundary line and the northerly line of said South Buffalo Railway Company's land, a distance of 507.02 feet to a point; thence N 56°-55'-40" W and continuing along said South Buffalo Railway Company's land, a distance of 386.48 feet to a point; thence N 03°-25'-27" W, a distance of 1,284.41 feet to a point of curvature of a tangent curve; thence along a curve to the left having a radius of 518.00 feet, an arc length of 168.84 feet to a point approximately 25 feet south from the existing southerly top of the high bank of Smokes Creek; thence N 30°-20'-56" E, crossing Smokes Creek, a distance of 395.96 feet to a point approximately 25 feet north from the existing northerly top of high bank of Smokes Creek and the principal point of beginning; thence N 18°-20'-36" W, a distance of 3,292.99 feet to a point; thence S 71°-34'-47" W, a distance of 93.00 feet to a point; thence N 18°-20'-36" W, a distance of 214.85 feet to a point on the southerly line of lands conveyed to Gateway Trade Center Inc. By deed recorded in the Erie County Clerk's Office in Liber 10886 of Deeds at page 1064; thence N 71°-41'-32" E, and along the southerly line of lands so conveyed to Gateway Trade Center, Inc. by deed aforesaid, a distance of 28.04 feet to a southeast corner thereof; thence N 71°-11'-53" E, a distance of 86.73 feet to a point; thence N 71°-31'-33" E, a distance of 1,251.00 feet to a point on the westerly highway boundary of Hamburg Turnpike as appropriated by the New York State Department of Public works as shown on Map No. 40-R2, Parcel 44 and recorded in the Erie County Clerk's Office in Liber 5650 of Deeds at page 388; thence southerly along the westerly highway boundary of the Hamburg Turnpike the following 4 courses and distances:

20. Thence S 20°-45'-14" E, a distance of 129.67 feet to a point;
21. Thence S 22°-43'-04" E, a distance of 272.45 feet to a point;

22. Thence S 18°-25'-27" E, a distance of 1,965.57 feet to the point of curvature of a non-tangent curve;
23. Thence along a curve to the right, having a radius of 3,226.70 feet, an arc length of 677.61 feet to a point which is approximately 25 feet north from the existing northerly top of high bank of Smokes Creek;

Thence westerly and southerly, approximately 25 feet north from the existing northerly top of the high bank of Smokes Creek the following 5 courses and distances;

24. Thence S 75°-24'-22" W, a distance of 420.71 feet to a point;
25. Thence S 52°-31'-09" W, a distance of 145.07 feet to a point;
26. Thence S 00°-25'-31" W, a distance of 225.66 feet to a point;
27. Thence S 14°-36'-37" W, a distance of 317.80 feet to a point;
28. Thence S 74°-29'-02" W, a distance of 360.63 feet to the principal point of beginning, containing 95.42 acres of land, more or less.

Being part of the piece or parcel of land in a bargain and sale deed dated 5/06/2003 and recorded 5/22/2003 in Liber 11040 of Deeds at page 8953 in the Erie County Clerk's Office. This parcel of land is part of the overall deed.

SUBSTATIONS EXCEPTED OUT OF EASEMENT AREA

Substation 10A
Commencing at the principal point of beginning of the Environmental Easement Business Park Phase II, Parcel "B";
Thence N 18°-50'-22" W, a distance of 457.40 feet to the point of beginning;
Thence N 18°-24'-23" W, a distance of 225.00 feet to a point;
Thence N 71°-35'-37" E, a distance of 188.17 feet to a point;
Thence S 18°-24'-23" E, a distance of 225.00 feet to a point;
Thence S 71°-35'-37" W, a distance of 188.17 feet to the point of beginning.
Containing 0.97 Acres of land, more or less.

Substation 11A
Commencing at the northwest corner of the Environmental Easement Parcel "B";
Thence S 33°-30'-30" E, a distance of 558.31 feet to the point of beginning;
Thence N 71°-48'-41" E, a distance of 112.00 feet to a point;
Thence S 20°-04'-28" E, a distance of 146.00 feet to a point;
Thence S 71°-48'-41" W, a distance of 112.00 feet to a point;
Thence N 20°-04'-28" W, a distance of 146.00 feet to the point of beginning.
Containing 0.38 Acres of land, more or less.

AFFIDAVIT OF SERVICE BY MAIL

STATE OF NEW YORK)
COUNTY OF ERIE) ss:

Michael L. Nisengard, being duly sworn, deposes and says: I am an attorney at the law firm of Harter Secrest & Emery LLP, Twelve Fountain Plaza, Suite 400, Buffalo, NY 14202. On the 18th day of July, 2014, I mailed by certified mail with return receipt requested, a copy of the attached Notice to the City of Lackawanna and County of Erie, such Notice enclosing a copy of the Environmental Easement, all as attached hereto as Exhibit "A" by depositing same enclosed in a postpaid properly addressed wrapper via Certified Mail, Return-Receipt Requested in a post office under the exclusive care and custody of the United States Postal Service within the State of New York. Attached hereto as Exhibit "B" are copies of the certified mail receipts.

Michael L. Nisengard

Sworn to before me on this
4th day of August 2014.

Notary Public

LISA K. SCHWEICKERT
Notary Public, State of New York
Qualified in Wyoming County
Commission Expires June 7, 2016

EXHIBIT A

Harter Secrest & Emery LLP
ATTORNEYS AND COUNSELORS
WWW.HSELAW.COM

July 17, 2014

City of Lackawanna
714 Ridge Road
Lackawanna New York, 14218

County Executive, County of Erie
Edward A. Rath County Office Building
95 Franklin Street, 16th Floor
Buffalo, New York 14202

Re: Environmental Easement

Dear Sir or Madam:

Attached please find a copy of an environmental easement granted to the New York State Department of Environmental Conservation ("DEC") by Tecumseh Redevelopment Inc. for a portion of the property located at 2303 Hamburg Turnpike, Hamburg, NY, and including DEC Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, C915198L (collectively, the "Sites"). This environmental easement has been filed in the Erie County Clerk's Office on July 15, 2014 in Liber 11266 of Deeds at page 5455.

The Sites are being remediated under the oversight of the New York State Department of Environmental Conservation (the "DEC") under the Brownfield Cleanup Program. The Sites were historically used for industrial operations. Remaining environmental contamination remediation at the Sites will be managed under a DEC-approved Site Management Plan, which requires, among other items described below, the recording of an Environmental Easement restricting future use of the Sites.

This Environmental Easement restricts future use of the above-referenced property to restricted commercial or industrial uses. It also requires compliance with a Site Management Plan, a copy of which is on file with the DEC. The Site Management Plan, which is incorporated into the Environmental Easement, requires maintenance of engineered controls to isolate remaining contaminated soils, monitoring and maintenance of on-site wells, and notices to DEC in advance of certain listed activities. Any approved activity must be done in accordance with the Site Management Plan. DEC approval is also required prior to any groundwater use.

Article 71, Section 71-3607 of the New York State Environmental Conservation Law requires that:

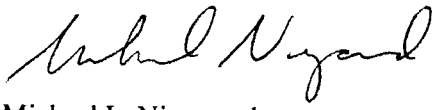
1. Whenever the department is granted an environmental easement, it shall provide each affected local government with a copy of such easement and shall also provide a copy of any documents modifying or terminating such environmental easement.

TWELVE FOUNTAIN PLAZA, SUITE 400 BUFFALO, NY 14202-2293 PHONE: 716.853.1616 FAX: 716.853.1617
ROCHESTER, NY • BUFFALO, NY • ALBANY, NY • CORNING, NY

2. Whenever an affected local government receives an application for a building permit or any other application affecting land use or development of land that is subject to an environmental easement and that may relate to or impact such easement, the affected local government shall notify the department and refer such application to the department. The department shall evaluate whether the application is consistent with the environmental easement and shall notify the affected local government of its determination in a timely fashion, considering the time frame for the local government's review of the application. The affected local government shall not approve the application until it receives approval from the department.

An electronic version of every environmental easement that has been accepted by this DEC is available to the public at: http://www.dec.ny.gov/cfmx/extapps/derfoil/index.cfm?pageid. If you have any questions or comments regarding this matter, please do not hesitate to contact me.

Very truly yours,
Harter Secrest & Emery LLP



Michael L. Nisengard
Associate
DIRECT DIAL: (716) 844-3715
E-MAIL: MNISENGARD@HSELAW.COM

MLN:dmm

FILED
JUL 15 2014
COUNTY CLERK'S OFFICE
ERIE

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L

Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 21th day of June, 2014 between Owner(s) Tecumseh Redevelopment Inc., having an office at 4020 Kinross Lakes Parkway, County of Summit, State of Ohio (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 2303 Hamburg Turnpike in the City of Lackawanna, County of Erie and State of New York, known and designated on the tax map of the County Clerk of Erie as tax map parcel numbers: Section 141.11 Block 1 Lot 50, being a portion of that certain plot, piece or parcel of land conveyed to Grantor by deed dated May 6, 2003 and recorded in the Erie County Clerk's Office in Liber 11040 and Page 8953. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 141.25 +/- acres, and is hereinafter more fully described in the Land Title Survey, which includes parcels recognized under Brownfield Cleanup Agreement Amendments dated August 22, 2012 ("Sites"), dated September 14, 2012, field survey completed June 12, 2012 and prepared by Wendel, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

[10/12]

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: B9-0696-05-06(B), Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Erie County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

[10/12]

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5 the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a

defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Site within the Controlled Property on or about which the violation pertains.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to: Site Numbers: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L

Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.
[10/12]

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Grantor: Tecumseh Redevelopment Inc.

By: Keith A. Nagel

Print Name: Keith A. Nagel

Title: VP - Envir Affairs & Real Estate Date: May 21, 2014

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

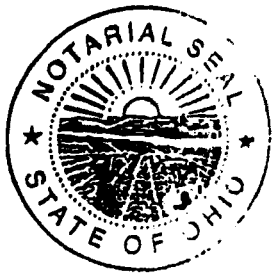
Grantor's Acknowledgment

STATE OF ~~NEW YORK~~ Ohio)
) ss:
COUNTY OF Summit)

On the 29th day of May, in the year 20 14, before me, the undersigned, personally appeared Keith Nigel, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public - State of ~~New York~~ Ohio

Commission expires: Nov. 6, 2017



County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 26th day of June, in the year 2014, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 20

[10/12]

County: Erie Site Nos: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, and C915198L
Brownfield Cleanup Agreement Number: B9-0696-05-06(B)

SCHEDULE "A" PROPERTY DESCRIPTION

PARCEL A

ALL THAT TRACT OR PARCEL OF LAND situate in the City of Lackawanna, County of Erie and State of New York, being part of Lot 15 of the Ogden Gore Tract and part of Lot 23, Township 10, Range 8 of the Buffalo Creek Reservation, described as follows:

Beginning at the intersection of the westerly highway boundary of the Hamburg Turnpike (also known as State Route No. 5) as appropriated by the New York State Department of Public Works as shown on Map No. 1, Parcel 1 and recorded in the Erie County Clerk's Office in Liber 5650 of Deeds at Page 404 and the municipal boundary line between the City of Lackawanna (to the north) and the Town of Hamburg (to the south), said point also being along the northerly boundary of lands conveyed to the South Buffalo Railway company by deed recorded in the Erie County Clerk's Office in Liber 10119 of Deeds at Page 131; running thence N 86°-32'-54" W along the northerly line of said South Buffalo Railway Company's land, a distance of 507.02 feet to an angle point therein; Thence N 56°-55'-40" W, and continuing along said South Buffalo Railway Company's land a distance of 386.48 feet to a point; thence N 03°-25'-27" W, a distance of 1,284.41 feet to a point of curvature of a tangent curve; thence along a curve to the left having a radius of 518.00 feet, an arc length of 168.84 feet to a point approximately 25 feet south from the existing southerly top of high bank of Smokes Creek; thence easterly and northerly approximately 25 feet south from the existing southerly top of the high bank of Smokes Creek the following 6 courses and distances;

1. Thence N 80°-39'-39" E, a distance of 37.52 feet to a point;
2. Thence N 44°-31'-00" E, a distance of 261.86 feet to a point;
3. Thence N 71°-51'-20" E, a distance of 455.12 feet to a point;
4. Thence N 20°-01'-37" E, a distance of 360.67 feet to a point;
5. Thence N 03°-49'-42" E, a distance of 217.94 feet to a point;
6. Thence N 72°-45'-22" E, a distance of 373.92 feet to a point on the westerly highway boundary of the Hamburg Turnpike as acquired by the New York State Department of Transportation under S. H. No. FAC 49-10 Map 305, Parcel 306 and recorded in the Erie County Clerk's Office in Liber 10960 of Deeds at page 2028; thence southerly along said westerly highway boundary the following 19 courses and distances;

1. Thence S 03°-16'-37" W, a distance of 188.27 feet to a point;
2. Thence S 03°-54'-17" W, a distance of 687.46 feet to the point of curvature of a tangent curve;
3. Thence along a curve to the right having a radius of 8,149.13 feet, an arc length of 144.86 feet to a point;
4. Thence S 04°-55'-24" W, a distance of 35.83 feet to a point;
5. Thence S 85°-04'-36" W, a distance of 9.84 feet to a point;
6. Thence S 05°-13'-45" W, a distance of 200.60 feet to a point;
7. Thence S 05°-20'-02" W, a distance of 110.00 feet to a point;
8. Thence S 00°-45'-26" W, a distance of 110.27 feet to a point;
9. Thence S 05°-20'-02" W, a distance of 220.00 feet to a point;
10. Thence S 05°-01'-28" W, a distance of 365.00 feet to a point;
11. Thence S 85°-13'-34" E, a distance of 5.00 feet to a point;

[10/12]

12. Thence S 04°-17'-11" W, a distance of 67.00 feet to a point;
13. Thence S 06°-15'-26" W, a distance of 248.08 feet to a point;
14. Thence S 03°-29'-18" W, a distance of 52.01 feet to a point;
15. Thence S 05°-06'-49" W, a distance of 133.00 feet to a point;
16. Thence S 85°-13'-34" W, a distance of 1.00 feet to a point;
17. Thence S 05°-06'-49" W, a distance of 45.00 feet to a point;
18. Thence S 85°-13'-34" W, a distance of 7.00 feet to a point;
19. Thence S 05°-06'-49" W, a distance of 90.00 feet to the point of beginning, containing 47.18 acres of land more or less.

Being part of the piece or parcel of land in a bargain and sale deed dated 5/06/2003 and recorded 5/22/2003 in Liber 11040 of Deeds at page 8953 in the Erie County Clerk's Office. This parcel of land is part of the overall deed.

PARCEL B

ALL THAT TRACT OR PARCEL OF LAND situated in the City of Lackawanna, County of Erie and State of New York, being part of lots 18, 20 and 21 of the Ogden Gore Tract and part of Lot 24, Township 10, Range 8 of the Buffalo Creek Reservation, bounded and described as follows:

Commencing at the intersection of the westerly highway boundary of the Hamburg Turnpike (also known as State Route No. 5) as appropriated by the New York State Department of Public Works as shown on Map No. 1, Parcel 1 and recorded in the Erie County Clerk's Office in Liber 5650 of Deeds at page 404 and the municipal boundary line between the City of Lackawanna (to the north) and the Town of Hamburg (to the south). Said point also being along the northerly boundary of lands conveyed to the South Buffalo Railway Company by deed recorded in the Erie County Clerk's Office in Liber 10119 of Deeds at page 131; thence N 86°-32'-54" W along said municipal boundary line and the northerly line of said South Buffalo Railway Company's land, a distance of 507.02 feet to a point; thence N 56°-55'-40" W and continuing along said South Buffalo Railway Company's land, a distance of 386.48 feet to a point; thence N 03°-25'-27" W, a distance of 1,284.41 feet to a point of curvature of a tangent curve; thence along a curve to the left having a radius of 518.00 feet, an arc length of 168.84 feet to a point approximately 25 feet south from the existing southerly top of the high bank of Smokes Creek; thence N 30°-20'-56" E, crossing Smokes Creek, a distance of 395.96 feet to a point approximately 25 feet north from the existing northerly top of high bank of Smokes Creek and the principal point of beginning; thence N 18°-20'-36" W, a distance of 3,292.99 feet to a point; thence S 71°-34'-47" W, a distance of 93.00 feet to a point; thence N 18°-20'-36" W, a distance of 214.85 feet to a point on the southerly line of lands conveyed to Gateway Trade Center Inc. By deed recorded in the Erie County Clerk's Office in Liber 10886 of Deeds at page 1064; thence N 71°-41'-32" E, and along the southerly line of lands so conveyed to Gateway Trade Center, Inc. by deed aforesaid, a distance of 28.04 feet to a southeast corner thereof; thence N 71°-11'-53" E, a distance of 86.73 feet to a point; thence N 71°-31'-33" E, a distance of 1,251.00 feet to a point on the westerly highway boundary of Hamburg Turnpike as appropriated by the New York State Department of Public works as shown on Map No. 40-R2, Parcel 44 and recorded in the Erie County Clerk's Office in Liber 5650 of Deeds at page 388; thence southerly along the westerly highway boundary of the Hamburg Turnpike the following 4 courses and distances:

20. Thence S 20°-45'-14" E, a distance of 129.67 feet to a point;
21. Thence S 22°-43'-04" E, a distance of 272.45 feet to a point;

22. Thence S 18°-25'-27" E, a distance of 1,965.57 feet to the point of curvature of a non-tangent curve;
23. Thence along a curve to the right, having a radius of 3,226.70 feet, an arc length of 677.61 feet to a point which is approximately 25 feet north from the existing northerly top of high bank of Smokes Creek;

Thence westerly and southerly, approximately 25 feet north from the existing northerly top of the high bank of Smokes Creek the following 5 courses and distances;

24. Thence S 75°-24'-22" W, a distance of 420.71 feet to a point;
25. Thence S 52°-31'-09" W, a distance of 145.07 feet to a point;
26. Thence S 00°-25'-31" W, a distance of 225.66 feet to a point;
27. Thence S 14°-36'-37" W, a distance of 317.80 feet to a point;
28. Thence S 74°-29'-02" W, a distance of 360.63 feet to the principal point of beginning, containing 95.42 acres of land, more or less.

Being part of the piece or parcel of land in a bargain and sale deed dated 5/06/2003 and recorded 5/22/2003 in Liber 11040 of Deeds at page 8953 in the Erie County Clerk's Office. This parcel of land is part of the overall deed.

SUBSTATIONS EXCEPTED OUT OF EASEMENT AREA

Substation 10A
Commencing at the principal point of beginning of the Environmental Easement Business Park Phase II, Parcel "B";
Thence N 18°-50'-22" W, a distance of 457.40 feet to the point of beginning;
Thence N 18°-24'-23" W, a distance of 225.00 feet to a point;
Thence N 71°-35'-37" E, a distance of 188.17 feet to a point;
Thence S 18°-24'-23" E, a distance of 225.00 feet to a point;
Thence S 71°-35'-37" W, a distance of 188.17 feet to the point of beginning.
Containing 0.97 Acres of land, more or less.

Substation 11A
Commencing at the northwest corner of the Environmental Easement Parcel "B";
Thence S 33°-30'-30" E, a distance of 558.31 feet to the point of beginning;
Thence N 71°-48'-41" E, a distance of 112.00 feet to a point;
Thence S 20°-04'-28" E, a distance of 146.00 feet to a point;
Thence S 71°-48'-41" W, a distance of 112.00 feet to a point;
Thence N 20°-04'-28" W, a distance of 146.00 feet to the point of beginning.
Containing 0.38 Acres of land, more or less.

TP-584 (4/13)

New York State Department of Taxation and Finance

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

Recording office time stamp

See Form TP-584-I, Instructions for Form TP-584, before completing this form. Print or type.

Schedule A – Information relating to conveyance

Grantor/Transferor

☐ Individual
☒ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Other

Name *(if individual, last, first, middle initial)* (☐ *check if more than one grantor*): Tecumseh Redevelopment, Inc.

Social security number:

Mailing address: 4020 Kinross Lakes Parkway

Social security number:

City: Richfield | State: OH | ZIP code: 44286

Federal EIN: 01-0649791

Single member's name if grantor is a single member LLC *(see instructions)*:

Single member EIN or SSN:

Grantee/Transferee

☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☒ Other

Name *(if individual, last, first, middle initial)* (☐ *check if more than one grantee*): The People of the State of New York, acting through their Commissioner of the Department of Environmental Conservation

Social security number:

Mailing address: 625 Broadway

Social security number:

City: Albany | State: NY | ZIP code: 12233

Federal EIN: 14-6013200

Single member's name if grantee is a single member LLC *(see instructions)*:

Single member EIN or SSN:

Location and description of property conveyed

Tax map designation – Section, block & lot *(include dots and dashes)*	SWIS code (six digits)	Street address	City, town, or village	County
141.11-1-50	140900	2303 Hamburg Tumpike	Lackawanna	Erie

Type of property conveyed *(check applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☐ Vacant land
5 ☒ Commercial/Industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☐ Other _____

Date of conveyance: 06 (month) | 26 (day) | 2014 (year)

Percentage of real property conveyed which is residential real property 0 % *(see instructions)*

Condition of conveyance *(check all that apply)*

a. ☐ Conveyance of fee interest
b. ☐ Acquisition of a controlling interest (state percentage acquired _____ %)
c. ☐ Transfer of a controlling interest (state percentage transferred _____ %)
d. ☐ Conveyance to cooperative housing corporation
e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*
f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*
g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*
h. ☐ Conveyance of cooperative apartment(s)
i. ☐ Syndication
j. ☐ Conveyance of air rights or development rights
k. ☐ Contract assignment
l. ☐ Option assignment or surrender
m. ☐ Leasehold assignment or surrender
n. ☐ Leasehold grant
o. ☐ Conveyance of an easement
p. ☒ Conveyance for which exemption from transfer tax claimed *(complete Schedule B, Part III)*
q. ☐ Conveyance of property partly within and partly outside the state
r. ☐ Conveyance pursuant to divorce or separation
s. ☒ Other *(describe)* Environmental Easement Pursuant to ECL Art. 71 Title 36

For recording officer's use	Amount received	Date received	Transaction number
	Schedule B., Part I $ _____ Schedule B., Part II $		

Schedule B – Real estate transfer tax return (Tax Law, Article 31)

Part I – Computation of tax due

1	Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, check the exemption claimed box, enter consideration and proceed to Part III)* ☒ **Exemption claimed**	1.	0 00
2	Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)*	2.	0 00
3	Taxable consideration *(subtract line 2 from line 1)*	3.	0 00
4	Tax: $2 for each $500, or fractional part thereof, of consideration on line 3	4.	
5	Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1, Schedule G)*	5.	
6	Total tax due* *(subtract line 5 from line 4)*	6.	0 00

Part II – Computation of additional tax due on the conveyance of residential real property for $1 million or more

1	Enter amount of consideration for conveyance *(from Part I, line 1)*	1.	0 00
2	Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in Schedule A)*	2.	
3	Total additional transfer tax due* *(multiply line 2 by 1% (.01))*	3.	0 00

Part III – Explanation of exemption claimed on Part I, line 1 *(check any boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, the state of New York, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) ..... a ☒

b. Conveyance is to secure a debt or other obligation ..... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance ..... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts ..... d ☒

e. Conveyance is given in connection with a tax sale ..... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F ..... f ☐

g. Conveyance consists of deed of partition ..... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act ..... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property ..... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment ..... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, section 1401(e) *(attach documents supporting such claim)* ..... k ☐

*The total tax (from Part I, line 6 and Part II, line 3 above) is due within 15 days from the date conveyance. Please make check(s) payable to the county clerk where the recording is to take place. If the recording is to take place in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, make check(s) payable to the ***NYC Department of Finance.*** If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance,*** directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

Schedule C – Credit Line Mortgage Certificate (Tax Law, Article 11)

Complete the following only if the interest being transferred is a fee simple interest.
I (we) certify that: *(check the appropriate box)*

1. ☒ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:
   - ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.
   - ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).
   - ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.
   - ☐ The maximum principal amount secured by the credit line mortgage is $3,000,000 or more, and the real property being sold or transferred is not principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

     Please note: for purposes of determining whether the maximum principal amount secured is $3,000,000 or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.
   - ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:
   - ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.
   - ☐ A check has been drawn payable for transmission to the credit line mortgagee or his agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in _____ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is _____. No exemption from tax is claimed and the tax of _____ is being paid herewith. *(Make check payable to county clerk where deed will be recorded or, if the recording is to take place in New York City but not in Richmond County, make check payable to the **NYC Department of Finance**.)*

Signature (both the grantor(s) and grantee(s) must sign)

The undersigned certify that the above information contained in schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of his/her knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

Tecumseh Redevelopment, Inc.

By: _____ Grantor signature — Vice President of Environmental Affairs and Real Estate — Title

New York State Department of Environmental Conservation

By: _____ Grantee signature — Bureau Chief — Title

NYSDEC

_____ Grantor signature — _____ Title

_____ Grantee signature — _____ Title

Reminder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you checked *e*, *f*, or *g* in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place or, if the recording is in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, to the ***NYC Department of Finance***? If no recording is required, send your check(s), made payable to the ***Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

Schedule D - Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, section 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part II, and check the second box under *Exemptions for nonresident transferor(s)/seller(s)* and sign at bottom.

Part I - New York State residents

If you are a New York State resident transferor(s)/seller(s) listed in Schedule A of Form TP-584 (or an attachment to Form TP-584), you must sign the certification below. If one or more transferors/sellers of the real property or cooperative unit is a resident of New York State, **each** resident transferor/seller must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

Certification of resident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law, section 663(a) upon the sale or transfer of this real property or cooperative unit.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Note: A resident of New York State may still be required to pay estimated tax under Tax Law, section 685(c), but not as a condition of recording a deed.

Part II - Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Schedule A of Form TP-584 (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law, section 663(c), check the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor(s)/seller(s), that transferor(s)/seller(s) is not required to pay estimated personal income tax to New York State under Tax Law, section 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form*. For more information, see *Payment of estimated personal income tax*, on page 1 of Form TP-584-I.

Exemption for nonresident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law, section 663 due to one of the following exemptions:

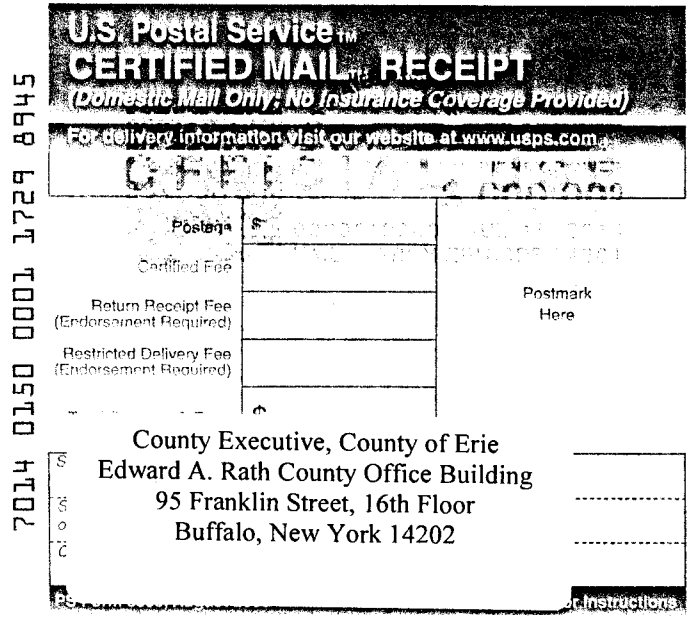
☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from _____ (Date) to _____ (Date) *(see instructions)*.

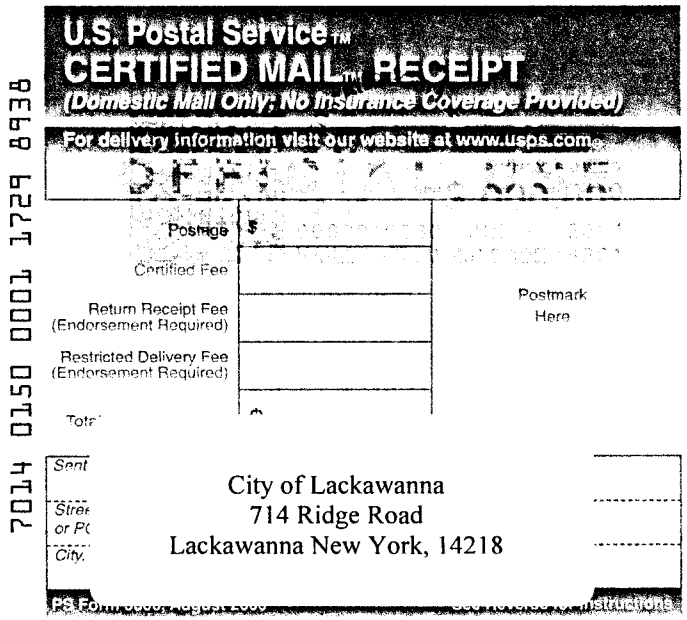
☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of the state of New York, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

EXHIBIT B





SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

County Executive, County of Erie
Edward A. Rath County Office Building
95 Franklin Street, 16th Floor
Buffalo, New York 14202

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X P. Palchi ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* P. PALADINO C. Date of Delivery 7-31

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7014 0150 0001 1729 8945

PS Form 3811 July 2013 Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

City of Lackawanna
714 Ridge Road
Lackawanna New York, 14218

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Rosanne Cay ☐ Agent ☐ Addre

B. Received by *(Printed Name)* C. Date of Del

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchar
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7014 0150 0001 1729 8938

PS Form 3811 July 2013 Domestic Return Receipt

AFFIDAVIT OF SERVICE BY MAIL

Michael L. Nisengard, being duly sworn, deposes and says: I am an attorney at the law firm of Harter Secrest & Emery LLP, Twelve Fountain Plaza, Suite 400, Buffalo, NY 14202. I mailed a copy of the attached Notice of Environmental Easement, which is attached hereto as "Exhibit A", to the parties listed on "Exhibit B" attached hereto, by certified mail with return receipt requested, copies of said slips are attached hereto as "Exhibit C". All parties listed on Exhibit "B" were notified by depositing a copy of the Notice of Environmental Easement in a postpaid addressed wrapper, in an official post office depository under the exclusive care and custody of the United States Post Office Department within the State of New York. Those mailings occurred on the 18th day of July, 2014.

Michael L. Nisengard

Sworn to before me on this
14th day of August 2014.

Notary Public

LISA K. SCHWEICKERT
Notary Public, State of New York
Qualified in Wyoming County
Commission Expires June 7, 2016

EXHIBIT A

NOTICE OF ENVIRONMENTAL EASEMENT

The New York State Department of Environmental Conservation (the "Grantee"), has been granted an Environmental Easement pursuant to Article 71, Section 36 affecting real property located at the following address:

2303 Hamburg Turnpike
Lackawanna, New York

Property Owner/Grantor: Tecumseh Redevelopment Inc.

The Tax Map Identification No.: 141.11-1-50

NYS Department of Environmental Conservation Site No.: C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, C915198L .

The Environmental Easement for the above referenced property has been filed in the Erie County Clerk's Office on July 15, 2014 in Liber 11266 of Deeds at page 5455.

The Environmental Easement contains institutional and/or engineering controls that run with the land. The Environmental Easement may restrict the use of the above referenced property to restricted Commercial and Industrial uses (residential, commercial or industrial).

NOTICE IS HEREBY GIVEN that any activity on the land which might or will prevent or interfere with the ongoing or completed remedial program, including the controls as set forth in the Environmental Easement and the Site Management Plan, must be done in accordance with the Site Management Plan which is incorporated by reference into the Environmental Easement. A copy of the Site Management Plan can be obtained by contacting the Department at derweb@gw.dec.state.ny.us. Be further advised of the notice provisions of NYCRR 375-1.11(d) relative to contemplated significant changes in use.

Failure to Comply with the terms and conditions of the Environmental Easement may subject violators to penalties of up to $37,500 per day for violation of 6 NYCRR 375-1.11(b).

An electronic version of this environmental easement has been accepted by the New York State Department of Environmental Conservation and is available to the public at: http://www.dec.ny.gov/chemical/36045.html.

EXHIBIT B

EASEMENT NOTICE ADDRESS LIST

Tecumseh Redevelopment Inc.
2303 Lackawanna Turnpike, Lackawanna, New York
Site No.: #C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, C915198L

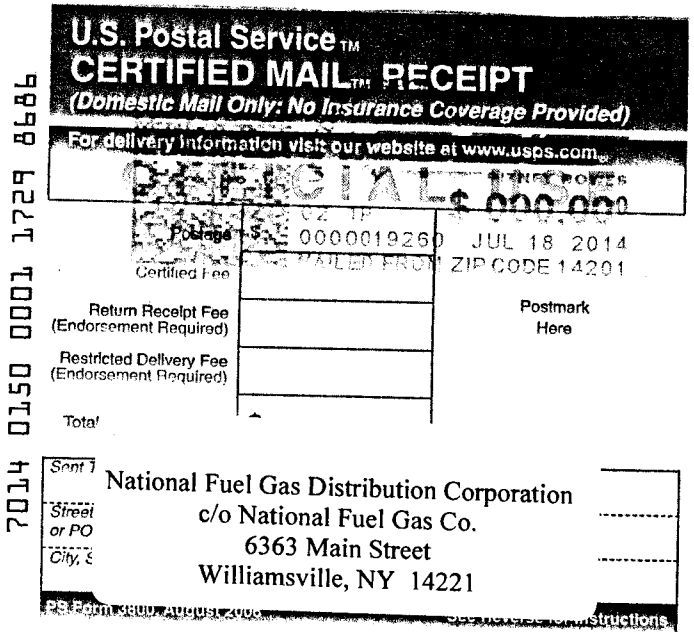
BQ Energy, LLC 47 S Hamilton Street Poughkeepsie, NY 12601	http://www.bqenergy.com/
City of Lackawanna 714 Ridge Road Lackawanna, NY 14218	http://www.lackawannany.gov/departments/city-clerk/
County Executive, County of Erie Edward A. Rath County Office Building 95 Franklin Street, 16th Floor Buffalo, New York 14202	http://www2.erie.gov/exec/index.php?q=office-information-0
Erie County Clerk's Office 92 Franklin Street Buffalo, NY 14202	http://www2.erie.gov/clerk/
Erie Wind, LLC 179 Lincoln Street # 500 Boston, MA 02111-2425	http://www.manta.com/c/mtbzbk2/erie-wind-llc
Great Lakes Industrial Development LLC 26 Mississippi Street Suite 400 Buffalo, NY 14203	http://www.dos.ny.gov/corps/bus_entity_search.html
KB Business Park Redevelopment LLC 4 Centre Drive Orchard Park, NY 14127	http://www.dos.ny.gov/corps/bus_entity_search.html
Niagara Mohawk Power Corporation 300 Erie Boulevard West Syracuse, NY 13202	http://www.dos.ny.gov/corps/bus_entity_search.html
Niagara Wind Power LLC 85 Wells Ave Suite 305 Newton, MA 02459	http://www.energyjustice.net/map/displaycorporation-7702.htm
Verizon New York, Inc. 140 West Street 20th Floor New York, NY 10007	http://www.dos.ny.gov/corps/bus_entity_search.html

EASEMENT NOTICE ADDRESS LIST

Tecumseh Redevelopment Inc.
2303 Lackawanna Turnpike, Lackawanna, New York
Site No.: #C915198, C915198B, C915198C, C915198D, C915198E, C915198F, C915198G, C915198H, C915198I, C915198J, C915198K, C915198L

Welded Tube USA Realty, LLC 111 Rayette Road Concord, Ontario, Canada L4K 2E9	http://www.yellowpages.ca/bus/Ontario/Concord/Welded-Tube-Of-Canada/2613233.html
National Fuel Gas Distribution Corp. 6363 Main Street Williamsville, NY 14221	http://www.dos.ny.gov/corps/bus_entity_search.html

EXHIBIT C



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National Fuel Gas Distribution Corporation
c/o National Fuel Gas Co.
6363 Main Street
Williamsville, NY 14221

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1. Article Addressed to:

National Fuel Gas Distribution Corporation
c/o National Fuel Gas Co.
6363 Main Street
Williamsville, NY 14221

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jerome Harris ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Jerome Harris
C. Date of Delivery 7/21/14

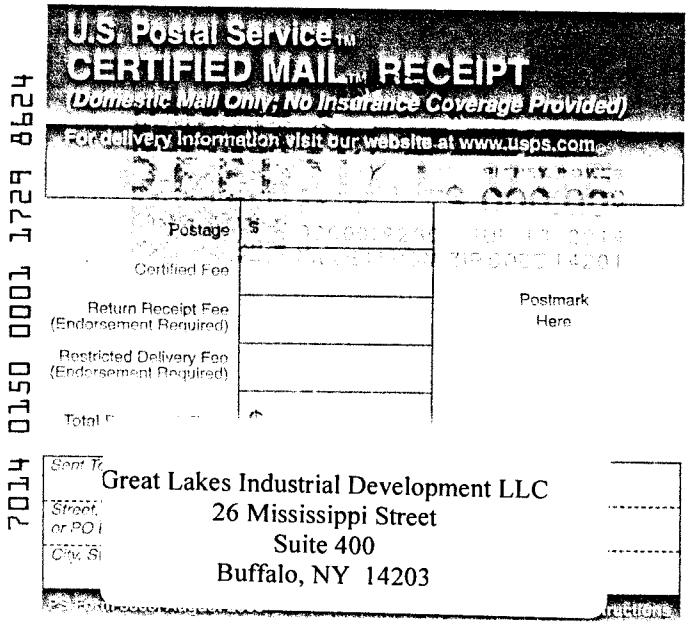
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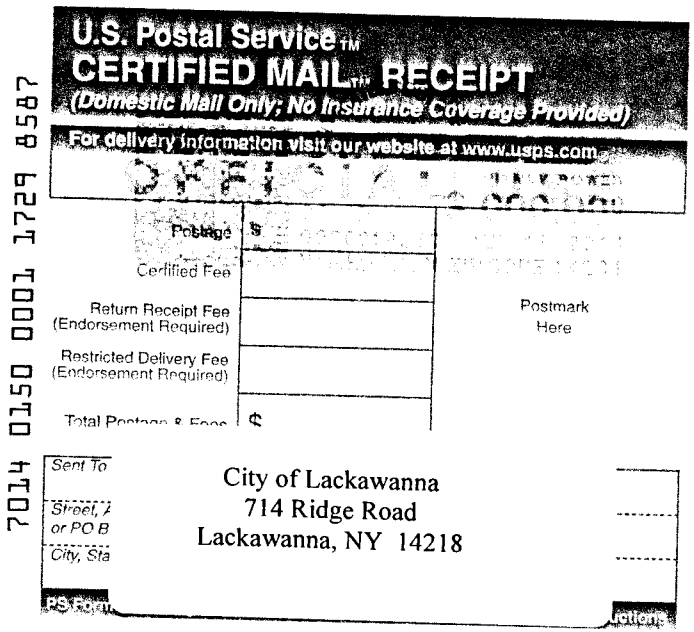
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1. Article Addressed to:

Great Lakes Industrial Development LLC
26 Mississippi Street
Suite 400
Buffalo, NY 14203

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Marie Carney C. Date of Delivery 7/31

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

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1. Article Addressed to:

City of Lackawanna
714 Ridge Road
Lackawanna, NY 14218

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Rosemarie Carney ☐ Agent ☐ Addre

B. Received by *(Printed Name)* C. Date of Del

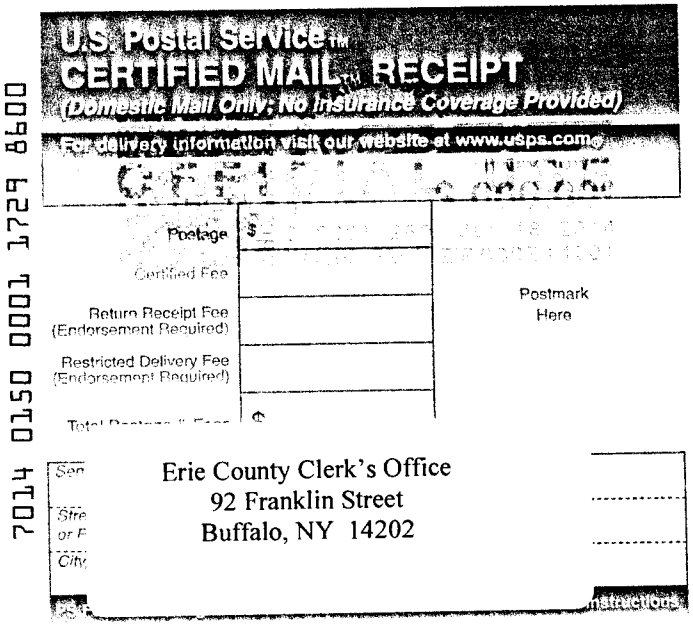
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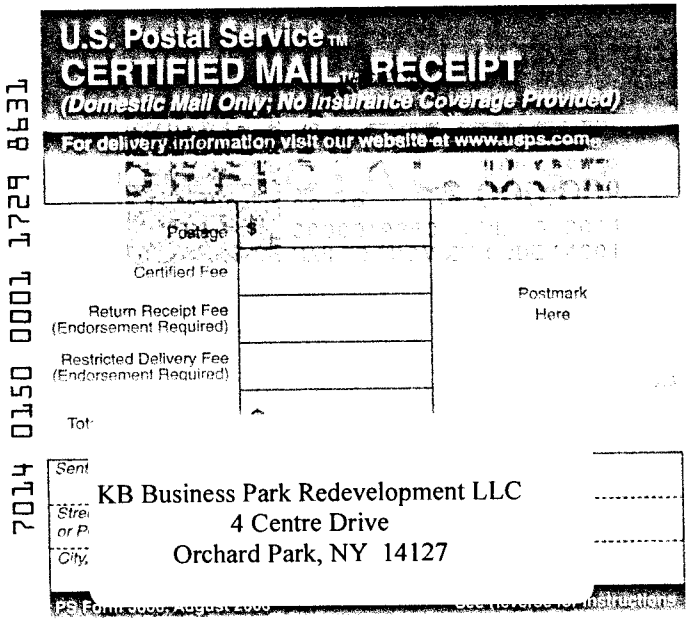
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1. Article Addressed to:

Erie County Clerk's Office
92 Franklin Street
Buffalo, NY 14202

COMPLETE THIS SECTION ON DELIVERY

A. Signature
x [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* T. Lindstedt C. Date of Delivery 7/24

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

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1. Article Addressed to:

KB Business Park Redevelopment LLC
4 Centre Drive
Orchard Park, NY 14127

COMPLETE THIS SECTION ON DELIVERY

A. Signature
x B. Rupple ☐ Agent ☐ Addre

B. Received by *(Printed Name)* B. Rupple C. Date of Del 7.21-14

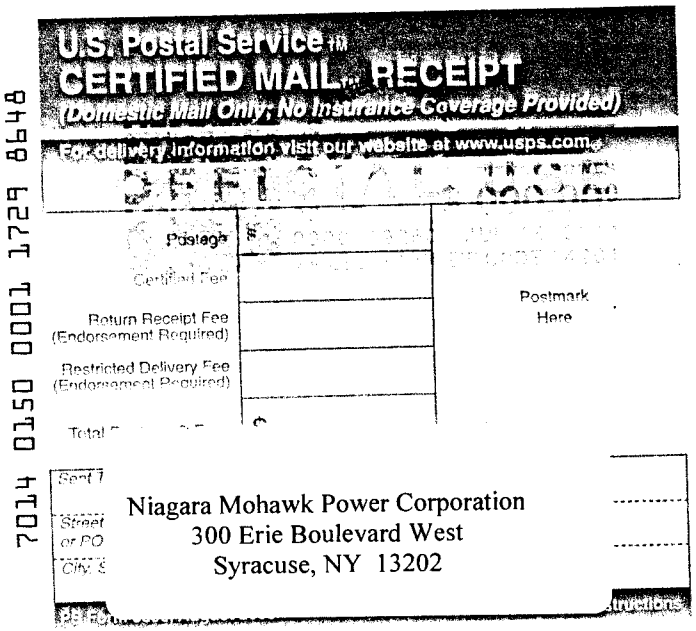
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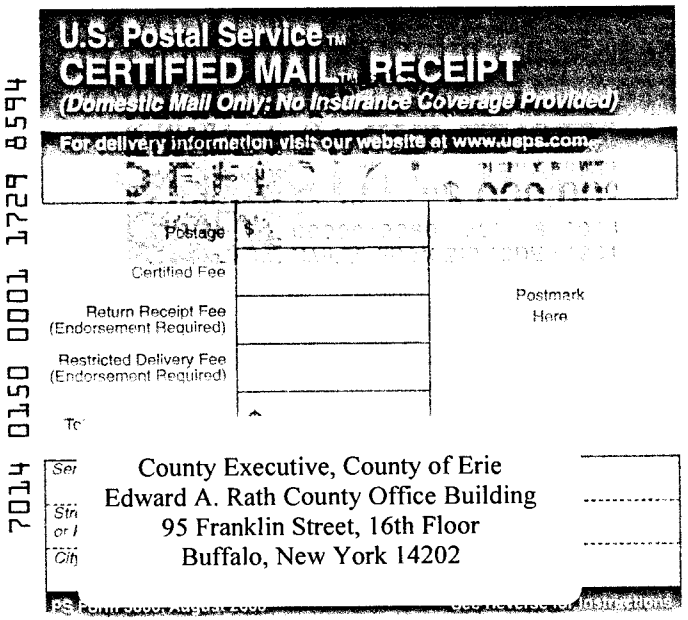
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4. Restricted Delivery? *(Extra Fee)* ☐ Yes

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1. Article Addressed to:

Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, NY 13202

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* [illegible] C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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4. Restricted Delivery? *(Extra Fee)* ☐ Yes

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1. Article Addressed to:

County Executive, County of Erie
Edward A. Rath County Office Building
95 Franklin Street, 16th Floor
Buffalo, New York 14202

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X P. Paladino ☐ Agent ☐ Addre

B. Received by *(Printed Name)* P. PALADINO C. Date of Del 9-4

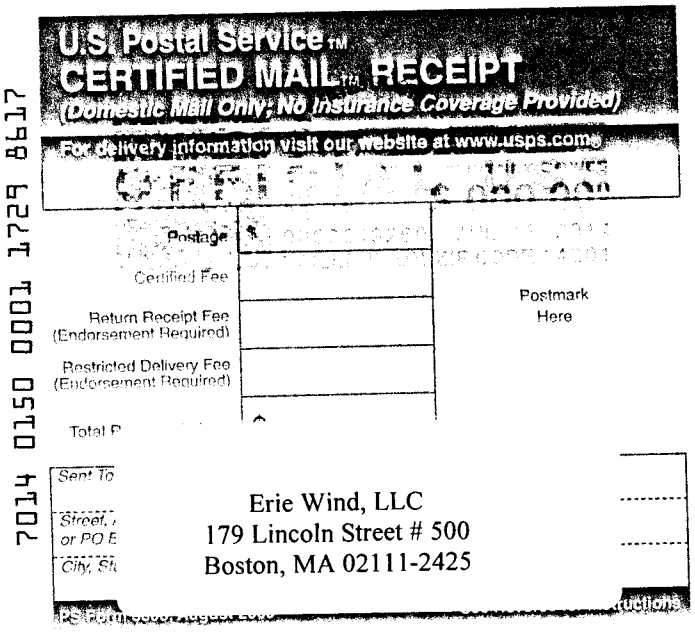
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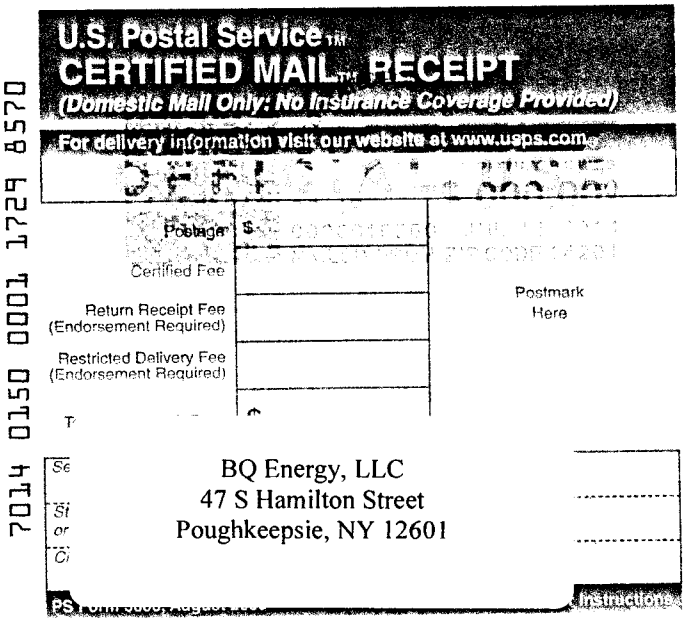
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☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7014 0150 0001 1729 8594

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1. Article Addressed to:

Erie Wind, LLC
179 Lincoln Street # 500
Boston, MA 02111-2425

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☒ Agent ☐ Addressee

B. Received by *(Printed Name)* GASpaff C. Date of Delivery 7/21/14

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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4. Restricted Delivery? *(Extra Fee)* ☐ Yes

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1. Article Addressed to:

BQ Energy, LLC
47 S Hamilton Street
Poughkeepsie, NY 12601

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☒ Agent ☐ Addressee

B. Received by *(Printed Name)* Kim Dowley C. Date of Delivery 7/21/14

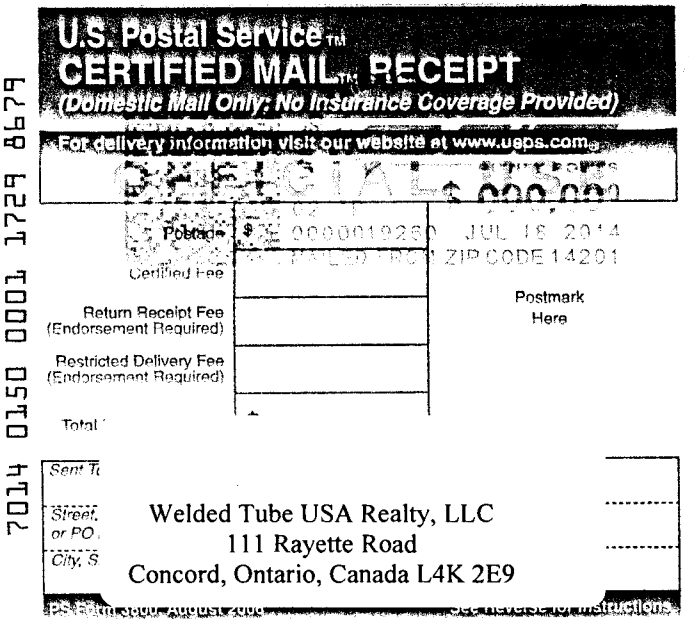
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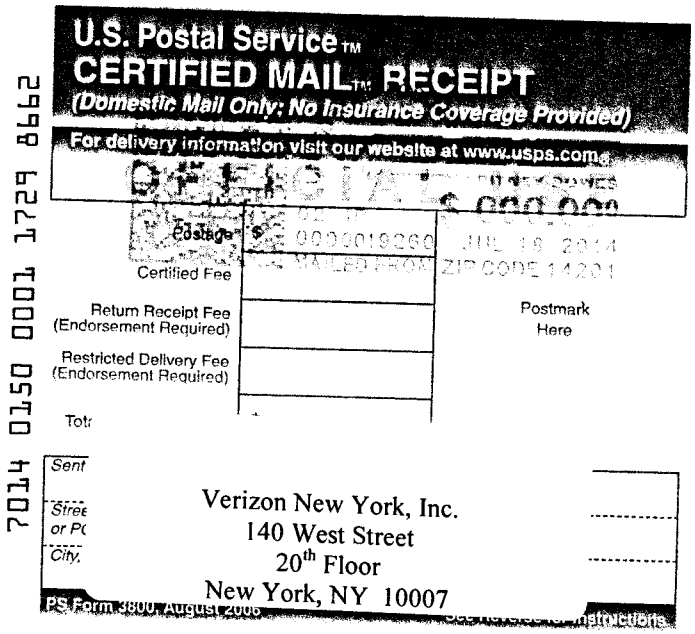
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4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7014 0150 0001 1729 8570

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1. Article Addressed to:

Welded Tube USA Realty, LLC
111 Rayette Road
Concord, Ontario, Canada L4K 2E9

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 23/07/14

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7014 0150 0001 1729 8679

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1. Article Addressed to:

Verizon New York, Inc.
140 West Street
20th Floor
New York, NY 10007

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addres

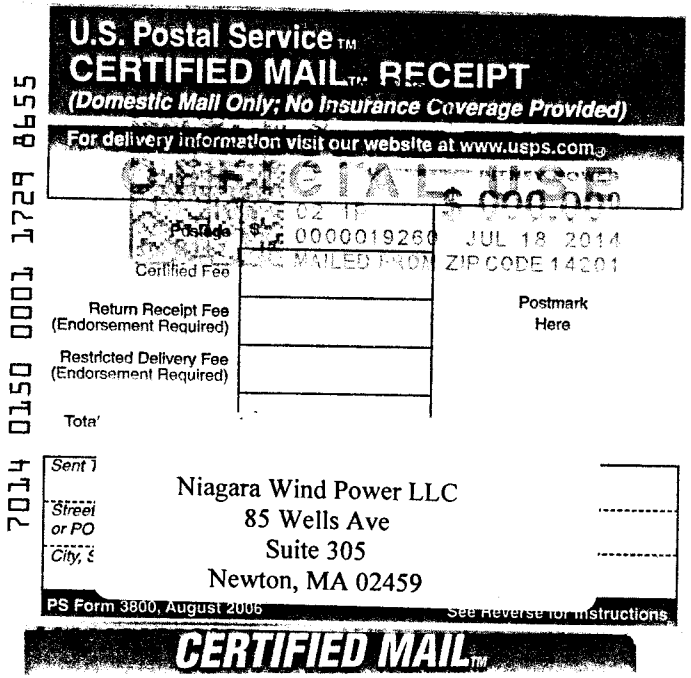
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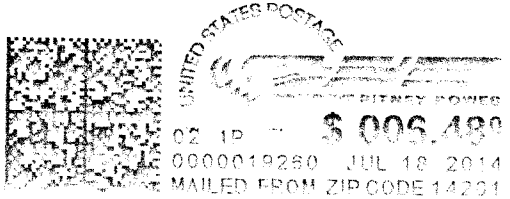
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HSE
Harter Secrest & Emery LLP
ATTORNEYS AND COUNSELORS
TWELVE FOUNTAIN PLAZA, SUITE 400 BUFFALO, NY 14202-2293



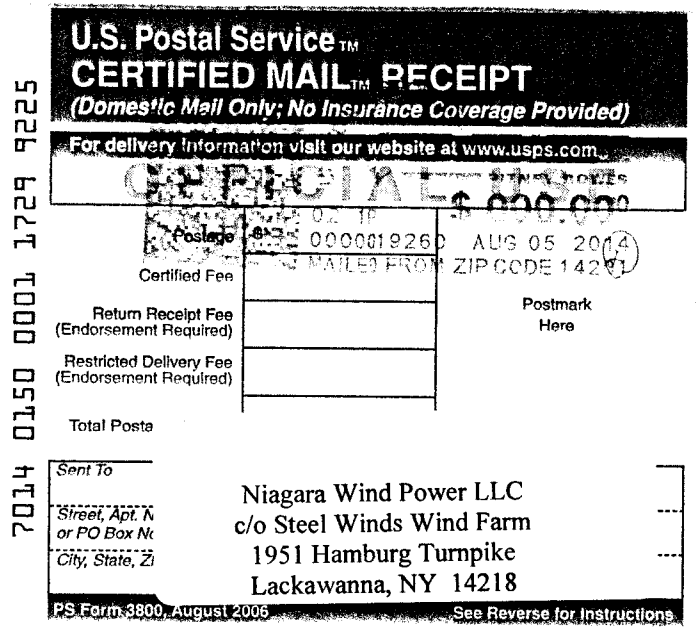


RTS

BUFF

Niagara Wind Power LLC
85 Wells Ave
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Newton,
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

02459321580
14202222200 BC: 14202222200 *1513-05425-18-40









HSE
Harter Secrest & Emery LLP
ATTORNEYS AND COUNSELORS
TWELVE FOUNTAIN PLAZA, SUITE 400 BUFFALO, NY 14202-2293

Niagara Wind Power LLC
c/o Steel Winds Wind Farm
1951 Hamburg Turnpike
Lackawanna, NY 14218

NIXIE 146 6E 1009 2208/12/14
RETURN TO SENDER
ATTEMPTED - NOT KNOWN
UNABLE TO FORWARD
BC: 14202222200 *1113-05804-05-39
14202@2222
14218104 6E

APPENDIX B

EXCAVATION WORK PLAN

BROWNFIELD CLEANUP PROGRAM

APPENDIX B
EXCAVATION WORK PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NUMBERS: C915198 through C915198L
LACKAWANNA, NEW YORK

December 2013
Revised July 2021

0071-012-322

Prepared By:

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

EXCAVATION WORK PLAN
TECUMSEH PHASE II BUSINESS PARK

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TECUMSEH PHASE II BUSINESS PARK

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1.0 INTRODUCTION

1.1 Purpose and Scope

This document is a required element of the remedial program for the New York State Brownfield Cleanup Program (BCP) Sites within and collectively comprising the property referred to as the "Tecumseh Phase II Business Park," located in City of Lackawanna, Erie County, New York (hereinafter referred to as the "Controlled Property" under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Controlled Property is comprised of an approximate 141-acre area bounded by the Tecumseh Phase I and IA Business Parks to the north; the South Buffalo Railroad Company to the south; Tecumseh Phase III Business Park and South Return Water Trench (SRWT) to the west; and Route 5 to the east (see Figures 1 and 2). As shown on Figure 2, the Controlled Property collectively includes Sites II-1 through II-12 (C915198 through C915198L).

This Excavation Work Plan (EWP) has been prepared by TurnKey Environmental Restoration, LLC (TurnKey) in accordance with NYSDEC Program Policy DER-10 (Ref. 1). An Interim EWP was followed during all ground intrusive activities conducted during site preparation work (e.g., excavation for utility lines, grading work performed in advance of cover placement, etc.) as remedial measures proceeded toward final cleanup and issuance of the Certificate of Completion (COC). In accordance with DER-10 Section 6.1(b)2, the Interim EWP was modified for post-remedial use and has been incorporated into this Excavation Work Plan component of the SMP.

1.2 Notification

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the Site Owner or their representative will notify the NYSDEC. Currently, this notification will be made to:

Mr. Andrew Zwack
Assistant Engineer
NYSDEC – Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

This notification will include:

- Depth of work to be performed; location of work; and areal extent.
- A detailed description of plans for re-grading, intrusive elements, or utilities to be installed below the soil cover; estimated volumes of contaminated soil to be excavated; and any work that may impact an existing engineering control. Appropriate locations for staging and stockpiling of non-impacted and impacted (if encountered) soil/fill materials will also be identified.
- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling.
- A schedule for the work, detailing the start and completion of all intrusive work.
- A summary of the applicable components of this EWP.
- A statement that the work will be performed in compliance with this EWP and 29CFR 1910.120.
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the Health and Safety Plan (HASP).
- Identification of disposal facilities for potential waste streams.
- Identification of sources of any anticipated backfill, along with all required analytical testing results.

2.0 SCREENING, SEGREGATION AND STOCKPILING

Requirements for screening, segregation, and stockpiling of excavated soil/fill materials are presented below. As further discussed in Section 3.0, all soil and fill excavated from the Site is to be treated as regulated contaminated material regardless of field evidence of impact. If any such material is removed from the Site it must be transported by a licensed hauler and either treated or disposed at a permitted facility in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations or reused, with NYSDEC pre-approval subject to a 6NYCRR Part 360 Beneficial Use Determination (BUD), at another regulated cleanup site having an Environmental Easement and Site Management Plan.

2.1 Soil Screening and Segregation Methods

Visual, olfactory, and/or instrument (photoionization detector or equivalent)-based, soil screening will be performed by a qualified environmental professional (QEP), as defined by NYSDEC in DER-10 Section 1.3(b)49, or a person under their supervision, during all intrusive activities, as necessary. Additionally, slag encountered will be further field-screened by an experienced technician using a Ludlum Model 2221 Ratemeter/Scaler with a sodium iodide scintillator (2x2 meter) or equivalent for gamma radiation due to its potential to contain technologically enhanced naturally occurring radioactive material (TENORM). Slag screening and TENORM evaluation are further discussed in Section 3.4.4.

Non-impacted soil/fill may be replaced in the excavation or reused on-site in accordance with Section 3.4. If field evidence of potentially impacted soil/fill is encountered during intrusive work, the NYSDEC Project Manager will be contacted, and the contractor will be directed to stockpile the material on polyethylene sheeting in an accessible location near the impacted area. The location of staged materials will be coordinated with the Site Owner but will remain within the same Site as the source to avoid administrative issues associated with import/export of these materials among differing BCP Sites. Field evidence of impact is defined as having readily identifiable visual or olfactory signs of contamination, including product, tars, or elevated photoionization detector (PID) readings (i.e., sustained readings >5 parts per million; ppm). All impacted soil/fill removal work will be directed by an experienced QEP. Removal and stockpiling will continue until visually impacted soil/fill is removed from the limits of the planned excavation or NYSDEC agrees that no further removal of soil/fill is required. If the impact extends beyond the proposed limits of the

excavation the Site Owner will be consulted and a plan for delineation and remediation of the remaining impacted material will be developed.

2.2 Stockpile Methods

Excavated soil/fill will be segregated, based on field screening and its status at the time of the excavation work, into material that can be reused as cover (i.e., if cover soil or NYSDEC approved-slag has been placed), non-impacted material that can be returned to the subsurface, and impacted material that requires treatment or off-site disposal. A continuous berm and/or silt fence will be placed around soil/fill stockpiles. Hay bales will be used as needed near catch basins, surface waters, and other discharge points. Stockpiles will be covered with appropriately anchored tarps or poly sheeting. Stockpiles will be routinely inspected at a minimum once each week and after every storm event. Damaged tarp covers will be promptly replaced.

Results of inspections will be recorded in a logbook, maintained with the Site Owner or Owner's representative, and made available for inspection by NYSDEC.

3.0 EXCAVATION, TRANSPORT, DISPOSAL, AND REUSE

3.1 Materials Excavation and Load Out

A QEP, or person under their supervision, will monitor all intrusive work and the excavation and load-out of all excavated material. The Site Owner and its contractors are responsible for safe execution of all intrusive and other work performed under this EWP; however, any entity performing intrusive work on the Site is required to abide by the requirements identified herein. The QEP will investigate the presence of utilities and easements on the Site and determine whether they pose a risk or impediment to the planned work under this EWP.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State (NYSDOT), local, and all other applicable transportation requirements.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking. The QEP will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. If truck tires will be in contact with impacted materials and/or ground conditions result in mud carryout on vehicles a truck wash will be operated on-site. Truck wash waters will be collected and disposed off-site in an appropriate manner. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

3.2 Material Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with tight-fitting covers; loose-fitting canvas-type truck covers are prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes will be pre-determined for wastes designated as hazardous and requiring off-site transport to a secure landfill (RCRA Subtitle C facility) or other RCRA-permitted Treatment Storage and Disposal Facility (TSDF).

All trucks loaded with Site materials will exit the vicinity of the Site using only NYSDEC-approved truck routes. The route will consider (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. If an alternate RCRA Subtitle C facility or TSDF is employed the corresponding truck transport route shall be provided to the NYSDEC for approval.

Trucks will be prohibited from stopping and idling in the neighborhood outside the Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials. Queuing of trucks will be performed on-site to minimize off-site disturbance; off-site queuing will be prohibited.

3.3 Materials Disposal Off-Site

All soil/fill/solid waste excavated and removed from the Site will be considered contaminated, regulated material to be transported and treated or disposed at a permitted facility in accordance with all local, State (including 6NYCRR Part 360), and Federal regulations. If alternate off-site disposal of soil/fill from this Site is proposed (e.g., at another regulated brownfield site), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility (i.e., hazardous waste facility, solid waste landfill, permitted petroleum treatment facility, C/D recycling facility, etc.), if appropriate. The disposal documentation submitted to NYSDEC will include: a summary of disposal quantities, waste profiles, test results, facility acceptance letters, manifests, bills of lading, and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a municipal solid waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

3.4 Materials Reuse On-Site

3.4.1 Soil/Fill

On-site reuse of soil/fill material is acceptable provided that the material does not exhibit visual or olfactory evidence of contamination and PID measurements of the atmosphere at the soil/fill interface do not exceed 5 ppm above background. The QEP will ensure that procedures defined for materials reuse are followed and that unacceptable material does not remain on-site. On-site material, including historic fill, that is acceptable for re-use on-site will be placed below the engineered cover demarcation layer or impervious surface (if in place at the time of excavation), and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

3.4.2 Petroleum-Impacted Soil/Fill

Petroleum-impacted soil/fill suitable for on-site bioremediation (e.g., materials impacted by non-tarry petroleum hydrocarbons) may be transported, with NYSDEC approval, to a designated portion of the Tecumseh property (specifically one of the Business Parks) for biotreatment. Qualitative assessment of treatment performance will be made based on field assessment of visual and olfactory conditions, with the goal of eliminating gross impacts. Once the soil/fill is considered treated, confirmatory samples will be collected at a frequency of no less than one per 1,000 cubic yards of treated soil/fill. The samples will be analyzed for USEPA Target Compound List (TCL) volatile organic compounds (VOCs) and base-neutral semi-volatile organic compounds (SVOCs) and compared to SCOs to be determined within an action-specific soil biotreatment work plan subject to NYSDEC approval. Once the samples meet these SCOs, the treated soil/fill will be removed and preferably transferred back to the original excavated Site as subgrade material; bioremediated soils will not be considered suitable for use as cover soil. No bioremediated soil/fill will be transported off-site unless deemed necessary due to poor treatment response. In such instance the material will be disposed, with NYSDEC approval, in accordance with Section 3.3.

3.4.3 Debris

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site without prior NYSDEC approval.

3.4.4 Slag

Slag proposed for reuse on-site will be field screened with a 2x2 meter or equivalent for gamma radiation via test pad. If field-screening measurements are 1.5 times background for the Controlled Property, the slag will be stockpiled and evaluated for TENORM. Background levels for the Controlled Property are approximately 5,000 counts per minute (cpm). Therefore, slag measurements below 7,500 cpm will not require further evaluation for reuse. Screening levels above 7,500 cpm will require submission of an action-specific work plan to address additional screening, sampling, analysis, and handling of elevated radiological material. NYSDEC and NYSDOH will be notified of any screening level exceedances.

Test pads will be constructed on an approximately 5-foot by 5-foot by 1-inch thick steel plate. Slag proposed for reuse will be used to create test pads to evaluate the slag. One test pad will be constructed for every 250 cubic yards of slag proposed for reuse unless a different frequency is approved by NYSDEC.

Slag will be placed on the steel plate in an approximate 6- to 8-inch thick lift. The 5-foot by 5-foot slag placement area will be screened with the 2x2 meter to identify location with the "highest" count rate based on the screening. A 1-minute count measurement will be collected from the highest screening location. If the results are less than 7,500 cpm, no further evaluation is required. If the measurement is greater than 7,500 cpm, a slag sample will be collected from the highest screening location and analyzed for Radium-226 via EPA Method 901.1M (21-day ingrowth). The results of the analysis will be provided to the Department and the decision to reuse the slag and/or its final disposition will be made in consultation with and pursuant to approval by the Department. Slag containing Radium-226 concentrations greater than 5 picocurie per gram will not be allowable for use as backfill or cover on any portion of the Site.

3.5 Fluids Management

All liquids to be removed from the Site, including excavation dewatering and truck wash water, will be verified to be visually free of any product, non-aqueous phase liquid, odor, or other visual indications of impact. In such instance it may be acceptable to discharge such water back to subgrade with prior NYSDEC approval. Generated water exhibiting signs of impact will not be recharged back to the land surface or subsurface of the Site unless treated to render it acceptable for discharge as approved by the NYSDEC.

Water generated during large-scale construction activities proposed for discharge to surface waters (i.e., a local pond, stream, or river) will require a NY State Pollutant Discharge Elimination System (SPDES) permit.

4.0 BACKFILL AND RESTORATION

4.1 Cover Materials

A minimum of 12 inches of NYSDEC-approved cover material (e.g., vegetated soil, stone, or Beneficial Use Determination [BUD]-approved steel slag with NYSDEC approval), where appropriate, will be placed over any unpaved areas of the Site as a component of the final remedy. The upper 6 inches of any soil cover must be of suitable quality to support vegetation. In general, this would be well-graded topsoil with a pH of 5.5 to 7.6, a minimum organic content of 2.5%, and a soluble salt content not greater than 500 ppm. Vegetation must be comprised of grasses or other plantings sufficiently dense to prevent wind and surface water erosion. All imported cover must also meet the criteria identified in Section 4.2.

After the completion of soil removal and any other invasive activities, the cover system will be restored in a manner that complies with the Site Management Plan (SMP) and Final Engineering Report (FER). The demarcation layer will be replaced to provide a visual reference to the top of the remaining in-place material. A change in the type of cover system that existed prior to the excavation (e.g., a soil cover is replaced by asphalt) constitutes a modification of the cover element of the remedy, and a figure showing the modified surface will be included in the subsequent Periodic Review Report (PRR) and in any updates to the SMP.

4.2 Backfill from Off-Site Sources

The criteria under which off-site material may be imported for use as backfill are presented below.

- **Off-Site Soil/Fill:** Off-site soil/fill may be used as backfill provided it originates from: 1) an NYSDEC-approved borrow site; or 2) a known source having no evidence of disposal or releases of hazardous substances, hazardous, toxic, or radioactive wastes, or petroleum. In both instances the imported soil must be tested and demonstrated to meet the criteria shown on Table B-1 in accordance with Appendix 5 of DER-10. In addition, no off-site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2 (a) shall be used as backfill. The criteria presented in Table B-1 represent the lesser of the Commercial Soil Cleanup Objectives (SCOs) or levels protective of groundwater quality as published in 6NYCRR Part 375-6.7(d)(c) and 375-6.8.

- **Other Off-Site Material:** Certain material may be imported as backfill, without chemical testing, provided it contains less than 10% (by weight) material that would pass through a size 80 sieve: 1) Rock or stone, consisting of virgin material from a permitted mine or quarry; 2) steel slag under BUD #555-9-15 with NYSDEC approval; 3) Recycled concrete, brick, or asphalt from a NYSDEC-registered or permitted C&D debris processing facility (as specified in Section 360-16.1 of 6 NYCRR Part 360) that conforms to Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2002). As stated in Section 360-16.4(b)(2), the facility may only accept recognizable, uncontaminated, non-pulverized C&D debris or C&D debris from other authorized C&D processing facilities. According to Section 360-16.2(c), "uncontaminated" means C&D debris that is not mixed or commingled with other solid waste at the point of generation, processing, or disposal, and that is not contaminated with spills of a petroleum product, hazardous waste, or industrial waste.

As indicated above, off-site borrow soils shall be tested to assure conformance with the criteria identified on Table B-1. A tiered approach based on the volume of impacted soil/fill being excavated will be used to determine the frequency of characterization sampling in accordance with DER-10 or as pre-approved by the NYSDEC.

Grab samples will be collected for VOC analysis. For all other required analyses, a minimum of four grab samples will be collected to form a single composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless-steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (e.g., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed for USEPA Target Compound List (TCL) VOCs, TCL SVOCs, pesticides, PCBs, as well as select metals[1] and cyanide in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory. Additionally, soil/fill samples will be tested for per- and polyfluoroalkyl substances (PFAS) in accordance with the Department's latest protocols[2]. Analytical results will be compared to Table B-1 criteria and provided to the NYSDEC as part of the approval process and reported in the PRR. Analytical results must be maintained

[1] Metals shall include those regulated under 6NYCRR Part 375-6.8, which presently include: Arsenic; Barium; Beryllium; Cadmium; Chromium (total and hexavalent forms); Copper; Lead; Manganese; Mercury; Nickel; Selenium; Silver; and Zinc.

[2] "Sampling, Analysis, and Assessment of Per- And Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs." January 2021.

on file for review in support of the periodic Institutional and Engineering Control (IC/EC) certification required as part of the final SMP.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

All materials proposed for import onto the Site will be approved by the QEP and in compliance with the provisions of this EWP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form[3] will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

4.3 Backfill from On-Site Sources

On-site soil/fill may be used as subgrade backfill beneath existing approved cover provided it does not exhibit field evidence of impact. Soil/fill that is bioremediated on-site, or within another designated and approved area within the Tecumseh Business Parks, may be similarly used as subgrade backfill provided it meets the treatment criteria discussed in Section 3.4.2. Slag may be used as subgrade backfill provided it meets the field screening criteria discussed in Section 3.4.4. Backfill material will be compacted with the excavator/backhoe bucket in maximum 2-foot lifts to minimize settling.

[3] http://www.dec.ny.gov/regulations/67386.html

5.0 MONITORING AND INSPECTIONS

5.1 Stormwater Pollution Prevention

If construction activities disturb more than 1 acre of land, the Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. seq.) and the New York State Environmental Conservation Law (Article 17, Titles 7 and 8, and Article 70) would apply.

With some exceptions, operators of construction activities and property development that will result in the disturbance of 1 or more acres of land must obtain coverage under SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001, expires 01/28/25) prior to the commencement of soil disturbance. (In the case of a remediation site, such as the Controlled Property, soil disturbances associated with remedial activities are exempt from State-issued permits; however, functional equivalent approvals, mitigation and compliance measures are required). Also requiring a permit are construction activities disturbing less than 1 acre if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than 1 acre, or activities that are designated by the NYSDEC. The NYSDEC can require a permit for construction activities disturbing less than 1 acre based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

To obtain coverage under the General Permit, the operator of a construction activity must file a completed Notice of Intent (NOI) with the NYSDEC. Submitting a NOI is an affirmation that a Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the site and will be implemented prior to the commencement of construction activities. Coverage under the General Permit will begin either 5 or 60 business days after receipt of a completed NOI by the NYSDEC. Appendix B-1 includes the NOI application form and SPDES General Permit GP-0-20-001.

For smaller disturbances not subject to SPDES General Permit requirements, erosion controls must be installed as necessary to mitigate impacted stormwater and sediment runoff. These controls (which may include silt fencing around stockpiles, berms, and hay bale checks) will be required in areas of disturbance proximate to surface water bodies and drainage structures and will also be required if disturbances occur in areas where the surrounding slag/fill is not sufficiently permeable to allow re-infiltration. Erosion and

sediment controls shall be installed in accordance with the standards and specifications presented in Appendix B-2.

The controls will be installed and inspected once a week and after every storm event. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the controls functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Results of inspections will be recorded in a logbook, maintained by the Site Owner or Owner's representative, and made available for inspection by NYSDEC.

5.2 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during intrusive activities, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment, and surrounding soils as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a comprehensive list of analytes (RCRA metals, TCL VOCs, SVOCs, and PCBs, and cyanide), unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval.

Identification of unknown or unexpected contaminated media identified by screening during intrusive activities will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline.

5.3 Community Air Monitoring Plan

As detailed in Appendix B-3, the following criteria shall also be adhered to during intrusive activities for the protection of the nearby community.

5.3.1 Organic Vapor Community Air Monitoring:

Community air monitoring will be performed at the downwind perimeter of the exclusion zone on a continuous basis during intrusive activities performed outdoors that may be reasonably expected to potentially release organic vapors, or when sustained readings are detected in the work zone (i.e., proximate to the source of the intrusive activity). Otherwise, the monitoring will be performed on an hourly basis. A photoionization detector (PID), or other equipment suitable to the types of contaminants known or suspected to be present, capable of calculating 15-minute running average concentrations will be used. All air monitoring equipment will be calibrated at least daily, and an upwind concentration will be taken at least daily to establish background conditions. The 15-minute average concentrations will be compared to the levels specified below.

- If the 15-minute ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the organic vapor decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If the ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone persists at levels above 5 ppm over background but less than 25 ppm, activities must be halted, the source of vapors identified, corrective actions to abate the emissions taken, and monitoring continued. After these steps, work activities can resume provided that: the organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest off-site potential receptor or residential or commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the exclusion zone, work activities must be shut down and the following activities will be performed:
  - All Emergency Response Contacts as listed in the HASP (Ref. 2) and the Emergency Response Plan (an appendix to the HASP) will be advised.
  - The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.
  - Air monitoring will be continued at ½ the distance from the exclusion zone to the nearest receptor.

All readings will be recorded and will be available for NYSDEC and NYSDOH personnel to review.

5.3.2 Explosive Vapor Community Air Monitoring

Explosive vapor community air monitoring will be performed at the downwind perimeter of the site on a continuous basis whenever sustained atmospheric concentrations of greater than 10% of the LEL are recorded in the exclusion zone. If sustained atmospheric concentrations of greater than 10% LEL are recorded at the downwind site perimeter, the local Fire Department will be contacted.

5.3.3 Airborne Particulate Community Air Monitoring

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

If after implementation of dust suppression techniques, downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped, and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

Air sampling stations will be located based on generally prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

5.3.4 Special Requirements

Ground intrusive activities within 20 feet of occupied structures or potential receptors (e.g., public roadways, sidewalks, etc.) should consider the following:

- Continuous monitoring locations should reflect the nearest potentially exposed individuals and vapor pathways (openings, conduits, vents, etc.).
- Take background readings in the occupied spaces prior to commencement of planned work.
- Consider use of engineering controls such as vapor/dust barriers, exhaust fans, or other controls to create negative air pressure within the work area.
- The planned work should be implemented during hours when building occupancy is at a minimum.

5.4 Odor Control Plan

The purpose of this odor control plan is to control emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis are described below. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the associated Site Owner, and any measures that are implemented will be documented.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or

proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

5.5 Dust Control Plan

Particulate monitoring will be performed along the downwind perimeter of the Site during subgrade excavation, grading, and handling activities in accordance with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under DER-10 Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring) both included as Appendix B-3. Dust suppression techniques will be employed as necessary to mitigate fugitive dust from non-vegetated or disturbed soil/fill during post-remediation construction and redevelopment.

A dust suppression plan that addresses dust management during intrusive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved by using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Covering or proof-rolling excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum.

5.6 Other Nuisances

A plan will be developed and used by the contractor for all remedial work to ensure compliance with local noise control ordinances. At a minimum, this shall include limiting construction to typical daylight work hours.

6.0 REFERENCES

1. New York State Department of Environmental Conservation. *DEC Program Policy DER-10/Technical Guidance for Site Investigation and Remediation.* May 3, 2010.
2. TurnKey Environmental Restoration, LLC in affiliation with Benchmark Environmental Engineering & Science, PLLC, *Site-Wide Health and Safety Plan (HASP). Tecumseh Redevelopment Site, Lackawanna, NY*. April 2010.

TABLES

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase II Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase II Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase II Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[2]	19
Chromium, Trivalent[2]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.02
Beta-BHC	0.09
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102

TABLE B-1

CRITERIA FOR IMPORTED SOILS

Site Management Plan
Tecumseh Phase II Business Park
Lackawanna, New York

Parameter	Cover Soil Criteria[1]
PCBs/Pesticides (mg/kg)	
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1
Per- and Polyfluoroalkyl Substances (ug/kg)	
Perfluorooctanoic acid (PFOA)	1.1
Perfluorooctanesulfonic acid (PFOS)	3.7

Notes:

[1] Soil criteria are lesser of concentrations protective of groundwater or commercial health-based soil cleanup objectives per 6 NYCRR 375-6.8(b).

[2] The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\Figure 1; Site Location and Vicinity Map.dwg

FIGURE 1



TurnKey Environmental Restoration, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

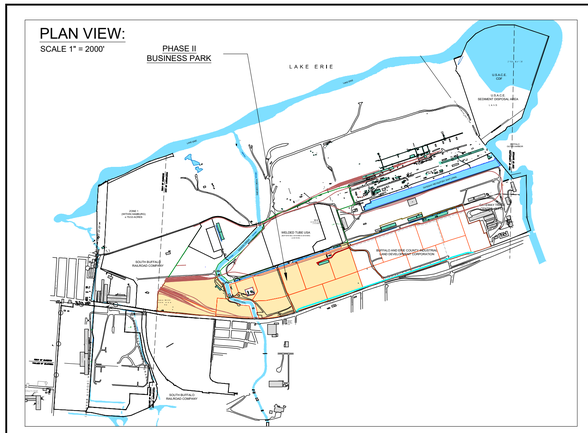
DATE: JULY 2012

DRAFTED BY: HAA

SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK



SMOKES CREEK

WEST CONNECTOR

SOUTH RETURN WATER TRENCH

EAST HARBOR LEAD

DONA STREET EXTENSION

OUTFALL 226

SMOKES CREEK

NIAGARA WIND PARCEL EXCLUDED FROM BCP (±0.38 ACRES)

NATIONAL GRID PARCEL EXCLUDED FROM BCP (±0.97 ACRES)

II-1
BCP SITE NO. C915198
(± 14.35 ACRES)

II-2
BCP SITE NO. C915198B
(± 9.43 ACRES)

II-3
BCP SITE NO. C915198C
(± 23.40 ACRES)

II-4
S. LINDE
BCP SITE NO. C915198D
(± 1.40 ACRES)

II-5
BCP SITE NO. C915198E
(± 5.78 ACRES)

II-6
BCP SITE NO. C915198F
(± 11.50 ACRES)

II-7
BCP SITE NO C915198G
(± 14.30 ACRES)

II-8
BCP SITE NO. C915198H
(± 11.41 ACRES)

II-9
BCP SITE NO. C915198I
(± 9.91 ACRES)

II-10
BCP SITE NO. C915198J
(± 15.78 ACRES)

II-11
BCP SITE NO. C915198K
(± 11.98 ACRES)

II-12
BCP SITE NO. C915198L
(± 12.02 ACRES)

HAMBURG TPKE. - SR 5

HOLBROOK STREET

ODELL STREET

LINCOLN AVE

ADAMS ST.

MADISON AVE

2nd STREET

GENERAL OFFICE BUILDING EAST

DONA STREET

LEGEND:

- EXISTING BUILDING / STRUCTURE
- PHASE II BUSINESS PARK BOUNDARY (+/- 141.26 ACRES)
- RAILROAD TRACK

Parcel Identification	BCP Site No.	Area (Acres)
II-1	C915198	14.35
II-2	C9151988	9.43
II-3	C915198C	23.40
II-4	C915198D	1.40
II-5	C915198E	5.78
II-6	C915198F	11.50
II-7	C915198G	14.30
II-8	C915198H	11.41
II-9	C915198I	9.91
II-10	C915198J	15.78
II-11	C915198K	11.98
II-12	C915198L	12.02
Total Area Phase II Business Park		**141.26**

N

200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

DRAWN BY: RFL
DATE: JUNE 2021
CHECKED BY: LR
APPROVED BY: THF

DISCLAIMER:
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SEAL

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
PHASE II BUSINESS PARK
LACKAWANNA, NEW YORK

TECUMSEH REDEVELOPMENT INC.

FIGURE 2

APPENDIX B-1

SPDES GENERAL PERMIT GP-0-20-001
NOTICE OF INTENT

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature

Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

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Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

   (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

   (ii) Control stormwater *discharge*s, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

   (iii) *Minimize* the amount of soil exposed during *construction activity*;

   (iv) *Minimize* the disturbance of *steep slopes*;

   (v) *Minimize* sediment *discharge*s from the site;

   (vi) Provide and maintain *natural buffer*s around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

   (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;

   (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

   (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments

listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharges*.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be

calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **not** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits

must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land*

use control MS4, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

    a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with

the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

    a. Background information about the scope of the project, including the location, type and size of project

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection

schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

   (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

   (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

   (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

   (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located

in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

   a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field,

superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the owner’s or operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system

and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed

training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover
- Cross-country ski trails and walking/hiking trails
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development;
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path.
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

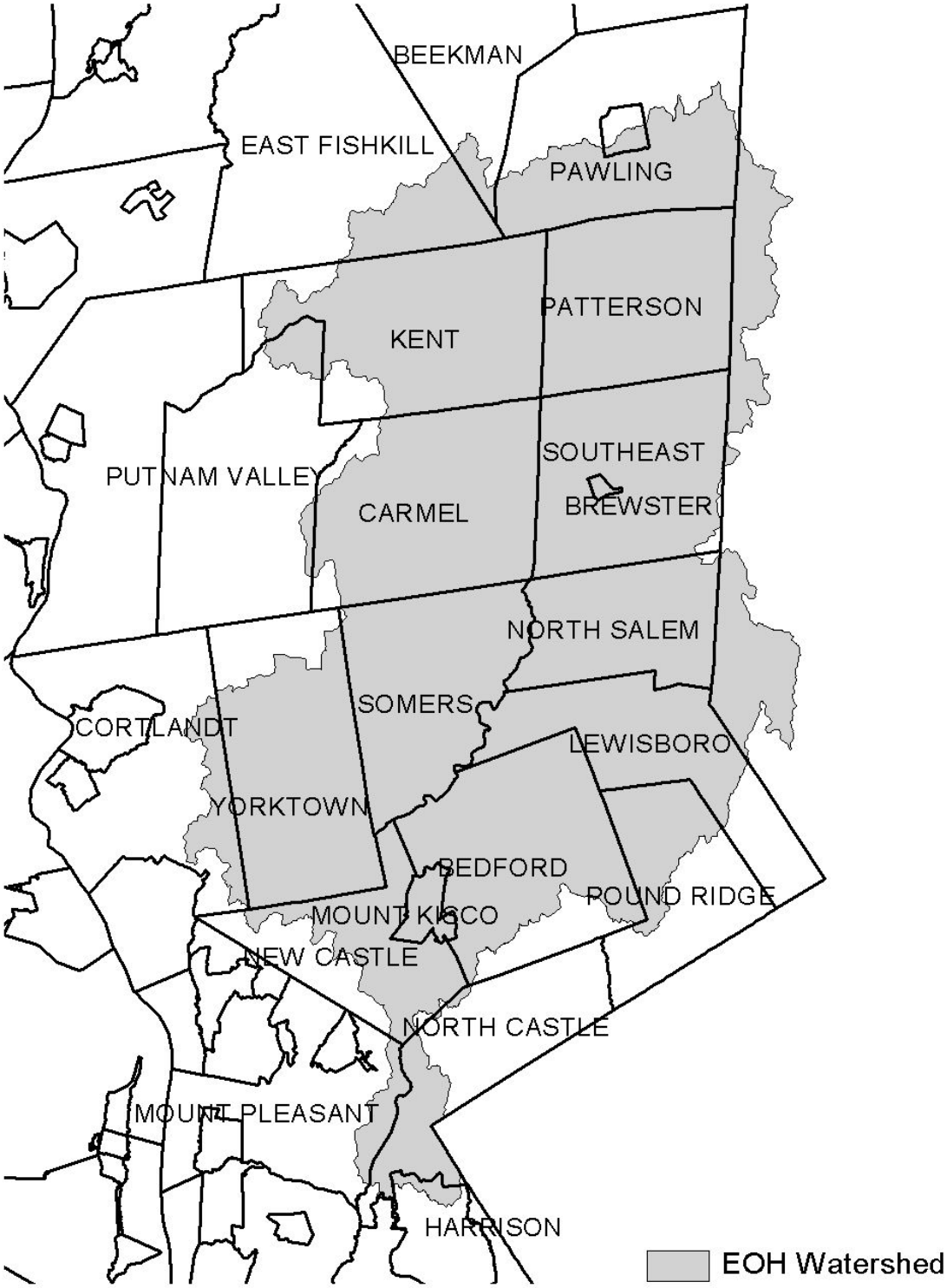


Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

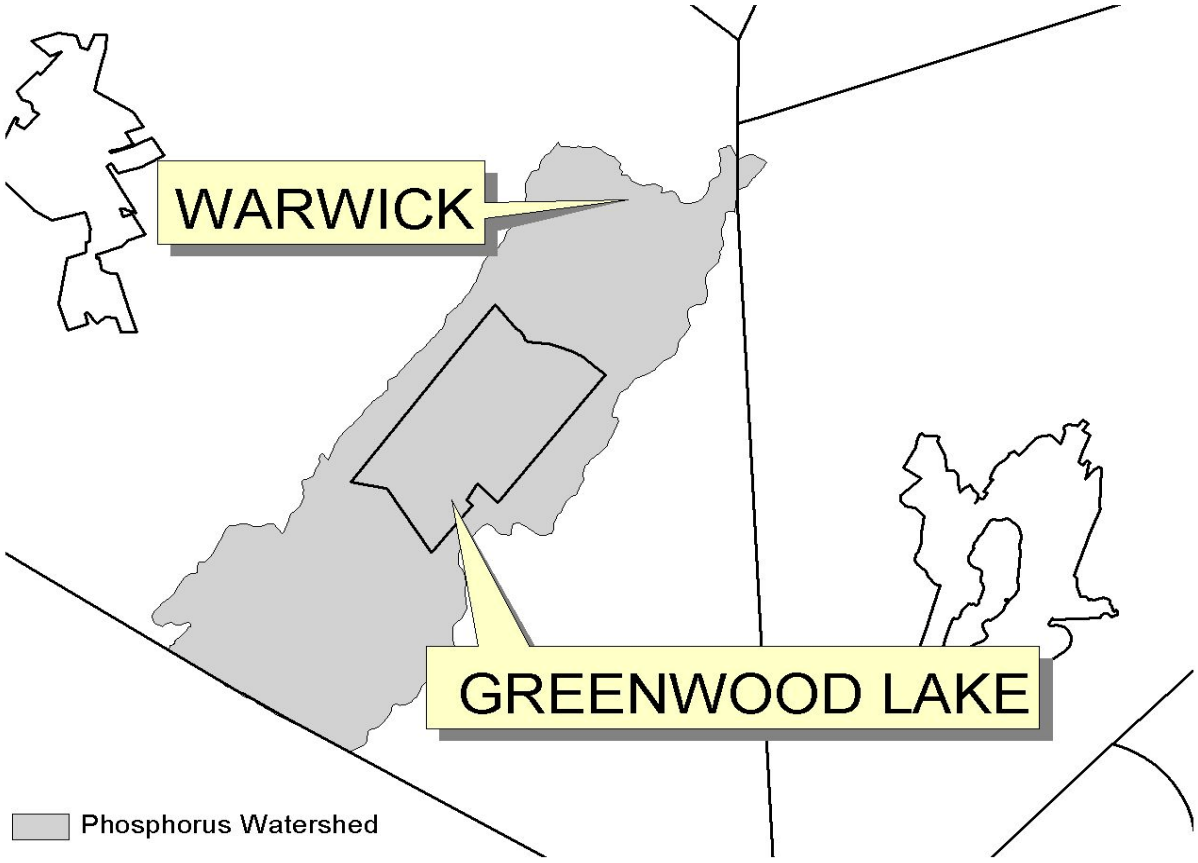


Figure 4 - Oscawana Lake Watershed

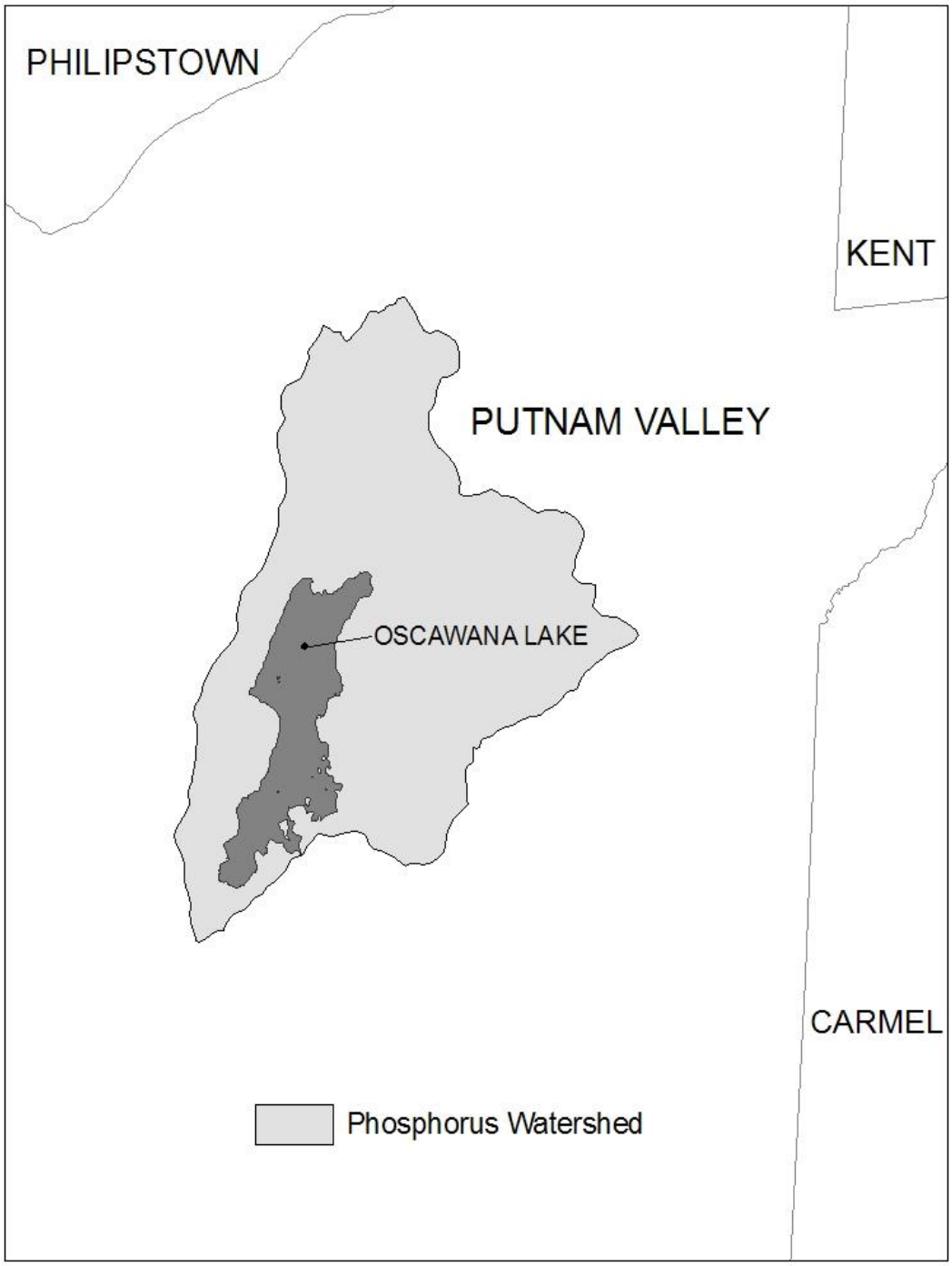
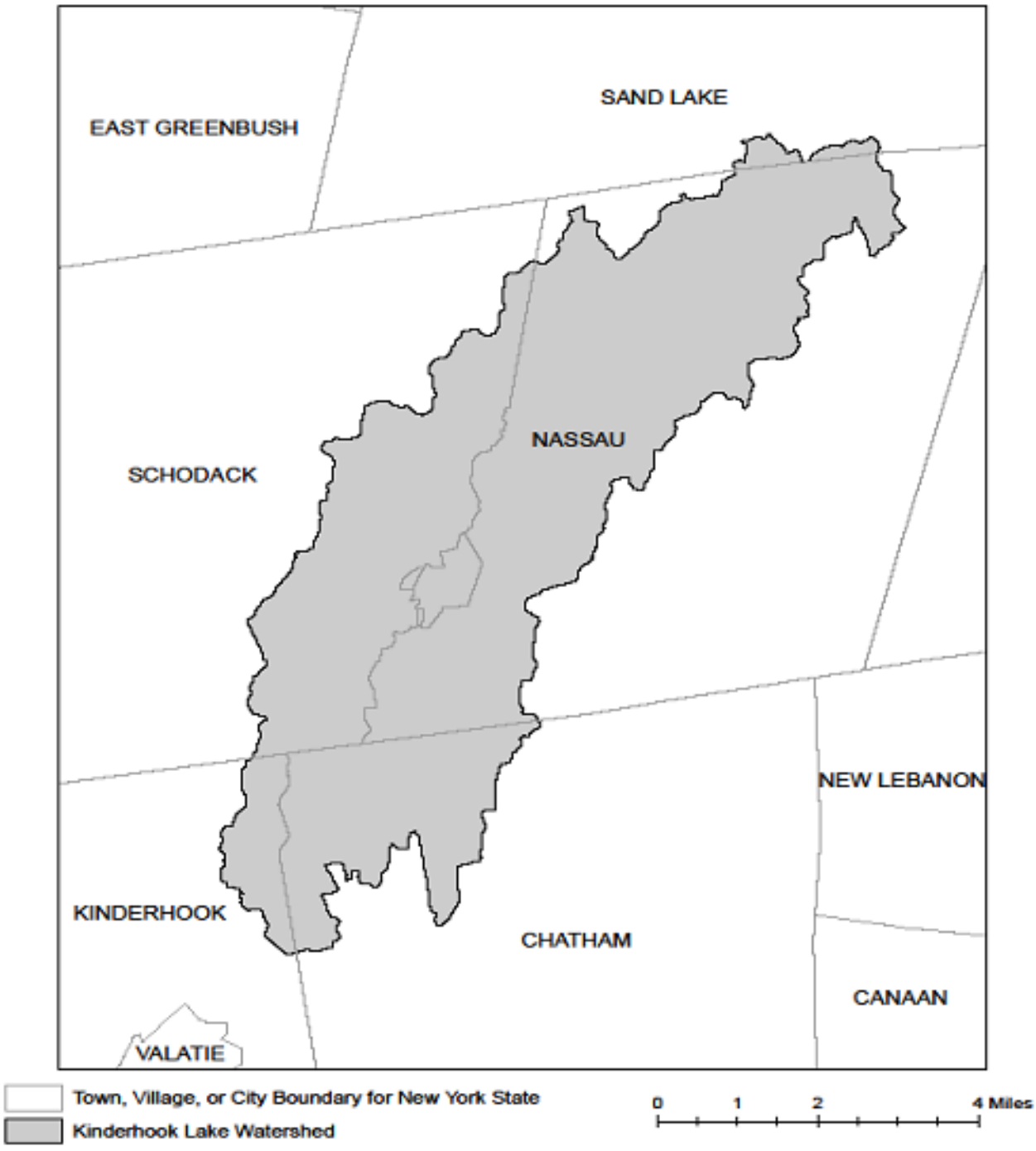


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	100 Hillside Avenue, Suite 1w White Plains, NY 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR ☐☐☐☐☐☐
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-20-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State ☐☐ Zip ☐☐☐☐☐ - ☐☐☐☐

Phone (Owner/Operator) ☐☐☐ - ☐☐☐ - ☐☐☐☐

Fax (Owner/Operator) ☐☐☐ - ☐☐☐ - ☐☐☐☐

Email (Owner/Operator)

FED TAX ID ☐☐ - ☐☐☐☐☐☐☐ (not required for individuals)

Project Site Information

Project/Site Name

Street Address (NOT P.O. BOX)

Side of Street
○ **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

State N Y Zip - County DEC Region

Name of Nearest Cross Street

Distance to Nearest Cross Street (Feet)

Project In Relation to Cross Street
○ **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site. To do this, go to the NYSDEC Stormwater Interactive Map on the DEC website at:

https://gisservices.dec.ny.gov/gis/stormwater/

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located the centroid of your project site, go to the bottom right hand corner of the map for the X, Y coordinates. Enter the coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)
-7
Ex. -73.749

Y Coordinates (Northing)
4
Ex. 42.652

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	**Total Area To Be Disturbed**	**Existing Impervious Area To Be Disturbed**	**Future Impervious Area Within Disturbed Area**
.	.	.	.

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	**B**	**C**	**D**
%	%	%	%

7. Is this a phased project? ○ **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date / / - **End Date** / /

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001? ○ **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001? ○ **Yes** ○ **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ○ **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ○ **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ○ **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ○ **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ○ **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ **Yes** ○ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ○ **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ○ **Yes** ○ **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ○ **Yes** ○ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ○ **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer

Contact Name (Last, Space, First)

Mailing Address

City

State Zip -

Phone - -

Fax - -

Email

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name **MI**

Last Name

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ○ Silt Fence
- ○ Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ○ Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ○ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

			.				**acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)	___.___	and/or	___.___
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	___.___	and/or	___.___
○ Tree Planting/Tree Pit (RR-3)	___.___	and/or	___.___
○ Disconnection of Rooftop Runoff (RR-4)	___.___	and/or	___.___
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			___.___
○ Rain Garden (RR-6)			___.___
○ Stormwater Planter (RR-7)			___.___
○ Rain Barrel/Cistern (RR-8)			___.___
○ Porous Pavement (RR-9)			___.___
○ Green Roof (RR-10)			___.___
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			___.___
○ Infiltration Basin (I-2)			___.___
○ Dry Well (I-3)			___.___
○ Underground Infiltration System (I-4)			___.___
○ Bioretention (F-5)			___.___
○ Dry Swale (O-1)			___.___
Standard SMPs			
○ Micropool Extended Detention (P-1)			___.___
○ Wet Pond (P-2)			___.___
○ Wet Extended Detention (P-3)			___.___
○ Multiple Pond System (P-4)			___.___
○ Pocket Pond (P-5)			___.___
○ Surface Sand Filter (F-1)			___.___
○ Underground Sand Filter (F-2)			___.___
○ Perimeter Sand Filter (F-3)			___.___
○ Organic Filter (F-4)			___.___
○ Shallow Wetland (W-1)			___.___
○ Extended Detention Wetland (W-2)			___.___
○ Pond/Wetland System (W-3)			___.___
○ Pocket Wetland (W-4)			___.___
○ Wet Swale (O-2)			___.___

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
○ **Hydrodynamic**	
○ **Wet Vault**	
○ **Media Filter**	
○ **Other**	

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

. **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

. **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

			.			
			.			**acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).

			.			
			.			

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ○ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

			.			
			.			**acre-feet**

CPv Provided

			.			
			.			**acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

			.			
			.			**CFS**

Post-development

			.			
			.			**CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

			.			
			.			**CFS**

Post-development

			.			
			.			**CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP [N][Y][R][ ][ ][ ][ ][ ][ ]
- ○ Other [ ]
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ○ **No**
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ].[ ]

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date / /

APPENDIX B-2

EROSION AND SEDIMENT CONTROLS

SECTION 5
SEDIMENT CONTROL

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Section prepared by:

Donald W. Lake Jr., P.E., CPESC, CPSWQ
Former Engineering Specialist
New York State Soil & Water Conservation Committee

Adjunct Assistant Professor
State University of New York, College of Environmental Science and Forestry

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SEDIMENT CONTROL

Scope and Discussion

Sediment control is the second component in the site management plan after erosion control. Primary emphasis should be placed on erosion control first which combines runoff control and soil stabilization to minimize soil erosion. Sediment control practices are then integrated into the plan to further reduce the migration of eroded soil both on and off site.

The majority of sediment control practices utilize settling to capture sediment within a storage volume where it can be contained and managed. These practices include sediment basins, sediment traps and dikes, rock dams, water structures, silt fence, turbidity curtains, straw bale dikes, and portable settling tanks. There is also a group of practices that rely on both filtering and settling to capture sediment. These practices include storm drain inlet protection structures, geotextile filter bags, compost tubes, and buffer filter strips. In addition, the use of chemical polymer substances is a process that may, with NYSDEC approval, be used on sites where disturbed clay soils remain in suspension.

It is important that these sediment control practices be designed, constructed and installed in accordance with the criteria contained in these standards. For these practices to effectively remove sediment from turbid water, the volumes, dimensions, and appropriate attributes of these individual practices must be maintained. This includes the calculated relationships of dimensions to respective drainage areas, length to width ratios, and frequency of inspection and maintenance.

Note: Performing activities within or adjacent to wetlands, streams and waterbodies may require permits from the New York State Department of Environmental Conservation (NYSDEC) pursuant to Article 15 (Protection of Waters), Article 24 (Freshwater Wetlands) and Article 25 (Tidal Wetlands) of the Environmental Conservation Law (ECL). Project owners should contact NYSDEC's Regional Division of Environmental Permits early in the site planning process to discuss the requirements for meeting permit issuance standards. Following the New York State Standards and Specifications for Erosion and Sediment Control may not ensure compliance with the above referenced sections of the ECL.

To assist with the success of these sediment control practices, apply the following concepts for the practice design and location:

1. Keep the clean water clean by diverting runoff from upslope areas away from disturbed areas.
2. Employ natural vegetative buffers or artificial mats to assist in sediment capture in sheet flow areas.
3. Control concentrated flow to minimize additional erosion that could overwhelm a practice.
4. Stabilize all sediment control systems as soon as they are installed so they do not contribute sediment to site runoff.
5. Remove all practices after use and stabilize the regraded areas immediately.

Sediment accumulated in the sediment control practices must be removed when the sediment has filled the designated storage volume for the practice. The material must be disposed of in a manner that stabilizes it on the construction site. These details, as well as the frequency of inspection, sequences of installation and removal, and an inspection checklist shall be included in the Stormwater Pollution Prevention Plan for the site.

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to a sediment basin in liquid, powder, or solid form. Flocculants include polyacrylimide, aluminum sulfate (alum), and polyaluminum chloride.



Polymer flocculation shall only be used for dispersive soil-water mixtures that do not respond to normal settling times when allowed to set in sediment traps and basins, i.e. less than 7 days. Controlled application takes place in a sediment basin or trap with anionic polyelectrolytes in the form of liquid, powder, or solid form, such as polyacrylimide, aluminum sulfate, chitosan lactate, or chitosan acetate. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic

polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt 2003).

Chemical treatment shall not be substituted for proper planning, phasing, sequencing, and the design of appropriate erosion and sediment control practices.



No polymer application shall take place without written approval from NYSDEC.

Field tests must be conducted on the proposed site at the design basin locations with the tributary soils to establish polymer dosing rates and verify settling performance.

Treated water discharged from sediment basins with polymer treatment will be tested to determine that any residual polymer meets the standards set by NYSDEC. Polymer flocculation systems require daily inspection.

STANDARD AND SPECIFICATIONS FOR BUFFER FILTER STRIP



Land Slope (%)	Minimum Filter Strip Width (ft.)
≤10	50
20	60
30	85
40	105
50	125
60	145
70	165

Definition & Scope

A **temporary/permanent** well vegetated grassed area below a disturbed area that can be used to remove sediment from runoff prior to it reaching surface waters or other designated areas of concern, such as parking lots and road pavement.

Condition Where Practice Applies

This practice is effective when the flow is in the form of sheet flow and the vegetative cover is established prior to disturbance. Surface water must be protected from sediment-laden runoff until buffer filter strip vegetation is established, and then the proposed disturbance can be undertaken. This practice is effective when the flow is in the form of sheet flow (maximum of 150 feet).

Design Criteria

1. The vegetation should be a well established perennial grass. Wooded and brushy areas are not acceptable for purposes of sediment removal.

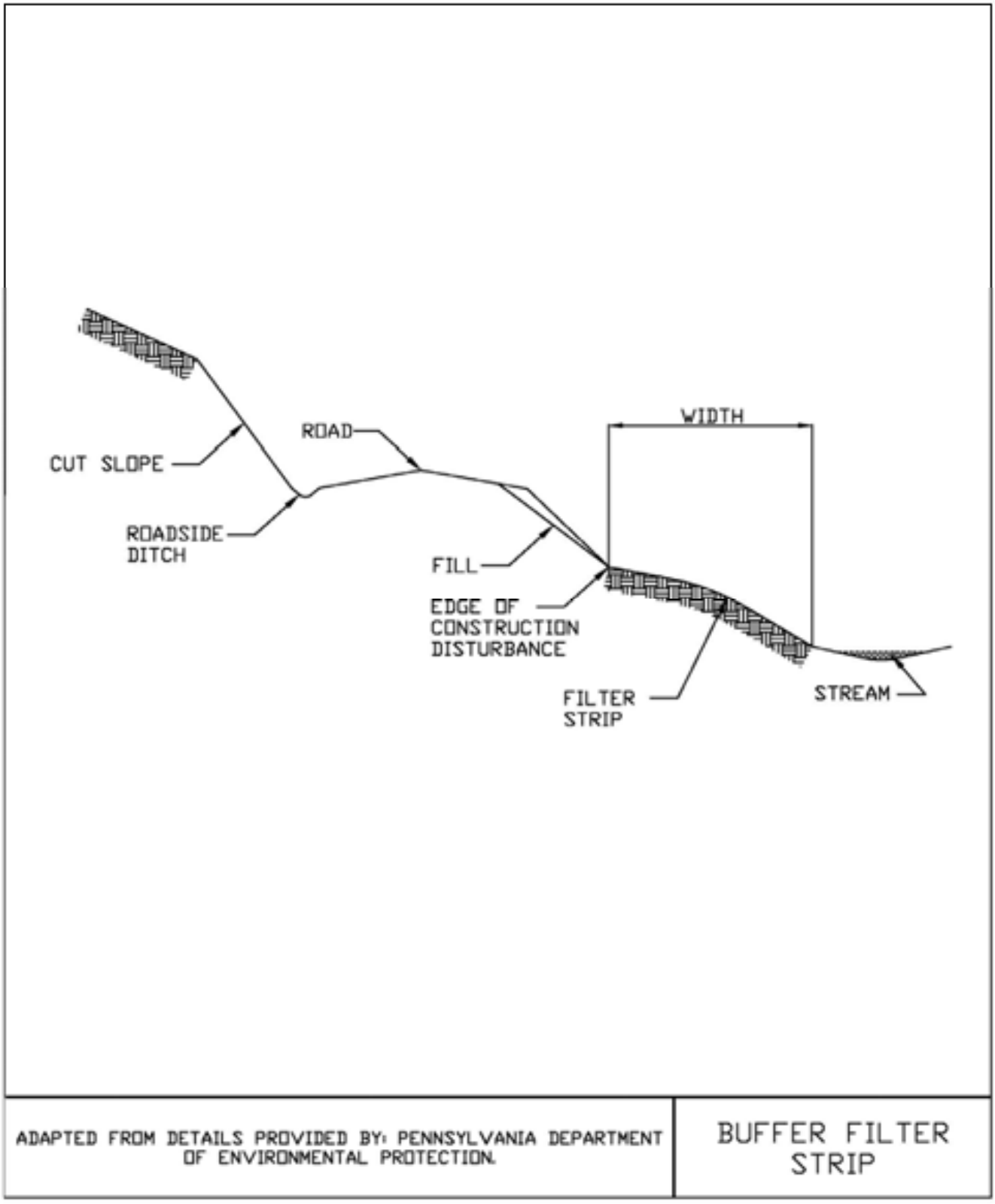
2. The minimum buffer filter strip width for stream protection shall be in accordance with the following table:

3. The minimum buffer filter strip width to protect paved areas during construction is 20 feet.

Maintenance

If at any time the width of the buffer filter strip has been reduced by sediment deposition to half its original width or concentrated flow has developed, suitable additional practices should be installed. The erosion and sediment control plan shall include these details.

Figure 5.1
Buffer Filter Strip



STANDARD AND SPECIFICATIONS FOR COFFERDAM STRUCTURES



Definition & Scope

A **temporary** barrier placed at a worksite to prevent water from flooding the work area so that construction can take place without discharging sediment into the water resource.

Condition Where Practice Applies

Temporary coffer dams are used to separate streams, rivers, lakes, and other sources of surface water from adjacent locations where soil disturbances are undertaken to complete construction. These barriers can be constructed of manufactured components such as geotextile/plastic tubes filled with water, portable dams formed by metal framing with a geo-membrane, or conventionally constructed earth and stone dike systems.

Design Criteria

The maximum height for this application is 10 feet. No construction activity shall commence in the area of the cofferdam until it is completed and stabilized.

Water Filled Structures

1. These structures shall be sized and installed according to the manufacturers recommendations.
2. Adequate freeboard must be provided to prevent flotation during high water events and periods of below freezing temperatures.
3. The foundation shall be prepared to provide full bottom contact prior to filling.
4. An interior dewatering system shall be designed within the work area to manage seepage.
5. The ends of the water structures shall be anchored on the stream banks or shorelines at an elevation at least above the top of the structure.

Structural Component Dams

1. These structures shall be sized and installed in accordance with the manufacturers recommendations.
2. The foundation area for the placement of the structural steel framing and the impervious fabric membrane shall be as directed by the manufacturer or by qualified personnel.
3. Dewatering the interior of the coffer dam will be done in a manner that does not disturb the foundation area of the structural frame.
4. A minimum of 2 feet of freeboard shall be provided above the expected high water elevation.

Earthen Coffer Dams

1. The earthen coffer dam shall be constructed of fill material that will preclude the transmission of water through the dam, or contain an impermeable core.
2. The minimum top width shall be 8 feet with 2:1 side slopes, and compacted in 9 inch lifts with a minimum of 4 passes of construction equipment.
3. The outside slope shall be covered with a 1 foot layer of rock riprap over a graded stone bedding or geotextile to prevent erosion of soil material into water. An alternative method is to cover the outside slope with an anchored plastic cover with a minimum thickness of 20 mil.
4. Interior work will be conducted in a manner that will not disturb or undermine the earthen coffer dam or its foundation.

Inspection and Maintenance

1. All cofferdams will be inspected daily to assure proper performance and stability as vibration from construction equipment can cause disturbance of the structures.
2. Particular attention should be given to the foundation support system at perimeter of structural component dams. Any undermined or settled areas shall be restored immediately.

3. Any holes, leaks, or torn areas in the geo-membranes or fabric shall be repaired immediately.

4. Any shifting, movement, or settling of the coffer dam shall be addressed immediately to protect workers in the construction area.

5. Inspect the interior dewatering system and ensure that the system is discharging clean water, or is being pumped to appropriate sediment control facility prior to returning to the water resource.

6. Repair or replace any loss of rock riprap or fill that may occur and assure the top of the coffer dam is level without any low spots due to settling.

7. Upon completion of the construction work, remove all excess material, accumulated sediment and debris from the work area, and remove the cofferdam in accordance with the site stabilization plan.

STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK



Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12" – 32" except that 8" diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	**5**	**10**	**20**	**25**	**33**	**50**
8	225*	200	100	50	20	—	—
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50
* Length in feet							



5. The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**

6. The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2" x 2" wooden stakes driven 12" into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.

4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.

5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

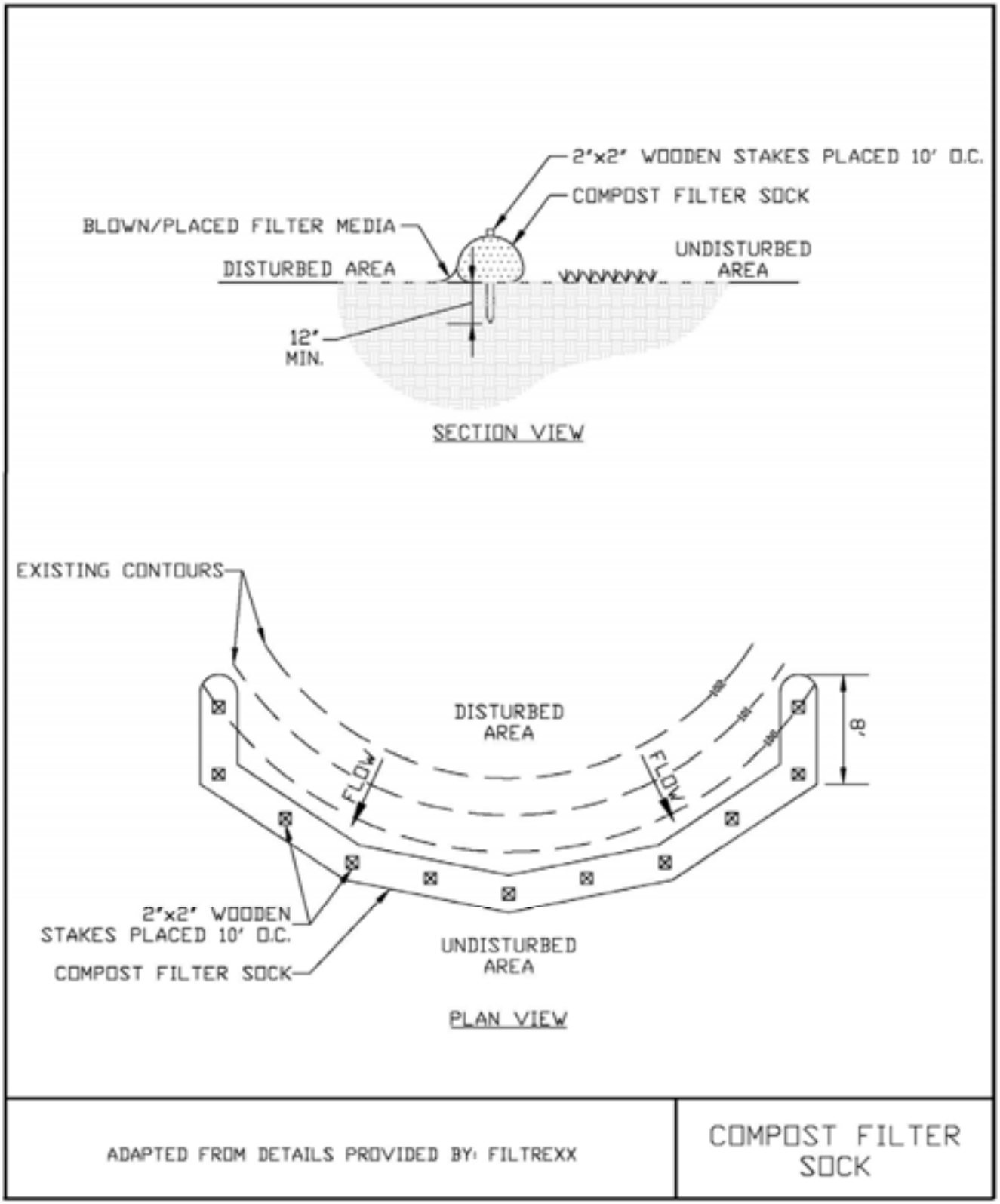
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Table 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1" screen and 10 - 50% passing a 3/8" screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR DEWATERING DEVICE



Definition & Scope

An appurtenance to a sediment trapping structure such as a basin or trap that allows sediment laden water to pond allowing sediment to settle out while removing relatively clean water to a suitable, stable outlet.

Condition Where Practice Applies

Dewatering devices are appropriate where the discharge from a trap or basin will be by gravity flow through a riser and pipe outlet system. The skimmer dewatering device is the preferred option. A fixed pipe dewatering device, configured as a perforated vertical riser surrounded by filter fabric and stone material is an alternate option for small structures.

Design Criteria

Skimmer Device

1. Skimmers must be designed so as to float just beneath the water surface to remove the least sediment laden water effectively.
2. Skimmer shall be constructed with a 4 foot long flexible pipe elbow to allow for vertical movement of the skimmer for its designated range of operation.
3. The designer will provide a table that shows all required dimensions for the skimmer. An example of this table is shown in Figure 5.4 on page 5.12. See design example in Appendix B.
4. The skimmer will be provided with vertical travel guides and a resting stone pad set at the appropriate design elevation.
5. The orifice plate will be at the "T" intersection of the perforated skimmer section with the non-perforated extension arm.

Riser-Pipe Device

1. The riser-pipe device is constructed as a fixed rigid structure with a larger diameter pipe as the vertical riser connected to a smaller diameter horizontal pipe barrel.
2. The joint of these two conduits will be anchored by means of a concrete block or welded steel plate to prevent flotation.
3. The riser will be perforated above the bottom of the dewatering zone elevation and wrapped with a geotextile filter fabric to filter out sediment.
4. The filter fabric shall be covered with stone graded as NYSDOT #1, #2, or a blend of both, to protect the fabric from deterioration.
5. An orifice plate shall be placed in the riser at the bottom of the dewatering zone elevation to control the dewatering rate.

Dewatering Drawdown

As a minimum, sediment traps and basins should have their temporary storage dewatered over a 48 hour period to maximize sediment retention. If the soils disturbed within the drainage area will have 60% - 80% fines the settling time should be increased to 4 days. Soils containing greater than 80% fines will need longer settling times but in no case longer than 7 days to maintain the hydraulic performance of the basin for recurring runoff events.

1. Skimmer orifices may be sized by using the design chart shown in Figure 5.3 on page 5.11.
2. Riser-pipe orifice sizes may be approximated by the following formula:

$$A_0 = \frac{A_s \times 2h^{0.5}}{T \times C_d \times 20{,}428}$$

Where:

A_0 = Areas of the dewatering orifice (ft^2)

As = Surface area of the basin/trap (ft^2)

h = head of water above the orifice (ft)

C_d = 0.6 (contraction coefficient of an orifice)

T = Detention time needed to dewater basin (48 hours minimum)

Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non -perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.

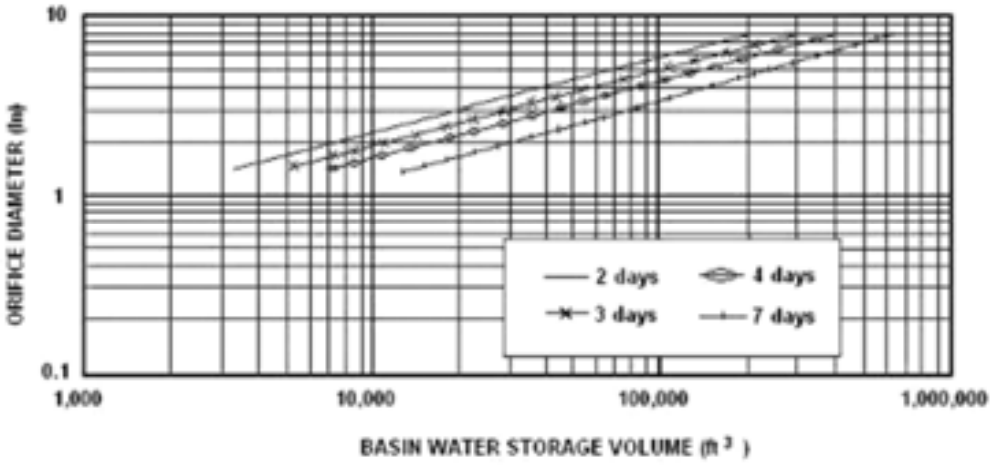
2. Filter fabric or media will be replaced as needed.

3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

Figure 5.3 - Skimmer Orifice Design Chart



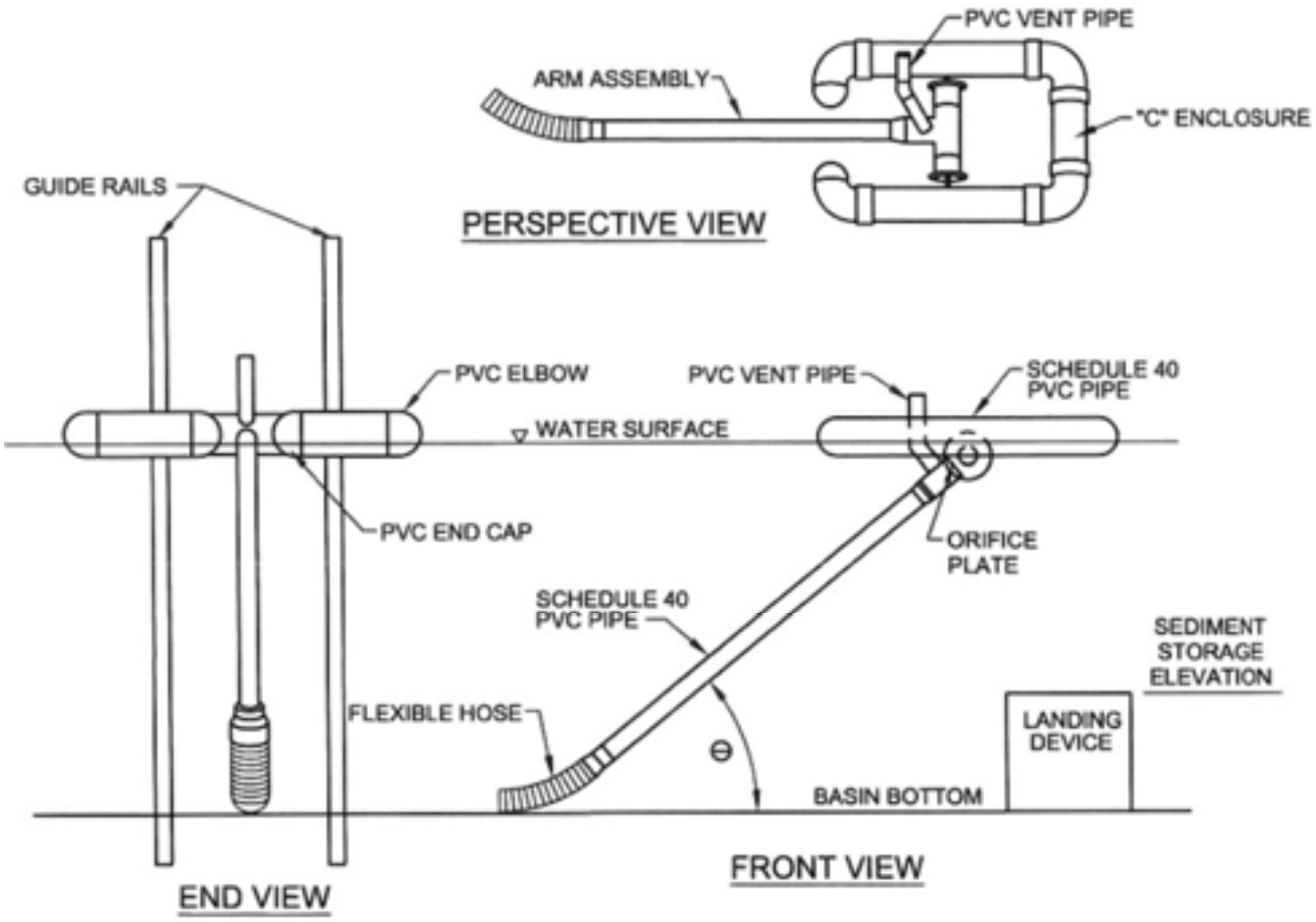
* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3" to 5" head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2" diameter, use a 2" head. For a 3" diameter tube, use a 2.5" head; 4" tube, use 3.3" head, 5" tube use 4" head, and 6" diameter tube use 5" head.

2. Find the vertical line representing the basin's dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)

* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle)
** Must be equal to or less than arm diameter

Skimmer Construction Notes

1. Pipe flotation section shall be solvent welded to ensure an airtight assembly. The contractor is required to conduct a test to check for leaks prior to installation.

2. Skimmer section shall have 12 rows of 1/2" diameter holes, 1 1/4" on center. If additional filtration is necessary, the filtering media shall consist of a Type GD-II geotextile fabric wrapped around the perforated portion of the skimmer and attached with plastic snap ties, bands, etc.

3. Flexible pipe shall be inserted into solid pipe and fastened with 2 #8 wood screws.

4. At a minimum, the structure shall be inspected after each rain and repairs made as needed. If vandalism is a problem, more frequent inspection may be necessary.

5. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

6. The structure shall only be removed when the contributing drainage area has been properly stabilized.

Materials

(Note: materials for a 4" diameter arm assembly)

1. Solid Pipe - 4" Schedule 40 PVC

2. Perforated Pipe - 4" Schedule 40 PVC

3. 90º Tee (1 each) - 4" Schedule 40 PVC

4. 90º Elbow (4 each) - 4" Schedule 40 PVC

5. Cap (2 each) - 4" Schedule 40 PVC, solid

6. Flexible pipe - 4" Corrugated Plastic Tubing (non-perforated)

Figure 5.5
Riser Pipe Dewatering Device

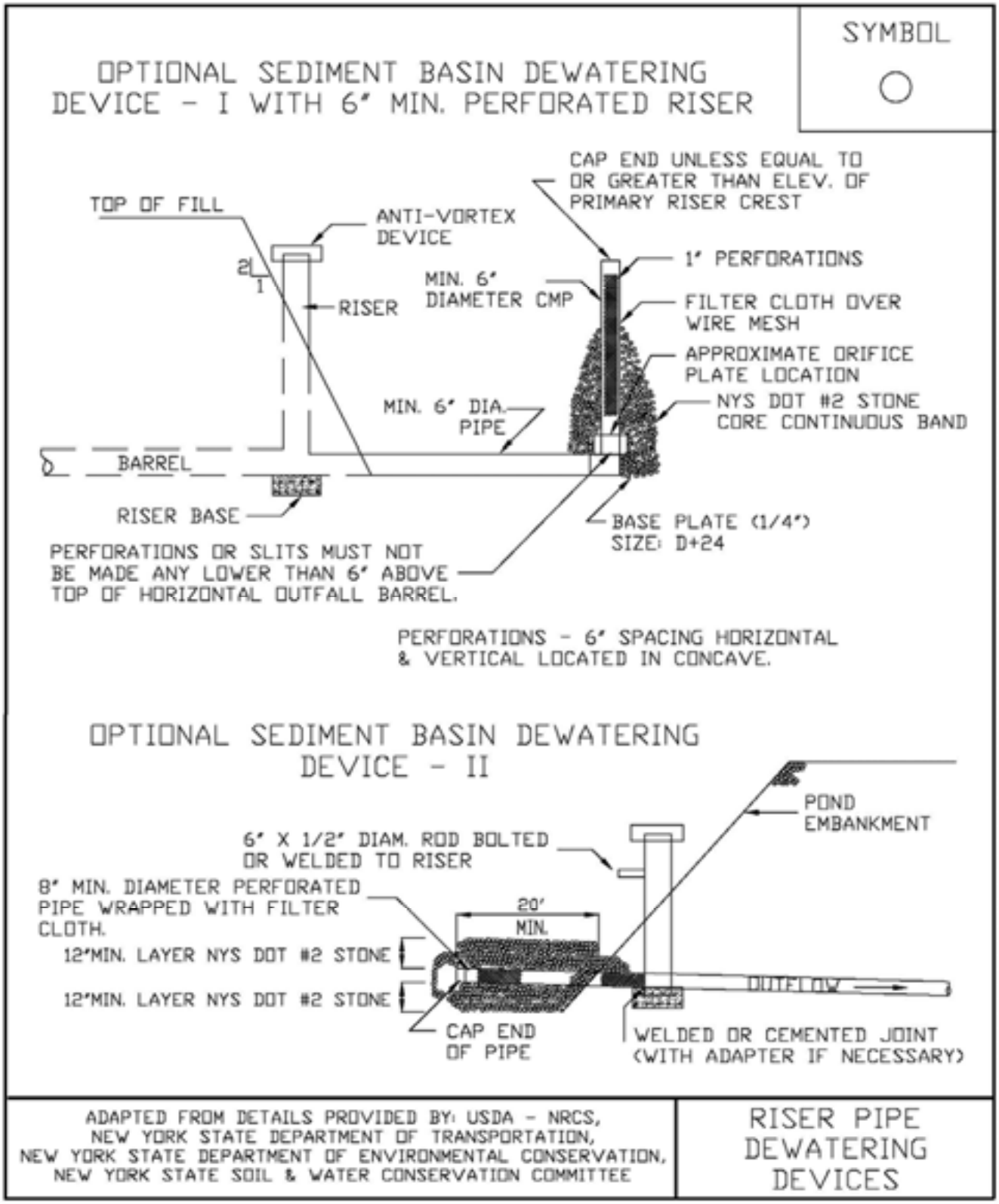


Figure 5.6
Riser Pipe Dewatering Device Construction Notes

Riser Pipe Construction Notes

1. Standpipe and connector pipe shall be a minimum of 6 inches diameter.

2. Metal pipe may be galvanized steel or aluminum; plastic pipe may be Schedule 40 PVC or HDPP.

3. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

4. The structure shall only be removed when the contributing drainage area has been properly stabilized.

5. All pipe connections shall be watertight. The lower portion of the standpipe, at a point above the barrel connection, shall be fitted with an internal orifice plate sized to release the volume of the basin no sooner than 48 hours.

6. The top 2/3 of the standpipe shall be perforated with 1 inch diameter hole or slit spaced 6 inches vertically and horizontally and placed in the concave portion of the pipe. No holes will be allowed within 6 inches inches of the horizontal connector pipe.

7. The riser shall be wrapped with a Type GD-II geotextile fabric. The fabric shall extend 6inches above the highest hole and 6" below the lowest hole. Where ends of fabric come together, they shall be overlapped, folded and stapled to prevent bypass.

8. Straps or connecting bands shall be used to hold the fabric and wire mesh (as needed) in place. They shall be placed at the top and bottom of the cloth.

9. The standpipe shall be anchored with either concrete base or steel plate base to prevent flotation. Concrete bases shall be 12 inches thick with the standpipe embedded nine inches. Steel plate bases will be 1/4 inch minimum thickness attached to the standpipe by a continuous weld around the bottom to form a watertight connection. The plate shall have 2.5 feet of stone, gravel or tampered earth placed on it.

10. The perforated standpipe shall be surrounded by NYSDOT #1 or #2 stone or a blend of both to protect the filter fabric.

STANDARD AND SPECIFICATIONS FOR GEOTEXTILE FILTER BAG



Definition & Scope

A **temporary** portable device through which sediment laden water is pumped to trap and retain sediment prior to its discharge to drainageways or off-site.

Condition Where Practice Applies

On sites where space is limited such as urban construction or linear projects (e.g. roads and utility work) where rights-of-way are limited and larger de-silting practices are impractical.

Design Criteria

1. Location - The portable filter bag should be located to minimize interference with construction activities and pedestrian traffic. It should also be placed in a location that is vegetated, relatively level, and provides for ease of access by heavy equipment, cleanout, disposal of trapped sediment, and proper release of filtered water.

   The filter bag shall also be placed at least 50 feet from all wetlands, streams or other surface waters.

2. Size - Geotextile filter bag shall be sized in accordance with the manufacturers recommendations based on the pump discharge rate.

Materials and Installation

1. The geotextile material will have the following attributes:

Minimum Grab Tensile Strength	200 lbs.
Minimum Grab Tensile Elongation	50 %
Minimum Trapezoid Tear Strength	80 lbs.
Mullen Burst Strength	380 psi
Minimum Puncture Strength	130 lbs
Apparent Opening Size	40 - 80 US sieve
Minimum UV Resistance	70%
Minimum Flow Thru Rate	70 gpm/sq ft

2. The bag shall be sewn with a double needle machine using high strength thread, double stitched “Joe” type capable of minimum roll strength of 100 lbs/inch (ASTM D4884).

3. The geotextile filter bag shall have an opening large enough to accommodate a 4 inch diameter discharge hose with an attached strap to tie off the bag to the hose to prevent back flow.

4. The geotextile shall be placed on a gravel bed 2 inches thick, a straw mat 4 inches thick, or a vegetated filter strip to allow water to flow out of the bag in all directions.

Maintenance

1. The geotextile filter bag is considered full when remaining bag flow area has been reduced by 75%. At this point, it should be replaced with a new bag.

2. Disposal may be accomplished by removing the bag to an appropriate designated upland area, cut open, remove the geotextile for disposal, and spread sediment contents and seeded and mulched according to the vegetative plan.

STANDARD AND SPECIFICATIONS FOR ROCK DAM



Definition & Scope

A rock embankment located to capture and retain sediment on the construction site and prevent sedimentation in offsite water bodies.

Conditions Where Practice Applies

The rock dam may be used instead of the standard sediment basin with barrel and riser. The rock dam is preferred when it is difficult to construct a stable, earthen embankment and rock materials are readily available. The site should be accessible for periodic sediment removal. This rock dam shall not be located in a perennial stream. The top of the dam will serve as the overflow outlet. The inside of the dam will be faced with smaller stone to reduce the rate of seepage so a sediment pool forms during runoff events.

Design Criteria

Drainage Area: The drainage area for this off stream structure is limited to 50 acres.

Location: The location of the dam should:

- provide a large area to trap sediment
- intercept runoff from disturbed areas
- be accessible to remove sediment
- not interfere with construction activities

Storage Volume: The storage volume behind the dam shall be at least 3,600 cubic feet per acre of drainage area to the dam. This volume is measured one foot below the crest of the dam.

Dam Section:

Top Width	5 feet minimum @ crest
Side Slopes	2:1 upstream slope 3:1 downstream slope
Height	6’ max to spillway crest

Length of Crest: The crest length should be designed to carry the 10 yr. peak runoff with a maximum flow depth of 1 foot and 1 foot of freeboard.

Rock at the abutments should extend at least 2 feet above the spillway and be at least 2 feet thick. These rock abutments should extend at least one foot above the downstream slope to prevent abutment scour. A rock apron at least 1.5 feet thick should extend downstream from the toe of the dam a distance equal to the height of the dam to protect the outlet area from scour.

Rock Fill: The rock fill should be well graded, hard, erosion resistant stone with a minimum d_{50} size of 9 inches. A “key trench” lined with geotextile filter fabric should be installed in the soil foundation under the rock fill. The filter fabric must extend from the key trench to the downstream edge of the apron and abutments to prevent soil movement and piping under the dam.

The upstream face of the dam should be covered with a fine washed gravel (NYS-DOT #1 or #1A gravel, crushed stone or equal) a minimum 3 feet thick to reduce the drainage rate.

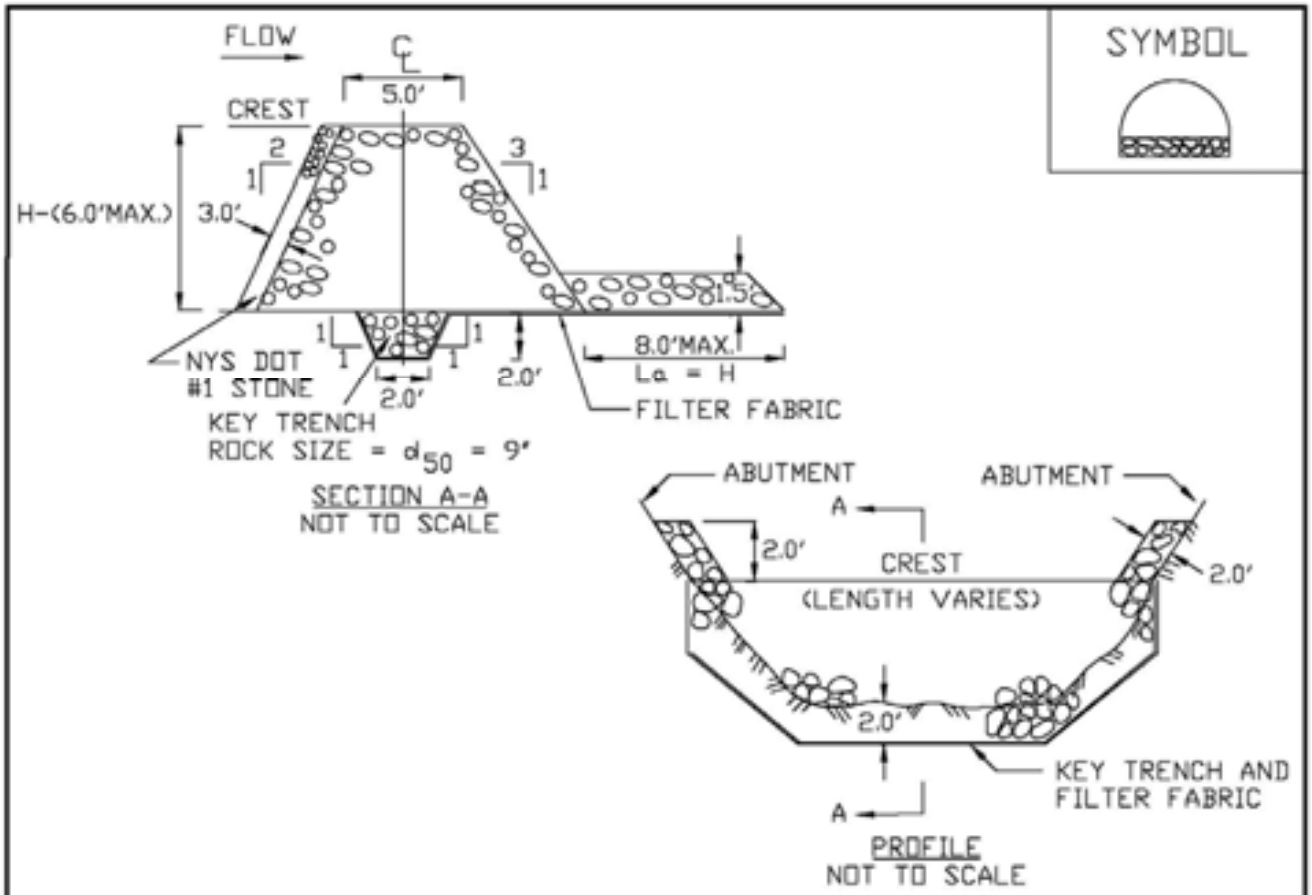
Trapping Efficiency: To obtain maximum trapping efficiency, design for a long detention period. Usually a minimum of eight (8) hours before the basin is completely drained. Maximize the length of travel of sediment laden water from the inlet to the drain for a minimum length to width ratio of 2 to 1 or greater. Achieve a surface area equal to 0.01 acres per cfs (inflow) based on the 10-year storm. See Figure 5.7 on page 5.18 for details.

Maintenance

Check the basin area after each rainfall event. Remove sediment and restore original volume when sediment accumulates to one-half the design volume. Check the structure for erosion, piping, and rock displacement after each significant event and replace immediately.

Remove the structure and any sediment immediately after the construction area has been permanently stabilized. All water should be removed from the basin prior to the removal of the rock dam. Sediment should be placed in designated disposal areas and not allowed to flow into streams or drainage ways during structure removal.

Figure 5.7
Rock Dam



CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER THE ROCK DAM SHALL BE CLEARED AND STRIPPED OF ROOTS AND OTHER OBJECTIONABLE MATERIAL. THE RESERVOIR SHALL BE CLEARED AS NEEDED TO FACILITATE SEDIMENT REMOVAL.
2. DIMENSIONS SHOWN ARE MINIMUM. TRENCH SHALL BE EXCAVATED FROM ABUTMENT TO ABUTMENT ON THE DAM CENTERLINE. FILTER FABRIC SHALL BE PLACED FROM UPSTREAM EDGE OF KEYTRENCH TO DOWNSTREAM EDGE OF APRON. JOINTS WILL LAP A MINIMUM OF 1 FT. WITH UPSTREAM STRIP ON TOP.
3. CONSTRUCT THE ROCK EMBANKMENT TO THE DIMENSIONS SHOWN ON THE DRAWING. ROCK ABUTMENTS SHALL BE MAINTAINED 2 FT. ABOVE THE CREST.
4. THE ROCK DAM SHALL BE CONSTRUCTED PRIOR TO CLEARING THE BASIN AREA. STABILIZE ALL DISTURBED AREAS, EXCEPT THE BASIN AREA, WITH TEMPORARY SEEDING.
5. FENCES AND WARNING SIGNS SHOULD BE PLACED AS APPROPRIATE.

MAXIMUM DRAINAGE AREA: 50 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

ROCK DAM

STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN



Definition & Scope

A **temporary** basin with a barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainageways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other control measures to adequately control runoff, erosion, and sedimentation. However, it is required that other erosion control measures be used with the sediment basin. The basin may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 50 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as **permanent** structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams."

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location - Maximum Drainage Area = 50 acres

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The sediment basin will contain two separate zones. The lowest zone is the sediment storage zone. This zone is sized for a volume equal to 1,000 cubic feet per disturbed acre over the course of the life of the project, contributing to the basin as measured from the bottom of the basin to the bottom of the dewatering zone. It shall have a minimum depth of 1 foot. Layered above this zone is the dewatering zone. This zone is sized for a minimum volume equal to 3,600 cubic feet per each acre draining to the basin. This volume is temporarily stored between the sediment storage zone and the crest of the principal spillway. This zone should be a minimum of 3 feet deep. See Figures 5.8 and 5.9 on pages 5.26 and 5.27. This 3,600 cubic feet per acre is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be 2:1 or greater, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end. See Figure 5.22 on page 5.41.

Surface Area

Research studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x$ D.A. (whichever is greater)

where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm. (The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

Sediment basins shall be cleaned out when the sediment storage zone volume described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the bottom of the dewatering zone. At this elevation, cleanout shall be performed to restore the original design volume to the sediment storage zone.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by standard accepted hydrologic methods noted previously in this book of standards. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten (10) year frequency, 24 hour duration storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5.10, 5.11 and 5.12 on pages 5.28, 5.29, and 5.30 for principal spillway sizes and capacities.

   A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

   B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not be other holes, leaks, rips, or perforations in the structure.

   C. Dewatering the basin:

      1) Preferred Method- The preferred method for dewatering sediment basins is by using surface skimmers to decant the cleaner top surface water from the basin as the sediment settles out. See Dewatering Device Standard, page 5.10.

      2) Alternative Method– A fixed vertical riser pipe configured with perforations and filter fabric with a cone of pea gravel or small crushed stone is an alternative option for use. See Figure 5.5 on page 5.14.

      The sediment basin dewatering system shall be designed to release the dewatering zone volume between 2 to 7 days in watersheds not impaired by sediment, and 4-7 days in sediment impaired watersheds (check the NYSDEC Waterbody Inventory/Priority Waterbody List - **http://www.dec.ny.gov/chemical/36730.html**, to see if your site is in an impaired watershed). The design performance range will depend on the percent of silt and clay in the soils tributary to the basin. If the performance of the basin does not meet water quality objectives after 7 days, chemical treatment may be necessary.

   D. Anti-vortex device and trash rack:

      An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5.13 and 5.14 on pages 5.31 and 5.32.

   E. Base:

      The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼" minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

      For risers greater than ten feet high, computations

shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5.15 on page 5.33 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

$$2(N)(P) = 1.15(L_s) \qquad N = (0.075)(L_s)/P$$

When anti-seep collars are used, the equation for revised seepage length becomes:

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight. See Figures 5.16 and 5.17 on pages 5.34 and 5.35 for anti-seep collar design and Figure 5.18 on page 5.36 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, Section 3, page 3.39.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5.19 on page 5.37 and the Design Tables in Figures 5.20 and 5.21 on pages 5.38 and 5.39.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

1. The maximum height of dam = 15 feet (measured from the low point of original ground at the downstream toe to the top of the dam).

2. Minimum top width of dam = 10 feet.

3. Side slopes shall be 2.5 to 1 or flatter.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for severe gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method (s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basins plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. **Sediment shall not be allowed to flush into a stream or drainageway.**

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include anionic polyelectrolytes such as polyacrylimides, aluminum sulfate (alum), polyaluminum chloride and chitosan. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. **Chemical applications shall not be applied without written approval from the NYSDEC.**

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one

wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than three (3) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified depth for cleanout noted on the plans which will not exceed 50% of the capacity of the sediment storage zone. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and backfilled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, New York State DEC, New York City DEP, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computations

    A. Zones total required

    B. Zones total Available

    C. Elevation of sediment at which cleanout shall be required; also stated as a distance from the riser

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by _____ Date _____Checked by _____Date _____
Project_____Basin #_____
Location _____ Total Area draining to basin (≤50 Ac.) _____Acres

BASIN SIZE DESIGN

1. Sediment storage zone volume = 1,000 cu. ft. x number of disturbed acres = _____ cu. ft., Top of Zone Elev. _____
2. Dewatering zone volume = 3,600 cu. ft. x number of drainage area acres = _____cu. ft., Top of Zone Elev. _____
3. Length to width ratio = _____
4. A. Cleanout at 50% of sediment storage zone volume, Elev. _____
   B. Distance below top of riser _____ feet
5. Minimum surface area is larger of 0.01 $Q_{(10)}$_____or, 0.015 DA = _____ use _____acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

6. $Q_{p(10)}$ = _____cfs (Attach runoff computation sheets)

Pipe Spillway (Q_{ps})

7. Min. pipe spillway cap., Q_{ps} = 0.2 x _____Drainage Area, acres = _____cfs
   Note: If there is no emergency spillway, then required Q_{ps} = $Q_{p(10)}$ = _____cfs.
8. H, head = _____ft. Barrel length = _____ft
9. Barrel: Diam. _____inches; Q_{ps} = (Q) _____x (cor.fac.)_____=_____cfs.
10. Riser: Diam. _____inches; Length _____ft.; h = _____ft. Crest Elev. _____
11. Trash Rack: Diameter = _____inches; H, height = _____inches

Emergency Spillway Design

12. Emergency Spillway Flow, Q_{es} = Q_p - Q_{ps} = _____ - _____ = _____cfs.
13. Width _____ft.; H_p_____ft Crest elevation _____; Design High Water Elev. _____
    Entrance channel slope_____% ; Top of Dam Elev. _____
    Exit channel slope _____%

ANTI-SEEP COLLAR/SEEPAGE DIAPHRAGM DESIGN

Collars:

14. y = _____ft.; z = _____:1; pipe slope = _____%, L_s = _____ft.
    Use _____ collars, _____ - _____inches square; projection = _____ft.

Diaphragms:

#_____ width_____ ft. height _____ft.

DEWATERING ORIFICE SIZING

(Determined from the Dewatering Device Standard)

15. Dewatering orifice diameter = _____ inches. Skimmer ___ or Riser ____ (check one)
16. Design dewatering time _____ days (Min. 2 days required)

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage zone volume is 1,000 cubic feet per acre from each disturbed acre within the total drainage area. Minimum required dewatering zone volume is 3,600 cubic feet per total area draining to the basin.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required zone volumes.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5. Use of the NRCC hydrologic data at www.precip.net with an appropriate hydrologic model, is the preferred process for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of "H" from field conditions; "H" is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Flow Charts, Figures 5.11 and 5.12 on pages 5.29 and 5.30.

9. See Riser Inflow Curves, Figure 5.10 on page 5.28.

10. Compute the orifice size required to dewater the basin over a minimum 48 hour period. See the Dewatering Device Standard on page 5.10.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5.13 and 5.14 on pages 5.31 and 5.32.

12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason (s).

14. See Anti-Seep Collar / Seepage Diaphragm Design (see figures 5.16, 5.17 and 5.18 on pages 5.34, 5.35 and 5.36).

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

To use charts for pipe spillway design:

1. Enter chart, Figures 5.11 or 5.12 on pages 5.29 and 5.30 with H and required discharge.

2. Find diameter of pipe conduit that provides equal or greater discharge

3. Enter chart, Figure 5.10 on page 5.28 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Figure 5.8
Pipe Spillway Design

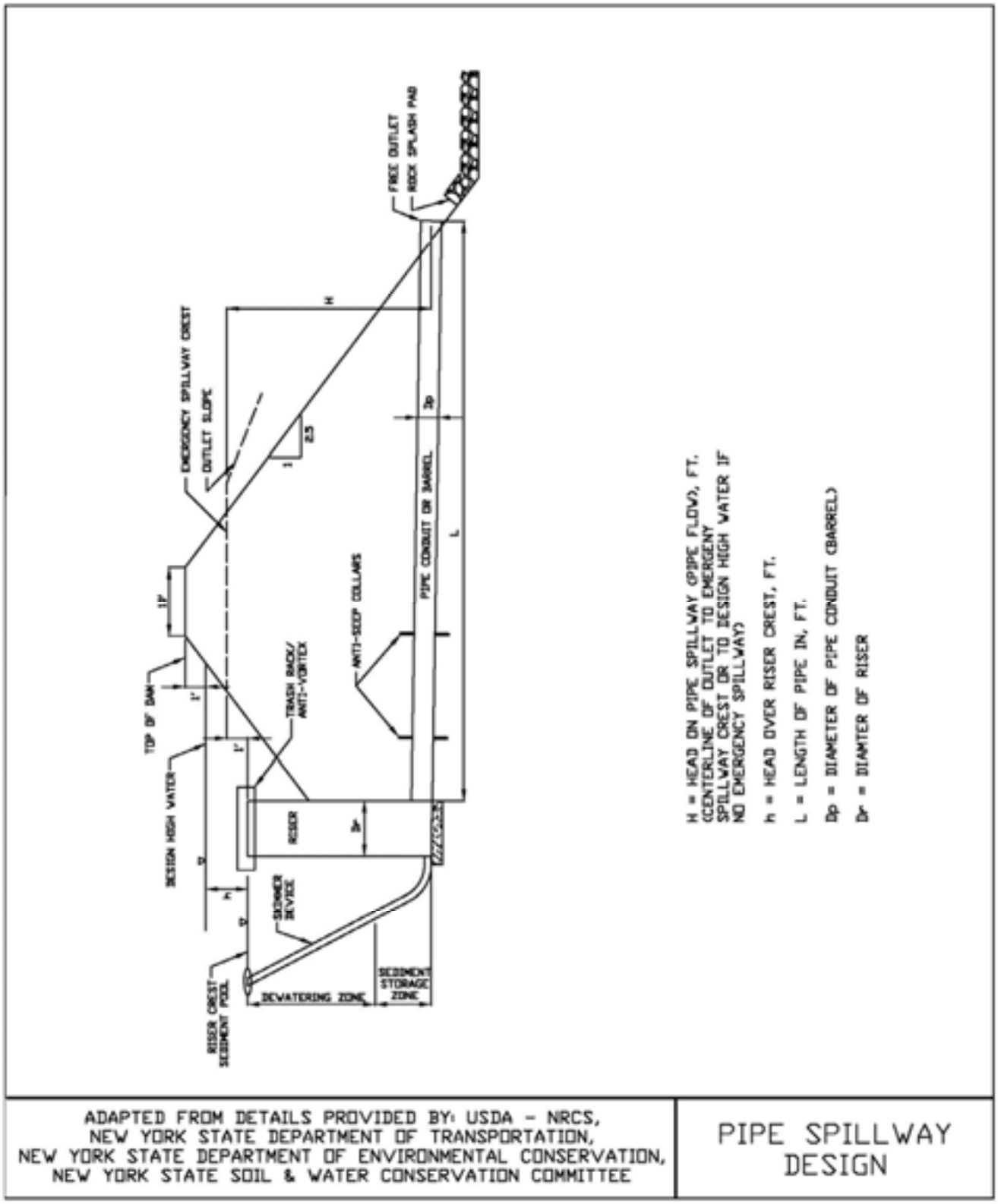


Figure 5.9
Sediment Basin

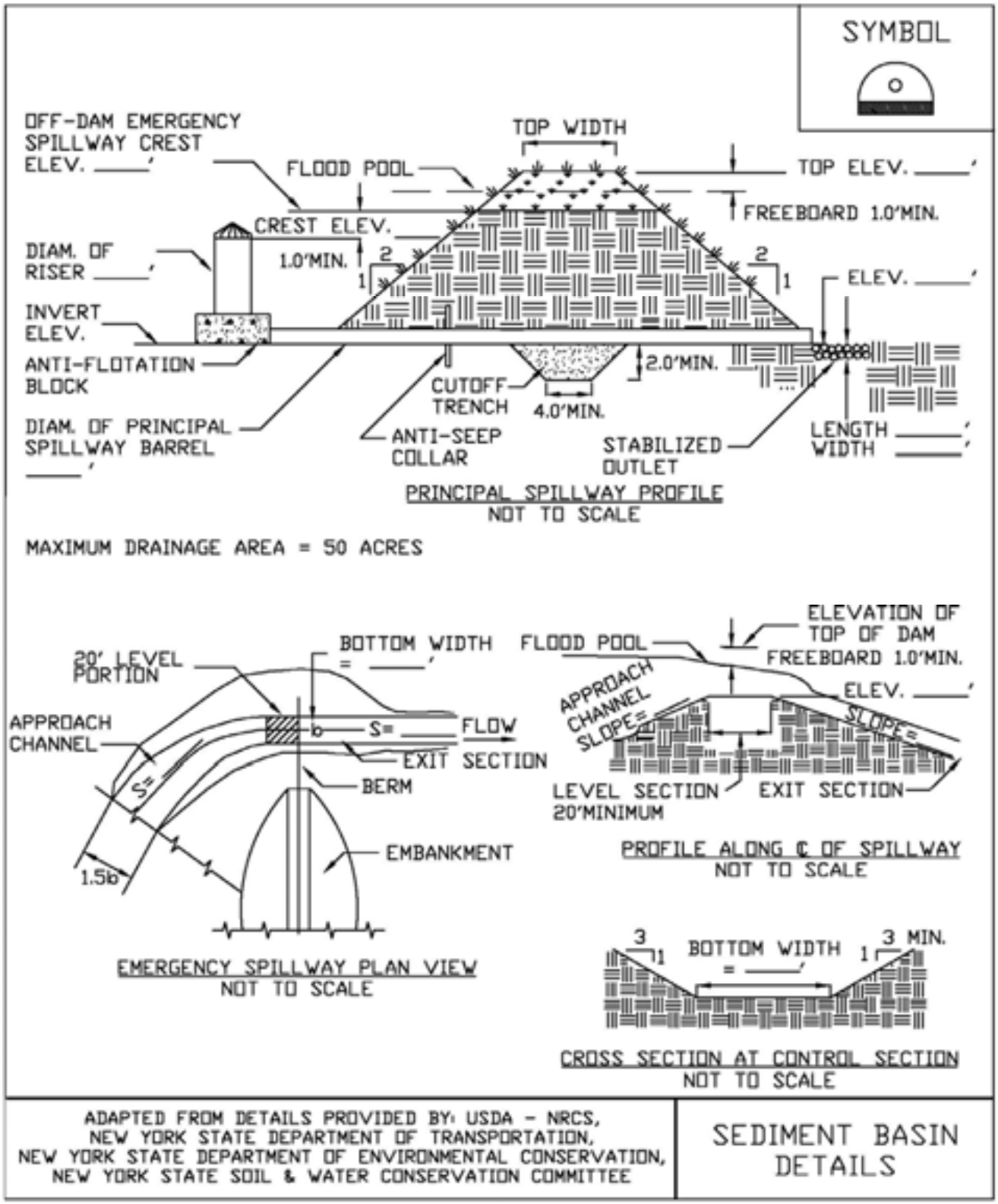


Figure 5.10
Riser Inflow Chart (USDA - NRCS)

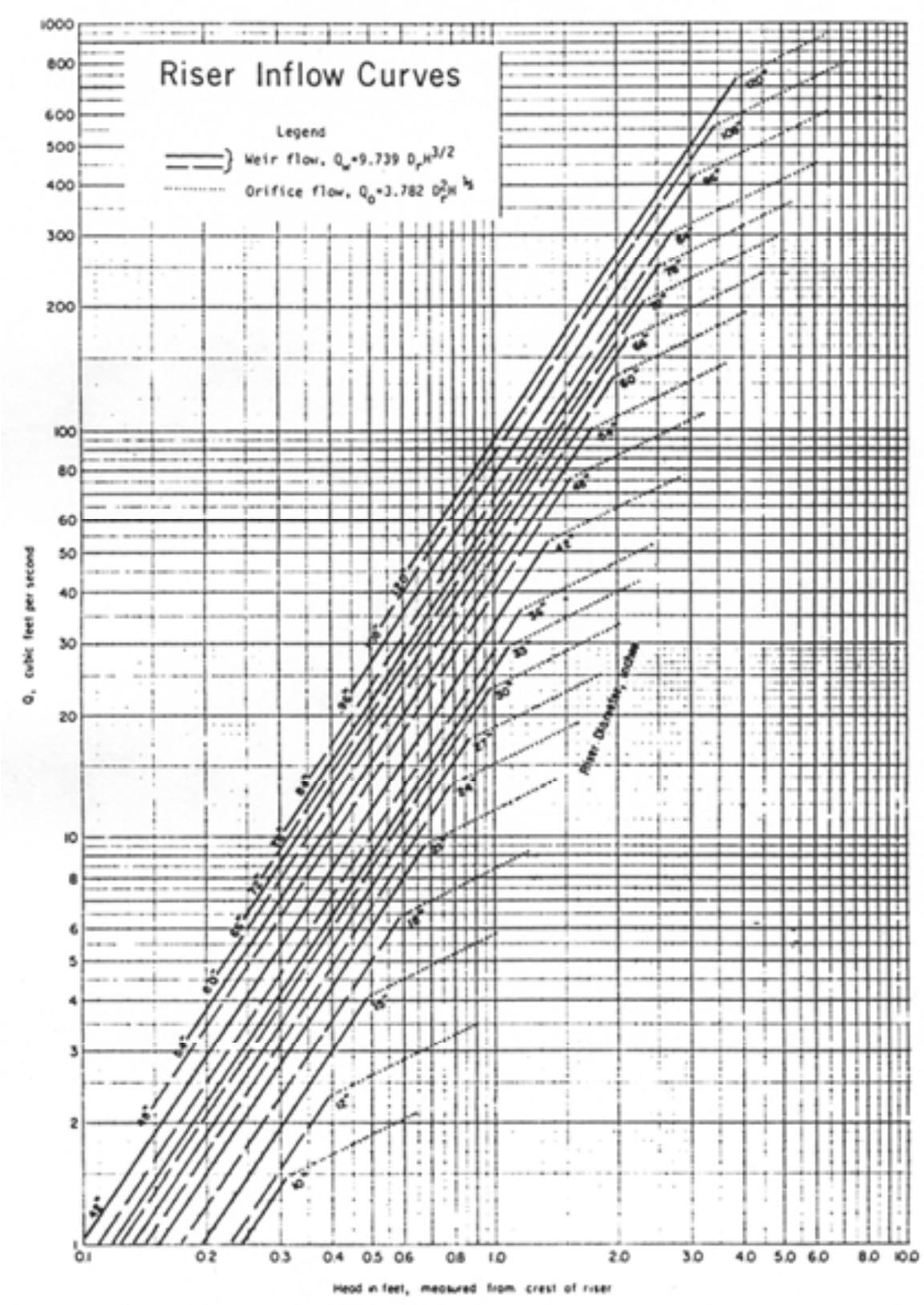


Figure 5.11
Pipe Flow Chart; "n" = 0.025 (USDA - NRCS)

PIPE FLOW CHART n = 0.025

FOR CORRUGATED METAL PIPE INLET $K_e = K_e + K_b = 1.0$ AND 70 FEET OF CORRUGATED METAL PIPE CONDUIT (full flow assumed)

Note correction factors for pipe lengths other than 70 feet

H, in feet	diameter of pipe in inches																							
	6"	8"	10"	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	0.33	0.70	1.25	1.98	3.48	5.47	7.99	11.0	18.8	28.8	41.1	55.7	72.6	91.8	113	137	163	191	222	255	290
2	0.47	0.99	1.76	2.80	4.92	7.74	11.3	15.6	26.6	40.8	58.2	78.8	103	130	160	194	231	271	314	360	410
3	0.58	1.22	2.16	3.43	6.02	9.48	13.8	19.1	32.6	49.9	71.2	96.5	126	159	196	237	282	331	384	441	502
4	0.67	1.40	2.49	3.97	6.96	10.9	16.0	22.1	37.6	57.7	82.3	111	145	184	226	274	326	383	444	510	580
5	0.74	1.57	2.79	4.41	7.78	12.2	17.9	24.7	42.1	64.5	92.0	125	162	205	253	306	365	428	496	570	648
6	0.82	1.72	3.05	4.86	8.52	13.4	19.6	27.0	46.1	70.6	101	136	178	225	277	336	399	469	544	624	710
7	0.88	1.86	3.30	5.25	9.20	14.5	21.1	29.2	49.8	76.3	109	147	192	243	300	362	431	506	587	674	767
8	0.94	1.99	3.53	5.61	9.84	15.5	22.6	31.2	53.2	81.5	116	158	205	260	320	388	461	541	628	721	820
9	1.00	2.11	3.74	5.95	10.4	16.4	24.0	33.1	56.4	86.5	123	167	218	275	340	411	489	574	666	764	870
10	1.05	2.22	3.94	6.27	11.0	17.3	25.3	34.9	59.5	91.2	130	176	230	290	358	433	516	605	702	806	917
11	1.10	2.33	4.13	6.58	11.5	18.2	26.5	36.6	62.4	95.6	136	185	241	304	376	454	541	635	736	845	962
12	1.15	2.43	4.32	6.87	12.1	19.0	27.7	38.2	65.2	99.9	142	193	252	318	392	475	565	663	769	883	1004
13	1.20	2.53	4.49	7.15	12.6	19.7	28.8	39.8	67.8	104	148	201	262	331	408	494	588	690	800	919	1045
14	1.25	2.63	4.66	7.42	13.0	20.5	29.9	41.3	70.4	108	154	208	272	343	424	513	610	716	830	953	1085
15	1.29	2.72	4.83	7.68	13.5	21.2	30.9	42.8	72.8	112	159	216	281	355	439	531	631	741	860	987	1123
16	1.33	2.81	4.99	7.93	13.9	21.9	32.0	44.2	75.2	115	165	223	290	367	453	548	652	765	888	1019	1160
17	1.37	2.90	5.14	8.18	14.3	22.6	32.9	45.5	77.5	119	170	230	299	378	467	565	672	789	915	1051	1195
18	1.41	2.98	5.29	8.41	14.8	23.2	33.9	46.8	79.8	120	174	236	308	389	480	581	692	812	942	1081	1230
19	1.45	3.06	5.43	8.64	15.2	23.9	34.8	48.1	82.0	126	179	243	316	400	494	597	711	834	967	1111	1264
20	1.49	3.14	5.57	8.87	15.6	24.5	35.7	49.4	84.1	129	184	249	325	410	506	613	729	856	993	1139	1297
21	1.53	3.22	5.71	9.09	15.9	25.1	36.6	50.6	86.2	132	188	255	333	421	519	628	747	877	1017	1168	1329
22	1.56	3.29	5.85	9.30	16.3	25.7	37.5	51.8	88.2	135	193	261	341	430	531	643	765	898	1041	1195	1360
23	1.60	3.37	5.98	9.51	16.7	26.2	38.3	53.0	90.2	138	197	267	348	440	543	657	782	918	1064	1222	1390
24	1.63	3.44	6.11	9.72	17.0	26.8	39.1	54.1	92.1	141	201	273	356	450	555	671	799	937	1087	1248	1420
25	1.66	3.51	6.23	9.92	17.4	27.4	39.9	55.2	94.0	144	206	279	363	459	566	685	815	957	1110	1274	1450
26	1.70	3.58	6.36	10.1	17.7	27.9	40.7	56.3	95.9	147	210	284	370	468	577	699	831	976	1132	1299	1478
27	1.73	3.65	6.48	10.3	18.1	28.4	41.5	57.4	97.7	150	214	290	377	477	588	712	847	994	1153	1324	1507
28	1.76	3.72	6.60	10.5	18.4	29.0	42.3	58.4	99.5	153	218	295	384	486	599	725	863	1013	1174	1348	1534
29	1.79	3.78	6.71	10.7	18.7	29.5	43.0	59.5	101	155	221	300	391	494	610	738	878	1030	1195	1372	1561
30	1.82	3.85	6.83	10.9	19.1	30.0	43.7	60.5	103	158	225	305	398	503	620	750	893	1048	1216	1396	1588

L, in feet	Correction Factors For Other Pipe Lengths																							
20	1.49	1.63	1.58	1.53	1.47	1.42	1.37	1.34	1.28	1.24	1.20	1.16	1.16	1.14	1.13	1.11	1.10	1.10	1.09	1.08	1.08
30	1.44	1.41	1.39	1.36	1.32	1.29	1.27	1.24	1.21	1.18	1.15	1.13	1.12	1.11	1.10	1.09	1.08	1.08	1.07	1.06	1.06
40	1.41	1.27	1.25	1.23	1.21	1.20	1.18	1.17	1.14	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.05	1.04
50	1.16	1.16	1.15	1.14	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.04	1.04	1.01	1.03
60	1.07	1.07	1.07	1.06	1.06	1.05	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.94	.94	.95	.95	.95	.96	.96	.96	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.98	.99	.99
90	.89	.89	.90	.90	.91	.91	.92	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97	.97	.97	.97	.94
100	.85	.85	.86	.86	.87	.88	.89	.89	.90	.91	.92	.93	.93	.94	.94	.95	.95	.95	.96	.96	.94
120	.78	.79	.79	.80	.81	.82	.83	.83	.85	.86	.87	.89	.89	.90	.91	.92	.92	.93	.93	.94	.92
140	.72	.73	.74	.75	.76	.77	.78	.79	.81	.82	.84	.85	.86	.87	.88	.89	.89	.90	.91	.91	.90
160	.68	.69	.69	.70	.71	.73	.74	.75	.77	.79	.80	.82	.83	.84	.85	.86	.87	.88	.89	.89	

Figure 5.12
Pipe Flow Chart; "n" = 0.013 (USDA - NRCS)

PIPE FLOW CHART n = 0.013

FOR REINFORCED CONCRETE PIPE INLET $K_m = K_e + K_b = 1.00$ AND 70 FEET OF REINFORCED CONCRETE PIPE CONDUIT (full flow assumed)

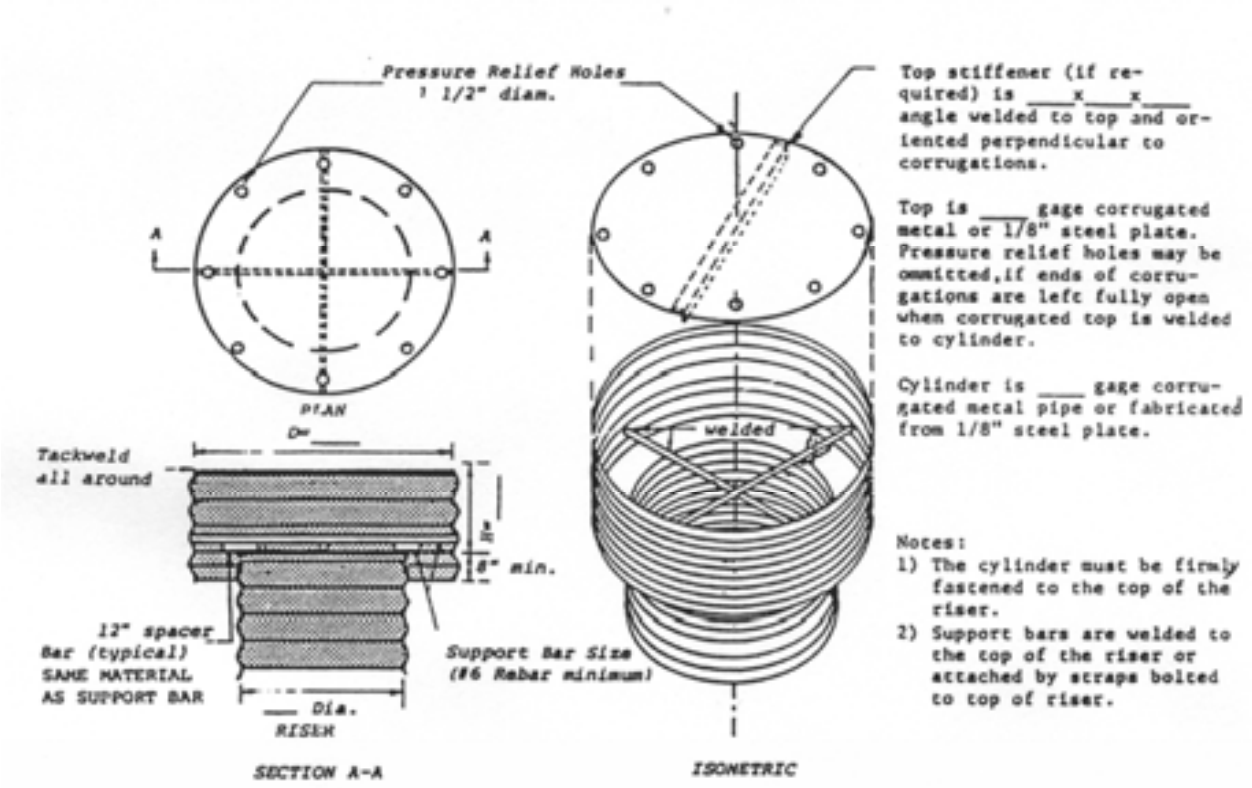
Note correction factors for pipe lengths other than 70 feet

diameter of pipe in inches

H, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	3.22	5.44	8.29	11.8	15.9	26.0	38.6	53.8	71.4	91.5	114	139	167	197	229	264	302	342
2	4.55	7.69	11.7	16.7	22.5	36.8	54.6	76.0	101	129	161	197	236	278	324	374	427	483
3	5.57	9.42	14.4	20.4	27.5	45.0	66.9	93.1	124	159	198	241	289	341	397	458	523	592
4	6.43	10.9	16.6	23.5	31.8	52.0	77.3	108	143	183	228	278	334	394	459	529	604	683
5	7.19	12.2	18.5	26.3	35.5	58.1	86.4	120	160	205	255	311	373	440	513	591	675	764
6	7.88	13.3	20.3	28.8	38.9	63.7	94.6	132	175	224	280	341	409	482	562	647	739	837
7	8.51	14.4	21.9	31.1	42.0	68.8	102	142	189	242	302	368	441	521	607	699	798	904
8	9.10	15.4	23.5	33.3	44.9	73.5	109	152	202	259	323	394	472	557	685	748	854	966
9	9.65	16.3	24.9	35.3	47.7	78.0	116	161	214	275	342	418	500	590	688	793	905	1025
10	10.2	17.2	26.2	37.2	50.2	82.2	122	170	226	289	361	440	527	622	725	836	954	1080
11	10.7	18.0	27.5	39.0	52.7	86.2	128	178	237	304	379	462	553	653	761	877	1001	1133
12	11.1	18.9	28.7	40.8	55.0	90.1	134	186	247	317	395	482	578	682	794	916	1045	1184
13	11.6	19.6	29.9	42.4	57.3	93.7	139	194	257	330	411	502	601	710	827	953	1088	1232
14	12.0	20.4	31.0	44.1	59.4	97.3	145	201	267	342	427	521	624	736	858	989	1129	1278
15	12.5	21.1	32.1	45.6	61.5	101	150	208	277	354	442	539	646	762	888	1024	1169	1323
16	12.9	21.8	33.2	47.1	63.5	104	155	215	286	366	457	557	667	787	917	1057	1207	1367
17	13.3	22.4	34.2	48.5	65.5	107	159	222	294	377	471	574	688	812	946	1090	1244	1409
18	13.7	23.1	35.2	49.9	67.4	110	164	228	303	388	484	591	708	835	973	1121	1280	1450
19	14.0	23.7	36.1	51.3	69.2	113	168	234	311	399	497	607	727	858	1000	1152	1315	1489
20	14.4	24.3	37.1	52.6	71.0	116	173	240	319	409	510	623	746	880	1026	1182	1350	1528
21	14.7	24.9	38.0	53.9	72.8	119	177	246	327	419	523	638	764	902	1051	1211	1383	1566
22	15.1	25.5	38.9	55.2	74.5	122	181	252	335	429	535	653	782	923	1076	1240	1415	1603
23	15.4	26.1	39.8	56.5	76.2	125	186	258	342	439	547	668	800	944	1100	1268	1447	1639
24	15.8	26.7	40.6	57.7	77.8	127	189	263	350	448	559	682	817	964	1123	1295	1478	1674
25	16.1	27.2	41.5	58.9	79.4	130	193	269	357	458	571	696	834	984	1147	1322	1509	1708
26	16.4	27.7	42.3	60.0	81.0	133	197	274	364	467	582	710	850	1004	1169	1348	1539	1742
27	16.7	28.3	43.1	61.2	82.5	135	201	279	371	476	593	723	867	1023	1192	1373	1568	1775
28	17.0	28.8	43.9	62.3	84.1	138	204	285	378	484	604	737	883	1041	1214	1399	1597	1808
29	17.3	29.3	44.7	63.4	85.5	140	208	290	384	493	615	750	898	1060	1235	1423	1625	1840
30	17.6	29.8	45.4	64.5	87.0	142	212	294	391	501	625	763	913	1078	1256	1448	1653	1871

L, in feet	Correction Factors for Other Pipe Lengths																	
20	1.30	1.24	1.21	1.18	1.15	1.12	1.10	1.08	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
30	1.22	1.18	1.15	1.13	1.12	1.09	1.08	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02
40	1.15	1.13	1.11	1.10	1.08	1.07	1.05	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
50	1.09	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
60	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.96	.97	.97	.97	.98	.98	.98	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99
90	.93	.94	.94	.95	.95	.96	.97	.97	.98	.98	.98	.98	.98	.98	.99	.99	.99	.99
100	.90	.91	.92	.93	.93	.95	.95	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99
120	.84	.86	.87	.89	.90	.91	.93	.94	.94	.95	.96	.96	.96	.97	.97	.97	.97	.98
140	.80	.82	.83	.85	.86	.88	.90	.91	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97
160	.76	.78	.80	.82	.83	.84	.88	.89	.90	.91	.92	.93	.94	.94	.95	.95	.95	.96

Figure 5.13
Concentric Trash Rack and Anti-Vortex Device (USDA - NRCS)



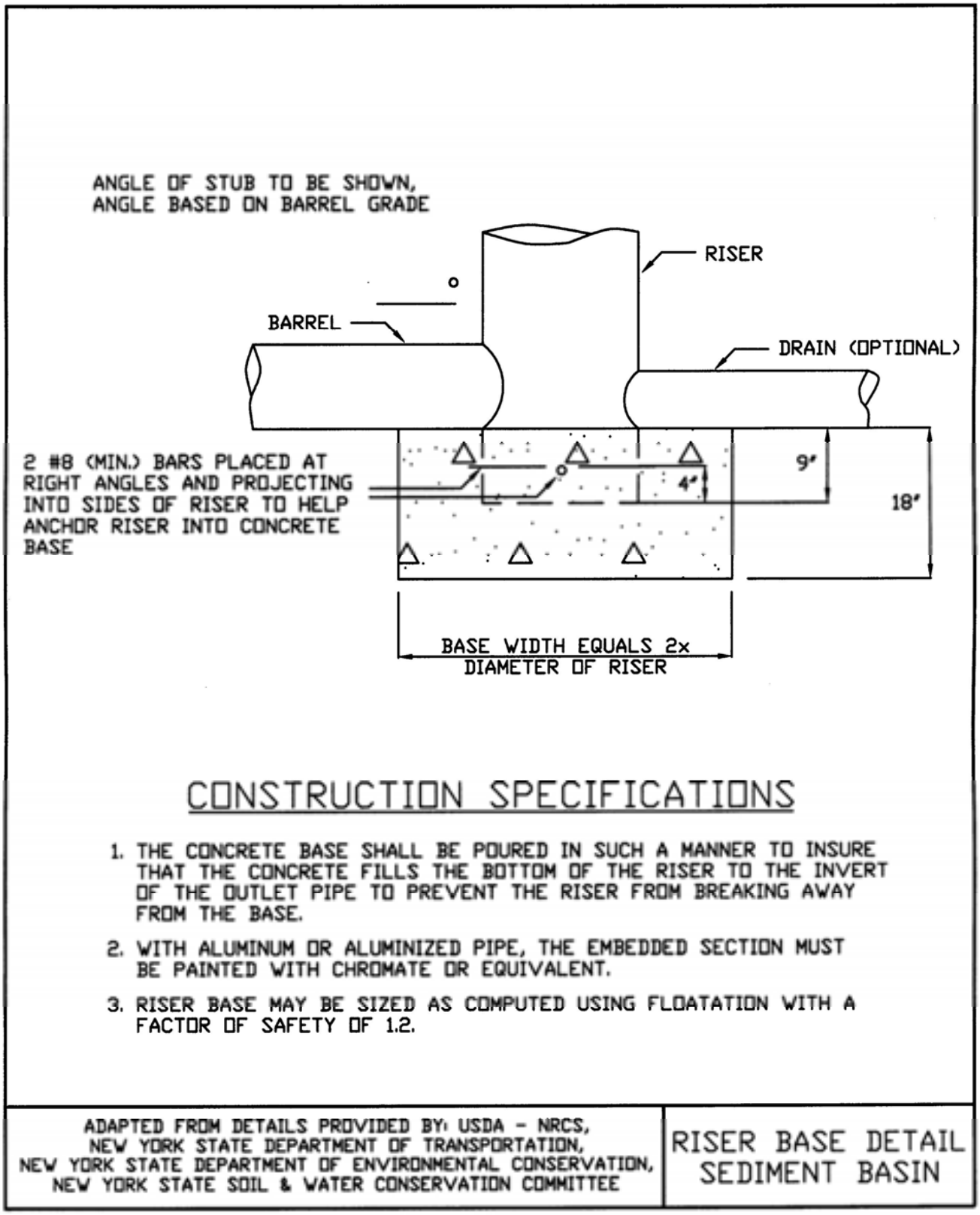
CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE
(not to scale)

Figure 5.14
Concentric Trash Rack and Anti-Vortex Device Design Table
(USDA - NRCS)

Riser Diam.(in)	Cylinder Diam (in.)	Thick. Gage	H (in.)	Minimum Size Support Bar	Minimum Top Thickness	Minimum Top Stiffener
12	18	16	6	#6 Rebar	16 ga.	—
15	21	16	7	#6 Rebar	16 ga.	—
18	27	16	8	#6 Rebar	16 ga.	—
21	30	16	11	#6 Rebar	16 ga.	—
24	36	16	13	#6 Rebar	14 ga.	—
27	42	16	15	#6 Rebar	14 ga.	—
36	54	14	17	#8 Rebar	12 ga.	—
42	60	14	19	#8 Rebar	12 ga.	—
48	72	12	21	1 1/4" pipe or 1 1/4x1 1/4x1/4 angle	10 ga.	—
54	78	12	25	See 48" Riser	10 ga.	—
60	90	12	29	1 1/2" pipe or 1 1/2x1 1/2x1/2 angle	8 ga.	—
66	96	10	33	2" pipe or 2x2x3/16 angle	8 ga. w/stiffener	2x2x1/4 angle
72	102	10	36	———See 66" Riser———		2 1/2x2 1/2x1/4 angle
78	114	10	39	2 1/2" pipe or 2x2x1/4 angle	See 72" Riser	See 72" Riser
84	120	10	42	2 1/2" pipe or 2 1/2x2 1/2x1/4 angle	See 72" Riser	2 1/2x 5/16 angle

Note: The criteria for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.

Figure 5.15
Riser Base Details



CONSTRUCTION SPECIFICATIONS

1. THE CONCRETE BASE SHALL BE POURED IN SUCH A MANNER TO INSURE THAT THE CONCRETE FILLS THE BOTTOM OF THE RISER TO THE INVERT OF THE OUTLET PIPE TO PREVENT THE RISER FROM BREAKING AWAY FROM THE BASE.
2. WITH ALUMINUM OR ALUMINIZED PIPE, THE EMBEDDED SECTION MUST BE PAINTED WITH CHROMATE OR EQUIVALENT.
3. RISER BASE MAY BE SIZED AS COMPUTED USING FLOATATION WITH A FACTOR OF SAFETY OF 1.2.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RISER BASE DETAIL SEDIMENT BASIN

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25 - \text{pipe slope}}\right]$$

Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:

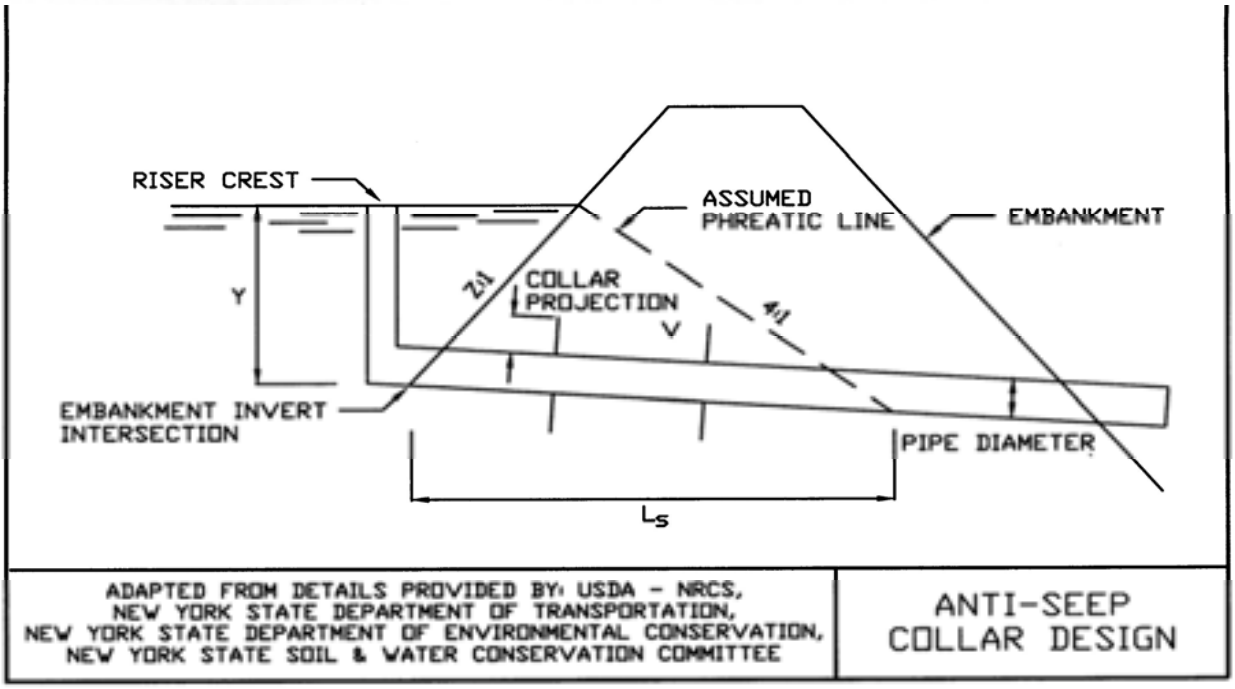


Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)

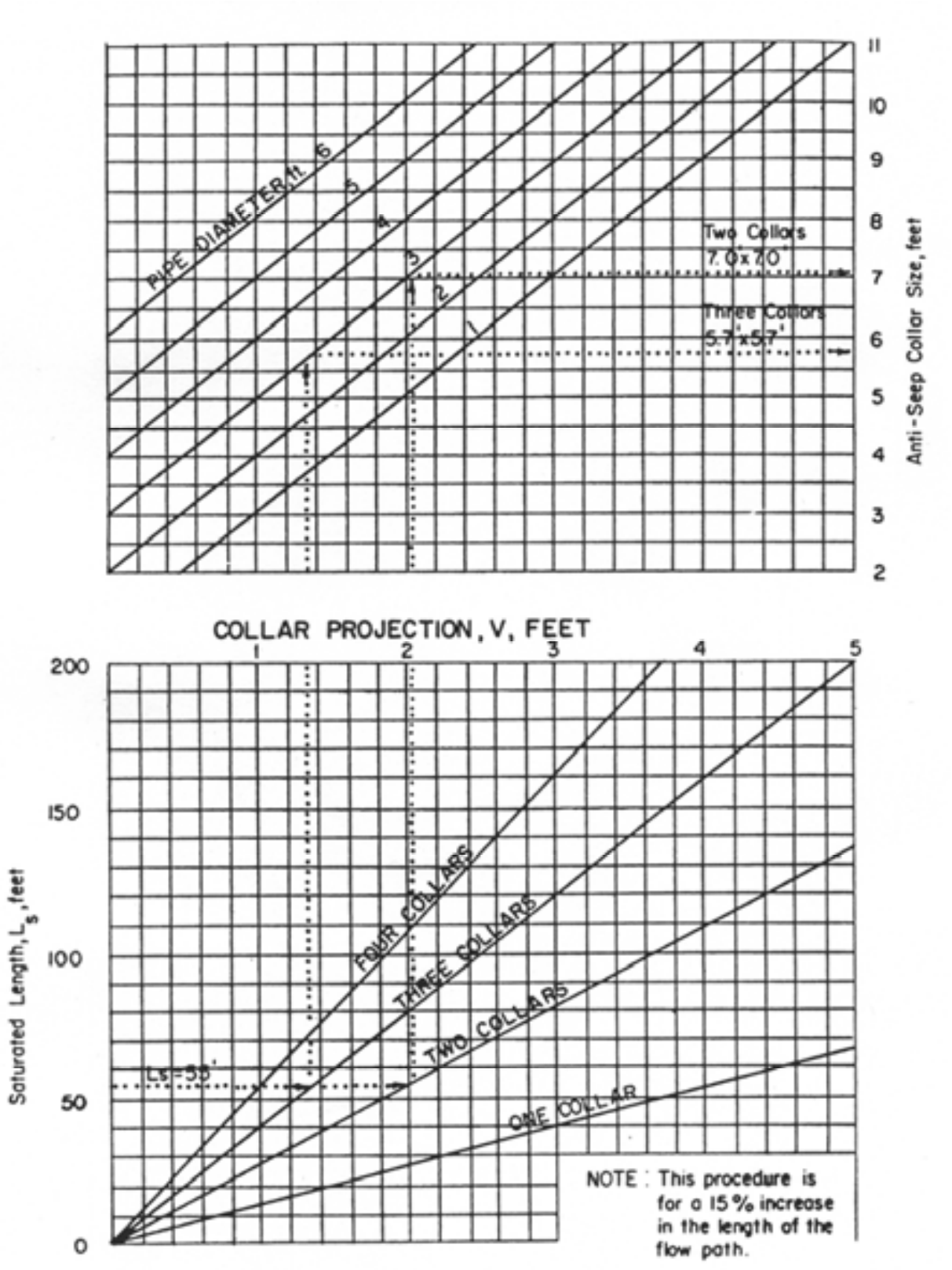


Figure 5.18
Anti-Seep Collar

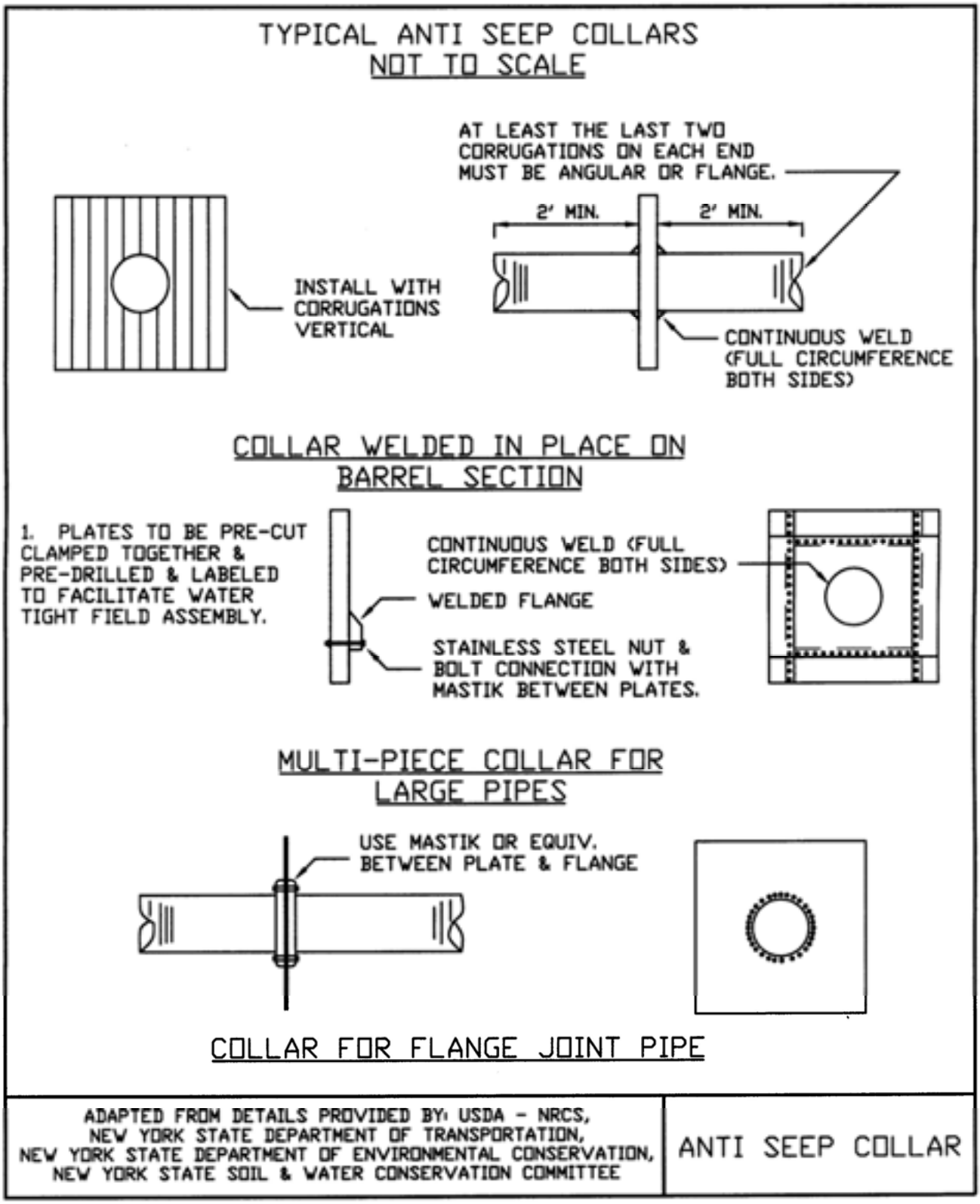
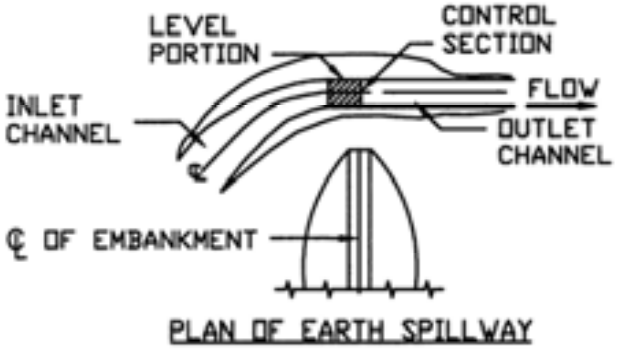
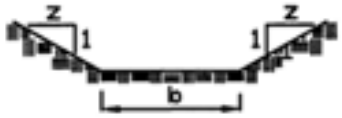


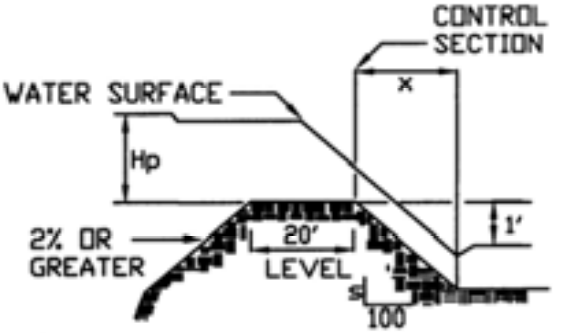
Figure 5.19
Design Data for Earth Spillways



PLAN OF EARTH SPILLWAY



CROSS SECTION OF EARTH SPILLWAY AT CONTROL SECTION



PROFILE ALONG CENTERLINE OF EARTH SPILLWAY

LEGEND

n = MANNING'S COEFFICIENT OF ROUGHNESS.

Hp = DIFFERENCE IN ELEVATION BETWEEN CREST OF EARTH SPILLWAY AT THE CONTROL SECTION AND WATER SURFACE IN RESERVOIR, IN FEET.

b = BOTTOM WIDTH OF EARTH SPILLWAY AT THE CONTROL SECTION, IN FEET.

Q = TOTAL DISCHARGE, IN cfs.

V = VELOCITY, IN FEET PER SECOND, THAT WILL EXIST IN CHANNEL BELOW CONTROL SECTION, AT DESIGN Q, IF CONSTRUCTED TO SLOPE (S) THAT IS SHOWN.

S = FLATTEST SLOPE (S), IN %, ALLOWABLE FOR CHANNEL BELOW CONTROL SECTION.

X = MINIMUM LENGTH OF CHANNEL BELOW CONTROL SECTION, IN FEET.

z = SIDE SLOPE RATIO.

NOTES:

1) FOR A GIVEN Hp A DECREASE IN THE EXIT SLOPE FROM S AS GIVEN IN THE TABLE DECREASES SPILLWAY DISCHARGE BUT INCREASING THE EXIT SLOPE FROM S DOES NOT INCREASE DISCHARGE. IF AN EXIT SLOPE (Se) STEEPER THAN S IS USED, THEN VELOCITY (Ve) IN THE EXIT CHANNEL WILL INCREASE ACCORDING TO THE FOLLOWING RELATIONSHIP:

$$Ve = V\left(\frac{Se}{S}\right)0.3$$

2) DATA TO RIGHT OF HEAVY VERTICAL LINES ON DRAWINGS SHOULD BE USED WITH CAUTION, AS THE RESULTING SECTIONS WILL BE EITHER POORLY PROPORTIONED OR HAVE VELOCITIES IN EXCESS OF 6 FT/SEC.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

DESIGN DATA FOR EARTH SPILLWAYS

Figure 5.20
Design Table for Vegetated Earth Spillways in Erosion Resistant Soils, K=0.1 - 0.35, Side Slopes = 3:1

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
15	3.3	12.2	8	.83
	3.5	18.2	12	.69
20	3.1	8.9	8	.97
	3.2	13.0	12	.81
	3.3	17.3	16	.70
25	2.9	7.1	8	1.09
	3.2	9.9	12	.91
	3.3	13.2	16	.79
	3.3	17.2	20	.70
30	2.9	6.0	8	1.20
	3.0	8.2	12	1.01
	3.0	10.7	16	.88
	3.3	13.8	20	.78
35	2.8	5.1	8	1.30
	2.9	6.9	12	1.10
	3.1	9.0	16	.94
	3.1	11.3	20	.85
	3.2	14.1	24	.77
40	2.7	4.5	8	1.40
	2.9	6.0	12	1.18
	2.9	7.6	16	1.03
	3.1	9.7	20	.91
	3.1	11.9	24	.83
45	2.6	4.1	8	1.49
	2.8	5.3	12	1.25
	2.9	6.7	16	1.09
	3.0	8.4	20	.98
	3.0	10.4	24	.89
50	2.7	3.7	8	1.57
	2.8	4.7	12	1.33
	2.8	6.0	16	1.16
	2.9	7.3	20	1.03
	3.1	9.0	24	.94
60	2.6	3.1	8	1.73
	2.7	3.9	12	1.47
	2.7	4.8	16	1.28
	2.9	5.9	20	1.15
	2.9	7.3	24	1.05
	3.0	8.6	28	.97
70	2.5	2.8	8	1.88
	2.6	3.3	12	1.60
	2.6	4.1	16	1.40
	2.7	5.0	20	1.26
	2.8	6.1	24	1.15
	2.9	7.0	28	1.05
80	2.5	2.9	12	1.72
	2.6	3.6	16	1.51
	2.7	4.3	20	1.35

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
80	2.8	5.2	24	1.24
	2.8	5.9	28	1.14
	2.9	7.0	32	1.06
90	2.5	2.6	12	1.84
	2.5	3.1	16	1.61
	2.6	3.8	20	1.45
	2.7	4.5	24	1.32
	2.8	5.3	28	1.22
	2.8	6.1	32	1.14
100	2.5	2.8	16	1.71
	2.6	3.3	20	1.54
	2.6	4.0	24	1.41
	2.7	4.8	28	1.30
	2.7	5.3	32	1.21
	2.8	6.1	36	1.13
120	2.5	2.8	20	1.71
	2.6	3.2	24	1.56
	2.7	3.8	28	1.44
	2.7	4.2	32	1.34
	2.7	4.8	36	1.26
140	2.5	2.7	24	1.71
	2.5	3.2	28	1.58
	2.6	3.6	32	1.47
	2.6	4.0	36	1.38
	2.7	4.5	40	1.30
160	2.5	2.7	28	1.70
	2.5	3.1	32	1.58
	2.6	3.4	36	1.49
	2.6	3.8	40	1.40
	2.7	4.3	44	1.33
180	2.4	2.7	32	1.72
	2.4	3.0	36	1.60
	2.5	3.4	40	1.51
	2.6	3.7	44	1.43
200	2.5	2.7	36	1.70
	2.5	2.9	40	1.60
	2.5	3.3	44	1.52
	2.6	3.6	48	1.45
220	2.4	2.6	40	1.70
	2.5	2.9	44	1.61
	2.5	3.2	48	1.53
240	2.5	2.6	44	1.70
	2.5	2.9	48	1.62
	2.6	3.2	52	1.54
260	2.4	2.6	48	1.70
	2.5	2.9	52	1.62
280	2.4	2.6	52	1.70
300	2.5	2.6	56	1.69

Figure 5.21
Design Table for Vegetated Earth Spillways in Very Erodible Soils, K = 0.36 - 0.80, Side Slopes = 3:1
(USDA - NRCS)

Discharge Q CFS	Slope Range		Bottom Width Feet	Stage Feet
	Minimum Percent	Maximum Percent		
10	3.5	4.7	8	.68
15	3.4	4.4	12	.69
	3.4	5.9	16	.60
20	3.3	3.3	12	.80
	3.3	4.1	16	.70
	3.5	5.3	20	.62
25	3.3	3.3	16	.79
	3.3	4.0	20	.70
	3.5	4.9	24	.64
30	3.3	3.3	20	.78
	3.3	4.0	24	.71
	3.4	4.7	28	.65
	3.4	5.5	32	.61
35	3.2	3.2	24	.77
	3.3	3.9	28	.71
	3.5	4.6	32	.66
	3.5	5.2	36	.62
40	3.3	3.3	28	.76
	3.4	3.8	32	.71
	3.4	4.4	36	.67
	3.4	5.0	40	.64
45	3.3	3.3	32	.76
	3.4	3.8	36	.71
	3.4	4.3	40	.67
	3.4	4.8	44	.64
50	3.3	3.3	36	.75
	3.3	3.8	40	.71
	3.3	4.3	44	.68
60	3.2	3.2	44	.75
	3.2	3.7	48	.72
70	3.3	3.3	52	.75
80	3.1	3.1	56	.78

Procedure for Determining or Altering Sediment Basin Shape

As specified in the Standard and Specification, the pool area at the elevation of the crest of the principal spillway shall have a length to width ratio of at least 2.0 to 1. The purpose of this requirement is to minimize the "short circuiting" effect of the sediment laden inflow to the riser and thereby increase the effectiveness of the sediment basin. The purpose of this procedure is to prescribe the parameters, procedures, and methods of determining and modifying the shape of the basin.

The length of the flow path (L) is the distance from the point of inflow to the riser (outflow point). The point of inflow is the point that the stream enters the normal pool (pool level at the riser crest elevation). The pool area (A) is the area of the normal pool. The effective width (W_e) is found by the equation:

$$W_e = A/L \text{ and L:W ratio} = L/W_e$$

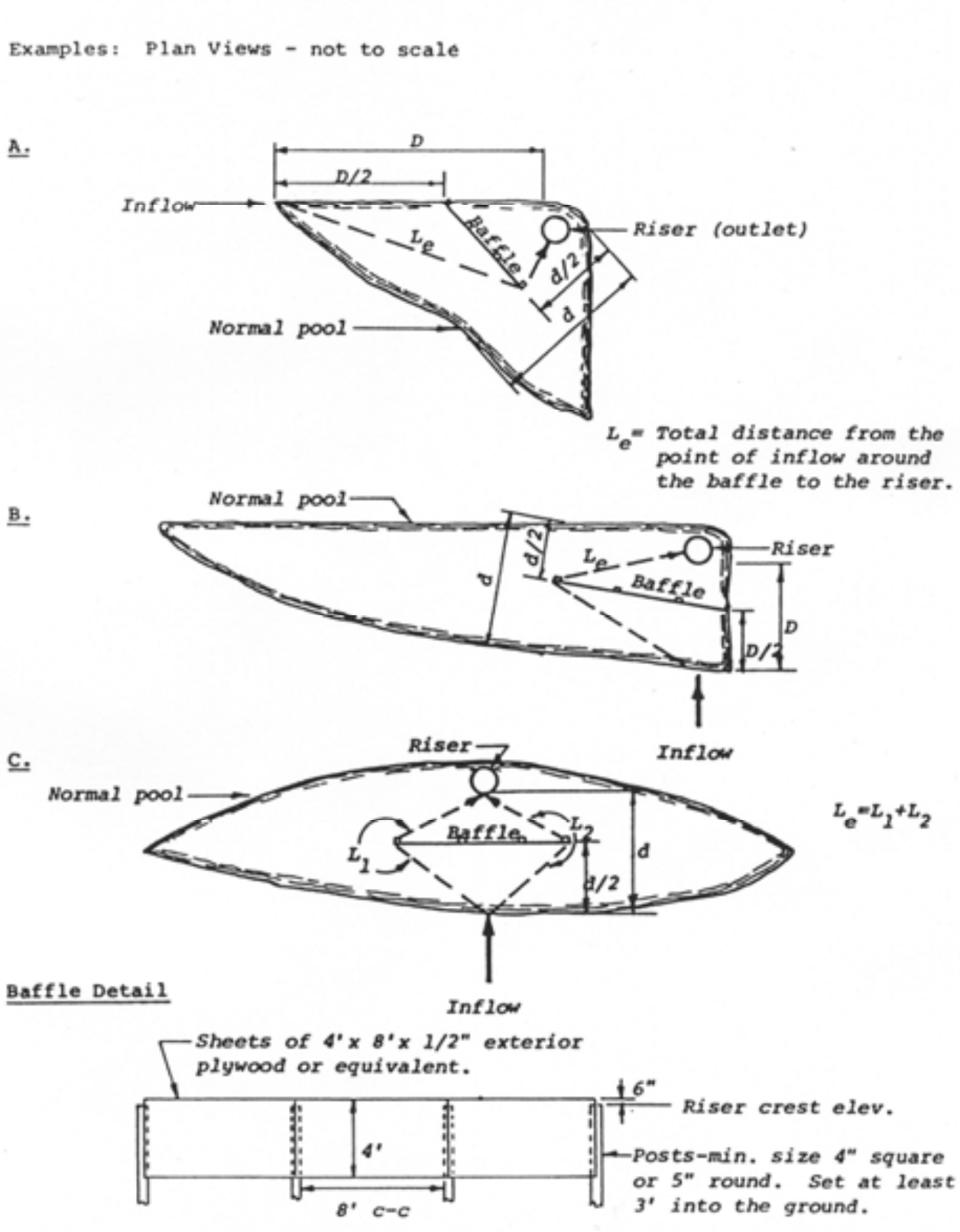
In the event there is more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate shall meet the length to width ratio criteria.

The required basin shape may be obtained by proper site selection, by excavation, or by constructing a baffle in the basin. The purpose of the baffle is to increase the effective flow length from the inflow point to the riser. Baffles (see Figure 5.22 on following page) shall be placed midway between the inflow point around the end of the baffle to the outflow point. Then:

$$W_e = A/L_e \text{ and L:W ratio} = L_e/W_e$$

Three examples are shown on the following page. Note that for the special case in example C the water is allowed to go around both ends of the baffle and the effective length, $L_e = L_1 + L_2$. Otherwise, the length to width ratio computations are the same as shown above. This special case procedure for computing L_e is allowable only when the two flow paths are equal, i.e., when $L_1 = L_2$. A baffle detail is also shown in Figure 5.22 on page 5.41.

Figure 5.22
Sediment Basin Baffle Details (USDA - NRCS)



STANDARD AND SPECIFICATIONS FOR SEDIMENT DIKE



Definition & Scope

A **temporary** earth dike with an excavated trench on the upslope toe placed across a slope to capture sediment laden flow from small disturbed drainage areas and allowing sediment to settle out by ponding.

Condition Where Practice Applies

This practice can be used on slopes and in areas where it is difficult to place and maintain silt fence. This practice acts as a smaller sediment trap for linear type applications. This practice will handle sheet and rill erosion for small tributary areas.

Design Criteria

1. The earth dike will be a maximum of 2 feet high with a 2 foot top width and 2:1 side slopes.

2. All earth fill will be placed on a stripped foundation, contain no stumps or woody material, and be compacted with the weight of the excavator bucket.

3. The interior capture trench will be a minimum 1.5 feet deep, 2 feet wide, with 1:1 side slopes and with a near level bottom. In areas where linear slopes exceed 4% the sediment dike system shall be segmented to maintain capture volume and ponding.

4. The system shall be used with a minimum 5 foot vegetated buffer on the down slope toe of the dike or an artificial buffer of erosion control matting.

5. The maximum ponding depth behind the dike shall be 1/2 the height of the constructed dike at its lowest elevation.

6. The ends of the dike system shall terminate with a 90º return of NYS DOT #1A crushed stone to filter any excess flow.

7. The maximum drainage area tributary to this practice shall not exceed 0.5 acres per 100 feet of dike, for slopes less than 10%. For slopes greater than 10%, the drainage area shall be 0.25 acres per 100 feet of dike.

8. The earthen dike shall be seeded and mulched to prevent erosion using an annual rye grass mixture at a rate of 1 lb. per 1, 000 square feet.

Maintenance

1. No traffic will be allowed on the dike.

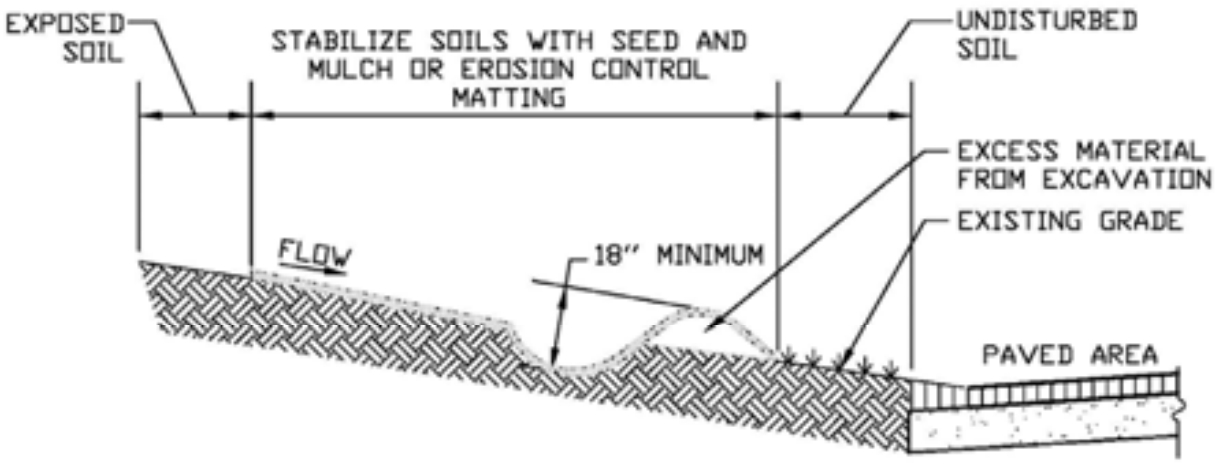
2. Dike system will be inspected weekly and after each runoff event.

3. Sediment in the system will be removed when the interior trench has filled to 75% capacity.

4. Sediment will be disposed of on-site as specified in the Erosion and Sediment Control Plan.

5. Upon stabilization of the tributary drainage area, the trench will be filled, excess dike fill removed, and the area graded and stabilized in accordance with the Erosion and Sediment Control Plan.

Figure 5.23
Sediment Dike



CONSTRUCTION NOTES:

1. ALL EARTH FILL WILL BE PLACED ON A STRIPPED FOUNDATION, CONTAIN NO STUMPS OR WOODY MATERIAL, AND BE COMPACTED WITH THE WEIGHT OF THE EXCAVATOR BUCKET.

2. THE SYSTEM SHALL BE USED WITH A MINIMUM 5 FOOT VEGETATED BUFFER ON THE DOWN SLOPE TOE OF THE DIKE OR AN ARTIFICIAL BUFFER OF EROSION CONTROL MATTING.

3. THE ENDS OF THE DIKE SYSTEM SHALL TERMINATE WITH A 90 DEGREE RETURN OF NYS DOT #1A CRUSHED STONE TO FILTER ANY EXCESS FLOW.

4. THE EARTHEN DIKE SHALL BE SEEDED AND MULCHED TO PREVENT EROSION USING AN ANNUAL RYE GRASS MIXTURE AT A RATE OF 1 LB. PER 1,000 SQUARE FEET.

ADAPTED FROM DETAILS PROVIDED BY: KEN BARBER, BARBER ENGINEERING	SEDIMENT DIKE

STANDARD AND SPECIFICATIONS FOR SEDIMENT TANK - PORTABLE



Definition & Scope

A sediment tank is a compartmented tank or vessel container to which sediment laden water is pumped to trap and retain the sediment prior to releasing the water to drainageways, and rights-of-way below the sediment tank site.

Conditions Where Practice Applies

A sediment tank is to be used on sites where excavations are deep, and space is limited, such as urban construction, where direct discharge of sediment laden water to stream and storm drainage systems is to be avoided.

Design Criteria

Location

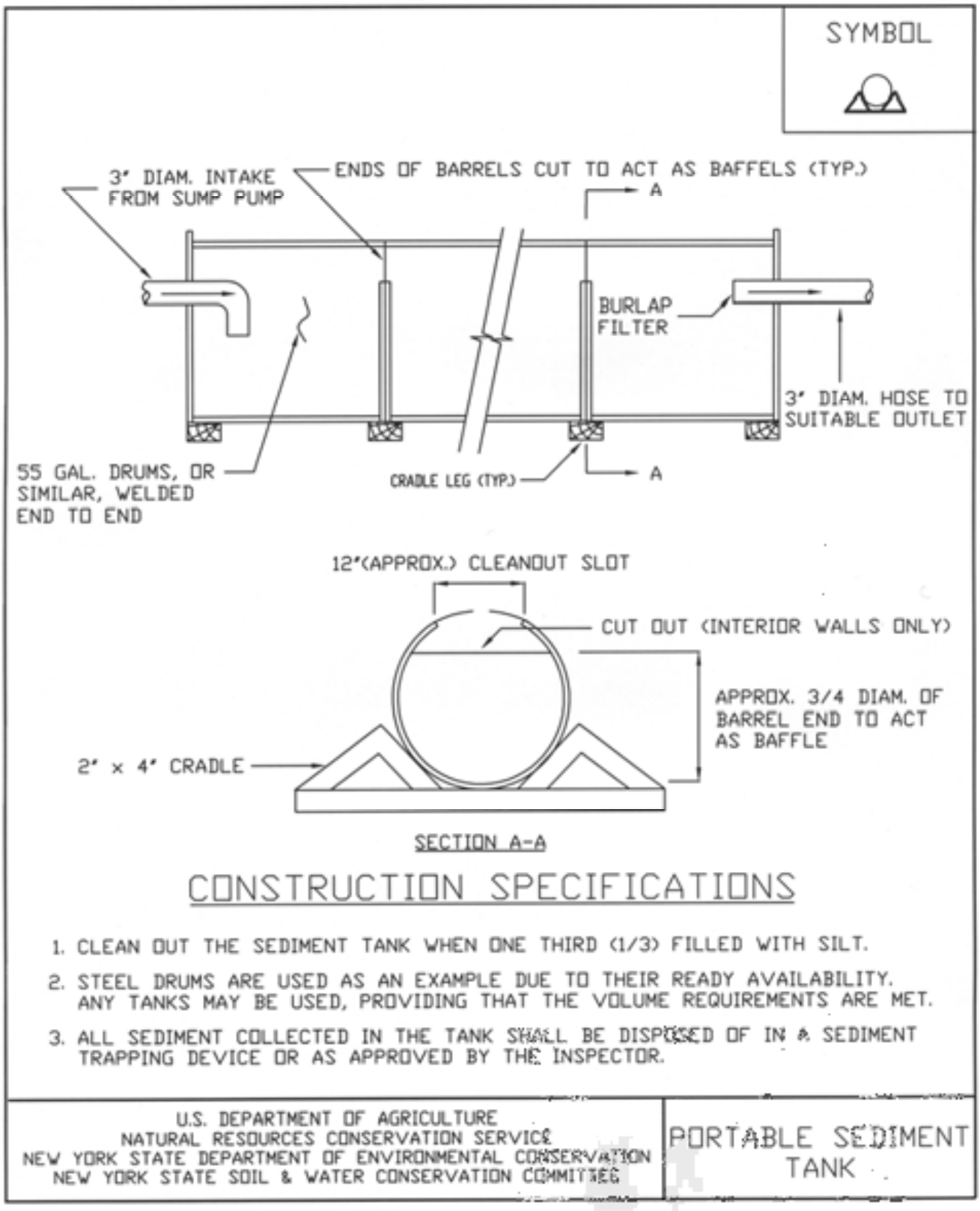
The sediment tank shall be located for ease of clean-out and disposal of the trapped sediment, and to minimize the interference with construction activities and pedestrian traffic.

Tank Size

The following formula should be used in determining the storage volume of the sediment tank; pump discharge (G.P.M.) x 16 = Cubic Foot Storage.

An example of a typical sediment tank is shown on Figure 5.24 on page 5.45. Other container designs can be used if the storage volume is adequate and approval is obtained from the local approving agency. Commercially manufactured tanks are also available.

Figure 5.24
Portable Sediment Tank



STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP



Definition & Scope

A **temporary** sediment control device formed by excavation and/or embankment to intercept sediment-laden runoff and trap the sediment in order to protect drainageways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainageway, at a storm drain inlet, or other points of collection from a disturbed area for one construction season.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If the drainage area to the proposed trap location exceeds 5 acres, or the trap is in place beyond one construction season, or any of the additional design criteria presented here cannot be met, a full Sediment Basin must be used. See Standard and Specification for Sediment Basin on page 5.19.

Drainage Area

The maximum drainage area for all sediment traps shall be 5 acres.

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must **not be located any closer than 20 feet** from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. A minimum length to width ratio of 2:1 should be provided. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of traps I-II, and 1/3 the depth for trap III. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All earth embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

All traps must be seeded and mulched immediately after construction.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are three (3) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Stone Outlet Sediment Trap
III. Compost Filter Sock Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The preferred method of dewatering the sediment trap is by surface skimmer. See Dewatering Device Standard, page 5.10. If the riser alone is used for dewatering, the top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or
2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment trap is interchangeable in the field with stone outlet provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:
See details for Pipe Outlet Sediment Trap ST-I in Figure 5.25 and 5.26 on pages 5.49 and 5.50.

Optional sediment trap dewatering devices are shown on Figure 5.29 on Page 5.53.

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter



II. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-II in Figure 5.27 on page 5.51



III. Compost Sock Sediment Trap

A compost sock sediment trap consists of a trap formed by creating an enclosure of geotextile mesh tubes filled with a compost filter media. These traps are used in locations where there is no opportunity to direct runoff into larger traps or well vegetated areas. This could occur at site entrances and access points or in tight areas due to construction boundary limits.

Surface runoff can be directed to the trap with standard conveyance practices. Groundwater or surface ponding in low areas can be pumped into the compost sock sediment trap with appropriate energy dissipation at the pump outlet to prevent scour.

Design criteria for Compost Sock Sediment Trap

1. The maximum drainage area tributary to the trap shall be 5 acres.

2. The minimum settled height above ground shall be 2.0 feet formed by staking 3 compost filter socks in a pyramid as shown in Figure 5.28 on page 5.52.

3. The storage volume provided in the compost sock sediment trap shall be 3,600 cubic feet per tributary drainage acre.

4. If necessary, additional storage area can be created by excavating a sump 1 foot deep beginning at least 5 feet away from the inside sock.

5. All compost filter sock materials, mesh, and compost, will meet the material specifications listed in the Compost Filter Sock standard. No spillway is required.

6. Compost filter sock sediment traps shall be inspected weekly and after every rainfall event. Sediment shall be removed when it reaches one third, 1/3, the height of the trap.

7. The maximum limit of use for a compost sock sediment trap is one (1) year. The existing trap shall be replaced if there is a need for a trap beyond that time limit.

8. Upon completion of the work, the compost sock sediment trap shall be removed. The compost within the socks may be used during cleanup as a vegetative growth medium in accordance with the site stabilization plan.



Figure 5.25
Pipe Outlet Sediment Trap: ST-I

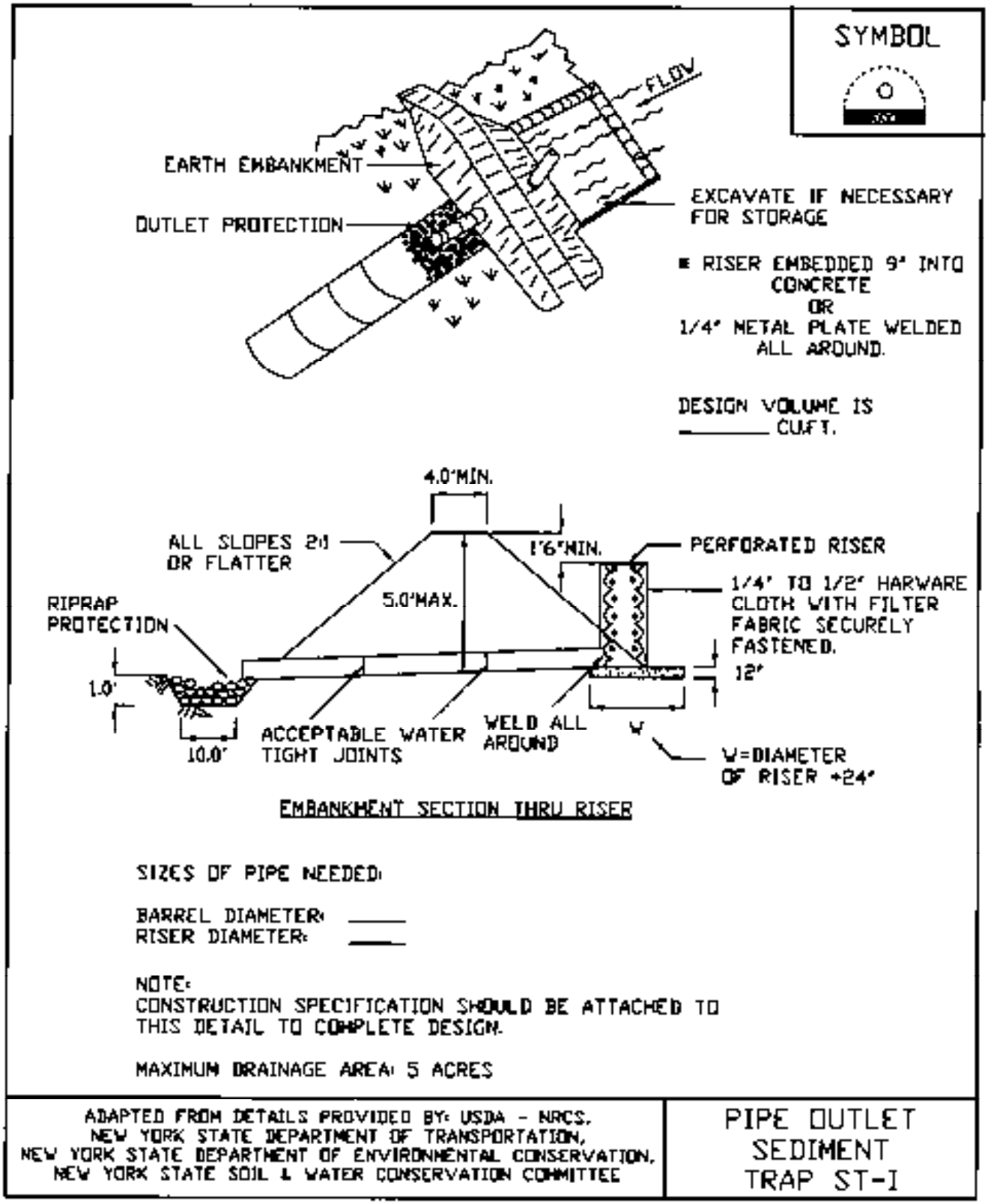


Figure 5.26
Pipe Outlet Sediment Trap: ST-I - Construction Specifications

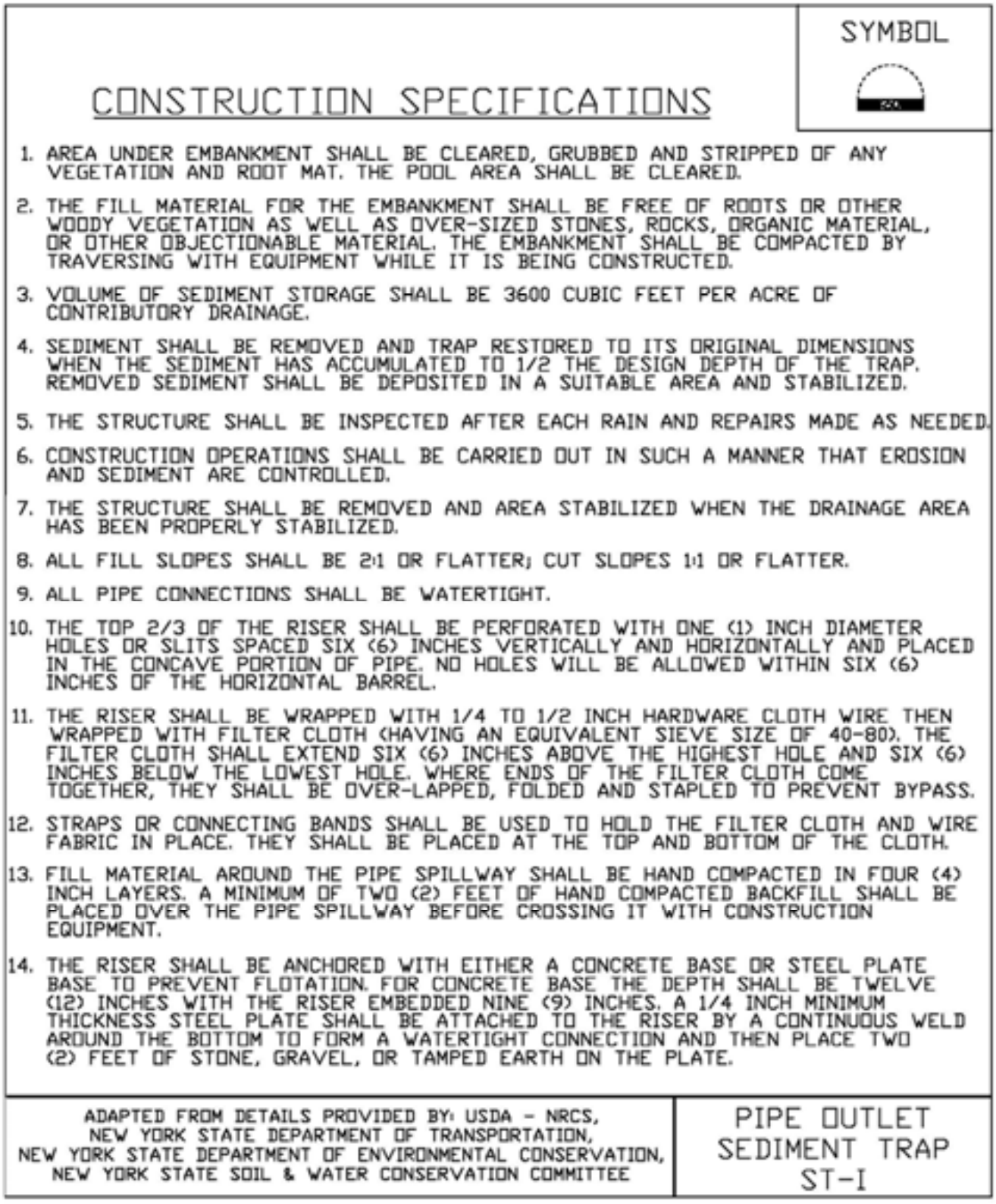
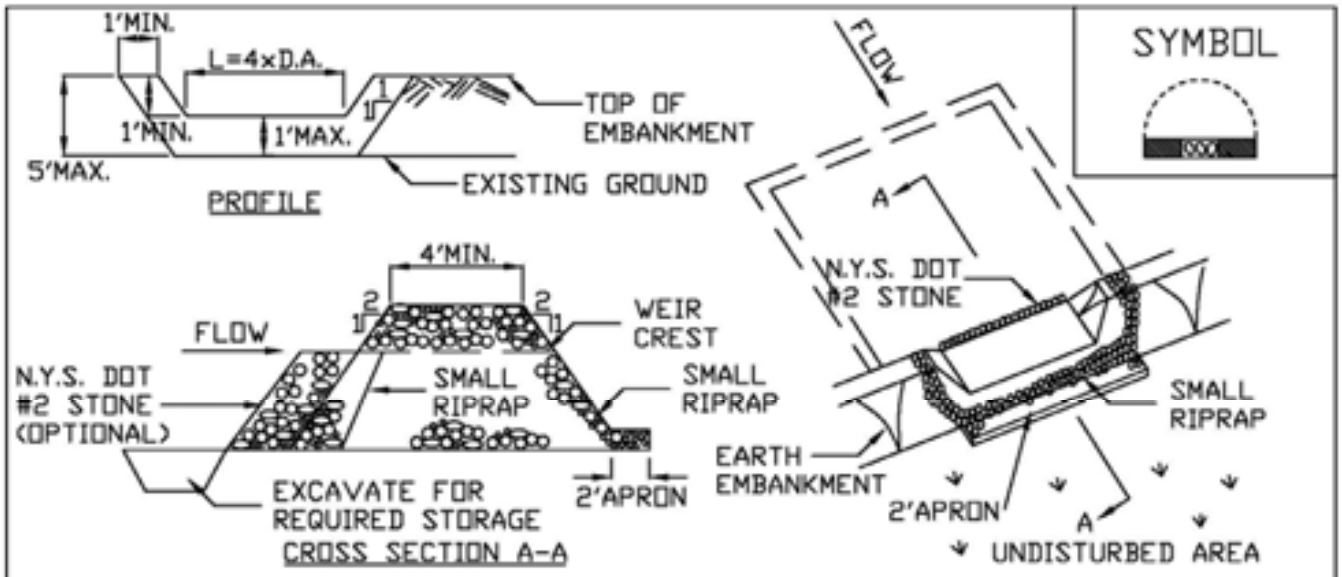


Figure 5.27
Stone Outlet Sediment Trap: ST-II



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

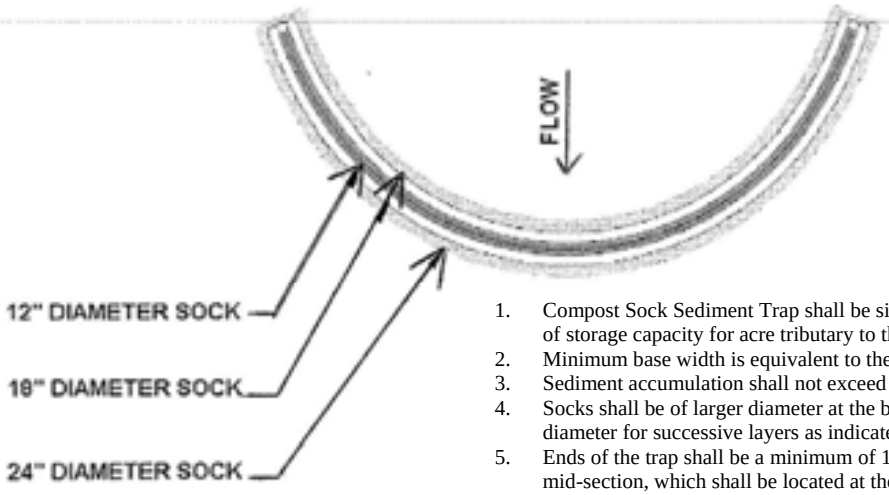
MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STONE OUTLET SEDIMENT TRAP ST-II

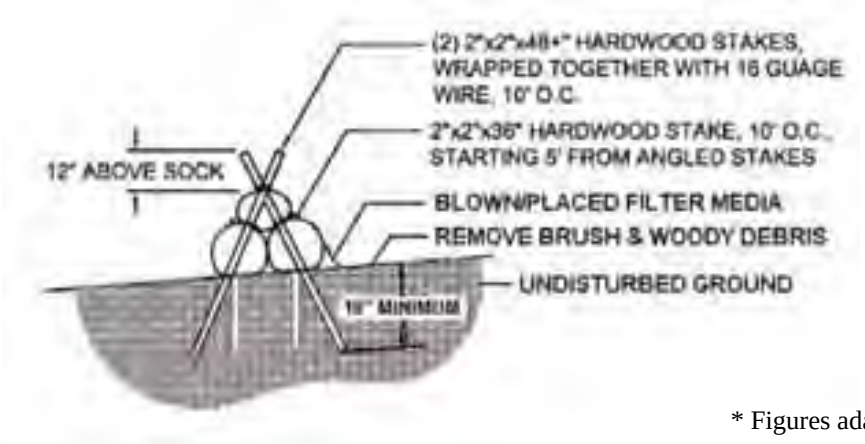
Figure 5.28
Compost Filter Sock Sediment Trap: ST-III

Plan View



1. Compost Sock Sediment Trap shall be sized to provide 3,600 cubic feet of storage capacity for acre tributary to the trap.
2. Minimum base width is equivalent to the height.
3. Sediment accumulation shall not exceed 1/3 the total height of the trap.
4. Socks shall be of larger diameter at the base of the trap and decrease in diameter for successive layers as indicated to the left.
5. Ends of the trap shall be a minimum of 1 foot higher in elevation that the mid-section, which shall be located at the point of discharge.

Staking Detail



* Figures adapted from Filtrexx

Specifications:

1. Sock infill and filter media material shall meet the standards of Table 5.1 on page 5.8 . Compost shall meet the compost filter sock standard of Table 5.2 on page 5.8.

2. Compost sock sediment traps shall not exceed three socks in height and shall be stacked in pyramidal form as shown above. Minimum trap height is one 24 inch diameter sock. Additional storage may be provided by means of an excavated sump 12 inches deep extending 1 to 3 feet upslope of the socks along the lower side of the trap.

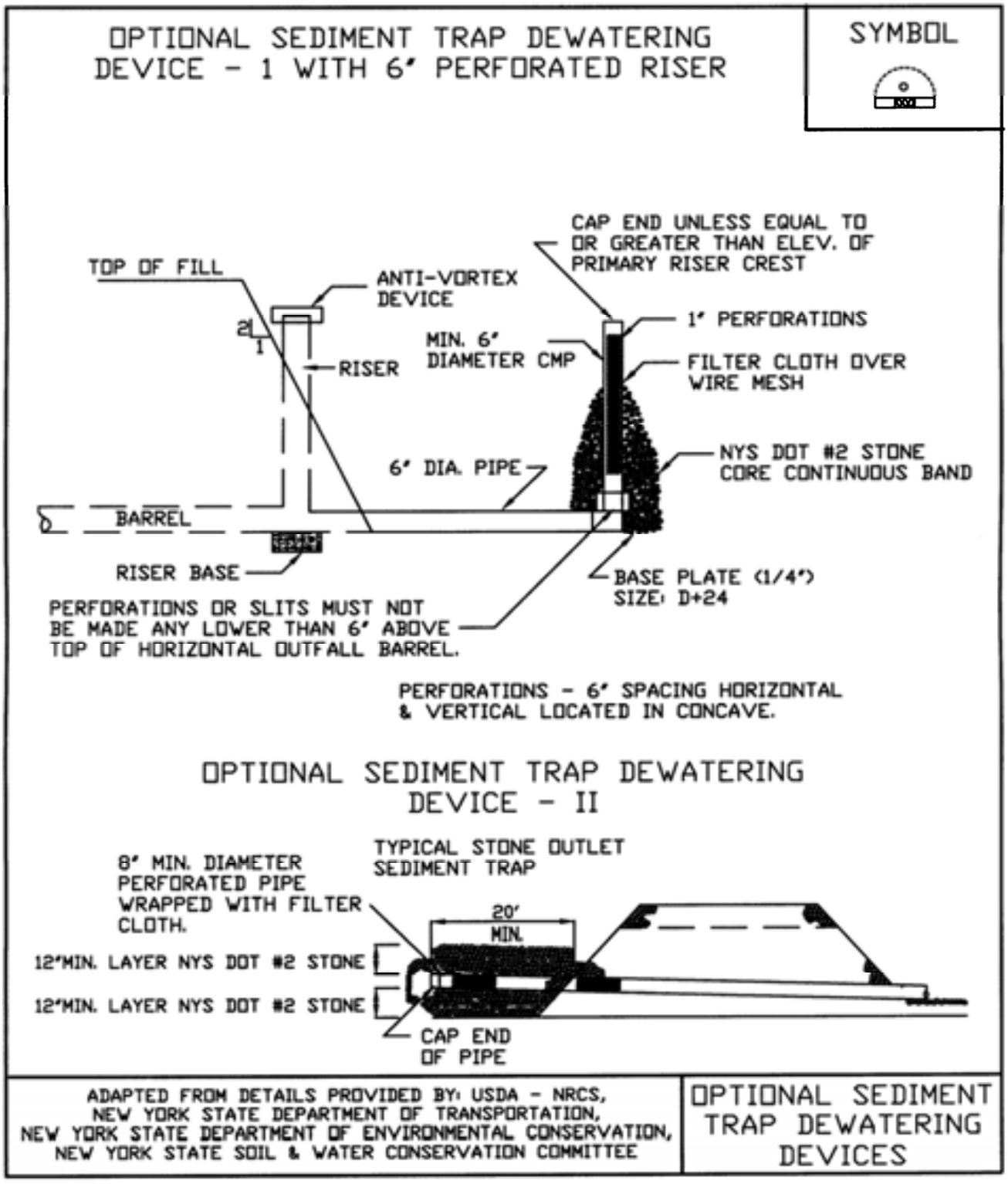
3. Compost sock sediment traps shall provide 3,600 cubic feet storage capacity with 12 inches of freeboard for each tributary drainage acreage. (See manufacturer for anticipated settlement.)

4. The maximum tributary drainage area is 5.0 acres. Since compost socks are "flow-through," no spillway is required.

5. Compost sock sediment traps shall be inspected weekly and after each runoff event. Sediment shall be removed when it reaches 1/3 the height of the socks.

6. Photodegradable and biodegradable socks shall not be used for more than 1 year.

Figure 5.29
Optional Sediment Trap Dewatering Devices
for Traps with <5 Acres Drainage Area



STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

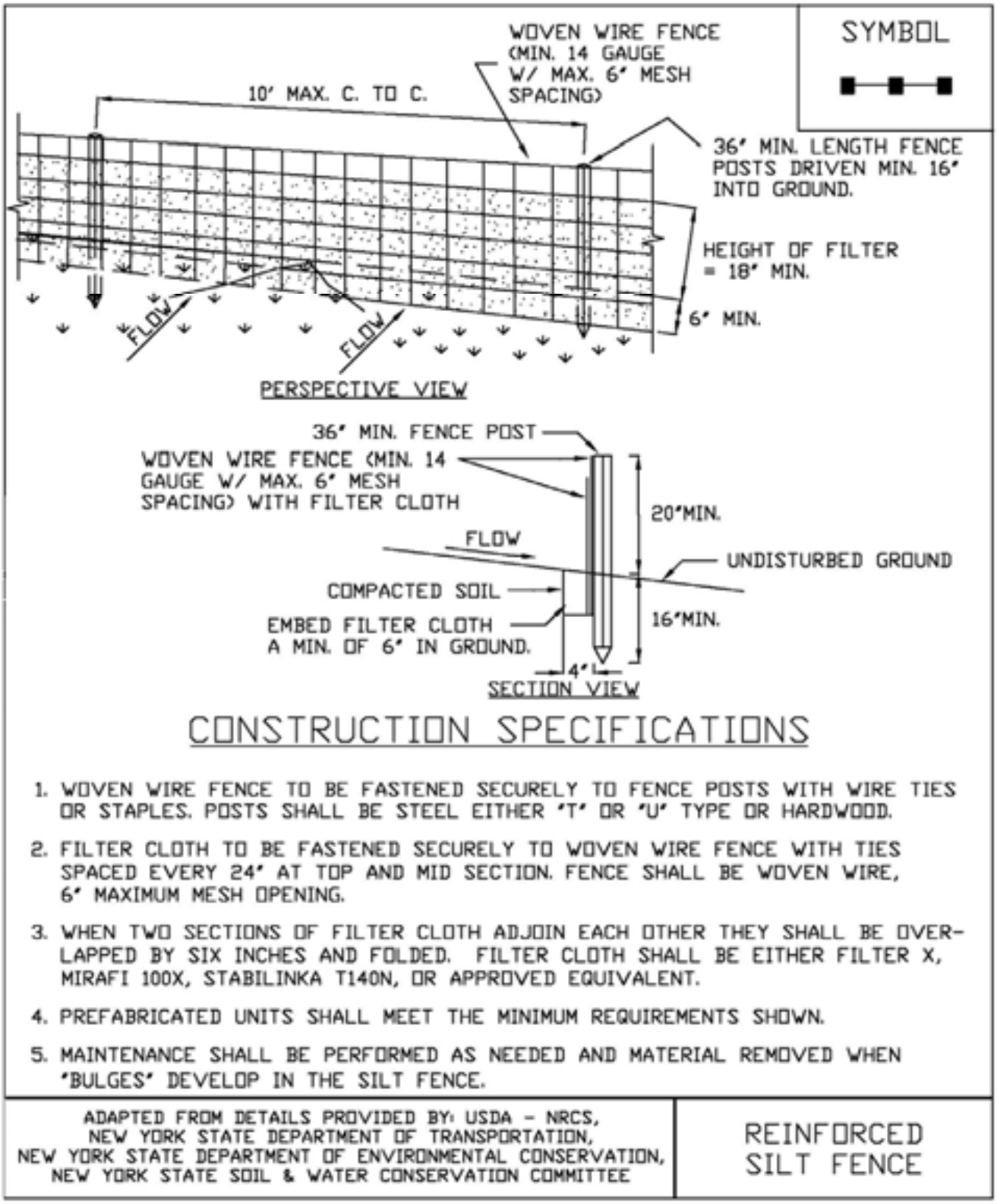
Super Silt Fence



Reinforced Silt Fence



Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION



Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection



This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to

unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet (“doughnut”). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection



This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.



The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection



The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection

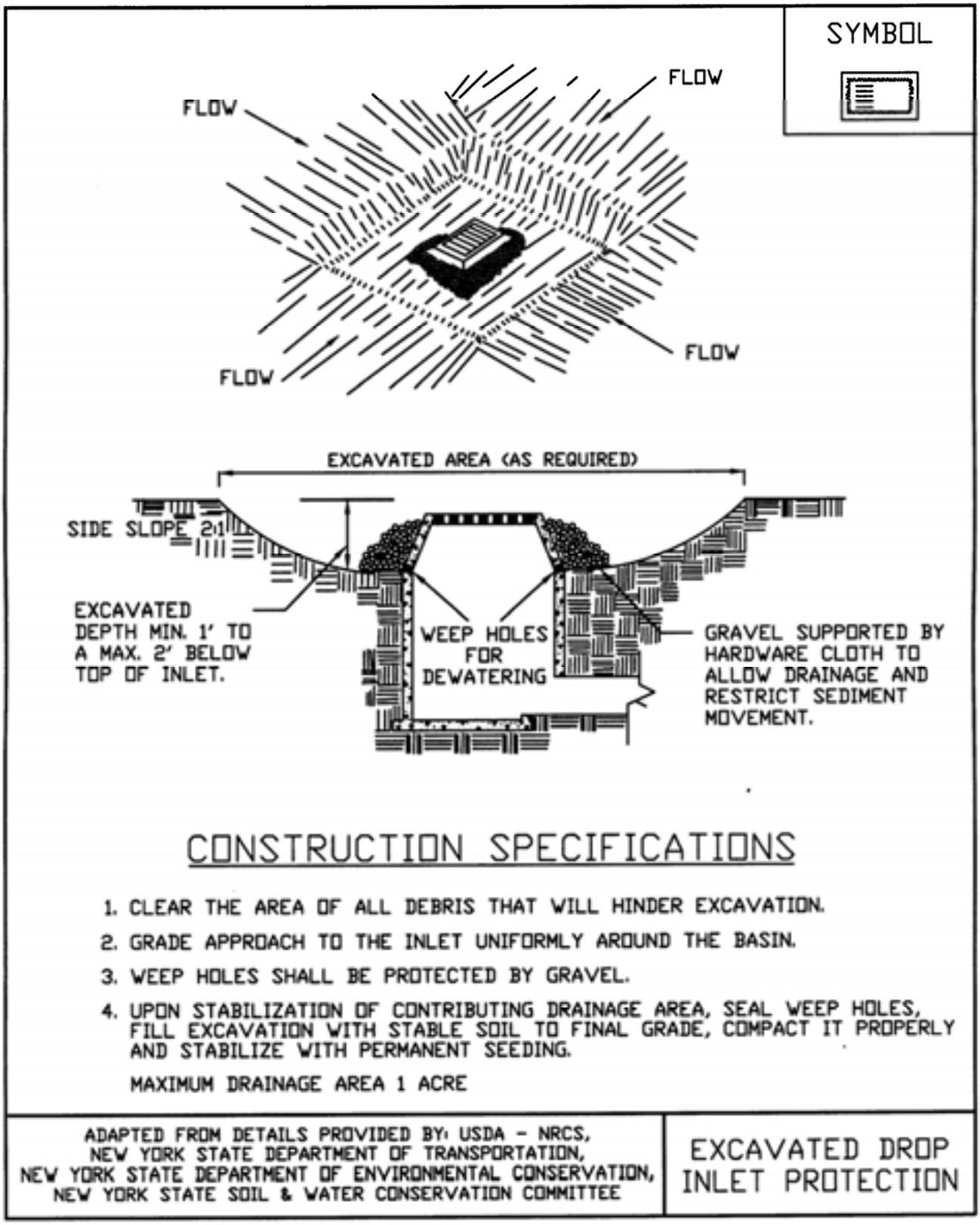


Figure 5.32
Fabric Drop Inlet Protection

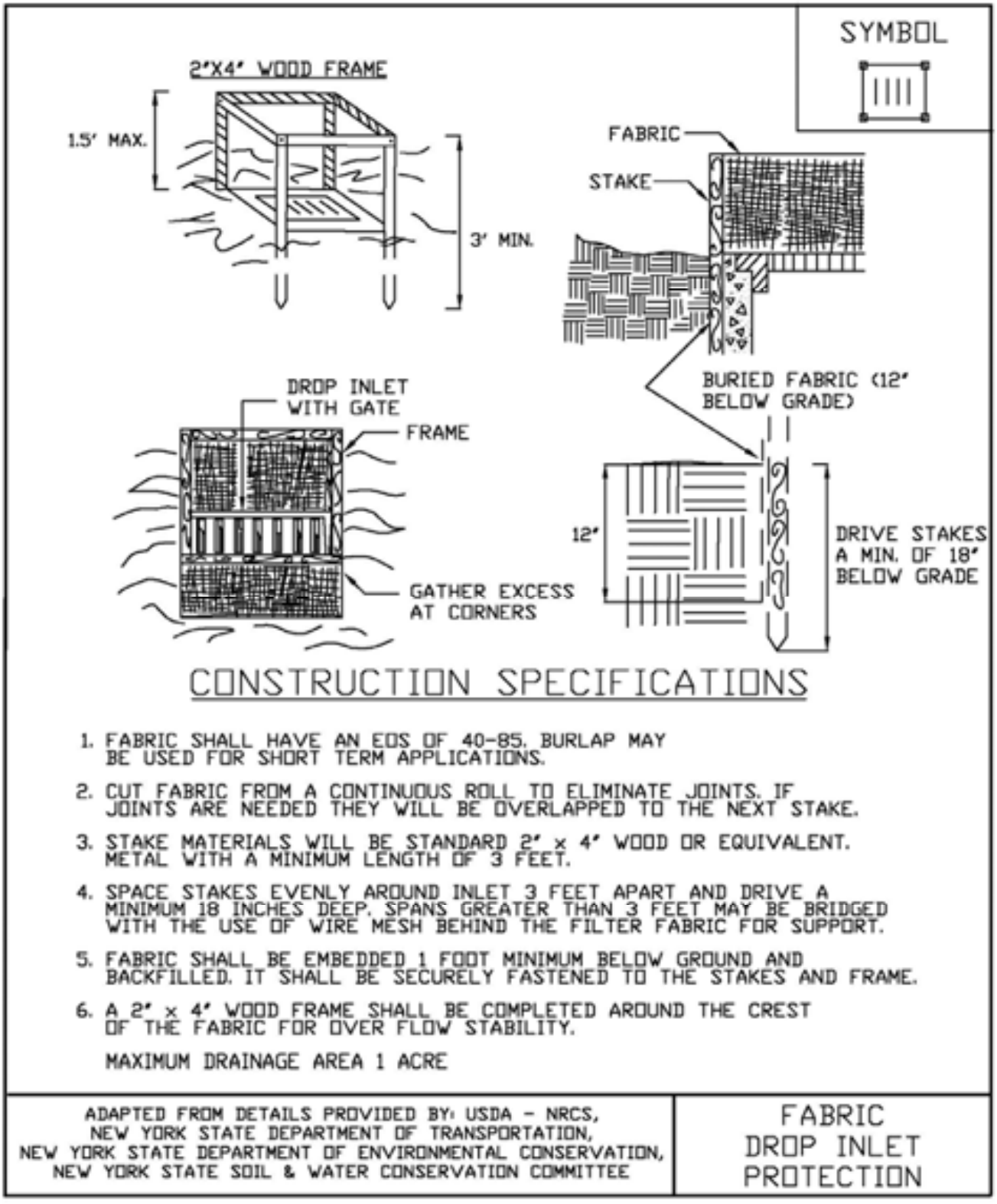
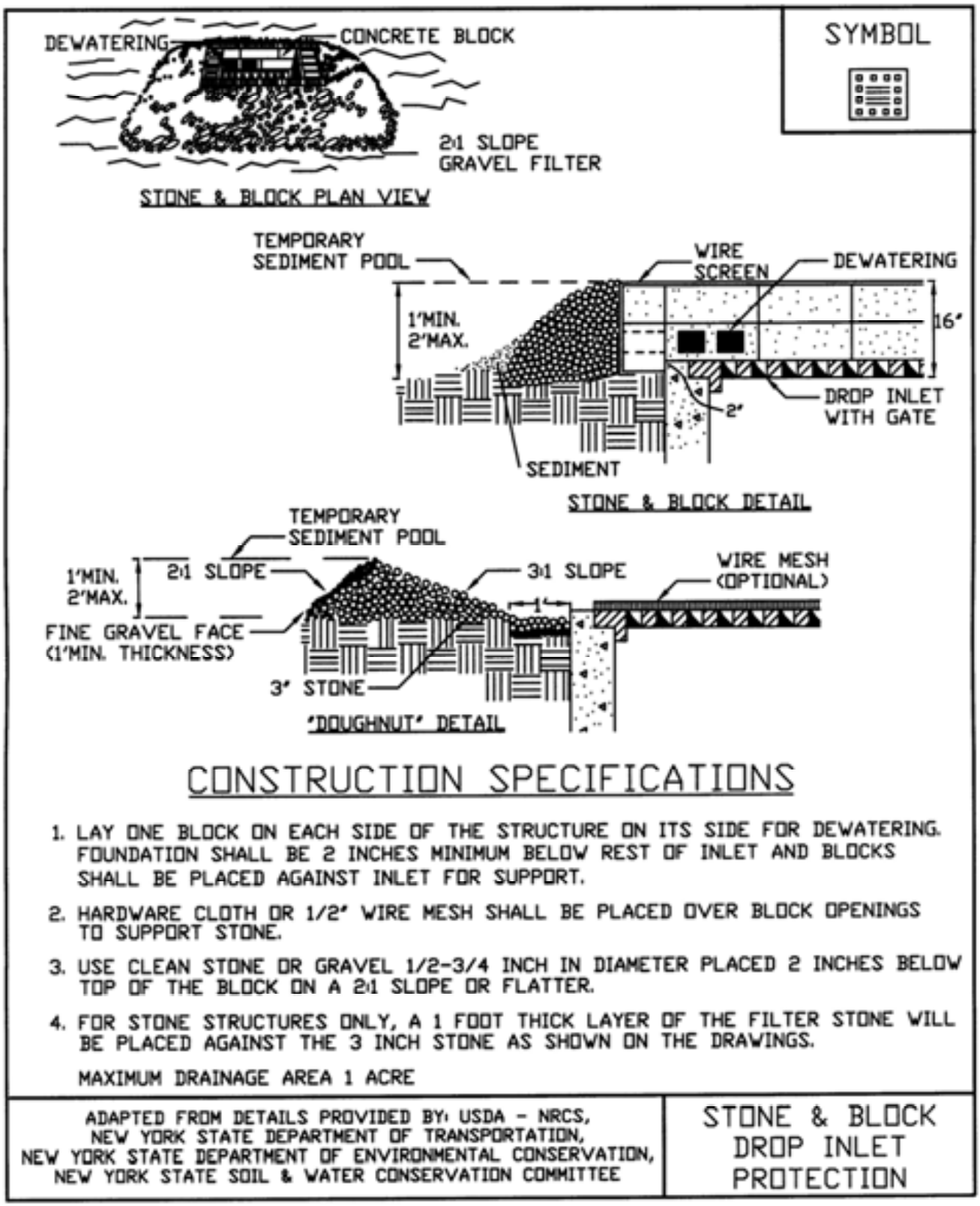


Figure 5.33
Stone & Block Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STONE & BLOCK DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE



Definition & Scope

A **temporary** barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Condition Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainageway above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed the following limits with the bale placed 10 feet from the toe of the slope:

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

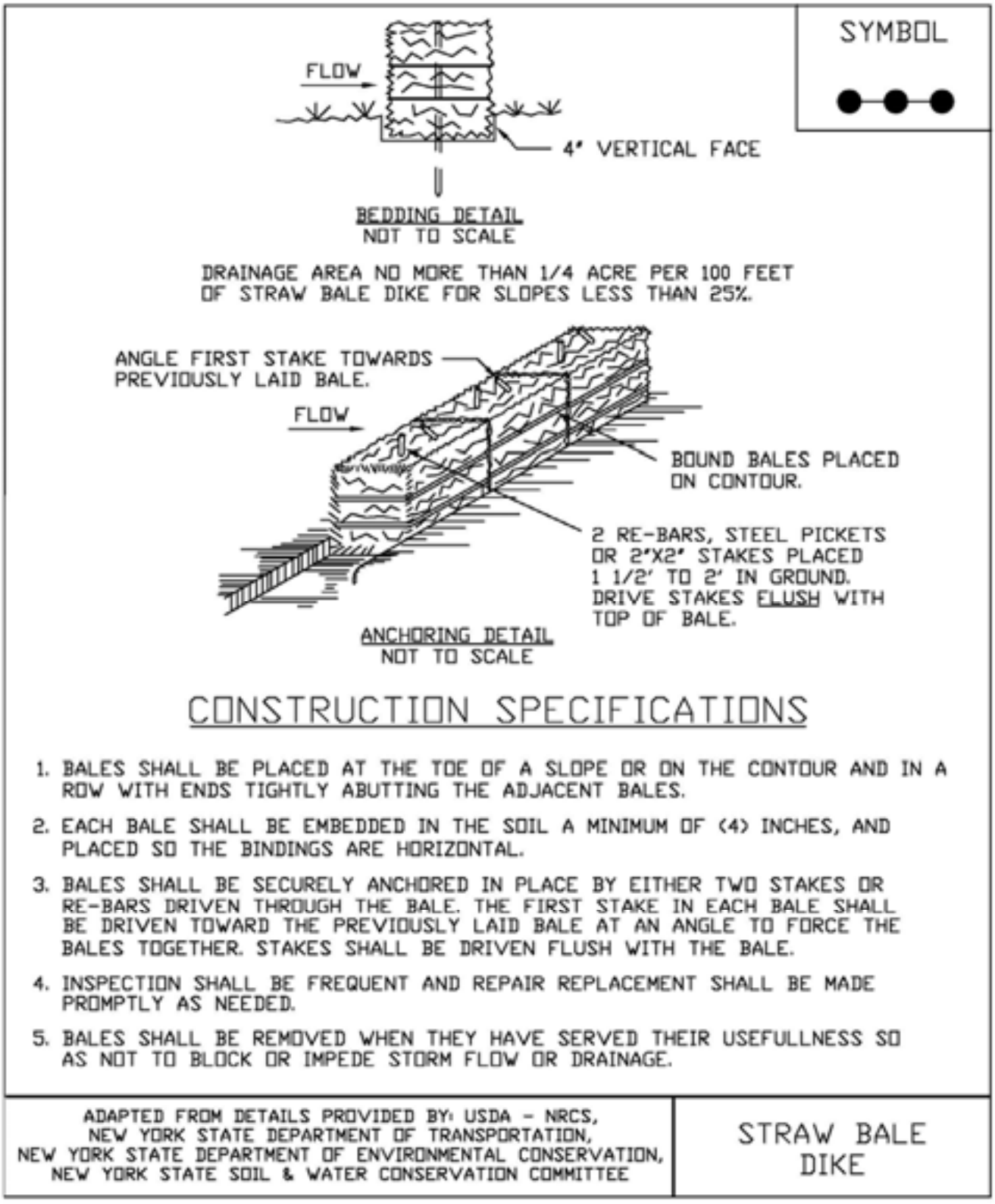
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of dike and the length of slope above the dike shall be less than 100 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5.34 on page 5.64 for details.

Figure 5.34
Straw Bale Dike



STANDARD AND SPECIFICATIONS FOR TURBIDITY CURTAIN



Definition & Scope

A **temporary** flexible, impenetrable barrier used to trap sediment in water bodies. This curtain is weighted at the bottom to achieve closure while supported at the top through a flotation system and used to prevent the migration of silt from a work site in a water environment into the larger body of water. Top bar float has to support weight of curtain material. Bottom anchor has to be flexible so that it will lie along the contour of the water body bottom.

Condition Where Practice Applies

A turbidity curtain is generally used when construction activity occurs within a waterbody or along its shoreline and is of short duration, generally less than one month. Curtains are used in calm water surfaces and not in areas of flowing water. **Turbidity curtains are not to be used across flowing watercourses.**

Design Criteria

The turbidity curtain shall be located beyond the lateral limits of the construction site and firmly anchored in place. The alignment should be set as close to the work area as possible but not so close as to be disturbed by applicable construction equipment. The height of the curtain shall be 20 percent greater than the depth of the water to allow for water level fluctuations. The area that the turbidity curtain protects shall not contain large culverts or drainage areas that if flows occur behind the curtain would cause a breach or lost contact at the bottom surface.

If water depths at the design alignment are minimal, the toe can be anchored in place by staking.

See Figure 5.35 on page 5.66.

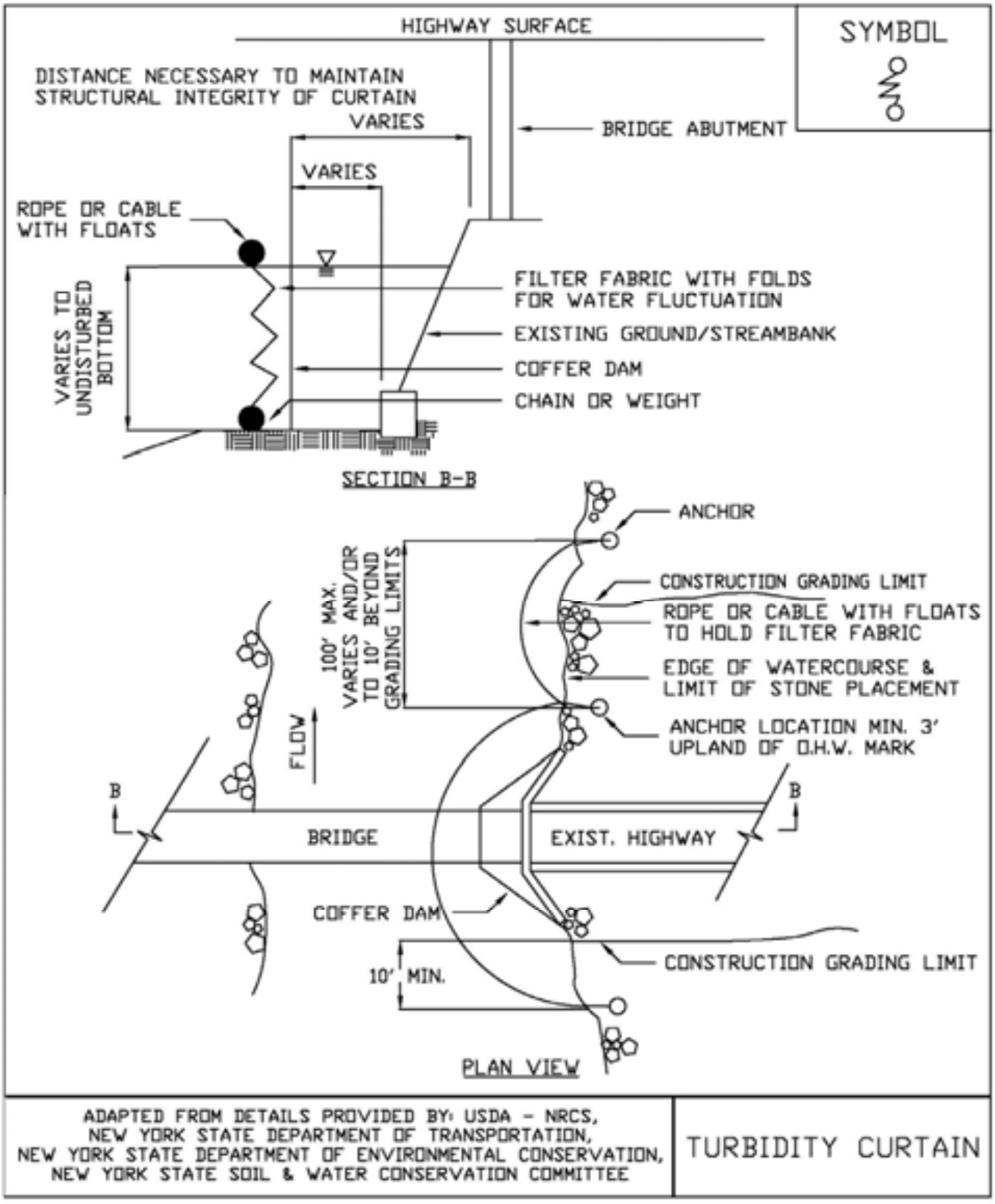
Construction Specifications

The area of proposed installation of the curtain shall be inspected for obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment. All materials shall be removed so they cannot enter the waterbody. Shallow installations can be made by securing the curtain by staking rather than using a flotation system. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances such as boats and wave action by winds.

Maintenance

The turbidity curtain shall be inspected daily and repaired or replaced immediately. It is not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt is stabilized away from the waterbody. The barrier shall be removed by carefully pulling it toward the construction site to minimize the release of attached sediment. Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain. If the curtain is oriented in a manner that faces the prevailing winds, frequent checks of the anchorage shall be made.

Figure 5.35
Turbidity Curtain



APPENDIX B-3

NYSDOH'S GENERIC COMMUNITY AIR MONITORING PLAN
FUGITIVE DUST AND PARTICULATE MONITORING

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX C

EXAMPLE
HEALTH & SAFETY PLAN (HASP)
&
COMMUNITY AIR MONITORING PLAN (CAMP)

Site-Wide Health and Safety Plan (HASP)

Tecumseh Redevelopment BCP Sites
Lackawanna, New York

April 2010
Revised July 2013

0071-012-322

Prepared By:

TurnKey Environmental Restoration, LLC

Benchmark Environmental Engineering & Science, PLLC

2558 Hamburg Turnpike, Suite 300, Buffalo, New York | phone: (716) 856-0599 | fax: (716) 856-0583

TECUMSEH REDEVELOPMENT SITE
SITE-WIDE HEALTH AND SAFETY PLAN

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: _____

Project Manager: _____

Designated Site Safety and Health Officer: _____

Acknowledgement:
I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

TECUMSEH REDEVELOPMENT BCP SITES
SITE-WIDE HEALTH AND SAFETY PLAN

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1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by TurnKey Environmental Restoration, LLC and Benchmark Environmental Engineering & Science, PLLC employees (referred to jointly hereafter as "TurnKey-Benchmark") during Brownfield Cleanup Program (BCP) activities on the Tecumseh Redevelopment Site (former Bethlehem Steel Lackawanna Works), located in the City of Lackawanna, New York. This HASP presents procedures for TurnKey-Benchmark employees who will be involved with investigation and remedial field activities; it does not cover the activities of other contractors, subcontractors, or other individuals on the Site. These firms will be required to develop and enforce their own HASPs as discussed in Section 2.0. TurnKey-Benchmark accepts no responsibility for the health and safety of contractor, subcontractor, or other personnel.

This HASP presents information on known Site health and safety hazards using available historical information, and identifies the equipment, materials, and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards.

1.2 Background

Tecumseh Redevelopment Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast. Figure 2 provides an overview of the Tecumseh Property, including major leased or licensed parcels, and adjacent parcels owned by others.

The Tecumseh property is located on a portion of the Site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was

formerly used for the production of steel, coke, and related products by Bethlehem Steel Corporation (BSC). According to the Real Estate Records, in 1937, Bethlehem Steel Company owned the subject Site. In 1964, Bethlehem Steel Company merged into Bethlehem Steel Corporation. Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in January 2005. In September 2006, USEPA approved the RFI and terminated Bethlehem Steel's (and in turn Tecumseh's) obligation under the 1990 Administrative Order. Tecumseh has entered into an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) to undertake a corrective measures study (CMS) at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property.

Outside of the CMS Area, Tecumseh designated five parcels for redevelopment under the New York State Brownfield Cleanup Program (BCP). These include: The Phase I, IA, II, and III Business Park, which are at various points of investigation and cleanup under the BCP and are slated for commercial/industrial redevelopment, and the Steel Winds Site, which was remediated under the BCP and redeveloped as a commercial wind farm.

This Site-Wide Health and Safety Plan (HASP) applies to the Business Park Sites under the BCP.

1.3 Known and Suspected Environmental Conditions

The Phase I, IA, II, and III Business Parks were formerly used to house portions of BSC's steelmaking operations. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as semi-volatile and volatile organic compounds (SVOCs and VOCs). In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX) in groundwater.

1.4 Parameters of Interest

Constituents of potential concern (COPCs) at the BCP Sites include:

- **Volatile Organic Compounds (VOCs)** – VOCs present at elevated concentration may include benzene, toluene, ethylbenzene, and xylene (i.e., BTEX). These VOCs are typically associated with storage and handling of petroleum products such as gasoline.
- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs present at elevated concentrations may include base-neutral semi-volatile organic compounds (SVOCs) from oils, greases, and fuels associated with the operation of locomotive engines, steel mills, petroleum bulk storage, and other historic steel manufacturing operations. Specifically, polycyclic aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Although PAHs are commonly found in urban soil environments, they may be present at the Site at concentrations that are elevated compared to typical "background" levels. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned.
- **Polychlorinated Biphenyls (PCBs)** – The potential impact of surface and subsurface soils by PCBs in discrete areas associated with former substations, rail yards, and hydraulic pump houses.
- **Inorganic Compounds** – Inorganic COPCs potentially present at elevated concentrations due to steel making activities may include arsenic, cadmium, chromium, lead, and mercury. Several of these parameters are components of coke and slag which are prevalent in the planned work area.

In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX).

1.5 Overview of BCP Activities

TurnKey-Benchmark personnel will be on-site to observe BCP investigation and remedial activities. General field activities to be completed are described below. Detailed BCP activities are more fully described in the individual work plans for each property.

1. **Soil/Fill Excavation:** TurnKey-Benchmark will monitor all soil/fill excavations (e.g., wind turbine foundation excavation, test pit investigations) and related activities to visually inspect soil/fill for evidence of contamination.

2. **Soil/Fill Documentation Sampling:** TurnKey-Benchmark will collect surface and subsurface soil/fill documentation samples following excavation.
3. **Surface Water Management:** During excavation, surface water and/or perched groundwater infiltration may occur. TurnKey-Benchmark will direct the contractor to collect and characterize the surface water for proper disposal.
4. **Subgrade Work:** Significant grading may be required before implementation of remedial measures (e.g., cover system placement).
5. **Cover Soil Placement:** A soil cover system will be placed over select portions of the Site to reduce potential contact with impacted soil/fill. TurnKey-Benchmark will oversee installation of the cover system.
6. **Groundwater Monitoring Well Installation and Sampling:** TurnKey-Benchmark will install groundwater monitoring wells and collect samples for the long-term groundwater monitoring program.
7. **Groundwater Remediation:** TurnKey-Benchmark personnel will oversee the potential groundwater remediation at the Site, which may include installation of treatment (ORC/HRC) filter socks in groundwater monitoring wells.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility, and communication as they pertain to health and safety functions at the BCP Sites. The purpose of this chapter is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations, and establishes the lines of communications among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at the BCP Sites.

2.1 Roles and Responsibilities

All Turnkey-Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety, and health, and other personnel on this site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The TurnKey-Benchmark Corporate Health and Safety Director is ***Mr. Michael M. Yount, CESCO.*** The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates TurnKey-Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for these Sites is ***Thomas H. Forbes, P.E.*** The Project Manager has the responsibility and authority to direct all TurnKey-Benchmark work operations at the site. The Project Manager coordinates safety and health functions with the

Site Safety and Health Officer, and bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the site work plan.
- Providing TurnKey-Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this site is ***Mr. Richard L. Dubisz***. The qualified alternate SSHO is ***Mr. Thomas Behrendt.*** The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for TurnKey-Benchmark personnel on the site.
- Serving as the point of contact for safety and health matters.
- Ensuring that TurnKey-Benchmark field personnel working on the site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP
- Maintaining site-specific safety and health records as described in this HASP
- Coordinating with the Project Manager, Site Workers, and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other site personnel who will have health and safety responsibilities will include the Remedial Contractor, who will be responsible for developing, implementing, and enforcing a Health and Safety Plan equally stringent or more stringent than TurnKey-Benchmark's HASP. TurnKey-Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. Each Contractor's HASP shall cover all non-TurnKey/ Benchmark site personnel. Each Contractor shall assign a SSHO who will coordinate with TurnKey-Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to TurnKey-Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the BCP Sites, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of soil/fill, and through the inhalation of contaminated particles or vapors, during test pit completion, monitoring well installation, and soil/fill excavation. In addition, the use of heavy construction equipment (e.g., dozer) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

As discussed in Section 1.3, historic activities related to the former steel-manufacturing operations and facilities have resulted in elevated concentrations of VOCs, SVOCs, PCBs, and inorganic compounds in soil/fill and groundwater. Table 1 identifies maximum concentrations of COPCs detected throughout the Tecumseh property. Table 2 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent constituents of potential concern and related health and safety guidance and criteria are provided below.

- **Arsenic (CAS #7440-38-2)** is a naturally occurring element and is usually found combined with one or more elements, such as oxygen or sulfur. Inhalation is a more important exposure route than ingestion. First phase exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.
- **Benzene (CAS #71-43-2)** poisoning occurs most commonly through inhalation of the vapor; however, benzene can also penetrate the skin and poison in that way. Locally, benzene has a comparatively strong irritating effect, producing

erythema and burning and, in more severe cases, edema and blistering. Exposure to high concentrations of the vapor (i.e., 3,000 ppm or higher) may result in acute poisoning characterized by the narcotic action of benzene on the central nervous system. In acute poisoning, symptoms include confusion, dizziness, tightening of the leg muscles, and pressure over the forehead. Chronic exposure to benzene (i.e., long-term exposure to concentrations of 100 ppm or less) may lead to damage of the blood-forming system. Benzene is very flammable when exposed to heat or flame and can react vigorously with oxidizing materials.

- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride, or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.
- **Chromium (CAS #7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.
- **Ethylbenzene (CAS #100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin liver and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, headache. Narcosis and coma may result in more severe cases.
- **Lead (CAS #7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect memory. Lead may cause anemia.
- **Mercury (CAS #7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Over-exposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue, and salivation. Mercury is a skin and eye irritant.
- **Naphthalene (CAS #91-20-3)** is a white solid with a strong smell; is also called mothballs, moth flakes, white tar, and tar camphor. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned. Acute exposure to naphthalene can cause systemic reactions, including nausea, headache,

diaphoresis, hematuria, fever, anemia, liver damage, vomiting, convulsions, and coma. Acute exposure can also cause eye irritation, confusion, excitement, malaise, abdominal pain, irritation to the bladder, profuse sweating, jaundice, hematopoietic, hemoglobinuria, renal shutdown, and dermatitis. Exposure to a large amount of naphthalene can cause red blood cells to be damaged or destroyed, a condition called hemolytic anemia, which leads to fatigue, lack of appetite, restlessness, and a pale appearance. Poisoning may occur by ingestion of large doses, skin and/or eye contact, inhalation, or skin absorption.

- **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAHs are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.
- **Polychlorinated Biphenyls (PCBs)** are associated with former substations, rail yards, and hydraulic pump houses on the Site. PCBs can be absorbed into the body by inhalation of its aerosol, through the skin, and by ingestion. Repeated or prolonged contact with skin may cause dermatitis. PCBs may have effects on the liver. Animal tests show that PCBs possibly cause toxic effects in human reproduction. In the food chain, bioaccumulation takes place, specifically in aquatic organisms. A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.
- **Toluene (CAS #108-88-3)** is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.
- **Xylenes (o, m, and p) (CAS #95-47-6, 108-38-3, and 106-42-3)** are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue,

muscular weakness, drowsiness, and coordination loss. Repeated exposures may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure of high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

With respect to the anticipated BCP activities discussed in Section 1.5, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

BCP investigation and remedial activities at the Tecumseh site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as grading equipment, excavators, and tandem trucks.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may be present during investigation and remedial activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing investigation and remedial activities at the Site (such as, but not limited to, equipment operators, general laborers, and supervisors) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the Site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and site control.
- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.

- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at TurnKey-Benchmark's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for site safety and health.
- Safety, health and other hazards present on the Site.
- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.
- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.

- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (i.e., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix A of this HASP, Emergency Response Plan.

4.4 Site Visitors

Each Contractor's SSHO will provide a site-specific briefing to all site visitors and other non-TurnKey/Benchmark personnel who enter the Site beyond the site entry point. The site-specific briefing will provide information about site hazards, the site layout including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to TurnKey-Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all TurnKey-Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured; received a health impairment; developed signs or symptoms of over-exposure to hazardous substances; or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by Health Works WNY, an occupational health care provider under contract with TurnKey-Benchmark. Health Works WNY's local facility is located at 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the TurnKey-Benchmark Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).
- Medical certification of physical requirements (i.e., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

In conformance with OSHA regulations, TurnKey-Benchmark will maintain and

preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All TurnKey-Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the site as required by the HASP or as modified by the site safety officer. Excessive facial hair (i.e., beards, long mustaches, or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the TurnKey-Benchmark occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during the workday.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for TurnKey-Benchmark employees, as requested and required.

The recommended specific safety practices for working around the contractor's equipment (e.g., backhoes, bulldozers, excavators, etc.) are as follows:

- Although the Contractor and subcontractors are responsible for their equipment and safe operation of the site, TurnKey-Benchmark personnel are also

responsible for their own safety.

- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots, and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the site.
- Proper lighting must be provided when working at night.
- Construction activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories designated A through D consistent with USEPA Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.
- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.
- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured, and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.
- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in

conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training, and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based on current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the investigation and remedial activities, the minimum required Levels of Protection for these tasks shall be as identified in Table 4.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exists that organic vapors and/or particulates may be released to the air during intrusive construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

TurnKey-Benchmark personnel will conduct routine, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by TurnKey-Benchmark personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Air Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined by NYSDOH Appendix 1A Generic Community Air Monitoring Plan (Reference 4) and attached as Appendix C. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and

the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community because of site investigation work.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, explosimeter, or other appropriate instrument(s), will be used by TurnKey-Benchmark personnel to monitor organic vapor concentrations as specified in this HASP. In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion using a real-time particulate monitor as specified in this plan. In the absence of such monitoring, appropriate respiratory protection for particulates shall be donned. Sustained readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for TurnKey-Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID - Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during RD activities involving deep excavation, if required. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.
- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.
- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.
- 19.5-21% oxygen - Proceed with extreme caution; attempt to determine potential source of oxygen displacement.
- Less than 19.5% oxygen - Leave work zone immediately.
- 21-25% oxygen - Continue engineering operations with caution.
- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of site soil/fill. Action levels based on the instrument readings shall be as follows:

- Less than 50 $\mu g/m^3$ - Continue field operations.
- 50-150 $\mu g/m^3$ - Don dust/particulate mask or equivalent
- Greater than 150 $\mu g/m^3$ - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (i.e., wetting of excavated soils or tools at discretion of SSHO).

Readings with the organic vapor analyzer, combustible gas meter, and particulate monitor will be recorded and documented on the appropriate Project Field Forms. All instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume but more frequent intervals of monitoring, as directed by the SSHO, must be conducted.
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the SSHO, are conducted.
  - If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone, the SSHO must be notified and work activities shut down. The SSHO will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) personnel to review.

- **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**
  - If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.
  - If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be

monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).

- If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

o ***Major Vapor Emission Response Plan*:**

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.
2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.
3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the SSHO.

The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

o **EXPLOSIVE VAPORS:**

- Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
- Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **Airborne Particulate Community Air Monitoring**

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and that visible dust is not migrating from the work area.
- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 $\mu g/m^3$ above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding RQ.
- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding RQ.

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes

that could form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.
- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on site history and decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during Remedial efforts.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented as Appendix A of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be

roped, ribboned, or otherwise blocked off to prevent unauthorized access.

- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Contractor will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (NYSDEC approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the site. The response contractor may use heavy equipment (i.e., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Op-Tech: (716) 873-7680
- Environmental Products and Services, Inc.: (716) 447-4700

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and

procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Site will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to TurnKey-Benchmark employees. The SSHO and/or his or her designee will be responsible for monitoring TurnKey-Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.
- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.
- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet, and abdomen.
- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.
- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same. If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.
- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No TurnKey-Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frost nip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions; removal of boots and gloves; soaking the injured part in warm water (102 to 108 degrees Fahrenheit); and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue, which will be firm to the touch but will yield little pain. The treatment is identical for Frost nip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frost nip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering
  2) Apathy (i.e., a change to an indifferent or uncaring mood)
  3) Unconsciousness
  4) Bodily freezing

  Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

  1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)
  2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).
  3) Perform passive re-warming with a blanket or jacket wrapped around

the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated area, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
    - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
    - At a workers request.
    - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).
    - As a screening measure whenever anyone worker on site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established on a daily basis and communicated to all employees and other site users by the SSHO. It shall be each Contractor's SSHO's responsibility to ensure that all site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone"): The area where contaminated materials may be exposed, excavated, or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.
- Contamination Reduction Zone: The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment, and samples must remain in the Contamination Reduction Zone until decontaminated.
- Support Zone: The part of the site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation and construction activities involving disruption or handling of site soils or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling/construction activity.
- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling/construction activity.
- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the completion of the task will be allowed access to these areas if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO.

The SSHO will maintain a Health and Safety Logbook containing the names of TurnKey-Benchmark workers and their level of protection. The zone boundaries may be

changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for TurnKey-Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions that may arise at the site. All TurnKey-Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves.

Station 3 - Tape, Outer Boot, and Glove Removal: Remove tape, outer boots, and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face, and forearms with absorbent wipes. If field activities proceed for six consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

Decontamination of heavy equipment will be conducted by the Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

Decontamination of all tools used for sample collection purposes will be conducted by TurnKey-Benchmark personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal), which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment.
- Wash with water to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.
- Wrap all parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by TurnKey-Benchmark employees is not anticipated to be necessary to complete the investigation and remedial activities identified in Section 2.0. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by TurnKey-Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through TurnKey-Benchmark's corporate Health and Safety Director. TurnKey-Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by each Contractor and are required on all heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling, or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the NFPA.

14.4 Hot Work

If the scope of work necessitates welding or blowtorch operation, the hot work permit presented in Appendix B will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix A. The hospital route map is presented as Figure A-1.

16.0 REFERENCES

1. New York State Department of Health. 2002. *Generic Community Air Monitoring Plan, Appendix 1A, DER-10 Technical Guidance for Site Investigation and Remediation.* May 2010.

TABLES

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Parameter[1]	CAS No.	Maximum Detected Concentration [2]			
		Groundwater [3] (mg/L)	Surface Soil/Fill (mg/kg)	Sub-Surface Soil/Fill (mg/kg)	LNAPL (mg/kg)
Volatile Organic Compounds (VOCs):					
Benzene	71-43-2	570	0.0047	2800	14,000
Ethylbenzene	100-41-4	25	*Note 4*	170	4,600
Toluene	108-88-3	77	0.001	1700	5,700
Xylene, Total	1330-20-7	390	0.0017	1100	31,000
Polycyclic Aromatic Hydrocarbons (PAHs):					
Acenaphthene	83-32-9	0.36	*Note 4*	*Note 4*	400
Acenaphthylene	208-96-8	0.09	*Note 4*	*Note 4*	570
Anthracene	120-12-7	0.27	0.23	*Note 4*	240
Benz(a)anthracene	56-55-3	0.28	0.7	*Note 4*	27
Benzo(a)pyrene	50-32-8	0.23	0.56	*Note 4*	ND
Benzo(b)fluoranthene	205-99-2	0.069	0.86	*Note 4*	12
Benzo(ghi)perylene	191-24-2	0.033	0.35	*Note 4*	ND
Benzo(k)fluoranthene	207-08-9	0.071	0.38	*Note 4*	ND
Chrysene	218-01-9	0.26	0.67	*Note 4*	17
Dibenz(ah)anthracene	53-70-3	0.022	0.08	*Note 4*	ND
Fluoranthene	206-44-0	0.76	1.3	*Note 4*	200
Fluorene	86-73-7	1.7	*Note 4*	*Note 4*	9,600
Indeno(1,2,3-cd)pyrene	193-39-5	0.04	0.36	*Note 4*	ND
Naphthalene	91-20-3	280	0.29	1100	49,000
Phenanthrene	85-01-8	0.94	0.87	*Note 4*	800
Pyrene	129-00-0	0.41	0.87	*Note 4*	220
Inorganic Compounds:					
Arsenic	7440-38-2	70.6	30.5	17.7	28.2
Cadmium	7440-43-9	20.6	9.7	3.7	0.03
Chromium	7440-47-3	306	1190	508	1.7
Lead	7439-92-1	26.3	160	224	0.34
Mercury	7439-97-6	0.22	4.2	0.99	ND
Polychlorinated Biphenyls (PCBs):					
Aroclor 1242	53469-21-9	*Note 4*	*Note 4*	*Note 4*	2
Aroclor 1260	11096-82-5	*Note 4*	*Note 4*	*Note 4*	3.3

Notes:

1. Constituents were identified as parameters of interest during the RFI for the Benzol Plant Tank Storage Area (SWMU P-11).
2. Maximum detected concentrations as presented in the Final RFI Report for the Benzol Plant Tank Storage Area (SWMU P-11).
3. Groundwater analytical data collected from the Coke Oven Area of the Former Bethlehem Steel Lackawanna Coke Division Site.
4. Compounds with a detection frequency greater than 5% and a maximum concentration greater than the screening criteria were retained as potential parameters of interest during the RFI (Reference 1).

Acronyms:

NA = Not analyzed.
ND = Parameter not detected above method detection limits.

TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs): ppm						
Benzene	Benzol, Phenyl hydride	71-43-2	Ca	1	0.5	500
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Toluene	Methyl benzene, Methyl benzol	108-88-3	C-300	200	50	500
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Polycyclic Aromatic Hydrocarbons (PAHs) [2] : ppm						
Acenaphthene	*none*	83-32-9	*none*	--	--	--
Acenaphthylene	*none*	208-96-8	*none*	--	--	--
Anthracene	*none*	120-12-7	*none*	--	--	--
Benz(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(ghi)perylene	*none*	191-24-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Chrysene	*none*	218-01-9	*none*	--	--	--
Dibenz(ah)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--
Polychlorinated Inorganic Compounds: mg/m [3]						
Aroclor 1242	Chlorodiphenyl, 42% chlorine	53469-21-9	Ca	--	--	--
Aroclor 1260	Chlorodiphenyl, 60% chlorine	11096-82-5	*none*	--	--	--
Inorganic Compounds: mg/m [3]						
Arsenic	*none*	7440-38-2	Ca	0.01	0.01	5
Cadmium	*none*	7440-43-9	Ca	0.005	0.01	9
Chromium	*none*	7440-47-3	*none*	1	0.5	250
Lead	*none*	7439-92-1	*none*	0.05	0.15	100
Mercury	*none*	7439-97-6	C-0.1	0.1	0.05	10

Notes:

1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. Individual parameters listed are those most commonly detected at steel/coke manufacturing sites.
3. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:

Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hours/day @ 40 hours/week.
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-STEL or Short Term Exposure Limits are 15 minute exposures that should not be exceeded for even an instant. It is not a stand alone value but is accompanied by the TLV-TWA.
It indicates a higher exposure that can be tolerated for a short time without adverse effect as long as the total time weighted average is not exceded.
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximium exposure conconcentration allowable for 8 hours per day @ 40 hours per week

TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
1. Soil/Fill Excavation	x	x	
2. Soil/Fill Documentation Sampling	x	x	
3. Surface Water Management			x
4. Slag/Fill Subgrade Preparation	x	x	
5. Cover Soil Placement	x	x	
6. Groundwater Monitoring Well Installation/Sampling	x	x	x
7. Groundwater Remediation	x	x	x

Notes:
1. Activity as described in Section 1.5 of the Health and Safety Plan.

TABLE 4

REQUIRED LEVELS OF PROTECTION
FOR BCP INVESTIGATION AND REMEDIAL ACTIVITIES

Site-Wide Health and Safety Plan
Tecumseh Redevelopment BCP Sites
Lackawanna, New York

Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
1. Soil/Fill Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
2. Soil/Fill Documentation Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
3. Surface Water Management	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
4. Slag/Fill Subgrade Preparation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
5. Cover Soil Placement	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
6. Groundwater Monitoring Well Installation/Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
7. Groundwater Remediation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS

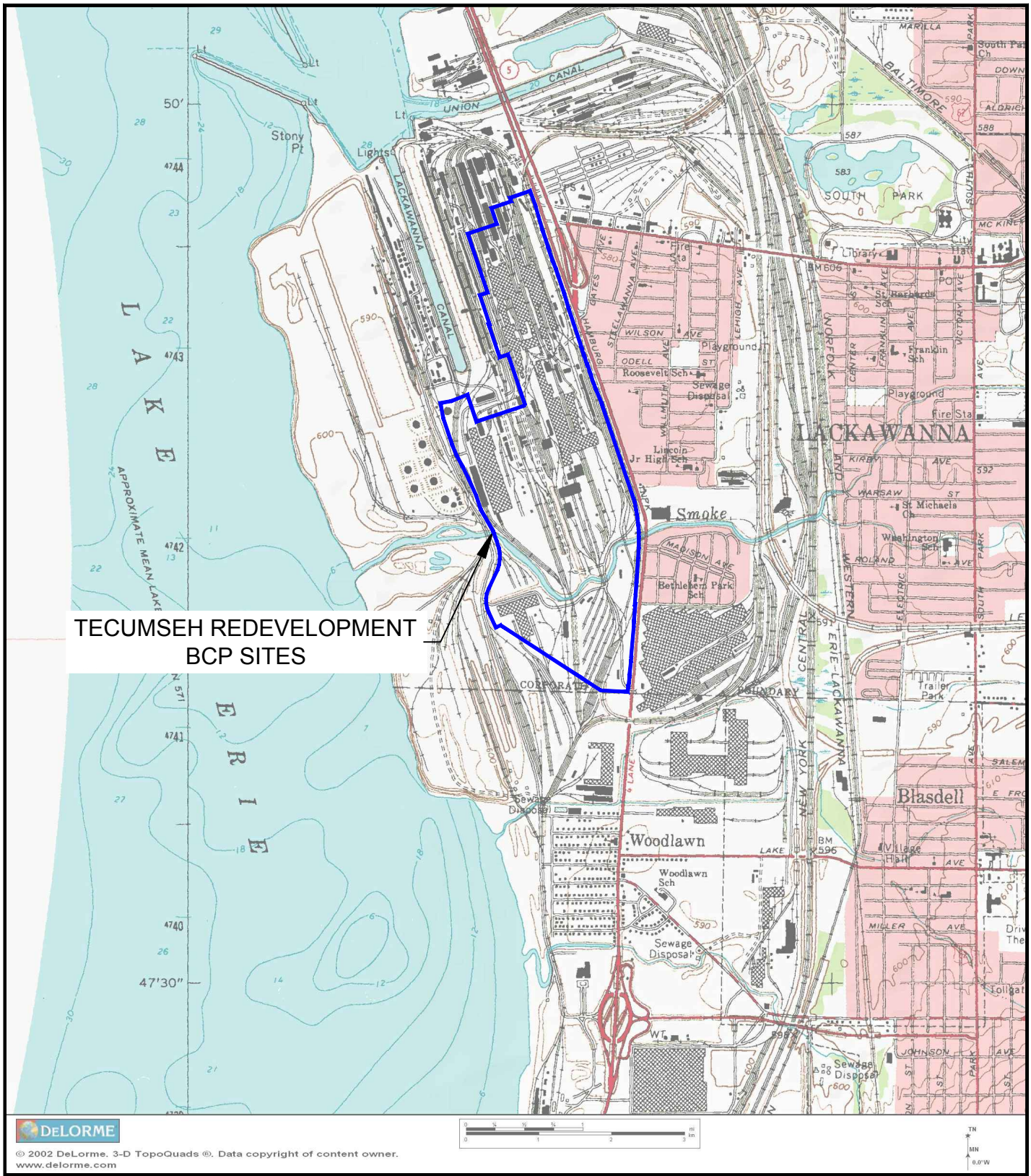
Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes.
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

F:\CAD\Tr Ke\Te m e\Rede eopme t\Bro ile d Cea p Pro ram (BCP)\Site-Wide HASP Fi re 1\Site Lo atio a d Vi it Map.d

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

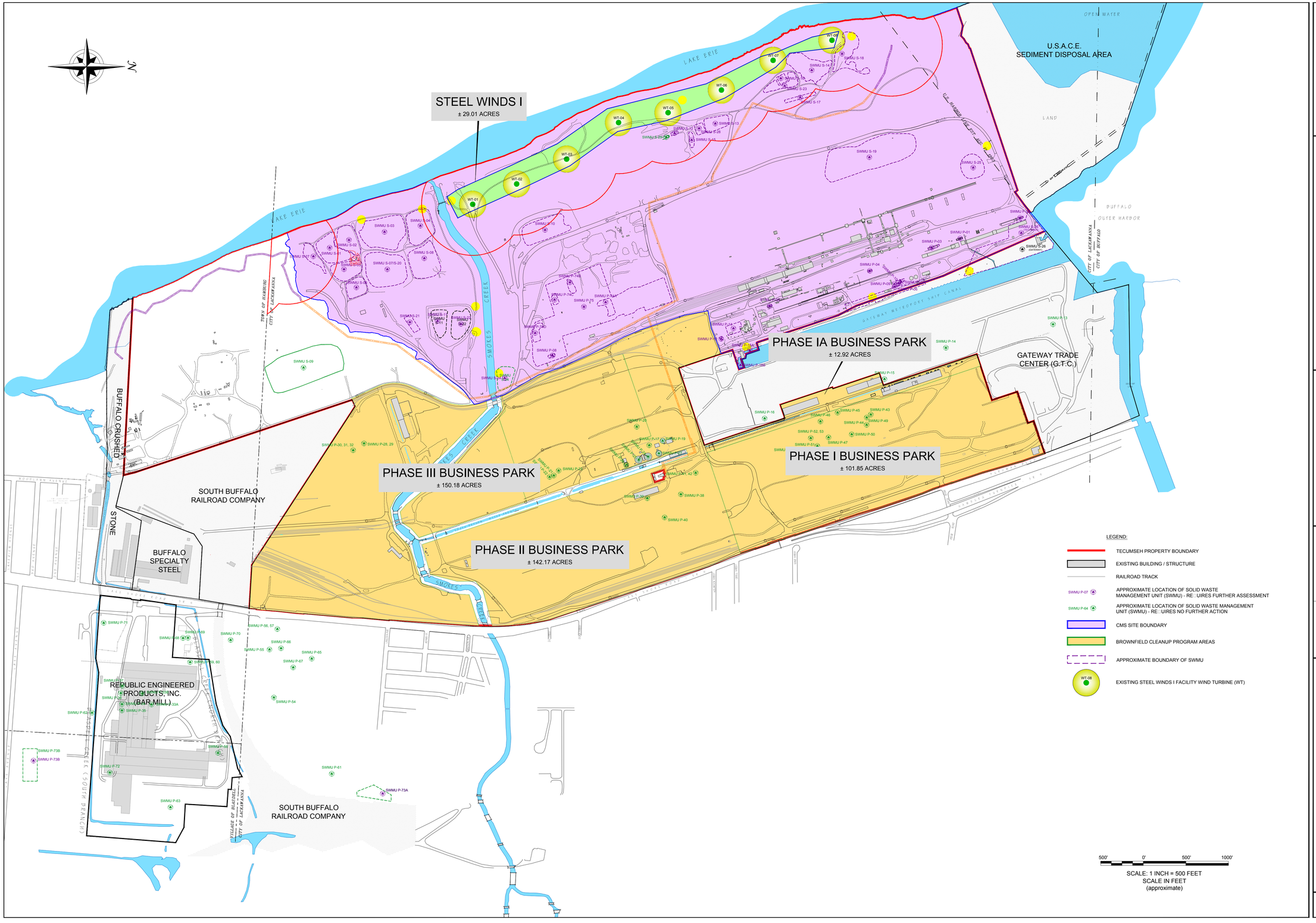
DATE: JULY 2013

DRAFTED BY: BLR

SITE LOCATION & VICINITY MAP

SITE-WIDE HEALTH AND SAFETY PLAN

TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK



TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-012-322

REVISIONS

NO.	BY	DATE	REMARKS

DRAWN BY: BLR
DATE: JULY 2013
CHECKED BY:
APPROVED BY:

DISCLAIMER:
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SEAL

SITE PLAN

SITE-WIDE HEALTH AND SAFETY PLAN
TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

FIGURE 2

APPENDIX A

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM

TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

April 2010 0071-012-322
Revised July 2013

TECUMSEH REDEVELOPMENT BCP SITES
SITE-WIDE HEALTH AND SAFETY PLAN
APPENDIX A: EMERGENCY RESPONSE PLAN

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Figure A-1 Hospital Route Map

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site-Wide Health and Safety Plan (HASP) prepared for BCP investigation and remedial activities conducted at the Tecumseh Redevelopment BCP Sites (former Bethlehem Steel Lackawanna Works), Lackawanna, New York. This appendix of the Site-Wide HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury
2. Fire

Source of Emergency:

1. Slip/trip/fall
2. Fire

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
Spill Response Kit	2	Benzol Yard ICM Treatment Building; Wastewater Treatment Plant Garage (Phase III parcel)
First Aid Kit	3	Site Vehicle; Benzol Yard ICM Treatment Building; Field Office in Coke Oven Office Building
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Tecumseh Redevelopment Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features; however, the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the TurnKey personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: ***Thomas H. Forbes, P.E.***
Work: (716) 856-0599
Mobile: (716) 864-1730

Corporate Health and Safety Director: ***Michael M. Yount, CESCO***
Work: (716) 856-0599
Mobile: (716) 983-3143

Site Safety and Health Officer (SSHO): ***Richard L. Dubisz***
Work: (716) 856-0635
Mobile: (716) 998-4334

Alternate SSHO: ***Thomas A. Behrendt***
Work: (716) 856-0635
Mobile: (716) 818-8358

MERCY HOSPITAL (ER):	(716) 826-7000
FIRE:	911
AMBULANCE:	911
BUFFALO POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:
Tecumseh Redevelopment Inc.
1951 Hamburg Turnpike
Lackawanna, New York 14218
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's SSHO to ensure an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site evacuation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction SSHO to review evacuation routes and procedures as necessary and to inform all TurnKey-Benchmark workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the SSHO (***Thomas Behrendt*** or ***Richard Dubisz***) so that appropriate action can be initiated. Contractors and subcontractors on this Site have coordinated their emergency response plans to ensure that

these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the SSHO in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (i.e., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Mercy Hospital.
- Inhalation: Move to fresh air and, if necessary, transport to Mercy Hospital.
- Ingestion: Decontaminate and transport to Mercy Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Mercy Hospital via ambulance. The SSHO will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Mercy Hospital (see Figure A-1):

The following directions describe the best route to Mercy Hospital:

- From Gate 2, proceed onto the Hamburg Turnpike (SR 5).
- Proceed east on Hamburg Turnpike (SR 5) to the Tifft Street Exit and turn right onto Tifft Street.
- Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.
- Turn right on Abbott Road and Mercy Hospital will be on right hand side. Follow signs to emergency room (ER).

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control, and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal, and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

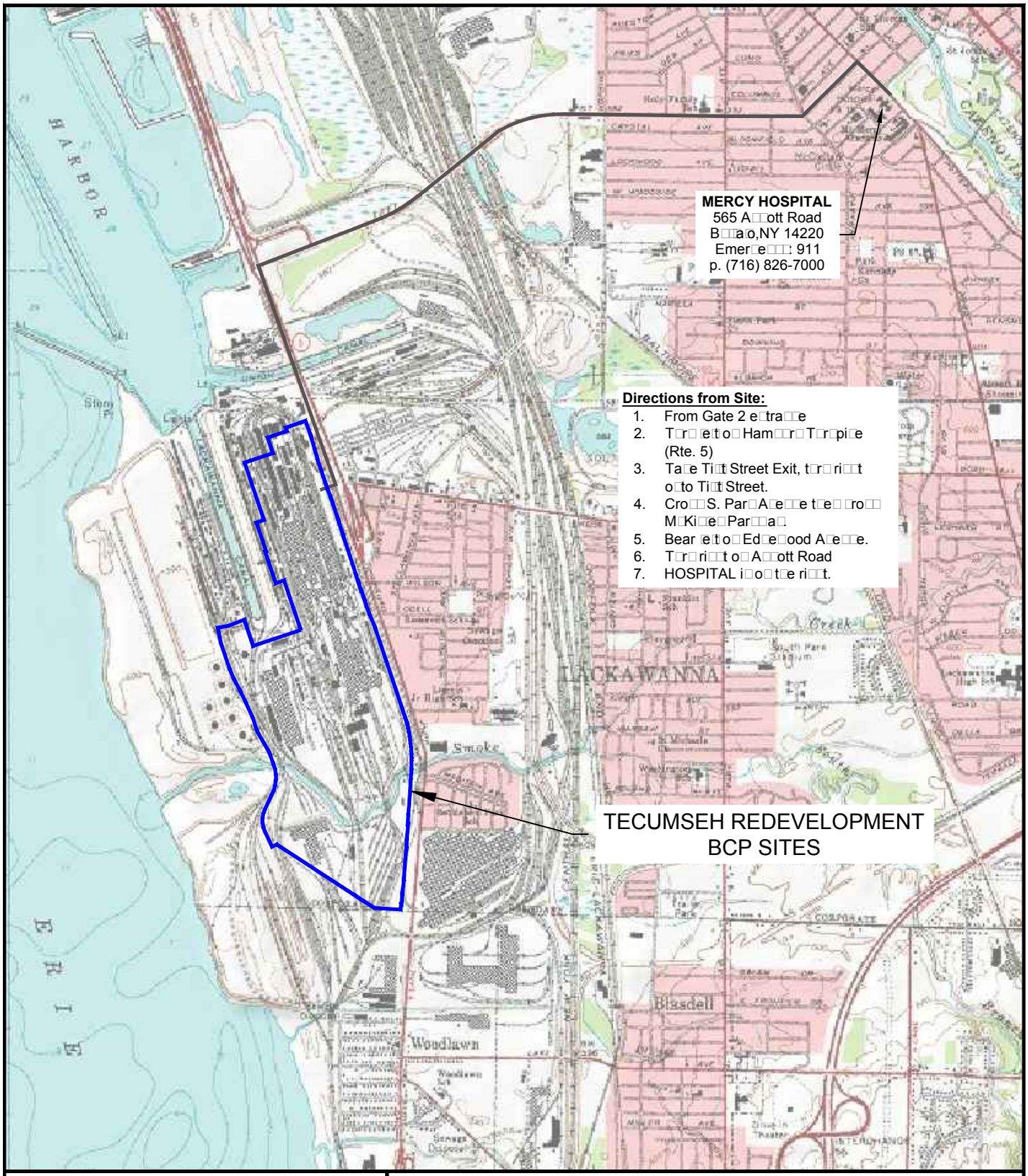
10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES

F:\CAD\Turnkey\Tecumseh Redevelopment\BCP Program (BCP)\Site-Wide HASP\Figure A-1 Hospital Route Map.dwg

FIGURE A-1



TurnKey Environmental Restoration, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-012-322

DATE: JULY 2013

DRAFTED BY: BLR

HOSPITAL ROUTE MAP

SITE-WIDE HEALTH AND SAFETY PLAN

TECUMSEH REDEVELOPMENT BCP SITES
LACKAWANNA, NEW YORK

APPENDIX B

HOT WORK PERMIT FORM

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

Prepared By: _____

APPENDIX C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX D

MONITORING WELL BORING AND CONSTRUCTION LOGS

Project No: 0071-009-311

Borehole Number: MWN-63A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

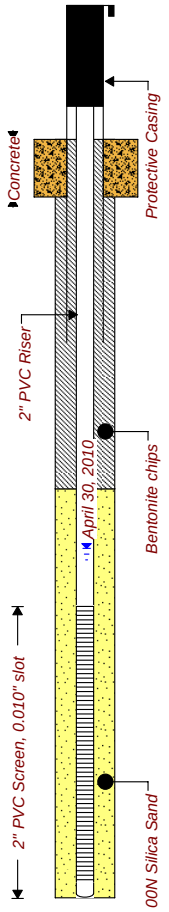
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0 / 0.0	Ground Surface							
		Advanced augers to 13.0 fbgs, see MWN-63D 0.0 to 13.0 fbgs for soil descriptions .							
2.0									
7.0									
12.0									
	-13.0 / 13.0	End of Borehole							
17.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich D-120
Drill Method: 4 1/4" HSA, no sampling
Comments:
Drill Date(s): 4 2 10

Hole Size: 8 1/2 - inch
Stick-up: 2.06 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0071-009-311

Borehole Number: MWN-63D

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

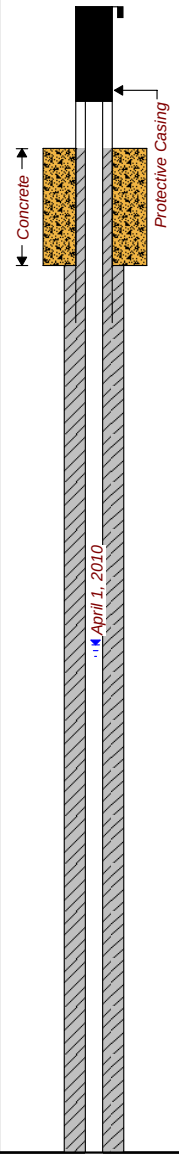
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 12.5 / 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Black, moist, non-plastic fines with some fine sand with slag, orange brick pieces, coal pieces, medium dense, loose when disturbed.	S1	18	1.3		0.0		
	-2.0								
2.0	2.0	Brown, moist to wet, non plastic fines, some sand, slag, brick, with pockets of lean clay.	S2	5	1.1		0.0		
	-4.0								
	4.0	***Lean Clay*** Grey, moist, mostly medium plastcity fines, few fine sands, stiff.	S3	6	1.1		0.0		
	-6.0								
	6.0	Same as above.	S4	17	1.4		0.0		
7.0	-8.0								
	8.0	***Poorly Graded Sand*** Dark grey, wet at (8.5 fbgs), mostly medium sand, trace non-plastic fines, few coarse sands, trace sub-rounded fine gravel, loose, rapid dilatancy.	S5	3	1.1		0.0		
	-10.0								
	10.0	As above	S6	10	.9		0.0		
	-12.0								
12.0	12.0	Same as above	S7	NA	1.1		0.0		
	-13.0								
	13.0	***Sandy Organic Soil*** Brown, wet, mostly organic fines, some fine sand, rootlets, low plasticity fines, soft.							
	-14.0								
	14.0	Same as above.	S8	3	1.0		0.0		
	-16.0								
	16.0								
	-16.5								
	16.5		S9	4	.9		0.0		
17.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Dietrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA and NQ core barrel
Comments:
Drill Date(s): 4/1 - 4/2/10

Hole Size: 8 1/2 -inch
Stick-up: 2.24-feet
Datum: Mean Sea Level

Sheet: 1 of 3

Project No: 0071-009-311

Borehole Number: MWN-63D

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

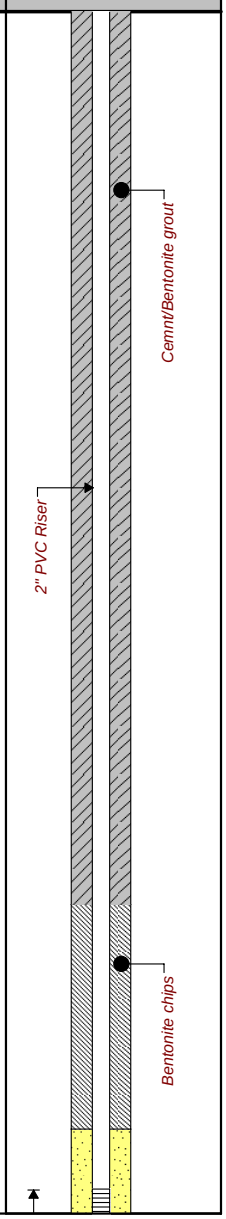
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 12.5 / 25)	Lab Sample	Well Completion Details or Remarks
	-18.0 / 18.0	***Lean Clay*** Grey, moist, mostly medium plasticity fines, few fine sand with organic particles, stiff.	S9	4			0.0		
		Sandy Organic Soil Brown, wet, mostly organic fines, some fine sand, rootlets, low plasticity fines, soft, thinley bedded lean clay lenses.	S10	5	.9		0.0		
	-20.0 / 20.0	Same as above,no clay lenses.							
	-21.0 / 21.0	Same as above.	S11	16	1.1		0.0		
	-22.0 / 22.0	***Poorly Graded Sand with Silt*** Grey, wet, Some fine sand, few silt, with trace trace fine gravel, medium dense							
22.0		***Silty Sand*** Grey, wet, mostly fine sand, few non plastic fines, medium dense	S12	12	1.4		0.0		
	-24.0 / 24.0	***Lean Clay*** Grey, wet, mostly high plasticity fines, few sand, very stiff, thinnly bedded.	S13	11	1.2		0.0		
	-26.0 / 26.0	Same as above, stiff to soft	S14	6	1.5		0.0		
27.0	-28.0 / 28.0	Same as above,soft.	S15	WH	2.0		0.0		
	-30.0 / 30.0	***Sandy Lean Clay*** Grey, wet, mostly medium plastcity fines with some fine sand, few fine gravel, trace coarse gravel, very dense, massive	S16	6	1.0		0.0		
32.0	-32.0 / 32.0	As above, few subangular coarse gravel.	S17	43	1.0		0.0		
	-34.0 / 34.0	***Dolomitic Limestone with Shale bedding.*** Shale chips; Top of bedrock 34.8 fgbs (Auger refusal)	S18	NA	0.0		0.0		
	-34.8 / 34.8								
37.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Dietrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA and NQ core barrel
Comments:
Drill Date(s): 4/1 - 4/2/10

Hole Size: 8 1/2 -inch
Stick-up: 2.24-feet
Datum: Mean Sea Level

Sheet: 2 of 3

Project No: 0071-009-311

Borehole Number: MWN-63D

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
42.0		Dark grey to grey, microcrystaline with laminations less then 1 to 3 mm, moderate field strength weathered slightly along bedding planes, medium soft, broken. Run #1 34.8 - 44.8 total recovery 99% RQD 43.69% poor, lost approximatley 20 gallons of drilling water. Run #2 44.8 - 49.8 total recovery 95% RQD 59% Fair, lost approximatley 180 gallons of drilling water.							2" PVC Screen, 0.010" slot 00N Silica Sand
47.0									
	-49.8 49.8	End of Borehole							
52.0									
57.0									

Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Dietrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA and NQ core barrel
Comments:
Drill Date(s): 4/1 - 4/2/10

Hole Size: 8 1/2 -inch
Stick-up: 2.24-feet
Datum: Mean Sea Level

Sheet: 3 of 3

Project No: 0071-009-311

Borehole Number: MWN-64A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

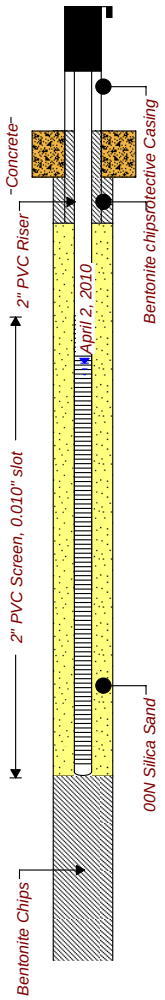
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Grey brown, moist, non-plastic fines with some fine sand, slag, medium dense.	S1	16	1.1		0.0		
	-2.0 2.0	As above, black, coal and coke fines, orange brick, loose.	S2	8	1.0		0.3		
2.0	-4.0 4.0	As above.	S3	3	1.0		0.3		
	-5.0 5.0	***Poorly Graded Sand with Silt*** Brown, wet, mostly medium sand, few non plastic fines, few fine sub rounded gravel, loose, rapid dilatancy.							
	-6.0 6.0	***Slag/Fill*** Grey, wet, coarse slag with trace non plastic fines and fine sand, medium dense.	S4	16	1.7		0.0		
7.0	-8.0 8.0	As above.	S5	17	1.2		0.0		
	-10.0 10.0	***Concrete*** No recovery concrete sluff, rig chatter (10.0 - 12.0 fbgs).	S6	NA	0.0		0.0		
12.0	-12.0 12.0	No Recovery.	S7	NA	0.0		0.0		
	-14.0 14.0	***Silty Sand*** Grey, wet, mostly fine sand, with some non plastic fines, soft, no odor.	S8	WR	0.6		0.0		
	-15.0 15.0								
	-16.0 16.0	***Sandy Organic Soil*** Brown, wet, mostly organic, some fine sand, low plasticity fines, soft.	S9	WH	0.8		0.3		
17.0	-18.0 18.0	as above.							
		End of Borehole							
22.0									



Drilled By: Eart Dimensions, Inc.
Drill Rig Type: Diedrich D120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 4 2 10

Hole Size: 8 1/2 -inch
Stick-up: 2.58 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0071-009-311

Borehole Number: MWN-65D

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

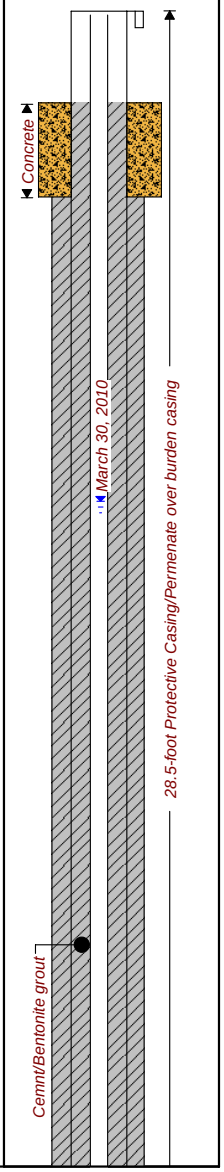
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 25 – 50)	Lab Sample	Well Completion Details or Remarks
-2.0									
	0.0	Ground Surface							
	0.0	Augered to 5.0 fbgs.							
3.0									
	-5.0								
	5.0	***Slag/Fill*** Dark grey, moist, mostly medium plasticity fines with few sand, with slag and orange brick, medium dense.	S1	10	2.0		0.1		
	-7.0								
	7.0	Augered to 10.0 fbgs.							
8.0									
	-10.0								
	10.0	***Silty Sand*** Black, wet, mostly fine sand with some non plastic fines, medium dense.	S2	13	1.9		15.1		
	-11.0								
	11.0	***Lean Clay*** Dark grey, moist, mostly medium plasticity fines with few fine sand, rootlets, soft, no odors.							
	-12.0								
	12.0	Augered to 15.0 fbgs.							
13.0									
	-15.0								
	15.0	***Silty Sand*** Black, wet, mostly fine sand with some non plastic fines, soft, petroleum like odor.	S3	WH	2.0		27.2		
	-17.0								
	17.0	Augered to 20.0 fbgs.							
18.0									
	-20.0								
	20.0	***Sandy Lean Clay*** Grey, wet, medium plasticity with some fine sand, thinly bedded, soft.	S4	14	1.4		0.0		
	-22.0								
	22.0						0.3		



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich D-120
Drill Method: Standard + continuous 2' SS + 4' macro core with 8 ½" HSA, NQ Core barrel
Comments:
Drill Date(s): 3 30 10 and 4 5 10

Hole Size: 17-inch
Stick-up: 1.92 - feet
Datum: Mean Sea Level

Sheet: 1 of 3

Project No: 0071-009-311

Borehole Number: MWN-65D

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

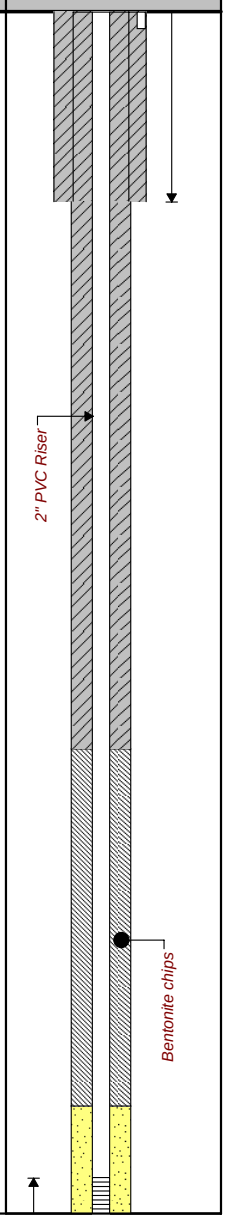
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm	Lab Sample	Well Completion Details or Remarks
	-24.0 / 24.0	***Lean Clay*** Grey, wet, medium plasticity fines, few sand, soft, (pushed 6-inch steel overburden casing to 26.5 fbgs.)	S5	4	2.0		0.0		
		No sample taken							
	-26.5 / 26.5								
27.0		As above, trace coarse sand (28.5-30.5 fbgs), soft, massive.	S6	NA	3.6		0.0		
	-30.5 / 30.5						0.0		
		Lean Clay with Sand. Grey, wet, medium plasticity fines with little fine sand, soft, massive.	S7	NA	2.0		0.0		
32.0	-33.0 / 33.0								
		Sandy Lean Clay Grey, moist, mostly medium plasticity fines, some fine sand, few sub rounded fine gravels, trace coarse gravel in shoe, very hard.					0.0		
	-34.5 / 34.5	As above, brown, mostly low plasticity fines.	S8	NA	2.3		0.0		
37.0							0.0		
	-38.5 / 38.5	As above shale fragments.	S9	138	1.8		0.0		
	-40.5 / 40.5	As above, slight Petroliferous odor, in shale	S10	154	1.5		0.0		
42.0	-42.5 / 42.5	As above.	S11	NA	1.0		0.3		
	-44.5 / 44.5		S12	NA	0.4				
		Shale Black, shale chips, some non plastic fines little fine sand, petroliferous odor, top of competent bed rock44.3 fbgs, seated temporary casing to 45.0 fbgs.							
47.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich D-120
Drill Method: Standard + continuous 2' SS + 4' macro core with 8 ½" HSA, NQ Core barrel
Comments:
Drill Date(s): 3 30 10 and 4 5 10

Hole Size: 17-inch
Stick-up: 1.92 - feet
Datum: Mean Sea Level

Sheet: 2 of 3

Project No: 0071-009-311

Borehole Number: MWN-65D

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

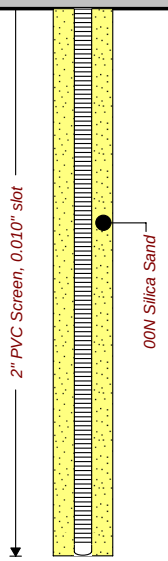
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 25 50	Lab Sample	Well Completion Details or Remarks
	-48.0 / 48.0	Run #1: 45.0' - 47.2' core barrel locked up due to fissile nature of bedrock, pulled core barrel, advanced temporary casing to 48.0 fbgs lost 20 gallons of drilling water. Recovery was less then 1.0 -foot of broken black shale pieces, very fissile petroliferous odor when broken.							
	-51.0 / 51.0	Run#2: 48.0' - 51.2' core locked up as above, pulled core barrel and advanced casing down to 51.2 fbgs, recovery was less then 1-foot of broken black shale, lost 20 gallons of drilling water.							
52.0		Run#3: 51.2'–59.0' lost bedrock core during core barrel retrieval no recovery, started loosing drilling water at 55 fbgs, lost1 75 gallons of drilling water.							
57.0									
	-59.0 / 59.0	End of Borehole							
62.0									
67.0									
72.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich D-120
Drill Method: Standard + continuous 2' SS + 4' macro core with 8 ½" HSA, NQ Core barrel
Comments:
Drill Date(s): 3 30 10 and 4 5 10

Hole Size: 17-inch
Stick-up: 1.92 - feet
Datum: Mean Sea Level

Sheet: 3 of 3

Project No: 0071-009-311

Borehole Number: MWS-32A

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

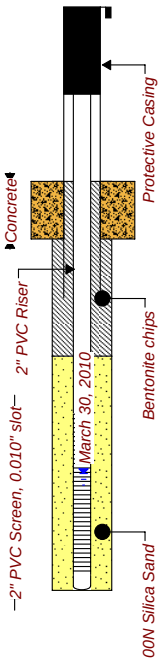
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Black, moist,, mostly non-plastic fines with some fine sand with slag and yellow refractory brick, very dense, loose when disturbed.	S1	NA	0.8		0.1		
	-2.0 2.0	As above.	S2	48	1.5		0.0		
	-4.0 4.0	As above, wet at 5.0 fbgs.	S3	22	0.8		0.0		
	-5.5 5.5	***Lean Clay*** Dark grey, moist, mostly medium plasticity fines with few fine sand, very stiff, massive.							
7.0	-6.0 6.0	As above, iron staining, rootlets, thinly bedded, trace fine sand, stiff.	S4	14	1.9		0.0		
	-8.0 8.0	End of Borehole							
12.0									
17.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 3 30 10

Hole Size: 8 1/2-inch
Stick-up: 2.82 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0071-009-311

Borehole Number: MWS-36A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

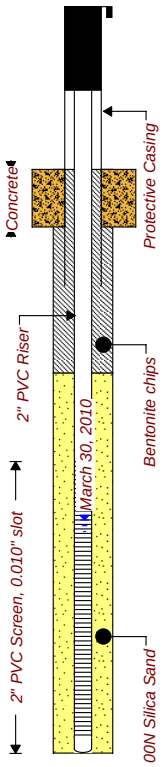
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Black, moist, mostly non-plastic fines with some sand with dark grey slag and yellow and orange brick, very dense, loose when disturbed, coal pieces.	S1	63	2.1		0.7		
2.0	-2.0 2.0	As above, coal.	S2	56	0.2		0.8		
	-4.0 4.0	As above, medium dense.	S3	10	.3		0.0		
	-6.0 6.0	Yellow brick, wet at 6.0 fbgs, medium dense.	S4	10	.2		0.0		
7.0	-8.0 8.0	***Lean Clay*** Dark grey, wet to moist, mostly medium plastcity fines with trace fine sand, soft, rootlets, massive.	S5	3	1.1		0.0		
	-10.0 10.0	As above, moist, with rootlets, iron staining, stiff.	S6	13	1.4		0.0		
12.0	-12.0 12.0	End of Borehole							
17.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich-D120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 3 30 10

Hole Size: 8 1/2 -inch
Stick-up: 2.61- feet
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0071-009-311

Borehole Number: MWS-37A

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

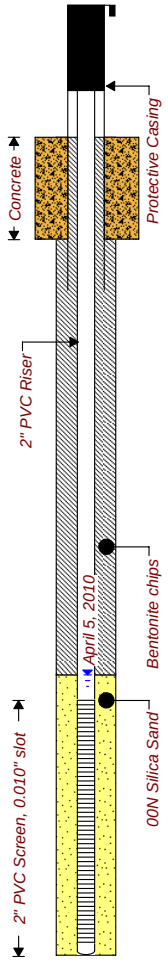
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Grey to black, moist, mostly non-plastic fines with some fine sand, slag, orange brick, medium dense, loose when disturbed.	S1	14	2		0.0		
2.0	-2.0 2.0	As above, loose, with coal peices.	S2	6	1.3		0.0		
	-4.0 4.0	As above, no coal peices.	S3	4	1.6		0.0		
	-5.5 5.5								
	-6.0 6.0	***Lean Clay*** Dark grey, moist, mostly medium plasticity fines with few fine sand, medium soft, massive.	S4	4	1.5		0.0		
7.0	-8.0 8.0	As above, iron staining, rootlets, thinly bedded, trace fine sand, black mottling.	S5	12	1.5		0.1		
	-10.0 10.0	As above.							
	-10.5 10.5	***Sandy Lean Clay*** As above, wet at 10.5 fbgs, some fine sand.	S6	6	1.9		0.0		
12.0	-12.0 12.0	***Silty Sand*** Orange/ brown, wet, fine sand with some non plastic fines, loose, rapid dilatency.	S7	WH	1.7		0.0		
	-14.0 14.0	As above. As above, grey, trace coarse sand and fine gravel, loose.	S8	5	1.1		0.0		
	-16.0 16.0	***Lean Clay*** Dark grey, moist, mostly medium plasticity fines with few fine sand, trace coarse sand, very stiff.	S9	24	1.2		0.0		
17.0	-18.0 18.0	End of Borehole							



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich-D120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 4 5 10

Hole Size: 8 1/2 -inch
Stick-up: 2.40-feet
Datum: Mean Sea Level

Sheet: 1 of 1

APPENDIX E

GROUNDWATER MONITORING WELL SAMPLING LOG FORMS

GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.			Diameter (inches):			Sample Date / Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			One Well Volume (gal):			Purpose: ☐ Development ☐ Sample ☐ Purge & Sample			
Total Depth (fbTOR):			Total Volume Purged (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:									
	S1								
	S2								

Well No.			Diameter (inches):			Sample Date / Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			One Well Volume (gal):			Purpose: ☐ Development ☐ Sample ☐ Purge & Sample			
Total Depth (fbTOR):			Total Volume Purged (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:									
	S1								
	S2								

REMARKS:

Note: All measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

PREPARED BY:

WATER LEVEL MONITORING RECORD

Project Name:	Client:
Project No.:	Location:
Field Personnel:	Date:
Weather:	

Well No.	Time	Top of Riser Elevation (fmsl)	Static Depth to Water (fbTOR)	Groundwater Elevation (fmsl)	Total Depth (fbTOR)	Last Total Depth Measurement (fbTOR)

APPENDIX F

INSPECTION FORM FOR THE CONTROLLED PROPERTY

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site Nos.**:** **C915198 through C915198L**

Site Name: **Phase II Business Park ("Controlled Property")**

Site Address: **2303 Hamburg Turnpike** Zip Code: **14218**

City/Town: **Lackawanna**

County: **Erie**

Current Use: **Industrial**

Intended Use: **Industrial/Commercial Business Park**

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NOs. C915198 through C915198L

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NOs. C915198 through C915198L

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

APPENDIX G

QUALITY ASSURANCE PROJECT PLAN

BROWNFIELD CLEANUP PROGRAM

APPENDIX G
QUALITY ASSURANCE PROJECT PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NUMBERS: C915198 through C915198L
LACKAWANNA, NEW YORK

December 2013 0071-012-322

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QUALITY ASSURANCE PROJECT PLAN (QAPP)
TECUMSEH PHASE II BUSINESS PARK

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is an appendix to the Site Management Plan (SMP), a required element of the remedial program at the Phase II Business Park (hereinafter referred to as the "Controlled Property") under the New York State (NYS) Brownfield Cleanup Program (BCP), administered by New York State Department of Environmental Conservation (NYSDEC). These BCP Sites were remediated in accordance with Brownfield Cleanup Agreement (BCA) Index #B9-0696-05-06(B), which was executed on March 14, 2007 and amended on August 20, 2012.

1.1 Site Location and Description

The Controlled Property is located in the City of Lackawanna, County of Erie, New York and is identified as a portion of tax parcel SBL#141.11-1-50 on the Erie County Tax Map. The Controlled Property is an approximate 143-acre area bounded by the Tecumseh Phase I and IA Business Parks to the north; South Buffalo Railroad Company to the south; Tecumseh Phase III Business Park and South Return Water Trench (SRWT) to the west; and Route 5 to the east. The boundaries of the Controlled Property as well as the boundaries of the individual Sites contained therein are more fully described in the Environmental Easement (see Appendix A of the SMP).

1.2 Site History

The approximate 143-acre Controlled Property formerly housed several facilities used in Bethlehem Steel Corporation's (BSC's) steel manufacturing processes. These included a pure oxygen generating station (known as South Linde Area); various mills; structural shipping yard; car repair shop; metal storage; and miscellaneous office production support buildings. Five historical Solid Waste Management Units (SWMUs) (i.e., P-38 through P-42) are present within the Controlled Property. BSC performed assessments for these SWMUs during a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) and subsequent RCRA Facility Investigation (RFI). Based on the findings, USEPA Region II issued "No Further Action" determination for the identified SWMUs within the Controlled Property.

The Controlled Property contains few structural remnants and other features associated with historic integrated steel-making facilities. These include the former 54" Bar Mill building; two separate electrical transformer stations; a former storage/welfare building to the south of Smokes Creek; the South Linde Area groundwater treatment system; and remnants of overhead lines, access roads, electrical power lines, and railroad tracks. Immediately east of the Site boundary is a man-made drainage channel designated as the SRWT that begins near WQCS No. 3 and flows south to Smokes Creek (see Figure 2). Historically and currently, the trench collects and discharges groundwater and storm water to Smokes Creek under active SPDES Permit No. NY-0269310. With the exception of treated groundwater discharges from the South Linde pump and treat system, there are no active outfalls into the SRWT from the Controlled Property.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The following section provides a generic organization for sampling activities, including roles, responsibilities, and required qualifications of these organizations.

2.1 NYSDEC and NYSDOH

It is the responsibility of the NYSDEC, in conjunction with the New York State Department of Health (NYSDOH), to review the project documents for completeness and conformance with the site-specific cleanup objectives and to make a decision to accept or reject these documents based on this review. The NYSDEC also has the responsibility and authority to review and approve all QA documentation collected during brownfield cleanup construction and to confirm that the QA Plan was followed.

2.2 Site Owner

The Site Owner, or holder of the certificate of completion (COC), will be responsible for complying with the QA requirements as specified herein and for monitoring and controlling the quality of the Brownfield cleanup activities either directly or through their designated environmental consultant and/or legal counsel. The Site Owner will also have the authority to select Contractor(s) to assist them in fulfilling these responsibilities. The Site Owner is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements.

2.3 Project Manager

The Project Manager has the responsibility for ensuring that the project meets the overall project objectives, reports directly to the Site Owner, coordinates with the NYSDEC/NYSDOH Project Coordinators, and is responsible for technical and project oversight. The PM will:

- Define project objectives and develop a detailed work plan schedule.
- Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task.
- Acquire and apply technical and corporate resources as needed to assure performance within budget and schedule constraints.

- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- Review the work performed on each task to assure its quality, responsiveness, and timeliness.
- Review and analyze overall task performance with respect to planned requirements and authorizations.
- Review and approve all deliverables before their submission to NYSDEC.
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- Ultimately be responsible for the preparation and quality of interim and final reports.
- Represent the project team at meetings.

2.4 Field Team Leader:

The Field Team Leader (FTL) has the responsibility for implementation of specific project tasks identified at the Site, and is responsible for the supervision of project field personnel, subconsultants, and subcontractors. The FTL reports directly to the Project Manager. The FTL will:

- Define daily develop work activities.
- Orient field staff concerning the project's special considerations.
- Monitor and direct subcontractor personnel.
- Review the work performed on each task to ensure its quality, responsiveness, and timeliness.
- Assure that field activities, including sample collection and handling, are carried out in accordance with this QAPP.

2.5 Quality Assurance (QA) Officer

The QA Officer will have direct access to corporate executive staff as necessary, to resolve any QA dispute, and is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations and policies, and NYSDEC requirements. Specific functions and duties include:

- Performing QA audits on various phases of the field operations.
- Reviewing and approving QA plans and procedures.
- Providing QA technical assistance to project staff.
- Reporting on the adequacy, status, and effectiveness of the QA program on a regular basis to the Project Manager for technical operations.
- Responsible for assuring third party data review of all sample results from the analytical laboratory.

2.6 Laboratory Responsibilities

Any environmental laboratory used for sample analysis for this Site must be an independent, NYSDOH Environmental Laboratory Approval Program (ELAP)-certified facility approved to perform the analyses prescribed herein.

- *Laboratory Director:*

  The Laboratory Director is a technical advisor and is responsible for summarizing and reporting overall unit performance. Responsibilities of the Laboratory Director include:

  - Provide technical, operational, and administrative leadership.
  - Allocation and management of personnel and equipment resources.
  - Quality performance of the facility.
  - Certification and accreditation activities.
  - Blind and reference sample analysis.

- *Quality Assurance Manager (QA Manager):*

  The QA Manager has the overall responsibility for data after it leaves the laboratory. The QA Manager will be independent of the laboratory but will communicate data issues through the Laboratory Director. In addition, the QA Manager will:

  - Oversee laboratory QA.
  - Oversee QA/QC documentation.
  - Conduct detailed data review.
  - Determine whether to implement laboratory corrective actions, if required.
  - Define appropriate laboratory QA procedures.
  - Prepare laboratory SOPs.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall objectives and criteria for assuring quality for this effort are discussed below. This QAPP addresses how the acquisition and handling of samples and the review and reporting of data will be documented. The objectives of this QAPP are to address the following:

- The procedures to be used to collect, preserve, package, and transport groundwater samples.
- Field data collection.
- Record keeping.
- Data management.
- Chain-of-custody procedures.
- Precision, accuracy, completeness, representativeness, for sample analysis and data management under EPA analytical methods.

Tables 1 and 2 provide analytical methods and detection/reporting limits for chemical parameters that may be analyzed. In addition, water levels and select water quality parameters (i.e., pH, turbidity, specific conductance, and temperature) will be measured in the field as described in the FOPs located in the SMP

The goals for precision, accuracy, and completeness intended for use on this project are discussed in Sections 3.1 through 3.3 of this QAPP. All data will be reported completely. No data will be omitted unless an error occurred in the analyses or the run was invalidated because of QC sample recovery or poor precision.

3.1 Precision

Precision is a measurement of the degree to which two or more measurements are in agreement, which is quantitatively assessed based on the standard deviation. Precision in the laboratory is assessed through the calculation of relative percent difference (RPD) and relative calculation of relative standard deviations (RSD) for three or more replicate samples. Table 3 provides general precision goals.

Laboratory precision will be assessed through the analysis of matrix spike/matrix spike duplicate (MS/MSD) and field duplicate samples for organic parameters. For inorganic

parameters, precision will be assessed through the analysis of matrix spike/duplicates field duplicate pairs. Precision for field parameters, including pH, turbidity, specific conductance, and temperature will be determined through duplicate analysis of 1 in every 20 samples. Table 4 provides precision control limits for field-measured parameters.

3.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference of true value. Accuracy in the field is assessed through the use of field blanks and trip blanks and through the adherence to all sample handling, preservation, and holding times. One trip blank will accompany each batch of water matrix sample containers shipped to the laboratory for volatile organic chemical analysis. Laboratory accuracy is assessed through the analysis of a matrix spike/matrix spike duplicate (MS/MSD) (1 per 20 samples), standard reference materials (SRM), laboratory control samples (LCS), and surrogate compounds, and the determination of percent recoveries. The equation to be used for accuracy for this investigation is found in Section 10.1 of this QAPP. Table 3 gives accuracy control limits for the laboratory.

3.3 Completeness

Data completeness is a measure of the amount of valid data obtained from a prescribed measurement system as compared with that expected and required to meet the project goals. Laboratory and field completeness will be addressed by applying data quality checks and assessments described in Section 3.1 and 3.2 and Section 7.0 to ensure that the data collected are valid and significant.

As shown on Table 3, the laboratory completeness objectives will be 90 percent or greater. A third party data validator will follow procedures described in Section 7.2 to assess the completeness and validity of laboratory data deliverables. For this investigation, 100 percent of all laboratory analytical results will undergo third party data review. The completeness of an analysis will be documented by including in the report sufficient information to allow the data validator to assess the quality of the results.

Raw data such as chromatograms, spectra, calibration data, laboratory worksheets and notes, etc will not be produced with the analytical data reporting package but will be stored with the sample results in the laboratory and made available upon request, if necessary, to

substantiate analytical results. The raw data will be archived for at least two years by the laboratory. The laboratory will retain all analytical information; regardless of whether the substantiation of results is requested.

3.4 Data Representativeness

Data representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. All proposed field-testing and measurement procedures were selected to maximize the degree to which the field data will represent the conditions at the Site, and the matrix being sampled or analyzed.

As described in Section 8.0, Performance System Audits and the proper execution of field activities are the main mechanism for ensuring data representativeness. Representativeness in the laboratory is ensured through the use of the proper analytical procedures, appropriate methods, meeting sample holding times, and analyzing and assessing field duplicate samples.

3.5 Level of QC Effort for Sample Parameters

Field blank, method blank, trip blank, field duplicate, laboratory duplicate, laboratory control, standard reference materials (SRM) and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. QC samples are discussed below.

- Field and trip blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field-sampling program. Field (equipment) blank samples are analyzed to check for procedural chemical constituents at the facility that may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage.
- Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures.
- Duplicate samples are analyzed to check for sampling and analytical reproducibility.

- MS/MSD and MS/Duplicate samples provide information about the effect of the sample matrix on the digestion and measurement methodology. Depending on site-specific circumstances, one MS/MSD or MS/Duplicate should be collected for every 20 or fewer investigative samples to be analyzed for organic and inorganic chemicals of a given matrix.

The general level of QC effort will be one field (blind) duplicate and one field blank (when non-dedicated equipment is used) for every 20 or fewer investigative samples of a given matrix. Additional sample volume will also be provided to the laboratory to allow one site-specific MS/MSD or MS/Duplicate for every 20 or fewer investigative samples of a given matrix. One trip blank consisting of distilled, deionized water will be included along with each sample delivery group of aqueous VOC samples.

4.0 CUSTODY PROCEDURES

Sample custody is controlled and maintained through the chain-of-custody procedures. Chain of custody is the means by which the possession and handling of samples will be tracked from the source (field) to their final disposition, the laboratory. A sample is considered to be in a person's custody if it is in the person's possession or it is in the person's view after being in his or her possession or it was in that person's possession and that person has locked it in a vehicle or room. Sample containers will be cleaned and preserved at the laboratory before shipment to the Site.

4.1 Field Custody Procedures

Field logbooks and appropriate field forms will provide the means of recording data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that persons going to the facility could reconstruct a particular situation without reliance on memory. Field logbooks will be bound field survey books or notebooks. Each logbook will be identified by the project-specific document number. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned
- Logbook number
- Project name
- Project start date
- End date

Entries into the logbook or appropriate field form will contain a variety of information. At the beginning of each logbook entry, the date, start time, weather, names of all sampling team members present, level of personal protection equipment being used, and the signature of the person making the entry will be entered. The names of visitors to the Site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook. Measurements made and samples collected will be recorded in the logbook and appropriate field form. All entries will be made in permanent ink, signed, and dated and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is signed and dated by the sampler. Whenever a sample location is surveyed, which includes compass and distance measurements or, latitude and longitude information (e.g., obtained by using a global positioning system) the location

information shall be recorded. In the event that photographs are taken to document field activities, the number and brief description of the photographs taken will also be recorded. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in this QAPP. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. Sample identification numbers will be assigned prior to sample collection. Field duplicate samples, which will receive a separate sample identification number, will be noted under sample description.

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact. The protocol for specific sample numbering and other sample designations is included in an FOP provided in Appendix A of this QAPP. Examples of field custody documents and instructions for completion are also presented in Appendix A of this QAPP.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. Field procedures have been designed such that as few people as possible will handle the samples.
- All bottles will be identified by the use of sample tags with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in the FOP.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the ballpoint pen would not function in freezing weather.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

Samples will be properly packaged and cooled to 4°C for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be locked

and secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by the field team leader. The cooler will be strapped shut with strapping tape in at least two locations.

4.2 Laboratory Custody Procedures

4.2.1 Sample Receipt

A sample custodian is responsible for receiving samples; completing chain-of-custody records; determining and documenting the condition of samples received through the Cooler Receipt and Preservation Form; logging samples into the system based on the order of log-in; and storing samples in appropriate limited-access storage areas. Chain-of-custody documentation is also maintained for the transfer of samples between the laboratory, and for shipment of samples to subcontracted laboratories.

Upon sample receipt, an inventory of shipment contents is compared with the chain-of-custody record, and any discrepancies, including broken containers, inappropriate container materials or preservatives, headspace in volatile organic samples, and incorrect or unclear sample identification, are documented and communicated to the appropriate project manager.

Each sample is given a unique laboratory code and an analytical request form is generated. The analytical request contains pertinent information for each sample, including:

- Client name
- Project number
- Task number
- Purchase order number
- Air bill number
- Chain-of-custody number
- Number of samples
- Sample descriptions
- Sample matrix type
- Date and time of sampling
- Analysis due dates
- Date and time of receipt by lab
- Client sample identification

- Any comments regarding special instructions or discrepancies

4.2.2 Sample Storage

Samples are stored in secure limited-access areas. Walk-in coolers or refrigerators are maintained at 4°C, ± 2°C, or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location if necessary.

4.2.3 Sample Custody

Sample custody, as defined by this document, is when any of the following occur:

- It is in someone's actual possession.
- It is in someone's view after being in his or her physical possession.
- It was in someone's possession and then locked, sealed, or secured in a manner that prevents unsuspected tampering.
- It is placed in a designated and secured area.

Samples are removed from storage areas by the sample custodian or analysts and transported to secure laboratory areas for analysis. Access to the laboratory and sample storage areas is restricted to laboratory personnel and escorted visitors only; all areas of the laboratory are therefore considered secure. If required by the applicable regulatory program, internal chain-of-custody is documented in a log by the person moving the samples between laboratory and storage areas.

Laboratory documentation used to establish chain-of-custody and sample identification may include the following:

- Field chain-of-custody forms or other paperwork that arrives with the sample.
- The laboratory chain-of-custody.
- Sample labels or tags are attached to each sample container.
- Sample custody seals.
- Sample preparation logs (i.e., extraction and digestion information) recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.

- Sample analysis logs (e.g., metals, GC/MS, etc.) information recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample storage log (same as the laboratory chain-of-custody).
- Sample disposition log, which documents sample disposal by a contracted waste disposal company.

4.2.4 Sample Tracking

All samples are maintained in the appropriate coolers prior to and after analysis. The analysts remove and return their samples as needed. Samples that require internal chain-of-custody are relinquished to the analysts by the sample custodians. The analyst and sample custodian must sign the original chain-of-custody relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned, the analyst will sign the original chain-of-custody returning sample custody to the sample custodian. Sample extracts are relinquished to the instrumentation analysts by the preparatory analysts. Each preparation department tracks internal chain-of-custody through their logbooks/ spreadsheets.

Any change in the sample during the time of custody will be noted on the chain-of-custody (e.g., sample breakage or depletion).

4.2.5 Sample Disposal

A minimum of 30 days following completion of the project, or after a period of time specified by any applicable project requirements, sample disposal is performed in compliance with federal, state, and local regulations. Alternatively, samples may be returned to the client by mutual agreement. All available data for each sample, including laboratory analysis results and any information provided by the client, are reviewed before sample disposal.

All samples are characterized according to hazardous/non-hazardous waste criteria and are segregated accordingly. All hazardous waste samples are disposed of according to formal procedures by the laboratory. It should be noted that all waste produced at the laboratory, including the laboratory's own various hazardous waste streams, is treated in accordance with all applicable local and Federal laws.

Complete internal chain-of-custody documentation is maintained for some samples from initial receipt through final disposal. This ensures that an accurate history of the sample from "cradle to grave" is generated.

5.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

5.1 Field Instrument Calibration

Quantitative field data to be obtained during groundwater sampling include pH, turbidity, specific conductance, temperature, and depth to groundwater. Quantitative water level measurements will be obtained with an electronic sounder or steel tape, which require no calibration. Quantitative field data to be obtained during soil sampling include screening for the presence of volatile organic constituents using a photoionization detector (PID). Field instruments used to monitor for these parameters will be calibrated in accordance with their manufacturer's recommendations.

5.2 Laboratory Instrument Calibration

All equipment and instruments used at the laboratory will be operated, maintained, and calibrated according to the manufacturer's guidelines and recommendations, as well as to criteria set forth in the applicable analytical methodology. Operation and calibration will be performed by personnel who have been properly trained in these procedures.

6.0 ANALYTICAL PROCEDURES

The SMP describes the laboratory methods to be employed for post-remedial groundwater sampling. Samples will be analyzed by a NYSDOH ELAP-certified laboratory employing the appropriate analytical protocols and quality assurance procedures for the respective NYSDEC or USEPA methods. Tables 1 and 2 list the constituents of primary concern (COPCs) for soil and groundwater. Table 6 is a summary of the sample containers, volume, preservatives, and holding time requirements.

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

All data generated through field activities, or by the laboratory operation shall be reduced and validated (as required in the SMP) before reported.

7.1 Data Reduction

7.1.1 Field Data Reduction Procedures

Field measurements of pH, turbidity, temperature, specific conductance, water level, and volatile organic vapor content (via the PID) are read directly in the units of final use, as discussed in this QAPP and listed in Table 5. Field personnel are responsible for monitoring the collection and reporting of field data. Field personnel will review field measurements at the time of measurement and will re-measure a parameter as necessary to assure quality and accuracy are maintained.

Field data will be recorded on appropriate field data record forms or the project field book as they are collected and will be maintained in the project file. The Project QA Officer will review field procedures and compare field data to previous measurements to assess comparability and accuracy of the field data measurements.

7.1.2 Laboratory Data Reduction Procedures

Results of laboratory analyses will be reported in units of final use as listed in Table 5. Laboratory calculations will be performed as prescribed for a given analytical method or in conformance with acceptable laboratory standards at the time the calculation is performed.

The laboratory will retain quality assurance/quality control (QA/QC) records for at least five years. Original laboratory reports will be stored in the project files. Copies of raw data will be available for review at the laboratory. Copies of raw data also may be requested as part of the QA/QC review. A Data Usability Summary Report (DUSR), which follows NYSDEC's May 3, 2010 DER-10 (Appendix 2B Guidance for Data Deliverables and the Development of DUSRs) will be developed from a USEPA SW-846 Equivalent Category B deliverable and completed by an independent third party data validator.

7.2 Data Usability Evaluation

If requested by the NYSDEC, data evaluation will be performed by a third party data validator using the most current methods and quality control criteria from the USEPA's Contract Laboratory Program (CLP) *National Functional Guidelines for Organic Data Review* and *National Functional Guidelines for Inorganic Data Review.*

7.3 Data Reporting

7.3.1 Field Data Reporting

All field documents will be accounted for when they are completed. Accountable documents include items such as field notebooks, sample logs, field data records, photographs, data packages, computer disks, and reports.

7.3.2 Laboratory Data Reporting

Analytical data will be summarized in tabular format with such information as sample identification, sample matrix description, parameters analyzed and their corresponding detected concentrations, and the detection limit. Analytical results will be incorporated into reports as data tables, maps showing sampling locations and analytical results, and supporting text.

8.0 PERFORMANCE SYSTEM AUDITS AND FREQUENCY

8.1 Field Performance and System Audits

8.1.1 Internal Field Audits

The QA Officer may conduct internal audits of field activities including sampling and field measurements. These audits will verify that all established procedures are being followed. Internal field audits will be conducted at least once at the beginning of the Site sample collection activities. Project duration may warrant subsequent audits on a monthly basis. The audit program consists of the following:

- Observation of field activities to confirm that procedures are performed in accordance with project protocols and standard accepted methods.
- Review daily field records, monitoring well sampling records, and any other data collection sheets during and after field measurements.

8.1.2 External Field Audits

The NYSDEC Site Project Coordinator may conduct external field audits. External field audits may be conducted any time during the field operations. These audits may or may not be announced and are at the discretion of the NYSDEC.

8.2 Laboratory System Audits

The adequacy and implementation of a laboratory's QA Plan are assessed on a continual basis through systems and performance audits. Systems audits evaluate practice against established quality system objectives and requirements. Performance audits measure the comparability and accuracy of laboratory data through the analysis of reference materials for which the true value is unknown to the analyst. Audits may be performed by the laboratory (internal), or by clients, regulatory agencies, or accreditation bodies (external).

9.0 PREVENTATIVE MAINTENANCE

Each piece of field equipment is checked according to its routine maintenance schedule and before field activities begin. Field equipment that may be used at the Site includes:

- Photoionization detector (PID)
- Water quality meters (includes pH, turbidity, temperature, Eh, and specific conductance)
- Electric water level indicator

Field personnel will report all equipment maintenance and/or replacement needs to the Project QA Officer and will record the information on the daily field record.

10.0 DATA PRECISION, ACCURACY, AND COMPLETENESS EVALUATION

10.1 Accuracy Assessment

Data accuracy, which is assessed for laboratory data only, is based on recoveries, expressed as the percentage of the true (known) concentration, from laboratory spiked samples and QA/QC samples generated by the analytical laboratory.

Percent recovery (%R) for MS/MSD results is determined according to the following equation:

$$R\% = \frac{(A - B) \times 100}{T}$$

Where A = measured concentration after spiking
B = background concentration
T = known true value of spike

Percent recovery (%R) for LCS and surrogate compound results is determined according to the following equation:

$$R\% = \frac{\text{Experimental Concentration}}{\text{Known amount added}} \times 100$$

This information is reviewed periodically by the Project Manager or Project QA Officer. Table 3 presents the goals for the recovery of any constituent in a spiked or QA/QC sample. Table 4 summarizes the accuracy goals for data generated in the field.

10.2 Precision Assessment

For data generated by the laboratory, data precision is estimated by comparing analytical results from duplicate samples. The comparison is made by calculating the relative percent difference (RPD) given by:

$$RPD\% = \frac{2(S_1 - S_2)}{S1 + S2} \times 100$$

Where S_1 = sample result
S_2 = duplicate result

This information is calculated and reviewed periodically by the Project Manager and/or Project QA Officer. Table 3 presents the goals for data precision for duplicate samples. Table 4 summarizes the precision goals for data generated in the field.

10.3 Completeness Assessment

Data completeness will be evaluated by comparing the objectives of sampling efforts with the data obtained and determining whether there are any shortcomings in required information. Completeness is defined as the percentage of valid results according to the equation below:

$$\% \text{ completeness} = \frac{A}{B} \times 100$$

Where: A = number of valid results;
B = total number of possible results

Table 3 presents the goals for data completeness for laboratory measurements. Table 4 summarizes the completeness goals for data generated in the field.

10.4 Assessment of Data

To assess the integrity of the data generated during this investigation, the Project Manager and QA Officer will review the laboratory analytical data and field data in accordance with procedures and protocols outlined in this QAPP. An assessment will be made to determine if the project objectives have been achieved and meet objectives for data integrity.

11.0 CORRECTIVE ACTION

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out of quality control performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. All corrective action proposed and implemented should be documented in the regular quality assurance reports to management. Corrective action should be implemented only after approval by the Project Manager, or his/her designee. If immediate corrective action is required, approvals secured by telephone from the Project Manager should be documented in an additional memorandum.

11.1 Field Corrective Action

If errors in field procedures are discovered during the observation or review of field activities by the Project QA Officer or his/her designee, corrective action will be initiated. Nonconformance to the QA/QC requirements of the field operating procedures will be identified by field audits or immediately by project staff who know or suspect that a procedure is not being performed in accordance with the requirements. The Project QA Officer or his designee will be informed immediately upon discovery of all deficiencies. Timely action will be taken if corrective action is necessary.

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Work Plan, etc.) or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. In general, the Project Manager and QA Officer may identify the need for corrective action. The Project Manager will approve the corrective measure that will be implemented by the field team. It will be the responsibility of the Project Manager to ensure that corrective action has been implemented.

If the corrective action will supplement the existing sampling using existing and approved procedures in the QAPP, corrective action approved by the Project Manager will be documented. If the corrective actions result in less samples (or analytical fractions), alternate locations, etc., which may result in non-achievement of project QA objectives, it will be necessary that all levels of project management, including the NYSDEC Project Coordinator, concur with the proposed action.

Corrective actions will be implemented and documented in the project field record book. No staff member will initiate corrective action without prior communication of findings through the proper channels. If corrective actions are insufficient, work may be stopped by the NYSDEC Project Coordinator.

If at any time a corrective action issue that directly impacts project data quality objectives is identified, the NYSDEC Project Coordinator will be notified immediately.

11.2 Laboratory Corrective Action

Corrective actions may be initiated if the quality assurance goals are not achieved. The initial step in a corrective action is to instruct the analytical laboratory to examine its procedures to assess whether analytical or computational errors caused the anomalous result. If no error in laboratory procedures or sample collection and handling procedures can be identified, then the Project Manager will assess whether reanalysis or resampling is required or whether any protocol should be modified for future sampling events.

11.3 Data Validation & Assessment Corrective Action

The need for corrective action may be identified during the data validation or assessment processes. Potential types of corrective action may include resampling by the field team, or reinjection/reanalysis of samples by the laboratory.

These actions are dependent upon the ability to mobilize the field team, whether the data to be collected is necessary to meet the QA objectives (e.g., the holding time for samples is not exceeded, etc.). If the data validator identifies a corrective action situation, the Project Manager will be responsible for approving the corrective action implementation. All required corrective actions will be documented by the laboratory Quality Assurance Coordinator.

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Periodic reports summarizing certain field activities may be required at the Site. Those reports will be the responsibility of the Project Manager and will include the QA Officers input on the accuracy, precision, and completeness of the data, as well as the results of the performance and system audits, and any corrective action needed or taken during the project.

12.1 Contents of Project QA Reports

The progress reports will contain, on a routine basis, a QA section describing all results of field and laboratory audits, all information generated during the period of work activities reflecting on the achievement of specific DQOs, and a summary of corrective action that was implemented, and its immediate results on the project. The status of the project with respect to the Project Schedule included in this QAPP will be determined. Whenever necessary, updates on training provided, changes in key personnel, anticipated problems in the field or laboratory for the coming month that could bear on data quality along with proposed solutions, will be reported. All QA reports will be prepared in written, final format by the project manager or his designee. To the extent possible, assessment of the project should also be performed on the basis of available QC data and overall results in relation to originally targeted objectives.

In the event of an emergency, or in case it is essential to implement corrective action immediately, QA reports can be made by telephone to the appropriate individuals, as identified in the Project Organization and Corrective Action sections of this QAPP. However, these events, and their resolution will be addressed thoroughly in the next periodic progress report.

TABLES

TABLE 1

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR SOIL

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	CAS Number	Analytical Method [2]	PQL	MDL
STARS Volatile Organic Compounds: (15 compounds) (ug/kg)				
Benzene	*71-43-2*	8021B	1	0.11
n-Butylbenzene	*104-51-8*	8021B	1	1.00
sec-Butylbenzene	*135-98-8*	8021B	1	0.08
tert-Butylbenzene	*98-06-6*	8021B	1	0.12
p-Cymene	*99-87-6*	8021B	1	0.41
Ethylbenzene	*100-41-4*	8021B	1	0.07
Isopropylbenzene	*98-82-8*	8021B	1	0.08
Methyl tert butyl ether	*1634-04-4*	8021B	1	0.06
n-Propylbenzene	*103-65-1*	8021B	1	0.11
Toluene	*108-88-3*	8021B	1	0.04
1,2,4-Trimethylbenzene	*95-63-6*	8021B	1	0.40
1,3,5-Trimethylbenzene	*108-67-8*	8021B	1	0.84
o-Xylene	*95-47-6*	8021B	1	0.01
p-Xylene	*106-42-3*	8021B	1	0.04
m-Xylene	*108-38-3*	8021B	1	0.04
Acenaphthene	*83-32-9*	8270C	330	11.00
Acenaphthylene	*208-96-8*	8270C	330	10.00
Anthracene	*120-12-7*	8270C	330	9.00
Benzo(a)anthracene	*56-55-3*	8270C	330	13.00
Benzo(a)pyrene	*50-32-8*	8270C	330	11.00
Benzo(b)fluoranthene	*205-99-2*	8270C	330	15.00
Benzo(g,h,i)perylene	*191-24-2*	8270C	330	10.00
Benzo(k)fluoranthene	*207-08-9*	8270C	330	17.00
Benzyl alcohol	*100-51-6*	8270C	330	14.00
bis(2-Chloroethoxy)methane	*111-91-1*	8270C	330	14.00
bis(2-Chloroethyl)ether	*111-44-4*	8270C	330	14.00
2,2'-oxybis(1-chloropropane); bis(2-chloroisopropyl)ether	*108-60-1*	8270C	330	14.00
bis(2-Ethylhexyl)phthalate	*117-81-7*	8270C	330	19.00
Butyl benzyl phthalate	*85-68-7*	8270C	330	17.00
4-Bromophenyl phenyl ether	*101-55-3*	8270C	330	11.00
4-Chloroaniline	*106-47-8*	8270C	330	18.00
4-Chloro-3-methylphenol	*59-50-7*	8270C	330	12.00
2-Chloronaphthalene	*91-58-7*	8270C	330	13.00
2-Chlorophenol	*95-57-8*	8270C	330	12.00

TABLE 1

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR SOIL

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/kg) ***[includes Base-Neutrals (black) and Acid Extractables (blue)]***				
4-Chlorophenyl-phenylether	*7005-72-3*	8270C	330	12.00
Chrysene	*218-01-9*	8270C	330	10.00
Dibenzo(a,h)anthracene	*53-70-3*	8270C	330	13.00
Dibenzofuran	*132-64-9*	8270C	330	10.00
3,3'-Dichlorobenzidine	*91-94-1*	8270C	330	148.00
2,4-Dichlorophenol	*120-83-2*	8270C	330	15.00
1,2-Dichlorobenzene	*95-50-1*	8270C	330	15.00
1,3-Dichlorobenzene	*541-73-1*	8270C	330	14.00
1,4-Dichlorobenzene	*106-46-7*	8270C	330	13.00
Diethyl phthalate	*84-66-2*	8270C	330	9.00
2,4-Dimethylphenol	*105-67-9*	8270C	330	33.00
Dimethyl phthalate	*131-11-3*	8270C	330	10.00
Di-n-butyl phthalate	*84-74-2*	8270C	330	11.00
Di-n-octyl phthalate	*117-84-0*	8270C	330	31.00
4,6-Dinitro-2-methylphenol	*534-52-1*	8270C	1600	66.00
2,4-Dinitrophenol	*51-28-5*	8270C	1600	120.00
2,4-Dinitrotoluene	*121-14-2*	8270C	330	33.00
2,6-Dinitrotoluene	*606-20-2*	8270C	330	66.00
Fluoranthene	*206-44-0*	8270C	330	12.00
Fluorene	*86-73-7*	8270C	330	10.00
Hexachlorobenzene	*118-74-1*	8270C	330	11.00
Hexachlorobutadiene	*87-68-3*	8270C	330	13.00
Hexachlorocyclopentadiene	*77-47-4*	8270C	330	12.00
Hexachloroethane	*67-72-1*	8270C	330	14.00
Indeno(1,2,3-cd)pyrene	*193-39-5*	8270C	330	11.00
Isophorone	*78-59-1*	8270C	330	13.00
2-Methylnaphthalene	*91-57-6*	8270C	330	14.00
2-Methylphenol (o-Cresol)	*95-48-7*	8270C	330	33.00
4-Methylphenol (p-Cresol)	*106-44-5*	8270C	330	14.00
Naphthalene	*91-20-3*	8270C	330	14.00
2-Nitroaniline	*88-74-4*	8270C	1600	12.00
3-Nitroaniline	*99-09-2*	8270C	1600	17.00
4-Nitroaniline	*100-01-6*	8270C	1600	66.00
Nitrobenzene	*98-95-3*	8270C	330	12.00

TABLE 1

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR SOIL

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	CAS Number	Analytical Method [2]	PQL	MDL
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/kg) ***[includes Base-Neutrals (black) and Acid Extractables (blue)]***				
2-Nitrophenol	*88-75-5*	8270C	330	66.00
4-Nitrophenol	*100-02-7*	8270C	1600	66.00
N-Nitrosodiphenylamine	*86-30-6*	8270C	330	29.00
N-Nitroso-di-n-propylamine	*621-64-7*	8270C	330	13.00
Pentachlorophenol	*87-86-5*	8270C	1600	50.00
Phenanthrene	*85-01-8*	8270C	330	11.00
Phenol	*108-95-2*	8270C	330	11.00
Pyrene	*129-00-0*	8270C	330	11.00
1,2,4-Trichlorobenzene	*120-82-1*	8270C	330	18.00
2,4,5-Trichlorophenol	*95-95-4*	8270C	800	14.00
2,4,6-Trichlorophenol	*88-06-2*	8270C	330	13.00
TAL Metals (modified): (12 compounds) (mg/L) - ***[site specific metals in blue]***				
Antimony	*7440-38-2*	6010B	15	0.69
Arsenic	*7440-38-2*	6010B	2	0.37
Barium	*7440-39-3*	6010B	0.5	0.05
Cadmium	*7440-43-9*	6010B	0.2	0.06
Chromium	*7440-47-3*	6010B	0.5	0.14
Lead	*7439-92-1*	6010B	1	0.19
Mercury	*7439-97-6*	7471A	0.02	0.0071
Nickel	*7440-02-0*	6010B	0.5	0.12
Potassium	*7440-09-7*	6010B	30	8.4
Selenium	*7782-49-2*	6010B	4	0.48
Silver	*7440-22-4*	6010B	0.5	0.15
Thallium	*7440-28-0*	6010B	6	0.66

Notes:

1. Analytes as per NYSDEC and USEPA list of parameters.
2. Analytical methods per USEPA publication, SW-846, "Test Methods for Evaluating Solid Waste," 3rd Ed.

Acronyms/Abbreviations:

CAS = Chemical Abstracts Service registry number.
MDL = Method Detection Limit provided by STL
PQL = Practical Quantitation Limit
mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram

TABLE 2

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR GROUNDWATER

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
STARS Volatile Organic Compounds: (15 compounds) (ug/L)				
Benzene	*71-43-2*	8021B	0.2	0.02
n-Butylbenzene	*104-51-8*	8021B	0.4	0.03
sec-Butylbenzene	*135-98-8*	8021B	0.4	0.02
tert-Butylbenzene	*98-06-6*	8021B	0.4	0.03
p-Cymene	*99-87-6*	8021B	0.4	0.28
Ethylbenzene	*100-41-4*	8021B	0.2	0.03
Isopropylbenzene	*98-82-8*	8021B	0.2	0.03
Methyl tert butyl ether	*1634-04-4*	8021B	0.4	0.23
n-Propylbenzene	*103-65-1*	8021B	0.2	0.03
Toluene	*108-88-3*	8021B	0.2	0.04
1,2,4-Trimethylbenzene	*95-63-6*	8021B	0.2	0.03
1,3,5-Trimethylbenzene	*108-67-8*	8021B	0.2	0.17
o-Xylene	*95-47-6*	8021B	0.2	0.09
p-Xylene	*106-42-3*	8021B	0.4	0.25
m-Xylene	*108-38-3*	8021B	0.4	0.25
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/L) [includes Base-Neutrals (black) and Acid Extractables (blue)]				
Acenaphthene	*83-32-9*	8270C	10	0.15
Acenaphthylene	*208-96-8*	8270C	10	0.09
Anthracene	*120-12-7*	8270C	10	0.10
Benzo(a)anthracene	*56-55-3*	8270C	10	0.16
Benzo(a)pyrene	*50-32-8*	8270C	10	0.09
Benzo(b)fluoranthene	*205-99-2*	8270C	10	0.17
Benzo(g,h,i)perylene	*191-24-2*	8270C	10	0.12
Benzo(k)fluoranthene	*207-08-9*	8270C	10	0.12
Benzyl alcohol	*100-51-6*	8270C	20	1.79
bis(2-Chloroethoxy)methane	*111-91-1*	8270C	10	2.10
bis(2-Chloroethyl)ether	*111-44-4*	8270C	10	2.44
2,2'-oxybis(1-chloropropane); bis(2-chloroisopropyl)ether	*108-60-1*	8270C	10	1.77
bis(2-Ethylhexyl)phthalate	*117-81-7*	8270C	10	2.80
Butyl benzyl phthalate	*85-68-7*	8270C	10	7.47
4-Bromophenyl phenyl ether	*101-55-3*	8270C	10	2.50
4-Chloroaniline	*106-47-8*	8270C	10	1.05
4-Chloro-3-methylphenol	*59-50-7*	8270C	10	2.73
2-Chloronaphthalene	*91-58-7*	8270C	10	1.94

TABLE 2

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR GROUNDWATER

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/L) [includes Base-Neutrals (black) and Acid Extractables (blue)]				
2-Chlorophenol	*95-57-8*	8270C	10	1.00
4-Chlorophenyl-phenylether	*7005-72-3*	8270C	10	2.42
Chrysene	*218-01-9*	8270C	10	0.17
Dibenzo(a,h)anthracene	*53-70-3*	8270C	10	0.12
Dibenzofuran	*132-64-9*	8270C	10	0.12
3,3'-Dichlorobenzidine	*91-94-1*	8270C	20	7.43
2,4-Dichlorophenol	*120-83-2*	8270C	10	2.13
1,2-Dichlorobenzene	*95-50-1*	8270C	10	2.50
1,3-Dichlorobenzene	*541-73-1*	8270C	10	2.43
1,4-Dichlorobenzene	*106-46-7*	8270C	10	2.45
Diethyl phthalate	*84-66-2*	8270C	10	2.99
2,4-Dimethylphenol	*105-67-9*	8270C	10	1.60
Dimethyl phthalate	*131-11-3*	8270C	10	2.53
Di-n-butyl phthalate	*84-74-2*	8270C	10	6.64
Di-n-octyl phthalate	*117-84-0*	8270C	10	6.95
4,6-Dinitro-2-methylphenol	*534-52-1*	8270C	50	7.62
2,4-Dinitrophenol	*51-28-5*	8270C	50	10.51
2,4-Dinitrotoluene	*121-14-2*	8270C	10	3.52
2,6-Dinitrotoluene	*606-20-2*	8270C	10	2.67
Fluoranthene	*206-44-0*	8270C	10	0.14
Fluorene	*86-73-7*	8270C	10	0.10
Hexachlorobenzene	*118-74-1*	8270C	10	1.14
Hexachlorobutadiene	*87-68-3*	8270C	10	3.50
Hexachlorocyclopentadiene	*77-47-4*	8270C	45	23.67
Hexachloroethane	*67-72-1*	8270C	10	3.47
Indeno(1,2,3-cd)pyrene	*193-39-5*	8270C	10	0.13
Isophorone	*78-59-1*	8270C	10	2.51
2-Methylnaphthalene	*91-57-6*	8270C	10	0.09
2-Methylphenol (o-Cresol)	*95-48-7*	8270C	10	2.07
4-Methylphenol (p-Cresol)	*106-44-5*	8270C	10	1.09
Naphthalene	*91-20-3*	8270C	10	0.11
2-Nitroaniline	*88-74-4*	8270C	50	4.50
3-Nitroaniline	*99-09-2*	8270C	50	3.50
4-Nitroaniline	*100-01-6*	8270C	50	3.14
Nitrobenzene	*98-95-3*	8270C	10	2.27
2-Nitrophenol	*88-75-5*	8270C	10	2.00

TABLE 2

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR GROUNDWATER

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/L) [includes Base-Neutrals (black) and Acid Extractables (blue)]				
4-Nitrophenol	*100-02-7*	8270C	50	15.00
N-Nitrosodiphenylamine	*86-30-6*	8270C	10	2.29
N-Nitroso-di-n-propylamine	*621-64-7*	8270C	10	1.66
Pentachlorophenol	*87-86-5*	8270C	50	9.54
Phenanthrene	*85-01-8*	8270C	10	0.14
Phenol	*108-95-2*	8270C	10	1.10
Pyrene	*129-00-0*	8270C	10	0.17
1,2,4-Trichlorobenzene	*120-82-1*	8270C	10	2.45
2,4,5-Trichlorophenol	*95-95-4*	8270C	10	3.21
2,4,6-Trichlorophenol	*88-06-2*	8270C	10	1.92
TAL Metals (modified): (12 compounds) (mg/L) - [site specific metals in blue]				
Antimony	*7440-38-2*	6010B	0.02	0.0055
Arsenic	*7440-38-2*	6010B	0.01	0.00338
Barium	*7440-39-3*	6010B	0.002	0.00017
Cadmium	*7440-43-9*	6010B	0.001	0.00034
Chromium	*7440-47-3*	6010B	0.004	0.0009
Lead	*7439-92-1*	6010B	0.005	0.0016
Mercury	*7439-97-6*	7470A	0.0002	0.00015
Nickel	*7440-02-0*	6010B	0.01	0.0011
Potassium	*7440-09-7*	6010B	0.5	0.039
Selenium	*7782-49-2*	6010B	0.015	0.0061
Silver	*7440-22-4*	6010B	0.003	0.0009
Thallium	*7440-28-0*	6010B	0.02	0.0066

TABLE 2

CONSTITUENTS OF PRIMARY CONCERN (COPCs) FOR GROUNDWATER

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
Field Parameters: (5 compounds) (units as identified below)				
pH (units)	*NA*	field	NA	NA
Temperature (^{o}C)	*NA*	field	NA	NA
Specific Conductance (uS/mS)	*NA*	field	NA	NA
Turbidity (NTU)	*NA*	field	NA	NA
Dissolved Oxygen	*NA*	field	NA	NA

Notes:

1. Analytes as per NYSDEC and USEPA list of parameters.
2. Analytical methods per USEPA publication, SW-846, "Test Methods for Evaluating Solid Waste", 3rd Ed.

Acronyms/Abbreviations:

CAS = Chemical Abstracts Service registry number.
MDL = Method Detection Limit provided by STL
mg/L = milligrams per liter
mS = milli-Siemans
ug/L = micrograms per liter
uS = micro-Siemans
NA = not applicable
NTU = nephelometric turbidity unit
PQL = Practical Quantitation Limit

TABLE 3

PROJECT GOALS FOR PRECISION, ACCURACY & COMPLETENESS FOR LABORATORY MEASUREMENTS

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Analytical Method	Precision Goal [1] (RPD) [2]	Accuracy Goal (% R) [3]		Completeness Goal (%)
	Soil & Water	Soil	Water	
STARS 8021B or EPA 8260B	± 30	± 50	± 30	90
EPA 8270C	± 30	± 50	± 30	90
EPA 6010B and EPA 7470A/7471A	± 30	± 50	± 30	90
Water Quality Parameters	± 30	NA	± 30	90

Notes:

1. Precision goals vary depending on the compound being analyzed; the precision goals presented are general in nature.
2. RPD = Relative Percent Difference
3. %R = Percent Recovery

TABLE 4

PROJECT GOALS FOR PRECISION, ACCURACY & COMPLETENESS FOR FIELD MEASUREMENTS

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Measurement	Units	Precision Goal	Accuracy Goal	Completeness Goal
pH	pH units	± 0.2 unit	± 0.2 unit	90%
Eh	milli-volts (mV)	± 1.0 mV	± 1.0 mV	90%
Temperature	degrees Celsius (^{o}C)	± 0.2 deg. C	± 0.4 deg. C	90%
Turbidity	NTU	± 0.05 NTU	± 0.05 NTU	90%
Specific Conductance	mS/cm at 25^{o}C mS/cm at 25oC	± 100 uS/cm ± 0.1 mS/cm	± 100 uS/cm ± 0.1 mS/cm	90%
Dissolved Oxygen	ppm	± 0.3 ppm	± 0.3 ppm	90%
Water Level	fbTOR	± 0.01 unit	± 0.01 unit	90%

Acronyms/Abbreviations:

fbTOR = feet below top of riser
mS = milli-Siemans
NTU = nephelometric turbidity unit
ug/L = micrograms per liter

TABLE 5

DATA MEASUREMENT UNITS FOR FIELD & LABORATORY PARAMETERS

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Parameter	Units
Water Level	feet below top of riser (fbTOR)
pH	pH units
Eh	milli-volts (mV)
Temperature	degrees Celsius (^{o}C)
Turbidity	Nephelometric Turbidity Unit (NTU)
Specific Conductance	microsiemens per centimeter at 25^{o}C (µS/cm) millisiemens per centimeter at 25^{o}C (mS/cm)
Dissolved Oxygen (DO)	parts per million (ppm)
Concentration of parameter in soil sample	micrograms per kilogram (mg/kg) organic milligrams per kilogram (mg/kg) inorganic
Concentration of parameter in groundwater sample	micrograms per liter (mg/L) organic milligrams per liter (mg/L) inorganic
Hydraulic Conductivity	centimeters per second (cm/sec)
Photoionization Detector (PID)	parts per million by volume (ppmv)

TABLE 6

SAMPLE CONTAINER, VOLUME, PRESERVATION & HOLDING TIME REQUIREMENTS

SITE MANAGEMENT PLAN

Tecumseh Phase II Business Park
Lackawanna, New York

Matrix	Parameter [1]	Method [1]	Container Type	Minimum Volume	Preservation (Cool to 2-4 °C for all samples)	Holding Time from Sample Date
Soil	STARS VOCs	8260B	WMG	16 oz.	Cool to 4 °C, Zero Headspace	14 days
	TCL VOCs	8260B	WMG	16 oz.	Cool to 4 °C, Zero Headspace	14 days
	TCL SVOCs	8270C	WMG	16 oz.	Cool to 4 °C	14 days extrac./40 days
	TAL Metals	6010B/7471B	WMG	4 oz.	Cool to 4 °C	6 months/Hg 26 days
	Cyanide	9021A	WMG	4 oz.	Cool to 4 °C	14 days
	TCLP Lead	6010	WMG	8 oz.	Cool to 4 °C	6 months extrac./6 months
	Ignitability	1010	WMG	8 oz.	Cool to 4 °C	6 months
Groundwater	TCL VOCs + TICs	8260B	glass vial	3 - 4 oz.	Cool to 4 °C, HCl to pH<2,Zero Headspace	14 days
	TCL SVOCs + TICs	8270C	amber glass	1000 mL	Cool to 4 °C	7 days extrac/40 days
	TAL Metals	6010B/7470A	plastic	250 mL	HNO_3 to pH<2, Cool to 4 °C	180 days / Hg 28 days

Notes:

1. EPA-approved methods published in Reference 1 above may be used. The list of analytes, laboratory method, and the method detection limit for each parameter are included in Tables 1 and 2 of the QAPP.

Acronyms:

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
TCLP = Toxicity Characteristic Leaching Procedure
TCL = Target Compound List
TAL = Target Analyte List
WMG = Wide Mouth Glass

References:

1. Test Methods for Evaluating Solid Wastes, USEPA SW-846, Update III, 1991.

APPENDIX H

SITE-SPECIFIC SMP REQUIREMENTS

APPENDIX H-1

SITE II-1 (C915198)

As the remedial actions are completed on Site II-1 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-1 as an addendum.

APPENDIX H-2

SITE II-2 (C915198B)

As the remedial actions are completed on Site II-2 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-2 as an addendum.

APPENDIX H-3

SITE II-3 (C915198C)

As the remedial actions are completed on Site II-3 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-3 as an addendum.

APPENDIX H-4

SITE II-4 (C915198D)

As the remedial actions are completed on Site II-4 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-4 as an addendum.

APPENDIX H-5

SITE II-5 (C915198E)

As the remedial actions are completed on Site II-5 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-5 as an addendum.

APPENDIX H-6

SITE II-6 (C915198F)

As the remedial actions are completed on Site II-6 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-6 as an addendum.

APPENDIX H-7

SITE II-7 (C915198G)

As the remedial actions are completed on Site II-7 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-7 as an addendum.

APPENDIX H-8

SITE II-8 (C915198H)

As the remedial actions are completed on Site II-8 and a Decision Document is prepared, Site-specific SMP requirements will be developed and added to Appendix H-8 as an addendum.

APPENDIX H-9/H-10

SITE II-9 (C915198I)
SITE II-10 (C915198J)

BROWNFIELD CLEANUP PROGRAM

APPENDIX H-9/H-10
SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NO. C915198I (II-9) and C915198J (II-10)
LACKAWANNA, NEW YORK

December 2020 0489-019-001

Prepared for:

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Revisions to Addenda of Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	11-12-2020	Added Site II-10	
2	12-10-2020	Addressed NYSDEC comments	

PHASE II BUSINESS PARK
SITE MANAGEMENT PLAN: APPENDIX H-9/H-10
SITES II-9 AND II-10

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Attachment B	Transformer Inspection Log
Attachment C	Operations and Maintenance Manual
Attachment D	IC/EC Certification Forms

1.0 INTRODUCTION

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase II Business Park (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMP (Ref. 1) for the Controlled Property was prepared by TurnKey Environmental Restoration, LLC (TurnKey), on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2) and the guidelines provided by NYSDEC. Since the Controlled Property was divided into 12 BCP Sites designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915199L), the main body of the SMP includes the site management components common to all 12 Sites. Site-specific requirements are included as Appendix H to the SMP.

Originally, Site II-10 (C915198J) was included with Site II-12 (C915198L) in Appendix H-10/H-12 (dated August 2017); however, with the purchase of Site II-9 and II-10 by Time Release Properties, LLC (TRP), combining Sites II-9 and II-10 into one appendix was necessary from an operational standpoint. Therefore, Site II-10 was removed from the August 2017 SMP Appendix H-10/H-12 creating a new SMP Appendix H-12

1.1 Site Location and Description

BCP Sites II-9 (SBL 141.19-1-2) and II-10 (SBL 141.15-1-4) are addressed as 6 Dona Street, Lackawanna, NY 14218. As shown on Figure 2, Site II-9 (BCP Site No. C915198I[1], approx. 9.91 acres) and Site II-10 (BCP Site No. C915198J, approx. 15.78 acres) are bounded by the South Return Water Trench (SRWT), and associated non-BCP embankment land, and Welded Tube USA to the west; BCP Site II-7 to the south; BCP Sites II-6 and II-8 to the east; and BCP Site II-12 to the north. The newly constructed Dona Street extension and associated easement area (66' wide right-of-way, total) presently runs in an east-west direction proximate to the southern boundary of Site II-9. This 66-foot wide area was covered with BCP-compliant

[1] On November 1, 2019, the Department approved an application to modify the southern boundary of Site II-9 to correspond to the north line of the Dona Street extension easement, which reduces the Site II-9 acreage from 11.98 acres to 9.91 acres. The 2.07 acres eliminated from Site II-9 was annexed to the adjacent Site II-7 (now approx. 14.3 acres).

hardscape (asphalt roadway, curbing and sidewalk) and soil (vegetated lawn area) during construction. The Niagara Wind Substation 11A consists of approximately 0.3 acres of land between Sites II-10 and II-12. The former 54" Mill Roll Shop (aka. Artmeier Commodity Supply building) covers approximately 0.66 acres on Site II-10. BCA

The NYSDEC issued a Decision Document for Site II-9 on December 30, 2016 and Site II-10 on January 6, 2017 (Refs. 3 and 4). The Decision Documents specify, among other requirements, placement of acceptable cover material such as buildings, pavement, sidewalks comprising the site development or other approved cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). These engineering controls (ECs) are intended to control exposure to remaining contamination during use of the Site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC by Tecumseh for the entire Phase II Business Park has been recorded with the Erie County Clerk and requires compliance with this SMP and all ECs. The Environmental Easement also places institutional controls (ICs) on the Site. The ICs restrict site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for Sites II-9 and II-10 of the Controlled Property. This Appendix is <u>not</u> to be used as a stand-alone document but rather as a component document of the January 2014 SMP for the Controlled Property.

1.2 Remedial Investigation

The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan (Ref. 5) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance across all 12 Sites within the Controlled Property. The RI was designed to provide defensible data to identify areas of the Controlled Property potentially requiring remediation, define chemical constituent migration pathways, and qualitatively assess human health and ecological risks to allow for performance of a remedial alternatives evaluation.

Investigative activities specific to Sites II-9 and II-10 were performed in March/April 2010 and included the completion of 22 test pits on Site II-9, and 28 test pits and 18 supplemental test pits to delineate Hotspot D (TP-89) on Site II-10. Monitoring wells MWN-

63A and MWN-63D were installed on Site II-10; there are no wells on Site II-9. Soil and groundwater samples were collected as detailed in the RI/AAR Work Plan.

The nature and extent of contamination at the Site is consistent with the former site use as a steel manufacturing facility. The primary contaminants of concern identified for soils include inorganics (primarily arsenic, chromium, cyanide, and lead); polychlorinated biphenyls (PCBs); and semi-volatile organic compounds (SVOCs), specifically polycyclic aromatic hydrocarbons (PAHs), such as benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene. When compared to the commercial soil cleanup objectives (CSCOs), parameters exceeding the objectives were primarily limited to PAHs and arsenic, with limited exceedances for PCBs, cyanide, and lead.

Groundwater samples were collected from the Site II-10 on-site monitoring wells during the RI (April 2010) and again in February 2016 during a site-wide groundwater sampling event. The groundwater sampling on Site II-10 indicated exceedances of the groundwater quality standards (GWQSs) for pH in well MWN-63D (April 2010); and naturally occurring metals manganese (MWN-63A in February 2016) and iron, magnesium, and sodium (MWN-63D in April 2010). Attachment A includes the monitoring well construction logs for MWN-63A and MWN-63D. Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

The RI/AA Report was submitted to NYSDEC in May 2011, revised, and finalized in March 2012 (Ref. 6). The RI/AA Report recommended remediation of hotspot slag/fill with deferred soil cover system placement until redevelopment as well as ECs and ICs to limit future use of the Controlled Property to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes (see Section 2.0).

1.3 Interim Remedial Measures

As an extension of the RI, a pre-Interim Remedial Measure (IRM) investigation was undertaken along the planned corridor for the East Harbor Lead railroad realignment in May 2009. The East Harbor Lead line was subsequently constructed, and a portion of the line is located along the western boundary of Sites II-9 and II-10 (see Figure 3). Because inorganics are not readily discernible in the field, representative slag/fill samples were collected from five test pits for analysis of select inorganic constituents of potential concern (COPCs), including arsenic, barium, cadmium, chromium, lead, and mercury. In addition, test pit RR-TP-30 (Site

II-9) slag/fill was analyzed for PCBs based on the presence of an apparent transformer pad in that area. Although no evidence of product or grossly impacted slag/fill were encountered, test pit RR-TP-30 exhibited elevated PCB detections in the 0-2 foot depth interval. To define the lateral extent of this hotspot area, TurnKey conducted a supplemental investigation in the vicinity of test pit RR-TP-30 on August 19, 2010. Shallow test pits were excavated approximately 25 feet in each compass direction from the original test pit. Sidewall samples (0-2 foot) were collected and analyzed for PCBs at each supplemental sampling location. In addition, a composite sample was collected from the floor of the supplemental test pits to verify that a 2-foot excavation depth was adequate.

The remediation of Sites II-9 and II-10 included IRMs to expedite remedial activities and facilitate redevelopment. In October 2010, Tecumseh submitted an IRM Work Plan to NYSDEC for Railroad Realignment (Ref. 7) and the work was performed in December 2010:

- Site II-9: Excavation of the PCB-impacted slag/fill proceeded to a depth of 2 feet below ground surface (fbgs) over an approximate 50-foot by 50-foot area centered on test pit RR-TP-30 (see Figure 3). The impacted slag/fill was direct-loaded onto truck trailer dumps and transported by Price Trucking Corp, a licensed hazardous waste transporter (NYSDEC #9A025), to CWM Chemical Services, LLC in Model City, NY. The 258.27 tons of PCB-impacted soil/slag-fill was disposed as regulated hazardous waste under CWM profile NY302140. Post-excavation documentation samples were not collected as the hotspot area was excavated to the pre-determined limits. Imported backfill was comprised of BUD-approved steel slag (BUD# 555-9-15) and placed in 1-foot compacted lifts within each test pit excavation. Approximately 2,400 tons of BUD-approved slag was used as backfill material.
- Site II-10: Approximately 60 cubic yards of arsenic-impacted slag/fill was excavated within the vicinity of test pit RR-TP-42. Excavation proceeded to a depth of 2 feet below grade with lateral dimensions of approximately 35 feet N x 75 feet S x 25 feet E x 25 feet W of RR-TP-42. The slag/fill was direct-loaded onto truck trailer dumps and transported by Zoladz, a licensed solid waste transporter (NYSDEC #9A499) and disposed at the Chautauqua County Landfill (CCLF) in Ellery, NY in accordance with Disposal Permit #CC1201.10S1. Additional documentation samples were not collected as the hotspot area was defined by sampling conducted during the supplemental investigation. Minor regrading was performed to fill in low spots and achieve subgrade elevations; no backfill was placed.

In April 2017, Tecumseh submitted to NYSDEC an IRM Work Plan for Phase II Business Park Sites II-10, II-11, and II-12 (Ref. 8). The Sites were remediated between February 9 and May 17, 2017 in accordance with the NYSDEC-approved IRM Work Plan.

The following remedial work performed on Site II-10 is documented in the August 2017 Final Engineering Report (Ref. 9) and shown on Figure 3:

- **Excavations:** With the exception of Hotspot A, which was associated with shallow PAH impacts, non-impacted overburden slag/fill that exhibited no visual (i.e., sheen product) or olfactory (i.e., nuisance odors) evidence of impact was removed and stockpiled for use as backfill in the excavations following the removal of petroleum/organic-impacted slag/fill. All other excavated materials were transported to the biotreatment pad constructed on Site II-9 except for a small quantity of ash/clay-like soil/fill containing PCBs that was not likely to bioremediate. This soil/fill was disposed off-site. Biotreatment continued until Site-Specific Action Limits (SSALs) were met.
- **In-Situ Amendment:** To address residual smear zone slag/fill impacts (i.e., sheen) in Hotspot G, approximately 320 pounds of RegenOx™ and 55 pounds of ORC Advanced® were applied to the bottom and sidewalls of the excavation using an excavator bucket prior to backfilling with clean overburden slag/fill. The RegenOx™ and ORC Advanced® was applied on March 24, 2017.
- **Backfill:** Following replacement of clean overburden materials and receipt of passing confirmatory results, where applicable, excavations were re-graded with surrounding slag/fill. In the case of Hotspot D (II-10), the backfill was supplemented with biotreated soils from other locations within the Tecumseh BCP Business Park Sites that were treated to meet SSALs and approved for use by the NYSDEC as subgrade backfill.

1.4 Summary of Remedial Actions

The final remedial measures for this Site involved placement of the cover system in accordance with the NYSDEC-approved November 2019 Remedial Action Work Plan (RAWP) and Cover System Modification Plan (Ref. 10). The cover system on Site II-10 was originally completed in August 2017. During redevelopment that began in December 2019, a portion of the vegetated cover on the southern side of Site II-10 was removed and replaced by the newly constructed building, new access drive/parking areas, vegetated crushed slag, and storm water detention cover areas. A June 30, 2020 Addendum (Ref. 11) to the November 2019 Report proposed on-site ex-site biotreatment of certain weathered petroleum impacts encountered in June 2020 during building foundation construction activities on Site II-9. These activities are more fully described in the December 2020 Final Engineering Report but involved on-site biotreatment of approximately 210 cubic yards (total) of petroleum-impacted fill between July 6 and September 15, 2020 until no field evidence of impact remained. Sample

results collected September 15, 2020 confirmed conformance with SSALs and the treated soil was reused in the landscape berm below the cover system on both Sites. The cover system on Sites II-9 and II-10 was completed in December 2020.

1.5 Remaining Contamination

The IRM work conducted on Sites II-9 and II-10 removed all known "source area" (i.e., arsenic-, petroleum/organic-, and PCB-impacted) slag/fill and treated residual petroleum-impacted "smear zone" slag/fill in-situ.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs (USCOs) for several ubiquitous constituents; specifically, PAHs and inorganic compounds (i.e., arsenic, cadmium, chromium, and lead). Other constituents remaining above USCOs in select areas of the Sites include PCBs (Site II-9) and inorganic compounds (i.e., barium, copper, manganese, mercury, nickel, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the USCO criteria; therefore, it is assumed that the entire 9.91-acre Site II-9 and 15.78-acre Site II-10 are impacted above the USCOs to the approximate native soil depth of 12 fbgs. Table 1 summarizes the sample locations remaining above USCOs.

Following grading of these Sites, demarcation was constructed and placed in areas slated for soil or stone cover to easily identify the existing Site sub-grade from the cover system material and prevent the potential for inadvertent removal of sub-grade material during future intrusive work. The demarcation layer is comprised of an orange ¾-inch plastic industrial netting material was rolled across the sub-grade and overlapped by approximately one foot at the seams.

Groundwater was not sampled on Site II-9 as no monitoring wells or piezometers were installed. Slight petroleum sheens were noted on groundwater in test pit BPA2-TP-36; however, groundwater is not used at the Site and is deed restricted from use for either potable or non-potable purposes without treatment. The groundwater quality on Site II-10 has been assessed by sampling monitoring wells MWN-63A and MWN-63D. These wells were sampled in April 2010 during the RI and again in February 2016 during a site-wide groundwater sampling event. The groundwater was analyzed for VOCs, SVOCs, and inorganic parameters. Table 2 presents the groundwater data with a comparison to NYSDEC Class GA GWQS. As indicated, analytical results from theses monitoring wells indicate concentration levels as non-

detect or below GWQS except for pH, iron, magnesium, and sodium in monitoring well MWN-63D on April 29, 2010 and manganese in well MWN-63A on February 26, 2016. These wells will be retained for future monitoring in the event NYSDEC requests groundwater quality monitoring on the larger Business Park II.

1.6 Transformers

Seven transformers are located within the former 54" Mill Roll Shop on Site II-10. In July 2017, TurnKey personnel de-energized the transformers and collected one oil sample from each. PCBs were not detected above the method detection limit (MDL) in 5 of the 7 samples. Aroclor 1260 was detected in two transformers at estimated concentrations of 0.734 mg/kg (transformer T88) and 16.8 mg/kg (transformer T93). According to 40CFR 761.3, none of the transformer are considered PCB transformers since the concentration of PCBs is less than 50 mg/kg. TRP does not intend to use the transformers as building demolition is planned for 2021. Until that time, TRP will monitor Transformers T88 and T93 weekly using the log in Attachment B until the transformer oil and carcasses are disposed off-site in accordance with all local, state, and federal regulatory requirements.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

Since remaining contaminated soil/fill and groundwater exists beneath the Phase II BP, Engineering Controls and Institutional Controls (EC/ICs) are required to protect public health and the environment. The EC/IC Plan in the Phase II BP SMP describes the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to Sites II-9 and II-10 are described below.

2.2 Engineering Control Systems

2.2.1 *Cover System*

As described in the December 2013 Construction Completion Report (CCR; Ref. 12), construction of the railroad bed cover system occurred in April 2013 and involved placement of a minimum 1-foot layer comprised of ballast material, meeting the requirements of the specification in the IRM Work Plan (Ref. 8), and embedded wood rail ties. A woven geotextile was installed on the prepared subgrade prior to placement of the ballast layer and rail ties as a demarcation layer. Ballast material was compacted in accordance with rail construction contract requirements to mitigate potential for settlement. TurnKey personnel were on-site to observe placement of ballast material.

The original cover system for Site II-10 is described in the August 2017 Final Engineering Report (Ref. 9). The final cover system for Sites II-9 and II-10 is described in the December 2020 Final Engineering Report (Ref. 13). Figure 4 shows the approximate locations and types of cover system materials placed on Sites II-9 and II-10. In the event these cover systems are breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the Control Property SMP and Section 4.0 of the Excavation Work Plan (SMP Appendix B).

2.2.2 *Vapor Barrier and Sub-Slab Radon Mitigation*

Although chlorinated organic compounds were not identified as constituents of concern at the Site, the Control Property SMP requires that a vapor barrier be placed beneath

any future structures designated for occupancy as a conservative measure to protect building occupants against potential vapor intrusion. A vapor barrier has been installed (see Figure 4).

During construction of the Site II-9 building slab, BUD-approved steel slag (BUD# 555-9-15) was used as subbase beneath the building slab. NYSDEC requested a sub-slab radon mitigation piping be installed beneath the building slab due to the potential for radon gas generation from the slag[2] or other fill materials observed in the subgrade, including brick.

Figure 5 shows the locations of the six sub-slab piping runs that were installed beneath building slab during construction. These pipes are generally oriented in an east to west direction, penetrate the building foundation on the west side, and are protected and accessible through road boxes installed on the west side of the building. The sub-slab piping consists of 4-inch diameter schedule 40 PVC perforated pipe and was installed within an 8-inch thick gas permeable layer (ASTM C33 stone material) installed beneath the building slab and 6 mil poly vapor barrier (see Figure 6).

If radon gas is determined to be a concern inside the building, based on analytical testing to be completed after the building is constructed (discussed below), the radon mitigation system construction will be completed. This will consist of installing six exterior vertical pipes consisting of 6-inch diameter solid schedule 40 PVC pipes and vacuum fans to the sub-slab piping. The vertical pipes will be vented a minimum of 1.5 feet above the finished roof line and 10 feet away from any air intake and/or window.

A radon testing program will be developed and implemented inside the building prior to occupancy by a radon measurement professional credentialed by the National Radon Proficiency Program (NRPP) in accordance with the Protocol for Conducting Radon and Radon Decay Product Measurements in Schools and Large Buildings (ANSI/AARST MALB 2014). The results of the radon testing program will be compared to the EPA action level of 4 picocuries per liter.

[2] Some slag in western New York has been identified as containing technologically enhanced naturally occurring radioactive material (TENORM), which contains Radium-226. The decay of Radium-226 generates radon gas which can migrate into overlying buildings. We note that the BUD-approved steel slag (BUD# 555-9-15) that was used has not been identified as TENORM and radon gas is also generated from soil, rock, and water which contain naturally occurring radioactive material (NORM).

2.3 Institutional Controls

The Institutional Controls described in Section 2.3 of the SMP (i.e., Environmental Easement and Excavation Work Plan) must be implemented for Sites II-9 and II-10; however, there are no Site-specific Institutional Control requirements for these Sites.

2.4 Inspections and Notifications

The annual inspections and notifications described in Section 2.4 of the SMP must be implemented for Sites II-9 and II-10; with Periodic Review Reports generated per NYSDEC-approved frequency. There are no other Site-specific inspection and notification requirements for these Sites.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (SMP Appendix C). The following emergency contact numbers are specific to Sites II-9 and II-10:

Table 3: Emergency Contact Numbers

Name: Robert Laughlin Title: President, Time Release Properties, LLC	Work: (716) 895-6100 Mobile: (716) 863-8806
Name: Thomas Forbes Title: Principal Engineer, Benchmark Environmental	Work: (716) 856-0599 Mobile: (716) 864-1730

Note: Contact numbers subject to change and should be updated as necessary

3.0 SITE MONITORING PLAN

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The soil cover system; and
- All affected Site media.

Monitoring of the cover system is described in Section 3.2 of the January 2014 SMP. No additional site-specific cover system monitoring is required.

Indoor air will be tested for radon prior to occupancy and biennially for two consecutive monitoring periods. If the sub-slab radon mitigation system is deemed necessary and put into operation, manometers will be installed on the vertical risers and will be visually checked monthly and recorded to verify the system is in operation.

4.0 OPERATION & MAINTENANCE PLAN

4.1 General

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the sub-slab radon mitigation system, if necessary, for Sites II-9 and II-10. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Sites II-9 and II-10 to operate and maintain the sub-slab radon mitigation system.
- Will be updated periodically to reflect changes in site conditions, or the way the sub-slab radon mitigation systems are operated and maintained.

Further detail regarding the Operation and Maintenance of the ASD system will be provided in an Operation and Maintenance Manual, which will be added hereto as Attachment C if deemed necessary. A copy of the Operation and Maintenance Manual, along with the complete SMP, will be maintained at Sites II-9 and II-10. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this Control Property SMP.

4.2 Operation and Maintenance of the Sub-slab Radon Mitigation System

The following sections provide a description of the operations and maintenance of the ASD system. Cut-sheets and as-built drawings for the ASD will be provided in Attachment C - Operations and Maintenance Manual, if needed.

4.2.1 System Start-Up and Testing

All system components will be visually inspected by a qualified person to ensure proper installation. With the system operating, smoke tubes may be used to check for leaks through floor joints and at suction points. Any leaks will be identified, noted, and repaired prior to continuing with testing and confirmation.

A field test will be conducted to confirm the negative pressure created beneath the slab. One-quarter inch diameter holes will be drilled through the concrete slab and into the sub-slab to measure vacuum in the subsurface using a digital manometer or comparable instrument

at the test locations. If adequate depressurization is not occurring, the following procedures will be enacted:

- All testing procedures will be repeated to ensure proper testing protocol
- Client and NYSDEC personnel will be informed of inadequate vacuum results

Troubleshooting of the system will then be completed, including the following:

- Confirmation of fan operation
- Inspection of and sealing of all major entry routes and penetrations (if necessary)
- Location of potential sub-slab barriers
- Inspection of the HVAC system and determination whether the HVAC system has a negative effect on the performance of the system

Upon completion of troubleshooting, if re-testing sub-slab test points indicates insufficient communication, the following measures will be considered:

- Adjustment of the HVAC system, and/or
- Installation of additional suction points to enhance sub-slab vacuum.

The system testing described above will be conducted if, during the system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

4.2.2 Routine System Operation and Maintenance

The manometers installed on the system stack pipes will be observed for vacuum readings. These reading will be compared to the system start-up measurements. If there is change in the vacuum readings of 40% or more from start-up, confirmation testing will be performed on that suction pit and/or system where the difference was noted and the troubleshooting procedures in Section 4.2.1 will be followed.

4.2.3 Non-Routine Operation and Maintenance

If the system is not working properly (i.e., loss of vacuum), the following protocol should be followed:

- The building owner/operator and head maintenance person should be contacted immediately

- The building owner/operator should apprise the NYSDEC of the system failure
- The date and time should be recorded
- The warning device should be identified (e.g., Gauge 1, 2, etc.)
- The fans should be inspected to confirm operation; if a circuit breaker was tripped causing the fan to cease operation, the circuit breaker should be reset
- System components should be visually inspected for signs of damage or dysfunction

If the system failure is not remedied, the building owner should contact a qualified engineer or other person with experience in radon systems to inspect the system and take the necessary measures to place the system back in service. The NYSDEC will be apprised of the system failure and what measures that will be taken to place the system back in service.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

All inspection, reporting, and certification requirement are described in Section 5.0 of the January 2014 SMP. Attachment D includes EC/IC Certification Forms to be completed for Sites II-9 and II-10.

6.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Site Management Plan for BCP Tecumseh Phase II Business Park, NYSDEC Site No. C915198 through C915198L, Lackawanna, New York*. January 2014.
2. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation.* May 3, 2010.
3. New York State Department of Environmental Conservations. *Decision Document, Site II-9 Tecumseh Phase II Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915198I*. December 2016.
4. New York State Department of Environmental Conservations. *Decision Document, Site II-10 Tecumseh Phase II Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915198J*. January 2017.
5. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan, Phase II Business Park Area, Lackawanna, New York*. July 2009.
6. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis (RI/AA) Report for Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York*. Revised March 2012.
7. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Railroad Realignment, Phase I-III Business Park Areas, Lackawanna, New York, BCP Site Nos. C915197-C915199.* October 2010.
8. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Phase II Business Park, Sites II-10, II-11 and II-12, BCP Site Nos. C915198J, C915198K & C915198L, Lackawanna, New York*. February 2017, revised April 2017.
9. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Final Engineering Report, Tecumseh Business Park II, Sub-Parcels II-10 and II-12, Lackawanna, New York*. August 2017.
10. Benchmark Environmental Engineering & Science, PLLC. *Remedial Action Work Plan (RAWP) and Cover System Modification Plan, Site II-9 (C915198I) and II-10 (C915198J), Tecumseh Phase II Business Park, Lackawanna, NY*. November 2019.
11. Benchmark Environmental Engineering & Science, PLLC. *Addendum to Remedial Action Work Plan (RAWP) and Cover System Modification Plan, Site II-9 (C915198I) and II-10 (C915198J), Tecumseh Phase II Business Park, Lackawanna, NY*. June 30, 2020.

12. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Construction Completion Report, Railroad Realignment, Tecumseh Phase I-III Business Park, Lackawanna, New York, BCP Site Nos. C915197-C915199*. December 2013.
13. Benchmark Environmental Engineering & Science, PLLC. *Final Engineering Report, Tecumseh Business Park II, Site II-9, Lackawanna, New York*. December 2020.

TABLES

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

Site Management Plan
Phase II Business Park, Sites II-9 and II-10
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Unrestricted SCO (mg/kg)	Test Pit Location and Depth Interval (feet)												
		Site II-9										Site II-10		
		TP-34	TP-35	TP-36	TP-38	TP-39	TP-40	TP-41	TP-43	Blind 3	TP-91	TP-90	TP-96	TP-97
		0.0 - 2.0	1.0 - 3.0	0.0 - 1.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	(TP-43)	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0
Volatile Organic Compounds (VOCs) - mg/kg														
Benzene	**0.06**	--	--	--	0.017	--	--	--	--	--	--	--	ND	--
Ethylbenzene	**1**	--	--	--	0.027	--	--	--	--	--	--	--	ND	--
n-Butylbenzene	**12**	--	--	--	0.036	--	--	--	--	--	--	--	ND	--
sec-Butylbenzene	**11**	--	--	--	0.0096 J	--	--	--	--	--	--	--	ND	--
Isopropylbenzene	**--**	--	--	--	0.0073 J	--	--	--	--	--	--	--	ND	--
p-Cymene	**--**	--	--	--	0.014	--	--	--	--	--	--	--	ND	--
n-Propylbenzene	**3.9**	--	--	--	0.0078 J	--	--	--	--	--	--	--	ND	--
Toluene	**0.7**	--	--	--	0.071	--	--	--	--	--	--	--	ND	--
1,2,4-Trimethylbenzene	**3.6**	--	--	--	0.059	--	--	--	--	--	--	--	ND	--
1,3,5-Trimethylbenzene	**8.4**	--	--	--	0.017	--	--	--	--	--	--	--	ND	--
o-Xylene	**0.26**	--	--	--	0.057	--	--	--	--	--	--	--	ND	--
Xylenes, Total	**--**	--	--	--	0.16	--	--	--	--	--	--	--	ND	--
Naphthalene	**--**	--	--	--	0.3 B	--	--	--	--	--	--	--	ND	--
Methylene Chloride	**0.05**	--	--	--	--	--	--	--	--	--	--	--	0.0036 J	--
TOTAL VOCs (mg/kg)	--	*0*	*0*	*0*	*0.62*	*0*	*0*	*0*	*0*	*0*	*0*	--	*0.0036*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg														
Acenaphthene	**20**	--	ND	ND	0.11 DJ	ND	1.1 DJ	ND	ND	ND	ND	ND	ND	2.6 DJ
Acenaphthylene	**100**	--	0.26 DJ	ND	0.1 DJ	ND	0.59 DJ	ND	ND	ND	0.32 DJ	0.4 DJ	0.23 DJ	ND
Acetophenone	**--**	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	**100**	--	0.19 DJ	0.24 DJ	0.52 DJ	0.067 DJ	3.7 D	ND	0.058 DJ	ND	0.3 DJ	1.5 DJ	0.34 DJ	13 D
Benzo(a)anthracene	**1**	--	0.9 DJ	**2.3 D**	**3.1 D**	0.33 DJ	**12 D**	0.53 DJ	0.26 DJ	0.25 DJ	**1.3 DJ**	**4.8 D**	**1.7 DJ**	**35 D**
Benzo(b)fluoranthene	**1**	--	**1 DJ**	**5.2 D**	**4 D**	0.35 DJ	**14 D**	0.67 DJ	0.38 DJ	0.34 DJ	**2.4 D**	**5.9 D**	**2.7 D**	**37 D**
Benzo(k)fluoranthene	**0.8**	--	0.38 DJ	**1.6 DJ**	**1.9 D**	0.14 DJ	**4.8 D**	0.27 DJ	0.16 DJ	0.14 DJ	**0.8 DJ**	**2.4 D**	**0.89 DJ**	**17 D**
Benzo(g,h,i)perylene	**100**	--	0.82 DJ	4.3 D	3.1 D	0.3 DJ	8.7 D	0.56 DJ	0.31 DJ	0.26 DJ	1.7 DJ	3.4 D	2 D	25 D
Benzo(a)pyrene	**1**	--	0.89 DJ	**3.9 D**	**3.8 D**	0.3 DJ	**12 D**	0.56 DJ	0.33 DJ	0.28 DJ	**1.7 DJ**	**4.9 D**	**2.2 D**	**35 D**
Bis(2-ethylhexyl) phthalate	**1**	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Biphenyl	**0.33**	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	**7**	--	--	--	--	--	--	--	--	--	--	--	0.12 DJ	--
Chrysene	**1**	--	0.88 DJ	**2.4 D**	**3.2 D**	0.34 DJ	**12 D**	0.52 DJ	0.3 DJ	0.25 DJ	**1.2 DJ**	**4.5 D**	**1.7 DJ**	**31 D**
Dibenz(a,h)anthracene	**0.33**	--	ND	**0.89 DJ**	**0.86 DJ**	0.083 DJ	ND	ND	0.091 DJ	0.073 DJ	**0.38 DJ**	**0.89 DJ**	**0.52 DJ**	**6.6 DJ**
Dibenzofuran	**--**	--	ND	ND	0.17 DJ	ND	0.47 DJ	ND	ND	ND	ND	ND	ND	1.8 DJ
Fluoranthene	**100**	--	1.2 DJ	2.8 D	3.4 D	0.4 DJ	25 D	0.71 DJ	0.39 DJ	0.34 DJ	2.8 D	11 D	3 D	77 D
Fluorene	**30**	--	ND	ND	0.11 DJ	ND	1.2 DJ	ND	ND	ND	ND	0.19 DJ	ND	3.3 DJ
Indeno(1,2,3-cd)pyrene	**0.5**	--	**0.69 DJ**	**3.2 D**	**2.7 D**	0.24 DJ	**8 D**	0.45 DJ	0.27 DJ	0.22 DJ	**1.5 DJ**	**3.2 D**	**1.7 DJ**	**23 D**
2-Methylnaphthalene	**--**	--	0.096 DJ	ND	0.26 DJ	0.048 DJ	0.18 DJ	ND	ND	0.051 DJ	ND	ND	ND	ND
Naphthalene	**12**	--	ND	ND	0.27 DJ	ND	0.36 DJ	ND	ND	ND	ND	ND	ND	1.7 DJ
Phenanthrene	**100**	--	0.6 DJ	0.96 DJ	1.8 DJ	0.25 DJ	12 D	0.28 DJ	0.17 DJ	0.15 DJ	1 DJ	4.5 D	1.4 DJ	42 D
Pyrene	**100**	--	1.3 DJ	2.1 D	3.2 D	0.42 DJ	23 D	0.71 DJ	0.34 DJ	0.3 DJ	2 D	7.6 D	2.3 D	54 D
TOTAL SVOCs (mg/kg)	--	--	*9.2*	*30*	*33*	*3.3*	*139*	*5.3*	*3.1*	*2.7*	*17*	*55.2*	*20.8*	*405*
Polychlorinated Biphenyls (PCBs) - mg/kg														
Aroclor 1248	**--**	--	--	0.029 J	--	--	ND	--	--	--	ND	ND	ND	--
Aroclor 1254	**--**	--	--	0.16 J	--	--	0.098 J,QSU	--	--	--	ND	ND	ND	--
Aroclor 1260	**--**	--	--	0.061 C8 J	--	--	0.064 J,QSU	--	--	--	0.13 QSU	ND	ND	--
TOTAL PCBs (mg/kg)	***0.1***	--	--	***0.25***	--	--	***0.162***	--	--	--	***0.13***	*0*	*0*	--

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

Site Management Plan
Phase II Business Park, Sites II-9 and II-10
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Unrestricted SCO (mg/kg)	Test Pit Location and Depth Interval (feet)												
		Site II-9										Site II-10		
		TP-34	TP-35	TP-36	TP-38	TP-39	TP-40	TP-41	TP-43	Blind 3	TP-91	TP-90	TP-96	TP-97
		0.0 - 2.0	1.0 - 3.0	0.0 - 1.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	(TP-43)	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0
Inorganic Compounds - mg/kg														
Arsenic, Total	**13**	**13.2**	**31.9 J**	6.6 J	11.7 J	**19.2 J**	**152 J**	**30.4 J**	**17.2 J**	**13 J**	**37.1**	**55.5**	**15.4**	4.7
Barium, Total	**350**	**103**	146 J	27.2 J	139 J	143 J	158 J	219 J	190 J	170 J	35.4	172	150	73.2
Cadmium, Total	**2.5**	**2.49**	**2.67 J**	1.03 J	**4.68 J**	**5.77 J**	**4.22 J**	**8.19 J**	**3.82 J**	**2.36 J**	1.13	**2.65**	1.49	1.31
Chromium, Total	**1**	**55.3**	**96.5 J**	**67.2 J**	**54.3 J**	**87.9 J**	**112 J**	**101 J**	**113 J**	**63.1 J**	**67.4**	**122**	**671**	**95.6**
Lead, Total	**63**	**265**	**282 J**	**128 J**	**914**	**442 J**	**656 J**	**1090**	**731**	**762**	**162**	**235**	**148**	**463**
Mercury, Total	**0.18**	**0.375**	**0.201 J**	0.0902 J	0.0998	0.09 J	0.0699 J	0.124	0.108	0.0877	0.0833 D	0.104 D	0.168	**0.671**
Cyanide, Total	**27**	--	ND J	**27 J**	**27.8 J**	ND J	ND J	10.5 NJ	ND J	ND J	--	ND	--	--

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

B = Analyte was detected in associated Method Blank.
C8 = Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
NJ = The detection is tentative in identification and estimated in value.
QSU = Sulfur (EPA 3660) clean-up performed on extract.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or imprecise.
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Soil Cleanup Objectives.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase II Business Park, Sites II-9 and II-10
Tecumseh Redevelopment Inc., Lackawanna, New York

PARAMETER [1]	GWQS [2]	Site II-10							
		MWN-63A		MWN-63A		MWN-63D [3]		MWN-63D	
		4/30/2010		2/26/2016		4/29/2010		2/26/2016	
Field Measurements [4]:									
Sample No.	--	initial	final	initial	final	initial	final	initial	final
pH (units)	**6.5 - 8.5**	6.65	6.67	6.92	6.93	**6.28**	6.52	6.60	6.64
Temperature (°C)	**NA**	11.0	12.2	7.8	7.1	11.7	12.7	9.8	8.4
Sp. Conductance (uS)	**NA**	1150	1141	961	960	1410	1402	1551	1547
Turbidity (NTU)	**NA**	480.0	252.0	45.4	23.2	36.2	23.0	17.3	11.8
Dissolved Oxygen (mg/L)	**NA**	--	--	3.05	2.95	--	--	2.49	1.93
Eh (mV)	**NA**	-81	-93	-84	-82	41	28	- 29	- 24
Total Inorganic Compounds (mg/L) [5]:									
Aluminum - Total	**NA**	--		--		0.878		--	
Barium - Total	**1**	0.206		0.2		0.87		0.91	
Calcium - Total	**NA**	--		--		167		--	
Chromium - Total	**0.05**	0.006		ND		ND		0.0011 J	
Iron - Total	**0.3**	--		--		**1.43**		--	
Lead - Total	**0.025**	0.005		0.003 J		ND		0.0031 J	
Magnesium - Total	**35***	--		--		**58.2**		--	
Manganese - Total	**0.3**	--		**1.2**		0.105		ND	
Potassium - Total	**NA**	--		--		15.2		--	
Sodium - Total	**20**	--		--		**91.4**		--	
Cyanide - Total	**0.2**	--		0.0073 J		ND		ND	
Soluble Inorganic Compounds (mg/L) [5,6]:									
Barium - Soluble	**1**	0.133		--		--		--	
Volatile Organic Compounds (ug/L) [6]:									
1,2,4-Trimethylbenzene	**5**	ND		ND		1.8		ND	
Cyclohexane	**NA**	--		ND		3.3		ND	
Methylcyclohexane	**NA**	--		ND		8.8		0.71 J	
m-Xylene & p-Xylene	**10**	ND		ND		1 J		ND	
Xylenes, total	**15**	ND		ND		1 J		ND	
Semi-Volatile Organic Compounds (ug/L) [6]:									
Benzaldehyde	**NA**	ND		0.78 J, B		ND		0.52 J, B	
Butyl benzyl phthalate	**50**	ND		0.64 J, B		ND		0.44 J, B	
Pyrene	**50***	ND		ND		ND		ND	

Notes:

1. Only those compounds detected above the method detection limit at a minimum of one sample location are reported in this table.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) as per TOGS 1.1.1 (June 1998, January 1999 Errata, April 2000 Addendum, and June 2004 Addendum).
3. Blind Duplicate and Matrix Spike/Matrix SpikeDuplicate (MS/MSD) analysis performed on groundwater sample collected from MWN-63D.
4. Field measurements were collected immediately before and after groundwater sample collection.
5. If the sample turbidity was above 50 NTUs, the sample was analyzed for dissolved metals.
6. Groundwater collected at April 2010 monitoring event was only analyzed for parameters listed in the July 2009 Remedial Investigation Work Plan.

Definitions:

J = Estimated Value; result is less than the sample quantitation limit but greater than zero.
B = Analyte was detecded in the associated method blank.
"--" = Not analyzed
NA = No standard available
ND = Indicates parameter was not detected above method detection limit.
* = Guidance Value

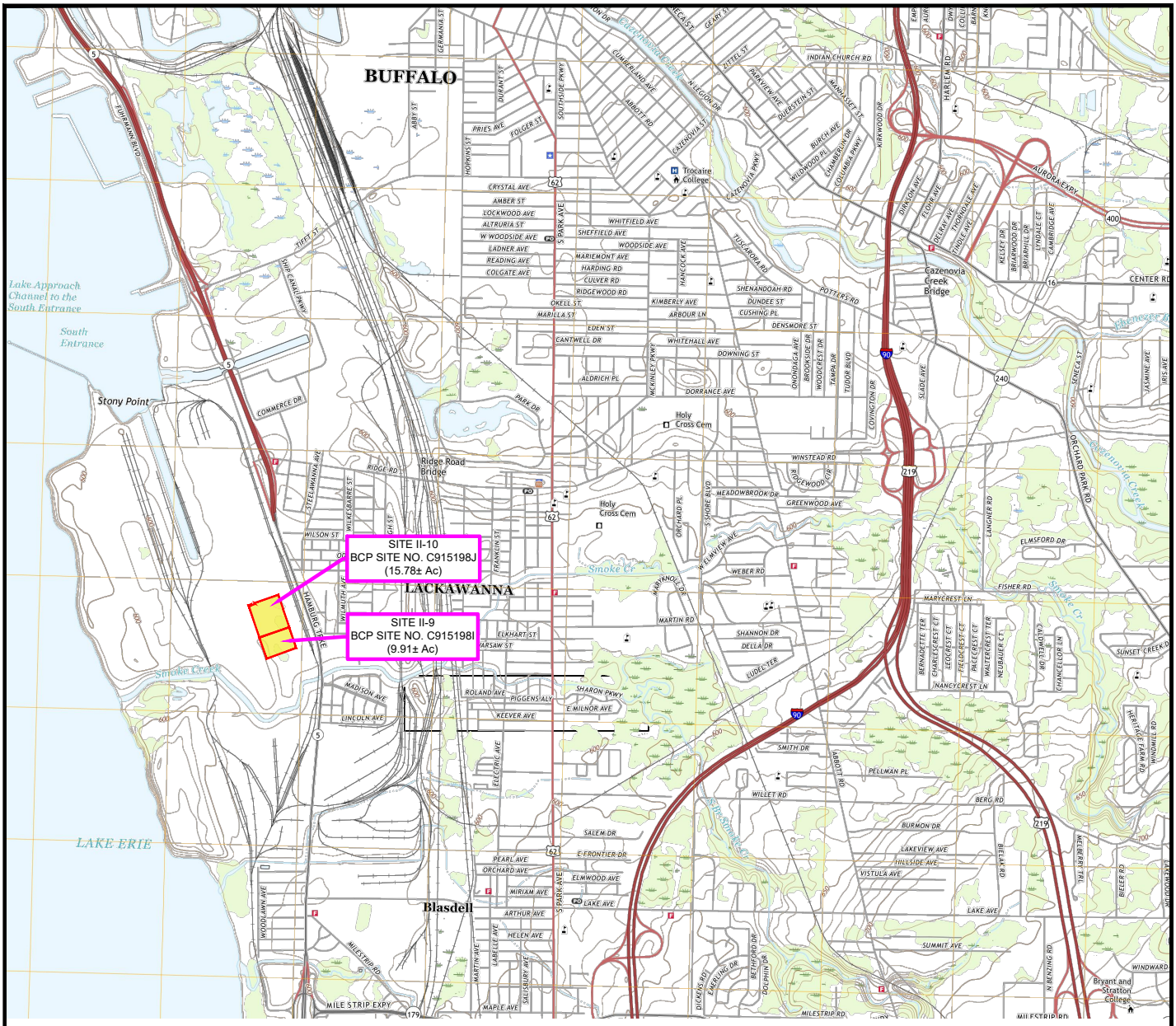
Color Code:

BOLD = Result exceeds the GWQS/GV.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\SMP Site II9 and II10\Figure 1; Site Location and Vicinity Map.dwg, 11/12/2020 10:33:02 AM

FIGURE 1



BASEMAP PER USGS QUADRANGLE BUFFALO SOUTHEAST 2019

4,000' 0' 4,000' 8,000'

SCALE: 1 INCH = 4,000 FEET
SCALE IN FEET
(approximate)

LEGEND:

TRP SITE



QUADRANGLE LOCATION

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0489-019-001

DATE: NOVEMBER 2020

DRAFTED BY: RFL

SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
BCP SITE NOS. C915198I (II-9) & C915198J (II-10)
LACKAWANNA, NEW YORK

PREPARED FOR

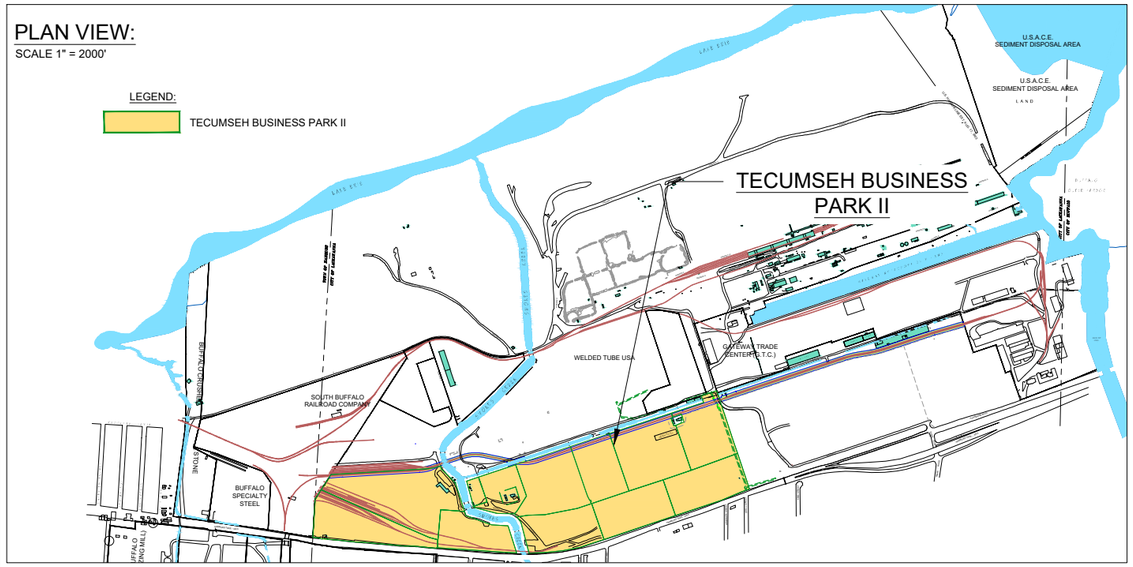
TIME RELEASE PROPERTIES, LLC

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F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\SMP Site II9 and II10\Figure 2- Site Delineation Map.dwg, 12/3/2020 2:57:51 PM

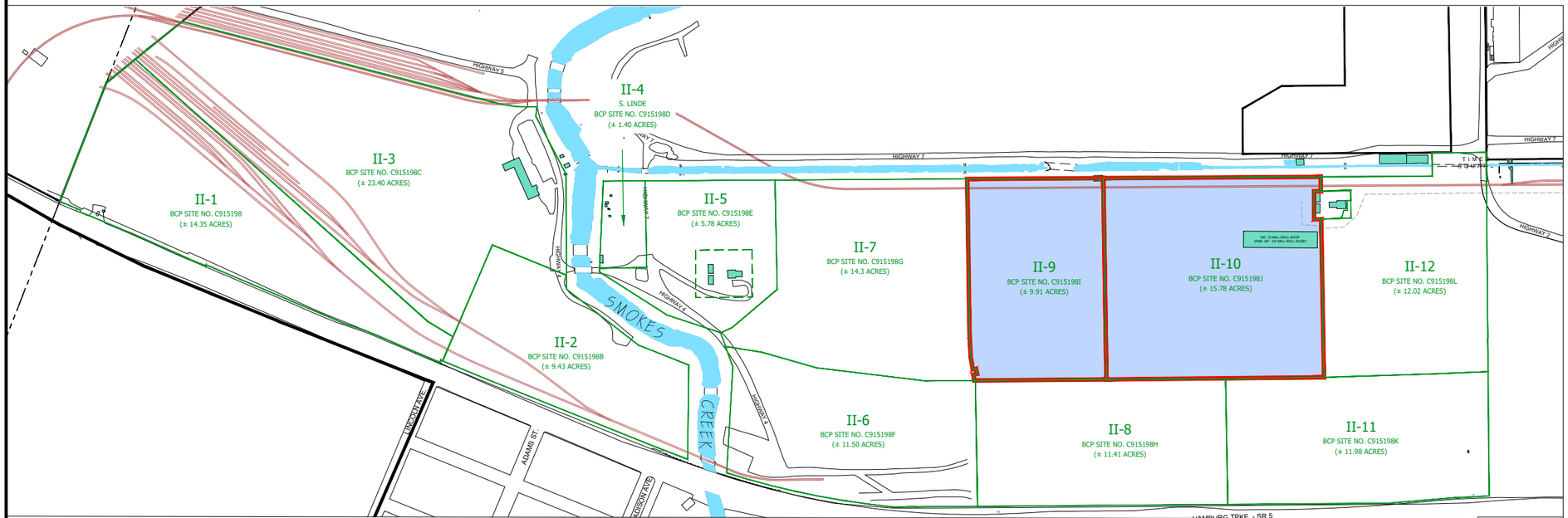
PLAN VIEW:

SCALE 1" = 2000'



LEGEND:

- SITES II-9 & II-10
- EXISTING BUILDING / STRUCTURE
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- RAILROAD TRACK





SCALE: 1 INCH = 1,000 FEET
SCALE IN FEET
(approximate)

DATE: NOVEMBER 2020
DRAFTED BY: RFL

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2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

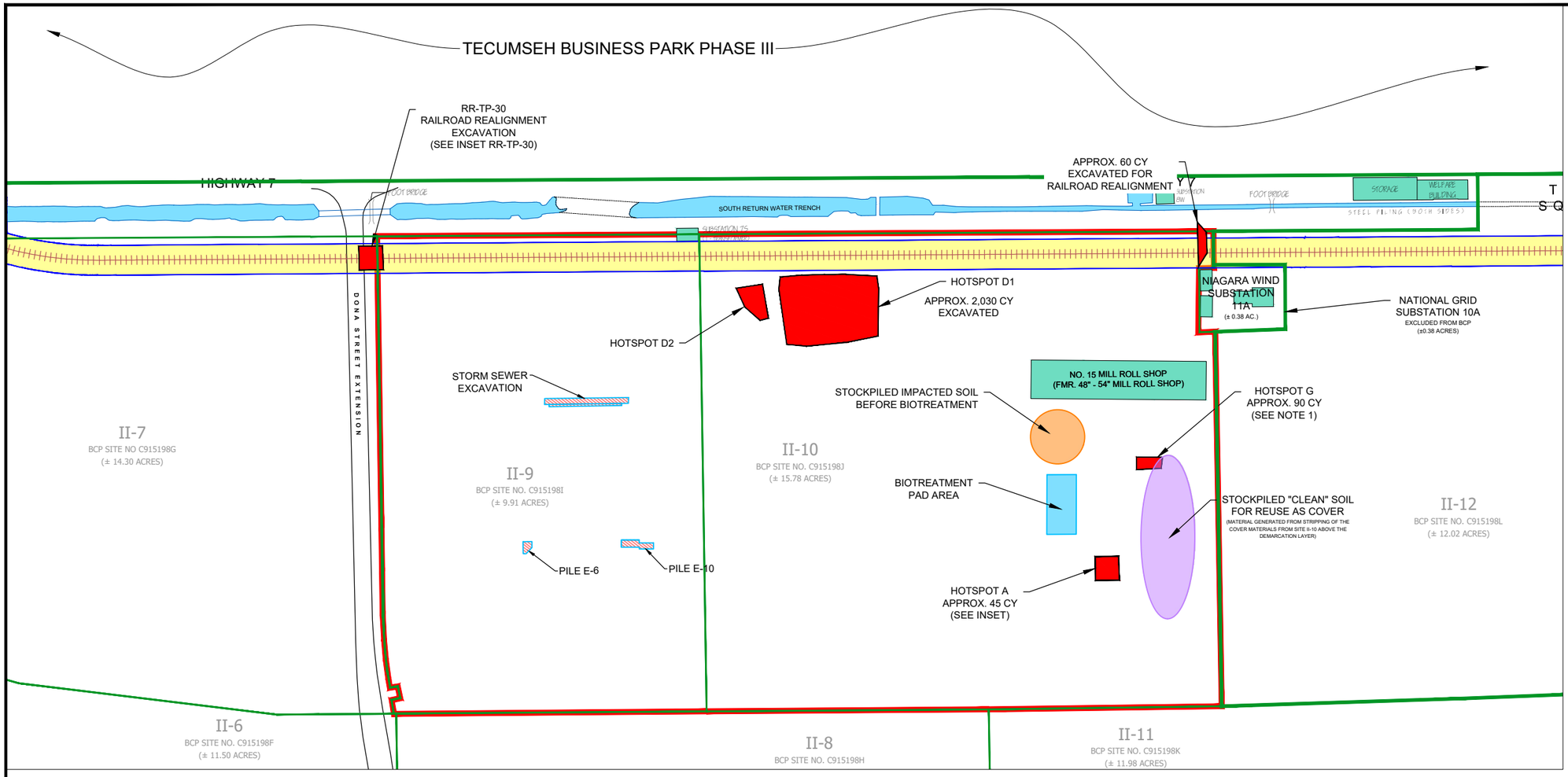
JOB NO.: 0489-019-001

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NOS. C915198I (II-9) & C915198J (II-10)
LACKAWANNA, NEW YORK
PREPARED FOR
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FIGURE 2

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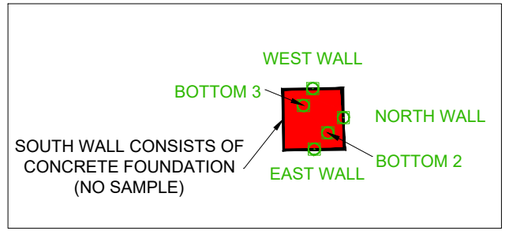
200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

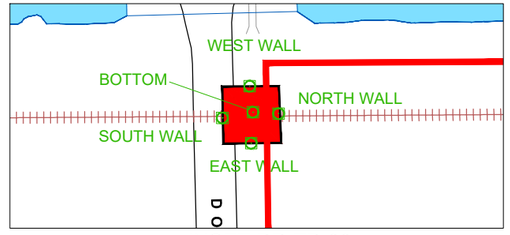
LEGEND:

- BCP BOUNDARY (TRP PROPERTY BOUNDARY)
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- IMPACTED SOIL/FILL EXCAVATED (HOTSPOT) DURING CONSTRUCTION (2020)
- IMPACTED SOIL/FILL EXCAVATED (HOTSPOT) PRE-CONSTRUCTION
- WEST WALL — CONFIRMATORY SAMPLE LOCATION
- EXISTING EAST HARBOR LEAD RAILROAD TRACK AND ROW

NOTE: 1) REGENOX™ & ORC ADVANCED® APPLIED



HOTSPOT A
NTS



INSET RR-TP-30
NTS

DATE: NOVEMBER 2020
DRAFTED BY: RFL

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SCIENCE, PLLC
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SUITE 300
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(716) 856-0599

JOB NO.: 0489-019-001

COMPLETED REMEDIAL MEASURES SITES II-9 & II-10

SITE MANAGEMENT PLAN

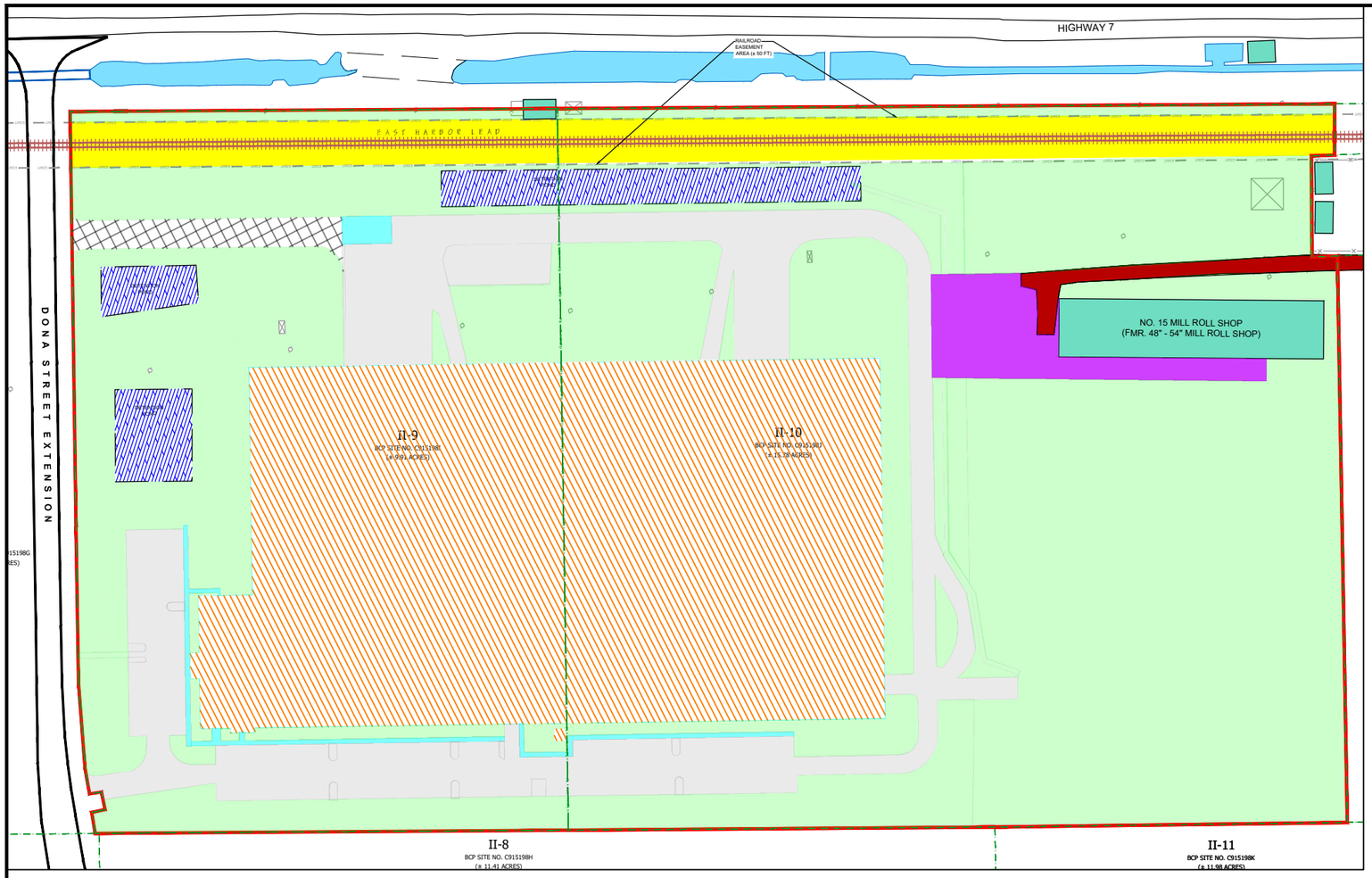
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NOS. C915198I (II-9) & C915198J (II-10)
LACKAWANNA, NEW YORK

PREPARED FOR
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FIGURE 3

DISCLAIMER:
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F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\SMP Site II9 and II10\Figure 3; Completed IRMs on Site II-9 and II-10.dwg, 12/10/2020 10:59:45 AM

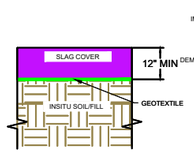




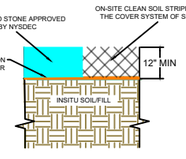
SCALE: 1 INCH = 150 FEET
SCALE IN FEET
(approximate)

LEGEND:

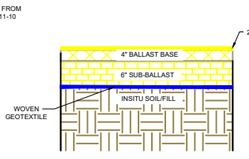
- BCP BOUNDARY (TRP PROPERTY)
- BCP SITE BOUNDARIES
- RAILROAD TRACK
- RAILROAD EASEMENT BOUNDARY
- ELECTRIC TOWER
- POWER POLE
- EXISTING BUILDING WITH CONCRETE SLAB ON GRADE FOUNDATION
- ACCESS DRIVE (RUN OF CRUSH) COVER
- ASPHALT COVER
- DETENTION POND COVER
- SOIL COVER
- STONE COVER (MIN. 12") PLANNED TO BE SIDEWALK
- CONCRETE COVER
- RAILROAD COVER SYSTEM
- SOIL COVER SYSTEM PLANNED TO BE ASPHALT PAVING
- SLAG COVER SYSTEM



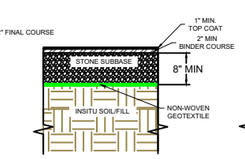
TEMPORARY CONSTRUCTION PARKING COVER SYSTEM DETAIL
NTS



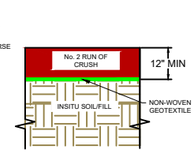
STONE/SOIL COVER SYSTEM DETAIL FOR AREAS PLANNED FOR HARDSCAPE
NTS



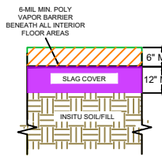
COVER SYSTEM BENEATH TRACKS COVER SYSTEM DETAIL
NTS



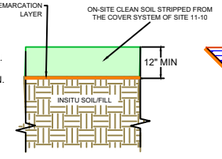
ASPHALT COVER SYSTEM DETAIL
NTS



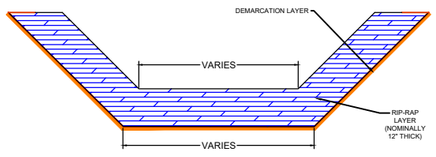
EXISTING ACCESS DRIVE COVER SYSTEM DETAIL
NTS



CONCRETE COVER SYSTEM DETAIL
NTS



SOIL AREA COVER SYSTEM DETAIL
NTS



DETENTION POND CROSS-SECTION
NTS

NOTES:
1. BASED ON RECORD DRAWINGS PROVIDED BY C&S COMPANIES

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COVER SYSTEM PLAN

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NOS. C915198I (II-9) & C915198J (II-10)
LACKAWANNA, NEW YORK
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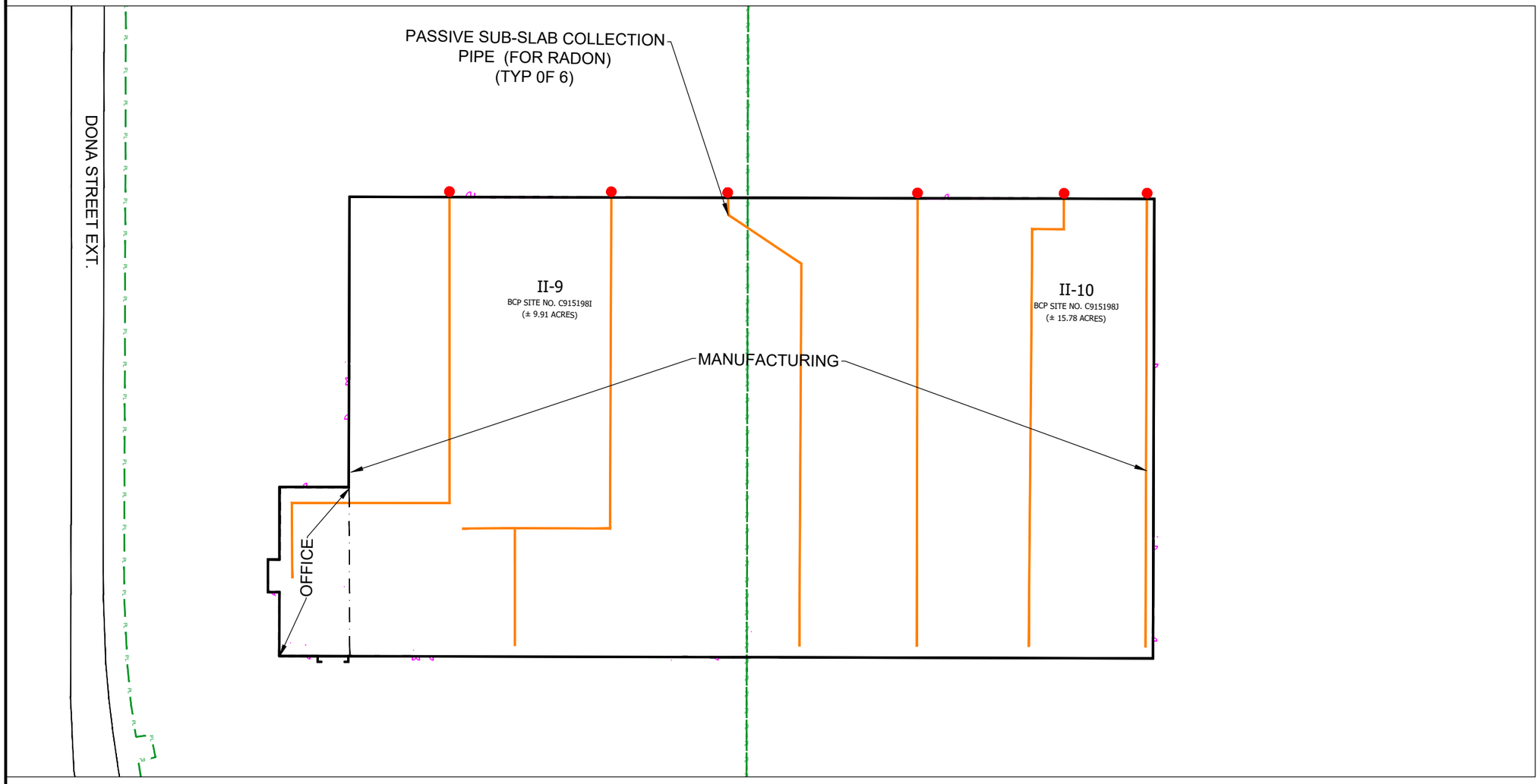
FIGURE 4

DISCLAIMER:
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DATE: NOVEMBER 2020
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F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\SMP Site II9 and II10\Figure 4; Cover System Plan\SMREV.dwg, 12/16/2020 8:13:48 AM

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\SMP Site II9 and II10\Figure 5; Radon Mit System Plan.dwg, 11/13/2020 2:01:40 PM



DATE: NOVEMBER 2020
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SUB-SLAB RADON MITIGATION SYSTEM

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
BCP SITE NOS. C915198I (II-9) & C915198J (II-10)
LACKAWANNA, NEW YORK

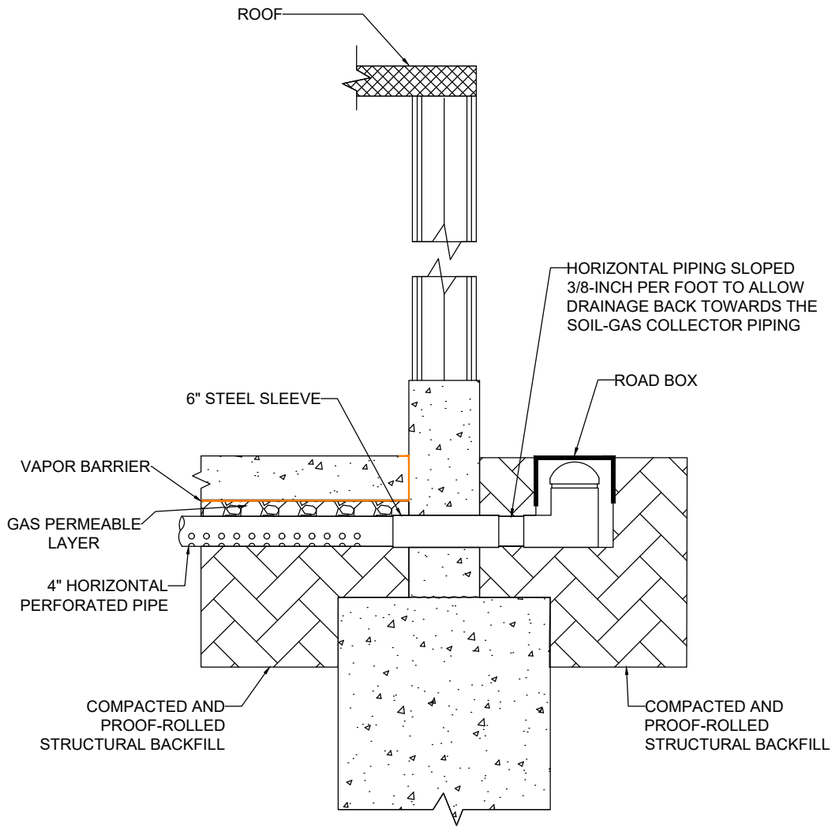
PREPARED FOR
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FIGURE 5

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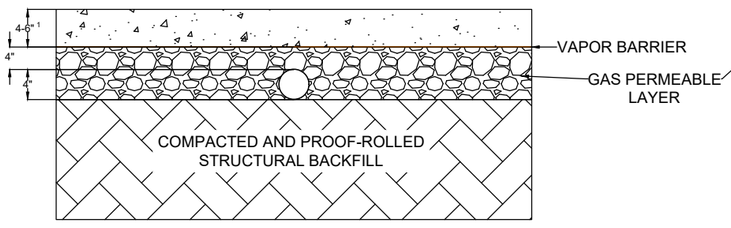


SPECIFICATIONS

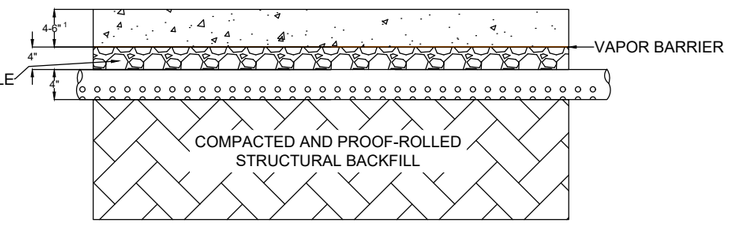
1. NO. 1 "CLEAN" CRUSHED STONE WAS USED FOR THE GAS PERMEABLE LAYER.
2. 2"-MINUS BENEFICIAL USE DETERMINATION (BUD) SLAG WAS USED FOR THE STRUCTURAL BACKFILL.
3. SUB-SLAB HORIZONTAL PIPING IS 4-INCH NOMINAL DIAMETER SDR 35 PVC PERFORATED PIPE.
4. PLASTIC PIPING THROUGH FOUNDATIONS WAS BE SLEEVED WITHIN 6-INCH NOMINAL DIAMETER SCHEDULE 40 STEEL PIPE.
5. ABOVE GRADE VERTICAL EXHAUST PIPING (IF NEEDED) SHALL BE 6-INCH NOMINAL DIAMETER SOLID SDR 35 PVC PIPE.
6. VAPOR BARRIER MEMBRANE IS POLYETHYLENE SHEETING 6 MILS IN THICKNESS
7. SEALANT USED IS POLYURETHANE CAULK (ASTM C920 CLASS 25)

INSTALLATION INSTRUCTIONS

1. THE STRUCTURAL BACKFILL WAS COMPACTED AND PROOF-ROLLED PRIOR TO INSTALLATION OF THE HORIZONTAL PERFORATED PIPING.
2. 8-INCHES OF NO. 1 "CLEAN" CRUSHED STONE WAS PLACED BENEATH THE SLAB (REPRESENTING THE GAS PERMEABLE LAYER). THE HORIZONTAL PIPE WAS PLACED ON TOP OF THE COMPACTED AND PROOF-ROLLED STRUCTURAL SUB-BASE AND THE NO. 1 STONE WAS PLACED SUCH THAT 4" ARE ABOVE THE PIPE (I.E., FROM THE TOP OF PIPE TO BOTTOM OF FLOOR SLAB).
3. HORIZONTAL PIPING WAS PLACED PER THE LAYOUT ON FIGURE 5 AND SUPPORTED BY PLACING AGGREGATE AROUND THE PIPE. PIPE PERFORATIONS WERE POSITIONED IN THE DOWNWARD DIRECTION TO AID IN DRAINAGE.
4. ALL NON-PERFORATED HORIZONTAL PIPING THAT IS CONNECTED TO THE SOIL-GAS COLLECTORS WAS SLOPED 3/8-INCH PER FOOT SO AS TO DRAIN INTO THE PERFORATED SOIL-GAS COLLECTORS.
5. STEEL SLEEVES WERE INSTALLED THROUGH THE FOUNDATION PER THE STRUCTURAL ENGINEER'S SPECIFICATIONS.
6. THE VAPOR BARRIER MEMBRANE WAS PLACED OVER THE GAS PERMEABLE LAYER.
7. PLUMBING AND ELECTRICAL CONDUITS BELOW GRADE WERE SOLVENT-WELDED.
8. PENETRATIONS THROUGH THE SLAB-ON-GRADE WERE SEALED USING POLYURETHANE CAULK.
9. CRACKS WERE SEALED USING POLYURETHANE CAULK.
10. VERTICAL EXHAUST PIPING (IF INSTALLED) WILL BE SECURED WITH BRACKETS EVERY 10 FEET.
11. TOP OF VERTICAL EXHAUST STACK SHALL BE MINIMUM 1.5' FEET ABOVE FINISHED ROOF AND BE 10' AWAY FROM ANY AIR INTAKE AND WINDOWS (IF INSTALLED).
12. WIRE MESH SHALL BE PLACED ON TOP OF THE EXHAUST STACK (IF INSTALLED) TO PREVENT DEBRIS OR SMALL ANIMALS FROM ENTERING THE EXHAUST PIPING.



GAS PERMEABLE LAYER CROSS-SECTION
NTS



GAS PERMEABLE LAYER CROSS-SECTION
NTS

NOTES:
1. THE CONCRETE SLAB IS 4" THICK IN THE OFFICE AREA; AND AT LEAST 6" THICK IN THE MANUFACTURING AREA.

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JOB NO.: 0489-019-001

VAPOR BARRIER & SUB-SLAB RADON MITIGATION DETAILS

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
BCP SITE NOS. C915198I (II-9) & C915189J (II-10)
LACKAWANNA, NEW YORK

PREPARED FOR
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FIGURE 6

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DATE: NOVEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\SMP Site II9 and II10\Figure 6 Radon Remediation 11x17 scaling.dwg, 11/13/2020 2:03:59 PM

ATTACHMENT A

MONITORING WELL BORING AND COMPLETION LOGS

Project No: 0071-009-311

Borehole Number: MWN-63A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

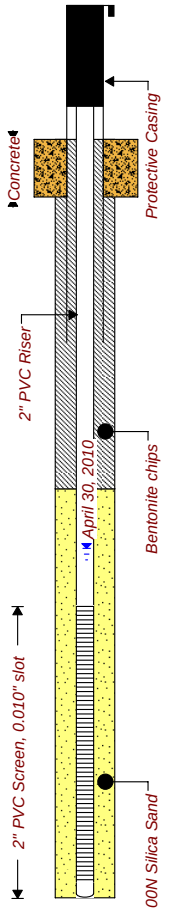
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0 / 0.0	Ground Surface							
		Advanced augers to 13.0 fbgs, see MWN-63D 0.0 to 13.0 fbgs for soil descriptions .							
2.0									
7.0									
12.0									
	-13.0 / 13.0	End of Borehole							
17.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Diedrich D-120
Drill Method: 4 1/4" HSA, no sampling
Comments:
Drill Date(s): 4 2 10

Hole Size: 8 1/2 - inch
Stick-up: 2.06 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0071-009-311

Borehole Number: MWN-63D

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

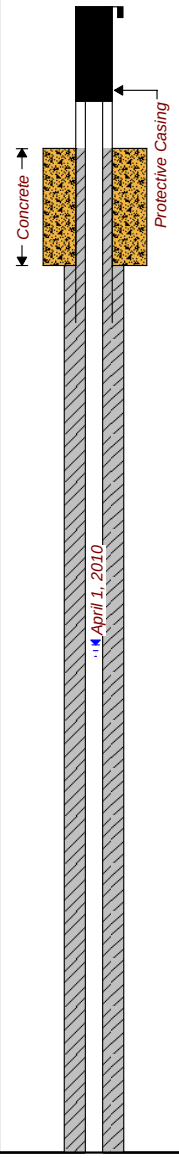
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 12.5 / 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Black, moist, non-plastic fines with some fine sand with slag, orange brick pieces, coal pieces, medium dense, loose when disturbed.	S1	18	1.3		0.0		
	-2.0								
2.0	2.0	Brown, moist to wet, non plastic fines, some sand, slag, brick, with pockets of lean clay.	S2	5	1.1		0.0		
	-4.0								
	4.0	***Lean Clay*** Grey, moist, mostly medium plastcity fines, few fine sands, stiff.	S3	6	1.1		0.0		
	-6.0								
	6.0	Same as above.	S4	17	1.4		0.0		
7.0	-8.0								
	8.0	***Poorly Graded Sand*** Dark grey, wet at (8.5 fbgs), mostly medium sand, trace non-plastic fines, few coarse sands, trace sub-rounded fine gravel, loose, rapid dilatancy.	S5	3	1.1		0.0		
	-10.0								
	10.0	As above	S6	10	.9		0.0		
	-12.0								
12.0	12.0	Same as above	S7	NA	1.1		0.0		
	-13.0								
	13.0	***Sandy Organic Soil*** Brown, wet, mostly organic fines, some fine sand, rootlets, low plasticity fines, soft.							
	-14.0								
	14.0	Same as above.	S8	3	1.0		0.0		
	-16.0								
	16.0								
	-16.5								
	16.5		S9	4	.9		0.0		
17.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Dietrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA and NQ core barrel
Comments:
Drill Date(s): 4/1 - 4/2/10

Hole Size: 8 1/2 -inch
Stick-up: 2.24-feet
Datum: Mean Sea Level

Sheet: 1 of 3

Project No: 0071-009-311

Borehole Number: MWN-63D

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

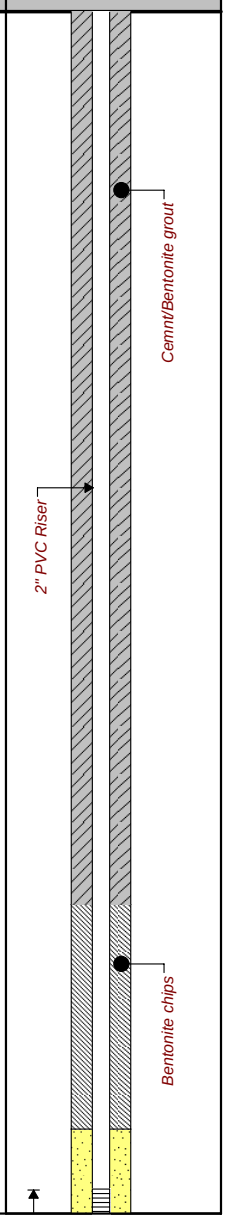
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

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Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 12.5 / 25)	Lab Sample	Well Completion Details or Remarks
	-18.0 / 18.0	***Lean Clay*** Grey, moist, mostly medium plasticity fines, few fine sand with organic particles, stiff.	S9	4			0.0		
		Sandy Organic Soil Brown, wet, mostly organic fines, some fine sand, rootlets, low plasticity fines, soft, thinley bedded lean clay lenses.	S10	5	.9		0.0		
	-20.0 / 20.0	Same as above,no clay lenses.							
	-21.0 / 21.0	Same as above.	S11	16	1.1		0.0		
	-22.0 / 22.0	***Poorly Graded Sand with Silt*** Grey, wet, Some fine sand, few silt, with trace trace fine gravel, medium dense							
22.0		***Silty Sand*** Grey, wet, mostly fine sand, few non plastic fines, medium dense	S12	12	1.4		0.0		
	-24.0 / 24.0	***Lean Clay*** Grey, wet, mostly high plasticity fines, few sand, very stiff, thinnly bedded.	S13	11	1.2		0.0		
	-26.0 / 26.0	Same as above, stiff to soft	S14	6	1.5		0.0		
27.0	-28.0 / 28.0	Same as above,soft.	S15	WH	2.0		0.0		
	-30.0 / 30.0	***Sandy Lean Clay*** Grey, wet, mostly medium plastcity fines with some fine sand, few fine gravel, trace coarse gravel, very dense, massive	S16	6	1.0		0.0		
32.0	-32.0 / 32.0	As above, few subangular coarse gravel.	S17	43	1.0		0.0		
	-34.0 / 34.0	***Dolomitic Limestone with Shale bedding.*** Shale chips; Top of bedrock 34.8 fgbs (Auger refusal)	S18	NA	0.0		0.0		
	-34.8 / 34.8								
37.0									



Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Dietrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA and NQ core barrel
Comments:
Drill Date(s): 4/1 - 4/2/10

Hole Size: 8 1/2 -inch
Stick-up: 2.24-feet
Datum: Mean Sea Level

Sheet: 2 of 3

Project No: 0071-009-311

Borehole Number: MWN-63D

Project: Phase II Business Park

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
42.0		Dark grey to grey, microcrystaline with laminations less then 1 to 3 mm, moderate field strength weathered slightly along bedding planes, medium soft, broken. Run #1 34.8 - 44.8 total recovery 99% RQD 43.69% poor, lost approximatley 20 gallons of drilling water. Run #2 44.8 - 49.8 total recovery 95% RQD 59% Fair, lost approximatley 180 gallons of drilling water.							2" PVC Screen, 0.010" slot 00N Silica Sand
47.0									
	-49.8 49.8	End of Borehole							
52.0									
57.0									

Drilled By: Earth Dimensions, Inc.
Drill Rig Type: Dietrich D-120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA and NQ core barrel
Comments:
Drill Date(s): 4/1 - 4/2/10

Hole Size: 8 1/2 -inch
Stick-up: 2.24-feet
Datum: Mean Sea Level

Sheet: 3 of 3

ATTACHMENT B

TRANSFORMER INSPECTION LOG

Inspection Log for Transformers in 54" Mill Roll Shop

Site Management Plan
Phase II Business Park, Sites II-9 and II-10
Tecumseh Redevelopment Inc.
Lackawanna, New York

Date	Inspector	Transformer T88 (PCB = 0.734 mg/kg)				Transformer T93 (PCB = 16.8 mg/kg)			
		In Use	Decommissioned	Leaking	Corrective Action	In Use	Decommissioned	Leaking	Corrective Action

ATTACHMENT C

OPERATIONS AND MAINTENANCE MANUAL

ATTACHMENT D

EC/IC CERTIFICATION FORMS

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. C915198I

Site Name: Site II-9 Tecumseh Phase II Business Park

Site Address: 6 Dona Street Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details **Box 2**

		YES	NO
1.	Are the Site Details above, correct?	☐	☐
	If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4.	Has a change-of-use occurred since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
	If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915198I **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915198I

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

IC/EC CERTIFICATIONS

Box 7

Qualified Environmental Professional Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____
(Owner or Remedial Party)

_____	_____	_____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	Date

Enclosure 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. **C915198J**

Site Name Site II-10 Tecumseh Phase II Business Park

Site Address: 6 Dona Street Zip Code: 14218
City/Town: Lackawanna
County: Erie
Site Acreage: 15.780

Reporting Period: April 28, 2019 to April 28, 2020

	YES	NO
1. Is the information above correct?	☐	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☐
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☐
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☐
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☐

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Commercial and Industrial	☐	☐
7. Are all ICs/ECs in place and functioning as designed?	☐	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____
Signature of Owner, Remedial Party or Designated Representative Date

Box 2A

	YES	NO
8. Has any new information revealed that assumptions made in the Qualitative Exposure Assessment regarding offsite contamination are no longer valid?	☐	☐

If you answered YES to question 8, include documentation or evidence that documentation has been previously submitted with this certification form.

9. Are the assumptions in the Qualitative Exposure Assessment still valid? (The Qualitative Exposure Assessment must be certified every five years)	☐	☐

If you answered NO to question 9, the Periodic Review Report must include an updated Qualitative Exposure Assessment based on the new assumptions.

SITE NO. C915198J **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
141.15-1-4	Time Release Properties, LLC	Ground Water Use Restriction Soil Management Plan Landuse Restriction Monitoring Plan Site Management Plan IC/EC Plan

Institutional Control Description:

Adherence to Site Management Plan (SMP)
Restriction to commercial re-use
Prohibition of groundwater use
Allowance for Departmental access
Requires a Periodic Review and Report

Box 4

Description of Engineering Controls

Parcel	Engineering Control
141.15-1-4	Cover System

Engineering Control Desription:

Soil cover, over 5 acres

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☐	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☐	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____

Signature of Owner, Remedial Party or Designated Representative — Date

IC CERTIFICATIONS
SITE NO. C915198J

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner, Remedial Party, or Designated Representative Date
Rendering Certification

IC/EC CERTIFICATIONS

Box 7

Qualified Environmental Professional Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____
(Owner or Remedial Party)

_____	_____	_____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

APPENDIX H-11

SITE II-11 (C915198K)

Appendix H-11
Site Management Plan

Tecumseh Phase II Business Park
NYSDEC Site No. C915198K (II-11)
Lackawanna, New York

December 2023

Prepared for:

Renaissance 6, LLC
100 Corporate Pkwy, Suite 500
Amherst, NY 14226

Prepared by:

Roux Environmental Engineering and Geology, D.P.C.
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0599

B0684-022-001/R

Environmental Consulting
& Management
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rouxinc.com

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Attachments

A. Sample EC/IC Certification Form

Certification Statement

I, Lori E. Riker, certify that I am currently a NYS registered professional engineer and that this Site Management Plan (SMP) appendix was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

STAMP: 

DATE: 12/4/2023

1. Introduction

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase II Business Park (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMP (Ref. 1) for the Controlled Property was prepared by TurnKey Environmental Restoration, LLC (TurnKey)[1], on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2) and the guidelines provided by NYSDEC. In 2012, the Controlled Property was divided into 12 BCP Sites designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915198L) and the main body of the 2014 SMP includes the site management components common to all Phase II Business Park sites. A subsequent BCA amendment outlined in Section 1.1 created Site II-13 (C915198M). Creation of Site II-14 (C915198N) is pending. Site-specific requirements are included as Appendix H to the SMP. This SMP appendix covers the site-specific requirements for Site II-11 (C915198K) identified on an Erie County Tax map as SBL 141.15-1-7.

1.1 BCA Amendments

The Brownfield Cleanup Agreement (BCA) for the Tecumseh Phase II Business Park (Site No. C915198) was signed by NYSDEC on March 14, 2007. Since that time, the following BCA amendments relating to Site II-11 (C915198K) have been signed by NYSDEC:

- Amendment 1 (8/22/2012) subdivided the Phase II Business Park into 12 BCP Sites designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915199L.
- Amendment 2 (10/2/2017) added the Erie County Industrial Land Development Corporation (ILDC) as an applicant for Site II-11 in advance of its purchase from Tecumseh Redevelopment Inc.
- Amendment 3 (4/18/2018) transitioned the BCP Site II-11 from Generation 1 to Generation 3.
- Amendment 4 (2/14/2019) transferred 1.23 acres of Site II-11 to BCP Site No. C915197L for construction of the Shoreline Trail (pedestrian bike path), reducing the size of Site II-11 to 10.75 acres.
- Amendment 5 (7/10/2022) excluded a 2.46-acre parcel from Site II-11 for use as a public roadway, creating new BCP Site No. C915198M (Site II-13) and reducing the size of Site II-11 to 8.29 acres. This amendment also added The Uniland Partnership of Delaware L.P. (Uniland Partnership) to the BCA and confirmed the Site is part of a revised tax parcel designated as SBL 141.11-1-52.1.
- Amendment 6 (6/23/2023) transferred ownership to The Uniland Partnership of Delaware L.P. by deed on 7/14/22, who in turn deeded the Site to Uniland Ventures, LLC on 12/8/22, who on the same day deeded the Site to Renaissance 6, LLC; and updated the tax parcel number to SBL No. 141.15-1-7.

[1] As of 7/24/23, TurnKey is Roux Environmental Engineering and Geology, D.P.C.

1.2 Site Location and Description

As shown on Figure 2, BCP Site II-11 (approx. 8.29 acres) is bounded by BCP Sites II-10 (C915198J), II-12 (C915198L), and Steelworker's Way (a portion of BCP Site II-13; C915198M) to the west; BCP Site II-8 (C915198H) to the south; the Bethlehem Shoreline Trail (i.e., the pedestrian bike path; BCP Site I-12; C915197L) and Hamburg Turnpike (NYS Route 5) to the east; and BCP Sites II-13 (C915198M) and I-2 (C915197B) to the north. Renaissance 6, LLC redeveloped the Site with a 151,200 square foot, single-story warehouse. Truck deep-docks and at-grade docks were constructed on the west side of the warehouse, accessed by a new public roadway off the Dona Street Extension called Steelworker's Way. The redevelopment includes utility improvements, an on-site storm water management area, and an asphalt parking lot.

The NYSDEC issued the Decision Document for Site II-11 on January 6, 2017 (Ref. 3). The Decision Document specifies, among other requirements, placement of acceptable cover material. Engineering controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during use of the Site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC by Tecumseh for the entire Phase II Business Park was recorded with the Erie County Clerk's office on July 15, 2014 in Liber 11266 of Dees at page 5455 and requires compliance with this SMP and all ECs and institutional controls (ICs) placed on the Site. Appendix A of the 2014 SMP contains the Environmental Easement. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for Site II-11 of the Controlled Property. This Appendix is not to be used as stand-alone documents but as a component document of the January 2014 SMP for the Controlled Property.

1.3 Remedial Investigation

The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan (Ref. 4) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance across all Sites within the Controlled Property. The RI was designed to provide defensible data to identify areas of the Controlled Property potentially requiring remediation, define chemical constituent migration pathways, and qualitatively assess human health and ecological risks to allow for performance of a remedial alternatives analysis.

As shown on Figure 3, investigative activities specific to Site II-11 included the completion of 11 RI test pits in April 2010 (only the eastern portion of test pit BPA 2-TP-58 extends into Site II-11). Six supplemental test pits were completed to delineate the impacts at test pit BPA 2-TP-56 (not determined to be a hotspot) and six supplemental test pits were completed to delineate test pit BPA 2-TP-53 (referred to as Hotspot C). Soil/fill samples were collected as detailed in the Work Plan.

The nature and extent of contamination at the Site is consistent with the former site use as a steel manufacturing facility. Polyaromatic hydrocarbons (PAHs) and arsenic, and to a lesser extent lead (one test pit sample) and polychlorinated biphenyls (PCBs; one test pit sample), concentrations exceeded commercial soil cleanup objectives (CSCOs). Arsenic concentrations exceeded the CSCO of 16 ppm in four test pit samples ranging from 68.7 to 141 ppm. Total PAHs did not exceed the site-specific action level (SSAL) of 500 ppm in any test pit sample. Field evidence of gross petroleum/organic impact was observed in test pit BPA 2-TP-53 and supplemental test pits BPA 2-TP-53D and BPA 2-TP-53E.

No monitoring wells were installed on Site II-11 as part of the RI. Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

The RI/AA Report was submitted to NYSDEC in May 2011, revised, and finalized in March 2012 (Ref. 5). The RI/AA Report recommended remediation of hotspot slag/fill with deferred soil cover system placement during redevelopment as well as ECs and ICs to limit future use of the Controlled Property to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes (see Section 2.0).

1.4 Interim Remedial Measures

The remediation of Site II-11 included two interim remedial measures (IRMs) to expedite remedial activities and facilitate redevelopment.

1.4.1 Metal-Impacted Hotspot Areas

In July 2013, Tecumseh submitted to NYSDEC an IRM Work Plan for Business Park Sites II-2, II-3, II-5, and II-11 (Ref. 6) to address metal-impacted hotspot slag/fill. IRM activities were initiated August 1, 2013 in accordance with the NYSDEC-approved IRM Work Plan. The following remedial work performed is documented in the Construction Completion Report (CCR) dated January 2014 (Ref. 7) and shown on Figure 4:

- Hotspot M (Test Pit BPA2-TP-52): Excavation of arsenic-impacted slag/fill proceeded to a depth of 2 feet below ground surface (fbgs) within a footprint of 20 feet by 30 feet to address arsenic above the SSAL of 118 ppm. A total of 43.51 tons of material was disposed off-site.

- Hotspot N (Test Pit BPA2-TP-58): This hotspot was originally on BCP Site II-11 but now falls on BCP Site II-13, which was formed in 2022. Excavation of arsenic-impacted slag/fill proceeded to a depth of 2 fbgs within a footprint of 20 feet by 25 feet. total of 68.38 tons of material was disposed off-site. An elevated concentration of lead (12,300 mg/kg) was detected at test pit BPA2-TP-58 in exceedance of the lead SSAL (3,600 mg/kg) during the RI. Accordingly, the excavation sidewall and bottom samples for Hotspot N were also analyzed for lead. All samples fell below the lead SSAL, and no further excavation work was performed at this location.

Arsenic- and lead-impacted materials were transported by Zoladz Construction to the Chautauqua County Ellery Landfill, a permitted RCRA Subtitle D sanitary landfill facility, on December 5 and 6, 2013. The sides of Hotspot N were gradually sloped and graded to make a smooth transition to the surrounding area. Due to the proximity to the railroad tracks, Hotspot M was backfilled with 30 tons of BUD-approved slag (BUD# 555-9-15) from Iron City.

1.4.2 Organic-Impacted Hotspot Areas

In April 2017, Tecumseh submitted to NYSDEC an IRM Work Plan for Phase II Business Park Sites II-10, II-11, and II-12 (Ref. 8). Site II-11 was remediated between February 9 and May 17, 2017 in accordance with the NYSDEC-approved IRM Work Plan. The following IRM work completed at Hotspot C occurred in conjunction with similar work on adjacent Sites II-10 and II-12 and, as such, was documented in the Department-approved August 2017 Final Engineering Report (FER) for those sites (Ref. 10): and is shown on Figure 4:

- **Excavations:** Hotspot C (Test Pit BPA2-TP-53) was excavated during the IRM due to petroleum-like odor and floating product/sheen on the water surface at approximately 5 fbgs. Approximately 360 cubic yards of petroleum-impacted slag/fill was excavated over a 3-foot interval from 3.5-6.5 fbgs

within a 70-foot x 30-foot area. The excavated material was transported to the biotreatment pad constructed on Site II-9.

- **On-Site Biotreatment:** Petroleum-impacted slag/fill designated for biotreatment was transported to a 250-foot by 250-foot biotreatment pad using front end loaders and a tandem dump truck. The impacted materials were spread across the pad to an average thickness of 1.5 to 2 feet. Slag/fill determined by visual and olfactory observation to be adequately treated remained on the biotreatment pad until analytical results confirmed slag/fill met SSALs, including CSCOs for petroleum VOCs and less than 500 mg/kg total PAHs. Following biotreatment, the material was used as backfill to bring Business Park excavations up to grade. Since all soil/fill was biotreated, off-site disposal was not required.

- **Backfill:** Following replacement of clean overburden materials, the sidewalls of the excavation were gradually sloped.

1.5 Summary of Remedial Actions

The final remedial measures for Site II-11 involved placement of the cover system during redevelopment in accordance with the NYSDEC-approved May 2023 Remedial Action Work Plan (RAWP; Ref. 11). The remedial work is documented in the FER (Ref. 9). The Site cover system is comprised of a minimum of 12 inches of clean soil, as well as asphalt pavement, concrete-covered sidewalks, concrete building slab, and stone and rip rap for the infiltration/detention pond. Figure 5 shows the location of each cover type on the Site.

1.6 Remaining Contamination

The remedial work conducted on Site II-11 has removed all known “source area” (i.e., metal- and petroleum/organic-impacted) slag/fill. The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 USCOs for several ubiquitous constituents; specifically, PAHs and inorganic compounds (i.e., arsenic, chromium, lead, and mercury). Other constituents remaining above USCOs in select areas of the Site include PCB Aroclor 1254 (one test pit) and inorganic compounds (i.e., cadmium, copper, manganese, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the USCO criteria; therefore, it is assumed that the entire 8.29-acre Site is impacted above the USCOs to the approximate native soil depth of 12 fbgs. Table 1 summarizes the sample locations remaining above USCOs.

Following grading of Site II-11, a demarcation was constructed and placed to easily identify the existing Site sub-grade from the cover system material and prevent the potential for inadvertent removal of sub-grade material during future intrusive work. The demarcation layer is comprised of an orange ¾-inch plastic industrial netting material was rolled across the sub-grade and overlapped by approximately one foot at the seams.

Groundwater was not sampled on Site II-11 as no monitoring wells or piezometers were installed; however, groundwater on neighboring sites was found to be generally free of impact that would necessitate remedial measures. Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

2. Engineering & Institutional Control Plan

2.1 Introduction

Since remaining contaminated soil/fill and groundwater exists beneath the Phase II Business Park, EC and ICs are required to protect public health and the environment. The EC/IC Plan in the January 2014 SMP describes the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to Site II-11 are described below.

2.2 Engineering Control Systems

The cover system for Site II-11 consists of 12 inches of clean soil, as well as asphalt pavement, concrete-covered sidewalks, a concrete building slab, and stone and rip rap for the infiltration/detention pond. Figure 5 shows the approximate locations and types of cover system materials placed on Site II-11. In the event these cover systems are breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the 2014 SMP and Section 4.0 of the Excavation Work Plan (2014 SMP Appendix B).

Should a building foundation or building slab be removed in the future, a cover system consistent with that described below will be placed in any areas where the upper one foot of exposed surface soil exceeds the CSCOs:

- The Site cover may consist of paved parking areas, sidewalks, soil cover, or other Department approved cover. Where soil cover is required, it will be a minimum of one foot of soil with the upper six inches of soil of sufficient quality to maintain a vegetative layer. All cover will be placed over a demarcation layer. Any cover material, including any fill material brought to the Site, must meet the SCOs for cover material as set forth in 6NYCRR Part 375-6.7(d).

2.3 Institutional Controls

The ICs described in Section 2.3 of the 2014 SMP (i.e., Environmental Easement and Excavation Work Plan) must be implemented for Site II-11. There are no Site-specific IC requirements for Site II-11.

2.4 Inspections and Notifications

The annual inspections and notifications described in Section 2.4 of the 2014 SMP must be implemented for Site II-11. Specifically, a comprehensive inspection of the Site will be conducted annually regardless of the frequency of the Periodic Review Report (PRR). If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the affected area of the Controlled Property will be conducted by a Qualified Environmental Professional (QEP) as defined in NYSDEC DER-10 within five days of the event to verify the effectiveness of the EC/ICs implemented. There are no Site-specific inspection and notification requirements for Site II-11.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (2014 SMP Appendix C). The following emergency contact numbers are specific to Site II-11:

Table 2: Emergency Contact Numbers

Name: Jeff Benderson Title: Project Manager Company: Uniland Construction	Work: (716) 834-5000 Mobile: (716) 242-9255
Name: Thomas H. Forbes, P.E. Title: Principal Engineer Company: Roux Environmental Engineering and Geology, D.P.C.	Work: (716) 856-0599 Mobile: (716) 864-1730

Note: Contact numbers subject to change and should be updated as necessary.

3. Site Monitoring Plan

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The soil cover system; and
- All affected Site media.

Monitoring of the cover system is described in Section 3.2 of the January 2014 SMP. No additional site-specific monitoring is required.

4. Operation & Maintenance Plan

The remedy for Site II-11 does not rely on any mechanical systems, such as sub-slab depressurization or soil vapor extraction, to protect public health and the environment. Therefore, a Site-specific Operation and Maintenance Plan is not required.

5. Inspections, Reporting & Certifications

All inspection, reporting, and certification requirement are described in Section 5.0 of the January 2014 SMP. Attachment A includes a sample EC/IC Certification Form to be completed for Site II-11.

6. References

1. TurnKey Environmental Restoration, LLC. *Site Management Plan for BCP Tecumseh Phase II Business Park, NYSDEC Site No. C915198 through C915198L, Lackawanna, New York.* January 2014.

2. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation*. May 3, 2010.

3. New York State Department of Environmental Conservations. *Decision Document, Site II-11 Tecumseh Phase II Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915198K*. January 2017.

4. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan, Phase II Business Park Area, Lackawanna, New York*. July 2009.

5. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis (RI/AA) Report for Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York*. Revised March 2012.

6. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Phase II Business Park, Sub-parcels II-2, II-3, II-5 and II-11, Lackawanna, New York, BCP Site Nos. C915198B, C915198C, C915198E and C915198K*. July 2013.

7. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Construction Completion Report, Metal-Impacted Hotspots, Business Park Sub-parcels II-2, II-3, II-5 & II-11, Lackawanna, New York, BCP Sites C915198B, C915198C, C915198E & C915198K*. January 2014.

8. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Phase II Business Park, Sites II-10, II-11 and II-12, BCP Site Nos. C915198J, C915198K & C915198L, Lackawanna, New York*. February 2017, revised April 2017.

9. Roux Environmental Engineering and Geology, D.P.C. *Final Engineering Report, Site II-11 (BCP Site No. C915198K), Tecumseh Phase II Business Park, Lackawanna, New York*. November 2023.

10. Benchmark Environmental Engineering & Science, PLLC in association with TurnKey Environmental Restoration, LLC. *Final Engineering Report, Tecumseh Business Park II, Sub-Parcels II-10 and II-12, Lackawanna, New York*. August 2017.

11. Benchmark Civil/Environmental Engineering & Geology, PLLC. *Remedial Action Work Plan, Site II-11 (BCP Site No. C915198K), Tecumseh Phase II Business Park, Lackawanna, New York.* February 2023, revised May 2023.

TABLES

1. Summary of Remaining Soil/Fill Contamination Above USCOs
2. Emergency Contact Numbers (Section 2.5)

TABLE 1

SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE USCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-11
Renaissance 6, LLC
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type							Unrestricted SCO (mg/kg)
	TP-48	Blind 2	TP-49	TP-50	TP-52	TP-53	TP-55	
	0.0 - 2.0	(TP-48)	0.0 - 7.0	0.0 - 2.0	0.0 - 2.0	4.0 - 6.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg								
Acetone	ND	ND	--	--	--	0.11 J	--	**0.05**
Benzene	ND	ND	--	--	--	ND	ND	**0.06**
2-Butanone	ND	ND	--	--	--	0.016 J	--	**--**
Chlorobenzene	ND	ND	--	--	--	ND	--	**1.1**
Chlorohexane	ND	ND	--	--	--	ND	--	**--**
Cyclohexane	ND	ND	--	--	--	ND	--	**--**
1,2-Dichlorobenzene	ND	ND	--	--	--	ND	--	**1.1**
1,3-Dichlorobenzene	ND	ND	--	--	--	ND	--	**2.4**
1,4-Dichlorobenzene	ND	ND	--	--	--	ND	--	**1.8**
Ethylbenzene	ND	ND	--	--	--	ND	ND	**1**
n-Butylbenzene	ND	ND	--	--	--	ND	0.0071 J	**12**
sec-Butylbenzene	ND	ND	--	--	--	ND	ND	**11**
Isopropylbenzene	ND	ND	--	--	--	ND	ND	**--**
p-Cymene	ND	ND	--	--	--	ND	ND	**--**
n-Propylbenzene	ND	ND	--	--	--	ND	ND	**3.9**
Toluene	ND	ND	--	2.0	--	ND	0.011	**0.7**
1,2,4-Trichlorobenzene	ND	ND	--	--	--	ND	--	**--**
1,2,4-Trimethylbenzene	ND	ND	--	--	--	0.016 J	0.012	**3.6**
1,3,5-Trimethylbenzene	ND	ND	--	--	--	ND	ND	**8.4**
o-Xylene	ND	ND	--	--	--	ND	0.011	**0.26**
m-Xylene	ND	ND	--	--	--	ND	--	**0.26**
Xylenes, Total	ND	ND	--	--	--	ND	0.026	**--**
Naphthalene	--	--	--	--	--	ND	0.087 B	**--**
Methylcyclohexane	ND	ND	--	--	--	ND	--	**--**
Methyl tert butyl ether	ND	ND	--	--	--	ND	ND	**0.93**
Methylene Chloride	ND	0.0045 J	--	--	--	0.018 J	--	**0.05**
TOTAL VOCs (mg/kg)	*0*	*0.0045*	*0*	*2.0*	*0*	*0.16*	*0.128*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg								
Acenaphthene	ND	ND	ND	ND	ND	17 TDJ	ND	**20**
Acenaphthylene	ND	ND	ND	2.3 DJ	0.72 DJ	4.2 TDJ	0.48 DJ	**100**
Acetophenone	ND	ND	ND	ND	ND	ND	ND	**--**
Anthracene	ND	ND	ND	0.79 DJ	0.55 DJ	23 TDJ	0.56 DJ	**100**
Benzo(a)anthracene	0.52 DJ	0.38 DJ	0.15 DJ	**5.4 DJ**	**2 DJ**	**30 TDJ**	**1.9 DJ**	**1**
Benzo(b)fluoranthene	0.89 DJ	0.64 DJ	0.17 DJ	**11 D**	**3.9 D**	**20 TDJ**	**3.3 DJ**	**1**
Benzo(k)fluoranthene	0.29 DJ	0.19 DJ	ND	**3.2 DJ**	**1.8 DJ**	**12 TDJ**	**1.7 DJ**	**0.8**
Benzo(g,h,i)perylene	1.1 DJ	0.44 DJ	ND	7.6 DJ	2.7 DJ	11 TDJ	3.2 DJ	**100**
Benzo(a)pyrene	0.65 DJ	0.42 DJ	ND	**7.9 DJ**	**2.9 DJ**	**17 TDJ**	**2.9 DJ**	**1**
Bis(2-ethylhexyl) phthalate	ND	ND	ND	ND	ND	ND	ND	**1**
Biphenyl	ND	ND	ND	ND	ND	ND	ND	**0.33**
Carbazole	ND	ND	--	--	--	**8.1 TDJ**	--	**7**
Chrysene	0.53 DJ	0.38 DJ	0.17 DJ	**6.7 DJ**	**2.2 DJ**	**29 TDJ**	**2.3 DJ**	**1**
Dibenzo(a,h)anthracene	ND	ND	ND	**2.1 DJ**	**0.69 DJ**	ND	**0.67 DJ**	**0.33**
Dibenzofuran	ND	ND	ND	ND	ND	13 TDJ	ND	**--**
Fluoranthene	0.68 DJ	0.49 DJ	0.25 DJ	10 DJ	1.8 DJ	64 TDJ	3.3 DJ	**100**
Fluorene	ND	ND	ND	ND	ND	21 TDJ	ND	**30**
Indeno(1,2,3-cd)pyrene	**0.8 DJ**	0.37 DJ	ND	**6.5 DJ**	**2.2 DJ**	**10 TDJ**	**2.5 DJ**	**0.5**
2-Methylnaphthalene	ND	ND	ND	ND	ND	7.3 TDJ	ND	**--**
Naphthalene	ND	ND	ND	ND	ND	**23 TDJ**	ND	**12**
Phenanthrene	0.31 DJ	0.23 DJ	0.26 DJ	3.3 DJ	0.57 DJ	91 TDJ	1.4 DJ	**100**
Pyrene	0.58 DJ	0.42 DJ	0.24 DJ	7.7 DJ	2 DJ	49 TDJ	2.6 DJ	**100**
TOTAL SVOCs (mg/kg)	*6.35*	*3.96*	*1.24*	*74.5*	*24.0*	*450*	*26.8*	--
Polychlorinated Biphenyls (PCBs) - mg/kg								
Aroclor 1242	ND	ND	--	--	--	ND	--	**--**
Aroclor 1248	ND	ND	--	--	--	ND	--	**--**
Aroclor 1254	24 QSU,D,J	3.8 QSU,J	--	--	--	ND	--	**--**
Aroclor 1260	ND	ND	--	--	--	ND	--	**--**
TOTAL PCBs (mg/kg)	***24***	***3.8***	--	--	--	*0*	--	***0.1***
Inorganic Compounds - mg/kg								
Aluminum	15300	16900	--	--	--	--	--	**--**
Antimony	ND J	ND J	--	--	--	--	--	**--**
Arsenic, Total	**74.8**	**76.9**	4.4	**14.3**	**141**	--	**68.7**	**13**
Barium, Total	192 J	196 J	134	173	93.3	--	84.3	**350**
Beryllium	1.94	2.12	--	--	--	--	--	**7.2**
Cadmium, Total	0.861	1.28	0.619	**3.42**	**3.18**	--	**2.77**	**2.5**
Calcium	64600	71300	--	--	--	--	--	**--**
Chromium, Total	**31.7 J**	**71.8 J**	**10.2**	**36.1**	**321 J**	--	**246**	**1**
Cobalt	8.55 J	5.1 J	--	--	--	--	--	**--**
Copper	**220**	**162**	--	--	--	--	--	**50**
Iron	69700 D	57700	--	--	--	--	--	**--**
Lead, Total	**383**	**387**	44.2	**515**	**456**	--	**275**	**63**
Magnesium	5450 J	7240 J	--	--	--	--	--	**--**
Manganese	**2030**	**7240 J**	--	--	--	--	--	**1600**
Mercury, Total	0.0505	0.0709	0.0517	**0.185**	0.138	--	0.0968	**0.18**
Nickel	17.6 J	18.3 J	--	--	--	--	--	**30**
Potassium	1270 J	1160 J	--	--	--	--	--	**--**
Selenium	ND J	ND J	--	--	--	--	--	**3.9**
Silver	ND	ND	--	--	--	--	--	**2**
Sodium	289 J	318 J	--	--	--	--	--	**--**
Vanadium	26.4	38.7	--	--	--	--	--	**--**
Zinc	**399**	**473**	--	--	--	--	--	**109**
Cyanide, Total	1.4	1.5 J	--	5.7	ND J	--	1.5	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

B = Analyte was detected in associated Method Blank.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
QSU = Sulfur (EPA 3660) clean-up performed on extract.
T = Sample had an adjusted final volume during extraction due to extract matrix and / or viscosity.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or imprecise.
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD	= Value exceeds Part 375 Unrestricted Use Soil Cleanup Objectives.
	= Removed during hotspot excavation

TABLE 1

SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE USCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-11
Renaissance 6, LLC
Lackawanna, New York

Parameter [1]	Sample Location, Depth Interval (fbgs), and Type				Unrestricted SCO [2] (mg/kg)
	TP-56	TP-58	Blind 4	TP-65	
	4.0 - 6.0	0.0 - 2.0	(TP-58)	2.0 - 4.0	
Volatile Organic Compounds (VOCs) - mg/kg					
Acetone	--	--	--	--	**0.05**
Benzene	--	ND	ND	--	**0.06**
2-Butanone	--	--	--	--	**--**
Chlorobenzene	--	--	--	--	**1.1**
Chlorohexane	--	--	--	--	**--**
Cyclohexane	--	--	--	--	**--**
1,2-Dichlorobenzene	--	--	--	--	**1.1**
1,3-Dichlorobenzene	--	--	--	--	**2.4**
1,4-Dichlorobenzene	--	--	--	--	**1.8**
Ethylbenzene	--	ND	ND	--	**1**
n-Butylbenzene	--	0.024	0.017	--	**12**
sec-Butylbenzene	--	0.01 J	0.0079 J	--	**11**
Isopropylbenzene	--	ND	ND	--	**--**
p-Cymene	--	ND	ND	--	**--**
n-Propylbenzene	--	ND	ND	--	**3.9**
Toluene	--	0.027 B	0.026 B	--	**0.7**
1,2,4-Trichlorobenzene	--	--	--	--	**--**
1,2,4-Trimethylbenzene	--	0.041	0.037	--	**3.6**
1,3,5-Trimethylbenzene	--	0.012	0.011 J	--	**8.4**
o-Xylene	--	0.051	0.036	--	**0.26**
m-Xylene	--	--	--	--	**0.26**
Xylenes, Total	--	0.099	0.081	--	**--**
Naphthalene	--	0.097 B	0.11 B	--	**--**
Methylcyclohexane	--	--	--	--	**--**
Methyl tert butyl ether	--	ND	ND	--	**0.93**
Methylene Chloride	--	--	--	--	**0.05**
TOTAL VOCs (mg/kg)	--	*0.262*	*0.245*	--	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg					
Acenaphthene	ND	ND	ND	ND	**20**
Acenaphthylene	ND	0.17 DJ	ND	ND	**100**
Acetophenone	ND	ND	ND	ND	**--**
Anthracene	2.3 DJ	0.31 DJ	ND	ND	**100**
Benzo(a)anthracene	**7.8 DJ**	**1.6 DJ**	0.83 DJ	0.23 DJ	**1**
Benzo(b)fluoranthene	**9.3 DJ**	**2.6 DJ**	0.87 DJ	ND	**1**
Benzo(k)fluoranthene	**4.6 DJ**	ND	0.53 DJ	ND	**0.8**
Benzo(g,h,i)perylene	6.3 DJ	1.3 DJ	0.74 DJ	ND	**100**
Benzo(a)pyrene	**7.9 DJ**	**1.6 DJ**	0.83 DJ	ND	**1**
Bis(2-ethylhexyl) phthalate	ND	ND	ND	ND	**1**
Biphenyl	ND	ND	ND	ND	**0.33**
Carbazole	--	--	--	--	**7**
Chrysene	**8.6 DJ**	**1.5 DJ**	0.82 DJ	ND	**1**
Dibenzo(a,h)anthracene	**1.8 DJ**	**0.4 DJ**	0.16 DJ	ND	**0.33**
Dibenzofuran	ND	ND	ND	ND	**--**
Fluoranthene	18 D	2.9 DJ	1.4 DJ	ND	**100**
Fluorene	0.91 DJ	ND	ND	ND	**30**
Indeno(1,2,3-cd)pyrene	**5.5 DJ**	1.1 DJ	0.58 DJ	ND	**0.5**
2-Methylnaphthalene	ND	ND	ND	ND	**--**
Naphthalene	ND	ND	ND	ND	**12**
Phenanthrene	8.5 DJ	1.6 DJ	0.67 DJ	ND	**100**
Pyrene	13 DJ	2.4 DJ	1.2 DJ	ND	**100**
TOTAL SVOCs (mg/kg)	*94.5*	*17.5*	*8.63*	*0.23*	--
Polychlorinated Biphenyls (PCBs) - mg/kg					
Aroclor 1242	ND	--	--	--	**--**
Aroclor 1248	ND	--	--	--	**--**
Aroclor 1254	ND	--	--	--	**--**
Aroclor 1260	ND	--	--	--	**--**
TOTAL PCBs (mg/kg)	*0*	--	--	--	***0.1***
Inorganic Compounds - mg/kg					
Aluminum	--	--	--	--	**--**
Antimony	--	--	--	--	**--**
Arsenic, Total	**14.1**	**122 J**	**57 J**	6.2	**13**
Barium, Total	102	**118**	177	159	**350**
Beryllium	--	--	--	--	**7.2**
Cadmium, Total	0.82	0.973	1.14	ND	**2.5**
Calcium	--	--	--	--	**--**
Chromium, Total	**16.7**	**24.3 J**	**41.6 J**	**23.4 J**	**1**
Cobalt	--	--	--	--	**--**
Copper	--	--	--	--	**50**
Iron	--	--	--	--	**--**
Lead, Total	**575**	**12300 DJ**	**216 J**	**68.4**	**63**
Magnesium	--	--	--	--	**--**
Manganese	--	--	--	--	**1600**
Mercury, Total	**0.414**	**0.269 J**	**0.541 J**	0.148	**0.18**
Nickel	--	--	--	--	**30**
Potassium	--	--	--	--	**--**
Selenium	--	--	--	--	**3.9**
Silver	--	--	--	--	**2**
Sodium	--	--	--	--	**--**
Vanadium	--	--	--	--	**--**
Zinc	--	--	--	--	**109**
Cyanide, Total	--	ND	ND J	--	**27**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds wer
2. SCO = Soil Cleanup Objective (Protection of Public Health - Commercial), per NYSDEC 6NYCRR Part 375-6.8(b), Final D

Definitions:

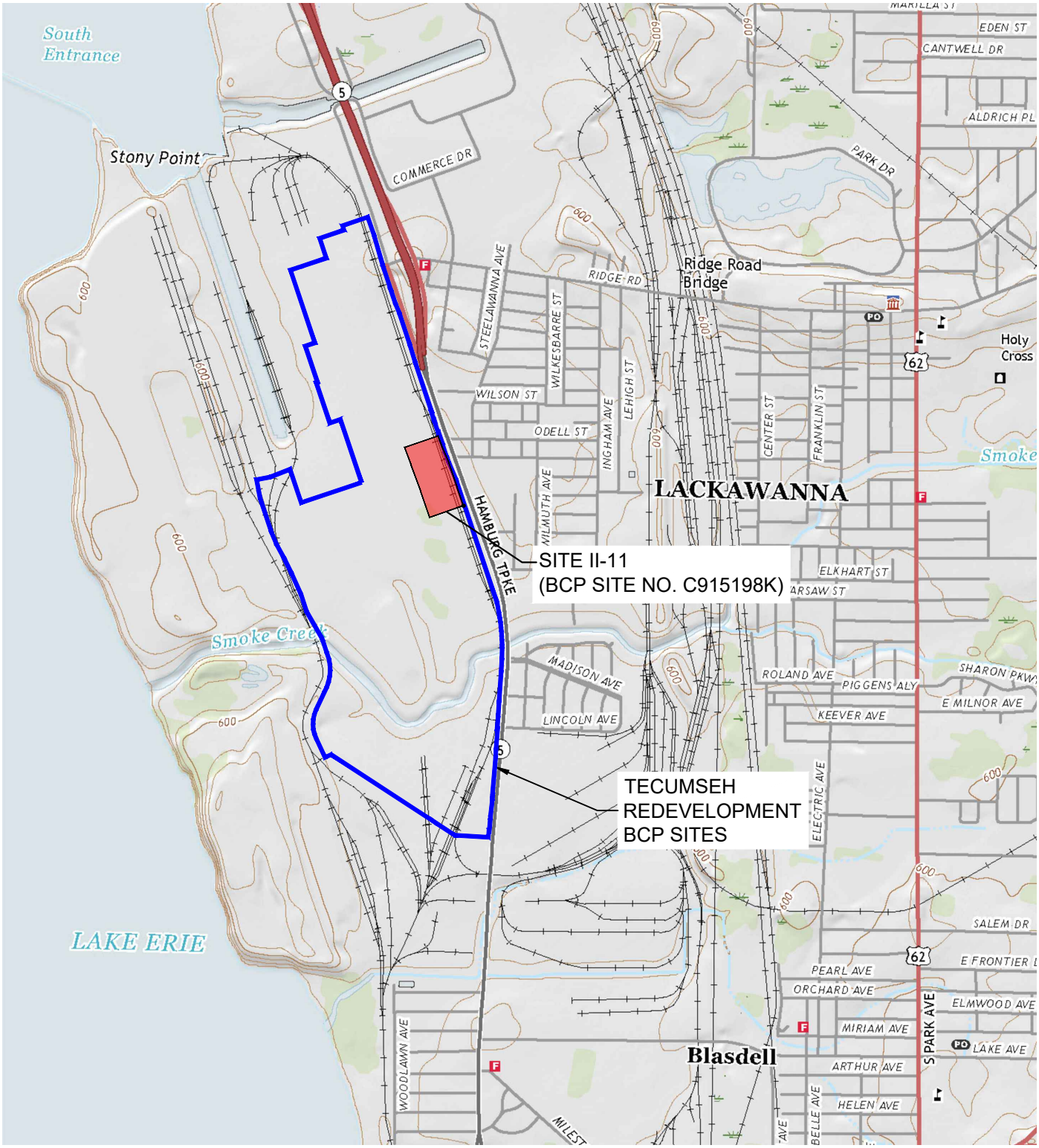
B = Analyte was detected in associated Method Blank.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
T = Sample had an adjusted final volume during extraction due to extract matrix and / or viscosity.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or impr
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

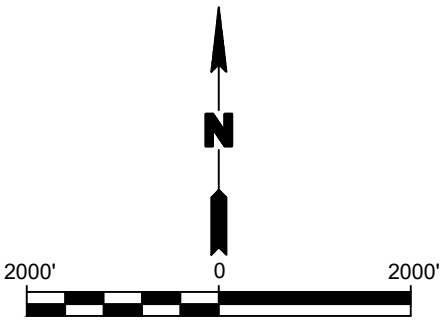
BOLD	= Value exceeds Part 375 Unrestricted Use Soil Cleanup Objectives.
	= Removed during hotspot excavation

FIGURES

1. Site Location and Vicinity Map
2. Site Delineation Map
3. Test Pit Locations on Site II-11
4. Completed Remedial Measures
5. Locations and Types of Cover System Materials







Title:

SITE LOCATION AND VICINITY MAP

SITE II-11 (BCP SITE NO. C915198K)
2 STEELWORKERS WAY
LACKAWANNA, NEW YORK

SITE MANAGEMENT PLAN - APPENDIX H-11

Prepared for:

RENAISSANCE 6, LLC

ROUX

Compiled by: CMS	Date: NOVEMBER 2023	FIGURE
Prepared by: CMS	Scale: AS SHOWN	1
Project Mgr: THF	Project: B0564-022-011	
File: FIGURE 1; SITE LOCATION AND VICINITY MAP-ROUX.DWG		

F:\CAD\BENCHMARK\UNILAND DEVELOPMENT COMPANY\11 DONA STREET (2 STEELWORKERS WAY)\SMP\FIGURE 1; SITE LOCATION AND VICINITY MAP-ROUX.DWG

TOWN OF HAMBURG
CITY OF LACKAWANNA

SMOKES CREEK

TECUMSEH PHASE III BUSINESS PARK

ZONE 1
(WITHIN HAMBURG)
± 79.53 ACRES

III-3
BCP SITE NO.
C915199C
(± 10.36 ACRES)

III-4
BCP SITE NO. C915199D
(± 16.19 ACRES)

III-2
BCP SITE NO. C915199B
(± 10.24 ACRES)

III-1
BCP SITE NO. C915199
(± 14.62 ACRES)

SOUTH BUFFALO
RAILROAD COMPANY

III-6
BCP SITE NO. C915199F
(± 10.89 ACRES)

III-5
BCP SITE NO. C915199E
(± 11.69 ACRES)

WELDED TUBE USA
(BCP SITE NOs. C915199G & C915199H)
(± 45.15 AC)

III-10
BCP SITE NO. C915199J
(± 17.24 ACRES)

III-9
BCP SITE NO. C915199I
(± 13.97 ACRES)

GATEWAY METROPORT SHIP CANAL

CITY OF LACKAWANNA
CITY OF BUFFALO

BUSINESS PARK IA

CURRENT SUGAR REFINERY & OFFICES

NEW RAW SUGAR STORAGE BUILDING

IA
BCP SITE NO. C915218
(± 12.31 ACRES)

I-1
BCP SITE NO. C915197
(± 5.57 ACRES)

I-2
BCP SITE NO. C915197B
(± 5.48 ACRES)

I-3
BCP SITE NO. C915197C
(± 7.63 ACRES)

I-4
BCP SITE NO. C915197D
(± 9.43 ACRES)

I-5
BCP SITE NO. C915197E
(± 10.05 ACRES)

I-6
BCP SITE NO. C915197F
(± 9.01 ACRES)

I-7
BCP SITE NO. C915197G
(± 10.03 ACRES)

I-8
BCP SITE NO. C915197H
(± 9.28 ACRES)

I-9
BCP SITE NO. C915197I
(± 10.03 ACRES)

I-10
BCP SITE NO. C915197J
(± 9.98 ACRES)

I-11
BCP SITE NO. C915197K
(± 11.59 ACRES)

I-12
BCP SITE NO. C915197L
(± 6.69 ACRES)

II-13
BCP SITE NO. C915198M
(± 1.91 ACRES)

TECUMSEH PHASE I BUSINESS PARK

II-12
BCP SITE NO. C915198L
(± 12.02 ACRES)

II-11
BCP SITE NO. C915198K
(± 8.29 ACRES)

II-10
BCP SITE NO. C915198J
(± 15.78 ACRES)

II-9
BCP SITE NO. C915198I
(± 9.91 ACRES)

II-8
BCP SITE NO. C915198H
(± 8.36 ACRES)

II-7
BCP SITE NO. C915198G
(± 14.3 ACRES)

II-6
BCP SITE NO. C915198F
(± 11.50 ACRES)

II-5
BCP SITE NO. C915198E
(± 6.75 ACRES)

II-4
ST. LINDE
BCP SITE NO. C915198D
(± 7.0 ACRES)

II-3
BCP SITE NO. C915198C
(± 23.40 ACRES)

II-2
BCP SITE NO. C915198B
(± 9.43 ACRES)

II-1
BCP SITE NO. C915198
(± 14.35 ACRES)

SMOKES CREEK

TECUMSEH PHASE II BUSINESS PARK

JFFALO
ECIALTY
STEEL

BLASDELL CREEK

GINEERED

GREAT LAKES INDUSTRIAL

LEGEND:

SITE II-11

EXISTING BUILDING / STRUCTURE

TECUMSEH PHASE II BUSINESS PARK ORIGINAL SITES BOUNDARIES

N

700' 0 700'

Title:

SITE DELINEATION MAP
SITE II-11 (BCP SITE NO. C915198K)
2 STEELWORKERS WAY
LACKAWANNA, NEW YORK

SITE MANAGEMENT PLAN - APPENDIX H-11

Prepared for:

RENAISSANCE 6, LLC

ROUX

Compiled by: CMS	Date: NOVEMBER 2023	FIGURE
Prepared by: CMS	Scale: AS SHOWN	2
Project Mgr: THF	Project: B0564-022-011	
File: FIGURE 2; SITE DELINEATION MAP-ROUX_REV1.DWG		

F:\CAD\BENCHMARK\UNILAND DEVELOPMENT COMPANY\111 DONA STREET (2 STEELWORKERS WAY)\SMP\FIGURE 2; SITE DELINEATION MAP-ROUX_REV1.DWG

II-10
BCP SITE NO. C915198J
(± 15.78 ACRES)

II-13
BCP SITE NO. C915197M
(± 1.91 ACRES)

II-12
BCP SITE NO. C915198L
(± 12.02 ACRES)

II-8
BCP SITE NO. C915198H
(± 8.36 ACRES)

II-11
BCP SITE NO. C915198K
(± 8.29 ACRES)

BIKE PATH I-12
BCP SITE NO. C915197L (± 6.69 ACRES)

BPA 2-TP-56A
BPA 2-TP-56B
BPA 2-TP-56
BPA 2-TP-56D
BPA 2-TP-56F
BPA 2-TP-56C
BPA 2-TP-59
BPA 2-TP-58
BPA 2-TP-95
BPA 2-TP-62
BPA 2-TP-60
BPA 2-TP-65
BPA 2-TP-54
BPA 2-TP-55
BPA 2-TP-48
BPA 2-TP-49
BPA 2-TP-50
BPA 2-TP-51
BPA 2-TP-52
BPA 2-TP-53A
BPA 2-TP-53
BPA 2-TP-53E
BPA 2-TP-53F
BPA -TP-53C
BPA 2-TP-53D
BPA 2-TP-53B

6-INCH MEDIUM PRESSURE GAS MAIN
15' EASEMENT (UNDERGROUND)

NATURAL GAS LINE
AND EASEMENT AREA

HAMBURG TPKE. - SR 5

TECUMSEH PHASE I BUSINESS PARK

LEGEND:

- EXISTING BUILDING / STRUCTURE
- BCP SITE II-11 BOUNDARY
- ORIGINAL BCP SITES BOUNDARIES
- BIKE PATH ROW
- UNDERGROUND NATURAL GAS LINE
- RAILROAD TRACK
- BPA 2-TP-55 — PHASE II BPA TEST PIT
- BPA 2-TP-53B — SUPPLEMENTAL PHASE II BPA TEST PIT (LOGS NOT CREATED)

100' 0 100'

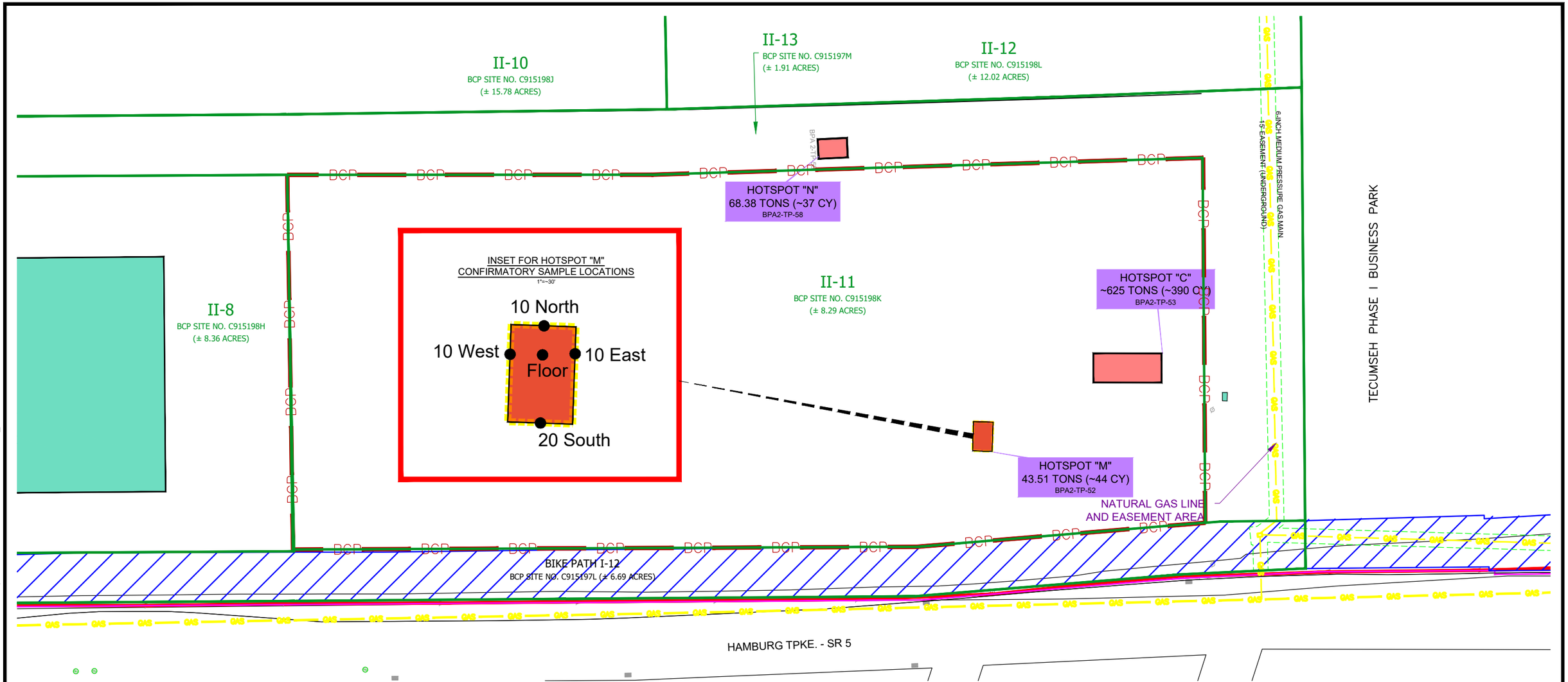
Title:
TEST PIT LOCATIONS SITE II-11
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198K
LACKAWANNA, NEW YORK
SITE MANAGMEMENT PLAN - APPENDIX H-11

Prepared for:
RENAISSANCE 6, LLC

ROUX

Compiled by: CMS	Date: NOVEMBER 2023	FIGURE
Prepared by: CMS	Scale: AS SHOWN	3
Project Mgr: LER	Project: 0564-022-011	
File: FIGURE 3; TEST PITS ON II-11-ROUX_REV.DWG		

F:\CAD\BENCHMARK\UNILAND DEVELOPMENT COMPANY\111 DONA STREET (2 STEELWORKERS WAY)\SMP\FIGURE 3; TEST PITS ON II-11-ROUX_REV.DWG



LEGEND:

- EXISTING BUILDING / STRUCTURE
- BCP SITE II-11 BOUNDARY
- ORIGINAL BCP SITES BOUNDARIES
- UNDERGROUND NATURAL GAS LINE
- IMPACTED SOIL/FILL "HOTSPOT" AREA
- 10 North ● POST-EXCAVATION CONFIRMATORY SAMPLE LOCATION
- BIKE PATH ROW

100' 0 100'

Title:
REMEDIAL MEASURES (COMPLETED)
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198K (II-11)
LACKAWANNA, NEW YORK
SITE MANAGEMENT PLAN - APPENDIX H-11

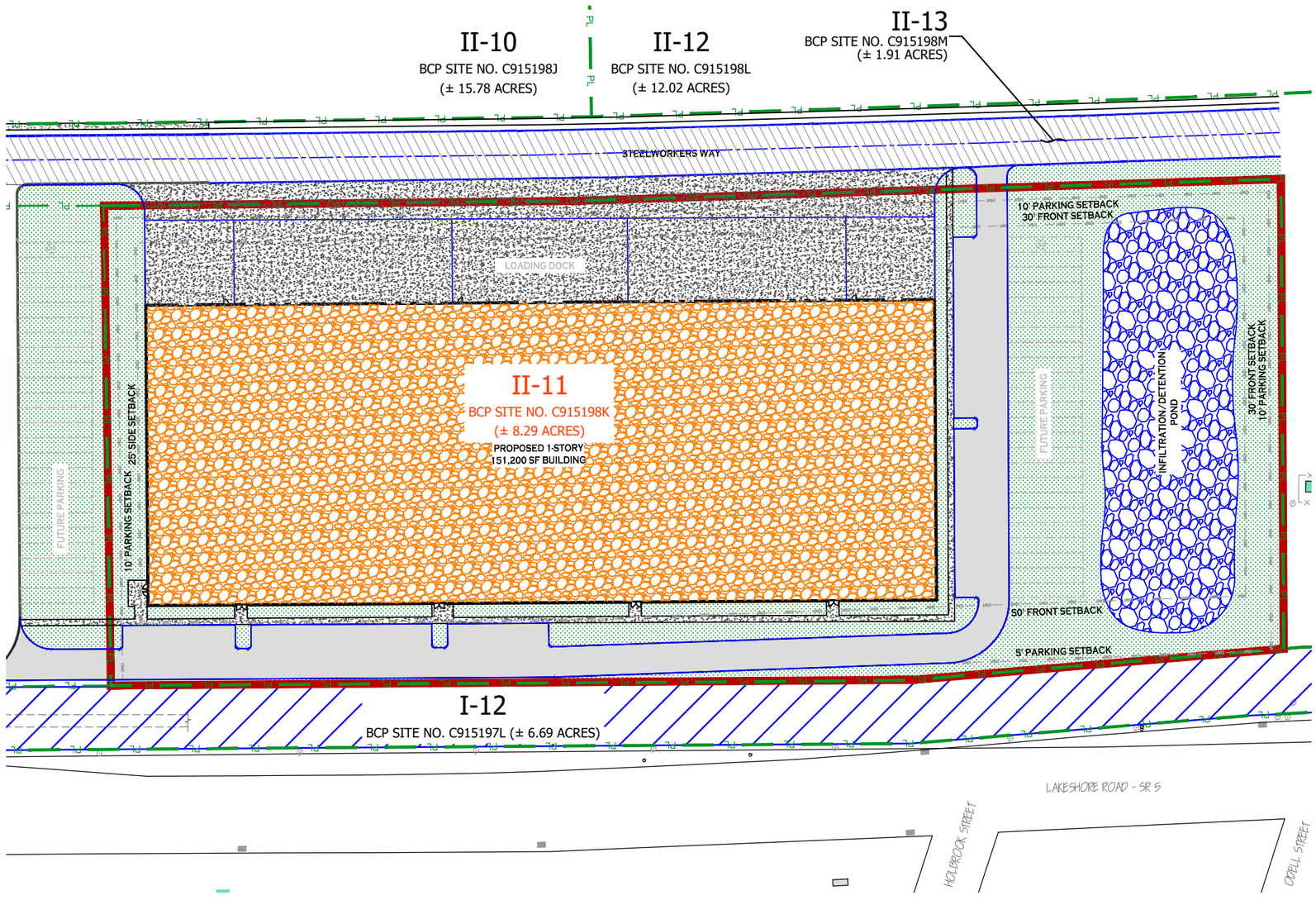
Prepared for:
RENAISSANCE 6, LLC

ROUX

Compiled by: CMS	Date: NOVEMBER 2023
Prepared by: CMS	Scale: AS SHOWN
Project Mgr: LER	Project: 0564-022-011
File: FIGURE 4; IRMS ON II-11-ROUX_REV.DWG	

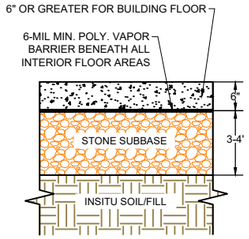
FIGURE 4

F:\CAD\BENCHMARK\UNILAND DEVELOPMENT COMPANY\111 DONA STREET (2 STEELWORKERS WAY)\SMP\FIGURE 4; IRMS ON II-11-ROUX_REV.DWG

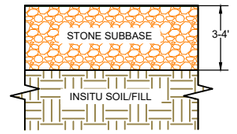


LEGEND:

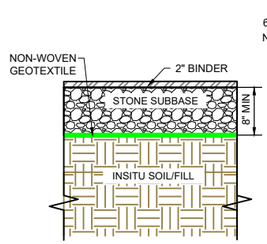
- BCP SITE BOUNDARY (BCP SITE NO. C915198K)
- BCP PARCEL BOUNDARY
- EASEMENT BOUNDARY
- BIKE PATH ROW
- ASPHALT COVER
- INFILTRATION/DETENTION POND COVER
- BUILDING FLOOR COVER (2" CRUSHER RUN)
- CONCRETE COVER
- SOIL COVER
- STEELWORKERS WAY



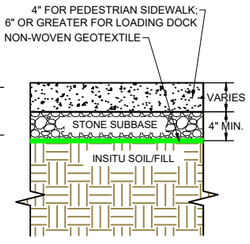
PLANNED BUILDING FLOOR COVER SYSTEM DETAIL
NTS



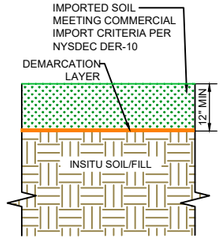
EXISTING BUILDING FLOOR COVER SYSTEM DETAIL
NTS



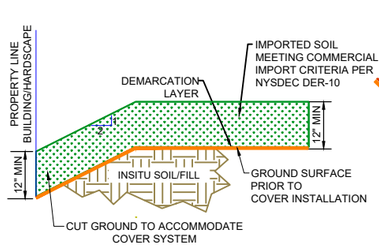
ASPHALT COVER SYSTEM DETAIL
NTS



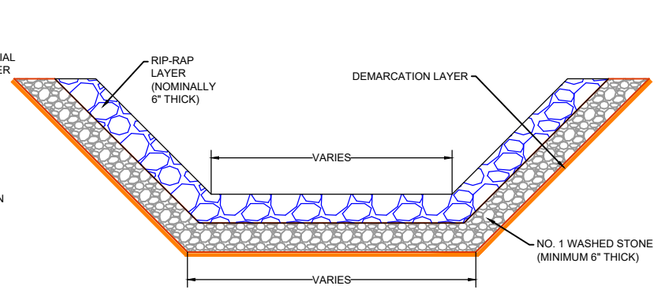
EXTERIOR CONCRETE COVER SYSTEM DETAIL
NTS



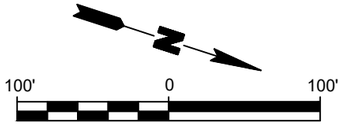
SOIL AREA COVER SYSTEM DETAIL
NTS



TIE-IN DETAIL
NTS



INFILTRATION DETENTION POND CROSS-SECTION
NTS



Title: **LOCATIONS AND TYPES OF COVER SYSTEM MATERIALS**
SITE II-11 (BCP SITE NO. C915198K)
2 STEELWORKERS WAY
LACKAWANNA, NEW YORK
SITE MANAGEMENT PLAN - APPENDIX H-11

Prepared for:
RENAISSANCE 6, LLC

ROUX

Compiled by: CMS	Date: NOVEMBER 2023	FIGURE
Prepared by: CMS	Scale: AS SHOWN	4
Project Mgr: THF	Project: B0564-022-011	
File: FIGURE 5; PLANNED COVER SYSTEM-ROUX_REV2.DWG		

F:\CAD\BENCHMARK\UNILAND DEVELOPMENT COMPANY\111 DONA STREET (2 STEELWORKERS WAY)\SMP\FIGURE 5; PLANNED COVER SYSTEM-ROUX_REV2.DWG

ATTACHMENT A

Sample EC/IC Certification Form

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No.C915198K

Site Name: Site II-11 Tecumseh Phase II Business Park

Site Address: 2 Steelworkers Way Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details **Box 2**

		YES	NO
1.	Are the Site Details above, correct?	☐	☐
	If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4.	Has a change-of-use occurred since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
	If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915198K **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	☐	☐
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	☐	☐
3. Groundwater monitoring as specified in the SMP:	☐	☐
4. Operation and maintenance of the ASD system as specified in the SMP:	☐	☐

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	☐	☐

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915198K

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification Stamp (if Required) Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

"Qualified Environmental Professional" (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer's or a professional geologist's license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

"Qualitative Exposure Assessment" means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

"Remedial Party" means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

"Site Management" (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

"Site Management Plan" (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

"Site Owner" means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

APPENDIX H-12

SITE II-12 (C915198L)

BROWNFIELD CLEANUP PROGRAM

APPENDIX H-12
SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
NYSDEC SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK

August 2017 0071-017-327
Revised December 2020
Revised July 2021

Prepared for:

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Revisions to Addenda of Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	12/8/2020	Removed Site II-10 from appendix	
2	4/29/2021	Addressed NYSDEC comments	7/28/2021
	7/29/2021	Finalized document	

PHASE II BUSINESS PARK
SITE MANAGEMENT PLAN: APPENDIX H-12
SITE II-12

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PHASE II BUSINESS PARK
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1.0 INTRODUCTION

The Site Management Plan (SMP) is a required element of the remedial program at the Tecumseh Redevelopment Inc. (Tecumseh) Phase II Business Park (herein referred to as the Controlled Property; see Figure 1) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The purpose of an SMP is to manage the contamination on a site remaining after remedial action.

The January 2014 SMP (Ref. 1) for the Controlled Property was prepared by TurnKey Environmental Restoration, LLC (TurnKey), on behalf of Tecumseh, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2) and the guidelines provided by NYSDEC. Since the Controlled Property was divided into 12 BCP Sites designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915199L), the main body of the SMP includes the site management components common to all 12 Sites. Site-specific requirements are included as Appendix H to the SMP.

Originally, Site II-10 (C915198J) was included with Site II-12 (C915198L) in Appendix H-10/H-12 (dated August 2017); however, with the purchase of Site II-9 and II-10 by Time Release Properties, LLC (TRP), combining Sites II-9 and II-10 into one appendix was necessary from an operational standpoint. Therefore, Site II-10 was removed from the August 2017 Appendix H-10/H-12 creating this Appendix H-12.

1.1 Site Location and Description

As shown on Figure 2, Site II-12 (approx. 12.02 acres) is bounded by BCP Site III-9 to the west; BCP Site II-10 to the south; BCP Site II-11 to the east; and BCP Sites I-1 and I-2 to the north. The Niagara Wind Substation 11A consists of approximately 0.3 acres of land between Sites II-10 and II-12. An existing natural gas line and easement traverses the property as shown on Figure 3.

The NYSDEC issued the Decision Document for Site II-12 on January 6, 2017 (Ref. 3). The Decision Document specifies, among other requirements, placement of acceptable cover material in areas not otherwise covered by rail lines, etc. Engineering controls (ECs) have been incorporated into the remedy to control exposure to remaining contamination during use of the Site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC by Tecumseh for the entire Phase II

Business Park has been recorded with the Erie County Clerk and requires compliance with this SMP and all ECs and institutional controls (ICs) placed on the Site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

This Appendix addresses the means for implementing the ICs and ECs that are required by the Environmental Easement for Site II-12 of the Controlled Property. This Appendix is not to be used as stand-alone documents but as a component document of the January 2014 SMP for the Controlled Property.

1.2 Remedial Investigation

The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan (Ref. 4) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance across all 12 Sites within the Controlled Property. The RI was designed to provide defensible data to identify areas of the Controlled Property potentially requiring remediation, define chemical constituent migration pathways, and qualitatively assess human health and ecological risks to allow for performance of a remedial alternatives evaluation.

As shown on Figure 3, investigative activities specific to Site II-12 were performed in March/April 2010 and included the completion of 24 RI test pits and four railroad corridor test pits. Four supplemental test pits were completed to delineate Hotspot E (TP-93) and two supplemental test pits were completed to delineate Hotspot F (TP-95); no supplemental test pits were necessary to define Hotspot B. Monitoring well MWN-64A was installed on Site II-12 as part of the RI. Soil and groundwater samples were collected as detailed in the Work Plan.

The nature and extent of contamination at the Site is consistent with the former site use as a steel manufacturing facility. Polyaromatic hydrocarbons (PAHs) and arsenic, and to a lesser extent copper and mercury, concentrations exceeded commercial soil cleanup objectives (SCOs). Arsenic was found in 13 test pit samples at concentrations ranging from 17.3 to 72.7 ppm, which exceeds the commercial SCO of 16 ppm. Total PAHs exceeded the SSAL of 500 ppm in two samples (TP-80 and TP-93), with field evidence of gross petroleum/organic impact observed in test pits TP-93 and TP-95.

Groundwater samples were collected from the on-site monitoring well during the RI (April 2010) and again in February 2016 during a site-wide groundwater sampling event. The

groundwater sampling on Site II-12 indicated there were no exceedances of GWQSs in well MWN-64A for either sampling event. Attachment A includes the monitoring well construction log for MWN-64A. Site groundwater is not used and is restricted from use for either potable or non-potable purposes without treatment by an Environmental Easement.

The RI/AA Report was submitted to NYSDEC in May 2011, revised, and finalized in March 2012 (Ref. 5). The RI/AA Report recommended remediation of hotspot slag/fill with deferred soil cover system placement during redevelopment as well as ECs and ICs to limit future use of the Controlled Property to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes (see Section 2.0).

1.3 Interim Remedial Measures

The remediation of Site II-12 included an Interim Remedial Measure (IRM) to expedite remedial activities and facilitate redevelopment. In April 2017, Tecumseh submitted to NYSDEC an IRM Work Plan for Phase II Business Park Sites II-10, II-11, and II-12 (Ref. 6). Site II-12 was remediated between February 9 and May 17, 2017 in accordance with the NYSDEC-approved IRM Work Plan. The following remedial work performed is documented in the Final Engineering Report (Ref. 7) and shown on Figure 4:

- **Excavations:** Hotspots B, E, and F were excavated during the IRM. Except for Hotspot B, which was associated with shallow PAH impacts, non-impacted overburden slag/fill on Hotspots E and F that exhibited no visual (i.e., sheen product) or olfactory (i.e., nuisance odors) evidence of impact was removed and stockpiled for use as backfill in the excavations following the removal of petroleum/organic-impacted slag/fill. All other excavated materials were transported to the biotreatment pad constructed on Site II-9.
- **On-Site Biotreatment:** Petroleum-impacted slag/fill designated for biotreatment was transported to the pad using front end loaders and a tandem dump truck. The impacted materials were spread across the pad to an average thickness of 1.5 to 2 feet. Slag/fill determined by visual and olfactory observation to be adequately treated remained on the biotreatment pad until analytical results confirmed slag/fill met site-specific action levels (SSALs), including commercial SCOs for petroleum VOCs and less than 500 mg/kg total PAHs. Following biotreatment, the material was used as backfill to bring Business Park excavations up to grade. Since all soil/fill was biotreated, off-site disposal was not required.
- **Backfill:** Following replacement of clean overburden materials and receipt of passing confirmatory results, where applicable, excavations were re-graded with

surrounding slag/fill. In the case of Hotspot E, the backfill was supplemented with biotreated soils from other locations within the Tecumseh BCP Business Park Sites that were treated to meet SSALs and approved for use by the NYSDEC as subgrade backfill.

1.4 Summary of Remedial Actions

The final remedial measures for Site II-12 involved placement of the cover system in accordance with the NYSDEC-approved June 2017 Remedial Action Work Plan (RAWP) (Ref. 8). The remedial work is document in the Final Engineering Report (Ref. 7).

1.5 Remaining Contamination

The remedial work conducted on Site II-12 has removed all known "source area" (i.e., arsenic- and petroleum/organic-impacted) slag/fill and treated residual petroleum-impacted "smear zone" slag/fill in-situ.

The remaining soil/fill is generally characterized by widespread exceedance of the Part 375 unrestricted-use SCOs (USCOs) for several ubiquitous constituents; specifically, PAHs and inorganic compounds (i.e., arsenic, cadmium, chromium, lead, and mercury). Other constituents remaining above USCOs in select areas of the Site include benzene, PCBs (Aroclor 1254 and 1260) and inorganic compounds (i.e., copper, manganese, nickel, and zinc). It is not possible to quantify with any certainty areas that do not exceed one or more of the USCO criteria; therefore, it is assumed that the entire 12.02-acre Site II-12 is impacted above the USCOs to the approximate native soil depth of 12 fbgs. Table 1 summarizes the sample locations remaining above USCOs.

Following grading of Site II-12, a demarcation was constructed and placed to easily identify the existing Site sub-grade from the cover system material and prevent the potential for inadvertent removal of sub-grade material during future intrusive work. The demarcation layer is comprised of an orange ¾-inch plastic industrial netting material was rolled across the sub-grade and overlapped by approximately one foot at the seams.

The groundwater quality on Site II-12 has been assessed by sampling monitoring well MWN-64A in April 2010 during the RI and again in February 2016 during a site-wide groundwater sampling event. The groundwater was analyzed for VOCs, SVOCs, and inorganic parameters. Table 2 presents the groundwater data with a comparison to NYSDEC Class GA GWQS. As indicated, analytical results from this monitoring well indicates concentration

levels as non-detect or below GWQS. This well will be retained for future monitoring in the event NYSDEC requests groundwater quality monitoring on the larger Business Park II.

2.0 ENGINEERING & INSTITUTIONAL CONTROL PLAN

2.1 Introduction

Since remaining contaminated soil/fill and groundwater exists beneath the Phase II Business Park, Engineering Controls and Institutional Controls (EC/ICs) are required to protect public health and the environment. The EC/IC Plan in the January 2014 SMP describes the procedures for the implementation and management of site-wide EC/ICs. The EC/IC Plan is one component of the SMP and subject to revision by NYSDEC. EC/ICs specific to Site II-12 are described below.

2.2 Engineering Control Systems

As described in the December 2013 Construction Completion Report (CCR; Ref. 9), construction of the railroad bed cover system occurred in April 2013 and involved placement of a minimum 1-foot layer comprised of ballast material, meeting the requirements of the specification in the IRM Work Plan (Ref. 10), and embedded wood rail ties. A woven geotextile was installed on the prepared subgrade prior to placement of the ballast layer and rail ties as a demarcation layer. Ballast material was compacted in accordance with rail construction contract requirements to mitigate potential for settlement. TurnKey personnel were on-site to observe placement of ballast material.

The cover system for Site II-12 is described in the August 2017 Final Engineering Report (Ref. 7). Figure 5 shows the approximate locations and types of cover system materials placed on Site II-12. In the event these cover systems are breached, penetrated, or temporarily removed, the cover system shall be repaired in accordance with Section 2.2 of the 2014 SMP and Section 4.0 of the Excavation Work Plan (2014 SMP Appendix B).

Although chlorinated organic compounds were not identified as constituents of concern at the Site, the 2014 SMP requires that a vapor barrier be placed beneath any future structures designated for occupancy as a conservative measure to protect building occupants against potential sub-slab vapor intrusion.

2.3 Institutional Controls

The Institutional Controls described in Section 2.3 of the 2014 SMP (i.e., Environmental Easement and Excavation Work Plan) must be implemented for Site II-12. There are no Site-specific institutional control requirements for Site II-12.

2.4 Inspections and Notifications

The annual inspections and notifications described in Section 2.4 of the 2014 SMP must be implemented for Site II-12. There are no other Site-specific inspection and notification requirements for Site II-12.

2.5 Contingency Plan

Emergencies conditions are addressed in the Emergency Response Plan (ERP), which is an attachment to the HASP (2014 SMP Appendix C). The following emergency contact numbers are specific to Site II-12:

Table 3: Emergency Contact Numbers

Name: John Cappellino Title: Executive Vice President, Buffalo and Erie County Industrial Land Development Corporation	Work: (716) 856-6525 Mobile: (716) 472-6667
Name: Thomas Forbes Title: President, Benchmark Environmental	Work: (716) 856-0599 Mobile: (716) 864-1730

Note: Contact numbers subject to change and should be updated as necessary

3.0 SITE MONITORING PLAN

The Site Monitoring Plan describes the measures for evaluating the performance and effectiveness of:

- The remedy to reduce or mitigate contamination at the Site;
- The soil cover system; and
- All affected Site media.

Monitoring of the cover system is described in Section 3.2 of the January 2014 SMP. No additional site-specific monitoring is required.

4.0 OPERATION & MAINTENANCE PLAN

The remedy for Site II-12 does not rely on any mechanical systems, such as sub-slab depressurization or soil vapor extraction, to protect public health and the environment. Therefore, a Site-specific Operation and Maintenance Plan is not required.

5.0 INSPECTIONS, REPORTING & CERTIFICATIONS

All inspection, reporting, and certification requirement are described in Section 5.0 of the January 2014 SMP. Attachment B includes a sample EC/IC Certification Form to be completed for Site II-12.

6.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Site Management Plan for BCP Tecumseh Phase II Business Park, NYSDEC Site No. C915198 through C915198L, Lackawanna, New York*. January 2014.
2. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation*. May 3, 2010.
3. New York State Department of Environmental Conservations. *Decision Document, Site II-12 Tecumseh Phase II Business Park, Brownfield Cleanup Program, Lackawanna, Erie County, Site No. C915198l*. January 2017.
4. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan, Phase II Business Park Area, Lackawanna, New York*. July 2009.
5. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis (RI/AA) Report for Phase II Business Park, Tecumseh Redevelopment Inc., Lackawanna, New York*. Revised March 2012.
6. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Phase II Business Park, Sites II-10, II-11 and II-12, BCP Site Nos. C915198J, C915198K & C915198L, Lackawanna, New York*. February 2017, revised April 2017.
7. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Final Engineering Report, Tecumseh Business Park II, Sub-Parcels II-10 and II-12, Lackawanna, New York*. August 2017.
8. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Remedial Action Work Plan, Tecumseh Business Parks I and II, Lackawanna, New York*. June 2017.
9. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Construction Completion Report, Railroad Realignment, Tecumseh Phase I-III Business Park, Lackawanna, New York, BCP Site Nos. C915197-C915199*. December 2013.
10. TurnKey Environmental Restoration, LLC in association with Benchmark Environmental Engineering & Science, PLLC. *Interim Remedial Measures (IRM) Work Plan, Railroad Realignment, Phase I-III Business Park Areas, Lackawanna, New York, BCP Site Nos. C915197-C915199*. October 2010.

TABLES

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Site No; Test Pit Location; and Depth Interval (fbgs)									Unrestricted SCO [2] (mg/kg)
	II-10 & II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	
	TP-57	TP-64	TP-66	TP-67	TP-69	TP-71	TP-74	TP-75	TP-76	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg										
Benzene	--	0.013	**0.077**	--	ND	--	ND	--	ND	**0.06**
Ethylbenzene	--	ND	0.1	--	ND	--	ND	--	ND	**1**
n-Butylbenzene	--	0.064	0.069	--	ND	--	ND	--	ND	**12**
sec-Butylbenzene	--	0.027 J	0.027 J	--	ND	--	ND	--	ND	**11**
tert-Butylbenzene	--	ND	ND	--	ND	--	ND	--	ND	**5.9**
Isopropylbenzene	--	0.025	0.026	--	ND	--	ND	--	ND	**--**
p-Cymene	--	ND	ND	--	ND	--	ND	--	ND	**--**
n-Propylbenzene	--	0.018	0.018	--	ND	--	ND	--	ND	**3.9**
Toluene	--	0.098 B	0.4 B	--	ND	--	ND	--	ND	**0.7**
1,2,4-Trimethylbenzene	--	0.11	0.11	--	ND	--	ND	--	ND	**3.6**
1,3,5-Trimethylbenzene	--	0.034	0.037	--	ND	--	ND	--	ND	**8.4**
o-Xylene	--	0.14	0.13	--	ND	--	ND	--	ND	**0.26**
Xylenes, Total	--	0.28	0.28	--	ND	--	ND	--	ND	**--**
Naphthalene	--	0.42 BJ	0.26 B	--	ND	--	ND	--	0.093 BD	**--**
Methyl tert butyl ether	--	0.01 J	0.05	--	ND	--	ND	--	ND	**0.93**
Methylene Chloride	--	--	--	--	0.0036 J	--	ND	--	--	**0.05**
TOTAL VOCs (mg/kg)	--	*1.2*	*1.6*	--	*0.0036*	--	*0*	--	*0.093*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg										
Acenaphthylene	0.68 DJ	0.44 DJ	1.1 DJ	1.3 DJ	ND	2.4 DJ	1.2 DJ	ND	0.51 DJ	**100**
Anthracene	1.3 DJ	0.55 DJ	1.1 DJ	7.7 DJ	ND	3.5 DJ	0.81 DJ	ND	0.38 DJ	**100**
Benzo(a)anthracene	**4.5 D**	**2.7 DJ**	**3.3 DJ**	**24 BD**	0.91 DJB	**9.9 BD**	**5 BD**	**2.6 TDJB**	**2 DJ**	**1**
Benzo(b)fluoranthene	**6.3 D**	**4.5 D**	**6.4 D**	**31 D**	**1.6 D,ID4,J**	**12 D**	**6 D**	**5.2 T,D,ID4,J**	**3.3 DJ**	**1**
Benzo(k)fluoranthene	**2 DJ**	**1.4 DJ**	**1.8 DJ**	**14 D**	ND	**5.4 DJ**	**2.8 DJ**	ND	**1.2 DJ**	**0.8**
Benzo(g,h,i)perylene	5.1 D	2.7 DJ	4 D	24 BD	0.8 DJB	7.6 DJB	3.4 DJ	2.6 TDJB	2.7 DJ	**100**
Benzo(a)pyrene	**5 D**	**3.1 DJ**	**3.5 DJ**	**29 D**	0.93 DJ	**9.4 DJ**	**4.6 DJ**	**2.3 T,D,J,B**	**2.7 DJ**	**1**
Chrysene	**4.5 D**	**2.8 DJ**	**3.7 DJ**	**26 D**	0.48 DJ	**11 D**	**4.6 BD**	ND	**2.1 DJ**	**1**
Dibenzo(a,h)anthracene	**1.2 DJ**	**0.68 DJ**	**0.96 DJ**	ND	ND	**2 DJB**	**0.86 DJ**	ND	**0.62 DJ**	**0.33**
Dibenzofuran	ND	0.37 DJ	0.33 DJ	2.3 DJ	ND	2 DJ	ND	ND	ND	**--**
Fluoranthene	9.7 D	4.4 D	5.4 D	55 D	1.5 DJ	29 D	8.6 BD	ND	4.4 D	**100**
Fluorene	ND	ND	ND	3.7 DJ	ND	3.4 DJ	ND	ND	ND	**30**
Indeno(1,2,3-cd)pyrene	**4.1 D**	**2.5 DJ**	**3.5 DJ**	**20 D**	**0.6 DJ**	**6.6 DJ**	**2.8 DJ**	**2.1 T,D,J**	**2.2 DJ**	**0.5**
2-Methylnaphthalene	ND	0.81 DJ	0.63 DJ	0.45 DJ	ND	0.54 DJ	ND	ND	ND	**--**
Naphthalene	ND	0.99 DJ	0.54 DJ	1.3 DJ	ND	**2.1 DJ**	ND	ND	ND	**12**
Phenanthrene	3.4 DJ	2.2 DJ	1.7 DJ	29 D	0.46 DJ	28 D	2.8 DJB	ND	1.7 DJ	**100**
Pyrene	7.2 D	4.2 D	5.2 D	50 D	1.6 DJ	23 D	7.4 D	2.4 TDJ	3.4 DJ	**100**
TOTAL SVOCs (mg/kg)	*55*	*34*	*43*	*319*	*9*	*158*	*51*	*17*	*27*	--

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

Parameter [1]	Site No; Test Pit Location; and Depth Interval (fbgs)									Unrestricted SCO [2] (mg/kg)
	II-10 & II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	II-12	
	TP-57	TP-64	TP-66	TP-67	TP-69	TP-71	TP-74	TP-75	TP-76	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Polychlorinated Biphenyls (PCBs) - mg/kg										
Aroclor 1254	ND	--	ND	0.35 QSU,D,J	ND	--	ND	--	ND	--
Aroclor 1260	ND	--	ND	ND	ND	--	ND	--	0.13 QSU	--
TOTAL PCBs (mg/kg)	*0*	*--*	*0*	***0.35***	*0*	*0*	*0*	*--*	***0.13***	***0.1***
Inorganic Compounds - mg/kg										
Aluminum	--	--	--	--	5530	--	7760	--	--	--
Arsenic, Total	**46.4**	**24.1**	**39.9**	**17.3**	**25.3**	**72.7**	**47.4**	**14.3**	**13.8**	**13**
Barium, Total	116	94	163	125	63.6 J	120	88.8	66.9	73.3	**350**
Beryllium	--	--	--	--	0.725	--	0.97	--	--	**7.2**
Cadmium, Total	**3**	1.73	**2.93**	2.21	**3.48**	**3.39**	1.87	**3.18**	**2.81**	**2.5**
Calcium	--	--	--	--	36500 D	--	52900	--	--	--
Chromium, Total	**55**	**61.8 J**	**174 J**	**54.8 J**	**73.4 J**	**44.1 J**	**91.4**	**67.8 J**	**277**	**1**
Cobalt	--	--	--	--	7.95	--	4.51	--	--	--
Copper	--	--	--	--	**779**	--	**120**	--	--	**50**
Iron	--	--	--	--	71400 D	--	45100	--	--	--
Lead, Total	**357**	**384**	**647**	**518**	**303**	**460**	**290**	**942**	**325**	**63**
Magnesium	--	--	--	--	4210 J	--	9020	--	--	--
Manganese	--	--	--	--	**3270 D**	--	**3770 D**	--	--	**1600**
Mercury, Total	0.152	**4.05 D**	**0.35**	**5.51 D**	**5.68 D**	**0.738 D**	0.116	**0.284**	**0.518**	**0.18**
Nickel	--	--	--	--	**71.1 J**	--	20	--	--	**30**
Potassium	--	--	--	--	408 J	--	900	--	--	--
Silver	--	--	--	--	ND	--	0.508	--	--	**2**
Sodium	--	--	--	--	166 J	--	234	--	--	--
Vanadium	--	--	--	--	44.2	--	39.7	--	--	--
Zinc	--	--	--	--	**409**	--	**380**	--	--	**109**
Cyanide, Total	1.6	4 J	ND	12 J	2.3 J	1.6 J	ND	--	ND	**27**

Notes:

1. Only parameters detected at a min. of one location are presented; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective; Unrestricted Use per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

B = Analyte was detected in associated Method Blank.
D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or sample viscosity.
ID4 = Benzo(b)fluoranthene coelutes with Benzo(k)fluoranthene. The reported result is a summation of the isomers and the concentration is based on the response factor of Benzo(b)fluoranthene.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
QSU = Sulfur (EPA 3660) clean-up performed on extract.
ND J = The analyte was not detected. The associated reported quantitation limit is an estimate and may be inaccurate or imprecise.
" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Use Soil Cleanup Objectives.

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Test Pit Location and Depth Interval (fbgs)			Unrestricted SCO [2] (mg/kg)
	II-12	II-12	II-10 & II-12	
	TP-86	TP-92	TP-96	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Volatile Organic Compounds (VOCs) - mg/kg				
Methylene Chloride	0.0065	ND	0.0036 J	**0.05**
TOTAL VOCs (mg/kg)	*0.0065*	*0*	*0.0036*	--
Semi-Volatile Organic Compounds (SVOCs) - mg/kg				
Acenaphthylene	ND	0.15 DJ	0.23 DJ	**100**
Anthracene	0.84 DJ	ND	0.34 DJ	**100**
Benzo(a)anthracene	**2.7 DJ**	0.7 DJ	**1.7 DJ**	**1**
Benzo(b)fluoranthene	**3.7 DJ**	0.92 DJ	**2.7 D**	**1**
Benzo(k)fluoranthene	**1.2 DJ**	**0.88 DJ**	**0.89 DJ**	**0.8**
Benzo(g,h,i)perylene	2.8 DJ	0.69 DJ	2 D	**100**
Benzo(a)pyrene	**2.9 DJ**	0.83 DJ	**2.2 D**	**1**
Carbazole	ND	ND	0.12 DJ	--
Chrysene	**2.5 DJ**	**1 DJ**	**1.7 DJ**	**1**
Dibenzo(a,h)anthracene	ND	0.27 DJ	**0.52 DJ**	**0.33**
Fluoranthene	6.1 DJ	0.91 DJ	3 D	**100**
Indeno(1,2,3-cd)pyrene	**2.1 DJ**	0.48 DJ	**1.7 DJ**	**0.5**
Phenanthrene	3.5 DJ	0.35 DJ	1.4 DJ	**100**
Pyrene	4.6 DJ	0.93 DJ	2.3 D	**100**
TOTAL SVOCs (mg/kg)	*33*	*8.1*	*21*	--
Polychlorinated Biphenyls (PCBs) - mg/kg				
Aroclor 1242	0.015 QSU, J	ND	ND	--
Aroclor 1260	0.063 QSU	ND	ND	--
TOTAL PCBs (mg/kg)	*0.078*	*0*	*0*	***0.1***
Inorganic Compounds - mg/kg				
Aluminum	19100	--	--	--
Antimony	91.3	--	--	--
Arsenic, Total	**42.8**	**26.7**	**15.4**	**13**
Barium, Total	141	10.4	150	**350**
Beryllium	2.71	--	--	**7.2**
Cadmium, Total	1.86	0.914	1.49	**2.5**
Calcium	109000 D	--	--	--
Chromium, Total	**73.2**	**26.3**	**671**	**1**
Cobalt	13.1	--	--	--
Copper	**655**	--	--	**50**

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 1
SUMMARY OF REMAINING SOIL/FILL CONTAMINATION ABOVE UNRESTRICTED SCOs
SITE MANAGEMENT PLAN
Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	Test Pit Location and Depth Interval (fbgs)			Unrestricted SCO [2] (mg/kg)
	II-12	II-12	II-10 & II-12	
	TP-86	TP-92	TP-96	
	0.0 - 2.0	0.0 - 2.0	0.0 - 2.0	
Inorganic Compounds - mg/kg				
Iron	135000 D	--	--	--
Lead, Total	0.62	**543**	**148**	**63**
Magnesium	16100	--	--	--
Manganese	**3630 D**	--	--	**1600**
Mercury, Total	**0.508 D**	0.035	0.168	**0.18**
Nickel	**157**	--	--	**30**
Potassium	1880	--	--	--
Sodium	512	--	--	--
Vanadium	24	--	--	--
Zinc	**376 D**	--	--	**109**
Cyanide, Total	1.1	--	--	**27**

Notes:

1. Only parameters detected at a min. of one location are presented; all other compounds were reported as non-detect.
2. SCO = Soil Cleanup Objective; Unrestricted Use per NYSDEC 6NYCRR Part 375-6.8(b), Final December 2006.

Definitions:

D = Dilution required due to high concentration of target analyte, sample matrix effects, sample color, or viscosity.

J = Estimated value; result is less than the sample quantitation limit but greater than zero.

ND = parameter not detected above laboratory detection limit.

QSU = Sulfur (EPA 3660) clean-up performed on extract.

" -- " = Not analyzed for this parameter or no individual SCO.

Color Code:

BOLD = Value exceeds Part 375 Unrestricted Soil Cleanup Objectives.

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA

SITE MANAGEMENT PLAN

Phase II Business Park, Site II-12
Tecumseh Redevelopment Inc., Lackawanna, New York

PARAMETER [1]	GWQS [2]	SITE II-12			
		MWN-64A		MWN-64A	
		4/30/2010		2/25/2016	
Field Measurements [3]:					
Sample No.	--	initial	final	initial	final
pH (units)	**6.5 - 8.5**	7.84	7.82	7.77	7.75
Temperature (°C)	**NA**	11.4	12.4	8.0	7.8
Sp. Conductance (uS)	**NA**	635.9	632.3	747.1	744.9
Turbidity (NTU)	**NA**	140	107	8.56	5.12
Dissolved Oxygen (mg/L)	**NA**	--	--	2.26	1.70
Eh (mV)	**NA**	-113	-119	-149	-139
Total Inorganic Compounds (mg/L) [4]:					
Barium - Total	**1**	0.043		0.042	
Manganese - Total	**0.3**	--		0.24	
Cyanide - Total	**0.2**	--		0.018	
Soluble Inorganic Compounds (mg/L) [4,5]:					
Barium - Soluble	**1**	0.0293		--	
Semi-Volatile Organic Compounds (ug/L) [5]:					
Pyrene	**50***	0.35 J		ND	

Notes:

1. Only those compounds detected above the method detection limit at a minimum of one sample location are reported in this table.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV) per TOGS 1.1.1 (June 1998, January 1999 Errata, April 2000 Addendum, and June 2004 Addendum).
3. Field measurements were collected immediately before and after groundwater sample collection.
4. A soluble metals sample was collected if the sample turbidity was above 50 NTUs.
5. Groundwater collected from April 2010 monitoring event were only analyzed for those parameters listed in the July 2009 Remedial Investigation Work Plan.

Definitions:

J = Estimated Value; result is less than the sample quantitation limit but greater than zero.

"--" = Not analyzed for.

* = Guidance Value

NA = No standard available at this time.

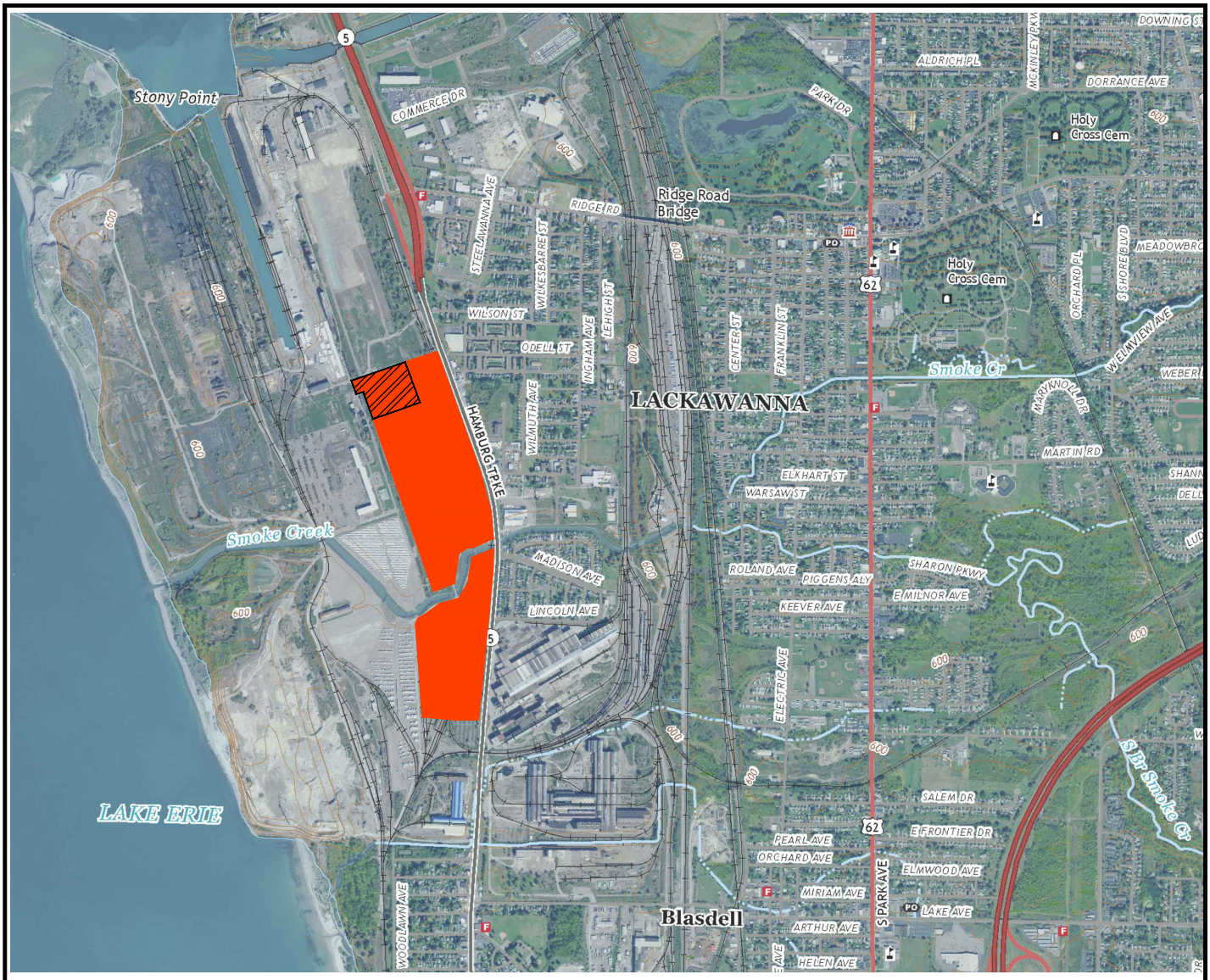
ND = Indicates parameter was not detected above method detection limit.

BOLD = Result exceeds the GWQS/GV.

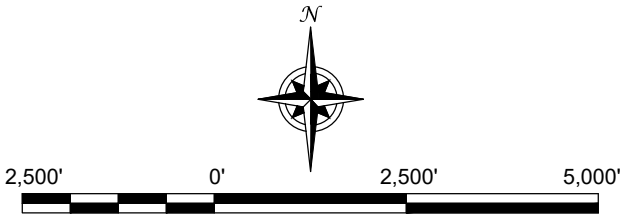
FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 1; Site Location and Vicinity Map.dwg, 12/8/2020 1:03:30 PM

FIGURE 1







SCALE: 1 INCH = 2,500 FEET
SCALE IN FEET
(approximate)

LEGEND:

- TECUMSEH BUSINESS PARK II
- SITE II-12

NOTE: BASEMAP USGS BUFFALO SE QUADRANGLE 2019

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-017-327

DATE: DECEMBER 2020

DRAFTED BY: RFL

SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK

PREPARED FOR

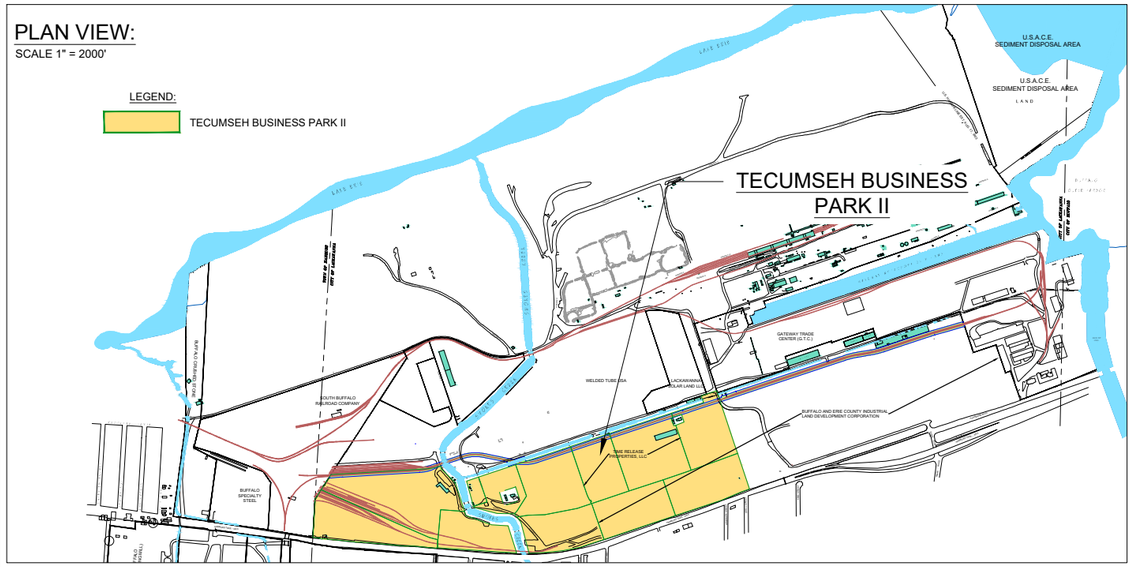
TECUMSEH REDEVELOPMENT INC.

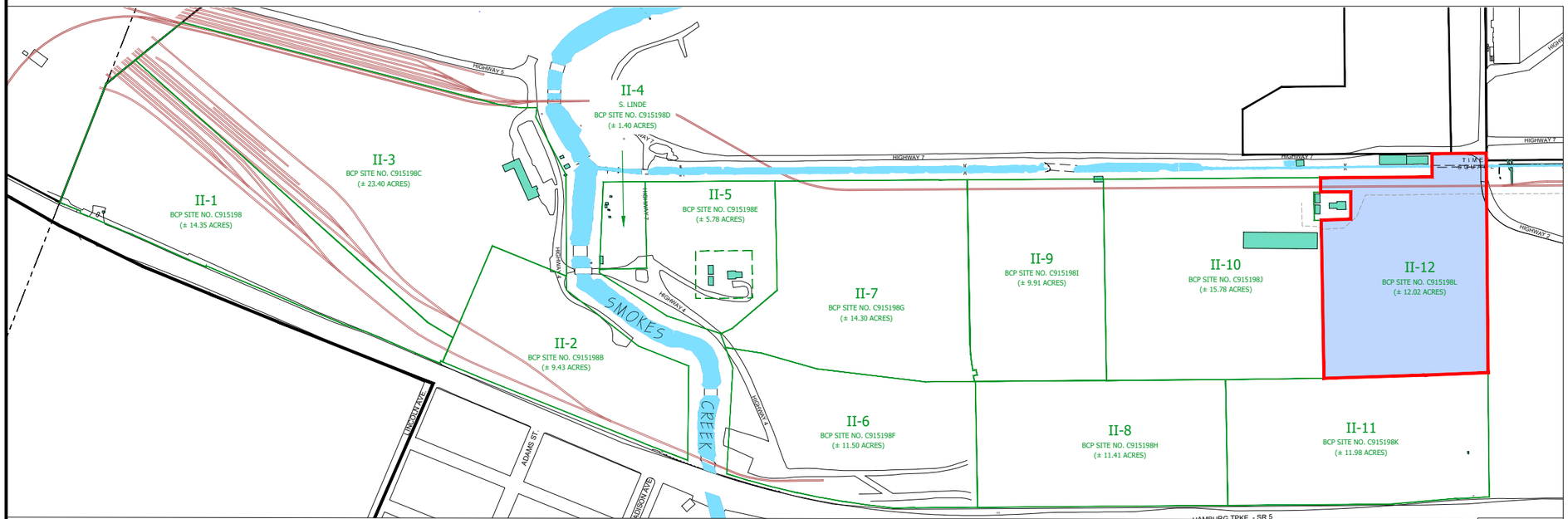
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F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 2- Site Delineation Map.dwg, 12/8/2020 3:20:06 PM

PLAN VIEW:

SCALE 1" = 2000'





LEGEND:

- SITE II-12
- EXISTING BUILDING / STRUCTURE
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- RAILROAD TRACK

500' 0' 500' 1,000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

DATE: DECEMBER 2020
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC

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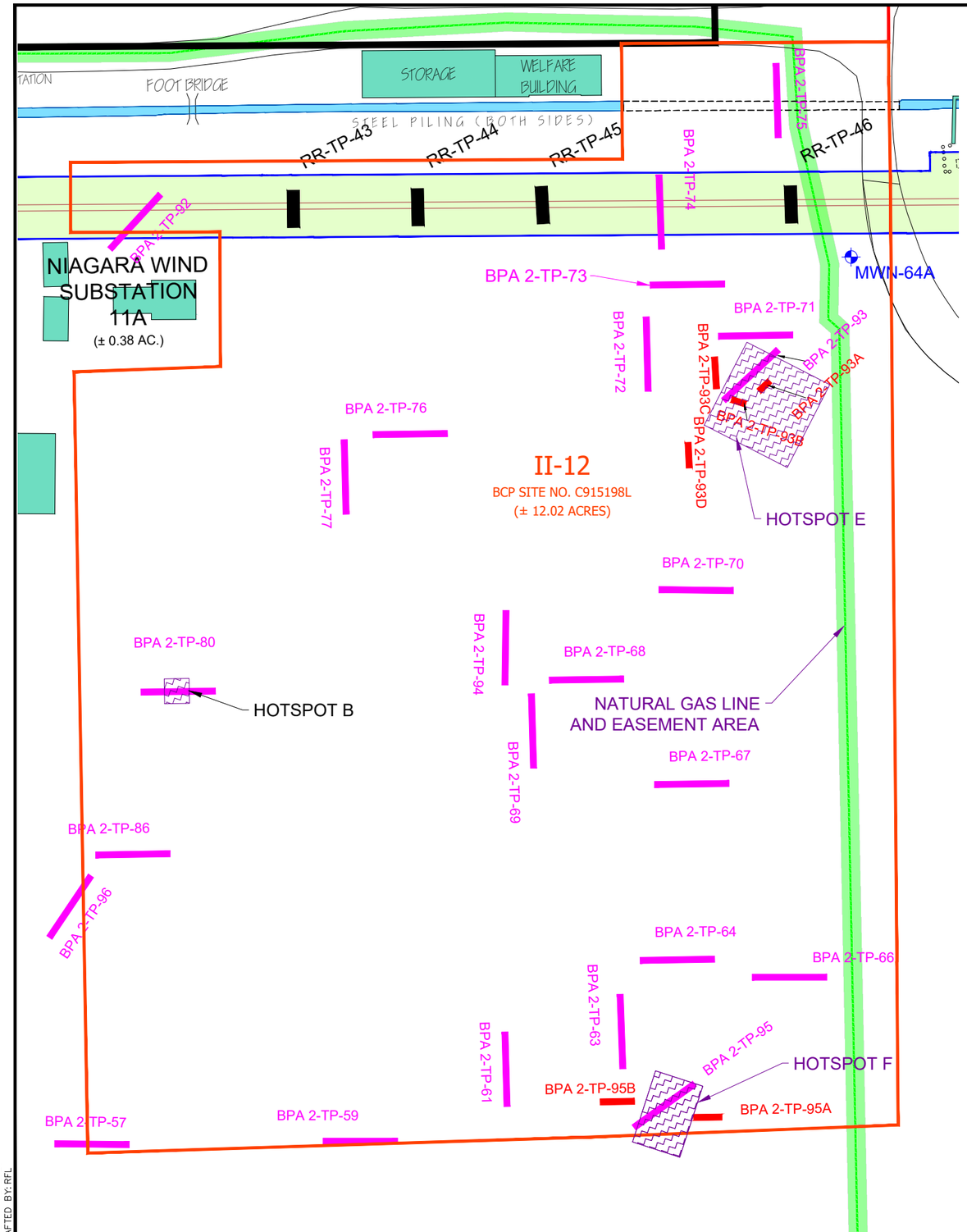
JOB NO.: 0071-017-327

SITE DELINEATION MAP

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 2

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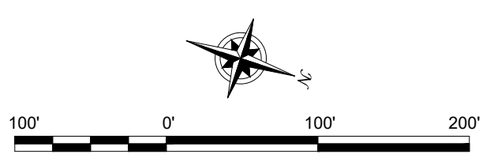
- EXISTING BUILDING / STRUCTURE
- BCP SITE II-12 BOUNDARY
- RAILROAD TRACK
- MWS-64A — EXISTING PHASE II BPA OVERBURDEN MONITORING WELL
- BPA 2-TP-72 — PHASE II BPA TEST PIT
- BPA 2-TP-72 — SUPPLEMENTAL PHASE II BPA TEST PIT (LOGS NOT CREATED)
- RR-TP-18 — RAILROAD CORRIDOR TEST PIT (SEE 2010 IRM WORK PLAN)

RI Test Pits
- BPA2-TP-57
- BPA2-TP-59
- BPA2-TP-61
- BPA2-TP-63
- BPA2-TP-64
- BPA2-TP-66
- BPA2-TP-67
- BPA2-TP-68
- BPA2-TP-69
- BPA2-TP-70
- BPA2-TP-71
- BPA2-TP-72
- BPA2-TP-73
- BPA2-TP-74
- BPA2-TP-75
- BPA2-TP-76
- BPA2-TP-77
- BPA2-TP-80 (Hotspot B)
- BPA2-TP-86
- BPA2-TP-92
- BPA2-TP-93 (Hotspot E)
- BPA2-TP-94
- BPA2-TP-95 (Hotspot F)
- BPA2-TP-96

Railroad Realignment Test Pits
- RR-TP-43
- RR-TP-44
- RR-TP-45
- RR-TP-46

Supplemental Test Pits (Hotspot E)
- BPA2-TP-93A
- BPA2-TP-93B
- BPA2-TP-93C
- BPA2-TP-93D

Supplemental Test Pits (Hotspot F)
- BPA2-TP-95A
- BPA2-TP-95B



SCALE: 1 INCH = 100 FEET
SCALE IN FEET
(approximate)

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-017-327

TEST PIT LOCATIONS SITE II-12

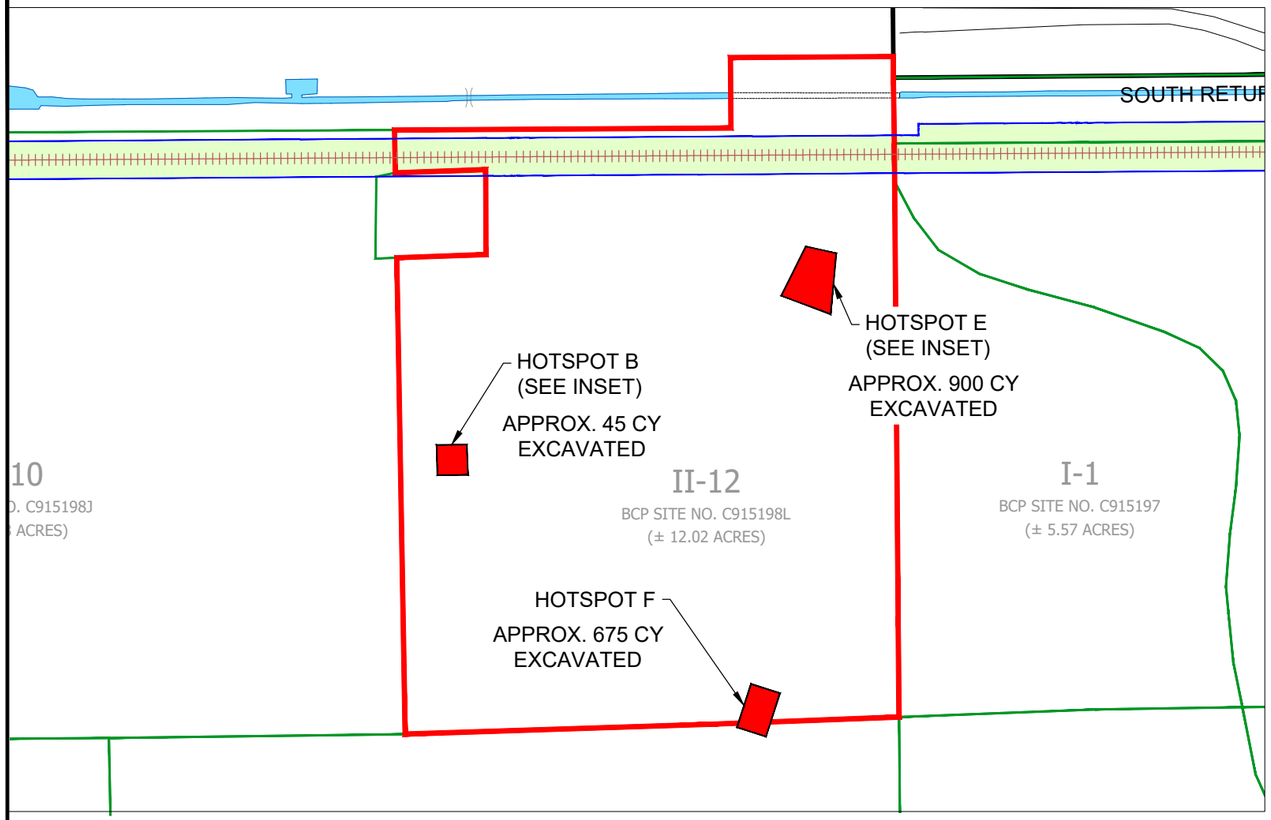
SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915189L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

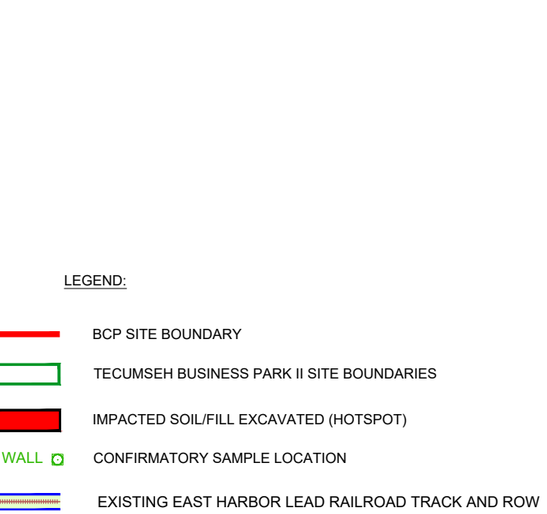
FIGURE 3

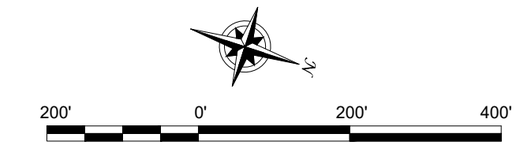
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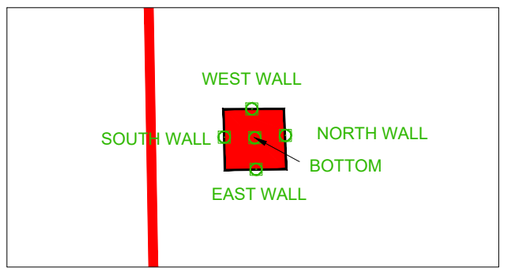
F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 3; Test Pits on II-12.dwg, 4/21/2021 11:46:29 AM



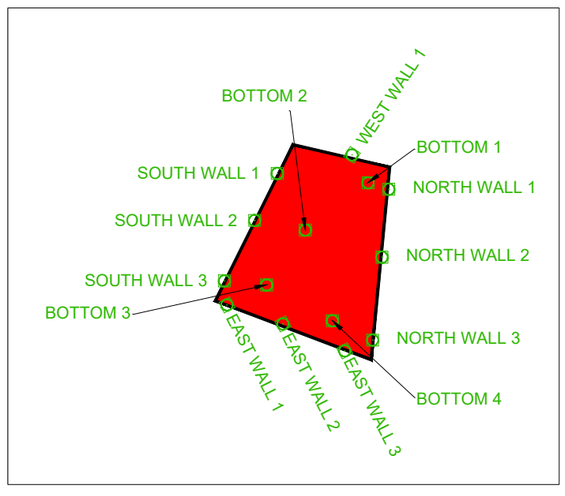




SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)



HOTSPOT B
NTS



HOTSPOT E
NTS'

DATE: DECEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 4; Completed RM.dwg, 4/20/2021 2:34:17 PM

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TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

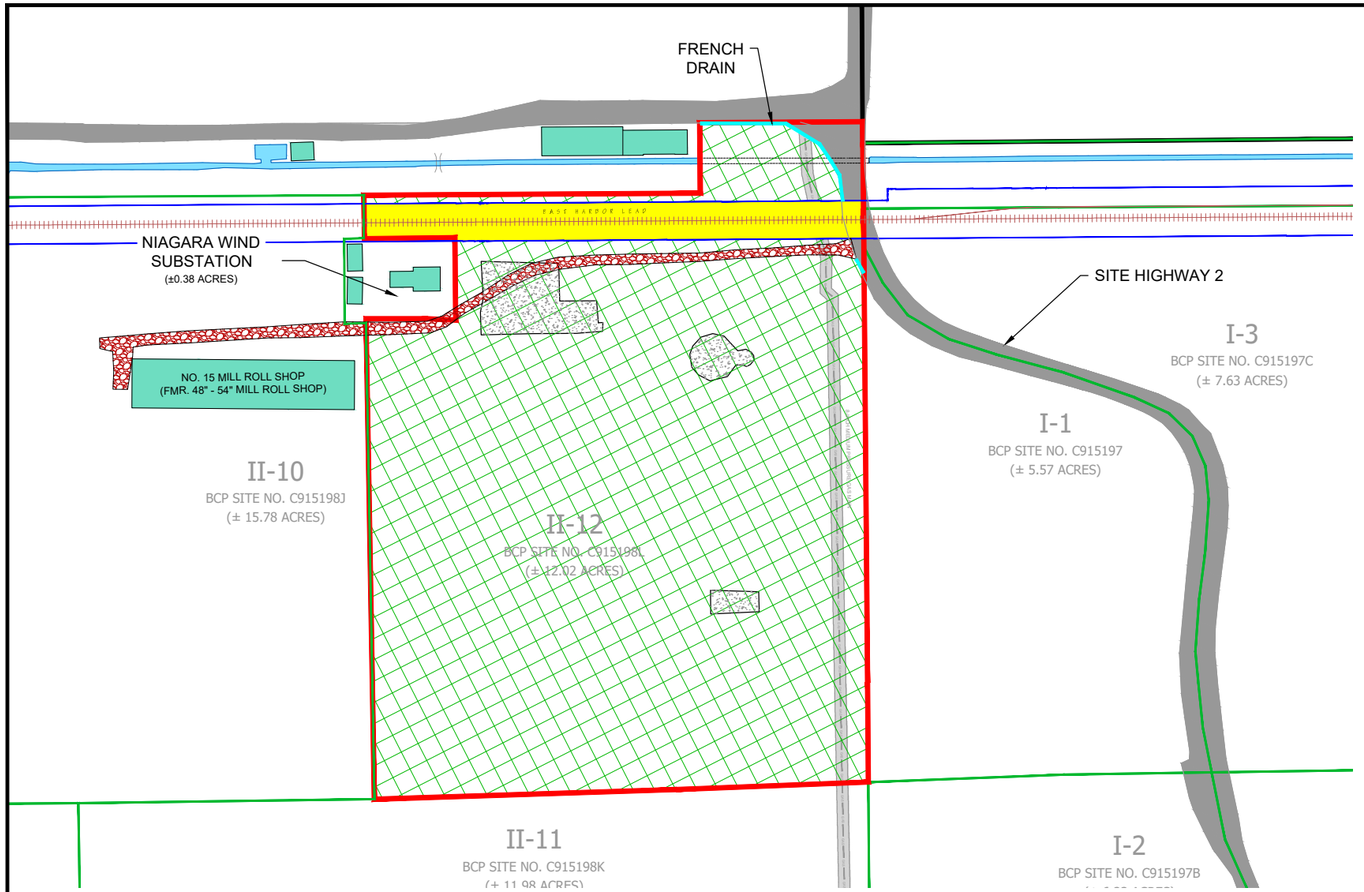
JOB NO.: 0071-017-327

COMPLETED REMEDIAL MEASURES

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 4

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC *IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.*



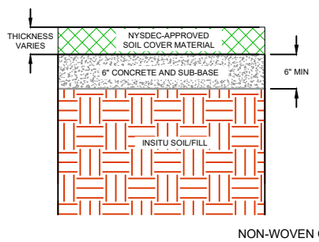
200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

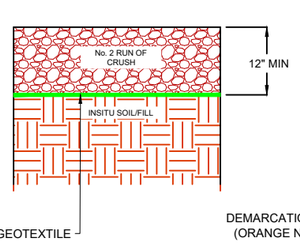
LEGEND:

- BCP BOUNDARY (SITE II-12)
- SITE BOUNDARIES
- EXISTING BUILDING / STRUCTURE
- SITE II-12 SOIL COVER SYSTEM
- ASPHALT PAVED ACCESS ROADS FINAL COVER
- EXISTING EAST HARBOR LEAD RAILROAD TRACK AND ROW
- ACCESS DRIVE (RUN OF CRUSH) FINAL COVER
- CONCRETE SLAB FINAL COVER
- NATURAL GAS LINE AND EASEMENT AREA

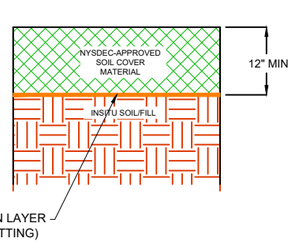
EXISTING CONCRETE COVER SYSTEM DETAIL[1]
NTS



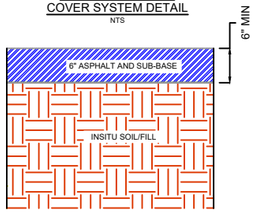
ACCESS DRIVE COVER SYSTEM DETAIL
NTS



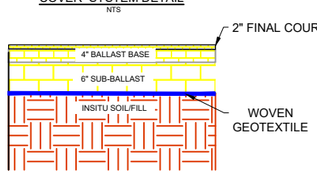
SOIL COVER SYSTEM DETAIL
NTS



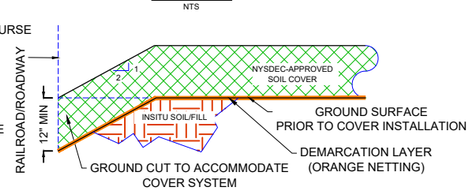
EXISTING ASPHALT COVER SYSTEM DETAIL
NTS



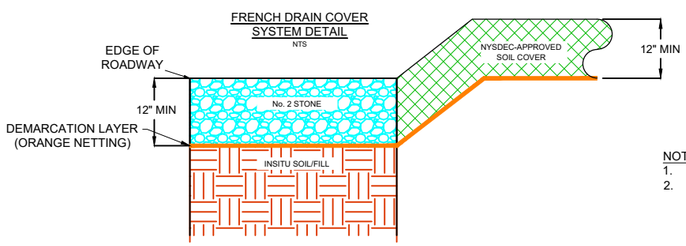
COVER SYSTEM BENEATH TRACKS COVER SYSTEM DETAIL[2]
NTS



TIE-IN DETAIL
NTS



FRENCH DRAIN COVER SYSTEM DETAIL
NTS



NOTES:
1. CONCRETE COVERED WITH VARYING AMOUNTS OF SOIL OR STONE.
2. BASED ON RECORD DRAWINGS PROVIDED BY C&S COMPANIES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

JOB NO.: 0071-017-327

APPROXIMATE LOCATIONS AND TYPES OF COVER SYSTEM MATERIALS

SITE MANAGEMENT PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198L (II-12)
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 5

DISCLAIMER: PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC & TURNKEY ENVIRONMENTAL RESTORATION, LLC.

DATE: DECEMBER 2020
DRAFTED BY: RFL

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Site Management Plan\2020 SMP II-12 only\Figure 5; Cover System PlanSMP.dwg, 4/29/2021 9:15:41 AM

ATTACHMENT A

MONITORING WELL BORING AND CONSTRUCTION LOG

Project No: 0071-009-311

Borehole Number: MWN-64A

Project: Phase II Business Park Area

A.K.A.:

Client: Tecumseh Redevelopment, Inc.

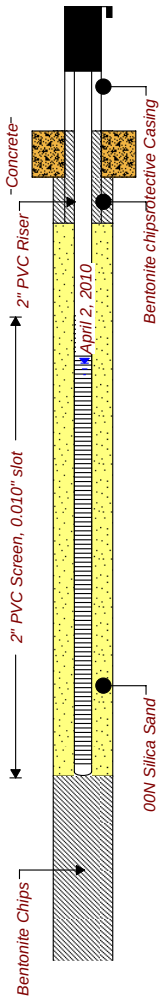
Logged By: TAB

Site Location: Lackawanna, NY

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 – 12.5 – 25)	Lab Sample	Well Completion Details or Remarks
-3.0									
	0.0	Ground Surface							
	0.0	***Fill*** Grey brown, moist, non-plastic fines with some fine sand, slag, medium dense.	S1	16	1.1		0.0		
	-2.0 2.0	As above, black, coal and coke fines, orange brick, loose.	S2	8	1.0		0.3		
2.0	-4.0 4.0	As above.	S3	3	1.0		0.3		
	-5.0 5.0	***Poorly Graded Sand with Silt*** Brown, wet, mostly medium sand, few non plastic fines, few fine sub rounded gravel, loose, rapid dilatancy.							
	-6.0 6.0	***Slag/Fill*** Grey, wet, coarse slag with trace non plastic fines and fine sand, medium dense.	S4	16	1.7		0.0		
7.0	-8.0 8.0	As above.	S5	17	1.2		0.0		
	-10.0 10.0	***Concrete*** No recovery concrete sluff, rig chatter (10.0 - 12.0 fbgs).	S6	NA	0.0		0.0		
12.0	-12.0 12.0	No Recovery.	S7	NA	0.0		0.0		
	-14.0 14.0	***Silty Sand*** Grey, wet, mostly fine sand, with some non plastic fines, soft, no odor.	S8	WR	0.6		0.0		
	-15.0 15.0								
	-16.0 16.0	***Sandy Organic Soil*** Brown, wet, mostly organic, some fine sand, low plasticity fines, soft.	S9	WH	0.8		0.3		
17.0	-18.0 18.0	as above.							
		End of Borehole							
22.0									



Drilled By: Eart Dimensions, Inc.
Drill Rig Type: Diedrich D120
Drill Method: 2' Continuous SS w/ 4 ¼" HSA
Comments:
Drill Date(s): 4 2 10

Hole Size: 8 1/2 -inch
Stick-up: 2.58 - feet
Datum: Mean Sea Level

Sheet: 1 of 1

ATTACHMENT B

SAMPLE EC/IC CERTIFICATION FORM

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. C915198L

Site Name: Site II-12 Tecumseh Phase II Business Park

Site Address: 2303 Hamburg Turnpike Zip Code: 14218

City/Town: Lackawanna

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915198L **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915198L

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

Appendix 3

TENORM NYSDEC Letter and Gamma Survey and Sampling Report

Excluding the comments above, the Department has reviewed the report and has concluded that the data from the reports support that the excavated material is not TENORM; this conclusion is based on the lack of provenance related to the source(s) of the material, as well comparison to background data. Please note, however, that the material is considered a solid waste and must be properly handled and/or disposed of, in compliance with appropriate regulations.

Please feel free to contact me with any comments or questions that you may have at (716)-851-7278 or via email at derick.dietrich@dec.ny.gov

Sincerely,

Derick Dietrich

Derick Dietrich
Environmental Radiation Specialist 1 Division of Materials Management, Region 9

DD:JB

ec:
Patrick Concannon, Professional Geologist 2, NYSDEC Region 9
Thomas Papura, Environmental Radiation Specialist 3, NYSDEC Albany
Andrew Zwack, Assistant Engineer, NYSDEC Region 9
Stanly Radon, P.G., Regional Geologist, NYSDEC Region 9
Andrew Frederick, Director of Property Development, ECIDA
Talia Johnson-Huff, ECIDA
John Cappellino, ECIDA
Gerard Sentz, Azar Design Co.

NEW YORK STATE | Department of Environmental Conservation

KATHY HOCHUL
Governor

AMANDA LEFTON
Commissioner

August 15, 2025

Michae Lydle
Azar Design Co.
295 Main Street #200,
Buffalo, New York 14203

Dear Michael Lydle:

Gamma Walkover
Survey and Sampling Report –
Renaissance Commerce Park,
Lackawanna

The NYS Department of Environmental Conservation (Department) has received and reviewed the Gamma Walkover Survey and Sampling Report (report) conducted at the Renaissance Commerce Park site (site), located at Odell Street Ext. at Steelworkers Way & Ridge Road Ext. at Fuhrmann Blvd. in Lackawanna, NY. After reviewing the report, dated August 5, 2025, the Radioactive Materials Management Section (RMMS) offers the following comments:

1. General: Please include a new figure, or revise a current figure, to show the locations where the radiological samples were collected

2. Section 4.0 Results: “The Northern Zone has potential radiologically elevated material. Radiological sample analysis confirms the presence of TENORM (Background-Comparable).”
    a. Based on the data from the report, the Department disagrees with this conclusion. Please revise the second sentence of the final bullet point to say “potential TENORM”.

Please revise the report to reflect these minor comments and provide the Department with the updated and finalized version of the report.

THE MJW COMPANIES

Radiological Consulting Professionals and Expert Technical Services

Gamma Walkover Survey and Sampling Report

For

Renaissance Commerce Park

Odell Street Ext. at Steelworkers Way & Ridge Road Ext. at Fuhrmann Blvd.

Lackawanna, NY 14218

Prepared for:

AZAR DESIGN CO

FORMERLY FOIT-ALBERT ASSOCIATES

295 Main Street

Buffalo, NY 14203

By:

MJW CORPORATION
RADIATION CONSULTING PROFESSIONALS

15 Hazelwood Dr., Suite 112
Amherst, NY, 14228

MJW Project No. 25.1009.2

1.0 Introduction

Azar Design Co. (Azar) is performing a preliminary site characterization for the Renaissance Commerce Park at the Odell Street extension at Steelworkers Way & Ridge Road extension at the Fuhrmann Blvd (the Site). The Site was formerly part of Bethlehem Steel Company's steel-making operations which were discontinued in 1983. This area is now filled land with between two (2) to eight (8) feet of fill material, including steel and iron-making slag. The Site is intended for redevelopment, and as such requires various environmental monitoring activities to be performed.

MJW was contracted by Azar to conduct a GPS-assisted gamma walkover survey of the site to determine if any areas are potentially radiologically contaminated prior to any work activities. This survey was conducted over two (2) days, from May 27 through May 28, 2025.

2.0 Methodology

A GPS-assisted gamma walkover survey of the Site was performed with a Bluetooth-enabled Ludlum model 3000 paired with a 44-10 (2" x 2") NaI gamma detector (Appendix A). The instrument and a GPS unit were paired with a mobile data collection device. The meter, detector, and other electronics were mounted on a cart to ensure consistent and reproducible geometry and data.

Background data was collected at the nearby Buffalo and Erie County Botanical Gardens. This area was selected due to its status as a known "clean" site, the similarities in ground cover, and the relative proximity to the Site. The background sample was previously collected by MJW, and the lab report is provided as Attachment C.

Data was collected along north-south and east-west transects throughout the Site and were spaced at varying distances (3-8 meters). These transects were generated prior to fieldwork, using the Azar provided site construction plans to determine transect spacing. Transects were displayed in the data collection device to aid in consistency. In some areas, the ground surface was impassable due to physical barriers (heavy vegetation), which is the reason for missing data from some transects or data collected off-line. The data collection device recorded a gamma measurement every second, and each measurement was spaced one (1) meter from the previous measurement.

Samples were collected in field following a preliminary review of gamma-walkover data. Samples were collected by taking a 1-minute static count at an elevated point and then collecting material from 0-6" below ground surface with a trowel. Material from a 1-meter circle around

the static count was comingled in a 5-gallon bucket and a 500 gram composite sample created from the material. All samples will be analyzed via EPA method 901.1M with a 21-day ingrowth for Ra-226.

3.0 Data Analysis

3.1 Gamma Walkover Data

The area background and survey data were statistically analyzed with QGIS, software designed to assist in spatial data analysis. MJW compiled Table 1 below, which highlights the statistical findings from the QGIS analysis, and Figures 5 and 6, which map the GPS-collected survey data.

Table 1: Gamma Walkover Statistics

Area Background Gamma Data	
Number of Data Points	430
Area Background Mean	7,508 cpm
1.5x Area Background Mean	11,262 cpm
Site Gamma Data	
Number of Data Points	11,798
# > 1.5x ABKG	306
% > 1.5x ABKG	2.6%

For area background data, a total of 430 data points were collected, exhibiting a mean count rate of 7,508 ± 14 CPM. For the survey area data, a total of 11,798 points were reviewed and categorized according to relevant area background data.

The Site can be categorized into two (2) zones of interest: the Northern Zone and the Southern Zone. Of the 306 data points above 1.5x area background, only one (1) was seen in the Southern Zone. This point can be treated as an outlier and this survey area can be considered not radiologically impacted.

The remaining 305 data points above 1.5x ABKG are seen clustered in the western section of the Northern Zone. In an attempt to delineate this potentially elevated area, MJW staff gathered additional data approximately five (5) meters beyond the original project boundary. Once it was determined that these elevated readings were only seen to continue northwest, more GPS data was obtained in that direction. Readings above 1.5x ABKG in this ~50 x 50-meter area beyond the boundary became more dispersed. Consistent readings above 1.5x ABKG are clustered in the western section of the Northern Zone.

3.2 Sample Analysis Data

MJW staff collected a soil/sediment sample from each zone of interest. Samples were specifically obtained from areas that showed elevated readings within each respective zone. One (1) sample was collected from the elevated point within the southern zone to assess subsurface material that may not have been adequately characterized by the overland gamma walkover. Two (2) samples were collected from the northern zone. Both northern zone samples were created from the same composite material given the small area displaying elevated counts. The composite was created from a three (3) meter circle around the static point instead of a one (1) meter circle. One northern zone sample was marked as a field dupe.

No samples returned Ra-226 concentrations above the DMM-5 limit for TENORM (Background-Comparable) of 5.0 pCi/g. A summary table is below, and the full Lab Report and EDD are provided as Attachment B:

Table 2:

Sample ID[1]	Ra-226 Concentration[2]	Uncertainty[2]
052825-FOIT-001(SouthernZone)(730947001)[3]	1.13	0.197
052825-FOIT-001 (Southern Zone)	1.18	0.200
052825-FOIT-002 (Northern Zone)	1.39	0.199
052825-FOIT-002 DUP	1.62	0.211
Average Result	1.33	0.202
Background Sample[4]	0.874	0.195

1. Date(MMDDYY) - Client (Foit) - Number (###) - Area (Northern/Sourthern)
2. Concentration and uncertainty in pCi/g
3. Laboratory Duplicate
4. Previously collected sample 030725-WYE-BKG from Lab Report 714507.

4.0 Results

The data collected from the Site walkover are also color-coded to indicate measurements as: below 1.5 times area background and at or above 1.5 times area background. The segregation criteria used for the various measurements align with the DMM-5 policy for screening the

presence of potential radiological contamination. The sample analysis results indicate TENORM (Background-Comparable) on site. 6 NYCRR Part 363-7.1 (o)(7) states that TENORM at any level cannot be disposed of in NYS and must be disposed of at an approved out of state facility. Reuse of material on site is under the discretion of the assigned NYSDEC Environmental Radiation Specialist.

MJW's conclusions from the investigation are as follows:

- The gamma walkover scans provided a clear evaluation of site material with 8,308 (70%) data points being < ABKG.
- The Southern Zone is determined to likely not be radiologically impacted, although slag-like material and TENORM (Background-Comparable) may be present below ground surface.
- The Northern Zone has potential radiologically elevated material. Radiological sample analysis confirm the presence of potential TENORM.

MJW will be available for any assistance with TENORM Management, field screening, reuse, and disposal of onsite material for future work at the sites surveyed.

Figures



Figure 1. Site Conditions – Southern Zone

Photo showing conditions at the Southern Zone



Figure 2: Site Conditions – Northern Zone

Photo showing conditions at the Northern Zone



Figure 3: Elevated Area of the Northern Zone

Photo showing location of elevated readings > 1.5x ABKG



Figure 4: Heavy Vegetation Areas of the Northern Zone

Photo showing conditions of the northern border of the Northern Zone

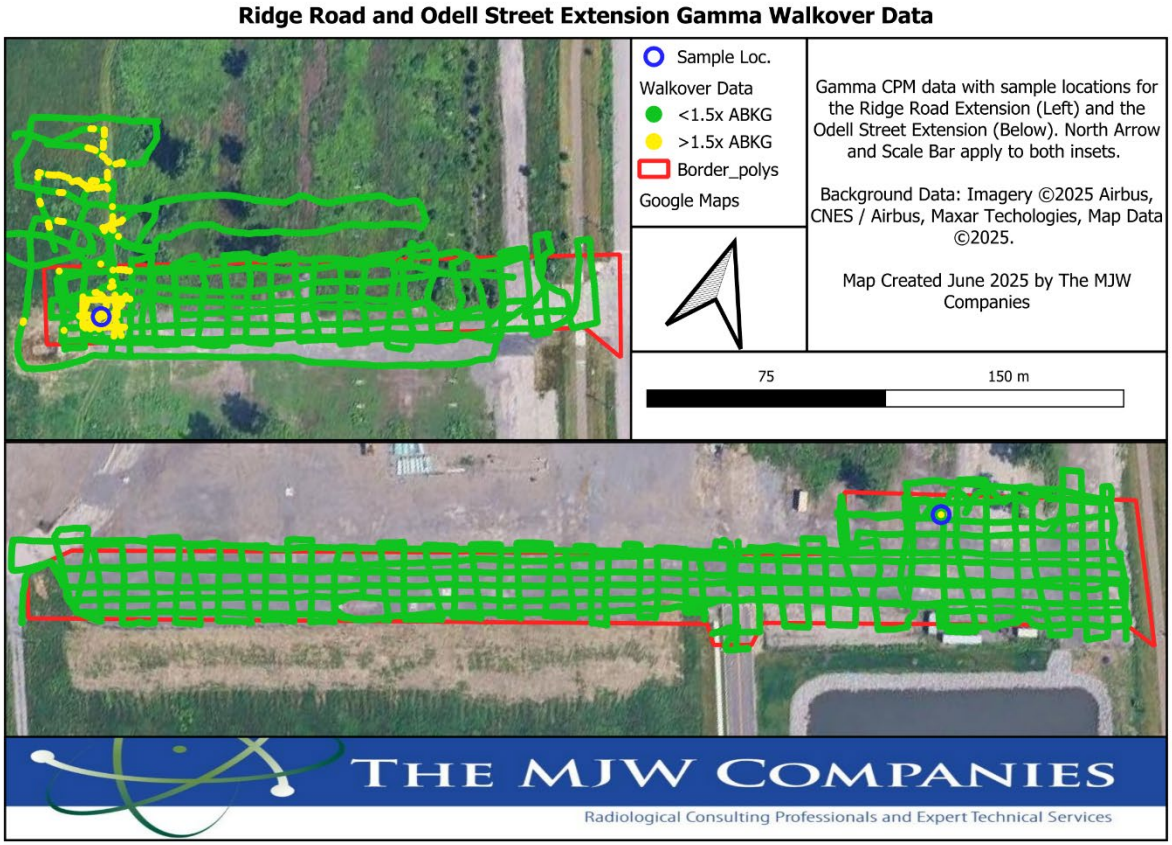


Figure 5. Gamma Walkover Data

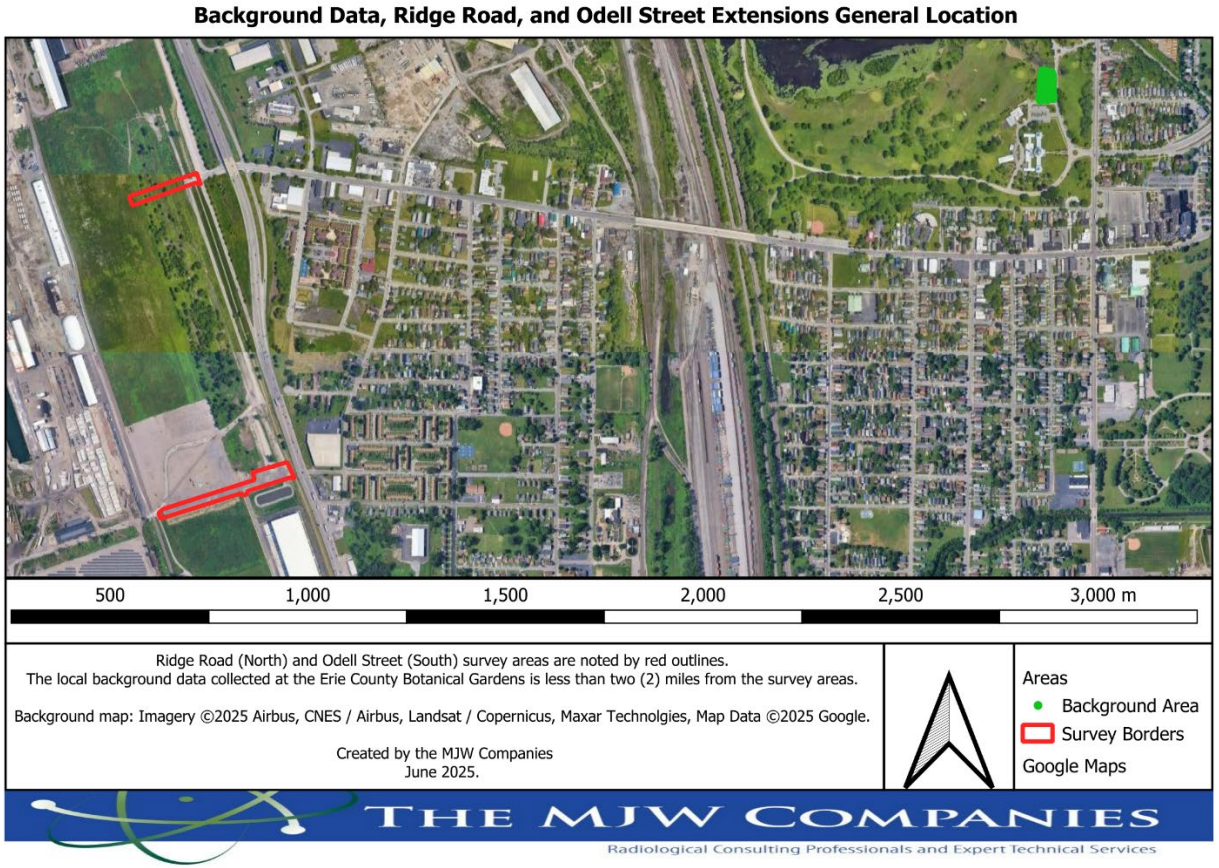


Figure 6. Site aerial with background location

Designer and Manufacturer of Scientific and Industrial Instruments

www.ludlums.com

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

ACCREDITED CERT # 4084.01

Customer ENVIRONMENTAL RESTORATION GROUP ORDER NO. 20487315/568431

Mfg. Ludlum Measurements, Inc. Model 3000 Serial No. 25024311

Mfg. Ludlum Measurements, Inc. Model 44-10 Serial No. PR408226

Cal. Date 29-Jan-25 Cal Due Date 29-Jan-26 Cal. Interval 1 Year Meterface 44-10 R

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 27 % Alt 703.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☐ Geotropism
☑ Audio ck. ☑ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 4.4 VDC
☑ Calibrated in accordance with LMI SOP 14.8 ☑ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set 900 V Input Sens. 10 mV Det. Oper. 900 V at 10 mV Threshold Dial Ratio = mV

☑ HV Readout (2 points) Ref./Inst. 500 / 494 V Ref./Inst. 1500 / 1505 V

COMMENTS:

```
          Deadtime: 8.1 µSec  Firmware: 5LC-N42.4904
Calibration Constant: 573 e+8 Overload checked but not set.
       Primary Units: cpm     Pulser calibration performed without deadtime.
     Secondary Units: R/hr    Pulser calibration SCALER READOUT reflects 6 second count.
                              Alarms disabled.
                              Calibrated using 5' cable.
```

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING	RANGE MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING
Digital	5 mR/hr	4.61 mR/hr	4.61 mR/hr				
Digital	1 mR/hr	935 µR/hr	935 µR/hr				
	800 µR/hr	751	751				
	200 µR/hr	183	183				

Range(s) Calibrated Electronically

Multimeter uncertainty within 1.4% of reading, Gamma uncertainty within 5.6% of reading, Neutron uncertainty within 7.0% of reading, Count rate uncertainty within 5.2% of reading

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING
Digital Readout	800K cpm	799 kcpm	799 kcpm	Scaler	800K cpm	79.9K	79.9K
	200K cpm	200	200		200K cpm	20.0K	20.0K
	80K cpm	79.9	79.9		80K cpm	7.99K	7.99K
	20K cpm	20.0	20.0		20K cpm	2.00K	2.00K
	8K cpm	7.99	7.99		8K cpm	799	799
	2K cpm	2.00	2.00		2K cpm	201	201
	800 cpm	801 cpm	801 cpm		800 cpm	80	80
	200 cpm	200	200		200 cpm	20	20

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.
All pass/fail determinations are based on the manufacturer's specifications without considering uncertainty factors.
Measurement results represent expanded uncertainties expressed at approximately the 95% level of confidence, using a coverage factor of k=2.
The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323AB-2013

ISO/IEC 17025:2017(E)
State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521
☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☑ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982
☐ E551 ☐ 5105 ☐ CSV280

☐ Alpha S/N ☐ Beta S/N ☑ Other Am241(~0.66µCi)

☑ m 500 S/N 251106 ☐ Oscilloscope S/N ☑ Multimeter S/N 15060230

Calibrator James McBeth James McBeth Title Calibrator Date 29JAN25

QC'd By [signature] Title Final QC Date 29 Jan 25

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

AC Inst. Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:

Dev

SN	25024311
Mdl	Model 3000
Aud Lvl	Single
Sleep	0
Setup Prtct	Normal
Rate Reset Btn	Off
Temp	63
LB	0
Conv R To Sv	0.0106
Fw	5LC-N42.4904
V Bat	6.41

RTC

Day	29
Mo	1
Hr	9
Mins	52
Sec	22
Yr	2025

Ext 1

Meas

Cur	21.3028

Cnt

Audio Mode	Off
Display Mode	Timer

Btn

Handle

Cnt Map 1	Take Log
Cnt Map 2	Do Nothing
Cnt Map 3	Do Nothing
Rate Map 1	Take Log
Rate Map 2	Do Nothing
Rate Map 3	Do Nothing

BklThr

Sensitivity	Low

High

Light Turn Off	0
Light Turn On	0

Low

Light Turn Off	0
Light Turn On	0

AuxCom

Crypto En	Off
Enable	On
Mode	LMI Direct
Write Prtct	Off

AutoMode

Interval	1

Pwr

Auto Off Tm	0
Mode	On At Boot

DetMem 1

Mdl	44-10
SN	PR408226
Aud Sigma	Off
Count Tm	60
HV	900
Op Mode	Rate/Max/Count
Over Cur	500

Ch 1

CPS Offset	0
DTC 1	8.1E-06
DTC 2	0
Eff	15
LO Cnt Tm	60
R Cal Const	5.73E+10
Thr	0.01

Response

Rate	Fast
Time	4

Unit 1

Count

Alrm 1	0
Alrm 2	0
Min Exp	000E0
Unit	counts

Rate

Alrm 1	0
Alrm 2	0
Max Val	999000
Min Exp	000E-2
Unit	cpm

Unit 2

Count

Alrm 1	0
Alrm 2	0
Min Exp	000E0
Unit	counts

Rate

Alrm 1	0
Alrm 2	0
Max Val	0.007
Min Exp	000E-8
Unit	R/h

LOG

MODE	1
NOTES	
USER	
ENABLE	0

AUTO

TM	60

NUM

MAX	1000
REC	0

Order #: 20487315/568431

Customer: ENVIRONMENTAL RESTORATION GROUP

Detector: 44-10 **Serial No.:** PR408226

Instrument: Model 3000 **Serial No.:** 25024311

BKG Time: 6

Distance: Surface

Selected HV: 900

Date: 29JAN25

Notes: Performed using 5' cable.

Signature: James McBride

Channel(s)

Name	Threshold
Channel 1	10 mV

Source(s)

Name	ID	Activity	Time	Type
Am241		0.66 µCi	6	γ

High Voltage	Background	Am241
	Reading	Reading
650	342	10,518
700	441	12,311
750	437	12,383
800	422	12,341
850	420	12,476
−900	403	12,430
950	484	12,551
1,000	359	12,547
1,050	408	12,974
1,100	830	14,121
1,150	1,473	16,444

GEL Laboratories LLC
a member of The GEL Group INC

2040 Savage Road | Charleston, SC 29407
843.556.8171
gel.com

July 28, 2025

Alex Bartels
MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Re: Routine Analytical
Work Order: 730947

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 2025. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4422.

Sincerely,

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

Purchase Order: GELP19-0644
Enclosures

MJW Technical Services
Routine Analytical
SDG: 730947

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Case Narrative

Case Narrative
for
MJW Technical Services
SDG: 730947

July 28, 2025

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on June 30, 2025 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
730947001	052825-FOIT-001 (Southern Zone)
730947002	052825-FOIT-002 (Northern Zone)
730947003	052825-FOIT-002 DUP

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

List of current GEL Certifications as of 28 July 2025

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-00651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	525-24-281-19660
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	KY90129
Kentucky Wastewater	KY90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2023019
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	NV-C24-00175
New Hampshire NELAP	205424
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2023-152
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235
Utah NELAP	SC000122024-45
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Chain of Custody and Supporting Documentation

Page: 1 of 1
Project #
GEL Quote #:
COC Number (1):
PO Number:

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: 730947
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: MJW FOR FOIT-ALBERT (AZAR) Phone # 716-631-8291
Project/Site Name: RIDGE RD./ODELL ST WALKOVER LOCATION Fax #
Address: 75 HAZELWOOD DR. SUITE 12 AMHERST, NY 14228
Collected By: LUKE ALEXANDER Send Results To: abartels@mjwcorp.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	(7) Known or possible Hazards	Total number of containers	GAMMA SPEC									<-- Preservative Type (6)
052825-FOIT-001 (SOUTHERN ZONE)	05-28-25	1220	N	N	SO	N		1	X									STORE SAMPLES UNTIL
052825-FOIT-002 (NORTHERN ZONE)	05-28-25	1305	N	N	SO	N		1	X									END OF AUGUST
052825-FOIT-002 DUP	05-28-25	1305	N	N	SO	N		1	X									

Comments
Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	6/26/25	1201	1 Melissa Tatro	6/27/25	10:00
2			2		
3			3		

TAT Requested: Normal: X Rush: _____ Specify: _____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No **Cooler Temp:** 1.6 °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone : [X] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B/7470A* **- 1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) **KNOWN OR POSSIBLE HAZARDS**

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Misc. RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WTW	SDG/AR/COC/Work Order: 730947	GEL PM: JC
Received By: Thyasia Tatum	Date Received at GEL: 6/30/25	

Courier (Circle Applicable)
FedEx Express FedEx Ground UPS Field Services Courier Client Other:

IR Temp gun # IR2-23 Daily Calibration Performed? Y N

Tracking Number	Temp (C)	If over 6 °C, check if samples do not require cold preservation (ie radiochem only).	Tracking Number	Temp (C)	If over 6 °C, check if samples do not require cold preservation (ie radiochem only).
8823 5300 7872	10°C	✓			

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Are there any sample hazards to document?		✓	If yes, select Hazards below. PCBs Flammable Foreign Soil RCRA Asbestos Beryllium Corrosive Other:
E) Was a SDS received and reviewed by Lab Safety?		✓	Circle Applicable: See additional Comments below. No additional comments needed after review.

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Direct client dropoff Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	If there are samples requiring cold preservation, did they arrive within (0 < 6 °C)?		✓		Preservation Method: Wet Ice Ice Packs Dry Ice (None) Other: *all temperatures recorded next to tracking numbers are in Celcius
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Preserved per COC request or list Sample IDs and Containers Affected: If Preservation added, Lot#:
6	Do any samples require Volatile Analysis? (If yes, answer all three additional questions.)			✓	If Yes, are Encores or Soil Kits present? Yes___ No___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample IDs and containers affected:
7	Samples received within holding time?	✓			IDs and tests affected:
8	Sample IDs on COC match IDs on bottles?	✓			IDs and containers affected:
9	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
10	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Missing Container (provide details) Other (describe)
11	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
12	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments:

PM (or PMA) review: Initials AM Date 7/1/25

☐ Continuation Form Required when selected

GL-CHL-SR-001 Rev 8

Data Review Qualifier Definitions

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.
P	Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
MJW Technical Services
SDG #: 730947

Product: **Dry Weight**
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2821732

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
730947001	052825-FOIT-001 (Southern Zone)
730947002	052825-FOIT-002 (Northern Zone)
730947003	052825-FOIT-002 DUP

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Gammaspec, Gamma, Solid (Standard List)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 29
Analytical Batch: 2822154

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2821732

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
730947001	052825-FOIT-001 (Southern Zone)
730947002	052825-FOIT-002 (Northern Zone)
730947003	052825-FOIT-002 DUP
1206156307	Method Blank (MB)
1206156308	730947001(052825-FOIT-001 (Southern Zone)) Sample Duplicate (DUP)
1206156309	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing

calibration, instrument controls and process controls where applicable.

Qualifier Information

Qualifier	Reason	Analyte	Sample
UI	Results are considered a false positive due to high peak-width.	Cobalt-58	730947003 (052825-FOIT-002 DUP)
		Lead-210	730947001 (052825-FOIT-001 (Southern Zone))
UI	Results are considered a false positive due to low abundance.	Cesium-134	730947002 (052825-FOIT-002 (Northern Zone))
UI	Results are considered a false positive due to no valid peak.	Beryllium-7	1206156308 (052825-FOIT-001 (Southern Zone)DUP)
		Uranium-235	730947003 (052825-FOIT-002 DUP)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Moisture LogBook

Batch: 2821732
Analyst: GG
Date/Time: 30-JUN-2025
Procedure Code:___PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
730947001	SAMPLE		SP-C238839655	13:48	13.01	579.66	546.71	566.65	533.7	5.814
730947002	SAMPLE		SP-C238839655	13:48	13.02	466.52	430.81	453.5	417.79	7.874
730947003	SAMPLE		SP-C238839655	13:48	13.03	489.73	448.65	476.7	435.62	8.617

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

GEL LABORATORIES LLC

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Qualifier Definition Report
for

MJWC001 MJW Technical Services

Client SDG: 730947 GEL Work Order: 730947

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI Gamma Spectroscopy--Uncertain identification

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:  **Name: Kate Gellatly**

Date: 29 JUL 2025 **Title: Analyst 1 PT**

Sample Data Summary

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: July 29, 2025

Contact: Alex Bartels
Project: Routine Analytical

Client Sample ID: 052825-FOIT-001 (Southern Zone)
Sample ID: 730947001
Matrix: Soil
Collect Date: 28-MAY-25
Receive Date: 30-JUN-25
Collector: Client
Moisture: 5.81%

Project: MJWC01325
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.08	+/-0.308	0.260	+/-0.340		pCi/g			MXR1	07/26/25	2226	2822154	1
Americium-241	U	0.155	+/-0.355	0.718	+/-0.363		pCi/g							
Antimony-124	U	0.0120	+/-0.183	0.398	+/-0.183		pCi/g							
Antimony-125	U	0.0722	+/-0.0878	0.188	+/-0.0938		pCi/g							
Barium-133	U	0.0174	+/-0.0482	0.0875	+/-0.0488		pCi/g							
Barium-140	U	-1.04	+/-2.59	4.06	+/-2.64		pCi/g							
Beryllium-7	U	0.452	+/-0.854	1.14	+/-0.855		pCi/g							
Bismuth-212	U	1.05	+/-1.09	1.15	+/-1.09		pCi/g							
Bismuth-214		0.795	+/-0.171	0.118	+/-0.184		pCi/g							
Cerium-139	U	0.00452	+/-0.0365	0.0666	+/-0.0366		pCi/g							
Cerium-141	U	-0.126	+/-0.189	0.318	+/-0.198		pCi/g							
Cerium-144	U	0.0165	+/-0.256	0.431	+/-0.256		pCi/g							
Cesium-134	U	0.0260	+/-0.0507	0.104	+/-0.0522		pCi/g							
Cesium-136	U	0.221	+/-1.18	2.43	+/-1.18		pCi/g							
Cesium-137	U	0.0321	+/-0.0677	0.0632	+/-0.0678	0.100	pCi/g							
Chromium-51	U	-0.194	+/-1.01	1.92	+/-1.01		pCi/g							
Cobalt-56	U	-0.0190	+/-0.0598	0.114	+/-0.0605		pCi/g							
Cobalt-57	U	-0.0288	+/-0.0313	0.0518	+/-0.0341		pCi/g							
Cobalt-58	U	0.000666	+/-0.0512	0.106	+/-0.0512		pCi/g							
Cobalt-60	U	-0.0143	+/-0.0313	0.0575	+/-0.0320		pCi/g							
Europium-152	U	0.0661	+/-0.112	0.218	+/-0.116		pCi/g							
Europium-154	U	0.0703	+/-0.147	0.305	+/-0.150		pCi/g							
Europium-155	U	-0.00919	+/-0.123	0.224	+/-0.123		pCi/g							
Iridium-192	U	-0.00504	+/-0.0507	0.0971	+/-0.0507		pCi/g							
Iron-59	U	0.124	+/-0.145	0.336	+/-0.156		pCi/g							
Lead-210	UI	0.000	+/-50.2	46.4	+/-52.7		pCi/g							
Lead-212		0.734	+/-0.122	0.100	+/-0.142		pCi/g							
Lead-214		1.18	+/-0.200	0.163	+/-0.228		pCi/g							
Manganese-54	U	-0.0107	+/-0.0346	0.0671	+/-0.0350		pCi/g							
Mercury-203	U	0.00218	+/-0.0753	0.146	+/-0.0753		pCi/g							
Neodymium-147	U	-16.9	+/-9.94	13.1	+/-12.6		pCi/g							
Neptunium-239	U	0.116	+/-0.267	0.513	+/-0.272		pCi/g							
Niobium-94	U	-0.0311	+/-0.0429	0.0645	+/-0.0452		pCi/g							
Niobium-95	U	-0.0635	+/-0.0829	0.146	+/-0.0880		pCi/g							
Potassium-40		13.5	+/-1.76	0.593	+/-2.46		pCi/g							
Promethium-144	U	0.0418	+/-0.0388	0.0818	+/-0.0433		pCi/g							
Promethium-146	U	-0.0211	+/-0.0418	0.0742	+/-0.0429		pCi/g							
Radium-226		1.18	+/-0.200	0.163	+/-0.228		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: July 29, 2025

Contact: Alex Bartels
Project: Routine Analytical

Client Sample ID: 052825-FOIT-001 (Southern Zone)
Sample ID: 730947001

Project: MJWC01325
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		1.08	+/-0.308	0.260	+/-0.340		pCi/g							
Ruthenium-106	U	0.0942	+/-0.326	0.655	+/-0.329		pCi/g							
Silver-110m	U	0.0164	+/-0.0602	0.126	+/-0.0607		pCi/g							
Sodium-22	U	0.0254	+/-0.0530	0.106	+/-0.0531		pCi/g							
Thallium-208		0.163	+/-0.0740	0.0733	+/-0.0753		pCi/g							
Thorium-234	U	-0.109	+/-2.80	5.31	+/-2.80		pCi/g							
Tin-113	U	0.00689	+/-0.0647	0.124	+/-0.0648		pCi/g							
Uranium-235	U	0.0735	+/-0.235	0.433	+/-0.235		pCi/g							
Uranium-238	U	-0.109	+/-2.80	5.31	+/-2.80		pCi/g							
Yttrium-88	U	-0.0424	+/-0.0603	0.103	+/-0.0634		pCi/g							
Zinc-65	U	0.0118	+/-0.0717	0.146	+/-0.0719		pCi/g							
Zirconium-95	U	0.00653	+/-0.125	0.226	+/-0.125		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	06/30/25	1348	2821732

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Company : MJW Technical Services
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Report Date: July 29, 2025

Contact: Alex Bartels
Project: Routine Analytical

Client Sample ID: 052825-FOIT-002 (Northern Zone)
Sample ID: 730947002
Matrix: Soil
Collect Date: 28-MAY-25
Receive Date: 30-JUN-25
Collector: Client
Moisture: 7.87%

Project: MJWC01325
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.852	+/-0.312	0.221	+/-0.328		pCi/g			MXR1	07/26/25	2229	2822154	1
Americium-241	U	-0.00705	+/-0.128	0.225	+/-0.128		pCi/g							
Antimony-124	U	0.0249	+/-0.128	0.275	+/-0.129		pCi/g							
Antimony-125	U	0.0412	+/-0.0785	0.159	+/-0.0807		pCi/g							
Barium-133	U	0.00969	+/-0.0363	0.0656	+/-0.0365		pCi/g							
Barium-140	U	0.688	+/-2.38	4.74	+/-2.41		pCi/g							
Beryllium-7	U	0.375	+/-0.528	1.08	+/-0.555		pCi/g							
Bismuth-212		1.16	+/-0.581	0.744	+/-0.592		pCi/g							
Bismuth-214		1.10	+/-0.197	0.111	+/-0.221		pCi/g							
Cerium-139	U	0.00178	+/-0.0329	0.0594	+/-0.0329		pCi/g							
Cerium-141	U	-0.0304	+/-0.136	0.242	+/-0.137		pCi/g							
Cerium-144	U	0.0138	+/-0.198	0.362	+/-0.198		pCi/g							
Cesium-134	UI	0.000	+/-0.0499	0.0765	+/-0.0672		pCi/g							
Cesium-136	U	0.220	+/-0.826	1.74	+/-0.833		pCi/g							
Cesium-137	U	-0.00424	+/-0.0314	0.0582	+/-0.0314	0.100	pCi/g							
Chromium-51	U	-1.07	+/-0.913	1.57	+/-1.04		pCi/g							
Cobalt-56	U	0.0115	+/-0.0457	0.0907	+/-0.0460		pCi/g							
Cobalt-57	U	-0.00368	+/-0.0253	0.0456	+/-0.0253		pCi/g							
Cobalt-58	U	0.00894	+/-0.0526	0.101	+/-0.0528		pCi/g							
Cobalt-60	U	0.00879	+/-0.0215	0.0517	+/-0.0219		pCi/g							
Europium-152	U	0.00436	+/-0.0942	0.164	+/-0.0943		pCi/g							
Europium-154	U	-0.0132	+/-0.0657	0.134	+/-0.0660		pCi/g							
Europium-155	U	0.0726	+/-0.0928	0.181	+/-0.0986		pCi/g							
Iridium-192	U	0.00582	+/-0.0481	0.0907	+/-0.0482		pCi/g							
Iron-59	U	-0.0733	+/-0.145	0.265	+/-0.149		pCi/g							
Lead-210	U	0.106	+/-3.21	6.33	+/-3.21		pCi/g							
Lead-212		1.24	+/-0.127	0.0857	+/-0.165		pCi/g							
Lead-214		1.39	+/-0.199	0.110	+/-0.230		pCi/g							
Manganese-54	U	-0.0251	+/-0.0432	0.0625	+/-0.0447		pCi/g							
Mercury-203	U	0.0183	+/-0.0645	0.128	+/-0.0651		pCi/g							
Neodymium-147	U	-0.256	+/-8.16	14.0	+/-8.17		pCi/g							
Neptunium-239	U	0.0769	+/-0.230	0.433	+/-0.233		pCi/g							
Niobium-94	U	0.0291	+/-0.0470	0.0488	+/-0.0470		pCi/g							
Niobium-95	U	-0.0126	+/-0.0837	0.133	+/-0.0839		pCi/g							
Potassium-40		5.73	+/-1.02	0.461	+/-1.17		pCi/g							
Promethium-144	U	-0.00435	+/-0.0369	0.0603	+/-0.0370		pCi/g							
Promethium-146	U	0.00176	+/-0.0318	0.0622	+/-0.0318		pCi/g							
Radium-226		1.39	+/-0.199	0.110	+/-0.230		pCi/g							
Radium-228		0.852	+/-0.312	0.221	+/-0.328		pCi/g							

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Certificate of Analysis

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Amherst, New York 14228

Report Date: July 29, 2025

Contact: Alex Bartels
Project: Routine Analytical

Client Sample ID: 052825-FOIT-002 (Northern Zone)
Sample ID: 730947002

Project: MJWC01325
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.151	+/-0.259	0.540	+/-0.269		pCi/g							
Silver-110m	U	0.0268	+/-0.0465	0.0961	+/-0.0481		pCi/g							
Sodium-22	U	-0.00324	+/-0.0242	0.0499	+/-0.0242		pCi/g							
Thallium-208		0.314	+/-0.0840	0.0548	+/-0.0886		pCi/g							
Thorium-234		2.36	+/-2.62	2.10	+/-2.67		pCi/g							
Tin-113	U	0.0215	+/-0.0475	0.0955	+/-0.0485		pCi/g							
Uranium-235	U	0.0866	+/-0.178	0.338	+/-0.178		pCi/g							
Uranium-238		2.36	+/-2.62	2.10	+/-2.67		pCi/g							
Yttrium-88	U	-0.00311	+/-0.0345	0.0732	+/-0.0345		pCi/g							
Zinc-65	U	-0.0148	+/-0.0828	0.140	+/-0.0831		pCi/g							
Zirconium-95	U	-0.0367	+/-0.0793	0.140	+/-0.0810		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	06/30/25	1348	2821732

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
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Amherst, New York 14228

Report Date: July 29, 2025

Contact: Alex Bartels
Project: Routine Analytical

Client Sample ID: 052825-FOIT-002 DUP
Sample ID: 730947003
Matrix: Soil
Collect Date: 28-MAY-25
Receive Date: 30-JUN-25
Collector: Client
Moisture: 8.62%

Project: MJWC01325
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.07	+/-0.337	0.273	+/-0.354		pCi/g			MXR1	07/27/25	1004	2822154	1
Americium-241	U	0.0443	+/-0.0438	0.0870	+/-0.0484		pCi/g							
Antimony-124	U	0.00289	+/-0.161	0.365	+/-0.161		pCi/g							
Antimony-125	U	0.0149	+/-0.0947	0.186	+/-0.0949		pCi/g							
Barium-133	U	0.00764	+/-0.0372	0.0688	+/-0.0374		pCi/g							
Barium-140	U	-0.169	+/-3.33	6.35	+/-3.34		pCi/g							
Beryllium-7	U	0.432	+/-0.555	1.20	+/-0.590		pCi/g							
Bismuth-212		1.10	+/-1.28	1.06	+/-1.29		pCi/g							
Bismuth-214		1.25	+/-0.238	0.143	+/-0.268		pCi/g							
Cerium-139	U	0.0156	+/-0.0325	0.0620	+/-0.0335		pCi/g							
Cerium-141	U	0.0588	+/-0.131	0.235	+/-0.133		pCi/g							
Cerium-144	U	0.0328	+/-0.174	0.329	+/-0.174		pCi/g							
Cesium-134	U	-0.00725	+/-0.0484	0.0954	+/-0.0485		pCi/g							
Cesium-136	U	1.04	+/-1.62	2.51	+/-1.69		pCi/g							
Cesium-137	U	0.0267	+/-0.0541	0.107	+/-0.0555	0.100	pCi/g							
Chromium-51	U	0.174	+/-1.05	2.10	+/-1.05		pCi/g							
Cobalt-56	U	-0.0256	+/-0.0647	0.122	+/-0.0658		pCi/g							
Cobalt-57	U	-0.00168	+/-0.0211	0.0395	+/-0.0211		pCi/g							
Cobalt-58	UI	0.000	+/-0.0751	0.111	+/-0.0765		pCi/g							
Cobalt-60	U	0.0102	+/-0.0378	0.0862	+/-0.0381		pCi/g							
Europium-152	U	-0.0144	+/-0.0943	0.181	+/-0.0945		pCi/g							
Europium-154	U	0.0653	+/-0.125	0.286	+/-0.129		pCi/g							
Europium-155	U	0.00130	+/-0.0727	0.138	+/-0.0727		pCi/g							
Iridium-192	U	-0.0566	+/-0.0473	0.0807	+/-0.0539		pCi/g							
Iron-59	U	0.0708	+/-0.198	0.427	+/-0.201		pCi/g							
Lead-210		2.24	+/-0.942	0.682	+/-0.966		pCi/g							
Lead-212		1.24	+/-0.135	0.0943	+/-0.186		pCi/g							
Lead-214		1.62	+/-0.211	0.129	+/-0.248		pCi/g							
Manganese-54	U	-0.0211	+/-0.0449	0.0836	+/-0.0460		pCi/g							
Mercury-203	U	0.00929	+/-0.0710	0.140	+/-0.0711		pCi/g							
Neodymium-147	U	-1.86	+/-11.0	20.5	+/-11.0		pCi/g							
Neptunium-239	U	-0.0975	+/-0.202	0.366	+/-0.207		pCi/g							
Niobium-94	U	0.00432	+/-0.0371	0.0762	+/-0.0372		pCi/g							
Niobium-95	U	0.0268	+/-0.0939	0.190	+/-0.0947		pCi/g							
Potassium-40		5.02	+/-1.42	0.842	+/-1.48		pCi/g							
Promethium-144	U	0.00951	+/-0.0351	0.0755	+/-0.0353		pCi/g							
Promethium-146	U	0.0284	+/-0.0479	0.0982	+/-0.0496		pCi/g							
Radium-226		1.62	+/-0.211	0.129	+/-0.248		pCi/g							
Radium-228		1.07	+/-0.337	0.273	+/-0.354		pCi/g							

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Amherst, New York 14228

Report Date: July 29, 2025

Contact: Alex Bartels
Project: Routine Analytical

Client Sample ID: 052825-FOIT-002 DUP
Sample ID: 730947003

Project: MJWC01325
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.204	+/-0.329	0.561	+/-0.342		pCi/g							
Silver-110m	U	0.0221	+/-0.0527	0.111	+/-0.0537		pCi/g							
Sodium-22	U	0.0236	+/-0.0453	0.103	+/-0.0466		pCi/g							
Thallium-208		0.405	+/-0.0941	0.0786	+/-0.102		pCi/g							
Thorium-234		1.77	+/-0.994	0.821	+/-1.07		pCi/g							
Tin-113	U	-0.0241	+/-0.0685	0.112	+/-0.0694		pCi/g							
Uranium-235	UI	0.000	+/-0.332	0.306	+/-0.334		pCi/g							
Uranium-238		1.77	+/-0.994	0.821	+/-1.07		pCi/g							
Yttrium-88	U	0.0249	+/-0.0882	0.194	+/-0.0890		pCi/g							
Zinc-65	U	0.0556	+/-0.117	0.234	+/-0.120		pCi/g							
Zirconium-95	U	-0.0129	+/-0.130	0.260	+/-0.130		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	06/30/25	1348	2821732

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Quality Control Data

QC Summary

Client : **MJW Technical Services**
15 Hazelwood Drive
Suite 112
Amherst, New York

Contact: **Alex Bartels**

Workorder: **730947**

Report Date: July 29, 2025

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
QC1206156308 730947001 DUP										
Actinium-228		1.08		0.678	pCi/g	45.3		(0% - 100%)	MXR1	07/27/2510:05
	Uncert:	+/-0.308		+/-0.337						
	TPU:	+/-0.340		+/-0.347						
Americium-241	U	0.155	U	-0.114	pCi/g	0		N/A		
	Uncert:	+/-0.355		+/-0.234						
	TPU:	+/-0.363		+/-0.240						
Antimony-124	U	0.0120	U	0.0293	pCi/g	0		N/A		
	Uncert:	+/-0.183		+/-0.144						
	TPU:	+/-0.183		+/-0.145						
Antimony-125	U	0.0722	U	0.00600	pCi/g	0		N/A		
	Uncert:	+/-0.0878		+/-0.0880						
	TPU:	+/-0.0938		+/-0.0880						
Barium-133	U	0.0174	U	0.0307	pCi/g	0		N/A		
	Uncert:	+/-0.0482		+/-0.0384						
	TPU:	+/-0.0488		+/-0.0409						
Barium-140	U	-1.04	U	-0.545	pCi/g	0		N/A		
	Uncert:	+/-2.59		+/-3.29						
	TPU:	+/-2.64		+/-3.30						
Beryllium-7	U	0.452	UI	0.000	pCi/g	0		N/A		
	Uncert:	+/-0.854		+/-0.804						
	TPU:	+/-0.855		+/-0.818						
Bismuth-212	U	1.05	U	0.830	pCi/g	0		N/A		
	Uncert:	+/-1.09		+/-0.489						
	TPU:	+/-1.09		+/-0.621						
Bismuth-214		0.795		0.953	pCi/g	18.1		(0%-20%)		
	Uncert:	+/-0.171		+/-0.183						
	TPU:	+/-0.184		+/-0.200						
Cerium-139	U	0.00452	U	0.00369	pCi/g	0		N/A		
	Uncert:	+/-0.0365		+/-0.0374						
	TPU:	+/-0.0366		+/-0.0374						
Cerium-141	U	-0.126	U	-0.0873	pCi/g	0		N/A		
	Uncert:	+/-0.189		+/-0.166						
	TPU:	+/-0.198		+/-0.171						
Cerium-144	U	0.0165	U	0.00615	pCi/g	0		N/A		
	Uncert:	+/-0.256		+/-0.212						
	TPU:	+/-0.256		+/-0.212						
Cesium-134	U	0.0260	U	0.00552	pCi/g	0		N/A		
	Uncert:	+/-0.0507		+/-0.0414						
	TPU:	+/-0.0522		+/-0.0415						
Cesium-136	U	0.221	U	-0.981	pCi/g	0		N/A		
	Uncert:	+/-1.18		+/-1.12						

QC Summary

Workorder: **730947**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
	TPU:	+/-1.18		+/-1.21						
Cesium-137	U	0.0321	U	0.00689	pCi/g	0			N/A	
	Uncert:	+/-0.0677		+/-0.0366						
	TPU:	+/-0.0678		+/-0.0368						
Chromium-51	U	-0.194	U	0.209	pCi/g	0			N/A	
	Uncert:	+/-1.01		+/-1.17						
	TPU:	+/-1.01		+/-1.18						
Cobalt-56	U	-0.0190	U	0.0354	pCi/g	0			N/A	
	Uncert:	+/-0.0598		+/-0.0524						
	TPU:	+/-0.0605		+/-0.0526						
Cobalt-57	U	-0.0288	U	0.00543	pCi/g	0			N/A	
	Uncert:	+/-0.0313		+/-0.0259						
	TPU:	+/-0.0341		+/-0.0260						
Cobalt-58	U	0.000666	U	0.0308	pCi/g	0			N/A	
	Uncert:	+/-0.0512		+/-0.0552						
	TPU:	+/-0.0512		+/-0.0570						
Cobalt-60	U	-0.0143	U	0.0157	pCi/g	0			N/A	
	Uncert:	+/-0.0313		+/-0.0348						
	TPU:	+/-0.0320		+/-0.0356						
Europium-152	U	0.0661	U	-0.0233	pCi/g	0			N/A	
	Uncert:	+/-0.112		+/-0.104						
	TPU:	+/-0.116		+/-0.105						
Europium-154	U	0.0703	U	-0.0439	pCi/g	0			N/A	
	Uncert:	+/-0.147		+/-0.108						
	TPU:	+/-0.150		+/-0.110						
Europium-155	U	-0.00919	U	0.0700	pCi/g	0			N/A	
	Uncert:	+/-0.123		+/-0.0961						
	TPU:	+/-0.123		+/-0.101						
Iridium-192	U	-0.00504	U	0.0340	pCi/g	0			N/A	
	Uncert:	+/-0.0507		+/-0.0487						
	TPU:	+/-0.0507		+/-0.0512						
Iron-59	U	0.124	U	-0.00979	pCi/g	0			N/A	
	Uncert:	+/-0.145		+/-0.156						
	TPU:	+/-0.156		+/-0.156						
Lead-210	UI	0.000	U	7.96	pCi/g	0			N/A	
	Uncert:	+/-50.2		+/-8.63						
	TPU:	+/-52.7		+/-9.38						
Lead-212		0.734		0.718	pCi/g	2.12		(0%-20%)		
	Uncert:	+/-0.122		+/-0.127						
	TPU:	+/-0.142		+/-0.141						
Lead-214		1.18		1.13	pCi/g	4.17		(0%-20%)		
	Uncert:	+/-0.200		+/-0.197						
	TPU:	+/-0.228		+/-0.219						
Manganese-54	U	-0.0107	U	0.00894	pCi/g	0			N/A	
	Uncert:	+/-0.0346		+/-0.0411						
	TPU:	+/-0.0350		+/-0.0413						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
Mercury-203	U	0.00218	U	-0.0382	pCi/g	0			N/A	
	Uncert:	+/-0.0753		+/-0.0793						
	TPU:	+/-0.0753		+/-0.0812						
Neodymium-147	U	-16.9	U	-4.70	pCi/g	0			N/A	
	Uncert:	+/-9.94		+/-8.52						
	TPU:	+/-12.6		+/-8.79						
Neptunium-239	U	0.116	U	0.177	pCi/g	0			N/A	
	Uncert:	+/-0.267		+/-0.262						
	TPU:	+/-0.272		+/-0.274						
Niobium-94	U	-0.0311	U	0.0248	pCi/g	0			N/A	
	Uncert:	+/-0.0429		+/-0.0309						
	TPU:	+/-0.0452		+/-0.0329						
Niobium-95	U	-0.0635	U	-0.00530	pCi/g	0			N/A	
	Uncert:	+/-0.0829		+/-0.0645						
	TPU:	+/-0.0880		+/-0.0645						
Potassium-40		13.5		12.5	pCi/g	7.86		(0%-20%)		
	Uncert:	+/-1.76		+/-1.70						
	TPU:	+/-2.46		+/-2.18						
Promethium-144	U	0.0418	U	-0.0205	pCi/g	0			N/A	
	Uncert:	+/-0.0388		+/-0.0302						
	TPU:	+/-0.0433		+/-0.0317						
Promethium-146	U	-0.0211	U	0.0250	pCi/g	0			N/A	
	Uncert:	+/-0.0418		+/-0.0318						
	TPU:	+/-0.0429		+/-0.0339						
Radium-226		1.18		1.13	pCi/g	4.17		(0%-20%)		
	Uncert:	+/-0.200		+/-0.197						
	TPU:	+/-0.228		+/-0.219						
Radium-228		1.08		0.678	pCi/g	45.3		(0% - 100%)		
	Uncert:	+/-0.308		+/-0.337						
	TPU:	+/-0.340		+/-0.347						
Ruthenium-106	U	0.0942	U	-0.0621	pCi/g	0			N/A	
	Uncert:	+/-0.326		+/-0.348						
	TPU:	+/-0.329		+/-0.349						
Silver-110m	U	0.0164	U	-0.0285	pCi/g	0			N/A	
	Uncert:	+/-0.0602		+/-0.0623						
	TPU:	+/-0.0607		+/-0.0637						
Sodium-22	U	0.0254	U	-0.0181	pCi/g	0			N/A	
	Uncert:	+/-0.0530		+/-0.0384						
	TPU:	+/-0.0531		+/-0.0393						
Thallium-208		0.163		0.225	pCi/g	32		(0% - 100%)		
	Uncert:	+/-0.0740		+/-0.0824						
	TPU:	+/-0.0753		+/-0.0846						
Thorium-234	U	-0.109	U	0.638	pCi/g	0			N/A	
	Uncert:	+/-2.80		+/-3.64						
	TPU:	+/-2.80		+/-3.64						
Tin-113	U	0.00689	U	-0.0164	pCi/g	0			N/A	

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
	Uncert:	+/-0.0647		+/-0.0456						
	TPU:	+/-0.0648		+/-0.0462						
Uranium-235	U	0.0735	U	0.0974	pCi/g	0			N/A	
	Uncert:	+/-0.235		+/-0.203						
	TPU:	+/-0.235		+/-0.208						
Uranium-238	U	-0.109	U	0.638	pCi/g	0			N/A	
	Uncert:	+/-2.80		+/-3.64						
	TPU:	+/-2.80		+/-3.64						
Yttrium-88	U	-0.0424	U	-0.0186	pCi/g	0			N/A	
	Uncert:	+/-0.0603		+/-0.0587						
	TPU:	+/-0.0634		+/-0.0593						
Zinc-65	U	0.0118	U	0.0365	pCi/g	0			N/A	
	Uncert:	+/-0.0717		+/-0.102						
	TPU:	+/-0.0719		+/-0.103						
Zirconium-95	U	0.00653	U	-0.0380	pCi/g	0			N/A	
	Uncert:	+/-0.125		+/-0.0890						
	TPU:	+/-0.125		+/-0.0907						
QC1206156309 LCS										
Actinium-228			U	0.521	pCi/g				MXR1	07/27/2510:06
	Uncert:			+/-1.40						
	TPU:			+/-1.42						
Americium-241	482			550	pCi/g		114	(75%-125%)		
	Uncert:			+/-10.6						
	TPU:			+/-71.9						
Antimony-124			U	0.224	pCi/g					
	Uncert:			+/-0.332						
	TPU:			+/-0.348						
Antimony-125			U	0.567	pCi/g					
	Uncert:			+/-1.15						
	TPU:			+/-1.18						
Barium-133			U	-0.123	pCi/g					
	Uncert:			+/-0.454						
	TPU:			+/-0.457						
Barium-140			U	2.06	pCi/g					
	Uncert:			+/-4.60						
	TPU:			+/-4.70						
Beryllium-7			U	6.44	pCi/g					
	Uncert:			+/-7.93						
	TPU:			+/-7.95						
Bismuth-212			U	-0.293	pCi/g					
	Uncert:			+/-3.46						
	TPU:			+/-3.47						
Bismuth-214			U	-0.221	pCi/g					
	Uncert:			+/-0.557						
	TPU:			+/-0.566						
Cerium-139			U	0.0259	pCi/g					

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
	Uncert:			+/-0.270						
	TPU:			+/-0.270						
Cerium-141			U	-0.0390	pCi/g					
	Uncert:			+/-0.739						
	TPU:			+/-0.739						
Cerium-144			U	1.29	pCi/g					
	Uncert:			+/-1.77						
	TPU:			+/-1.86						
Cesium-134			U	0.0895	pCi/g					
	Uncert:			+/-0.324						
	TPU:			+/-0.326						
Cesium-136			U	-0.399	pCi/g					
	Uncert:			+/-1.99						
	TPU:			+/-2.00						
Cesium-137	147			139	pCi/g		94.9	(75%-125%)		
	Uncert:			+/-2.06						
	TPU:			+/-11.4						
Chromium-51			U	1.90	pCi/g					
	Uncert:			+/-5.00						
	TPU:			+/-5.07						
Cobalt-56			U	0.293	pCi/g					
	Uncert:			+/-0.386						
	TPU:			+/-0.410						
Cobalt-57			U	0.142	pCi/g					
	Uncert:			+/-0.225						
	TPU:			+/-0.234						
Cobalt-58			U	0.0728	pCi/g					
	Uncert:			+/-0.351						
	TPU:			+/-0.352						
Cobalt-60	50.8			50.5	pCi/g		99.4	(75%-125%)		
	Uncert:			+/-1.53						
	TPU:			+/-6.21						
Europium-152			U	-0.852	pCi/g					
	Uncert:			+/-0.973						
	TPU:			+/-1.05						
Europium-154			U	0.135	pCi/g					
	Uncert:			+/-0.453						
	TPU:			+/-0.457						
Europium-155			U	-0.761	pCi/g					
	Uncert:			+/-0.930						
	TPU:			+/-0.994						
Iridium-192			U	-0.236	pCi/g					
	Uncert:			+/-0.397						
	TPU:			+/-0.412						
Iron-59			U	-0.487	pCi/g					
	Uncert:			+/-1.19						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
	TPU:			+/-1.21						
Lead-210				4300	pCi/g					
	Uncert:			+/-325						
	TPU:			+/-625						
Lead-212			U	0.191	pCi/g					
	Uncert:			+/-0.533						
	TPU:			+/-0.540						
Lead-214			U	0.875	pCi/g					
	Uncert:			+/-0.771						
	TPU:			+/-0.870						
Manganese-54			U	-0.215	pCi/g					
	Uncert:			+/-0.295						
	TPU:			+/-0.312						
Mercury-203			U	-0.0585	pCi/g					
	Uncert:			+/-0.439						
	TPU:			+/-0.439						
Neodymium-147			U	-3.70	pCi/g					
	Uncert:			+/-10.6						
	TPU:			+/-10.7						
Neptunium-239			U	0.113	pCi/g					
	Uncert:			+/-2.30						
	TPU:			+/-2.30						
Niobium-94			U	-0.115	pCi/g					
	Uncert:			+/-0.233						
	TPU:			+/-0.239						
Niobium-95			U	0.138	pCi/g					
	Uncert:			+/-0.316						
	TPU:			+/-0.323						
Potassium-40			U	-0.584	pCi/g					
	Uncert:			+/-1.30						
	TPU:			+/-1.33						
Promethium-144			U	0.0869	pCi/g					
	Uncert:			+/-0.250						
	TPU:			+/-0.254						
Promethium-146			U	-0.115	pCi/g					
	Uncert:			+/-0.573						
	TPU:			+/-0.575						
Radium-226			U	0.875	pCi/g					
	Uncert:			+/-0.771						
	TPU:			+/-0.870						
Radium-228			U	0.521	pCi/g					
	Uncert:			+/-1.40						
	TPU:			+/-1.42						
Ruthenium-106			U	3.02	pCi/g					
	Uncert:			+/-3.83						
	TPU:			+/-3.84						

QC Summary

Workorder: **730947**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
Silver-110m			U	-0.212	pCi/g					
	Uncert:			+/-0.494						
	TPU:			+/-0.504						
Sodium-22			U	0.0500	pCi/g					
	Uncert:			+/-0.161						
	TPU:			+/-0.163						
Thallium-208			U	-0.00492	pCi/g					
	Uncert:			+/-0.301						
	TPU:			+/-0.301						
Thorium-234				98.6	pCi/g					
	Uncert:			+/-19.0						
	TPU:			+/-53.9						
Tin-113			U	0.394	pCi/g					
	Uncert:			+/-0.549						
	TPU:			+/-0.578						
Uranium-235			U	-0.155	pCi/g					
	Uncert:			+/-1.70						
	TPU:			+/-1.70						
Uranium-238				98.6	pCi/g					
	Uncert:			+/-19.0						
	TPU:			+/-53.9						
Yttrium-88			U	-0.0322	pCi/g					
	Uncert:			+/-0.143						
	TPU:			+/-0.144						
Zinc-65			U	0.990	pCi/g					
	Uncert:			+/-0.762						
	TPU:			+/-0.889						
Zirconium-95			U	-0.0410	pCi/g					
	Uncert:			+/-0.605						
	TPU:			+/-0.605						
QC1206156307 MB										
Actinium-228			U	0.0591	pCi/g				MXR1	07/27/2510:05
	Uncert:			+/-0.164						
	TPU:			+/-0.167						
Americium-241			U	0.0104	pCi/g					
	Uncert:			+/-0.0319						
	TPU:			+/-0.0323						
Antimony-124			U	0.0775	pCi/g					
	Uncert:			+/-0.108						
	TPU:			+/-0.114						
Antimony-125			U	-0.0370	pCi/g					
	Uncert:			+/-0.0864						
	TPU:			+/-0.0882						
Barium-133			U	-0.0414	pCi/g					
	Uncert:			+/-0.0502						
	TPU:			+/-0.0539						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
Barium-140			U	-0.211	pCi/g					
	Uncert:			+/-0.489						
	TPU:			+/-0.500						
Beryllium-7			U	-0.297	pCi/g					
	Uncert:			+/-0.432						
	TPU:			+/-0.455						
Bismuth-212			U	0.0978	pCi/g					
	Uncert:			+/-0.485						
	TPU:			+/-0.488						
Bismuth-214			U	-0.00201	pCi/g					
	Uncert:			+/-0.0957						
	TPU:			+/-0.0957						
Cerium-139			U	-0.00503	pCi/g					
	Uncert:			+/-0.0299						
	TPU:			+/-0.0300						
Cerium-141			U	-0.00937	pCi/g					
	Uncert:			+/-0.0692						
	TPU:			+/-0.0693						
Cerium-144			U	-0.0597	pCi/g					
	Uncert:			+/-0.158						
	TPU:			+/-0.160						
Cesium-134			U	-0.0179	pCi/g					
	Uncert:			+/-0.0373						
	TPU:			+/-0.0382						
Cesium-136			U	0.138	pCi/g					
	Uncert:			+/-0.224						
	TPU:			+/-0.233						
Cesium-137			U	-0.00807	pCi/g					
	Uncert:			+/-0.0384						
	TPU:			+/-0.0386						
Chromium-51			U	0.0723	pCi/g					
	Uncert:			+/-0.541						
	TPU:			+/-0.542						
Cobalt-56			U	0.0149	pCi/g					
	Uncert:			+/-0.0453						
	TPU:			+/-0.0458						
Cobalt-57			U	-0.00286	pCi/g					
	Uncert:			+/-0.0186						
	TPU:			+/-0.0186						
Cobalt-58			U	0.0156	pCi/g					
	Uncert:			+/-0.0454						
	TPU:			+/-0.0459						
Cobalt-60			U	-0.0165	pCi/g					
	Uncert:			+/-0.0365						
	TPU:			+/-0.0373						
Europium-152			U	-0.0435	pCi/g					

QC Summary

Workorder: **730947**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
	Uncert:			+/-0.100						
	TPU:			+/-0.102						
Europium-154			U	-0.00315	pCi/g					
	Uncert:			+/-0.0985						
	TPU:			+/-0.0986						
Europium-155			U	-0.00586	pCi/g					
	Uncert:			+/-0.0682						
	TPU:			+/-0.0683						
Iridium-192			U	-0.000377	pCi/g					
	Uncert:			+/-0.0473						
	TPU:			+/-0.0473						
Iron-59			U	-0.0351	pCi/g					
	Uncert:			+/-0.112						
	TPU:			+/-0.114						
Lead-210			U	0.487	pCi/g					
	Uncert:			+/-0.718						
	TPU:			+/-0.722						
Lead-212			U	-0.0370	pCi/g					
	Uncert:			+/-0.0646						
	TPU:			+/-0.0668						
Lead-214			U	0.0699	pCi/g					
	Uncert:			+/-0.101						
	TPU:			+/-0.106						
Manganese-54			U	0.0345	pCi/g					
	Uncert:			+/-0.0381						
	TPU:			+/-0.0413						
Mercury-203			U	-0.000464	pCi/g					
	Uncert:			+/-0.0456						
	TPU:			+/-0.0456						
Neodymium-147			U	0.0889	pCi/g					
	Uncert:			+/-1.20						
	TPU:			+/-1.20						
Neptunium-239			U	0.166	pCi/g					
	Uncert:			+/-0.180						
	TPU:			+/-0.196						
Niobium-94			U	0.0167	pCi/g					
	Uncert:			+/-0.0400						
	TPU:			+/-0.0407						
Niobium-95			U	0.0230	pCi/g					
	Uncert:			+/-0.0425						
	TPU:			+/-0.0438						
Potassium-40			U	0.0521	pCi/g					
	Uncert:			+/-0.732						
	TPU:			+/-0.732						
Promethium-144			U	0.0295	pCi/g					
	Uncert:			+/-0.0378						

QC Summary

Workorder: **730947**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2822154										
	TPU:			+/-0.0402						
Promethium-146			U	-0.00230	pCi/g					
	Uncert:			+/-0.0404						
	TPU:			+/-0.0404						
Radium-226			U	0.0699	pCi/g					
	Uncert:			+/-0.101						
	TPU:			+/-0.106						
Radium-228			U	0.0591	pCi/g					
	Uncert:			+/-0.164						
	TPU:			+/-0.167						
Ruthenium-106			U	0.241	pCi/g					
	Uncert:			+/-0.319						
	TPU:			+/-0.338						
Silver-110m			U	-0.0447	pCi/g					
	Uncert:			+/-0.0575						
	TPU:			+/-0.0611						
Sodium-22			U	-0.00112	pCi/g					
	Uncert:			+/-0.0350						
	TPU:			+/-0.0350						
Thallium-208			U	-0.0234	pCi/g					
	Uncert:			+/-0.0411						
	TPU:			+/-0.0426						
Thorium-234			U	0.545	pCi/g					
	Uncert:			+/-0.742						
	TPU:			+/-0.794						
Tin-113			U	-0.0127	pCi/g					
	Uncert:			+/-0.0544						
	TPU:			+/-0.0548						
Uranium-235			U	0.0183	pCi/g					
	Uncert:			+/-0.191						
	TPU:			+/-0.191						
Uranium-238			U	0.545	pCi/g					
	Uncert:			+/-0.742						
	TPU:			+/-0.794						
Yttrium-88			U	-0.0314	pCi/g					
	Uncert:			+/-0.0355						
	TPU:			+/-0.0383						
Zinc-65			U	0.00739	pCi/g					
	Uncert:			+/-0.0674						
	TPU:			+/-0.0675						
Zirconium-95			U	-0.0202	pCi/g					
	Uncert:			+/-0.0913						
	TPU:			+/-0.0918						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

QC Summary

Workorder: **730947**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time

The Qualifiers in this report are defined as follows:

U	Analyte was analyzed for, but not detected above the Lc.
J	Value is estimated
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
H	Analytical holding time was exceeded
<	Result is less than value reported
>	Result is greater than value reported
UI	Gamma Spectroscopy--Uncertain identification
BD	Results are either below the MDC or tracer recovery is low
h	Preparation or preservation holding time was exceeded
R	Sample results are rejected
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
N/A	RPD or %Recovery limits do not apply.
ND	Analyte concentration is not detected above the detection limit
M	M if above MDC and less than LLD
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
FA	Failed analysis.
M	REMP Result > MDC/CL and < RDL
UJ	Gamma Spectroscopy--Uncertain identification
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
N1	See case narrative
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
**	Analyte is a Tracer compound
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Gamma Spectroscopy Raw Data

Batch 2822154 Check-list

This check-list was completed on 28-JUL-25 by Tim Winters

This batch was reviewed by Spencer Collins on 28-JUL-25 and Tim Winters on 28-JUL-25.

Batch ID: 2822154 **Product:** GSCGAMMS **Description:** Gamma Spec Solid RAD A-013

#	Criteria	Yes	No	Comments
Preparation Information				
1	Did any sample(s) require dilution?		No	
2	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
3	Was the preservation correct for this analysis?	Yes		
Internal Checklist Information				
4	Are instrument source checks within limits?	Yes		
5	Have sample historical results been reviewed for this batch?	Yes		
Technical Information				
6	Were any additional radionuclides added that were not requested by the client?		No	
7	Were all the samples prepared/analyzed within the required holding time period?	Yes		
Quality Control (QC) Information				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
11	Has the method required detection limit been met?	Yes		
Miscellaneous Information				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

Prep Logbook

Gamma Spectroscopy

Batch ID: **2822154**
Analyst: Maggie Stamps (MXR1)
Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Lab SOP: GL-RAD-A-013 REV# 29
Instrument: No instrument-manual method

Due Dates for Lab: 27-JUL-2025 **Hold: 09-JUN-2025** **Package: 28-JUL-2025** **SDG: 29-JUL**

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1206156309	84680-278	1556	1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Adjusted Aliquot (g)
1	730947001	01-JUL-2025	.1	Dry to Dry	111.39	111.39	111.39
2	730947002	01-JUL-2025	.1	Dry to Dry	140.48	140.48	140.48
3	730947003	01-JUL-2025	.1	Dry to Dry	141.72	141.72	141.72
4	1206156307 MB	01-JUL-2025	.1	Dry to Wet	141.72	141.72	141.72
5	1206156308 DUP (730947001)	01-JUL-2025	.1	Dry to Dry	111.39	111.39	111.39
6	1206156309 LCS	01-JUL-2025	.1	Dry to Wet	115	115	115

Reagent/Solvent Lot ID	Description	Amount

Comments:

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:26:50.59

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947001.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM50.CNF;99
                                     Background date  : 25-JUL-2025 22:45:23
Sample date      : 28-MAY-2025 12:20:00 Acquisition date : 26-JUL-2025 22:26:16
Sample ID        : G730947001           Sample quantity  : 1.11390E+02 GRAM
Detector name    : GAM50                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.70  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2822154              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	47.61	64	75	3.78	95.44	90	12	1.77E-02	29.9	
2	1	74.83	50	71	1.04	149.91	146	20	1.39E-02	29.7	2.51E+00
3	1	77.29	80	69	1.05	154.81	146	20	2.21E-02	19.8	
4	1	80.78	28	67	1.05	161.81	146	20	7.78E-03	50.3	
5	2	87.21	49	64	1.18	174.67	166	17	1.37E-02	31.4	3.27E+00
6	2	89.69	39	56	1.19	179.62	166	17	1.09E-02	37.7	
7	0	92.51*	39	64	1.21	185.26	183	6	1.08E-02	39.1	
8	3	128.72	59	73	1.41	257.70	253	12	1.63E-02	26.4	5.41E+00
9	3	130.71	20	49	1.18	261.68	253	12	5.60E-03	68.8	
10	0	186.05*	24	120	1.05	372.41	366	12	6.67E-03	96.1	
11	0	192.00	18	56	1.14	384.32	378	8	5.02E-03	77.1	
12	7	209.18	31	40	1.34	418.67	416	10	8.62E-03	36.7	1.04E+01
13	7	211.39	11	31	1.43	423.10	416	10	3.18E-03	76.8	
14	0	238.69*	216	37	1.18	477.72	474	7	6.01E-02	8.5	
15	0	241.93	62	67	1.58	484.21	482	8	1.73E-02	26.7	
16	0	271.11	23	78	1.48	542.59	535	12	6.39E-03	79.6	
17	0	295.42*	96	70	0.87	591.22	586	10	2.67E-02	19.4	
18	0	300.81	9	40	1.44	602.00	597	8	2.50E-03	126.2	
19	0	310.14	20	30	2.18	620.67	617	9	5.44E-03	56.1	
20	0	339.29*	28	71	1.12	678.99	672	12	7.67E-03	64.8	
21	0	352.08*	221	37	1.25	704.57	700	10	6.15E-02	8.7	
22	0	409.72	13	30	1.02	819.90	814	10	3.59E-03	86.1	
23	1	462.89	24	10	1.65	926.30	922	18	6.77E-03	29.9	1.71E+00
24	1	465.89	20	8	1.65	932.30	922	18	5.43E-03	42.5	
25	0	478.12	9	25	0.86	956.77	953	8	2.61E-03	96.5	
26	0	540.89	22	6	3.36	1082.35	1076	13	6.20E-03	31.4	
27	0	583.48*	52	22	1.03	1167.58	1163	10	1.43E-02	23.2	
28	0	609.32*	130	14	1.35	1219.29	1213	14	3.62E-02	11.0	
29	0	649.16	6	6	0.67	1299.00	1295	6	1.67E-03	76.4	
30	0	662.47*	9	20	1.31	1325.64	1318	13	2.55E-03	107.6	
31	0	698.15	13	15	1.30	1397.03	1391	10	3.67E-03	61.2	
32	0	727.55	22	24	1.50	1455.86	1447	14	6.02E-03	53.0	
33	0	730.61	11	6	0.86	1461.98	1460	7	3.07E-03	46.3	
34	0	759.57	11	4	1.38	1519.94	1517	6	3.14E-03	41.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	796.26	6	10	0.68	1593.36	1587	8	1.68E-03	99.5	
36	0	911.83*	70	6	2.20	1824.64	1818	18	1.94E-02	14.6	
37	0	957.63	11	7	0.69	1916.29	1907	13	2.92E-03	58.8	
38	0	968.94	39	27	0.81	1938.92	1931	18	1.08E-02	35.1	
39	0	1002.02*	1	7	1.41	2005.12	2000	8	2.49E-04	99.6	
40	0	1080.35	9	8	1.56	2161.89	2157	8	2.50E-03	63.8	
41	0	1099.24	6	2	1.44	2199.69	2194	8	1.61E-03	59.6	
42	0	1104.96	14	7	2.31	2211.14	2207	9	3.81E-03	43.9	
43	0	1120.28*	42	0	2.06	2241.80	2236	11	1.17E-02	16.2	
44	0	1125.95	6	5	1.50	2253.15	2246	9	1.53E-03	81.6	
45	0	1274.07	4	6	1.35	2549.60	2544	8	1.22E-03	106.6	
46	0	1373.69	8	0	1.07	2749.00	2743	11	2.22E-03	35.4	
47	0	1460.97*	232	0	1.70	2923.69	2914	16	6.44E-02	6.6	
48	0	1593.96	6	9	1.19	3189.92	3180	13	1.75E-03	108.5	
49	0	1764.76*	26	0	1.60	3531.83	3524	15	7.19E-03	21.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 26-JUL-2025 23:26:52

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947001.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 28-MAY-2025 12:20:00	Acquisition date	: 26-JUL-2025 22:26:16
Sample ID	: G730947001	Sample quantity	: 111.39 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA50	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.70 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	9	10.44*	2.853E+00	2.082E-01	4.517E-01	193.03
NA-22	1274.54	4	99.94*	1.156E+00	2.428E-02	2.536E-02	213.20
K-40	1460.82	218	10.66*	1.022E+00	1.349E+01	1.349E+01	13.28
CD-109	88.03	51	3.70*	3.816E+00	2.445E+00	2.673E+00	62.80
SN-126	64.28	------	9.60	1.258E+00	------ Line Not Found		------
	86.94	51	8.90	3.816E+00	1.016E+00	1.016E+00	62.80
	87.57	51	37.00*	3.816E+00	2.445E-01	2.445E-01	62.80
BA-137M	661.66	9	89.90*	2.200E+00	3.028E-02	3.040E-02	215.25
CS-137	661.66	9	85.10*	2.200E+00	3.199E-02	3.211E-02	215.25
TL-208	277.37	------	6.60	4.153E+00	------ Line Not Found		------
	583.19	50	85.00*	2.448E+00	1.628E-01	1.628E-01	46.40
	860.56	------	12.50	1.722E+00	------ Line Not Found		------
BI-210	46.54	68	4.25*	1.263E-01	8.510E+01	8.553E+01	59.86
PB-210	46.54	68	4.25*	1.263E-01	8.510E+01	8.553E+01	59.86
BI-211	72.87	------	1.23	2.231E+00	------ Line Not Found		------
	351.06	220	12.92*	3.537E+00	3.238E+00	3.238E+00	17.34
BI-212	727.33	21	6.67*	2.023E+00	1.045E+00	1.045E+00	105.97
	1620.50	------	1.47	9.490E-01	------ Line Not Found		------
PB-212	74.82	52	10.28	2.462E+00	1.395E+00	1.395E+00	59.49
	77.11	83	17.10	2.749E+00	1.193E+00	1.193E+00	39.57
	238.63	218	43.60*	4.583E+00	7.337E-01	7.337E-01	16.94
	300.09	9	3.30	3.934E+00	4.661E-01	4.661E-01	252.40
BI-214	609.32	127	45.49*	2.362E+00	7.949E-01	7.950E-01	21.99
	1120.29	40	14.92	1.315E+00	1.376E+00	1.376E+00	32.34
	1764.49	24	15.30	9.089E-01	1.173E+00	1.173E+00	42.76
PB-214	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.834E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
RN-222	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.834E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
RA-224	240.99	63	4.10*	4.544E+00	2.263E+00	2.263E+00	53.50
RA-226	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.834E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
AC-228	338.32	27	11.27	3.627E+00	4.522E-01	4.522E-01	129.69
	911.20	67	25.80*	1.625E+00	1.075E+00	1.075E+00	29.22
	968.97	37	15.80	1.527E+00	1.041E+00	1.041E+00	70.22
RA-228	338.32	27	11.27	3.627E+00	4.522E-01	4.522E-01	129.69
	911.20	67	25.80*	1.625E+00	1.075E+00	1.075E+00	29.22

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	37	15.80	1.527E+00	1.041E+00	1.041E+00	70.22
TH-228	74.82	52	10.28	2.462E+00	1.395E+00	1.395E+00	59.49
	77.11	83	17.10	2.749E+00	1.193E+00	1.193E+00	39.57
	238.63	218	43.60*	4.583E+00	7.337E-01	7.337E-01	16.94
	300.09	9	3.30	3.934E+00	4.661E-01	4.661E-01	252.40
TH-230	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.833E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
PA-231	283.69	------	1.70	4.091E+00	------ Line Not Found		------
	301.36	9	5.35*	3.934E+00	2.875E-01	2.875E-01	252.40
TH-232	338.32	27	11.27	3.627E+00	4.522E-01	4.522E-01	129.69
	911.20	67	25.80*	1.625E+00	1.075E+00	1.075E+00	29.22
	968.97	37	15.80	1.527E+00	1.041E+00	1.041E+00	70.22
U-234	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.833E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
U-235	89.96	41	3.47	4.048E+00	1.957E+00	1.957E+00	75.41
	93.35	40	5.60	4.293E+00	1.132E+00	1.132E+00	78.28
	143.76	------	10.96*	5.786E+00	------ Line Not Found		------
	163.33	------	5.08	5.615E+00	------ Line Not Found		------
	185.72	24	57.20	5.307E+00	5.407E-02	5.407E-02	192.30
	205.31	------	5.01	5.029E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	4.588E-02	------ Line Not Found		------
	74.66	52	67.20*	2.462E+00	2.134E-01	2.134E-01	59.49

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:26:53.24

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947001.CNF;1    *
* Acquisition date : 26-JUL-2025 22:26:16 Sensitivity     : 3.000          *
* Detector ID      : GAM50                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.70     Half life ratio : *****          *
* Sample date      : 28-MAY-2025 12:20:00 Analyst initials: MXR1           *
* Sample ID        : G730947001           Sample Quantity : 1.1139E+02 GRAM   *
* Batch Number     : 2822154              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;19                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-JUL-2025 13:31:25 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM50_CAN.CNF;8           *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	4.517E-01	8.544E-01	1.136E+00
NA-22	2.536E-02	5.299E-02	1.063E-01
K-40	1.349E+01	1.756E+00	5.929E-01
CD-109	2.673E+00	1.645E+00	1.690E+00
SN-126	2.445E-01	1.505E-01	1.562E-01
BA-137M	3.040E-02	6.412E-02	5.979E-02
CS-137	3.211E-02	6.774E-02	6.316E-02
TL-208	1.628E-01	7.402E-02	7.332E-02
BI-210	8.553E+01	5.018E+01	4.642E+01
PB-210	8.553E+01	5.018E+01	4.642E+01
BI-211	3.238E+00	5.502E-01	4.473E-01
BI-212	1.045E+00	1.086E+00	1.150E+00
PB-212	7.337E-01	1.218E-01	1.001E-01
BI-214	7.950E-01	1.713E-01	1.182E-01
PB-214	1.175E+00	1.997E-01	1.627E-01
RN-222	1.175E+00	1.997E-01	1.627E-01
RA-224	2.263E+00	1.186E+00	1.023E+00
RA-226	1.175E+00	1.997E-01	1.627E-01
AC-228	1.075E+00	3.077E-01	2.601E-01
RA-228	1.075E+00	3.077E-01	2.601E-01
TH-228	7.337E-01	1.218E-01	1.001E-01
TH-230	1.175E+00	1.997E-01	1.627E-01
PA-231	2.875E-01	7.112E-01	9.505E-01
TH-232	1.075E+00	3.077E-01	2.601E-01
U-234	1.175E+00	1.997E-01	1.627E-01
U-235	7.350E-02	2.348E-01	4.325E-01
AM-243	2.134E-01	1.244E-01	1.493E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-24	0.000E+00	1.726E+27	0.000E+00	SHORT HLIF
AL-26	4.956E-03	2.346E-02	6.429E-02	NOT IDENT.
SC-46	-1.907E-02	6.107E-02	1.156E-01	FAIL ABUN

V-48	-8.682E-02	5.792E-01	1.111E+00	NOT IDENT.
CR-51	-1.937E-01	1.010E+00	1.924E+00	NOT IDENT.
MN-52	0.000E+00	7.802E+01	0.000E+00	SHORT HLIF
MN-54	-1.065E-02	3.464E-02	6.705E-02	NOT IDENT.
CO-56	-1.897E-02	5.981E-02	1.138E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-2.883E-02	3.132E-02	5.182E-02	NOT IDENT.
CO-58	6.657E-04	5.119E-02	1.063E-01	NOT IDENT.
FE-59	1.242E-01	1.451E-01	3.363E-01	FAIL ABUN
CO-60	-1.425E-02	3.131E-02	5.748E-02	NOT IDENT.
ZN-65	1.176E-02	7.171E-02	1.458E-01	NOT IDENT.
GE-68	-8.392E-02	1.858E+00	3.176E+00	NOT IDENT.
AS-73	2.142E+00	4.679E+00	9.478E+00	NOT IDENT.
AS-74	-3.277E-01	5.530E-01	9.731E-01	NOT IDENT.
SE-75	-3.920E-02	5.494E-02	9.349E-02	NOT IDENT.
BR-77	0.000E+00	7.772E+06	0.000E+00	SHORT HLIF
SR-82	-2.811E-01	1.304E+00	2.498E+00	NOT IDENT.
RB-83	-1.323E-01	1.061E-01	1.590E-01	NOT IDENT.
RB-84	8.011E-02	1.621E-01	3.612E-01	NOT IDENT.
KR-85	-2.778E+01	1.046E+01	1.282E+01	NOT IDENT.
SR-85	-2.347E-01	8.829E-02	1.082E-01	NOT IDENT.
RB-86	1.467E+00	4.472E+00	8.705E+00	NOT IDENT.
Y-88	-4.242E-02	6.029E-02	1.028E-01	NOT IDENT.
Y-91	2.614E+01	4.549E+01	9.471E+01	NOT IDENT.
NB-94	-3.105E-02	4.285E-02	6.451E-02	NOT IDENT.
NB-95	-6.349E-02	8.292E-02	1.456E-01	NOT IDENT.
NB-95M	-8.790E-02	2.156E-01	3.260E-01	NOT IDENT.
ZR-95	6.532E-03	1.246E-01	2.259E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.941E+25	0.000E+00	SHORT HLIF
MO-99	0.000E+00	8.099E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	0.000E+00	5.566E-02	6.002E-02	FAIL ABUN
RH-102	3.912E-02	6.069E-02	1.256E-01	FAIL ABUN
RU-103	1.085E-02	7.350E-02	1.475E-01	FAIL ABUN
RH-106	9.422E-02	3.259E-01	6.550E-01	NOT IDENT.
RU-106	9.422E-02	3.259E-01	6.550E-01	NOT IDENT.
AG-108M	9.233E-03	3.184E-02	6.276E-02	NOT IDENT.
AG-110	-2.574E-02	8.721E-01	1.471E+00	NOT IDENT.
AG-110M	1.644E-02	6.023E-02	1.258E-01	NOT IDENT.
SN-113	6.894E-03	6.468E-02	1.243E-01	NOT IDENT.
CD-115	0.000E+00	1.122E+07	0.000E+00	SHORT HLIF
SN-117M	5.147E-01	4.896E-01	9.865E-01	NOT IDENT.
SB-122	0.000E+00	1.619E+05	0.000E+00	SHORT HLIF
TE-123M	2.168E-02	3.644E-02	6.975E-02	NOT IDENT.
SB-124	1.195E-02	1.830E-01	3.975E-01	NOT IDENT.
SB-125	7.220E-02	8.780E-02	1.884E-01	FAIL ABUN
TE-125M	1.010E+01	1.780E+01	3.457E+01	NOT IDENT.
I-126	-2.156E+00	2.971E+00	4.064E+00	NOT IDENT.
SB-126	4.243E-01	1.877E+00	3.344E+00	FAIL ABUN
SB-127	0.000E+00	4.143E+03	0.000E+00	SHORT HLIF
I-131	1.615E+00	5.549E+00	1.099E+01	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.152E+04	0.000E+00	SHORT HLIF
BA-133	1.737E-02	4.816E-02	8.747E-02	FAIL ABUN
I-133	0.000E+00	1.378E+19	0.000E+00	SHORT HLIF
CS-134	2.602E-02	5.074E-02	1.039E-01	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	2.206E-01	1.175E+00	2.425E+00	FAIL ABUN
LA-138	3.051E-02	7.448E-02	1.613E-01	NOT IDENT.
CE-139	4.524E-03	3.650E-02	6.657E-02	NOT IDENT.
BA-140	-1.040E+00	2.592E+00	4.058E+00	NOT IDENT.
LA-140	9.983E-01	8.462E-01	2.499E+00	NOT IDENT.
CE-141	-1.264E-01	1.891E-01	3.183E-01	NOT IDENT.
CE-143	0.000E+00	6.944E+11	0.000E+00	SHORT HLIF
CE-144	1.651E-02	2.555E-01	4.311E-01	FAIL ABUN
PM-144	4.176E-02	3.878E-02	8.180E-02	FAIL ABUN
PR-144	3.276E+00	2.984E+00	6.307E+00	NOT IDENT.
PM-146	-2.108E-02	4.182E-02	7.422E-02	NOT IDENT.
ND-147	-1.694E+01	9.943E+00	1.310E+01	FAIL ABUN
PM-147	-5.713E+02	8.377E+02	1.425E+03	NOT IDENT.
PM-149	0.000E+00	9.091E+07	0.000E+00	SHORT HLIF
EU-150	-1.606E-02	3.119E-02	4.954E-02	FAIL ABUN
EU-152	6.611E-02	1.120E-01	2.181E-01	NOT IDENT.
GD-153	-1.013E-01	1.245E-01	2.104E-01	NOT IDENT.
EU-154	7.026E-02	1.468E-01	3.049E-01	FAIL ABUN
EU-155	-9.185E-03	1.226E-01	2.242E-01	FAIL ABUN
TB-160	9.428E-03	1.762E-01	3.684E-01	FAIL ABUN

HO-166M	-4.930E-02	6.351E-02	1.009E-01	FAIL ABUN
TM-171	-1.870E+01	8.208E+01	1.441E+02	NOT IDENT.
HF-172	-2.847E-02	2.192E-01	3.643E-01	FAIL ABUN
LU-172	-2.141E-04	7.525E-02	1.331E-01	FAIL ABUN
LU-176	-7.726E-03	3.040E-02	5.077E-02	FAIL ABUN
HF-181	-4.638E-02	1.012E-01	1.565E-01	NOT IDENT.
TA-182	-1.284E-02	2.785E-01	5.366E-01	FAIL ABUN
RE-183	3.303E-01	8.043E-01	1.622E+00	NOT IDENT.
RE-184	-2.942E-02	2.951E-01	5.856E-01	NOT IDENT.
W-188	3.100E+00	1.210E+01	2.184E+01	NOT IDENT.
IR-192	-5.035E-03	5.067E-02	9.711E-02	FAIL ABUN
HG-203	2.179E-03	7.527E-02	1.456E-01	NOT IDENT.
TL-204	-1.770E+00	9.121E+00	1.560E+01	FAIL ABUN
BI-207	2.514E-02	5.377E-02	1.172E-01	FAIL ABUN
PB-211	2.250E-01	7.760E-01	1.418E+00	NOT IDENT.
BI-213	-2.547E-02	9.543E-02	1.773E-01	NOT IDENT.
RN-219	-3.471E-01	3.807E-01	6.373E-01	FAIL ABUN
RA-223	6.071E-03	6.011E-01	1.167E+00	FAIL ABUN
AC-225	-7.487E+00	1.427E+01	2.354E+01	NOT IDENT.
AC-227	-3.106E-02	2.675E-01	5.106E-01	FAIL ABUN
TH-227	-3.106E-02	2.675E-01	5.106E-01	FAIL ABUN
TH-229	-1.399E-01	5.258E-01	8.324E-01	FAIL ABUN
TH-231	6.071E-03	6.011E-01	1.167E+00	FAIL ABUN
PA-233	-8.039E-03	6.581E-02	1.131E-01	FAIL ABUN
PA-234	-9.540E-02	3.390E-01	6.401E-01	FAIL ABUN
PA-234M	-1.094E-01	2.799E+00	5.313E+00	FAIL ABUN
TH-234	-1.094E-01	2.799E+00	5.313E+00	FAIL ABUN
NP-237	-8.039E-03	6.581E-02	1.131E-01	FAIL ABUN
NP-238	0.000E+00	4.691E+07	0.000E+00	SHORT HLIF
U-238	-1.094E-01	2.799E+00	5.313E+00	FAIL ABUN
NP-239	1.158E-01	2.666E-01	5.134E-01	NOT IDENT.
PU-239	0.000E+00	5.797E+02	7.885E+02	FAIL ABUN
AM-241	1.546E-01	3.551E-01	7.177E-01	NOT IDENT.
CM-243	-1.676E-02	1.145E-01	2.093E-01	NOT IDENT.
BK-247	-5.373E-02	8.296E-02	1.320E-01	NOT IDENT.
CM-247	-3.862E-02	3.560E-02	5.774E-02	NOT IDENT.
CF-249	1.907E-02	4.603E-02	9.097E-02	NOT IDENT.
CF-251	-5.791E-02	1.300E-01	2.208E-01	NOT IDENT.
ANH-511	-1.032E-02	5.134E-02	1.132E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:26:51.59

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	9	10.44*	2.853E+00	2.082E-01	4.517E-01	193.03
NA-22	1274.54	4	99.94*	1.156E+00	2.428E-02	2.536E-02	213.20
K-40	1460.82	218	10.66*	1.022E+00	1.349E+01	1.349E+01	13.28
CD-109	88.03	51	3.70*	3.816E+00	2.445E+00	2.673E+00	62.80
SN-126	64.28	------	9.60	1.258E+00	------ Line Not Found		------
	86.94	51	8.90	3.816E+00	1.016E+00	1.016E+00	62.80
	87.57	51	37.00*	3.816E+00	2.445E-01	2.445E-01	62.80
BA-137M	661.66	9	89.90*	2.200E+00	3.028E-02	3.040E-02	215.25
CS-137	661.66	9	85.10*	2.200E+00	3.199E-02	3.211E-02	215.25
TL-208	277.37	------	6.60	4.153E+00	------ Line Not Found		------
	583.19	50	85.00*	2.448E+00	1.628E-01	1.628E-01	46.40
	860.56	------	12.50	1.722E+00	------ Line Not Found		------
BI-210	46.54	68	4.25*	1.263E-01	8.510E+01	8.553E+01	59.86
PB-210	46.54	68	4.25*	1.263E-01	8.510E+01	8.553E+01	59.86
BI-211	72.87	------	1.23	2.231E+00	------ Line Not Found		------
	351.06	220	12.92*	3.537E+00	3.238E+00	3.238E+00	17.34
BI-212	727.33	21	6.67*	2.023E+00	1.045E+00	1.045E+00	105.97
	1620.50	------	1.47	9.490E-01	------ Line Not Found		------
PB-212	74.82	52	10.28	2.462E+00	1.395E+00	1.395E+00	59.49
	77.11	83	17.10	2.749E+00	1.193E+00	1.193E+00	39.57
	238.63	218	43.60*	4.583E+00	7.337E-01	7.337E-01	16.94
	300.09	9	3.30	3.934E+00	4.661E-01	4.661E-01	252.40
BI-214	609.32	127	45.49*	2.362E+00	7.949E-01	7.950E-01	21.99
	1120.29	40	14.92	1.315E+00	1.376E+00	1.376E+00	32.34
	1764.49	24	15.30	9.089E-01	1.173E+00	1.173E+00	42.76
PB-214	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.834E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
RN-222	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.834E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
RA-224	240.99	63	4.10*	4.544E+00	2.263E+00	2.263E+00	53.50
RA-226	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.834E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
AC-228	338.32	27	11.27	3.627E+00	4.522E-01	4.522E-01	129.69
	911.20	67	25.80*	1.625E+00	1.075E+00	1.075E+00	29.22
	968.97	37	15.80	1.527E+00	1.041E+00	1.041E+00	70.22

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
RA-228	338.32	27	11.27	3.627E+00	4.522E-01	4.522E-01	129.69
	911.20	67	25.80*	1.625E+00	1.075E+00	1.075E+00	29.22
	968.97	37	15.80	1.527E+00	1.041E+00	1.041E+00	70.22
TH-228	74.82	52	10.28	2.462E+00	1.395E+00	1.395E+00	59.49
	77.11	83	17.10	2.749E+00	1.193E+00	1.193E+00	39.57
	238.63	218	43.60*	4.583E+00	7.337E-01	7.337E-01	16.94
	300.09	9	3.30	3.934E+00	4.661E-01	4.661E-01	252.40
TH-230	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.833E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
PA-231	283.69	------	1.70	4.091E+00	------ Line Not Found		------
	301.36	9	5.35*	3.934E+00	2.875E-01	2.875E-01	252.40
TH-232	338.32	27	11.27	3.627E+00	4.522E-01	4.522E-01	129.69
	911.20	67	25.80*	1.625E+00	1.075E+00	1.075E+00	29.22
	968.97	37	15.80	1.527E+00	1.041E+00	1.041E+00	70.22
U-234	74.82	52	5.80	2.462E+00	2.473E+00	2.473E+00	59.49
	77.11	83	9.70	2.749E+00	2.103E+00	2.103E+00	39.57
	87.09	51	3.41	3.816E+00	2.653E+00	2.653E+00	62.80
	242.00	63	7.25	4.544E+00	1.280E+00	1.280E+00	53.50
	295.22	96	18.42	3.982E+00	8.833E-01	8.833E-01	38.84
	351.93	220	35.60*	3.537E+00	1.175E+00	1.175E+00	17.34
U-235	89.96	41	3.47	4.048E+00	1.957E+00	1.957E+00	75.41
	93.35	40	5.60	4.293E+00	1.132E+00	1.132E+00	78.28
	143.76	------	10.96*	5.786E+00	------ Line Not Found		------
	163.33	------	5.08	5.615E+00	------ Line Not Found		------
	185.72	24	57.20	5.307E+00	5.407E-02	5.407E-02	192.30
	205.31	------	5.01	5.029E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	4.588E-02	------ Line Not Found		------
	74.66	52	67.20*	2.462E+00	2.134E-01	2.134E-01	59.49

Flag: "*" = Keyline

Sample ID : G730947001 Acquisition date : 26-JUL-2025 22:26:16

Total number of lines in spectrum 49
Number of unidentified lines 14
Number of lines tentatively identified by NID 35 71.43%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	2.17	2.082E-01	4.517E-01	8.718E-01	193.03	
NA-22	2.60Y	1.04	2.428E-02	2.536E-02	5.407E-02	213.20	
K-40	1.25E+09Y	1.00	1.349E+01	1.349E+01	0.179E+01	13.28	
CD-109	461.40D	1.09	2.445E+00	2.673E+00	1.679E+00	62.80	
SN-126	2.30E+05Y	1.00	2.445E-01	2.445E-01	1.535E-01	62.80	
BA-137M	30.08Y	1.00	3.028E-02	3.040E-02	6.543E-02	215.25	
CS-137	30.08Y	1.00	3.199E-02	3.211E-02	6.912E-02	215.25	
TL-208	1.41E+10Y	1.00	1.628E-01	1.628E-01	0.755E-01	46.40	
BI-210	22.20Y	1.01	8.510E+01	8.553E+01	5.120E+01	59.86	
PB-210	22.20Y	1.01	8.510E+01	8.553E+01	5.120E+01	59.86	
BI-211	7.04E+08Y	1.00	3.238E+00	3.238E+00	0.561E+00	17.34	
BI-212	1.41E+10Y	1.00	1.045E+00	1.045E+00	1.108E+00	105.97	
PB-212	1.41E+10Y	1.00	7.337E-01	7.337E-01	1.243E-01	16.94	
BI-214	1600.00Y	1.00	7.949E-01	7.950E-01	1.748E-01	21.99	
PB-214	1600.00Y	1.00	1.175E+00	1.175E+00	0.204E+00	17.34	
RN-222	1600.00Y	1.00	1.175E+00	1.175E+00	0.204E+00	17.34	
RA-224	1.41E+10Y	1.00	2.263E+00	2.263E+00	1.211E+00	53.50	
RA-226	1600.00Y	1.00	1.175E+00	1.175E+00	0.204E+00	17.34	
AC-228	1.41E+10Y	1.00	1.075E+00	1.075E+00	0.314E+00	29.22	
RA-228	1.41E+10Y	1.00	1.075E+00	1.075E+00	0.314E+00	29.22	
TH-228	1.41E+10Y	1.00	7.337E-01	7.337E-01	1.243E-01	16.94	
TH-230	7.54E+04Y	1.00	1.175E+00	1.175E+00	0.204E+00	17.34	
PA-231	7.04E+08Y	1.00	2.875E-01	2.875E-01	7.257E-01	252.40	
TH-232	1.41E+10Y	1.00	1.075E+00	1.075E+00	0.314E+00	29.22	
U-234	2.45E+05Y	1.00	1.175E+00	1.175E+00	0.204E+00	17.34	
U-235	7.04E+08Y	1.00	5.407E-02	5.407E-02	10.40E-02	192.30	K
AM-243	7370.00Y	1.00	2.134E-01	2.134E-01	1.270E-01	59.49	
	Total Activity :		2.053E+02	2.066E+02			

Grand Total Activity : 2.053E+02 2.066E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	80.78	29	70	1.05	161.81	146	20	7.78E-03	****	3.15E+00	T
3	128.72	60	76	1.41	257.70	253	12	1.63E-02	52.8	5.76E+00	T
3	130.71	21	51	1.18	261.68	253	12	5.60E-03	****	5.78E+00	T
0	192.00	18	57	1.14	384.32	378	8	5.02E-03	****	5.22E+00	
7	209.18	31	40	1.34	418.67	416	10	8.62E-03	73.4	4.97E+00	
7	211.39	12	31	1.43	423.10	416	10	3.18E-03	****	4.94E+00	T
0	271.11	23	78	1.48	542.59	535	12	6.39E-03	****	4.22E+00	T
0	310.14	20	30	2.18	620.67	617	9	5.44E-03	****	3.85E+00	
0	409.72	13	30	1.02	819.90	814	10	3.59E-03	****	3.19E+00	T
1	462.89	24	10	1.65	926.30	922	18	6.77E-03	59.8	2.92E+00	T
1	465.89	19	8	1.65	932.30	922	18	5.43E-03	85.0	2.91E+00	
0	540.89	22	6	3.36	1082.35	1076	13	6.20E-03	62.8	2.60E+00	
0	649.16	6	6	0.67	1299.00	1295	6	1.67E-03	****	2.24E+00	
0	698.15	13	14	1.30	1397.03	1391	10	3.67E-03	****	2.10E+00	T
0	730.61	11	6	0.86	1461.98	1460	7	3.07E-03	92.5	2.02E+00	
0	759.57	11	4	1.38	1519.94	1517	6	3.14E-03	82.5	1.94E+00	
0	796.26	6	10	0.68	1593.36	1587	8	1.68E-03	****	1.86E+00	T
0	957.63	10	6	0.69	1916.29	1907	13	2.92E-03	****	1.55E+00	
0	1002.02	1	7	1.41	2005.12	2000	8	2.49E-04	****	1.48E+00	T
0	1080.35	9	8	1.56	2161.89	2157	8	2.50E-03	****	1.36E+00	
0	1099.24	6	2	1.44	2199.69	2194	8	1.61E-03	****	1.34E+00	T
0	1104.96	13	7	2.31	2211.14	2207	9	3.81E-03	87.7	1.33E+00	
0	1125.95	5	4	1.50	2253.15	2246	9	1.53E-03	****	1.31E+00	
0	1373.69	8	0	1.07	2749.00	2743	11	2.22E-03	70.7	1.08E+00	
0	1593.96	6	8	1.19	3189.92	3180	13	1.75E-03	****	9.59E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:27:03.63

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947001.CNF;1    *
* Acquisition date : 26-JUL-2025 22:26:16 Sensitivity     : 3.000          *
* Detector ID      : GAM50                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.70     Half life ratio : *****          *
* Sample date      : 28-MAY-2025 12:20:00 Nuclide Library : SOLID          *
* Sample ID        : G730947001           Analyst initials: MXR1           *
* Batch Number     : 2822154              Sample Quantity : 1.1139E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-JUL-2025 13:31:25 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM50_CAN.CNF;8           *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	5.014E-01
NA-22	4.496E-02
K-40	2.132E-01
CD-109	7.748E-01
SN-126	7.163E-02
BA-137M	2.527E-02
CS-137	2.670E-02
TL-208	3.228E-02
BI-210	2.100E+01
PB-210	2.100E+01
BI-211	2.037E-01
BI-212	5.077E-01
PB-212	4.548E-02
BI-214	5.064E-02
PB-214	7.409E-02
RN-222	7.409E-02
RA-224	4.624E-01
RA-226	7.409E-02
AC-228	1.084E-01
RA-228	1.084E-01
TH-228	4.548E-02
TH-230	7.408E-02
PA-231	4.317E-01
TH-232	1.084E-01
U-234	7.408E-02
U-235	2.018E-01
AM-243	6.905E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-24	0.000E+00	SHORT HLIF
AL-26	2.207E-02	NOT IDENT.
SC-46	4.889E-02	FAIL ABUN
V-48	4.758E-01	NOT IDENT.

CR-51	8.534E-01	NOT IDENT.
MN-52	0.000E+00	SHORT HLIF
MN-54	2.767E-02	NOT IDENT.
CO-56	4.804E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.370E-02	NOT IDENT.
CO-58	4.420E-02	NOT IDENT.
FE-59	1.379E-01	FAIL ABUN
CO-60	2.036E-02	NOT IDENT.
ZN-65	5.679E-02	NOT IDENT.
GE-68	1.348E+00	NOT IDENT.
AS-73	4.329E+00	NOT IDENT.
AS-74	4.213E-01	NOT IDENT.
SE-75	4.162E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.088E+00	NOT IDENT.
RB-83	6.730E-02	NOT IDENT.
RB-84	1.531E-01	NOT IDENT.
KR-85	5.625E+00	NOT IDENT.
SR-85	4.746E-02	NOT IDENT.
RB-86	3.653E+00	NOT IDENT.
Y-88	3.641E-02	NOT IDENT.
Y-91	4.158E+01	NOT IDENT.
NB-94	2.788E-02	NOT IDENT.
NB-95	6.381E-02	NOT IDENT.
NB-95M	1.478E-01	NOT IDENT.
ZR-95	9.662E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.758E-02	FAIL ABUN
RH-102	5.547E-02	FAIL ABUN
RU-103	6.339E-02	FAIL ABUN
RH-106	2.834E-01	NOT IDENT.
RU-106	2.834E-01	NOT IDENT.
AG-108M	2.809E-02	NOT IDENT.
AG-110	6.279E-01	NOT IDENT.
AG-110M	5.408E-02	NOT IDENT.
SN-113	5.602E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	4.545E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.215E-02	NOT IDENT.
SB-124	1.580E-01	NOT IDENT.
SB-125	8.386E-02	FAIL ABUN
TE-125M	1.597E+01	NOT IDENT.
I-126	1.726E+00	NOT IDENT.
SB-126	1.439E+00	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	4.947E+00	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.949E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.592E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	1.028E+00	FAIL ABUN
LA-138	6.731E-02	NOT IDENT.
CE-139	3.051E-02	NOT IDENT.
BA-140	1.666E+00	NOT IDENT.
LA-140	9.985E-01	NOT IDENT.
CE-141	1.475E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.990E-01	FAIL ABUN
PM-144	3.603E-02	FAIL ABUN
PR-144	2.781E+00	NOT IDENT.
PM-146	3.227E-02	NOT IDENT.
ND-147	5.421E+00	FAIL ABUN
PM-147	6.529E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.216E-02	FAIL ABUN
EU-152	9.943E-02	NOT IDENT.
GD-153	9.714E-02	NOT IDENT.
EU-154	1.298E-01	FAIL ABUN
EU-155	1.034E-01	FAIL ABUN
TB-160	1.525E-01	FAIL ABUN
HO-166M	4.228E-02	FAIL ABUN

TM-171	6.530E+01	NOT IDENT.
HF-172	1.670E-01	FAIL ABUN
LU-172	5.520E-02	FAIL ABUN
LU-176	2.287E-02	FAIL ABUN
HF-181	6.769E-02	NOT IDENT.
TA-182	2.283E-01	FAIL ABUN
RE-183	7.387E-01	NOT IDENT.
RE-184	2.462E-01	NOT IDENT.
W-188	9.901E+00	NOT IDENT.
IR-192	4.347E-02	FAIL ABUN
HG-203	6.621E-02	NOT IDENT.
TL-204	7.192E+00	FAIL ABUN
BI-207	4.977E-02	FAIL ABUN
PB-211	6.336E-01	NOT IDENT.
BI-213	7.702E-02	NOT IDENT.
RN-219	2.758E-01	FAIL ABUN
RA-223	5.221E-01	FAIL ABUN
AC-225	1.075E+01	NOT IDENT.
AC-227	2.333E-01	FAIL ABUN
TH-227	2.333E-01	FAIL ABUN
TH-229	3.761E-01	FAIL ABUN
TH-231	5.221E-01	FAIL ABUN
PA-233	5.038E-02	FAIL ABUN
PA-234	2.717E-01	FAIL ABUN
PA-234M	2.440E+00	FAIL ABUN
TH-234	2.440E+00	FAIL ABUN
NP-237	5.038E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	2.440E+00	FAIL ABUN
NP-239	2.359E-01	NOT IDENT.
PU-239	3.690E+02	FAIL ABUN
AM-241	3.267E-01	NOT IDENT.
CM-243	9.584E-02	NOT IDENT.
BK-247	5.889E-02	NOT IDENT.
CM-247	2.493E-02	NOT IDENT.
CF-249	4.130E-02	NOT IDENT.
CF-251	1.006E-01	NOT IDENT.
ANH-511	5.323E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:27:08.48

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                           DETECTOR AND SAMPLE DATA                             *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947001.CNF;1      *
* Acquisition date : 26-JUL-2025 22:26:16 Sensitivity     : 3.000               *
* Detector ID      : GAM50                Energy tolerance: 1.500               *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000              *
* Elapsed real time:    0 01:00:00.70     Half life ratio : *****               *
* Sample date      : 28-MAY-2025 12:20:00 Nuclide Library : SOLID               *
* Sample ID        : G730947001           Analyst initials: MXR1                *
* Batch Number     : 2822154              Sample Quantity : 1.1139E+02 GRAM     *
*                                         Quantity Err(%) : 1.7955E-03 %        *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000          *
*                                         Dry Weight      :    0.00000          *
*********************************************************************************
*                                                                                *
*                           CALIBRATION INFORMATION                              *
*                                                                                *
* Eff. Cal. date   : 25-JUL-2025 13:31:25 Eff. Geometry   : CAN                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM50_CAN.CNF;8                  *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	4.517E-01	8.552E-01	8.552E-01
NA-22	2.536E-02	5.307E-02	5.307E-02
K-40	1.349E+01	2.463E+00	2.463E+00
CD-109	2.673E+00	1.667E+00	1.667E+00
SN-126	2.445E-01	1.519E-01	1.519E-01
BA-137M	3.040E-02	6.417E-02	6.417E-02
CS-137	3.211E-02	6.779E-02	6.779E-02
TL-208	1.628E-01	7.528E-02	7.528E-02
BI-210	8.553E+01	5.273E+01	5.273E+01
PB-210	8.553E+01	5.273E+01	5.273E+01
BI-211	3.238E+00	6.300E-01	6.300E-01
BI-212	1.045E+00	1.090E+00	1.090E+00
PB-212	7.337E-01	1.416E-01	1.416E-01
BI-214	7.950E-01	1.839E-01	1.839E-01
PB-214	1.175E+00	2.278E-01	2.278E-01
RN-222	1.175E+00	2.278E-01	2.278E-01
RA-224	2.263E+00	1.208E+00	1.208E+00
RA-226	1.175E+00	2.278E-01	2.278E-01
AC-228	1.075E+00	3.398E-01	3.398E-01
RA-228	1.075E+00	3.398E-01	3.398E-01
TH-228	7.337E-01	1.416E-01	1.416E-01
TH-230	1.175E+00	2.278E-01	2.278E-01
PA-231	2.875E-01	7.144E-01	7.144E-01
TH-232	1.075E+00	3.398E-01	3.398E-01
U-234	1.175E+00	2.278E-01	2.278E-01
U-235	7.350E-02	2.349E-01	2.349E-01
AM-243	2.134E-01	1.260E-01	1.260E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-24	3.968E+26	1.727E+27	0.000E+00	SHORT HLIF
AL-26	4.956E-03	2.347E-02	2.357E-02	NOT IDENT.
SC-46	-1.907E-02	6.112E-02	6.172E-02	FAIL ABUN

V-48	-8.682E-02	5.793E-01	5.806E-01	NOT IDENT.
CR-51	-1.937E-01	1.010E+00	1.014E+00	NOT IDENT.
MN-52	3.411E+01	7.813E+01	7.963E+01	SHORT HLIF
MN-54	-1.065E-02	3.466E-02	3.499E-02	NOT IDENT.
CO-56	-1.897E-02	5.985E-02	6.046E-02	NOT IDENT.
MN-56	-1.000E+41	3.108E+41	0.000E+00	SHORT HLIF
CO-57	-2.883E-02	3.147E-02	3.405E-02	NOT IDENT.
CO-58	6.657E-04	5.119E-02	5.119E-02	NOT IDENT.
FE-59	1.242E-01	1.459E-01	1.562E-01	FAIL ABUN
CO-60	-1.425E-02	3.137E-02	3.202E-02	NOT IDENT.
ZN-65	1.176E-02	7.172E-02	7.191E-02	NOT IDENT.
GE-68	-8.392E-02	1.858E+00	1.858E+00	NOT IDENT.
AS-73	2.142E+00	4.714E+00	4.812E+00	NOT IDENT.
AS-74	-3.277E-01	5.541E-01	5.735E-01	NOT IDENT.
SE-75	-3.920E-02	5.510E-02	5.786E-02	NOT IDENT.
BR-77	4.681E+07	8.080E+07	8.351E+07	SHORT HLIF
SR-82	-2.811E-01	1.304E+00	1.310E+00	NOT IDENT.
RB-83	-1.323E-01	1.081E-01	1.234E-01	NOT IDENT.
RB-84	8.011E-02	1.624E-01	1.664E-01	NOT IDENT.
KR-85	-2.778E+01	1.071E+01	1.648E+01	NOT IDENT.
SR-85	-2.347E-01	9.046E-02	1.392E-01	NOT IDENT.
RB-86	1.467E+00	4.475E+00	4.524E+00	NOT IDENT.
Y-88	-4.242E-02	6.039E-02	6.335E-02	NOT IDENT.
Y-91	2.614E+01	4.556E+01	4.706E+01	NOT IDENT.
NB-94	-3.105E-02	4.294E-02	4.517E-02	NOT IDENT.
NB-95	-6.349E-02	8.317E-02	8.796E-02	NOT IDENT.
NB-95M	-8.790E-02	2.158E-01	2.194E-01	NOT IDENT.
ZR-95	6.532E-03	1.246E-01	1.246E-01	NOT IDENT.
NB-97	1.000E+41	4.289E+43	0.000E+00	SHORT HLIF
ZR-97	-5.379E+25	1.992E+25	0.000E+00	SHORT HLIF
MO-99	-4.032E+05	8.110E+05	8.311E+05	SHORT HLIF
TC-99M	-1.000E+41	9.090E+41	0.000E+00	SHORT HLIF
RH-101	1.076E-01	5.968E-02	7.692E-02	FAIL ABUN
RH-102	3.912E-02	6.084E-02	6.334E-02	FAIL ABUN
RU-103	1.085E-02	7.351E-02	7.367E-02	FAIL ABUN
RH-106	9.422E-02	3.260E-01	3.287E-01	NOT IDENT.
RU-106	9.422E-02	3.260E-01	3.287E-01	NOT IDENT.
AG-108M	9.233E-03	3.185E-02	3.212E-02	NOT IDENT.
AG-110	-2.574E-02	8.721E-01	8.722E-01	NOT IDENT.
AG-110M	1.644E-02	6.027E-02	6.072E-02	NOT IDENT.
SN-113	6.894E-03	6.468E-02	6.476E-02	NOT IDENT.
CD-115	1.157E+07	1.128E+07	1.242E+07	SHORT HLIF
SN-117M	5.147E-01	4.914E-01	5.434E-01	NOT IDENT.
SB-122	9.575E+04	1.621E+05	1.677E+05	SHORT HLIF
TE-123M	2.168E-02	3.648E-02	3.777E-02	NOT IDENT.
SB-124	1.195E-02	1.830E-01	1.831E-01	NOT IDENT.
SB-125	7.220E-02	8.800E-02	9.382E-02	FAIL ABUN
TE-125M	1.010E+01	1.783E+01	1.840E+01	NOT IDENT.
I-126	-2.156E+00	2.978E+00	3.132E+00	NOT IDENT.
SB-126	4.243E-01	1.877E+00	1.887E+00	FAIL ABUN
SB-127	1.568E+03	4.167E+03	4.227E+03	SHORT HLIF
I-131	1.615E+00	5.551E+00	5.598E+00	FAIL ABUN
I-132	-1.000E+41	4.706E+41	0.000E+00	SHORT HLIF
TE-132	4.486E+03	1.154E+04	1.172E+04	SHORT HLIF
BA-133	1.737E-02	4.819E-02	4.882E-02	FAIL ABUN
I-133	4.810E+18	1.390E+19	0.000E+00	SHORT HLIF
CS-134	2.602E-02	5.082E-02	5.216E-02	FAIL ABUN
I-135	-1.000E+41	1.469E+42	0.000E+00	SHORT HLIF
CS-136	2.206E-01	1.176E+00	1.180E+00	FAIL ABUN
LA-138	3.051E-02	7.458E-02	7.584E-02	NOT IDENT.
CE-139	4.524E-03	3.651E-02	3.656E-02	NOT IDENT.
BA-140	-1.040E+00	2.593E+00	2.635E+00	NOT IDENT.
LA-140	9.983E-01	8.535E-01	9.649E-01	NOT IDENT.
CE-141	-1.264E-01	1.894E-01	1.978E-01	NOT IDENT.
CE-143	1.234E+11	6.945E+11	6.968E+11	SHORT HLIF
CE-144	1.651E-02	2.555E-01	2.556E-01	FAIL ABUN
PM-144	4.176E-02	3.896E-02	4.327E-02	FAIL ABUN
PR-144	3.276E+00	2.998E+00	3.342E+00	NOT IDENT.
PM-146	-2.108E-02	4.187E-02	4.294E-02	NOT IDENT.
ND-147	-1.694E+01	1.005E+01	1.262E+01	FAIL ABUN
PM-147	-5.713E+02	8.398E+02	8.784E+02	NOT IDENT.
PM-149	-4.607E+07	9.124E+07	9.358E+07	SHORT HLIF
EU-150	-1.606E-02	3.123E-02	3.206E-02	FAIL ABUN
EU-152	6.611E-02	1.122E-01	1.161E-01	NOT IDENT.
GD-153	-1.013E-01	1.248E-01	1.329E-01	NOT IDENT.
EU-154	7.026E-02	1.470E-01	1.504E-01	FAIL ABUN
EU-155	-9.185E-03	1.226E-01	1.227E-01	FAIL ABUN
TB-160	9.428E-03	1.762E-01	1.763E-01	FAIL ABUN

HO-166M	-4.930E-02	6.370E-02	6.746E-02	FAIL ABUN
TM-171	-1.870E+01	8.216E+01	8.259E+01	NOT IDENT.
HF-172	-2.847E-02	2.192E-01	2.196E-01	FAIL ABUN
LU-172	-2.141E-04	7.525E-02	7.525E-02	FAIL ABUN
LU-176	-7.726E-03	3.041E-02	3.061E-02	FAIL ABUN
HF-181	-4.638E-02	1.013E-01	1.034E-01	NOT IDENT.
TA-182	-1.284E-02	2.785E-01	2.786E-01	FAIL ABUN
RE-183	3.303E-01	8.063E-01	8.199E-01	NOT IDENT.
RE-184	-2.942E-02	2.951E-01	2.954E-01	NOT IDENT.
W-188	3.100E+00	1.211E+01	1.219E+01	NOT IDENT.
IR-192	-5.035E-03	5.067E-02	5.072E-02	FAIL ABUN
HG-203	2.179E-03	7.527E-02	7.528E-02	NOT IDENT.
TL-204	-1.770E+00	9.123E+00	9.158E+00	FAIL ABUN
BI-207	2.514E-02	5.385E-02	5.503E-02	FAIL ABUN
PB-211	2.250E-01	7.762E-01	7.828E-01	NOT IDENT.
BI-213	-2.547E-02	9.546E-02	9.615E-02	NOT IDENT.
RN-219	-3.471E-01	3.840E-01	4.146E-01	FAIL ABUN
RA-223	6.071E-03	6.011E-01	6.012E-01	FAIL ABUN
AC-225	-7.487E+00	1.430E+01	1.469E+01	NOT IDENT.
AC-227	-3.106E-02	2.675E-01	2.679E-01	FAIL ABUN
TH-227	-3.106E-02	2.675E-01	2.679E-01	FAIL ABUN
TH-229	-1.399E-01	5.259E-01	5.297E-01	FAIL ABUN
TH-231	6.071E-03	6.011E-01	6.012E-01	FAIL ABUN
PA-233	-8.039E-03	6.582E-02	6.592E-02	FAIL ABUN
PA-234	-9.540E-02	3.563E-01	3.589E-01	FAIL ABUN
PA-234M	-1.094E-01	2.799E+00	2.800E+00	FAIL ABUN
TH-234	-1.094E-01	2.799E+00	2.800E+00	FAIL ABUN
NP-237	-8.039E-03	6.582E-02	6.592E-02	FAIL ABUN
NP-238	5.384E+06	4.691E+07	4.697E+07	SHORT HLIF
U-238	-1.094E-01	2.799E+00	2.800E+00	FAIL ABUN
NP-239	1.158E-01	2.670E-01	2.720E-01	NOT IDENT.
PU-239	1.121E+03	5.905E+02	7.772E+02	FAIL ABUN
AM-241	1.546E-01	3.557E-01	3.625E-01	NOT IDENT.
CM-243	-1.676E-02	1.145E-01	1.148E-01	NOT IDENT.
BK-247	-5.373E-02	8.381E-02	8.724E-02	NOT IDENT.
CM-247	-3.862E-02	3.629E-02	4.025E-02	NOT IDENT.
CF-249	1.907E-02	4.607E-02	4.687E-02	NOT IDENT.
CF-251	-5.791E-02	1.302E-01	1.328E-01	NOT IDENT.
ANH-511	-1.032E-02	5.135E-02	5.156E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	23.9664	81.75	42.2990	125.81	43.6125
879.38	30.1920	82.47	42.3746	127.23	41.2563
46.54	30.2966	83.79	40.5795	127.91	41.3072
228.16	0.0000	265.00	40.6000	129.30	41.4101
52.39	28.1743	193.51	40.7410	131.20	41.1954
1093.63	34.1043	105.31	40.8503	133.02	42.7527
52.39	35.3424	86.79	40.8734	133.52	47.0689
125.81	28.3291	86.94	40.8881	136.00	49.4204
53.44	30.1469	87.09	40.9028	136.47	47.3099
54.07	33.7640	87.57	40.9493	739.50	0.0000
293.27	0.0000	88.03	40.9938	140.51	0.0000
482.18	32.3468	306.78	41.0236	143.76	52.2480
57.98	28.7933	88.47	41.0361	144.24	44.6642
59.27	28.9095	143.76	41.1790	145.44	62.2159
59.32	28.9141	90.64	29.4598	152.43	48.5701
59.54	28.0295	531.02	29.4919	1048.07	53.0544
60.96	29.9682	92.59	48.6619	154.21	34.3159
61.17	26.3524	93.35	75.0949	158.56	36.6330
62.93	32.8869	94.56	43.5945	159.00	35.6870
63.29	35.6655	311.90	50.2098	162.33	30.2638
290.67	34.7808	946.00	50.2121	537.26	33.6433
87.57	33.0182	94.87	50.2345	163.33	38.1675
66.73	42.4901	97.43	62.8174	165.86	38.3123
67.24	41.6269	98.43	44.9674	427.87	42.3302
67.68	44.4576	98.44	44.9684	176.60	44.6367
1221.41	45.3928	103.37	59.0981	177.52	43.5490
70.82	41.8212	116.74	59.0981	181.07	0.0000
97.43	49.3632	100.11	42.1224	181.52	43.0248
70.82	51.0769	102.03	42.2954	184.41	47.8251
279.20	51.0786	103.18	42.3980	185.72	47.9109
1063.66	50.1013	103.37	42.4150	193.51	34.3593
72.87	50.1095	105.31	48.6709	197.03	49.4245
351.06	50.1095	106.12	32.5017	198.01	40.0616
74.66	50.3491	106.47	36.5908	201.83	44.9957
351.93	50.3703	109.28	38.8451	203.43	53.3936
238.63	50.3703	111.00	53.3405	205.31	45.1957
351.93	50.3703	111.76	0.0000	210.85	45.5106
238.63	50.3703	114.06	35.0879	215.65	38.5513
74.97	50.3902	116.30	0.0000	218.12	47.1254
77.11	50.6726	116.74	35.2708	222.11	38.8525
78.74	50.8850	119.76	31.3010	227.09	37.8607
256.23	51.0079	264.66	54.3939	227.38	31.7649
80.03	51.0510	121.22	53.3579	228.16	0.0000
133.52	51.0632	344.28	56.5560	228.18	35.4632
364.49	51.0722	122.06	56.5852	235.69	39.4722
711.68	51.1210	122.92	31.4866	235.96	31.2585
356.01	51.1759	1274.44	31.4953	238.63	33.0033
323.87	51.1849	123.68	45.1941	238.98	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
240.99	29.7817	911.20	28.2035	537.26	10.9973
242.00	39.7539	340.48	30.0781	1260.41	0.0000
244.70	36.5507	340.55	30.0801	552.55	16.9089
685.70	0.0000	344.28	26.3355	795.86	14.8864
388.16	28.4949	345.93	40.2904	564.24	0.0000
507.63	0.0000	351.06	34.9462	569.33	16.0046
256.23	39.5348	351.93	34.9717	569.50	17.0729
527.90	0.0000	355.39	0.0000	569.70	20.2764
264.66	32.5891	356.01	23.5472	583.19	18.2797
264.80	33.1030	364.49	23.2463	584.27	18.2908
265.00	33.1102	366.42	0.0000	595.83	16.2415
269.46	37.5278	372.51	24.3322	600.60	19.5403
270.03	37.5493	375.05	20.6304	602.52	0.0000
401.81	37.5959	377.52	20.6707	604.72	14.6876
273.65	35.9758	383.85	25.4943	607.14	14.7068
276.40	37.7937	388.16	26.5269	609.32	11.9972
583.19	28.3728	666.33	28.4320	610.33	12.0035
277.60	28.3795	391.69	26.5992	614.28	6.5613
402.40	27.5306	400.66	16.2595	618.01	18.6270
279.20	33.5926	401.81	24.8892	884.68	13.1646
279.54	39.6361	402.40	26.8157	621.93	10.9798
279.70	39.6426	404.85	17.2701	630.19	0.0000
280.46	43.9848	410.95	20.2395	631.29	12.1369
301.36	25.9564	413.71	23.1777	633.25	9.9401
284.31	30.3010	720.70	17.3961	634.78	16.5802
285.41	30.3338	423.72	19.4556	635.95	21.0140
285.90	0.0000	427.09	14.6268	636.99	16.5991
287.50	28.6588	427.87	12.6837	657.50	11.7411
290.67	27.4407	433.94	20.5775	657.76	11.7424
293.27	0.0000	439.40	21.6397	657.90	0.0000
295.22	31.4978	440.45	17.7184	661.66	10.0847
316.51	31.5205	453.88	20.8629	664.57	0.0000
298.58	31.5989	463.37	10.9984	666.33	20.2163
299.98	32.9590	468.07	7.5223	666.50	20.2178
300.09	32.9628	473.00	0.0000	667.71	0.0000
300.13	32.9643	631.29	18.1370	677.62	12.4233
311.90	32.9643	696.49	18.1575	685.70	0.0000
301.36	33.0025	477.60	19.1763	692.65	0.0000
302.85	47.5895	482.18	19.7396	695.00	6.8335
304.50	31.7754	487.02	16.2471	696.49	6.8384
304.85	32.8452	492.35	0.0000	696.51	6.8384
306.78	31.8428	497.08	11.2417	697.00	15.9602
308.46	21.2617	505.52	13.3560	697.30	15.9625
311.90	23.9952	507.63	0.0000	697.49	15.9636
316.51	25.8812	511.00	13.4014	702.65	23.3186
319.41	22.3699	514.00	65.0662	706.68	18.3242
320.08	23.2784	514.00	65.0662	711.68	17.2192
321.04	25.0907	520.40	24.8838	720.70	10.3751
323.87	24.2556	520.69	0.0000	721.93	0.0000
325.23	34.1793	667.71	0.0000	1690.97	13.8472
1596.21	29.7747	527.90	0.0000	722.91	13.8477
333.37	36.6891	528.26	13.5427	723.31	12.1193
333.97	32.6294	529.59	12.5112	756.73	12.1240
334.37	31.2804	529.87	0.0000	727.33	19.0795
338.28	28.2022	531.02	28.1744	733.00	15.6517

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
735.93	11.1449	983.53	12.3279	1368.63	0.0000
737.46	5.8087	946.00	13.2852	1384.29	7.6161
739.50	0.0000	949.00	9.7716	1408.01	1.0948
1434.09	0.0000	954.55	0.0000	1434.09	0.0000
747.24	12.2521	962.31	12.7287	1435.80	5.5139
748.06	9.6304	964.08	12.2273	1457.56	0.0000
752.31	11.4032	966.17	18.3551	1460.82	2.2197
753.82	7.8997	968.97	14.3541	1489.16	5.5893
756.73	11.2500	983.53	13.4677	1505.03	4.4890
756.80	11.2504	984.45	0.0000	1584.12	7.1181
763.94	17.6343	996.26	9.0192	1596.21	0.0000
765.81	26.4734	1002.74	12.3973	1620.50	3.6920
766.84	26.4853	1004.73	9.3047	1621.92	3.6934
772.60	0.0000	1021.30	0.0000	1678.03	0.0000
776.52	17.7319	1025.87	0.0000	1690.97	4.6897
777.92	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	13.3127	1037.84	7.8433	1764.49	0.9532
783.70	0.0000	1038.76	0.0000	1770.23	1.5907
1435.80	11.5872	1046.59	13.7667	1771.35	4.7732
903.28	8.5688	1048.07	8.8544	1791.20	0.0000
795.86	10.0133	1049.04	10.8254	1808.65	0.9622
801.95	7.1709	1050.41	9.8462	1810.72	0.0000
810.06	10.7933	1063.66	6.9231	1836.06	5.8066
810.29	8.9954	1077.00	6.3578		
810.45	8.9960	1077.34	11.1269		
810.76	8.0975	1085.87	10.9590		
815.77	6.3113	1093.63	7.9907		
818.51	9.9291	1099.45	5.3372		
832.01	10.8926	1112.07	4.0193		
834.85	9.9963	1112.84	8.0405		
836.80	0.0000	1115.54	3.2189		
846.75	0.0000	1120.29	3.2238		
846.77	12.7849	1120.55	3.2242		
856.80	15.5873	1121.30	0.0000		
860.56	9.1827	1808.65	9.4313		
871.09	8.2993	1131.51	0.0000		
873.19	8.3062	1147.95	0.0000		
875.33	0.0000	1332.49	10.2429		
879.38	7.4014	1177.95	16.4131		
880.51	11.1068	1189.05	11.3223		
881.60	6.4818	1204.77	11.3760		
883.24	7.4126	1221.41	11.4324		
884.68	10.1980	1231.02	10.4230		
889.28	13.0024	1235.36	22.9601		
894.76	13.0302	1238.28	9.4005		
1836.06	13.0468	1260.41	0.0000		
900.72	10.2618	1271.87	5.0628		
903.28	10.2719	1274.44	10.1332		
911.20	8.4298	1274.54	10.1332		
912.08	8.4326	1291.59	15.9100		
984.45	0.0000	1298.22	0.0000		
926.50	8.4787	1312.11	5.3342		
929.11	12.2589	1332.49	4.2915		
935.54	0.0000	1362.66	0.0000		
937.49	16.0812	1365.19	2.1649		

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:29:37.99

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*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947002.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;827
                                        Background date  : 20-JUL-2025 10:27:43
Sample date      : 28-MAY-2025 13:05:00 Acquisition date : 26-JUL-2025 22:29:08
Sample ID        : G730947002           Sample quantity  : 1.40480E+02 GRAM
Detector name    : GAM29                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.43  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2822154              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	50.92	35	104	1.79	102.63	99	7	9.81E-03	50.6	
2	0	62.87*	46	183	2.09	126.51	122	9	1.27E-02	56.6	
3	2	74.99	162	210	1.20	150.73	147	15	4.51E-02	16.2	1.93E+00
4	2	77.16	251	149	1.03	155.08	147	15	6.97E-02	10.2	
5	0	84.27*	34	153	1.15	169.27	166	7	9.55E-03	63.9	
6	0	87.21	97	132	1.42	175.16	173	6	2.68E-02	21.3	
7	6	90.17	76	92	0.97	181.07	179	18	2.10E-02	20.4	1.11E+00
8	6	92.81*	101	193	1.61	186.35	179	18	2.80E-02	29.4	
9	0	99.29	54	97	1.62	199.29	196	8	1.50E-02	34.7	
10	0	185.81*	137	122	1.18	372.19	367	11	3.80E-02	18.5	
11	4	197.81*	20	61	1.10	396.18	394	11	5.43E-03	65.7	4.07E+00
12	4	199.35*	34	91	1.36	399.25	394	11	9.38E-03	54.1	
13	0	209.46	58	95	1.00	419.46	416	9	1.62E-02	33.0	
14	4	238.70*	503	54	1.26	477.90	473	19	1.40E-01	5.2	1.30E+00
15	4	241.82	150	72	1.87	484.13	473	19	4.16E-02	16.2	
16	0	270.15	64	70	1.03	540.75	536	10	1.78E-02	27.5	
17	1	295.36	264	46	1.44	591.13	584	21	7.34E-02	7.7	3.03E+00
18	1	300.17	41	56	1.47	600.73	584	21	1.14E-02	34.6	
19	0	327.83	36	70	0.82	656.02	650	10	9.99E-03	46.6	
20	0	338.58*	114	78	1.16	677.50	673	12	3.16E-02	18.3	
21	0	352.03*	365	78	1.29	704.38	698	13	1.01E-01	7.3	
22	0	464.75	35	56	0.85	929.67	923	15	9.78E-03	49.3	
23	0	511.02*	53	40	2.72	1022.13	1013	18	1.48E-02	36.8	
24	0	520.61	9	25	0.58	1041.31	1038	8	2.41E-03	104.4	
25	0	528.38	11	21	0.96	1056.83	1051	9	2.99E-03	84.6	
26	0	583.38*	141	52	1.26	1166.76	1160	13	3.91E-02	13.6	
27	0	609.58*	255	61	1.36	1219.13	1213	14	7.09E-02	9.2	
28	0	644.35	18	13	1.89	1288.63	1285	9	4.86E-03	42.5	
29	0	701.58	13	27	0.60	1403.02	1396	12	3.72E-03	82.2	
30	0	727.38	35	12	1.19	1454.58	1449	10	9.60E-03	25.6	
31	0	771.73	26	71	4.96	1543.24	1532	17	7.36E-03	77.5	
32	0	795.20	33	9	2.59	1590.14	1584	16	9.13E-03	26.2	
33	0	839.14	16	21	1.25	1677.98	1671	12	4.53E-03	61.3	
34	0	861.25	27	23	1.72	1722.17	1715	15	7.36E-03	43.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	871.21	6	4	0.92	1742.08	1739	7	1.67E-03	66.9	
36	0	878.61*	6	14	0.71	1756.87	1750	12	1.63E-03	140.6	
37	0	911.54*	82	34	1.37	1822.70	1817	12	2.28E-02	18.7	
38	0	917.30	25	8	4.68	1834.21	1828	13	6.92E-03	32.3	
39	0	934.29	16	12	1.10	1868.17	1864	8	4.46E-03	46.6	
40	1	965.39*	25	12	1.97	1930.33	1923	20	6.99E-03	36.9	1.34E+00
41	1	969.20*	55	11	1.91	1937.95	1923	20	1.52E-02	19.0	
42	0	1064.59*	27	0	2.01	2128.64	2121	16	7.47E-03	24.1	
43	0	1120.12	46	11	2.49	2239.64	2234	11	1.29E-02	20.2	
44	0	1240.53	5	17	1.41	2480.36	2473	9	1.36E-03	161.0	
45	0	1298.29	6	0	1.37	2595.83	2593	6	1.67E-03	40.8	
46	0	1460.92*	157	8	1.57	2920.97	2913	16	4.36E-02	9.1	
47	0	1764.57*	57	3	2.62	3528.09	3521	14	1.57E-02	15.2	
48	0	1898.75	8	3	0.48	3796.39	3787	14	2.12E-03	63.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 26-JUL-2025 23:29:39

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947002.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 28-MAY-2025 13:05:00	Acquisition date	: 26-JUL-2025 22:29:08
Sample ID	: G730947002	Sample quantity	: 140.48 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA29	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.43 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	150	10.66*	1.316E+00	5.731E+00	5.731E+00	18.22
RB-83	520.40	9	45.00*	3.201E+00	3.378E-02	5.446E-02	208.73
	529.59	11	29.30	3.165E+00	6.493E-02	1.047E-01	169.11
	552.55	------	16.00	3.057E+00	------ Line Not Found		------
NB-94	702.65	14	99.81*	2.515E+00	2.913E-02	2.913E-02	164.49
	871.09	6	99.89	2.080E+00	1.549E-02	1.549E-02	133.85
CD-109	88.03	117	3.70*	6.409E+00	2.628E+00	2.873E+00	42.54
SN-126	64.28	56	9.60	3.449E+00	9.092E-01	9.092E-01	113.22
	86.94	117	8.90	6.409E+00	1.092E+00	1.092E+00	42.54
	87.57	117	37.00*	6.409E+00	2.628E-01	2.628E-01	42.54
TM-171	51.35	44	0.27	1.542E+00	5.682E+01	6.025E+01	101.26
	52.39	44	0.47*	1.542E+00	3.264E+01	3.461E+01	101.26
	66.73	------	0.14	4.055E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	5.030E+00	------ Line Not Found		------
	583.19	146	85.00*	2.928E+00	3.143E-01	3.143E-01	27.27
	860.56	27	12.50	2.102E+00	5.418E-01	5.418E-01	87.16
BI-211	72.87	------	1.23	4.928E+00	------ Line Not Found		------
	351.06	396	12.92*	4.265E+00	3.840E+00	3.840E+00	14.57
BI-212	727.33	35	6.67*	2.439E+00	1.158E+00	1.158E+00	51.20
	1620.50	------	1.47	1.221E+00	------ Line Not Found		------
PB-212	74.82	198	10.28	5.197E+00	1.979E+00	1.979E+00	32.38
	77.11	306	17.10	5.456E+00	1.750E+00	1.750E+00	20.41
	238.63	563	43.60*	5.558E+00	1.240E+00	1.240E+00	10.46
	300.09	45	3.30	4.765E+00	1.531E+00	1.531E+00	69.12
BI-214	609.32	264	45.49*	2.827E+00	1.098E+00	1.098E+00	18.32
	1120.29	45	14.92	1.654E+00	9.843E-01	9.844E-01	40.36
	1764.49	53	15.30	1.160E+00	1.603E+00	1.603E+00	30.40
PB-214	74.82	198	5.80	5.197E+00	3.507E+00	3.508E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.238E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.394E+00	14.57
RN-222	74.82	198	5.80	5.197E+00	3.507E+00	3.508E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.238E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.394E+00	14.57
RA-224	240.99	167	4.10*	5.511E+00	3.956E+00	3.956E+00	32.35
RA-226	74.82	198	5.80	5.197E+00	3.507E+00	3.508E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.238E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.394E+00	14.57
AC-228	338.32	124	11.27	4.383E+00	1.339E+00	1.339E+00	36.51
	911.20	82	25.80*	1.997E+00	8.524E-01	8.524E-01	37.37
	968.97	54	15.80	1.888E+00	9.755E-01	9.755E-01	37.90

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
RA-228	338.32	124	11.27	4.383E+00	1.339E+00	1.339E+00	36.51
	911.20	82	25.80*	1.997E+00	8.524E-01	8.524E-01	37.37
	968.97	54	15.80	1.888E+00	9.755E-01	9.755E-01	37.90
TH-228	74.82	198	10.28	5.197E+00	1.979E+00	1.979E+00	32.38
	77.11	306	17.10	5.456E+00	1.750E+00	1.750E+00	20.41
	238.63	563	43.60*	5.558E+00	1.240E+00	1.240E+00	10.46
	300.09	45	3.30	4.765E+00	1.531E+00	1.531E+00	69.12
TH-229	85.43	42	14.70	6.170E+00	2.451E-01	2.451E-01	127.71
	88.47	117	24.00	6.409E+00	4.051E-01	4.051E-01	42.54
	193.51	------	4.41*	6.326E+00	------ Line Not Found		------
	210.85	66	2.80	6.036E+00	2.085E+00	2.085E+00	65.94
TH-230	74.82	198	5.80	5.197E+00	3.507E+00	3.507E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.237E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.393E+00	14.57
PA-231	283.69	------	1.70	4.953E+00	------ Line Not Found		------
	301.36	45	5.35*	4.765E+00	9.447E-01	9.447E-01	69.12
TH-232	338.32	124	11.27	4.383E+00	1.339E+00	1.339E+00	36.51
	911.20	82	25.80*	1.997E+00	8.524E-01	8.524E-01	37.37
	968.97	54	15.80	1.888E+00	9.755E-01	9.755E-01	37.90
PA-234M	63.29	56	3.70*	3.449E+00	2.359E+00	2.359E+00	113.22
	92.59	121	4.23	6.779E+00	2.254E+00	2.254E+00	58.89
TH-234	63.29	56	3.70*	3.449E+00	2.359E+00	2.359E+00	113.22
	92.59	121	4.23	6.779E+00	2.254E+00	2.254E+00	58.89
U-234	74.82	198	5.80	5.197E+00	3.507E+00	3.507E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.237E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.393E+00	14.57
U-235	89.96	91	3.47	6.617E+00	2.116E+00	2.116E+00	40.76
	93.35	121	5.60	6.779E+00	1.702E+00	1.702E+00	58.89
	143.76	------	10.96*	7.244E+00	------ Line Not Found		------
	163.33	------	5.08	6.903E+00	------ Line Not Found		------
	185.72	156	57.20	6.471E+00	2.250E-01	2.250E-01	37.00
	205.31	------	5.01	6.110E+00	------ Line Not Found		------
U-238	63.29	56	3.70*	3.449E+00	2.359E+00	2.359E+00	113.22
	92.59	121	4.23	6.779E+00	2.254E+00	2.254E+00	58.89
AM-243	43.53	------	5.90	6.346E-01	------ Line Not Found		------
	74.66	198	67.20*	5.197E+00	3.027E-01	3.027E-01	32.38
ANH-511	511.00	56	100.00*	3.247E+00	9.236E-02	9.236E-02	73.59

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:29:40.87

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947002.CNF;1    *
* Acquisition date : 26-JUL-2025 22:29:08 Sensitivity     : 3.000          *
* Detector ID      : GAM29                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****          *
* Sample date      : 28-MAY-2025 13:05:00 Analyst initials: MXR1           *
* Sample ID        : G730947002           Sample Quantity : 1.4048E+02 GRAM   *
* Batch Number     : 2822154              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;19                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 24-JUL-2025 09:21:08 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;23          *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	5.731E+00	1.023E+00	4.610E-01
RB-83	5.446E-02	1.114E-01	1.542E-01
NB-94	2.913E-02	4.696E-02	4.878E-02
CD-109	2.873E+00	1.198E+00	1.310E+00
SN-126	2.628E-01	1.095E-01	1.094E-01
TM-171	3.461E+01	3.435E+01	3.439E+01
TL-208	3.143E-01	8.399E-02	5.483E-02
BI-211	3.840E+00	5.482E-01	3.027E-01
BI-212	1.158E+00	5.809E-01	7.442E-01
PB-212	1.240E+00	1.271E-01	8.567E-02
BI-214	1.098E+00	1.972E-01	1.108E-01
PB-214	1.394E+00	1.990E-01	1.101E-01
RN-222	1.394E+00	1.990E-01	1.101E-01
RA-224	3.956E+00	1.254E+00	9.175E-01
RA-226	1.394E+00	1.990E-01	1.101E-01
AC-228	8.524E-01	3.121E-01	2.208E-01
RA-228	8.524E-01	3.121E-01	2.208E-01
TH-228	1.240E+00	1.271E-01	8.567E-02
TH-229	-2.111E-01	5.147E-01	8.799E-01
TH-230	1.393E+00	1.989E-01	1.101E-01
PA-231	9.447E-01	6.399E-01	6.907E-01
TH-232	8.524E-01	3.121E-01	2.208E-01
PA-234M	2.359E+00	2.617E+00	2.097E+00
TH-234	2.359E+00	2.617E+00	2.097E+00
U-234	1.393E+00	1.989E-01	1.101E-01
U-235	8.655E-02	1.778E-01	3.376E-01
U-238	2.359E+00	2.617E+00	2.097E+00
AM-243	3.027E-01	9.606E-02	9.249E-02
ANH-511	9.236E-02	6.661E-02	4.069E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	3.754E-01	5.275E-01	1.075E+00	NOT IDENT.

NA-22	-3.238E-03	2.418E-02	4.985E-02	NOT IDENT.
NA-24	0.000E+00	1.198E+27	0.000E+00	SHORT HLIF
AL-26	1.742E-02	3.271E-02	7.434E-02	NOT IDENT.
SC-46	-1.825E-02	5.035E-02	8.827E-02	FAIL ABUN
V-48	1.365E-01	3.505E-01	7.576E-01	NOT IDENT.
CR-51	-1.071E+00	9.130E-01	1.571E+00	NOT IDENT.
MN-52	0.000E+00	4.820E+01	0.000E+00	SHORT HLIF
MN-54	-2.509E-02	4.320E-02	6.249E-02	NOT IDENT.
CO-56	1.154E-02	4.573E-02	9.073E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-3.682E-03	2.527E-02	4.564E-02	NOT IDENT.
CO-58	8.944E-03	5.261E-02	1.014E-01	NOT IDENT.
FE-59	-7.331E-02	1.445E-01	2.651E-01	NOT IDENT.
CO-60	8.786E-03	2.151E-02	5.166E-02	NOT IDENT.
ZN-65	-1.479E-02	8.278E-02	1.403E-01	NOT IDENT.
GE-68	-3.146E-01	9.945E-01	1.915E+00	NOT IDENT.
AS-73	2.748E-01	1.253E+00	2.247E+00	NOT IDENT.
AS-74	-1.834E-01	4.024E-01	7.199E-01	NOT IDENT.
SE-75	-3.049E-03	4.489E-02	8.749E-02	NOT IDENT.
BR-77	0.000E+00	8.041E+06	0.000E+00	SHORT HLIF
SR-82	-3.049E-01	9.822E-01	1.543E+00	NOT IDENT.
RB-84	-1.856E-01	1.611E-01	2.010E-01	NOT IDENT.
KR-85	-3.009E+00	6.567E+00	1.034E+01	NOT IDENT.
SR-85	-2.559E-02	5.541E-02	8.718E-02	NOT IDENT.
RB-86	-4.273E-01	2.879E+00	5.726E+00	NOT IDENT.
Y-88	-3.105E-03	3.446E-02	7.321E-02	NOT IDENT.
Y-91	-5.272E+00	2.262E+01	4.403E+01	NOT IDENT.
NB-95	-1.261E-02	8.367E-02	1.328E-01	NOT IDENT.
NB-95M	-6.820E-02	1.592E-01	2.699E-01	NOT IDENT.
ZR-95	-3.665E-02	7.925E-02	1.398E-01	NOT IDENT.
NB-97	0.000E+00	1.563E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.184E+25	0.000E+00	SHORT HLIF
MO-99	0.000E+00	7.216E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.553E+41	0.000E+00	SHORT HLIF
RH-101	-3.008E-02	2.971E-02	4.967E-02	FAIL ABUN
RH-102	4.676E-02	4.276E-02	9.454E-02	NOT IDENT.
RU-103	-1.516E-02	6.934E-02	1.298E-01	FAIL ABUN
RH-106	1.514E-01	2.594E-01	5.398E-01	NOT IDENT.
RU-106	1.514E-01	2.594E-01	5.398E-01	NOT IDENT.
AG-108M	1.021E-02	2.011E-02	4.206E-02	NOT IDENT.
AG-110	-2.554E-01	6.686E-01	1.199E+00	NOT IDENT.
AG-110M	2.678E-02	4.646E-02	9.611E-02	NOT IDENT.
SN-113	2.153E-02	4.749E-02	9.549E-02	NOT IDENT.
CD-115	0.000E+00	1.226E+07	0.000E+00	SHORT HLIF
SN-117M	9.196E-02	4.851E-01	8.812E-01	NOT IDENT.
SB-122	0.000E+00	1.336E+05	0.000E+00	SHORT HLIF
TE-123M	8.056E-03	3.307E-02	6.046E-02	NOT IDENT.
SB-124	2.491E-02	1.284E-01	2.752E-01	NOT IDENT.
SB-125	4.120E-02	7.846E-02	1.592E-01	FAIL ABUN
TE-125M	8.073E+00	1.358E+01	2.623E+01	NOT IDENT.
I-126	2.342E+00	2.146E+00	4.547E+00	NOT IDENT.
SB-126	5.967E-01	1.362E+00	2.755E+00	NOT IDENT.
SB-127	0.000E+00	2.864E+03	0.000E+00	SHORT HLIF
I-131	-1.238E-01	4.232E+00	8.190E+00	NOT IDENT.
I-132	0.000E+00	1.570E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	9.042E+03	0.000E+00	SHORT HLIF
BA-133	9.690E-03	3.627E-02	6.563E-02	NOT IDENT.
I-133	0.000E+00	1.569E+19	0.000E+00	SHORT HLIF
CS-134	0.000E+00	4.993E-02	7.647E-02	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	2.197E-01	8.264E-01	1.739E+00	NOT IDENT.
BA-137M	-4.017E-03	2.970E-02	5.512E-02	NOT IDENT.
CS-137	-4.244E-03	3.138E-02	5.823E-02	NOT IDENT.
LA-138	-2.964E-03	4.740E-02	9.514E-02	NOT IDENT.
CE-139	1.782E-03	3.290E-02	5.938E-02	NOT IDENT.
BA-140	6.880E-01	2.384E+00	4.742E+00	NOT IDENT.
LA-140	-2.706E-01	1.081E+00	2.013E+00	FAIL ABUN
CE-141	-3.037E-02	1.363E-01	2.422E-01	NOT IDENT.
CE-143	0.000E+00	4.648E+11	0.000E+00	SHORT HLIF
CE-144	1.376E-02	1.981E-01	3.617E-01	NOT IDENT.
PM-144	-4.351E-03	3.690E-02	6.026E-02	NOT IDENT.
PR-144	-3.260E-01	2.827E+00	4.619E+00	NOT IDENT.
PM-146	1.757E-03	3.182E-02	6.223E-02	NOT IDENT.
ND-147	-2.561E-01	8.164E+00	1.396E+01	FAIL ABUN
PM-147	-2.832E+01	6.762E+02	1.232E+03	NOT IDENT.
PM-149	0.000E+00	7.455E+07	0.000E+00	SHORT HLIF
EU-150	-3.583E-03	2.523E-02	4.305E-02	FAIL ABUN
EU-152	4.357E-03	9.423E-02	1.640E-01	FAIL ABUN

GD-153	3.076E-02	8.750E-02	1.387E-01	NOT IDENT.
EU-154	-1.318E-02	6.569E-02	1.336E-01	NOT IDENT.
EU-155	7.256E-02	9.279E-02	1.809E-01	FAIL ABUN
TB-160	8.931E-02	2.461E-01	3.042E-01	FAIL ABUN
HO-166M	3.019E-02	5.188E-02	1.054E-01	FAIL ABUN
HF-172	7.951E-03	1.757E-01	3.215E-01	FAIL ABUN
LU-172	1.262E-02	5.282E-02	1.096E-01	FAIL ABUN
LU-176	1.890E-02	2.087E-02	4.396E-02	FAIL ABUN
HF-181	-5.110E-03	7.193E-02	1.374E-01	NOT IDENT.
TA-182	9.189E-02	1.545E-01	3.472E-01	FAIL ABUN
RE-183	-4.620E-02	2.486E-01	4.686E-01	NOT IDENT.
RE-184	1.212E-01	2.045E-01	4.576E-01	NOT IDENT.
W-188	-4.879E+00	8.944E+00	1.467E+01	FAIL ABUN
IR-192	5.823E-03	4.812E-02	9.069E-02	FAIL ABUN
HG-203	1.830E-02	6.450E-02	1.277E-01	NOT IDENT.
TL-204	-2.147E+00	4.754E+00	8.608E+00	NOT IDENT.
BI-207	1.101E-01	5.193E-02	1.117E-01	FAIL ABUN
BI-210	1.056E-01	3.206E+00	6.331E+00	NOT IDENT.
PB-210	1.056E-01	3.206E+00	6.331E+00	NOT IDENT.
PB-211	8.723E-02	5.113E-01	1.017E+00	NOT IDENT.
BI-213	-6.702E-02	8.264E-02	1.438E-01	NOT IDENT.
RN-219	-1.345E-02	3.417E-01	6.543E-01	FAIL ABUN
RA-223	-1.570E-01	5.534E-01	9.330E-01	FAIL ABUN
AC-225	8.465E+00	1.003E+01	2.089E+01	NOT IDENT.
AC-227	-8.196E-02	1.974E-01	3.737E-01	FAIL ABUN
TH-227	-8.196E-02	1.974E-01	3.737E-01	FAIL ABUN
TH-231	-1.570E-01	5.534E-01	9.330E-01	FAIL ABUN
PA-233	1.754E-02	5.274E-02	1.056E-01	FAIL ABUN
PA-234	-7.435E-02	2.036E-01	3.933E-01	FAIL ABUN
NP-237	1.754E-02	5.274E-02	1.056E-01	FAIL ABUN
NP-238	0.000E+00	2.806E+07	0.000E+00	SHORT HLIF
NP-239	7.693E-02	2.302E-01	4.332E-01	FAIL ABUN
PU-239	7.178E+01	3.044E+02	5.633E+02	NOT IDENT.
AM-241	-7.050E-03	1.281E-01	2.254E-01	NOT IDENT.
CM-243	-4.366E-02	1.033E-01	1.686E-01	FAIL ABUN
BK-247	4.370E-02	6.286E-02	1.262E-01	FAIL ABUN
CM-247	-1.792E-02	3.149E-02	5.691E-02	NOT IDENT.
CF-249	-4.624E-03	3.319E-02	6.309E-02	NOT IDENT.
CF-251	-5.364E-02	1.160E-01	1.990E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:29:38.87

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	150	10.66*	1.316E+00	5.731E+00	5.731E+00	18.22
RB-83	520.40	9	45.00*	3.201E+00	3.378E-02	5.446E-02	208.73
	529.59	11	29.30	3.165E+00	6.493E-02	1.047E-01	169.11
	552.55	------	16.00	3.057E+00	------ Line Not Found		------
NB-94	702.65	14	99.81*	2.515E+00	2.913E-02	2.913E-02	164.49
	871.09	6	99.89	2.080E+00	1.549E-02	1.549E-02	133.85
CD-109	88.03	117	3.70*	6.409E+00	2.628E+00	2.873E+00	42.54
SN-126	64.28	56	9.60	3.449E+00	9.092E-01	9.092E-01	113.22
	86.94	117	8.90	6.409E+00	1.092E+00	1.092E+00	42.54
	87.57	117	37.00*	6.409E+00	2.628E-01	2.628E-01	42.54
TM-171	51.35	44	0.27	1.542E+00	5.682E+01	6.025E+01	101.26
	52.39	44	0.47*	1.542E+00	3.264E+01	3.461E+01	101.26
	66.73	------	0.14	4.055E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	5.030E+00	------ Line Not Found		------
	583.19	146	85.00*	2.928E+00	3.143E-01	3.143E-01	27.27
	860.56	27	12.50	2.102E+00	5.418E-01	5.418E-01	87.16
BI-211	72.87	------	1.23	4.928E+00	------ Line Not Found		------
	351.06	396	12.92*	4.265E+00	3.840E+00	3.840E+00	14.57
BI-212	727.33	35	6.67*	2.439E+00	1.158E+00	1.158E+00	51.20
	1620.50	------	1.47	1.221E+00	------ Line Not Found		------
PB-212	74.82	198	10.28	5.197E+00	1.979E+00	1.979E+00	32.38
	77.11	306	17.10	5.456E+00	1.750E+00	1.750E+00	20.41
	238.63	563	43.60*	5.558E+00	1.240E+00	1.240E+00	10.46
	300.09	45	3.30	4.765E+00	1.531E+00	1.531E+00	69.12
BI-214	609.32	264	45.49*	2.827E+00	1.098E+00	1.098E+00	18.32
	1120.29	45	14.92	1.654E+00	9.843E-01	9.844E-01	40.36
	1764.49	53	15.30	1.160E+00	1.603E+00	1.603E+00	30.40
PB-214	74.82	198	5.80	5.197E+00	3.507E+00	3.508E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.238E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.394E+00	14.57
RN-222	74.82	198	5.80	5.197E+00	3.507E+00	3.508E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.238E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.394E+00	14.57
RA-224	240.99	167	4.10*	5.511E+00	3.956E+00	3.956E+00	32.35
RA-226	74.82	198	5.80	5.197E+00	3.507E+00	3.508E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.238E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.394E+00	14.57
AC-228	338.32	124	11.27	4.383E+00	1.339E+00	1.339E+00	36.51

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	82	25.80*	1.997E+00	8.524E-01	8.524E-01	37.37
	968.97	54	15.80	1.888E+00	9.755E-01	9.755E-01	37.90
RA-228	338.32	124	11.27	4.383E+00	1.339E+00	1.339E+00	36.51
	911.20	82	25.80*	1.997E+00	8.524E-01	8.524E-01	37.37
	968.97	54	15.80	1.888E+00	9.755E-01	9.755E-01	37.90
TH-228	74.82	198	10.28	5.197E+00	1.979E+00	1.979E+00	32.38
	77.11	306	17.10	5.456E+00	1.750E+00	1.750E+00	20.41
	238.63	563	43.60*	5.558E+00	1.240E+00	1.240E+00	10.46
	300.09	45	3.30	4.765E+00	1.531E+00	1.531E+00	69.12
TH-229	85.43	42	14.70	6.170E+00	2.451E-01	2.451E-01	127.71
	88.47	117	24.00	6.409E+00	4.051E-01	4.051E-01	42.54
	193.51	------	4.41*	6.326E+00	------ Line Not Found		------
	210.85	66	2.80	6.036E+00	2.085E+00	2.085E+00	65.94
TH-230	74.82	198	5.80	5.197E+00	3.507E+00	3.507E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.237E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.393E+00	14.57
PA-231	283.69	------	1.70	4.953E+00	------ Line Not Found		------
	301.36	45	5.35*	4.765E+00	9.447E-01	9.447E-01	69.12
TH-232	338.32	124	11.27	4.383E+00	1.339E+00	1.339E+00	36.51
	911.20	82	25.80*	1.997E+00	8.524E-01	8.524E-01	37.37
	968.97	54	15.80	1.888E+00	9.755E-01	9.755E-01	37.90
PA-234M	63.29	56	3.70*	3.449E+00	2.359E+00	2.359E+00	113.22
	92.59	121	4.23	6.779E+00	2.254E+00	2.254E+00	58.89
TH-234	63.29	56	3.70*	3.449E+00	2.359E+00	2.359E+00	113.22
	92.59	121	4.23	6.779E+00	2.254E+00	2.254E+00	58.89
U-234	74.82	198	5.80	5.197E+00	3.507E+00	3.507E+00	32.38
	77.11	306	9.70	5.456E+00	3.086E+00	3.086E+00	20.41
	87.09	117	3.41	6.409E+00	2.851E+00	2.851E+00	42.54
	242.00	167	7.25	5.511E+00	2.237E+00	2.237E+00	32.35
	295.22	290	18.42	4.819E+00	1.748E+00	1.748E+00	15.36
	351.93	396	35.60*	4.265E+00	1.393E+00	1.393E+00	14.57
U-235	89.96	91	3.47	6.617E+00	2.116E+00	2.116E+00	40.76
	93.35	121	5.60	6.779E+00	1.702E+00	1.702E+00	58.89
	143.76	------	10.96*	7.244E+00	------ Line Not Found		------
	163.33	------	5.08	6.903E+00	------ Line Not Found		------
	185.72	156	57.20	6.471E+00	2.250E-01	2.250E-01	37.00
	205.31	------	5.01	6.110E+00	------ Line Not Found		------
U-238	63.29	56	3.70*	3.449E+00	2.359E+00	2.359E+00	113.22
	92.59	121	4.23	6.779E+00	2.254E+00	2.254E+00	58.89
AM-243	43.53	------	5.90	6.346E-01	------ Line Not Found		------
	74.66	198	67.20*	5.197E+00	3.027E-01	3.027E-01	32.38
ANH-511	511.00	56	100.00*	3.247E+00	9.236E-02	9.236E-02	73.59

Flag: "*" = Keyline

Sample ID : G730947002 Acquisition date : 26-JUL-2025 22:29:08

Total number of lines in spectrum 48
Number of unidentified lines 6
Number of lines tentatively identified by NID 42 87.50%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	5.731E+00	5.731E+00	1.044E+00	18.22	
RB-83	86.20D	1.61	3.378E-02	5.446E-02	11.37E-02	208.73	
NB-94	20300.00Y	1.00	2.913E-02	2.913E-02	4.791E-02	164.49	
CD-109	461.40D	1.09	2.628E+00	2.873E+00	1.222E+00	42.54	
SN-126	2.30E+05Y	1.00	2.628E-01	2.628E-01	1.118E-01	42.54	
TM-171	1.92Y	1.06	3.264E+01	3.461E+01	3.505E+01	101.26	
TL-208	1.41E+10Y	1.00	3.143E-01	3.143E-01	0.857E-01	27.27	
BI-211	7.04E+08Y	1.00	3.840E+00	3.840E+00	0.559E+00	14.57	
BI-212	1.41E+10Y	1.00	1.158E+00	1.158E+00	0.593E+00	51.20	
PB-212	1.41E+10Y	1.00	1.240E+00	1.240E+00	0.130E+00	10.46	
BI-214	1600.00Y	1.00	1.098E+00	1.098E+00	0.201E+00	18.32	
PB-214	1600.00Y	1.00	1.393E+00	1.394E+00	0.203E+00	14.57	
RN-222	1600.00Y	1.00	1.393E+00	1.394E+00	0.203E+00	14.57	
RA-224	1.41E+10Y	1.00	3.956E+00	3.956E+00	1.280E+00	32.35	
RA-226	1600.00Y	1.00	1.393E+00	1.394E+00	0.203E+00	14.57	
AC-228	1.41E+10Y	1.00	8.524E-01	8.524E-01	3.185E-01	37.37	
RA-228	1.41E+10Y	1.00	8.524E-01	8.524E-01	3.185E-01	37.37	
TH-228	1.41E+10Y	1.00	1.240E+00	1.240E+00	0.130E+00	10.46	
TH-229	7340.00Y	1.00	4.051E-01	4.051E-01	1.723E-01	42.54	K
TH-230	7.54E+04Y	1.00	1.393E+00	1.393E+00	0.203E+00	14.57	
PA-231	7.04E+08Y	1.00	9.447E-01	9.447E-01	6.530E-01	69.12	
TH-232	1.41E+10Y	1.00	8.524E-01	8.524E-01	3.185E-01	37.37	
PA-234M	4.47E+09Y	1.00	2.359E+00	2.359E+00	2.671E+00	113.22	
TH-234	4.47E+09Y	1.00	2.359E+00	2.359E+00	2.671E+00	113.22	
U-234	2.45E+05Y	1.00	1.393E+00	1.393E+00	0.203E+00	14.57	
U-235	7.04E+08Y	1.00	2.250E-01	2.250E-01	0.833E-01	37.00	K
U-238	4.47E+09Y	1.00	2.359E+00	2.359E+00	2.671E+00	113.22	
AM-243	7370.00Y	1.00	3.027E-01	3.027E-01	0.980E-01	32.38	
ANH-511	1.00E+09Y	1.00	9.236E-02	9.236E-02	6.797E-02	73.59	
	Total Activity :		7.274E+01	7.498E+01			

Grand Total Activity : 7.274E+01 7.498E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	99.29	64	116	1.62	199.29	196	8	1.50E-02	69.5	7.09E+00	T
4	197.81	22	69	1.10	396.18	394	11	5.43E-03	****	6.25E+00	T
4	199.35	38	103	1.36	399.25	394	11	9.38E-03	****	6.22E+00	
0	270.15	71	77	1.03	540.75	536	10	1.78E-02	54.9	5.12E+00	T
0	327.83	39	76	0.82	656.02	650	10	9.99E-03	93.2	4.48E+00	T
0	464.75	37	59	0.85	929.67	923	15	9.78E-03	98.7	3.49E+00	T
0	644.35	18	13	1.89	1288.63	1285	9	4.86E-03	85.0	2.70E+00	
0	771.73	27	72	4.96	1543.24	1532	17	7.36E-03	****	2.32E+00	T
0	795.20	33	9	2.59	1590.14	1584	16	9.13E-03	52.4	2.26E+00	T
0	839.14	16	21	1.25	1677.98	1671	12	4.53E-03	****	2.15E+00	
0	878.61	6	14	0.71	1756.87	1750	12	1.63E-03	****	2.06E+00	T
0	917.30	25	8	4.68	1834.21	1828	13	6.92E-03	64.6	1.99E+00	
0	934.29	16	12	1.10	1868.17	1864	8	4.46E-03	93.2	1.95E+00	T
1	965.39	25	12	1.97	1930.33	1923	20	6.99E-03	73.9	1.90E+00	T
0	1064.59	27	0	2.01	2128.64	2121	16	7.47E-03	48.1	1.73E+00	T
0	1240.53	5	17	1.41	2480.36	2473	9	1.36E-03	****	1.51E+00	
0	1298.29	6	0	1.37	2595.83	2593	6	1.67E-03	81.6	1.45E+00	T
0	1898.75	7	3	0.48	3796.39	3787	14	2.12E-03	****	1.12E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:29:51.36

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947002.CNF;1    *
* Acquisition date : 26-JUL-2025 22:29:08 Sensitivity     : 3.000          *
* Detector ID      : GAM29                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****          *
* Sample date      : 28-MAY-2025 13:05:00 Nuclide Library : SOLID          *
* Sample ID        : G730947002           Analyst initials: MXR1           *
* Batch Number     : 2822154              Sample Quantity : 1.4048E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 24-JUL-2025 09:21:08 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;23          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.788E-01
RB-83	6.883E-02
NB-94	2.146E-02
CD-109	6.200E-01
SN-126	5.149E-02
TM-171	1.621E+01
TL-208	2.445E-02
BI-211	1.379E-01
BI-212	3.269E-01
PB-212	3.974E-02
BI-214	4.967E-02
PB-214	5.014E-02
RN-222	5.014E-02
RA-224	4.257E-01
RA-226	5.014E-02
AC-228	9.623E-02
RA-228	9.623E-02
TH-228	3.974E-02
TH-229	4.130E-01
TH-230	5.013E-02
PA-231	3.160E-01
TH-232	9.623E-02
PA-234M	9.894E-01
TH-234	9.894E-01
U-234	5.013E-02
U-235	1.593E-01
U-238	9.894E-01
AM-243	4.404E-02
ANH-511	1.807E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	4.927E-01	NOT IDENT.
NA-22	1.977E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	3.086E-02	NOT IDENT.
SC-46	3.827E-02	FAIL ABUN
V-48	3.271E-01	NOT IDENT.
CR-51	7.126E-01	NOT IDENT.
MN-52	0.000E+00	SHORT HLIF
MN-54	2.738E-02	NOT IDENT.
CO-56	3.951E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.144E-02	NOT IDENT.
CO-58	4.475E-02	NOT IDENT.
FE-59	1.132E-01	NOT IDENT.
CO-60	2.060E-02	NOT IDENT.
ZN-65	5.987E-02	NOT IDENT.
GE-68	8.038E-01	NOT IDENT.
AS-73	1.059E+00	NOT IDENT.
AS-74	3.158E-01	NOT IDENT.
SE-75	4.030E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	6.640E-01	NOT IDENT.
RB-84	8.236E-02	NOT IDENT.
KR-85	4.637E+00	NOT IDENT.
SR-85	3.909E-02	NOT IDENT.
RB-86	2.415E+00	NOT IDENT.
Y-88	2.718E-02	NOT IDENT.
Y-91	1.836E+01	NOT IDENT.
NB-95	6.042E-02	NOT IDENT.
NB-95M	1.247E-01	NOT IDENT.
ZR-95	5.898E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.328E-02	FAIL ABUN
RH-102	4.234E-02	NOT IDENT.
RU-103	5.791E-02	FAIL ABUN
RH-106	2.401E-01	NOT IDENT.
RU-106	2.401E-01	NOT IDENT.
AG-108M	1.880E-02	NOT IDENT.
AG-110	5.267E-01	NOT IDENT.
AG-110M	4.227E-02	NOT IDENT.
SN-113	4.361E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	4.148E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.841E-02	NOT IDENT.
SB-124	1.122E-01	NOT IDENT.
SB-125	7.259E-02	FAIL ABUN
TE-125M	1.233E+01	NOT IDENT.
I-126	2.068E+00	NOT IDENT.
SB-126	1.222E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	3.725E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.995E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.422E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	7.510E-01	NOT IDENT.
BA-137M	2.445E-02	NOT IDENT.
CS-137	2.583E-02	NOT IDENT.
LA-138	3.927E-02	NOT IDENT.
CE-139	2.784E-02	NOT IDENT.
BA-140	2.126E+00	NOT IDENT.
LA-140	8.509E-01	FAIL ABUN
CE-141	1.134E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.702E-01	NOT IDENT.
PM-144	2.686E-02	NOT IDENT.
PR-144	2.059E+00	NOT IDENT.
PM-146	2.784E-02	NOT IDENT.
ND-147	6.216E+00	FAIL ABUN
PM-147	5.789E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.977E-02	FAIL ABUN
EU-152	7.551E-02	FAIL ABUN
GD-153	6.490E-02	NOT IDENT.

EU-154	5.249E-02	NOT IDENT.
EU-155	8.538E-02	FAIL ABUN
TB-160	1.312E-01	FAIL ABUN
HO-166M	4.725E-02	FAIL ABUN
HF-172	1.512E-01	FAIL ABUN
LU-172	4.754E-02	FAIL ABUN
LU-176	2.028E-02	FAIL ABUN
HF-181	6.154E-02	NOT IDENT.
TA-182	1.484E-01	FAIL ABUN
RE-183	2.191E-01	NOT IDENT.
RE-184	1.983E-01	NOT IDENT.
W-188	6.648E+00	FAIL ABUN
IR-192	4.192E-02	FAIL ABUN
HG-203	5.940E-02	NOT IDENT.
TL-204	4.089E+00	NOT IDENT.
BI-207	5.019E-02	FAIL ABUN
BI-210	2.975E+00	NOT IDENT.
PB-210	2.975E+00	NOT IDENT.
PB-211	4.578E-01	NOT IDENT.
BI-213	6.402E-02	NOT IDENT.
RN-219	2.982E-01	FAIL ABUN
RA-223	4.252E-01	FAIL ABUN
AC-225	9.759E+00	NOT IDENT.
AC-227	1.720E-01	FAIL ABUN
TH-227	1.720E-01	FAIL ABUN
TH-231	4.252E-01	FAIL ABUN
PA-233	4.861E-02	FAIL ABUN
PA-234	1.651E-01	FAIL ABUN
NP-237	4.861E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.038E-01	FAIL ABUN
PU-239	2.655E+02	NOT IDENT.
AM-241	1.053E-01	NOT IDENT.
CM-243	7.924E-02	FAIL ABUN
BK-247	5.829E-02	FAIL ABUN
CM-247	2.579E-02	NOT IDENT.
CF-249	2.872E-02	NOT IDENT.
CF-251	9.293E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 26-JUL-2025 23:29:56.43

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947002.CNF;1   *
* Acquisition date : 26-JUL-2025 22:29:08 Sensitivity     : 3.000           *
* Detector ID      : GAM29                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****           *
* Sample date      : 28-MAY-2025 13:05:00 Nuclide Library : SOLID           *
* Sample ID        : G730947002           Analyst initials: MXR1            *
* Batch Number     : 2822154              Sample Quantity : 1.4048E+02 GRAM *
*                                         Quantity Err(%) : 1.4237E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 24-JUL-2025 09:21:08 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;23            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	5.731E+00	1.168E+00	1.168E+00
RB-83	5.446E-02	1.117E-01	1.117E-01
NB-94	2.913E-02	4.704E-02	4.704E-02
CD-109	2.873E+00	1.231E+00	1.231E+00
SN-126	2.628E-01	1.117E-01	1.117E-01
TM-171	3.461E+01	3.451E+01	3.451E+01
TL-208	3.143E-01	8.859E-02	8.859E-02
BI-211	3.840E+00	6.359E-01	6.359E-01
BI-212	1.158E+00	5.924E-01	5.924E-01
PB-212	1.240E+00	1.653E-01	1.653E-01
BI-214	1.098E+00	2.205E-01	2.205E-01
PB-214	1.394E+00	2.297E-01	2.297E-01
RN-222	1.394E+00	2.297E-01	2.297E-01
RA-224	3.956E+00	1.299E+00	1.299E+00
RA-226	1.394E+00	2.297E-01	2.297E-01
AC-228	8.524E-01	3.275E-01	3.275E-01
RA-228	8.524E-01	3.275E-01	3.275E-01
TH-228	1.240E+00	1.653E-01	1.653E-01
TH-229	-2.111E-01	5.150E-01	5.150E-01
TH-230	1.393E+00	2.297E-01	2.297E-01
PA-231	9.447E-01	6.741E-01	6.741E-01
TH-232	8.524E-01	3.275E-01	3.275E-01
PA-234M	2.359E+00	2.671E+00	2.671E+00
TH-234	2.359E+00	2.671E+00	2.671E+00
U-234	1.393E+00	2.297E-01	2.297E-01
U-235	8.655E-02	1.779E-01	1.779E-01
U-238	2.359E+00	2.671E+00	2.671E+00
AM-243	3.027E-01	9.878E-02	9.878E-02
ANH-511	9.236E-02	6.710E-02	6.710E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	3.754E-01	5.285E-01	5.549E-01	NOT IDENT.

NA-22	-3.238E-03	2.418E-02	2.422E-02	NOT IDENT.
NA-24	-7.889E+26	1.202E+27	0.000E+00	SHORT HLIF
AL-26	1.742E-02	3.274E-02	3.367E-02	NOT IDENT.
SC-46	-1.825E-02	5.039E-02	5.106E-02	FAIL ABUN
V-48	1.365E-01	3.508E-01	3.562E-01	NOT IDENT.
CR-51	-1.071E+00	9.173E-01	1.037E+00	NOT IDENT.
MN-52	4.446E+01	4.838E+01	5.237E+01	SHORT HLIF
MN-54	-2.509E-02	4.329E-02	4.474E-02	NOT IDENT.
CO-56	1.154E-02	4.574E-02	4.604E-02	NOT IDENT.
MN-56	1.000E+41	3.855E+41	0.000E+00	SHORT HLIF
CO-57	-3.682E-03	2.527E-02	2.533E-02	NOT IDENT.
CO-58	8.944E-03	5.262E-02	5.277E-02	NOT IDENT.
FE-59	-7.331E-02	1.448E-01	1.485E-01	NOT IDENT.
CO-60	8.786E-03	2.152E-02	2.188E-02	NOT IDENT.
ZN-65	-1.479E-02	8.279E-02	8.306E-02	NOT IDENT.
GE-68	-3.146E-01	9.950E-01	1.005E+00	NOT IDENT.
AS-73	2.748E-01	1.254E+00	1.261E+00	NOT IDENT.
AS-74	-1.834E-01	4.029E-01	4.113E-01	NOT IDENT.
SE-75	-3.049E-03	4.489E-02	4.491E-02	NOT IDENT.
BR-77	7.847E+07	1.349E+08	1.395E+08	SHORT HLIF
SR-82	-3.049E-01	9.827E-01	9.923E-01	NOT IDENT.
RB-84	-1.856E-01	1.624E-01	1.827E-01	NOT IDENT.
KR-85	-3.009E+00	6.572E+00	6.711E+00	NOT IDENT.
SR-85	-2.559E-02	5.546E-02	5.665E-02	NOT IDENT.
RB-86	-4.273E-01	2.879E+00	2.886E+00	NOT IDENT.
Y-88	-3.105E-03	3.446E-02	3.449E-02	NOT IDENT.
Y-91	-5.272E+00	2.263E+01	2.275E+01	NOT IDENT.
NB-95	-1.261E-02	8.367E-02	8.387E-02	NOT IDENT.
NB-95M	-6.820E-02	1.593E-01	1.623E-01	NOT IDENT.
ZR-95	-3.665E-02	7.933E-02	8.103E-02	NOT IDENT.
NB-97	-1.000E+41	1.565E+41	0.000E+00	SHORT HLIF
ZR-97	3.276E+24	1.184E+25	0.000E+00	SHORT HLIF
MO-99	-5.992E+05	7.243E+05	7.730E+05	SHORT HLIF
TC-99M	-1.000E+41	1.557E+41	0.000E+00	SHORT HLIF
RH-101	-3.008E-02	3.024E-02	3.314E-02	FAIL ABUN
RH-102	4.676E-02	4.309E-02	4.797E-02	NOT IDENT.
RU-103	-1.516E-02	6.935E-02	6.969E-02	FAIL ABUN
RH-106	1.514E-01	2.598E-01	2.686E-01	NOT IDENT.
RU-106	1.514E-01	2.598E-01	2.686E-01	NOT IDENT.
AG-108M	1.021E-02	2.012E-02	2.064E-02	NOT IDENT.
AG-110	-2.554E-01	6.690E-01	6.788E-01	NOT IDENT.
AG-110M	2.678E-02	4.657E-02	4.810E-02	NOT IDENT.
SN-113	2.153E-02	4.753E-02	4.851E-02	NOT IDENT.
CD-115	7.398E+06	1.229E+07	1.273E+07	SHORT HLIF
SN-117M	9.196E-02	4.852E-01	4.870E-01	NOT IDENT.
SB-122	-4.399E+04	1.337E+05	1.352E+05	SHORT HLIF
TE-123M	8.056E-03	3.308E-02	3.328E-02	NOT IDENT.
SB-124	2.491E-02	1.284E-01	1.289E-01	NOT IDENT.
SB-125	4.120E-02	7.854E-02	8.070E-02	FAIL ABUN
TE-125M	8.073E+00	1.359E+01	1.407E+01	NOT IDENT.
I-126	2.342E+00	2.159E+00	2.403E+00	NOT IDENT.
SB-126	5.967E-01	1.365E+00	1.391E+00	NOT IDENT.
SB-127	1.739E+03	2.907E+03	3.011E+03	SHORT HLIF
I-131	-1.238E-01	4.232E+00	4.232E+00	NOT IDENT.
I-132	-1.000E+41	3.985E+41	0.000E+00	SHORT HLIF
TE-132	4.964E+03	9.066E+03	9.338E+03	SHORT HLIF
BA-133	9.690E-03	3.628E-02	3.654E-02	NOT IDENT.
I-133	9.468E+18	1.608E+19	0.000E+00	SHORT HLIF
CS-134	9.731E-02	5.093E-02	6.722E-02	FAIL ABUN
I-135	-1.000E+41	4.731E+41	0.000E+00	SHORT HLIF
CS-136	2.197E-01	8.269E-01	8.328E-01	NOT IDENT.
BA-137M	-4.017E-03	2.971E-02	2.976E-02	NOT IDENT.
CS-137	-4.244E-03	3.138E-02	3.144E-02	NOT IDENT.
LA-138	-2.964E-03	4.740E-02	4.742E-02	NOT IDENT.
CE-139	1.782E-03	3.291E-02	3.292E-02	NOT IDENT.
BA-140	6.880E-01	2.385E+00	2.405E+00	NOT IDENT.
LA-140	-2.706E-01	1.081E+00	1.088E+00	FAIL ABUN
CE-141	-3.037E-02	1.363E-01	1.370E-01	NOT IDENT.
CE-143	4.890E+11	4.667E+11	5.161E+11	SHORT HLIF
CE-144	1.376E-02	1.981E-01	1.982E-01	NOT IDENT.
PM-144	-4.351E-03	3.690E-02	3.696E-02	NOT IDENT.
PR-144	-3.260E-01	2.828E+00	2.831E+00	NOT IDENT.
PM-146	1.757E-03	3.182E-02	3.183E-02	NOT IDENT.
ND-147	-2.561E-01	8.164E+00	8.165E+00	FAIL ABUN
PM-147	-2.832E+01	6.762E+02	6.763E+02	NOT IDENT.
PM-149	-5.136E+07	7.497E+07	7.846E+07	SHORT HLIF
EU-150	-3.583E-03	2.523E-02	2.528E-02	FAIL ABUN
EU-152	4.357E-03	9.423E-02	9.425E-02	FAIL ABUN

GD-153	3.076E-02	8.753E-02	8.863E-02	NOT IDENT.
EU-154	-1.318E-02	6.570E-02	6.597E-02	NOT IDENT.
EU-155	7.256E-02	9.301E-02	9.859E-02	FAIL ABUN
TB-160	8.931E-02	2.463E-01	2.496E-01	FAIL ABUN
HO-166M	3.019E-02	5.197E-02	5.372E-02	FAIL ABUN
HF-172	7.951E-03	1.757E-01	1.757E-01	FAIL ABUN
LU-172	1.262E-02	5.284E-02	5.315E-02	FAIL ABUN
LU-176	1.890E-02	2.093E-02	2.259E-02	FAIL ABUN
HF-181	-5.110E-03	7.193E-02	7.197E-02	NOT IDENT.
TA-182	9.189E-02	1.547E-01	1.601E-01	FAIL ABUN
RE-183	-4.620E-02	2.487E-01	2.496E-01	NOT IDENT.
RE-184	1.212E-01	2.052E-01	2.123E-01	NOT IDENT.
W-188	-4.879E+00	8.967E+00	9.233E+00	FAIL ABUN
IR-192	5.823E-03	4.812E-02	4.820E-02	FAIL ABUN
HG-203	1.830E-02	6.452E-02	6.505E-02	NOT IDENT.
TL-204	-2.147E+00	4.758E+00	4.856E+00	NOT IDENT.
BI-207	1.101E-01	5.306E-02	7.267E-02	FAIL ABUN
BI-210	1.056E-01	3.206E+00	3.206E+00	NOT IDENT.
PB-210	1.056E-01	3.206E+00	3.206E+00	NOT IDENT.
PB-211	8.723E-02	5.113E-01	5.128E-01	NOT IDENT.
BI-213	-6.702E-02	8.284E-02	8.818E-02	NOT IDENT.
RN-219	-1.345E-02	3.417E-01	3.417E-01	FAIL ABUN
RA-223	-1.570E-01	5.536E-01	5.581E-01	FAIL ABUN
AC-225	8.465E+00	1.008E+01	1.078E+01	NOT IDENT.
AC-227	-8.196E-02	1.978E-01	2.012E-01	FAIL ABUN
TH-227	-8.196E-02	1.978E-01	2.012E-01	FAIL ABUN
TH-231	-1.570E-01	5.536E-01	5.581E-01	FAIL ABUN
PA-233	1.754E-02	5.276E-02	5.335E-02	FAIL ABUN
PA-234	-7.435E-02	2.207E-01	2.233E-01	FAIL ABUN
NP-237	1.754E-02	5.276E-02	5.335E-02	FAIL ABUN
NP-238	-3.184E+06	2.806E+07	2.810E+07	SHORT HLIF
NP-239	7.693E-02	2.303E-01	2.329E-01	FAIL ABUN
PU-239	7.178E+01	3.044E+02	3.061E+02	NOT IDENT.
AM-241	-7.050E-03	1.281E-01	1.281E-01	NOT IDENT.
CM-243	-4.366E-02	1.034E-01	1.053E-01	FAIL ABUN
BK-247	4.370E-02	6.354E-02	6.653E-02	FAIL ABUN
CM-247	-1.792E-02	3.166E-02	3.267E-02	NOT IDENT.
CF-249	-4.624E-03	3.320E-02	3.326E-02	NOT IDENT.
CF-251	-5.364E-02	1.162E-01	1.187E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	70.9349	85.43	79.3206	133.02	91.7578
45.60	72.2910	86.55	79.4668	133.52	82.6337
46.54	64.5162	86.79	79.4978	136.00	71.3734
49.72	0.0000	86.94	79.5176	136.47	88.6917
51.35	78.9677	87.09	85.9863	140.51	0.0000
51.87	88.4411	87.57	86.0535	143.76	69.7165
52.39	89.8866	88.03	105.4948	144.24	72.0811
52.97	76.5703	88.34	105.5471	145.44	78.0034
53.44	77.9953	88.47	105.5695	152.43	105.6253
54.07	92.9170	89.96	105.8230	153.25	78.7048
57.36	0.0000	1093.63	86.4801	323.87	85.8454
57.53	94.6333	91.11	86.5448	156.02	96.6243
57.98	73.3340	92.59	86.7468	158.56	77.9903
59.27	77.6180	93.35	86.8506	159.00	72.1164
59.32	77.6261	94.56	87.0142	162.33	81.8722
59.54	69.4866	94.65	87.0264	162.66	81.9007
60.96	73.7899	94.67	87.0288	163.33	85.5242
61.17	73.8218	94.87	87.0557	165.86	73.8454
62.93	93.6358	97.43	61.1786	176.31	79.4747
63.29	93.7032	98.43	61.2714	176.60	79.4979
63.58	93.7575	98.44	61.2722	177.52	78.3668
64.28	122.4329	99.53	56.9889	181.07	0.0000
66.73	123.0214	100.11	57.0385	181.52	72.6324
67.24	116.2246	102.03	80.6682	184.41	59.4877
125.81	111.1299	103.18	74.9280	143.76	59.5655
67.75	111.1446	103.37	94.0534	193.51	89.4165
68.89	119.7150	105.31	74.0552	197.03	75.3798
69.67	102.1683	106.12	75.2487	198.01	71.3495
70.82	134.7762	106.47	83.0363	201.83	64.1986
70.83	130.9482	109.28	67.8068	203.43	60.9975
72.81	138.4191	111.00	84.6848	205.31	69.3608
72.87	138.4342	111.76	0.0000	210.85	64.7334
74.66	132.5724	114.06	89.5197	215.65	65.8470
74.82	132.6104	116.30	0.0000	218.12	50.1208
74.97	132.6465	116.74	75.2467	222.11	55.3263
77.11	133.1531	119.76	90.2112	227.09	53.8822
78.74	133.5337	121.12	81.3362	227.38	62.3171
79.69	103.3238	121.22	81.3466	228.16	0.0000
80.03	101.9670	121.78	78.0148	228.18	61.5173
80.12	101.9839	122.06	83.6988	116.74	61.5173
80.19	101.9963	122.92	83.7931	235.69	55.9735
80.57	106.3156	123.07	87.2072	235.96	62.3483
81.00	95.7548	265.00	89.5434	238.63	55.2613
81.07	95.7658	125.81	81.8344	238.98	0.0000
81.75	104.3994	127.23	102.4781	240.99	55.3694
82.47	113.7720	127.91	77.4958	242.00	55.4157
83.79	105.4724	129.30	83.3403	244.70	56.3931
84.00	105.5093	131.20	105.2828	252.40	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	51.6028	345.93	44.1133	564.24	0.0000
254.15	0.0000	351.06	35.0374	569.33	23.7824
256.23	52.6065	351.93	35.0568	946.00	23.7833
260.90	0.0000	355.39	0.0000	569.70	24.8203
264.66	46.8776	356.01	31.9093	583.19	22.8871
264.80	40.6320	364.49	34.4022	584.27	22.8979
265.00	36.4697	366.42	0.0000	595.83	23.0116
269.46	47.9225	372.51	22.4248	427.87	27.2515
270.03	47.9437	375.05	31.8169	602.52	0.0000
271.23	41.8799	377.52	21.5555	604.72	26.7742
273.65	44.5783	356.01	32.9257	607.14	31.5308
276.40	50.8019	388.16	36.7823	609.32	25.2480
277.37	58.7286	388.63	38.6786	610.33	25.2588
277.60	58.7381	391.69	26.4625	614.28	23.7195
278.00	57.0020	264.66	31.3504	618.01	19.0049
279.20	54.4203	401.81	36.1237	620.36	23.2506
279.54	54.4342	402.40	40.8908	621.93	14.8055
279.70	54.4405	404.85	24.7596	630.19	0.0000
280.46	51.8351	410.95	26.7564	631.29	11.6781
283.69	46.6748	413.71	35.4117	633.25	27.6250
284.31	39.6478	414.70	23.9400	634.78	19.1367
285.41	49.3794	423.72	27.9103	635.95	18.0819
285.90	0.0000	427.09	35.6751	636.99	19.1536
287.50	37.9741	427.87	27.9740	657.50	22.5313
290.67	41.1605	433.94	17.4207	657.76	24.6799
293.27	0.0000	439.40	29.1199	657.90	0.0000
351.93	36.4105	440.45	33.9924	661.66	22.5680
295.96	36.4297	453.88	23.4756	664.57	0.0000
879.38	36.4981	463.37	26.5408	666.33	18.3032
299.98	36.5348	468.07	17.7367	666.50	18.3046
300.09	36.5373	473.00	0.0000	667.71	0.0000
300.13	36.5381	475.06	37.5779	677.62	24.8727
301.36	38.7997	476.78	30.6821	685.70	0.0000
302.85	50.8943	477.60	28.7144	692.65	0.0000
256.23	47.1990	482.18	25.8032	695.00	27.4343
304.85	43.9919	487.02	22.8811	696.49	24.5087
306.78	32.2324	492.35	0.0000	696.51	24.5096
308.46	47.5094	497.08	25.9947	697.00	21.2456
311.90	39.5348	505.52	24.0938	697.30	21.2480
316.51	45.9697	507.63	0.0000	697.49	22.8842
319.41	45.1569	511.00	21.1378	702.65	18.0153
320.08	52.4056	514.00	33.2645	706.68	19.6831
321.04	37.0695	514.00	33.2645	711.68	17.5286
323.87	40.7639	520.40	23.2555	720.70	15.3894
325.23	36.7213	520.69	0.0000	721.93	0.0000
328.76	42.2598	522.65	0.0000	722.78	24.7513
333.37	39.3803	527.90	0.0000	722.91	24.7531
333.97	45.1414	528.26	18.2673	723.31	19.8054
334.37	38.3120	529.59	24.3711	724.19	14.8585
338.28	45.7255	529.87	0.0000	727.33	17.6309
338.32	45.7265	531.02	22.8635	733.00	17.6673
311.90	45.7906	537.26	21.4008	735.93	21.0024
340.48	45.7906	546.56	0.0000	333.97	9.9540
340.55	45.7926	552.55	29.7611	739.50	0.0000
344.28	44.0674	563.25	22.6866	744.23	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
747.24	11.0994	964.08	12.5063	1457.56	0.0000
748.06	13.3232	966.17	12.5140	1460.82	4.0432
752.31	13.3433	968.97	12.5243	1489.16	6.1011
753.82	7.7878	983.53	9.8825	1505.03	6.1212
756.73	14.4779	984.45	0.0000	1584.12	10.3674
756.80	14.4785	1274.44	14.4277	1596.21	12.4702
884.68	25.1230	1002.74	11.7444	1620.50	2.0884
765.81	35.1953	1004.73	10.8472	1621.92	1.0444
766.84	38.5612	507.63	0.0000	1678.03	0.0000
772.60	0.0000	1025.87	0.0000	1690.97	5.2917
776.52	16.8225	1028.54	0.0000	1750.46	0.0000
739.50	0.0000	1037.84	10.0366	1764.49	5.3644
778.90	20.2039	1038.76	0.0000	1063.66	0.0000
783.70	0.0000	631.29	10.9753	1771.35	4.2969
788.74	22.9766	1048.07	10.9805	1791.20	0.0000
792.07	16.9135	1049.04	15.5598	1808.65	4.3257
795.86	10.1616	1050.41	13.7338	1810.72	0.0000
810.06	18.1523	1063.66	12.8652	1836.06	3.2600
810.29	19.2882	1077.00	11.0676		
344.28	19.2896	1077.34	11.9907		
810.76	17.0221	1085.87	7.3960		
815.77	19.3242	1093.63	12.0431		
1048.07	17.0667	1099.45	16.7014		
832.01	13.7148	1112.07	11.1716		
834.85	25.7391	1112.84	10.2427		
836.80	0.0000	1115.54	13.4183		
846.75	0.0000	1120.29	9.3298		
846.77	12.6333	1120.55	9.3304		
856.80	10.3700	1221.41	8.9590		
860.56	11.5361	1129.67	10.2883		
871.09	9.2601	1131.51	0.0000		
873.19	13.8999	1147.95	0.0000		
875.33	0.0000	1173.23	11.3496		
879.38	8.7045	1177.95	15.1504		
880.51	6.9661	1189.05	7.5967		
881.60	17.4213	1204.77	10.4864		
883.24	19.1735	1221.41	6.7005		
884.68	11.6256	1231.02	5.7568		
889.28	18.6276	1235.36	9.2203		
894.76	10.4960	1238.28	10.7646		
898.04	14.0093	1260.41	0.0000		
900.72	5.2579	1271.87	3.8757		
903.28	8.7701	1274.44	5.8169		
911.20	15.4730	1274.54	5.8173		
912.08	15.4773	1291.59	10.7079		
923.98	0.0000	1298.22	0.0000		
926.50	8.8330	1312.11	10.7590		
929.11	21.2161	1332.49	2.9480		
935.54	0.0000	1362.66	0.0000		
937.49	8.5078	1365.19	3.9600		
944.13	13.3200	1368.63	0.0000		
946.00	12.4393	1384.29	4.9710		
949.00	9.7824	1408.01	2.9982		
667.71	0.0000	1434.09	0.0000		
962.31	11.4285	1435.80	8.0435		

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:07.99

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM21.CNF;916
                                    Background date  : 20-JUL-2025 10:27:18
Sample date      : 28-MAY-2025 13:05:00 Acquisition date : 27-JUL-2025 10:04:35
Sample ID        : G730947003           Sample quantity  : 1.41720E+02 GRAM
Detector name    : GAM21                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.50  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2822154              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.68	109	135	1.10	93.58	90	9	3.03E-02	21.5	
2	0	63.34	86	173	1.18	126.87	123	8	2.39E-02	28.6	
3	3	75.21	294	154	0.96	150.58	147	15	8.16E-02	8.5	4.07E+00
4	3	77.38	438	107	0.86	154.91	147	15	1.22E-01	6.0	
5	2	87.57	149	146	1.17	175.28	164	28	4.15E-02	15.4	3.95E+00
6	2	90.34	91	119	1.18	180.83	164	28	2.54E-02	23.7	
7	2	93.14*	104	93	1.19	186.41	164	28	2.88E-02	21.3	
8	0	143.73	43	123	1.05	287.51	283	9	1.19E-02	49.7	
9	6	186.45*	115	110	1.52	372.87	367	18	3.21E-02	18.6	9.21E-01
10	6	189.78	38	122	2.07	379.52	367	18	1.06E-02	67.2	
11	0	209.81	37	107	1.09	419.55	416	9	1.02E-02	53.7	
12	3	238.99*	433	58	1.03	477.87	471	20	1.20E-01	5.6	8.66E-01
13	3	242.07	148	88	1.67	484.03	471	20	4.10E-02	16.2	
14	0	271.20	35	51	1.99	542.24	539	8	9.70E-03	39.5	
15	0	295.59	163	62	1.08	590.98	586	10	4.52E-02	12.0	
16	0	300.66	33	51	0.69	601.12	597	9	9.28E-03	41.9	
17	0	330.61	8	70	2.90	660.97	651	11	2.28E-03	199.5	
18	0	338.66	93	49	0.99	677.07	671	11	2.59E-02	17.9	
19	0	352.36*	326	33	1.20	704.45	699	12	9.05E-02	6.6	
20	0	396.44	8	39	0.51	792.55	786	9	2.14E-03	149.6	
21	0	464.77	25	41	1.42	929.12	921	16	7.08E-03	61.0	
22	0	470.31	14	21	1.82	940.19	936	9	3.81E-03	65.5	
23	0	511.90*	21	53	2.16	1023.33	1017	15	5.92E-03	87.1	
24	0	562.67	8	21	1.46	1124.82	1117	12	2.10E-03	126.7	
25	0	583.51*	118	19	1.27	1166.47	1162	11	3.29E-02	11.9	
26	0	609.77*	188	28	1.85	1218.96	1209	17	5.21E-02	9.7	
27	0	638.29	17	12	1.48	1275.98	1268	13	4.63E-03	50.7	
28	0	643.76	28	4	5.92	1286.92	1281	15	7.66E-03	24.6	
29	0	728.59	20	31	0.69	1456.50	1450	13	5.66E-03	59.3	
30	0	809.70	20	2	3.40	1618.66	1614	10	5.50E-03	26.8	
31	0	817.20	14	7	1.38	1633.67	1628	10	3.78E-03	46.3	
32	0	889.46	6	10	1.25	1778.14	1774	9	1.74E-03	96.3	
33	0	911.59	62	10	1.62	1822.38	1815	12	1.72E-02	16.1	
34	0	923.31	14	10	5.62	1845.82	1837	14	3.91E-03	55.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	969.10	28	18	2.28	1937.39	1933	11	7.66E-03	34.7	
36	0	1047.92	7	6	3.43	2095.00	2087	12	1.94E-03	79.5	
37	0	1121.25	38	20	1.16	2241.64	2231	15	1.06E-02	29.8	
38	0	1237.91	17	6	2.90	2474.97	2469	11	4.58E-03	36.9	
39	0	1460.76*	79	11	1.49	2920.72	2913	14	2.20E-02	14.4	
40	0	1763.75*	25	7	2.46	3526.89	3518	16	6.82E-03	33.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 27-JUL-2025 11:05:09

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947003.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 28-MAY-2025 13:05:00	Acquisition date	: 27-JUL-2025 10:04:35
Sample ID	: G730947003	Sample quantity	: 141.72 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA21	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.50 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	76	10.66*	7.513E-01	5.019E+00	5.019E+00	28.77
SC-46	889.28	6	99.98*	1.221E+00	2.724E-02	4.471E-02	192.67
	1120.55	37	99.99	9.689E-01	2.044E-01	3.354E-01	59.60
CO-58	810.76	20	99.45*	1.344E+00	7.943E-02	1.427E-01	53.70
CD-109	88.03	181	3.70*	8.661E+00	2.994E+00	3.276E+00	30.71
SN-126	64.28	107	9.60	8.641E+00	6.829E-01	6.829E-01	57.24
	86.94	181	8.90	8.661E+00	1.245E+00	1.245E+00	30.71
	87.57	181	37.00*	8.661E+00	2.994E-01	2.994E-01	30.71
TL-208	277.37	------	6.60	4.145E+00	------ Line Not Found		------
	583.19	123	85.00*	1.898E+00	4.047E-01	4.047E-01	23.72
	860.56	------	12.50	1.263E+00	------ Line Not Found		------
BI-210	46.54	138	4.25*	7.750E+00	2.226E+00	2.237E+00	42.94
PB-210	46.54	138	4.25*	7.750E+00	2.226E+00	2.237E+00	42.94
BI-211	72.87	------	1.23	8.771E+00	------ Line Not Found		------
	351.06	354	12.92*	3.252E+00	4.468E+00	4.468E+00	13.29
BI-212	727.33	21	6.67*	1.500E+00	1.103E+00	1.103E+00	118.59
	1620.50	------	1.47	6.813E-01	------ Line Not Found		------
PB-212	74.82	360	10.28	8.774E+00	2.117E+00	2.117E+00	17.04
	77.11	537	17.10	8.769E+00	1.896E+00	1.896E+00	12.03
	238.63	486	43.60*	4.776E+00	1.236E+00	1.236E+00	11.17
	300.09	37	3.30	3.826E+00	1.544E+00	1.544E+00	83.72
BI-214	609.32	195	45.49*	1.811E+00	1.252E+00	1.252E+00	19.42
	1120.29	37	14.92	9.689E-01	1.370E+00	1.370E+00	59.60
	1764.49	23	15.30	6.291E-01	1.273E+00	1.273E+00	66.79
PB-214	74.82	360	5.80	8.774E+00	3.752E+00	3.753E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.249E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
RN-222	74.82	360	5.80	8.774E+00	3.752E+00	3.753E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.249E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
RA-224	240.99	165	4.10*	4.720E+00	4.530E+00	4.530E+00	32.31
RA-226	74.82	360	5.80	8.774E+00	3.752E+00	3.753E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.249E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
AC-228	338.32	102	11.27	3.388E+00	1.411E+00	1.411E+00	35.79
	911.20	62	25.80*	1.191E+00	1.068E+00	1.068E+00	32.18
	968.97	27	15.80	1.120E+00	8.233E-01	8.233E-01	69.30
RA-228	338.32	102	11.27	3.388E+00	1.411E+00	1.411E+00	35.79
	911.20	62	25.80*	1.191E+00	1.068E+00	1.068E+00	32.18
	968.97	27	15.80	1.120E+00	8.233E-01	8.233E-01	69.30

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	360	10.28	8.774E+00	2.117E+00	2.117E+00	17.04
	77.11	537	17.10	8.769E+00	1.896E+00	1.896E+00	12.03
	238.63	486	43.60*	4.776E+00	1.236E+00	1.236E+00	11.17
	300.09	37	3.30	3.826E+00	1.544E+00	1.544E+00	83.72
TH-230	74.82	360	5.80	8.774E+00	3.752E+00	3.752E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.248E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
PA-231	283.69	------	1.70	4.054E+00	------ Line Not Found		------
	301.36	37	5.35*	3.826E+00	9.522E-01	9.522E-01	83.72
TH-232	338.32	102	11.27	3.388E+00	1.411E+00	1.411E+00	35.79
	911.20	62	25.80*	1.191E+00	1.068E+00	1.068E+00	32.18
	968.97	27	15.80	1.120E+00	8.233E-01	8.233E-01	69.30
PA-234M	63.29	107	3.70*	8.641E+00	1.772E+00	1.772E+00	57.24
	92.59	125	4.23	8.558E+00	1.835E+00	1.835E+00	42.69
TH-234	63.29	107	3.70*	8.641E+00	1.772E+00	1.772E+00	57.24
	92.59	125	4.23	8.558E+00	1.835E+00	1.835E+00	42.69
U-234	74.82	360	5.80	8.774E+00	3.752E+00	3.752E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.248E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
U-235	89.96	111	3.47	8.613E+00	1.960E+00	1.960E+00	47.40
	93.35	125	5.60	8.558E+00	1.386E+00	1.386E+00	42.69
	143.76	50	10.96*	7.106E+00	3.409E-01	3.409E-01	99.39
	163.33	------	5.08	6.531E+00	------ Line Not Found		------
	185.72	132	57.20	5.913E+00	2.070E-01	2.070E-01	37.16
	205.31	------	5.01	5.464E+00	------ Line Not Found		------
U-238	63.29	107	3.70*	8.641E+00	1.772E+00	1.772E+00	57.24
	92.59	125	4.23	8.558E+00	1.835E+00	1.835E+00	42.69
AM-243	43.53	------	5.90	7.448E+00	------ Line Not Found		------
	74.66	360	67.20*	8.774E+00	3.239E-01	3.239E-01	17.04
ANH-511	511.00	22	100.00*	2.184E+00	5.451E-02	5.451E-02	174.12

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:10.35

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947003.CNF;1		
Acquisition date	: 27-JUL-2025 10:04:35	Sensitivity	: 3.000
Detector ID	: GAM21	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.50	Half life ratio	: *****
Sample date	: 28-MAY-2025 13:05:00	Analyst initials	: MXR1
Sample ID	: G730947003	Sample Quantity	: 1.4172E+02 GRAM
Batch Number	: 2822154	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;19		

CALIBRATION INFORMATION

Eff. Cal. date	: 24-JUL-2025 07:17:30	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;28		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	5.019E+00	1.415E+00	8.419E-01
SC-46	4.471E-02	8.441E-02	1.334E-01
CO-58	1.427E-01	7.510E-02	1.113E-01
CD-109	3.276E+00	9.860E-01	8.457E-01
SN-126	2.994E-01	9.011E-02	7.719E-02
TL-208	4.047E-01	9.409E-02	7.861E-02
BI-210	2.237E+00	9.415E-01	6.821E-01
PB-210	2.237E+00	9.415E-01	6.821E-01
BI-211	4.468E+00	5.818E-01	3.551E-01
BI-212	1.103E+00	1.282E+00	1.061E+00
PB-212	1.236E+00	1.354E-01	9.425E-02
BI-214	1.252E+00	2.383E-01	1.429E-01
PB-214	1.622E+00	2.112E-01	1.292E-01
RN-222	1.622E+00	2.112E-01	1.292E-01
RA-224	4.530E+00	1.435E+00	9.808E-01
RA-226	1.622E+00	2.112E-01	1.292E-01
AC-228	1.068E+00	3.369E-01	2.731E-01
RA-228	1.068E+00	3.369E-01	2.731E-01
TH-228	1.236E+00	1.354E-01	9.425E-02
TH-230	1.622E+00	2.112E-01	1.292E-01
PA-231	9.522E-01	7.812E-01	8.252E-01
TH-232	1.068E+00	3.369E-01	2.731E-01
PA-234M	1.772E+00	9.939E-01	8.205E-01
TH-234	1.772E+00	9.939E-01	8.205E-01
U-234	1.622E+00	2.112E-01	1.292E-01
U-235	3.409E-01	3.321E-01	3.063E-01
U-238	1.772E+00	9.939E-01	8.205E-01
AM-243	3.239E-01	5.408E-02	4.741E-02
ANH-511	5.451E-02	9.301E-02	5.561E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	4.319E-01	5.553E-01	1.200E+00	NOT IDENT.

NA-22	2.356E-02	4.529E-02	1.034E-01	NOT IDENT.
NA-24	0.000E+00	2.713E+27	0.000E+00	SHORT HLIF
AL-26	4.323E-02	4.480E-02	1.218E-01	NOT IDENT.
V-48	4.574E-02	5.440E-01	1.122E+00	NOT IDENT.
CR-51	1.743E-01	1.051E+00	2.096E+00	NOT IDENT.
MN-52	0.000E+00	6.659E+01	0.000E+00	SHORT HLIF
MN-54	-2.108E-02	4.491E-02	8.362E-02	NOT IDENT.
CO-56	-2.563E-02	6.470E-02	1.224E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.683E-03	2.111E-02	3.946E-02	NOT IDENT.
FE-59	7.082E-02	1.984E-01	4.274E-01	NOT IDENT.
CO-60	1.018E-02	3.784E-02	8.616E-02	NOT IDENT.
ZN-65	5.563E-02	1.172E-01	2.335E-01	NOT IDENT.
GE-68	1.300E+00	1.546E+00	3.614E+00	NOT IDENT.
AS-73	3.007E-01	2.279E-01	4.966E-01	NOT IDENT.
AS-74	-1.520E-01	5.738E-01	1.051E+00	NOT IDENT.
SE-75	3.116E-02	5.004E-02	1.043E-01	NOT IDENT.
BR-77	0.000E+00	9.857E+06	0.000E+00	SHORT HLIF
SR-82	-3.149E-01	1.313E+00	2.554E+00	NOT IDENT.
RB-83	2.234E-02	1.032E-01	2.065E-01	NOT IDENT.
RB-84	-6.250E-02	1.615E-01	3.109E-01	NOT IDENT.
KR-85	4.773E+00	7.472E+00	1.548E+01	NOT IDENT.
SR-85	4.009E-02	6.334E-02	1.311E-01	NOT IDENT.
RB-86	3.019E+00	4.662E+00	1.054E+01	NOT IDENT.
Y-88	2.490E-02	8.822E-02	1.944E-01	NOT IDENT.
Y-91	-2.273E+01	3.716E+01	6.392E+01	NOT IDENT.
NB-94	4.320E-03	3.714E-02	7.619E-02	NOT IDENT.
NB-95	2.680E-02	9.385E-02	1.901E-01	NOT IDENT.
NB-95M	-1.463E-02	1.952E-01	3.174E-01	NOT IDENT.
ZR-95	-1.292E-02	1.301E-01	2.599E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	2.676E+25	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.269E+06	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.882E+41	0.000E+00	SHORT HLIF
RH-101	-2.359E-02	2.588E-02	4.475E-02	NOT IDENT.
RH-102	4.647E-03	6.846E-02	1.253E-01	FAIL ABUN
RU-103	-3.713E-02	7.849E-02	1.421E-01	FAIL ABUN
RH-106	-2.042E-01	3.290E-01	5.605E-01	NOT IDENT.
RU-106	-2.042E-01	3.290E-01	5.605E-01	NOT IDENT.
AG-108M	8.878E-03	2.975E-02	5.994E-02	NOT IDENT.
AG-110	3.004E-01	1.034E+00	2.043E+00	NOT IDENT.
AG-110M	2.213E-02	5.267E-02	1.113E-01	NOT IDENT.
SN-113	-2.408E-02	6.847E-02	1.122E-01	NOT IDENT.
CD-115	0.000E+00	1.251E+07	0.000E+00	SHORT HLIF
SN-117M	-2.906E-02	4.887E-01	8.883E-01	NOT IDENT.
SB-122	0.000E+00	2.071E+05	0.000E+00	SHORT HLIF
TE-123M	1.287E-03	3.299E-02	6.051E-02	NOT IDENT.
SB-124	2.886E-03	1.605E-01	3.654E-01	NOT IDENT.
SB-125	1.485E-02	9.468E-02	1.862E-01	FAIL ABUN
TE-125M	2.665E+00	1.187E+01	2.283E+01	NOT IDENT.
I-126	1.259E+00	3.176E+00	6.261E+00	NOT IDENT.
SB-126	-2.931E-01	1.646E+00	3.316E+00	NOT IDENT.
SB-127	0.000E+00	4.686E+03	0.000E+00	SHORT HLIF
I-131	-8.203E-01	5.534E+00	1.059E+01	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.038E+04	0.000E+00	SHORT HLIF
BA-133	7.638E-03	3.723E-02	6.879E-02	NOT IDENT.
I-133	0.000E+00	2.145E+19	0.000E+00	SHORT HLIF
CS-134	-7.248E-03	4.840E-02	9.536E-02	FAIL ABUN
I-135	0.000E+00	1.518E+41	0.000E+00	SHORT HLIF
CS-136	1.038E+00	1.619E+00	2.510E+00	FAIL ABUN
BA-137M	2.528E-02	5.124E-02	1.008E-01	NOT IDENT.
CS-137	2.671E-02	5.413E-02	1.065E-01	NOT IDENT.
LA-138	-1.653E-02	5.554E-02	1.145E-01	NOT IDENT.
CE-139	1.559E-02	3.252E-02	6.197E-02	NOT IDENT.
BA-140	-1.691E-01	3.334E+00	6.351E+00	NOT IDENT.
LA-140	-9.353E-01	1.427E+00	2.526E+00	FAIL ABUN
CE-141	5.878E-02	1.305E-01	2.352E-01	NOT IDENT.
CE-143	0.000E+00	7.511E+11	0.000E+00	SHORT HLIF
CE-144	3.279E-02	1.735E-01	3.286E-01	NOT IDENT.
PM-144	9.505E-03	3.505E-02	7.547E-02	NOT IDENT.
PR-144	7.283E-01	2.686E+00	5.782E+00	NOT IDENT.
PM-146	2.844E-02	4.785E-02	9.820E-02	NOT IDENT.
ND-147	-1.861E+00	1.097E+01	2.045E+01	FAIL ABUN
PM-147	-2.329E+02	5.897E+02	1.072E+03	NOT IDENT.
PM-149	0.000E+00	9.935E+07	0.000E+00	SHORT HLIF
EU-150	3.734E-03	2.721E-02	4.884E-02	FAIL ABUN
EU-152	-1.436E-02	9.429E-02	1.810E-01	FAIL ABUN

GD-153	1.204E-02	5.739E-02	1.046E-01	NOT IDENT.
EU-154	6.526E-02	1.254E-01	2.864E-01	NOT IDENT.
EU-155	1.298E-03	7.273E-02	1.383E-01	FAIL ABUN
TB-160	-7.133E-02	2.079E-01	3.998E-01	FAIL ABUN
HO-166M	-2.725E-02	5.892E-02	1.123E-01	FAIL ABUN
TM-171	-2.152E+00	3.119E+00	5.926E+00	NOT IDENT.
HF-172	-6.019E-04	1.451E-01	2.726E-01	FAIL ABUN
LU-172	7.203E-02	8.390E-02	1.896E-01	FAIL ABUN
LU-176	1.644E-02	2.596E-02	5.356E-02	FAIL ABUN
HF-181	5.068E-02	1.071E-01	2.161E-01	NOT IDENT.
TA-182	-1.465E-01	2.911E-01	5.121E-01	FAIL ABUN
RE-183	-5.312E-02	7.685E-02	1.447E-01	NOT IDENT.
RE-184	-4.015E-02	3.397E-01	6.728E-01	NOT IDENT.
W-188	1.093E+00	1.068E+01	1.924E+01	FAIL ABUN
IR-192	-5.657E-02	4.728E-02	8.071E-02	FAIL ABUN
HG-203	9.290E-03	7.095E-02	1.404E-01	NOT IDENT.
TL-204	-9.735E-01	2.152E+00	4.048E+00	NOT IDENT.
BI-207	2.247E-02	5.744E-02	1.248E-01	FAIL ABUN
PB-211	-7.355E-01	7.834E-01	1.342E+00	NOT IDENT.
BI-213	2.055E-04	9.624E-02	1.886E-01	NOT IDENT.
RN-219	2.685E-01	4.067E-01	8.473E-01	FAIL ABUN
RA-223	7.740E-03	6.876E-01	1.214E+00	FAIL ABUN
AC-225	-2.065E+01	1.352E+01	2.047E+01	NOT IDENT.
AC-227	1.953E-01	2.247E-01	4.749E-01	FAIL ABUN
TH-227	1.953E-01	2.247E-01	4.749E-01	FAIL ABUN
TH-229	3.839E-01	4.697E-01	8.643E-01	FAIL ABUN
TH-231	7.740E-03	6.876E-01	1.214E+00	FAIL ABUN
PA-233	-4.766E-02	5.933E-02	1.068E-01	FAIL ABUN
PA-234	2.274E-02	2.831E-01	6.001E-01	NOT IDENT.
NP-237	-4.766E-02	5.933E-02	1.068E-01	FAIL ABUN
NP-238	0.000E+00	5.115E+07	0.000E+00	SHORT HLIF
NP-239	-9.745E-02	2.020E-01	3.655E-01	NOT IDENT.
PU-239	3.529E+02	2.907E+02	5.856E+02	NOT IDENT.
AM-241	4.434E-02	4.383E-02	8.702E-02	NOT IDENT.
CM-243	-4.689E-02	7.086E-02	1.277E-01	NOT IDENT.
BK-247	2.951E-02	6.800E-02	1.400E-01	NOT IDENT.
CM-247	4.376E-04	3.678E-02	7.153E-02	NOT IDENT.
CF-249	-1.906E-03	4.006E-02	7.735E-02	NOT IDENT.
CF-251	-1.956E-02	1.133E-01	2.034E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:08.81

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	76	10.66*	7.513E-01	5.019E+00	5.019E+00	28.77
SC-46	889.28	6	99.98*	1.221E+00	2.724E-02	4.471E-02	192.67
	1120.55	37	99.99	9.689E-01	2.044E-01	3.354E-01	59.60
CO-58	810.76	20	99.45*	1.344E+00	7.943E-02	1.427E-01	53.70
CD-109	88.03	181	3.70*	8.661E+00	2.994E+00	3.276E+00	30.71
SN-126	64.28	107	9.60	8.641E+00	6.829E-01	6.829E-01	57.24
	86.94	181	8.90	8.661E+00	1.245E+00	1.245E+00	30.71
	87.57	181	37.00*	8.661E+00	2.994E-01	2.994E-01	30.71
TL-208	277.37	------	6.60	4.145E+00	------ Line Not Found		------
	583.19	123	85.00*	1.898E+00	4.047E-01	4.047E-01	23.72
	860.56	------	12.50	1.263E+00	------ Line Not Found		------
BI-210	46.54	138	4.25*	7.750E+00	2.226E+00	2.237E+00	42.94
PB-210	46.54	138	4.25*	7.750E+00	2.226E+00	2.237E+00	42.94
BI-211	72.87	------	1.23	8.771E+00	------ Line Not Found		------
	351.06	354	12.92*	3.252E+00	4.468E+00	4.468E+00	13.29
BI-212	727.33	21	6.67*	1.500E+00	1.103E+00	1.103E+00	118.59
	1620.50	------	1.47	6.813E-01	------ Line Not Found		------
PB-212	74.82	360	10.28	8.774E+00	2.117E+00	2.117E+00	17.04
	77.11	537	17.10	8.769E+00	1.896E+00	1.896E+00	12.03
	238.63	486	43.60*	4.776E+00	1.236E+00	1.236E+00	11.17
	300.09	37	3.30	3.826E+00	1.544E+00	1.544E+00	83.72
BI-214	609.32	195	45.49*	1.811E+00	1.252E+00	1.252E+00	19.42
	1120.29	37	14.92	9.689E-01	1.370E+00	1.370E+00	59.60
	1764.49	23	15.30	6.291E-01	1.273E+00	1.273E+00	66.79
PB-214	74.82	360	5.80	8.774E+00	3.752E+00	3.753E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.249E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
RN-222	74.82	360	5.80	8.774E+00	3.752E+00	3.753E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.249E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
RA-224	240.99	165	4.10*	4.720E+00	4.530E+00	4.530E+00	32.31
RA-226	74.82	360	5.80	8.774E+00	3.752E+00	3.753E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.249E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
AC-228	338.32	102	11.27	3.388E+00	1.411E+00	1.411E+00	35.79
	911.20	62	25.80*	1.191E+00	1.068E+00	1.068E+00	32.18
	968.97	27	15.80	1.120E+00	8.233E-01	8.233E-01	69.30
RA-228	338.32	102	11.27	3.388E+00	1.411E+00	1.411E+00	35.79

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	62	25.80*	1.191E+00	1.068E+00	1.068E+00	32.18
	968.97	27	15.80	1.120E+00	8.233E-01	8.233E-01	69.30
TH-228	74.82	360	10.28	8.774E+00	2.117E+00	2.117E+00	17.04
	77.11	537	17.10	8.769E+00	1.896E+00	1.896E+00	12.03
	238.63	486	43.60*	4.776E+00	1.236E+00	1.236E+00	11.17
	300.09	37	3.30	3.826E+00	1.544E+00	1.544E+00	83.72
TH-230	74.82	360	5.80	8.774E+00	3.752E+00	3.752E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.248E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
PA-231	283.69	------	1.70	4.054E+00	------ Line Not Found		------
	301.36	37	5.35*	3.826E+00	9.522E-01	9.522E-01	83.72
TH-232	338.32	102	11.27	3.388E+00	1.411E+00	1.411E+00	35.79
	911.20	62	25.80*	1.191E+00	1.068E+00	1.068E+00	32.18
	968.97	27	15.80	1.120E+00	8.233E-01	8.233E-01	69.30
PA-234M	63.29	107	3.70*	8.641E+00	1.772E+00	1.772E+00	57.24
	92.59	125	4.23	8.558E+00	1.835E+00	1.835E+00	42.69
TH-234	63.29	107	3.70*	8.641E+00	1.772E+00	1.772E+00	57.24
	92.59	125	4.23	8.558E+00	1.835E+00	1.835E+00	42.69
U-234	74.82	360	5.80	8.774E+00	3.752E+00	3.752E+00	17.04
	77.11	537	9.70	8.769E+00	3.343E+00	3.343E+00	12.03
	87.09	181	3.41	8.661E+00	3.248E+00	3.248E+00	30.71
	242.00	165	7.25	4.720E+00	2.562E+00	2.562E+00	32.31
	295.22	180	18.42	3.892E+00	1.328E+00	1.328E+00	23.98
	351.93	354	35.60*	3.252E+00	1.622E+00	1.622E+00	13.29
U-235	89.96	111	3.47	8.613E+00	1.960E+00	1.960E+00	47.40
	93.35	125	5.60	8.558E+00	1.386E+00	1.386E+00	42.69
	143.76	50	10.96*	7.106E+00	3.409E-01	3.409E-01	99.39
	163.33	------	5.08	6.531E+00	------ Line Not Found		------
	185.72	132	57.20	5.913E+00	2.070E-01	2.070E-01	37.16
	205.31	------	5.01	5.464E+00	------ Line Not Found		------
U-238	63.29	107	3.70*	8.641E+00	1.772E+00	1.772E+00	57.24
	92.59	125	4.23	8.558E+00	1.835E+00	1.835E+00	42.69
AM-243	43.53	------	5.90	7.448E+00	------ Line Not Found		------
	74.66	360	67.20*	8.774E+00	3.239E-01	3.239E-01	17.04
ANH-511	511.00	22	100.00*	2.184E+00	5.451E-02	5.451E-02	174.12

Flag: "*" = Keyline

Sample ID : G730947003 Acquisition date : 27-JUL-2025 10:04:35

Total number of lines in spectrum 40
Number of unidentified lines 5
Number of lines tentatively identified by NID 35 87.50%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	5.019E+00	5.019E+00	1.444E+00	28.77	
SC-46	83.79D	1.64	2.724E-02	4.471E-02	8.613E-02	192.67	
CO-58	70.86D	1.80	7.943E-02	1.427E-01	0.766E-01	53.70	
CD-109	461.40D	1.09	2.994E+00	3.276E+00	1.006E+00	30.71	
SN-126	2.30E+05Y	1.00	2.994E-01	2.994E-01	0.920E-01	30.71	
TL-208	1.41E+10Y	1.00	4.047E-01	4.047E-01	0.960E-01	23.72	
BI-210	22.20Y	1.01	2.226E+00	2.237E+00	0.961E+00	42.94	
PB-210	22.20Y	1.01	2.226E+00	2.237E+00	0.961E+00	42.94	
BI-211	7.04E+08Y	1.00	4.468E+00	4.468E+00	0.594E+00	13.29	
BI-212	1.41E+10Y	1.00	1.103E+00	1.103E+00	1.308E+00	118.59	
PB-212	1.41E+10Y	1.00	1.236E+00	1.236E+00	0.138E+00	11.17	
BI-214	1600.00Y	1.00	1.252E+00	1.252E+00	0.243E+00	19.42	
PB-214	1600.00Y	1.00	1.622E+00	1.622E+00	0.215E+00	13.29	
RN-222	1600.00Y	1.00	1.622E+00	1.622E+00	0.215E+00	13.29	
RA-224	1.41E+10Y	1.00	4.530E+00	4.530E+00	1.464E+00	32.31	
RA-226	1600.00Y	1.00	1.622E+00	1.622E+00	0.215E+00	13.29	
AC-228	1.41E+10Y	1.00	1.068E+00	1.068E+00	0.344E+00	32.18	
RA-228	1.41E+10Y	1.00	1.068E+00	1.068E+00	0.344E+00	32.18	
TH-228	1.41E+10Y	1.00	1.236E+00	1.236E+00	0.138E+00	11.17	
TH-230	7.54E+04Y	1.00	1.622E+00	1.622E+00	0.215E+00	13.29	
PA-231	7.04E+08Y	1.00	9.522E-01	9.522E-01	7.972E-01	83.72	
TH-232	1.41E+10Y	1.00	1.068E+00	1.068E+00	0.344E+00	32.18	
PA-234M	4.47E+09Y	1.00	1.772E+00	1.772E+00	1.014E+00	57.24	
TH-234	4.47E+09Y	1.00	1.772E+00	1.772E+00	1.014E+00	57.24	
U-234	2.45E+05Y	1.00	1.622E+00	1.622E+00	0.215E+00	13.29	
U-235	7.04E+08Y	1.00	3.409E-01	3.409E-01	3.389E-01	99.39	
U-238	4.47E+09Y	1.00	1.772E+00	1.772E+00	1.014E+00	57.24	
AM-243	7370.00Y	1.00	3.239E-01	3.239E-01	0.552E-01	17.04	
ANH-511	1.00E+09Y	1.00	5.451E-02	5.451E-02	9.491E-02	174.12	
Total Activity :			4.540E+01	4.579E+01			
Grand Total Activity :			4.540E+01	4.579E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
6	189.78	43	139	2.07	379.52	367	18	1.06E-02	****	5.83E+00	
0	209.81	42	122	1.09	419.55	416	9	1.02E-02	****	5.36E+00	T
0	271.20	39	57	1.99	542.24	539	8	9.70E-03	78.9	4.24E+00	T
0	330.61	9	76	2.90	660.97	651	11	2.28E-03	****	3.47E+00	
0	396.44	8	42	0.51	792.55	786	9	2.14E-03	****	2.87E+00	
0	464.77	27	43	1.42	929.12	921	16	7.08E-03	****	2.42E+00	T
0	470.31	15	23	1.82	940.19	936	9	3.81E-03	****	2.39E+00	
0	562.67	8	22	1.46	1124.82	1117	12	2.10E-03	****	1.97E+00	T
0	638.29	17	13	1.48	1275.98	1268	13	4.63E-03	****	1.72E+00	T
0	643.76	28	5	5.92	1286.92	1281	15	7.66E-03	49.2	1.71E+00	
0	817.20	14	7	1.38	1633.67	1628	10	3.78E-03	92.6	1.33E+00	T
0	923.31	14	10	5.62	1845.82	1837	14	3.91E-03	****	1.18E+00	T
0	1047.92	7	6	3.43	2095.00	2087	12	1.94E-03	****	1.04E+00	T
0	1237.91	16	5	2.90	2474.97	2469	11	4.58E-03	73.9	8.80E-01	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:20.38

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947003.CNF;1    *
* Acquisition date : 27-JUL-2025 10:04:35 Sensitivity     : 3.000       *
* Detector ID      : GAM21                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.50     Half life ratio : *****       *
* Sample date      : 28-MAY-2025 13:05:00 Nuclide Library : SOLID       *
* Sample ID        : G730947003           Analyst initials: MXR1        *
* Batch Number     : 2822154              Sample Quantity : 1.4172E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 24-JUL-2025 07:17:30 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;28        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.311E-01
SC-46	5.692E-02
CO-58	4.585E-02
CD-109	3.970E-01
SN-126	3.623E-02
TL-208	3.477E-02
BI-210	3.176E-01
PB-210	3.176E-01
BI-211	1.600E-01
BI-212	4.577E-01
PB-212	4.356E-02
BI-214	6.257E-02
PB-214	5.824E-02
RN-222	5.824E-02
RA-224	4.521E-01
RA-226	5.824E-02
AC-228	1.129E-01
RA-228	1.129E-01
TH-228	4.356E-02
TH-230	5.824E-02
PA-231	3.763E-01
TH-232	1.129E-01
PA-234M	3.864E-01
TH-234	3.864E-01
U-234	5.824E-02
U-235	1.435E-01
U-238	3.864E-01
AM-243	2.242E-02
ANH-511	2.445E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	5.345E-01	NOT IDENT.
NA-22	4.289E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	4.923E-02	NOT IDENT.
V-48	4.725E-01	NOT IDENT.
CR-51	9.547E-01	NOT IDENT.
MN-52	0.000E+00	SHORT HLIF
MN-54	3.543E-02	NOT IDENT.
CO-56	5.152E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.841E-02	NOT IDENT.
FE-59	1.808E-01	NOT IDENT.
CO-60	3.410E-02	NOT IDENT.
ZN-65	9.935E-02	NOT IDENT.
GE-68	1.547E+00	NOT IDENT.
AS-73	2.332E-01	NOT IDENT.
AS-74	4.564E-01	NOT IDENT.
SE-75	4.805E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.100E+00	NOT IDENT.
RB-83	9.093E-02	NOT IDENT.
RB-84	1.251E-01	NOT IDENT.
KR-85	6.954E+00	NOT IDENT.
SR-85	5.891E-02	NOT IDENT.
RB-86	4.498E+00	NOT IDENT.
Y-88	7.963E-02	NOT IDENT.
Y-91	2.571E+01	NOT IDENT.
NB-94	3.341E-02	NOT IDENT.
NB-95	8.525E-02	NOT IDENT.
NB-95M	1.469E-01	NOT IDENT.
ZR-95	1.122E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.087E-02	NOT IDENT.
RH-102	5.494E-02	FAIL ABUN
RU-103	6.073E-02	FAIL ABUN
RH-106	2.337E-01	NOT IDENT.
RU-106	2.337E-01	NOT IDENT.
AG-108M	2.685E-02	NOT IDENT.
AG-110	9.069E-01	NOT IDENT.
AG-110M	4.603E-02	NOT IDENT.
SN-113	5.050E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	4.166E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.836E-02	NOT IDENT.
SB-124	1.368E-01	NOT IDENT.
SB-125	8.340E-02	FAIL ABUN
TE-125M	1.071E+01	NOT IDENT.
I-126	2.797E+00	NOT IDENT.
SB-126	1.400E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	4.789E+00	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.065E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.111E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	1.050E+00	FAIL ABUN
BA-137M	4.551E-02	NOT IDENT.
CS-137	4.807E-02	NOT IDENT.
LA-138	4.287E-02	NOT IDENT.
CE-139	2.903E-02	NOT IDENT.
BA-140	2.799E+00	NOT IDENT.
LA-140	9.804E-01	FAIL ABUN
CE-141	1.097E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.537E-01	NOT IDENT.
PM-144	3.250E-02	NOT IDENT.
PR-144	2.490E+00	NOT IDENT.
PM-146	4.446E-02	NOT IDENT.
ND-147	9.054E+00	FAIL ABUN
PM-147	5.006E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.217E-02	FAIL ABUN
EU-152	8.206E-02	FAIL ABUN
GD-153	4.864E-02	NOT IDENT.

EU-154	1.188E-01	NOT IDENT.
EU-155	6.473E-02	FAIL ABUN
TB-160	1.652E-01	FAIL ABUN
HO-166M	4.740E-02	FAIL ABUN
TM-171	2.751E+00	NOT IDENT.
HF-172	1.271E-01	FAIL ABUN
LU-172	8.252E-02	FAIL ABUN
LU-176	2.467E-02	FAIL ABUN
HF-181	9.763E-02	NOT IDENT.
TA-182	2.130E-01	FAIL ABUN
RE-183	6.760E-02	NOT IDENT.
RE-184	2.852E-01	NOT IDENT.
W-188	8.777E+00	FAIL ABUN
IR-192	3.603E-02	FAIL ABUN
HG-203	6.482E-02	NOT IDENT.
TL-204	1.911E+00	NOT IDENT.
BI-207	5.285E-02	FAIL ABUN
PB-211	6.018E-01	NOT IDENT.
BI-213	8.324E-02	NOT IDENT.
RN-219	3.842E-01	FAIL ABUN
RA-223	5.547E-01	FAIL ABUN
AC-225	9.432E+00	NOT IDENT.
AC-227	2.200E-01	FAIL ABUN
TH-227	2.200E-01	FAIL ABUN
TH-229	4.027E-01	FAIL ABUN
TH-231	5.547E-01	FAIL ABUN
PA-233	4.819E-02	FAIL ABUN
PA-234	2.473E-01	NOT IDENT.
NP-237	4.819E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.708E-01	NOT IDENT.
PU-239	2.770E+02	NOT IDENT.
AM-241	4.102E-02	NOT IDENT.
CM-243	5.950E-02	NOT IDENT.
BK-247	6.428E-02	NOT IDENT.
CM-247	3.214E-02	NOT IDENT.
CF-249	3.487E-02	NOT IDENT.
CF-251	9.465E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:24.64

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G730947003.CNF;1   *
* Acquisition date : 27-JUL-2025 10:04:35 Sensitivity     : 3.000           *
* Detector ID      : GAM21                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.50     Half life ratio : *****           *
* Sample date      : 28-MAY-2025 13:05:00 Nuclide Library : SOLID           *
* Sample ID        : G730947003           Analyst initials: MXR1            *
* Batch Number     : 2822154              Sample Quantity : 1.4172E+02 GRAM *
*                                         Quantity Err(%) : 1.4112E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 24-JUL-2025 07:17:30 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;28            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	5.019E+00	1.482E+00	1.482E+00
SC-46	4.471E-02	8.452E-02	8.452E-02
CO-58	1.427E-01	7.645E-02	7.645E-02
CD-109	3.276E+00	1.046E+00	1.046E+00
SN-126	2.994E-01	9.430E-02	9.430E-02
TL-208	4.047E-01	1.020E-01	1.020E-01
BI-210	2.237E+00	9.664E-01	9.664E-01
PB-210	2.237E+00	9.664E-01	9.664E-01
BI-211	4.468E+00	6.877E-01	6.877E-01
BI-212	1.103E+00	1.287E+00	1.287E+00
PB-212	1.236E+00	1.863E-01	1.863E-01
BI-214	1.252E+00	2.679E-01	2.679E-01
PB-214	1.622E+00	2.482E-01	2.482E-01
RN-222	1.622E+00	2.482E-01	2.482E-01
RA-224	4.530E+00	1.507E+00	1.507E+00
RA-226	1.622E+00	2.482E-01	2.482E-01
AC-228	1.068E+00	3.541E-01	3.541E-01
RA-228	1.068E+00	3.541E-01	3.541E-01
TH-228	1.236E+00	1.863E-01	1.863E-01
TH-230	1.622E+00	2.482E-01	2.482E-01
PA-231	9.522E-01	8.094E-01	8.094E-01
TH-232	1.068E+00	3.541E-01	3.541E-01
PA-234M	1.772E+00	1.074E+00	1.074E+00
TH-234	1.772E+00	1.074E+00	1.074E+00
U-234	1.622E+00	2.482E-01	2.482E-01
U-235	3.409E-01	3.344E-01	3.344E-01
U-238	1.772E+00	1.074E+00	1.074E+00
AM-243	3.239E-01	6.139E-02	6.139E-02
ANH-511	5.451E-02	9.315E-02	9.315E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	4.319E-01	5.567E-01	5.897E-01	NOT IDENT.

NA-22	2.356E-02	4.533E-02	4.656E-02	NOT IDENT.
NA-24	7.676E+26	2.714E+27	0.000E+00	SHORT HLIF
AL-26	4.323E-02	4.492E-02	4.896E-02	NOT IDENT.
V-48	4.574E-02	5.440E-01	5.444E-01	NOT IDENT.
CR-51	1.743E-01	1.051E+00	1.054E+00	NOT IDENT.
MN-52	-4.293E+01	6.669E+01	6.944E+01	SHORT HLIF
MN-54	-2.108E-02	4.496E-02	4.596E-02	NOT IDENT.
CO-56	-2.563E-02	6.476E-02	6.578E-02	FAIL ABUN
MN-56	-1.000E+41	2.526E+41	0.000E+00	SHORT HLIF
CO-57	-1.683E-03	2.111E-02	2.113E-02	NOT IDENT.
FE-59	7.082E-02	1.985E-01	2.011E-01	NOT IDENT.
CO-60	1.018E-02	3.785E-02	3.813E-02	NOT IDENT.
ZN-65	5.563E-02	1.173E-01	1.199E-01	NOT IDENT.
GE-68	1.300E+00	1.551E+00	1.658E+00	NOT IDENT.
AS-73	3.007E-01	2.366E-01	2.727E-01	NOT IDENT.
AS-74	-1.520E-01	5.741E-01	5.782E-01	NOT IDENT.
SE-75	3.116E-02	5.011E-02	5.204E-02	NOT IDENT.
BR-77	9.003E+07	1.562E+08	1.614E+08	SHORT HLIF
SR-82	-3.149E-01	1.313E+00	1.321E+00	NOT IDENT.
RB-83	2.234E-02	1.032E-01	1.037E-01	NOT IDENT.
RB-84	-6.250E-02	1.616E-01	1.640E-01	NOT IDENT.
KR-85	4.773E+00	7.486E+00	7.789E+00	NOT IDENT.
SR-85	4.009E-02	6.345E-02	6.597E-02	NOT IDENT.
RB-86	3.019E+00	4.670E+00	4.864E+00	NOT IDENT.
Y-88	2.490E-02	8.824E-02	8.895E-02	NOT IDENT.
Y-91	-2.273E+01	3.720E+01	3.859E+01	NOT IDENT.
NB-94	4.320E-03	3.714E-02	3.719E-02	NOT IDENT.
NB-95	2.680E-02	9.389E-02	9.466E-02	NOT IDENT.
NB-95M	-1.463E-02	1.952E-01	1.953E-01	NOT IDENT.
ZR-95	-1.292E-02	1.301E-01	1.303E-01	NOT IDENT.
NB-97	1.000E+41	2.782E+41	0.000E+00	SHORT HLIF
ZR-97	-8.892E+24	2.677E+25	0.000E+00	SHORT HLIF
MO-99	6.366E+04	1.269E+06	1.269E+06	SHORT HLIF
TC-99M	1.000E+41	1.887E+41	0.000E+00	SHORT HLIF
RH-101	-2.359E-02	2.632E-02	2.838E-02	NOT IDENT.
RH-102	4.647E-03	6.846E-02	6.849E-02	FAIL ABUN
RU-103	-3.713E-02	7.857E-02	8.034E-02	FAIL ABUN
RH-106	-2.042E-01	3.298E-01	3.424E-01	NOT IDENT.
RU-106	-2.042E-01	3.298E-01	3.424E-01	NOT IDENT.
AG-108M	8.878E-03	2.976E-02	3.003E-02	NOT IDENT.
AG-110	3.004E-01	1.035E+00	1.043E+00	NOT IDENT.
AG-110M	2.213E-02	5.272E-02	5.366E-02	NOT IDENT.
SN-113	-2.408E-02	6.850E-02	6.935E-02	NOT IDENT.
CD-115	-1.437E+06	1.251E+07	1.253E+07	SHORT HLIF
SN-117M	-2.906E-02	4.887E-01	4.889E-01	NOT IDENT.
SB-122	-2.136E+05	2.081E+05	2.293E+05	SHORT HLIF
TE-123M	1.287E-03	3.299E-02	3.300E-02	NOT IDENT.
SB-124	2.886E-03	1.605E-01	1.605E-01	NOT IDENT.
SB-125	1.485E-02	9.469E-02	9.492E-02	FAIL ABUN
TE-125M	2.665E+00	1.187E+01	1.193E+01	NOT IDENT.
I-126	1.259E+00	3.179E+00	3.229E+00	NOT IDENT.
SB-126	-2.931E-01	1.647E+00	1.652E+00	NOT IDENT.
SB-127	9.872E+01	4.686E+03	4.686E+03	SHORT HLIF
I-131	-8.203E-01	5.535E+00	5.547E+00	FAIL ABUN
I-132	1.000E+41	4.905E+41	0.000E+00	SHORT HLIF
TE-132	5.270E+03	1.041E+04	1.068E+04	SHORT HLIF
BA-133	7.638E-03	3.723E-02	3.739E-02	NOT IDENT.
I-133	-8.112E+18	2.166E+19	0.000E+00	SHORT HLIF
CS-134	-7.248E-03	4.840E-02	4.851E-02	FAIL ABUN
I-135	1.000E+41	2.036E+41	0.000E+00	SHORT HLIF
CS-136	1.038E+00	1.623E+00	1.690E+00	FAIL ABUN
BA-137M	2.528E-02	5.130E-02	5.255E-02	NOT IDENT.
CS-137	2.671E-02	5.420E-02	5.552E-02	NOT IDENT.
LA-138	-1.653E-02	5.556E-02	5.605E-02	NOT IDENT.
CE-139	1.559E-02	3.272E-02	3.347E-02	NOT IDENT.
BA-140	-1.691E-01	3.334E+00	3.335E+00	NOT IDENT.
LA-140	-9.353E-01	1.429E+00	1.490E+00	FAIL ABUN
CE-141	5.878E-02	1.307E-01	1.333E-01	NOT IDENT.
CE-143	3.219E+11	7.515E+11	7.654E+11	SHORT HLIF
CE-144	3.279E-02	1.735E-01	1.742E-01	NOT IDENT.
PM-144	9.505E-03	3.507E-02	3.533E-02	NOT IDENT.
PR-144	7.283E-01	2.687E+00	2.707E+00	NOT IDENT.
PM-146	2.844E-02	4.795E-02	4.964E-02	NOT IDENT.
ND-147	-1.861E+00	1.098E+01	1.101E+01	FAIL ABUN
PM-147	-2.329E+02	5.902E+02	5.994E+02	NOT IDENT.
PM-149	-3.023E+07	9.945E+07	1.004E+08	SHORT HLIF
EU-150	3.734E-03	2.721E-02	2.726E-02	FAIL ABUN
EU-152	-1.436E-02	9.430E-02	9.452E-02	FAIL ABUN

GD-153	1.204E-02	5.740E-02	5.766E-02	NOT IDENT.
EU-154	6.526E-02	1.256E-01	1.290E-01	NOT IDENT.
EU-155	1.298E-03	7.273E-02	7.273E-02	FAIL ABUN
TB-160	-7.133E-02	2.081E-01	2.105E-01	FAIL ABUN
HO-166M	-2.725E-02	5.899E-02	6.026E-02	FAIL ABUN
TM-171	-2.152E+00	3.127E+00	3.274E+00	NOT IDENT.
HF-172	-6.019E-04	1.451E-01	1.451E-01	FAIL ABUN
LU-172	7.203E-02	8.440E-02	9.043E-02	FAIL ABUN
LU-176	1.644E-02	2.599E-02	2.703E-02	FAIL ABUN
HF-181	5.068E-02	1.072E-01	1.096E-01	NOT IDENT.
TA-182	-1.465E-01	2.913E-01	2.987E-01	FAIL ABUN
RE-183	-5.312E-02	7.711E-02	8.074E-02	NOT IDENT.
RE-184	-4.015E-02	3.397E-01	3.402E-01	NOT IDENT.
W-188	1.093E+00	1.068E+01	1.069E+01	FAIL ABUN
IR-192	-5.657E-02	4.749E-02	5.390E-02	FAIL ABUN
HG-203	9.290E-03	7.095E-02	7.107E-02	NOT IDENT.
TL-204	-9.735E-01	2.154E+00	2.199E+00	NOT IDENT.
BI-207	2.247E-02	5.747E-02	5.836E-02	FAIL ABUN
PB-211	-7.355E-01	7.861E-01	8.531E-01	NOT IDENT.
BI-213	2.055E-04	9.624E-02	9.624E-02	NOT IDENT.
RN-219	2.685E-01	4.086E-01	4.261E-01	FAIL ABUN
RA-223	7.740E-03	6.876E-01	6.876E-01	FAIL ABUN
AC-225	-2.065E+01	1.386E+01	1.669E+01	NOT IDENT.
AC-227	1.953E-01	2.267E-01	2.432E-01	FAIL ABUN
TH-227	1.953E-01	2.267E-01	2.432E-01	FAIL ABUN
TH-229	3.839E-01	4.719E-01	5.026E-01	FAIL ABUN
TH-231	7.740E-03	6.876E-01	6.876E-01	FAIL ABUN
PA-233	-4.766E-02	5.945E-02	6.321E-02	FAIL ABUN
PA-234	2.274E-02	2.843E-01	2.845E-01	NOT IDENT.
NP-237	-4.766E-02	5.945E-02	6.321E-02	FAIL ABUN
NP-238	3.345E+06	5.115E+07	5.117E+07	SHORT HLIF
NP-239	-9.745E-02	2.023E-01	2.070E-01	NOT IDENT.
PU-239	3.529E+02	2.930E+02	3.334E+02	NOT IDENT.
AM-241	4.434E-02	4.402E-02	4.835E-02	NOT IDENT.
CM-243	-4.689E-02	7.109E-02	7.417E-02	NOT IDENT.
BK-247	2.951E-02	6.829E-02	6.957E-02	NOT IDENT.
CM-247	4.376E-04	3.678E-02	3.678E-02	NOT IDENT.
CF-249	-1.906E-03	4.006E-02	4.007E-02	NOT IDENT.
CF-251	-1.956E-02	1.133E-01	1.136E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	60.4262	85.43	77.8458	133.02	61.8595
45.60	60.9403	86.55	78.0714	133.52	66.1872
46.54	61.1700	86.79	78.1190	136.00	57.9131
49.72	0.0000	86.94	78.1493	136.47	49.3762
51.35	77.0222	87.09	78.1795	140.51	0.0000
51.87	71.9680	87.57	78.2753	143.76	73.9548
52.39	71.2367	88.03	78.3668	144.24	74.0170
52.97	66.1643	88.34	78.4280	145.44	53.8123
53.44	50.5799	88.47	78.4539	152.43	81.6940
54.07	69.9234	89.96	78.7481	153.25	82.9124
57.36	0.0000	1093.63	78.8816	323.87	65.3298
57.53	82.2786	91.11	78.9736	156.02	78.8545
57.98	83.2910	92.59	79.2616	158.56	73.6095
59.27	61.7035	93.35	79.4087	159.00	69.1985
59.32	61.7138	94.56	79.6417	162.33	81.9167
59.54	61.7593	94.65	79.6590	162.66	76.3464
60.96	83.5305	94.67	79.6627	163.33	68.5608
61.17	90.7533	94.87	57.7258	165.86	62.0672
62.93	87.3712	97.43	54.1186	176.31	65.3731
63.29	87.4724	98.43	60.5304	176.60	68.8440
63.58	87.5538	98.44	60.5318	177.52	64.3433
64.28	88.0509	99.53	63.6699	181.07	0.0000
66.73	85.0832	100.11	67.7406	181.52	66.2689
67.24	91.3040	102.03	61.0354	184.41	71.1946
125.81	96.9125	103.18	69.2200	143.76	67.4537
67.75	94.1901	103.37	77.2790	193.51	43.9049
68.89	89.9288	105.31	70.5597	197.03	48.4548
69.67	88.3015	106.12	70.6868	198.01	63.9050
70.82	102.4484	106.47	70.7413	201.83	65.4308
70.83	102.4518	109.28	71.1776	203.43	61.9968
72.81	91.5989	111.00	69.4008	205.31	60.9586
72.87	91.6147	111.76	0.0000	210.85	62.6141
74.66	100.7993	114.06	80.1245	215.65	48.4674
74.82	100.8454	116.30	0.0000	218.12	82.6571
74.97	100.8883	116.74	79.5396	222.11	61.0863
77.11	101.4988	119.76	75.8744	227.09	40.5697
78.74	101.9578	121.12	64.6182	227.38	40.5843
79.69	102.2231	121.22	76.0983	228.16	0.0000
80.03	98.5275	121.78	66.7910	228.18	41.8557
80.12	98.5529	122.06	66.8286	116.74	41.8557
80.19	98.5712	122.92	66.9429	235.69	53.0091
80.57	89.1850	123.07	66.9629	235.96	53.0267
81.00	98.7870	265.00	70.1866	238.63	49.8718
81.07	98.8060	125.81	63.1169	238.98	0.0000
81.75	78.0468	127.23	86.4978	240.99	46.6781
82.47	99.1774	127.91	83.4433	242.00	46.7339
83.79	77.5134	129.30	70.9565	244.70	51.4871
84.00	77.5560	131.20	105.2268	252.40	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	39.7184	345.93	38.0463	564.24	0.0000
254.15	0.0000	351.06	27.9651	569.33	20.7001
256.23	37.3284	351.93	27.9865	946.00	19.6128
260.90	0.0000	355.39	0.0000	569.70	18.5253
264.66	35.1126	356.01	19.6606	583.19	19.7703
264.80	35.1176	364.49	32.0645	584.27	19.7827
265.00	35.1251	366.42	0.0000	595.83	17.7012
269.46	38.7405	372.51	24.6866	427.87	21.0774
270.03	38.7643	375.05	31.3994	602.52	0.0000
271.23	48.3027	377.52	23.8363	604.72	18.3463
273.65	37.6191	356.01	25.8777	607.14	16.7010
276.40	45.9696	388.16	28.8538	609.32	16.7218
277.37	45.1488	388.63	29.8275	610.33	16.7310
277.60	40.8171	391.69	33.2766	614.28	15.0908
278.00	38.2288	264.66	29.1437	618.01	19.0427
279.20	46.1065	401.81	22.3641	620.36	7.8514
279.54	42.6417	402.40	26.2656	621.93	14.5933
279.70	41.7783	404.85	39.9615	630.19	0.0000
280.46	46.1680	410.95	32.3172	631.29	16.2475
283.69	38.4579	413.71	34.3484	633.25	11.8599
284.31	38.4830	414.70	33.3927	634.78	15.2611
285.41	40.2781	423.72	26.7001	635.95	13.5737
285.90	0.0000	427.09	24.7854	636.99	13.5815
287.50	29.8351	427.87	20.8317	657.50	16.0183
290.67	34.3345	433.94	20.9261	657.76	16.0206
293.27	0.0000	439.40	23.0112	657.90	0.0000
351.93	41.1265	440.45	19.0240	661.66	21.7863
295.96	41.1577	453.88	22.2421	664.57	0.0000
879.38	21.2983	463.37	18.3204	666.33	18.3906
299.98	35.9912	468.07	6.1270	666.50	18.3926
300.09	35.9953	473.00	0.0000	667.71	0.0000
300.13	35.9970	475.06	24.6260	677.62	10.4052
301.36	36.0406	476.78	15.4095	685.70	0.0000
302.85	38.7679	477.60	13.3623	692.65	0.0000
256.23	38.8307	482.18	22.6839	695.00	16.3282
304.85	44.2028	487.02	17.5859	696.49	10.5044
306.78	34.8923	492.35	0.0000	696.51	10.5048
308.46	38.5340	497.08	16.6628	697.00	12.2585
311.90	41.3604	505.52	18.8496	697.30	12.2603
316.51	41.5443	507.63	0.0000	697.49	13.1374
319.41	29.8854	511.00	17.8660	702.65	15.8049
320.08	32.6235	514.00	17.9006	706.68	18.4756
321.04	39.0020	514.00	17.9006	711.68	14.1113
323.87	34.1042	520.40	15.8594	720.70	11.5158
325.23	36.8795	520.69	0.0000	721.93	0.0000
328.76	31.9758	522.65	0.0000	722.78	12.7692
333.37	33.0293	527.90	0.0000	722.91	9.9319
333.97	30.2936	528.26	11.6884	723.31	9.9340
334.37	28.9276	529.59	17.0150	724.19	15.6170
338.28	30.4131	529.87	0.0000	727.33	13.3301
338.32	30.4138	531.02	22.3527	733.00	24.2383
311.90	34.6291	537.26	19.2341	735.93	16.0620
340.48	34.6291	546.56	0.0000	333.97	10.7161
340.55	30.4756	552.55	22.6509	739.50	0.0000
344.28	34.2840	563.25	11.3985	744.23	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
747.24	15.2511	964.08	11.0055	1457.56	0.0000
748.06	11.6670	966.17	9.4409	1460.82	4.5911
752.31	18.8845	968.97	16.7354	1489.16	4.6250
753.82	8.0991	983.53	8.9083	1505.03	4.6438
756.73	14.4180	984.45	0.0000	1584.12	9.4731
756.80	16.2202	1274.44	8.9503	1596.21	8.5509
884.68	22.6028	1002.74	10.9651	1620.50	4.7783
765.81	21.7178	1004.73	7.9805	1621.92	2.8680
766.84	15.3907	507.63	0.0000	1678.03	0.0000
772.60	0.0000	1025.87	0.0000	1690.97	2.9149
776.52	15.4586	1028.54	0.0000	1750.46	0.0000
739.50	0.0000	1037.84	2.0189	1764.49	2.9638
778.90	8.1928	1038.76	0.0000	1063.66	10.8813
783.70	0.0000	631.29	6.0758	1771.35	7.9156
788.74	16.4586	1048.07	9.7260	1791.20	0.0000
792.07	18.3148	1049.04	14.5942	1808.65	0.9976
795.86	14.6763	1050.41	8.1118	1810.72	0.0000
810.06	12.9225	1063.66	7.1307	1836.06	5.0173
810.29	7.3850	1077.00	6.1403		
344.28	7.3857	1077.34	5.1175		
810.76	7.3867	1085.87	7.1850		
815.77	7.4028	1093.63	7.2042		
1048.07	7.4116	1099.45	7.2183		
832.01	10.2504	1112.07	8.2847		
834.85	14.9282	1112.84	4.9720		
836.80	0.0000	1115.54	6.6352		
846.75	0.0000	1120.29	10.3839		
846.77	13.1284	1120.55	10.3845		
856.80	18.8336	1221.41	6.6480		
860.56	14.1476	1129.67	4.1665		
871.09	14.2094	1131.51	0.0000		
873.19	16.1180	1147.95	0.0000		
875.33	0.0000	1173.23	9.5076		
879.38	10.4555	1177.95	8.4639		
880.51	12.3625	1189.05	13.8022		
881.60	8.5625	1204.77	10.6689		
883.24	6.5280	1221.41	12.8687		
884.68	4.5724	1231.02	9.8337		
889.28	11.4521	1235.36	1.7232		
894.76	14.0280	1238.28	12.0729		
898.04	9.5773	1260.41	0.0000		
900.72	13.4224	1271.87	5.4443		
903.28	11.5166	1274.44	4.3589		
911.20	7.7021	1274.54	4.3589		
912.08	3.0819	1291.59	9.8569		
923.98	0.0000	1298.22	0.0000		
926.50	9.2982	1312.11	6.6105		
929.11	8.8644	1332.49	3.3246		
935.54	0.0000	1362.66	0.0000		
937.49	14.5908	1365.19	2.2369		
944.13	9.7519	1368.63	0.0000		
946.00	6.8312	1384.29	3.3732		
949.00	12.7013	1408.01	4.5269		
667.71	0.0000	1434.09	0.0000		
962.31	16.6939	1435.80	4.5608		

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:53.70

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156307.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM31.CNF;829
                                    Background date  : 20-JUL-2025 10:27:48
Sample date      : 1-JUL-2025 00:00:00. Acquisition date : 27-JUL-2025 10:05:17
Sample ID        : G1206156307          Sample quantity  : 1.41720E+02 GRAM
Detector name    : GAM31                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:08.13  0.2%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2822154              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	5	36.01*	9	7	1.31	72.19	68	19	2.44E-03	100.0	1.83E+00
2	5	38.40	21	21	1.96	76.96	68	19	5.79E-03	58.5	
3	5	41.17*	7	23	1.48	82.51	68	19	1.88E-03	144.6	
4	0	46.63*	18	37	1.07	93.44	87	10	5.00E-03	75.1	
5	0	63.27*	18	25	1.00	126.73	122	9	5.12E-03	69.5	
6	0	240.48*	3	35	1.39	481.36	475	8	6.97E-04	434.5	
7	0	306.12	12	12	0.94	612.70	609	7	3.35E-03	55.9	
8	0	327.14	30	40	7.95	654.75	638	23	8.26E-03	58.4	
9	0	511.85*	17	14	1.86	1024.31	1015	19	4.58E-03	79.9	
10	0	566.83	7	4	1.02	1134.31	1130	7	1.81E-03	61.8	
11	0	614.13	25	34	8.35	1228.93	1211	27	6.99E-03	67.3	
12	0	816.01*	9	3	2.28	1632.75	1627	10	2.37E-03	52.6	
13	0	954.85	12	0	2.53	1910.42	1906	9	3.33E-03	28.9	
14	0	1016.58	9	7	0.90	2033.88	2025	13	2.36E-03	70.7	
15	0	1462.45*	9	0	1.50	2925.38	2921	9	2.44E-03	44.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 27-JUL-2025 11:05:55

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156307.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 1-JUL-2025 00:00:00	Acquisition date	: 27-JUL-2025 10:05:17
Sample ID	: G1206156307	Sample quantity	: 141.72 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA31	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:08.13 0.2%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BI-210	46.54	23	4.25*	5.862E+00	4.863E-01	4.874E-01	150.29
PB-210	46.54	23	4.25*	5.862E+00	4.863E-01	4.874E-01	150.29
RA-224	240.99	3	4.10*	3.062E+00	1.188E-01	1.188E-01	869.01
ANH-511	511.00	17	100.00*	1.640E+00	5.617E-02	5.617E-02	159.87

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:55.94

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156307.CNF;1  *
* Acquisition date : 27-JUL-2025 10:05:17 Sensitivity     : 3.000       *
* Detector ID      : GAM31                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:08.13     Half life ratio : *****       *
* Sample date      :  1-JUL-2025 00:00:00 Analyst initials: MXR1        *
* Sample ID        : G1206156307          Sample Quantity : 1.4172E+02 GRAM  *
* Batch Number     : 2822154              Wet Weight      :    0.00000  *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000  *
* Nuclide Library  : SOLID.NLB;19                                       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 22-AUG-2024 08:21:06 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;19        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BI-210	4.874E-01	7.178E-01	6.911E-01
PB-210	4.874E-01	7.178E-01	6.911E-01
RA-224	1.188E-01	1.011E+00	1.185E+00
ANH-511	5.617E-02	8.800E-02	4.578E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-2.971E-01	4.320E-01	7.271E-01	NOT IDENT.
NA-22	-1.120E-03	3.498E-02	7.695E-02	NOT IDENT.
NA-24	0.000E+00	2.087E+11	0.000E+00	SHORT HLIF
AL-26	7.060E-04	2.486E-02	6.854E-02	NOT IDENT.
K-40	5.208E-02	7.318E-01	1.376E+00	NOT IDENT.
SC-46	1.613E-03	3.921E-02	8.587E-02	NOT IDENT.
V-48	8.744E-02	1.140E-01	2.827E-01	NOT IDENT.
CR-51	7.233E-02	5.408E-01	9.760E-01	NOT IDENT.
MN-52	3.551E-01	1.166E+00	2.681E+00	NOT IDENT.
MN-54	3.445E-02	3.810E-02	9.351E-02	NOT IDENT.
CO-56	1.494E-02	4.529E-02	1.017E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-2.856E-03	1.859E-02	3.702E-02	NOT IDENT.
CO-58	1.556E-02	4.536E-02	9.507E-02	NOT IDENT.
FE-59	-3.510E-02	1.124E-01	2.172E-01	NOT IDENT.
CO-60	-1.646E-02	3.652E-02	6.811E-02	NOT IDENT.
ZN-65	7.392E-03	6.742E-02	1.548E-01	NOT IDENT.
GE-68	5.976E-01	1.186E+00	2.867E+00	NOT IDENT.
AS-73	1.182E-02	1.632E-01	3.245E-01	NOT IDENT.
AS-74	-8.039E-02	1.479E-01	2.802E-01	NOT IDENT.
SE-75	1.594E-02	5.282E-02	1.061E-01	NOT IDENT.
BR-77	0.000E+00	2.713E+02	0.000E+00	SHORT HLIF
SR-82	3.469E-01	3.334E-01	9.294E-01	NOT IDENT.
RB-83	1.666E-02	6.633E-02	1.434E-01	NOT IDENT.
RB-84	4.779E-02	1.046E-01	2.336E-01	NOT IDENT.
KR-85	1.506E+01	8.360E+00	2.029E+01	NOT IDENT.

SR-85	8.974E-02	4.987E-02	1.210E-01	NOT IDENT.
RB-86	5.563E-01	1.104E+00	2.668E+00	NOT IDENT.
Y-88	-3.137E-02	3.550E-02	3.051E-02	NOT IDENT.
Y-91	-4.841E+00	2.302E+01	4.559E+01	NOT IDENT.
NB-94	1.670E-02	3.997E-02	8.689E-02	NOT IDENT.
NB-95	2.301E-02	4.251E-02	1.002E-01	NOT IDENT.
NB-95M	6.526E-03	1.391E-01	2.460E-01	NOT IDENT.
ZR-95	-2.022E-02	9.133E-02	1.816E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.312E+11	0.000E+00	SHORT HLIF
MO-99	-1.349E+02	2.296E+02	4.234E+02	NOT IDENT.
TC-99M	0.000E+00	1.221E+30	0.000E+00	SHORT HLIF
RH-101	-1.065E-02	2.536E-02	4.848E-02	NOT IDENT.
RH-102	1.397E-02	5.397E-02	1.198E-01	NOT IDENT.
RU-103	-6.294E-03	5.719E-02	1.086E-01	NOT IDENT.
RH-106	2.411E-01	3.186E-01	7.500E-01	NOT IDENT.
RU-106	2.411E-01	3.186E-01	7.500E-01	NOT IDENT.
AG-108M	2.271E-03	3.120E-02	6.207E-02	FAIL ABUN
CD-109	-7.063E-02	4.660E-01	8.993E-01	NOT IDENT.
AG-110	-4.744E-02	8.023E-01	1.658E+00	NOT IDENT.
AG-110M	-4.474E-02	5.749E-02	9.870E-02	NOT IDENT.
SN-113	-1.273E-02	5.444E-02	1.015E-01	NOT IDENT.
CD-115	0.000E+00	4.341E+02	0.000E+00	SHORT HLIF
SN-117M	2.709E-02	8.613E-02	1.764E-01	NOT IDENT.
SB-122	6.578E+00	2.743E+01	5.658E+01	NOT IDENT.
TE-123M	1.504E-02	2.650E-02	5.574E-02	NOT IDENT.
SB-124	7.748E-02	1.078E-01	3.012E-01	NOT IDENT.
SB-125	-3.695E-02	8.635E-02	1.569E-01	NOT IDENT.
TE-125M	3.831E+00	7.030E+00	1.523E+01	NOT IDENT.
I-126	-4.025E-01	3.293E-01	4.808E-01	NOT IDENT.
SB-126	-2.776E-01	2.534E-01	3.978E-01	NOT IDENT.
SN-126	-1.951E-02	4.467E-02	8.383E-02	FAIL ABUN
SB-127	3.706E+00	1.253E+01	2.675E+01	NOT IDENT.
I-131	1.959E-01	3.071E-01	6.672E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	-1.346E+00	8.108E+00	1.556E+01	NOT IDENT.
BA-133	-4.143E-02	5.021E-02	8.465E-02	NOT IDENT.
I-133	0.000E+00	5.540E+07	0.000E+00	SHORT HLIF
CS-134	-1.789E-02	3.727E-02	7.103E-02	NOT IDENT.
I-135	0.000E+00	1.415E+28	0.000E+00	SHORT HLIF
CS-136	1.384E-01	2.236E-01	5.168E-01	NOT IDENT.
BA-137M	-7.642E-03	3.636E-02	7.336E-02	NOT IDENT.
CS-137	-8.073E-03	3.841E-02	7.749E-02	NOT IDENT.
LA-138	-1.873E-02	6.274E-02	1.226E-01	NOT IDENT.
CE-139	-5.025E-03	2.985E-02	5.771E-02	NOT IDENT.
BA-140	-2.113E-01	4.893E-01	8.905E-01	FAIL ABUN
LA-140	-1.111E-02	1.525E-01	3.401E-01	FAIL ABUN
CE-141	-9.374E-03	6.919E-02	1.353E-01	NOT IDENT.
CE-143	0.000E+00	3.007E+04	0.000E+00	SHORT HLIF
CE-144	-5.969E-02	1.575E-01	3.027E-01	NOT IDENT.
PM-144	2.945E-02	3.775E-02	8.824E-02	NOT IDENT.
PR-144	2.177E+00	2.833E+00	6.616E+00	NOT IDENT.
PM-146	-2.302E-03	4.038E-02	7.956E-02	NOT IDENT.
ND-147	8.891E-02	1.196E+00	2.399E+00	NOT IDENT.
PM-147	3.264E+02	4.802E+02	1.065E+03	NOT IDENT.
PM-149	0.000E+00	3.051E+03	0.000E+00	SHORT HLIF
EU-150	-2.143E-02	2.820E-02	5.020E-02	NOT IDENT.
EU-152	-4.347E-02	1.001E-01	1.822E-01	NOT IDENT.
GD-153	-4.747E-02	6.369E-02	1.156E-01	NOT IDENT.
EU-154	-3.152E-03	9.854E-02	2.168E-01	NOT IDENT.
EU-155	-5.861E-03	6.820E-02	1.374E-01	NOT IDENT.
TB-160	3.933E-02	1.761E-01	3.782E-01	FAIL ABUN
HO-166M	2.191E-02	6.351E-02	1.409E-01	NOT IDENT.
TM-171	1.737E+00	3.087E+00	6.036E+00	NOT IDENT.
HF-172	3.072E-02	1.450E-01	2.987E-01	FAIL ABUN
LU-172	-4.100E-02	6.842E-02	1.213E-01	NOT IDENT.
LU-176	2.975E-02	3.259E-02	5.936E-02	FAIL ABUN
HF-181	1.818E-02	5.995E-02	1.229E-01	NOT IDENT.
TA-182	-1.264E-01	2.037E-01	3.535E-01	NOT IDENT.
RE-183	-7.342E-03	4.141E-02	8.203E-02	NOT IDENT.
RE-184	2.211E-01	1.872E-01	4.619E-01	NOT IDENT.
W-188	-4.241E+00	6.354E+00	1.123E+01	FAIL ABUN
IR-192	-3.773E-04	4.730E-02	8.197E-02	NOT IDENT.
HG-203	-4.635E-04	4.563E-02	8.905E-02	NOT IDENT.
TL-204	7.979E-01	1.661E+00	3.590E+00	NOT IDENT.
BI-207	7.840E-03	4.739E-02	1.066E-01	NOT IDENT.
TL-208	-2.341E-02	4.109E-02	8.185E-02	NOT IDENT.
BI-211	-2.569E-01	2.900E-01	4.902E-01	NOT IDENT.

PB-211	1.955E-01	6.630E-01	1.390E+00	NOT IDENT.
BI-212	9.784E-02	4.854E-01	1.061E+00	NOT IDENT.
PB-212	-3.697E-02	6.459E-02	1.257E-01	NOT IDENT.
BI-213	1.651E-03	1.042E-01	2.067E-01	NOT IDENT.
BI-214	-2.008E-03	9.574E-02	2.039E-01	NOT IDENT.
PB-214	6.985E-02	1.006E-01	2.069E-01	NOT IDENT.
RN-219	2.139E-02	4.124E-01	8.177E-01	NOT IDENT.
RN-222	6.985E-02	1.006E-01	2.069E-01	NOT IDENT.
RA-223	5.675E-03	5.715E-01	1.139E+00	NOT IDENT.
AC-225	7.027E-01	1.254E+00	2.617E+00	NOT IDENT.
RA-226	6.985E-02	1.006E-01	2.069E-01	NOT IDENT.
AC-227	2.784E-01	2.514E-01	5.593E-01	NOT IDENT.
TH-227	2.784E-01	2.514E-01	5.593E-01	NOT IDENT.
AC-228	5.910E-02	1.644E-01	3.752E-01	NOT IDENT.
RA-228	5.910E-02	1.644E-01	3.752E-01	NOT IDENT.
TH-228	-3.697E-02	6.459E-02	1.257E-01	NOT IDENT.
TH-229	-8.315E-02	4.820E-01	9.303E-01	NOT IDENT.
TH-230	6.985E-02	1.006E-01	2.069E-01	NOT IDENT.
PA-231	-5.126E-03	4.899E-01	9.137E-01	NOT IDENT.
TH-231	5.675E-03	5.715E-01	1.139E+00	NOT IDENT.
TH-232	5.910E-02	1.644E-01	3.752E-01	NOT IDENT.
PA-233	6.473E-03	6.813E-02	1.348E-01	NOT IDENT.
PA-234	1.841E-01	3.288E-01	7.628E-01	NOT IDENT.
PA-234M	5.452E-01	7.424E-01	1.124E+00	FAIL ABUN
TH-234	5.452E-01	7.424E-01	1.124E+00	FAIL ABUN
U-234	6.985E-02	1.006E-01	2.069E-01	NOT IDENT.
U-235	1.832E-02	1.907E-01	3.783E-01	NOT IDENT.
NP-237	6.473E-03	6.813E-02	1.348E-01	NOT IDENT.
NP-238	0.000E+00	1.016E+03	0.000E+00	SHORT HLIF
U-238	5.452E-01	7.424E-01	1.124E+00	FAIL ABUN
NP-239	1.657E-01	1.802E-01	4.037E-01	NOT IDENT.
PU-239	2.686E+02	2.608E+02	5.791E+02	NOT IDENT.
AM-241	1.035E-02	3.191E-02	6.428E-02	NOT IDENT.
AM-243	-1.450E-02	2.207E-02	4.254E-02	NOT IDENT.
CM-243	2.629E-02	6.862E-02	1.452E-01	NOT IDENT.
BK-247	1.418E-02	8.738E-02	1.731E-01	NOT IDENT.
CM-247	-5.348E-03	3.647E-02	7.011E-02	NOT IDENT.
CF-249	2.523E-02	4.543E-02	9.528E-02	NOT IDENT.
CF-251	8.659E-02	1.107E-01	2.394E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:05:54.70

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BI-210	46.54	23	4.25*	5.862E+00	4.863E-01	4.874E-01	150.29
PB-210	46.54	23	4.25*	5.862E+00	4.863E-01	4.874E-01	150.29
RA-224	240.99	3	4.10*	3.062E+00	1.188E-01	1.188E-01	869.01
ANH-511	511.00	17	100.00*	1.640E+00	5.617E-02	5.617E-02	159.87

Flag: "*" = Keyline

Sample ID : G1206156307 Acquisition date : 27-JUL-2025 10:05:17

Total number of lines in spectrum 15
Number of unidentified lines 7
Number of lines tentatively identified by NID 8 53.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-210	22.20Y	1.00	4.863E-01	4.874E-01	7.325E-01	150.29	
PB-210	22.20Y	1.00	4.863E-01	4.874E-01	7.325E-01	150.29	
RA-224	1.41E+10Y	1.00	1.188E-01	1.188E-01	10.32E-01	869.01	
ANH-511	1.00E+09Y	1.00	5.617E-02	5.617E-02	8.979E-02	159.87	
	Total Activity :		1.147E+00	1.150E+00			

Grand Total Activity : 1.147E+00 1.150E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1206156307 Acquisition date : 27-JUL-2025 10:05:17

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
5	36.01	11	10	1.31	72.19	68	19	2.44E-03	****	5.27E+00	
5	38.40	27	27	1.96	76.96	68	19	5.79E-03	****	5.46E+00	
5	41.17	9	30	1.48	82.51	68	19	1.88E-03	****	5.63E+00	
0	63.27	23	31	1.00	126.73	122	9	5.12E-03	****	6.01E+00	T
0	306.12	13	13	0.94	612.70	609	7	3.35E-03	****	2.52E+00	T
0	327.14	33	44	7.95	654.75	638	23	8.26E-03	****	2.39E+00	
0	566.83	7	4	1.02	1134.31	1130	7	1.81E-03	****	1.50E+00	
0	614.13	26	35	8.35	1228.93	1211	27	6.99E-03	****	1.40E+00	T
0	816.01	9	3	2.28	1632.75	1627	10	2.37E-03	****	1.10E+00	T
0	954.85	12	0	2.53	1910.42	1906	9	3.33E-03	57.7	9.68E-01	T
0	1016.58	8	6	0.90	2033.88	2025	13	2.36E-03	****	9.19E-01	
0	1462.45	8	0	1.50	2925.38	2921	9	2.44E-03	88.2	6.80E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:06.62

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156307.CNF;1   *
* Acquisition date : 27-JUL-2025 10:05:17 Sensitivity     : 3.000       *
* Detector ID      : GAM31                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:08.13     Half life ratio : *****       *
* Sample date      :  1-JUL-2025 00:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1206156307          Analyst initials: MXR1        *
* Batch Number     : 2822154              Sample Quantity : 1.4172E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 22-AUG-2024 08:21:06 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;19        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BI-210	3.146E-01
PB-210	3.146E-01
RA-224	5.328E-01
ANH-511	1.841E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.063E-01	NOT IDENT.
NA-22	2.881E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.166E-02	NOT IDENT.
K-40	5.887E-01	NOT IDENT.
SC-46	3.413E-02	NOT IDENT.
V-48	1.171E-01	NOT IDENT.
CR-51	4.284E-01	NOT IDENT.
MN-52	1.064E+00	NOT IDENT.
MN-54	3.964E-02	NOT IDENT.
CO-56	4.223E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.656E-02	NOT IDENT.
CO-58	3.899E-02	NOT IDENT.
FE-59	8.615E-02	NOT IDENT.
CO-60	2.413E-02	NOT IDENT.
ZN-65	5.927E-02	NOT IDENT.
GE-68	1.158E+00	NOT IDENT.
AS-73	1.466E-01	NOT IDENT.
AS-74	1.159E-01	NOT IDENT.
SE-75	4.787E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	3.782E-01	NOT IDENT.
RB-83	5.920E-02	NOT IDENT.
RB-84	9.898E-02	NOT IDENT.
KR-85	9.106E+00	NOT IDENT.
SR-85	5.431E-02	NOT IDENT.

RB-86	1.078E+00	NOT IDENT.
Y-88	0.000E+00	NOT IDENT.
Y-91	1.803E+01	NOT IDENT.
NB-94	3.761E-02	NOT IDENT.
NB-95	4.178E-02	NOT IDENT.
NB-95M	1.102E-01	NOT IDENT.
ZR-95	7.563E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	1.722E+02	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.186E-02	NOT IDENT.
RH-102	5.027E-02	NOT IDENT.
RU-103	4.664E-02	NOT IDENT.
RH-106	3.193E-01	NOT IDENT.
RU-106	3.193E-01	NOT IDENT.
AG-108M	2.671E-02	FAIL ABUN
CD-109	4.115E-01	NOT IDENT.
AG-110	6.970E-01	NOT IDENT.
AG-110M	3.892E-02	NOT IDENT.
SN-113	4.428E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	8.010E-02	NOT IDENT.
SB-122	2.248E+01	NOT IDENT.
TE-123M	2.535E-02	NOT IDENT.
SB-124	1.167E-01	NOT IDENT.
SB-125	6.524E-02	NOT IDENT.
TE-125M	6.861E+00	NOT IDENT.
I-126	1.703E-01	NOT IDENT.
SB-126	1.501E-01	NOT IDENT.
SN-126	3.826E-02	FAIL ABUN
SB-127	1.157E+01	NOT IDENT.
I-131	2.929E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	6.963E+00	NOT IDENT.
BA-133	3.695E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.777E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.177E-01	NOT IDENT.
BA-137M	3.050E-02	NOT IDENT.
CS-137	3.222E-02	NOT IDENT.
LA-138	4.539E-02	NOT IDENT.
CE-139	2.619E-02	NOT IDENT.
BA-140	3.647E-01	FAIL ABUN
LA-140	1.199E-01	FAIL ABUN
CE-141	6.137E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.356E-01	NOT IDENT.
PM-144	3.801E-02	NOT IDENT.
PR-144	2.848E+00	NOT IDENT.
PM-146	3.348E-02	NOT IDENT.
ND-147	1.012E+00	NOT IDENT.
PM-147	4.768E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.181E-02	NOT IDENT.
EU-152	7.891E-02	NOT IDENT.
GD-153	5.257E-02	NOT IDENT.
EU-154	8.115E-02	NOT IDENT.
EU-155	6.177E-02	NOT IDENT.
TB-160	1.591E-01	FAIL ABUN
HO-166M	5.959E-02	NOT IDENT.
TM-171	2.738E+00	NOT IDENT.
HF-172	1.350E-01	FAIL ABUN
LU-172	4.698E-02	NOT IDENT.
LU-176	2.654E-02	FAIL ABUN
HF-181	5.331E-02	NOT IDENT.
TA-182	1.370E-01	NOT IDENT.
RE-183	3.619E-02	NOT IDENT.
RE-184	1.994E-01	NOT IDENT.
W-188	4.701E+00	FAIL ABUN
IR-192	3.631E-02	NOT IDENT.
HG-203	3.956E-02	NOT IDENT.
TL-204	1.630E+00	NOT IDENT.
BI-207	4.229E-02	NOT IDENT.
TL-208	3.505E-02	NOT IDENT.
BI-211	2.197E-01	NOT IDENT.
PB-211	5.974E-01	NOT IDENT.

BI-212	4.404E-01	NOT IDENT.
PB-212	5.729E-02	NOT IDENT.
BI-213	8.808E-02	NOT IDENT.
BI-214	9.059E-02	NOT IDENT.
PB-214	9.420E-02	NOT IDENT.
RN-219	3.533E-01	NOT IDENT.
RN-222	9.420E-02	NOT IDENT.
RA-223	4.925E-01	NOT IDENT.
AC-225	1.185E+00	NOT IDENT.
RA-226	9.420E-02	NOT IDENT.
AC-227	2.528E-01	NOT IDENT.
TH-227	2.528E-01	NOT IDENT.
AC-228	1.597E-01	NOT IDENT.
RA-228	1.597E-01	NOT IDENT.
TH-228	5.729E-02	NOT IDENT.
TH-229	4.181E-01	NOT IDENT.
TH-230	9.420E-02	NOT IDENT.
PA-231	4.026E-01	NOT IDENT.
TH-231	4.925E-01	NOT IDENT.
TH-232	1.597E-01	NOT IDENT.
PA-233	5.965E-02	NOT IDENT.
PA-234	3.194E-01	NOT IDENT.
PA-234M	5.276E-01	FAIL ABUN
TH-234	5.276E-01	FAIL ABUN
U-234	9.420E-02	NOT IDENT.
U-235	1.736E-01	NOT IDENT.
NP-237	5.965E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	5.276E-01	FAIL ABUN
NP-239	1.826E-01	NOT IDENT.
PU-239	2.641E+02	NOT IDENT.
AM-241	2.860E-02	NOT IDENT.
AM-243	1.934E-02	NOT IDENT.
CM-243	6.570E-02	NOT IDENT.
BK-247	7.781E-02	NOT IDENT.
CM-247	2.995E-02	NOT IDENT.
CF-249	4.224E-02	NOT IDENT.
CF-251	1.084E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:10.31

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156307.CNF;1  *
* Acquisition date : 27-JUL-2025 10:05:17 Sensitivity     : 3.000           *
* Detector ID      : GAM31                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:08.13     Half life ratio : *****           *
* Sample date      :  1-JUL-2025 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1206156307          Analyst initials: MXR1            *
* Batch Number     : 2822154              Sample Quantity : 1.4172E+02 GRAM *
*                                         Quantity Err(%) : 1.4112E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 22-AUG-2024 08:21:06 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;19            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BI-210	4.874E-01	7.216E-01	7.216E-01
PB-210	4.874E-01	7.216E-01	7.216E-01
RA-224	1.188E-01	1.011E+00	1.011E+00
ANH-511	5.617E-02	8.847E-02	8.847E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-2.971E-01	4.349E-01	4.551E-01	NOT IDENT.
NA-22	-1.120E-03	3.498E-02	3.498E-02	NOT IDENT.
NA-24	1.535E+10	2.088E+11	2.089E+11	SHORT HLIF
AL-26	7.060E-04	2.486E-02	2.487E-02	NOT IDENT.
K-40	5.208E-02	7.318E-01	7.322E-01	NOT IDENT.
SC-46	1.613E-03	3.921E-02	3.922E-02	NOT IDENT.
V-48	8.744E-02	1.143E-01	1.209E-01	NOT IDENT.
CR-51	7.233E-02	5.409E-01	5.419E-01	NOT IDENT.
MN-52	3.551E-01	1.166E+00	1.177E+00	NOT IDENT.
MN-54	3.445E-02	3.826E-02	4.129E-02	NOT IDENT.
CO-56	1.494E-02	4.531E-02	4.581E-02	NOT IDENT.
MN-56	1.000E+41	2.942E+41	0.000E+00	SHORT HLIF
CO-57	-2.856E-03	1.860E-02	1.864E-02	NOT IDENT.
CO-58	1.556E-02	4.538E-02	4.592E-02	NOT IDENT.
FE-59	-3.510E-02	1.125E-01	1.136E-01	NOT IDENT.
CO-60	-1.646E-02	3.655E-02	3.730E-02	NOT IDENT.
ZN-65	7.392E-03	6.743E-02	6.751E-02	NOT IDENT.
GE-68	5.976E-01	1.187E+00	1.217E+00	NOT IDENT.
AS-73	1.182E-02	1.632E-01	1.633E-01	NOT IDENT.
AS-74	-8.039E-02	1.485E-01	1.528E-01	NOT IDENT.
SE-75	1.594E-02	5.284E-02	5.333E-02	NOT IDENT.
BR-77	-1.677E+02	3.004E+02	3.098E+02	SHORT HLIF
SR-82	3.469E-01	3.355E-01	3.701E-01	NOT IDENT.
RB-83	1.666E-02	6.642E-02	6.685E-02	NOT IDENT.
RB-84	4.779E-02	1.047E-01	1.069E-01	NOT IDENT.
KR-85	1.506E+01	8.710E+00	1.104E+01	NOT IDENT.

SR-85	8.974E-02	5.195E-02	6.585E-02	NOT IDENT.
RB-86	5.563E-01	1.105E+00	1.133E+00	NOT IDENT.
Y-88	-3.137E-02	3.558E-02	3.829E-02	NOT IDENT.
Y-91	-4.841E+00	2.302E+01	2.312E+01	NOT IDENT.
NB-94	1.670E-02	4.002E-02	4.072E-02	NOT IDENT.
NB-95	2.301E-02	4.259E-02	4.383E-02	NOT IDENT.
NB-95M	6.526E-03	1.391E-01	1.392E-01	NOT IDENT.
ZR-95	-2.022E-02	9.136E-02	9.181E-02	NOT IDENT.
NB-97	-1.000E+41	4.131E+41	0.000E+00	SHORT HLIF
ZR-97	-2.647E+10	1.313E+11	1.318E+11	SHORT HLIF
MO-99	-1.349E+02	2.301E+02	2.380E+02	NOT IDENT.
TC-99M	-1.147E+30	1.231E+30	0.000E+00	SHORT HLIF
RH-101	-1.065E-02	2.546E-02	2.591E-02	NOT IDENT.
RH-102	1.397E-02	5.400E-02	5.437E-02	NOT IDENT.
RU-103	-6.294E-03	5.720E-02	5.727E-02	NOT IDENT.
RH-106	2.411E-01	3.203E-01	3.383E-01	NOT IDENT.
RU-106	2.411E-01	3.203E-01	3.383E-01	NOT IDENT.
AG-108M	2.271E-03	3.120E-02	3.122E-02	FAIL ABUN
CD-109	-7.063E-02	4.661E-01	4.672E-01	NOT IDENT.
AG-110	-4.744E-02	8.023E-01	8.026E-01	NOT IDENT.
AG-110M	-4.474E-02	5.765E-02	6.108E-02	NOT IDENT.
SN-113	-1.273E-02	5.449E-02	5.479E-02	NOT IDENT.
CD-115	-2.677E+01	4.341E+02	4.343E+02	SHORT HLIF
SN-117M	2.709E-02	8.617E-02	8.703E-02	NOT IDENT.
SB-122	6.578E+00	2.745E+01	2.761E+01	NOT IDENT.
TE-123M	1.504E-02	2.653E-02	2.739E-02	NOT IDENT.
SB-124	7.748E-02	1.081E-01	1.136E-01	NOT IDENT.
SB-125	-3.695E-02	8.659E-02	8.817E-02	NOT IDENT.
TE-125M	3.831E+00	7.043E+00	7.252E+00	NOT IDENT.
I-126	-4.025E-01	3.329E-01	3.792E-01	NOT IDENT.
SB-126	-2.776E-01	2.565E-01	2.853E-01	NOT IDENT.
SN-126	-1.951E-02	4.470E-02	4.556E-02	FAIL ABUN
SB-127	3.706E+00	1.254E+01	1.265E+01	NOT IDENT.
I-131	1.959E-01	3.086E-01	3.210E-01	NOT IDENT.
I-132	-1.000E+41	3.720E+41	0.000E+00	SHORT HLIF
TE-132	-1.346E+00	8.109E+00	8.132E+00	NOT IDENT.
BA-133	-4.143E-02	5.059E-02	5.392E-02	NOT IDENT.
I-133	-7.513E+06	5.543E+07	5.553E+07	SHORT HLIF
CS-134	-1.789E-02	3.732E-02	3.818E-02	NOT IDENT.
I-135	-2.071E+27	1.421E+28	0.000E+00	SHORT HLIF
CS-136	1.384E-01	2.241E-01	2.327E-01	NOT IDENT.
BA-137M	-7.642E-03	3.637E-02	3.653E-02	NOT IDENT.
CS-137	-8.073E-03	3.842E-02	3.859E-02	NOT IDENT.
LA-138	-1.873E-02	6.277E-02	6.334E-02	NOT IDENT.
CE-139	-5.025E-03	2.987E-02	2.995E-02	NOT IDENT.
BA-140	-2.113E-01	4.904E-01	4.996E-01	FAIL ABUN
LA-140	-1.111E-02	1.525E-01	1.526E-01	FAIL ABUN
CE-141	-9.374E-03	6.920E-02	6.933E-02	NOT IDENT.
CE-143	1.019E+04	3.009E+04	3.043E+04	SHORT HLIF
CE-144	-5.969E-02	1.576E-01	1.599E-01	NOT IDENT.
PM-144	2.945E-02	3.789E-02	4.015E-02	NOT IDENT.
PR-144	2.177E+00	2.843E+00	3.008E+00	NOT IDENT.
PM-146	-2.302E-03	4.039E-02	4.040E-02	NOT IDENT.
ND-147	8.891E-02	1.196E+00	1.197E+00	NOT IDENT.
PM-147	3.264E+02	4.820E+02	5.039E+02	NOT IDENT.
PM-149	4.124E+02	3.052E+03	3.057E+03	SHORT HLIF
EU-150	-2.143E-02	2.834E-02	2.994E-02	NOT IDENT.
EU-152	-4.347E-02	1.003E-01	1.022E-01	NOT IDENT.
GD-153	-4.747E-02	6.384E-02	6.733E-02	NOT IDENT.
EU-154	-3.152E-03	9.854E-02	9.855E-02	NOT IDENT.
EU-155	-5.861E-03	6.821E-02	6.826E-02	NOT IDENT.
TB-160	3.933E-02	1.761E-01	1.770E-01	FAIL ABUN
HO-166M	2.191E-02	6.356E-02	6.433E-02	NOT IDENT.
TM-171	1.737E+00	3.099E+00	3.196E+00	NOT IDENT.
HF-172	3.072E-02	1.451E-01	1.458E-01	FAIL ABUN
LU-172	-4.100E-02	6.862E-02	7.107E-02	NOT IDENT.
LU-176	2.975E-02	3.277E-02	3.541E-02	FAIL ABUN
HF-181	1.818E-02	6.003E-02	6.059E-02	NOT IDENT.
TA-182	-1.264E-01	2.040E-01	2.118E-01	NOT IDENT.
RE-183	-7.342E-03	4.143E-02	4.156E-02	NOT IDENT.
RE-184	2.211E-01	1.888E-01	2.135E-01	NOT IDENT.
W-188	-4.241E+00	6.384E+00	6.664E+00	FAIL ABUN
IR-192	-3.773E-04	4.730E-02	4.730E-02	NOT IDENT.
HG-203	-4.635E-04	4.563E-02	4.563E-02	NOT IDENT.
TL-204	7.979E-01	1.665E+00	1.703E+00	NOT IDENT.
BI-207	7.840E-03	4.740E-02	4.753E-02	NOT IDENT.
TL-208	-2.341E-02	4.122E-02	4.255E-02	NOT IDENT.
BI-211	-2.569E-01	2.924E-01	3.145E-01	NOT IDENT.

PB-211	1.955E-01	6.639E-01	6.698E-01	NOT IDENT.
BI-212	9.784E-02	4.856E-01	4.876E-01	NOT IDENT.
PB-212	-3.697E-02	6.469E-02	6.680E-02	NOT IDENT.
BI-213	1.651E-03	1.042E-01	1.042E-01	NOT IDENT.
BI-214	-2.008E-03	9.574E-02	9.574E-02	NOT IDENT.
PB-214	6.985E-02	1.011E-01	1.059E-01	NOT IDENT.
RN-219	2.139E-02	4.124E-01	4.125E-01	NOT IDENT.
RN-222	6.985E-02	1.011E-01	1.059E-01	NOT IDENT.
RA-223	5.675E-03	5.715E-01	5.715E-01	NOT IDENT.
AC-225	7.027E-01	1.257E+00	1.296E+00	NOT IDENT.
RA-226	6.985E-02	1.011E-01	1.059E-01	NOT IDENT.
AC-227	2.784E-01	2.552E-01	2.844E-01	NOT IDENT.
TH-227	2.784E-01	2.552E-01	2.844E-01	NOT IDENT.
AC-228	5.910E-02	1.645E-01	1.667E-01	NOT IDENT.
RA-228	5.910E-02	1.645E-01	1.667E-01	NOT IDENT.
TH-228	-3.697E-02	6.469E-02	6.680E-02	NOT IDENT.
TH-229	-8.315E-02	4.821E-01	4.835E-01	NOT IDENT.
TH-230	6.985E-02	1.011E-01	1.059E-01	NOT IDENT.
PA-231	-5.126E-03	4.899E-01	4.899E-01	NOT IDENT.
TH-231	5.675E-03	5.715E-01	5.715E-01	NOT IDENT.
TH-232	5.910E-02	1.645E-01	1.667E-01	NOT IDENT.
PA-233	6.473E-03	6.814E-02	6.820E-02	NOT IDENT.
PA-234	1.841E-01	3.907E-01	3.994E-01	NOT IDENT.
PA-234M	5.452E-01	7.551E-01	7.941E-01	FAIL ABUN
TH-234	5.452E-01	7.551E-01	7.941E-01	FAIL ABUN
U-234	6.985E-02	1.011E-01	1.059E-01	NOT IDENT.
U-235	1.832E-02	1.907E-01	1.909E-01	NOT IDENT.
NP-237	6.473E-03	6.814E-02	6.820E-02	NOT IDENT.
NP-238	-1.124E+02	1.017E+03	1.018E+03	SHORT HLIF
U-238	5.452E-01	7.551E-01	7.941E-01	FAIL ABUN
NP-239	1.657E-01	1.816E-01	1.964E-01	NOT IDENT.
PU-239	2.686E+02	2.628E+02	2.893E+02	NOT IDENT.
AM-241	1.035E-02	3.195E-02	3.229E-02	NOT IDENT.
AM-243	-1.450E-02	2.213E-02	2.308E-02	NOT IDENT.
CM-243	2.629E-02	6.870E-02	6.971E-02	NOT IDENT.
BK-247	1.418E-02	8.743E-02	8.767E-02	NOT IDENT.
CM-247	-5.348E-03	3.649E-02	3.657E-02	NOT IDENT.
CF-249	2.523E-02	4.567E-02	4.707E-02	NOT IDENT.
CF-251	8.659E-02	1.113E-01	1.179E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	14.7545	85.43	37.5283	133.02	34.9103
45.60	34.5577	86.55	38.4543	133.52	30.3312
46.54	34.6161	86.79	38.4655	136.00	31.3233
49.72	18.2334	86.94	37.5983	136.47	26.7286
51.35	31.1659	87.09	38.4799	140.51	39.7802
51.87	18.7158	87.57	40.2526	143.76	30.6193
52.39	21.2297	88.03	37.6486	144.24	27.8476
52.97	30.8335	88.34	36.7870	145.44	34.3823
53.44	26.6876	88.47	32.4128	152.43	34.5949
54.07	26.7151	89.96	80.7396	153.25	29.9414
57.36	0.0000	90.64	77.2923	154.21	25.2839
57.53	26.8639	91.11	64.1535	156.02	26.2611
57.98	21.1702	92.59	34.3341	158.56	28.1979
59.27	15.1520	93.35	30.8404	159.00	25.3875
59.32	15.1532	94.56	68.8276	162.33	36.7736
59.54	17.6847	94.65	68.8348	162.66	37.7271
60.96	22.7870	94.67	68.8364	163.33	30.1986
61.17	22.7943	94.87	67.9699	165.86	34.9901
62.93	27.9336	97.43	41.6112	176.31	18.1202
63.29	27.9486	98.43	29.2498	176.60	16.2164
63.58	27.9607	98.44	29.2501	177.52	20.0467
64.28	29.2619	99.53	23.9616	181.07	24.8889
66.73	28.0898	100.11	39.0740	181.52	26.8128
67.24	37.0547	102.03	40.9383	184.41	32.6311
67.68	29.6625	103.18	29.4064	185.72	23.0569
67.75	29.6654	103.37	24.9562	193.51	28.9914
68.89	33.2996	105.31	27.6890	197.03	34.8809
69.67	26.4982	106.12	28.6074	198.01	31.0273
70.82	25.6845	106.47	30.4070	201.83	30.1419
70.83	25.6850	109.28	20.6319	203.43	26.2829
72.81	31.7649	111.00	37.7446	205.31	18.5205
72.87	37.7776	111.76	33.2779	210.85	21.5296
74.66	36.1482	114.06	24.3425	215.65	25.5297
74.82	36.1559	116.30	24.3990	218.12	22.6226
74.97	33.5801	116.74	18.0816	222.11	21.6983
77.11	29.3587	119.76	26.2990	227.09	19.7925
78.74	38.9404	121.12	16.3459	227.38	19.7963
79.69	35.5230	121.22	16.3476	228.16	26.7391
80.03	31.2045	121.78	24.5351	228.18	26.7393
80.12	31.2083	122.06	26.3599	235.69	23.8870
80.19	31.2111	122.92	30.0214	235.96	23.8914
80.57	27.7568	123.07	30.9358	238.63	28.9192
81.00	28.6400	123.68	23.6711	238.98	0.0000
81.07	28.6425	125.81	26.4578	240.99	26.9659
81.75	33.0111	127.23	34.7169	242.00	25.4844
82.47	35.6500	127.91	34.7399	244.70	25.0282
83.79	33.9675	129.30	21.0550	252.40	23.1385
84.00	32.2340	131.20	30.2644	252.80	25.1569

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
254.15	0.0000	351.93	17.0182	569.50	5.2471
256.23	15.1264	355.39	0.0000	569.70	5.2474
260.90	0.0000	356.01	26.6454	583.19	9.6670
264.66	24.3281	364.49	10.7029	584.27	10.5498
264.80	24.3301	366.42	22.4975	595.83	12.3581
265.00	24.3330	372.51	17.1917	600.60	8.8419
269.46	18.2992	375.05	10.7581	602.52	0.0000
270.03	19.3224	377.52	15.0792	604.72	7.0837
271.23	17.3009	383.85	15.1248	607.14	9.7482
273.65	16.3066	388.16	14.0730	609.32	9.7556
276.40	21.4375	388.63	18.4073	610.33	9.7589
277.37	25.5356	391.69	18.4336	614.28	9.7720
277.60	26.5602	400.66	13.0662	618.01	9.9624
278.00	26.5665	401.81	13.0732	620.36	9.9702
279.20	21.4730	402.40	13.0767	621.93	5.0896
279.54	18.4091	404.85	9.8185	630.19	0.0000
279.70	16.3649	410.95	8.7518	631.29	7.1479
280.46	16.3724	413.71	10.9534	633.25	13.4111
283.69	19.4789	414.70	10.9583	634.78	10.7344
284.31	20.5115	423.72	6.6014	635.95	8.9490
285.41	15.3934	427.09	9.9170	636.99	6.2664
285.90	0.0000	427.87	12.1248	657.50	9.9140
287.50	15.4120	433.94	12.1572	657.76	11.7174
290.67	15.4401	439.40	13.2937	657.90	0.0000
293.27	0.0000	440.45	11.0832	661.66	9.9275
295.22	17.5440	453.88	10.0322	664.57	0.0000
295.96	16.5189	463.37	15.6680	666.33	9.9422
298.58	15.5093	468.07	5.6066	666.50	9.9429
299.98	17.5911	473.00	8.9888	667.71	0.0000
300.09	17.5921	475.06	11.2455	677.62	9.0714
300.13	17.5925	476.78	14.6292	685.70	10.9135
301.36	18.6401	477.60	16.8857	692.65	4.5572
302.85	20.2101	482.18	11.2781	695.00	12.7695
304.50	17.1167	487.02	11.3000	696.49	6.3878
304.85	17.1200	492.35	0.0000	696.51	6.3878
306.78	12.4641	497.08	13.6147	697.00	8.2142
308.46	17.1539	505.52	11.9526	697.30	10.9534
311.90	18.7489	507.63	0.0000	697.49	10.9537
316.51	20.3621	511.00	5.7039	702.65	10.0570
319.41	17.2563	514.00	5.7104	706.68	12.8161
320.08	15.6931	514.00	5.7104	711.68	7.3347
321.04	13.6078	520.40	5.7247	720.70	11.0325
323.87	13.6284	520.69	0.0000	721.93	0.0000
325.23	13.6382	522.65	0.0000	722.78	7.3596
328.76	15.7657	527.90	0.0000	722.91	7.3599
333.37	12.6431	528.26	12.6319	723.31	7.3608
333.97	21.0783	529.59	10.3407	724.19	4.6017
334.37	21.0828	529.87	0.0000	727.33	5.5274
338.28	11.6190	531.02	9.1966	733.00	7.3826
338.32	11.6192	537.26	9.2184	735.93	12.0070
340.48	14.8046	546.56	0.0000	737.46	8.3164
340.55	14.8052	552.55	9.2708	739.50	11.0955
344.28	19.0715	563.25	12.2158	744.23	8.3334
345.93	12.7251	564.24	3.4915	747.24	11.1211
351.06	31.8951	569.33	5.2469	748.06	6.4888

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
752.31	9.2813	966.17	10.8144	1460.82	6.9793
753.82	7.4285	968.97	4.9190	1489.16	2.1921
756.73	10.2229	983.53	2.9619	1505.03	4.3965
756.80	8.3644	984.45	0.0000	1584.12	2.2285
763.94	2.7939	996.26	2.9711	1596.21	2.2332
765.81	4.6591	1002.74	0.9919	1620.50	0.0000
766.84	5.5926	1004.73	9.9237	1621.92	0.0000
772.60	0.0000	1021.30	0.0000	1678.03	0.0000
776.52	0.9347	1025.87	0.0000	1690.97	0.9073
777.92	5.6107	1028.54	0.0000	1750.46	0.0000
778.90	4.6768	1037.84	2.0004	1764.49	1.8359
783.70	4.6834	1038.76	0.0000	1770.23	3.6752
788.74	2.8141	1046.59	7.0154	1771.35	2.7568
792.07	5.6334	1048.07	5.0128	1791.20	0.0000
795.86	7.5193	1049.04	5.0137	1808.65	0.9242
801.95	8.4738	1050.41	11.0342	1810.72	0.0000
810.06	3.0198	1063.66	4.0247	1836.06	2.7844
810.29	3.0200	1077.00	3.0276		
810.45	3.0201	1077.34	3.0278		
810.76	4.5306	1085.87	5.0562		
815.77	3.7808	1093.63	8.1040		
818.51	7.5674	1099.45	7.1004		
832.01	9.4943	1112.07	5.0861		
834.85	3.8008	1112.84	5.0870		
836.80	0.0000	1115.54	3.0538		
846.75	0.0000	1120.29	6.1143		
846.77	5.7197	1120.55	2.0382		
856.80	6.6911	1121.30	2.0386		
860.56	11.4818	1129.67	5.1056		
871.09	6.7167	1131.51	0.0000		
873.19	1.9201	1147.95	0.0000		
875.33	0.0000	1173.23	4.1233		
879.38	7.6931	1177.95	2.0637		
880.51	6.7334	1189.05	4.1370		
881.60	6.7353	1204.77	6.2260		
883.24	5.7757	1221.41	8.3301		
884.68	10.5928	1231.02	2.0867		
889.28	4.8207	1235.36	3.1328		
894.76	3.8621	1238.28	1.0449		
898.04	9.6634	1260.41	0.0000		
900.72	9.6701	1271.87	3.1560		
903.28	3.8706	1274.44	3.1577		
911.20	3.8785	1274.54	3.1578		
912.08	3.8794	1291.59	3.1685		
923.98	0.0000	1298.22	0.0000		
926.50	8.7608	1312.11	5.3021		
929.11	6.8184	1332.49	4.2585		
935.54	2.9269	1362.66	0.0000		
937.49	6.8329	1365.19	5.3568		
944.13	5.8665	1368.63	0.0000		
946.00	4.8911	1384.29	3.2258		
949.00	9.1368	1408.01	2.1600		
954.55	0.0000	1434.09	3.2556		
962.31	4.9109	1435.80	4.3423		
964.08	9.8260	1457.56	0.0000		

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:35.72

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*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156308.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM32.CNF;700
                                        Background date  : 20-JUL-2025 10:27:53
Sample date      : 28-MAY-2025 12:20:00 Acquisition date : 27-JUL-2025 10:05:41
Sample ID        : G1206156308          Sample quantity  : 1.11390E+02 GRAM
Detector name    : GAM32                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.59  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2822154              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.37*	7	110	1.78	127.66	123	9	1.88E-03	290.6	
2	0	69.89	29	78	0.99	140.72	137	7	8.19E-03	52.7	
3	0	76.33	183	144	0.81	153.59	149	9	5.09E-02	13.9	
4	0	86.81	44	78	0.79	174.55	173	6	1.23E-02	34.5	
5	0	93.08*	48	120	1.27	187.08	183	9	1.32E-02	47.0	
6	0	185.49*	78	107	1.07	371.85	367	12	2.17E-02	29.6	
7	0	192.71	17	47	0.71	386.28	385	5	4.77E-03	65.1	
8	1	238.67*	229	65	1.26	478.19	472	17	6.36E-02	9.0	2.96E+00
9	1	241.96*	95	52	1.26	484.77	472	17	2.65E-02	17.4	
10	0	295.40*	95	65	1.06	591.64	586	10	2.64E-02	19.2	
11	0	300.68	17	47	1.82	602.20	596	9	4.82E-03	75.2	
12	0	317.20	10	17	1.34	635.22	633	5	2.70E-03	73.0	
13	0	338.52	45	58	1.00	677.86	672	10	1.26E-02	34.7	
14	0	352.02*	227	50	1.11	704.85	700	10	6.30E-02	8.9	
15	0	362.56*	3	20	0.69	725.92	720	8	8.08E-04	293.4	
16	0	411.21	31	42	2.13	823.21	813	15	8.52E-03	50.7	
17	0	456.89	18	10	0.79	914.55	911	7	4.95E-03	38.2	
18	0	472.88	29	12	0.83	946.52	942	9	7.98E-03	29.4	
19	0	477.43	38	12	2.21	955.64	951	11	1.06E-02	23.5	
20	0	493.28	14	50	5.88	987.31	970	19	3.97E-03	123.7	
21	0	510.85*	30	55	2.42	1022.45	1015	21	8.31E-03	67.8	
22	0	583.29*	75	30	0.99	1167.32	1161	11	2.09E-02	18.7	
23	0	609.35*	165	22	1.15	1219.42	1214	11	4.57E-02	9.8	
24	0	655.14	22	5	0.69	1311.00	1307	9	5.97E-03	28.0	
25	0	709.39	11	14	1.33	1419.47	1416	10	3.19E-03	65.3	
26	0	741.51	6	4	0.53	1483.71	1481	6	1.64E-03	69.4	
27	0	747.14	15	6	1.91	1494.97	1488	12	4.17E-03	41.6	
28	6	767.62	20	5	2.52	1535.92	1532	18	5.46E-03	26.5	9.06E-01
29	6	772.35	16	2	2.77	1545.38	1532	18	4.42E-03	33.9	
30	0	846.80	6	5	1.00	1694.27	1690	7	1.65E-03	75.5	
31	0	859.91	18	9	1.78	1720.48	1713	12	5.09E-03	40.1	
32	0	901.60	7	10	0.63	1803.86	1799	10	1.94E-03	92.6	
33	0	911.37*	47	19	1.44	1823.39	1816	15	1.31E-02	25.4	
34	0	969.94	22	22	2.33	1940.52	1932	11	6.11E-03	46.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1120.55	38	13	1.67	2241.71	2237	12	1.05E-02	24.7	
36	0	1156.86	3	17	1.41	2314.33	2308	10	9.17E-04	229.8	
37	0	1200.11	10	7	1.45	2400.83	2394	10	2.71E-03	61.2	
38	3	1238.02	14	5	1.99	2476.64	2471	14	3.76E-03	46.7	6.10E-01
39	3	1240.95	10	4	1.32	2482.49	2471	14	2.74E-03	33.6	
40	0	1246.13	11	4	1.06	2492.86	2489	7	2.92E-03	42.7	
41	0	1377.62	8	7	1.54	2755.82	2748	11	2.31E-03	74.0	
42	0	1460.68*	237	7	1.85	2921.94	2914	14	6.60E-02	6.9	
43	0	1764.56*	20	2	0.67	3529.69	3523	11	5.50E-03	28.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 27-JUL-2025 11:06:37

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156308.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 28-MAY-2025 12:20:00	Acquisition date	: 27-JUL-2025 10:05:41
Sample ID	: G1206156308	Sample quantity	: 111.39 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA32	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.59 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	37	10.44*	3.018E+00	8.008E-01	1.748E+00	46.95
K-40	1460.82	223	10.66*	1.133E+00	1.247E+01	1.247E+01	13.90
CO-56	846.77	6	99.94*	1.864E+00	2.069E-02	3.544E-02	150.91
	1037.84	------	14.17	1.538E+00	------ Line Not Found		------
	1238.28	13	66.90	1.304E+00	9.902E-02	1.696E-01	93.44
	1771.35	------	15.47	1.003E+00	------ Line Not Found		------
CD-109	88.03	46	3.70*	4.852E+00	1.729E+00	1.891E+00	68.98
SN-126	64.28	7	9.60	2.031E+00	2.460E-01	2.460E-01	581.18
	86.94	46	8.90	4.852E+00	7.186E-01	7.186E-01	68.98
	87.57	46	37.00*	4.852E+00	1.729E-01	1.729E-01	68.98
TL-204	68.89	31	0.47	2.904E+00	1.531E+01	1.578E+01	105.48
	70.82	31	0.79*	2.904E+00	9.104E+00	9.382E+00	105.48
	80.03	------	0.28	4.161E+00	------ Line Not Found		------
	82.47	------	0.07	4.426E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.472E+00	------ Line Not Found		------
	583.19	73	85.00*	2.579E+00	2.249E-01	2.249E-01	37.39
	860.56	18	12.50	1.837E+00	5.165E-01	5.165E-01	80.17
BI-211	72.87	------	1.23	3.294E+00	------ Line Not Found		------
	351.06	225	12.92*	3.777E+00	3.105E+00	3.105E+00	17.80
PB-212	74.82	------	10.28	3.542E+00	------ Line Not Found		------
	77.11	192	17.10	3.729E+00	2.026E+00	2.026E+00	27.86
	238.63	230	43.60*	4.955E+00	7.183E-01	7.183E-01	17.98
	300.09	17	3.30	4.226E+00	8.370E-01	8.370E-01	150.36
BI-214	609.32	160	45.49*	2.488E+00	9.530E-01	9.531E-01	19.59
	1120.29	36	14.92	1.430E+00	1.134E+00	1.134E+00	49.37
	1764.49	19	15.30	1.004E+00	8.118E-01	8.119E-01	57.75
PB-214	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.573E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.817E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.123E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
RN-222	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.573E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.817E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.123E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
RA-224	240.99	96	4.10*	4.910E+00	3.212E+00	3.212E+00	34.85
RA-226	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.573E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.817E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.123E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
AC-228	338.32	45	11.27	3.884E+00	6.916E-01	6.916E-01	69.47
	911.20	45	25.80*	1.740E+00	6.778E-01	6.778E-01	50.78
	968.97	21	15.80	1.640E+00	5.467E-01	5.467E-01	92.93
RA-228	338.32	45	11.27	3.884E+00	6.916E-01	6.916E-01	69.47

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	45	25.80*	1.740E+00	6.778E-01	6.778E-01	50.78
	968.97	21	15.80	1.640E+00	5.467E-01	5.467E-01	92.93
TH-228	74.82	------	10.28	3.542E+00	------ Line Not Found		------
	77.11	192	17.10	3.729E+00	2.026E+00	2.026E+00	27.86
	238.63	230	43.60*	4.955E+00	7.183E-01	7.183E-01	17.98
	300.09	17	3.30	4.226E+00	8.370E-01	8.370E-01	150.36
TH-230	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.572E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.816E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.122E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
PA-231	283.69	------	1.70	4.402E+00	------ Line Not Found		------
	301.36	17	5.35*	4.226E+00	5.163E-01	5.163E-01	150.36
TH-232	338.32	45	11.27	3.884E+00	6.916E-01	6.916E-01	69.47
	911.20	45	25.80*	1.740E+00	6.778E-01	6.778E-01	50.78
	968.97	21	15.80	1.640E+00	5.467E-01	5.467E-01	92.93
PA-234M	63.29	7	3.70*	2.031E+00	6.384E-01	6.384E-01	581.18
	92.59	49	4.23	5.363E+00	1.470E+00	1.470E+00	93.93
TH-234	63.29	7	3.70*	2.031E+00	6.384E-01	6.384E-01	581.18
	92.59	49	4.23	5.363E+00	1.470E+00	1.470E+00	93.93
U-234	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.572E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.816E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.122E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
U-238	63.29	7	3.70*	2.031E+00	6.384E-01	6.384E-01	581.18
	92.59	49	4.23	5.363E+00	1.470E+00	1.470E+00	93.93
ANH-511	511.00	29	100.00*	2.865E+00	6.885E-02	6.885E-02	135.67

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:37.91

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156308.CNF;1		
Acquisition date	27-JUL-2025 10:05:41	Sensitivity	3.000
Detector ID	GAM32	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.59	Half life ratio	*****
Sample date	28-MAY-2025 12:20:00	Analyst initials	MXR1
Sample ID	G1206156308	Sample Quantity	1.1139E+02 GRAM
Batch Number	2822154	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;19		

CALIBRATION INFORMATION

Eff. Cal. date	24-JUL-2025 06:17:00	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;25		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.748E+00	8.042E-01	6.357E-01
K-40	1.247E+01	1.698E+00	7.152E-01
CO-56	3.544E-02	5.241E-02	9.835E-02
CD-109	1.891E+00	1.279E+00	1.773E+00
SN-126	1.729E-01	1.169E-01	1.470E-01
TL-204	9.382E+00	9.698E+00	1.051E+01
TL-208	2.249E-01	8.240E-02	6.085E-02
BI-211	3.105E+00	5.417E-01	3.917E-01
PB-212	7.183E-01	1.266E-01	9.433E-02
BI-214	9.531E-01	1.830E-01	1.109E-01
PB-214	1.127E+00	1.966E-01	1.425E-01
RN-222	1.127E+00	1.966E-01	1.425E-01
RA-224	3.212E+00	1.097E+00	1.011E+00
RA-226	1.127E+00	1.966E-01	1.425E-01
AC-228	6.778E-01	3.373E-01	2.594E-01
RA-228	6.778E-01	3.373E-01	2.594E-01
TH-228	7.183E-01	1.266E-01	9.433E-02
TH-230	1.127E+00	1.966E-01	1.424E-01
PA-231	5.163E-01	7.607E-01	7.220E-01
TH-232	6.778E-01	3.373E-01	2.594E-01
PA-234M	6.384E-01	3.636E+00	3.216E+00
TH-234	6.384E-01	3.636E+00	3.216E+00
U-234	1.127E+00	1.966E-01	1.424E-01
U-238	6.384E-01	3.636E+00	3.216E+00
ANH-511	6.885E-02	9.154E-02	5.701E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	-1.809E-02	3.841E-02	7.221E-02	NOT IDENT.
NA-24	0.000E+00	2.413E+27	0.000E+00	SHORT HLIF
AL-26	-2.408E-03	3.241E-02	7.023E-02	NOT IDENT.
SC-46	-3.041E-02	6.825E-02	1.189E-01	FAIL ABUN
V-48	-3.858E-01	4.524E-01	6.943E-01	NOT IDENT.

CR-51	2.086E-01	1.174E+00	1.994E+00	NOT IDENT.
MN-52	0.000E+00	4.886E+01	0.000E+00	SHORT HLIF
MN-54	8.939E-03	4.108E-02	8.174E-02	NOT IDENT.
MN-56	0.000E+00	1.479E+41	0.000E+00	SHORT HLIF
CO-57	5.429E-03	2.589E-02	4.900E-02	NOT IDENT.
CO-58	3.076E-02	5.518E-02	1.193E-01	NOT IDENT.
FE-59	-9.791E-03	1.560E-01	3.026E-01	NOT IDENT.
CO-60	1.565E-02	3.482E-02	8.169E-02	NOT IDENT.
ZN-65	3.653E-02	1.017E-01	2.046E-01	NOT IDENT.
GE-68	-5.316E-01	1.315E+00	2.311E+00	NOT IDENT.
AS-73	2.173E-01	2.115E+00	4.142E+00	NOT IDENT.
AS-74	1.108E-01	5.669E-01	1.116E+00	NOT IDENT.
SE-75	-6.866E-02	5.935E-02	8.972E-02	NOT IDENT.
BR-77	0.000E+00	9.303E+06	0.000E+00	SHORT HLIF
SR-82	-5.844E-01	8.635E-01	1.179E+00	NOT IDENT.
RB-83	-2.377E-02	9.414E-02	1.779E-01	NOT IDENT.
RB-84	9.887E-02	1.636E-01	3.582E-01	NOT IDENT.
KR-85	-1.966E+00	6.602E+00	1.231E+01	NOT IDENT.
SR-85	-1.674E-02	5.603E-02	1.044E-01	NOT IDENT.
RB-86	-3.202E-01	3.610E+00	6.982E+00	NOT IDENT.
Y-88	-1.858E-02	5.871E-02	1.131E-01	NOT IDENT.
Y-91	-1.719E+01	3.132E+01	5.503E+01	NOT IDENT.
NB-94	2.483E-02	3.086E-02	6.744E-02	NOT IDENT.
NB-95	-5.300E-03	6.445E-02	1.104E-01	NOT IDENT.
NB-95M	-1.329E-02	2.213E-01	3.594E-01	NOT IDENT.
ZR-95	-3.803E-02	8.899E-02	1.619E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	2.450E+25	0.000E+00	SHORT HLIF
MO-99	0.000E+00	8.385E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.084E-02	3.020E-02	5.380E-02	NOT IDENT.
RH-102	3.230E-02	4.264E-02	9.739E-02	FAIL ABUN
RU-103	1.938E-02	7.465E-02	1.538E-01	FAIL ABUN
RH-106	-6.205E-02	3.480E-01	6.546E-01	NOT IDENT.
RU-106	-6.205E-02	3.480E-01	6.546E-01	NOT IDENT.
AG-108M	9.629E-03	2.568E-02	5.331E-02	NOT IDENT.
AG-110	-2.196E-01	7.680E-01	1.264E+00	NOT IDENT.
AG-110M	-2.851E-02	6.233E-02	1.088E-01	NOT IDENT.
SN-113	-1.637E-02	4.557E-02	8.673E-02	NOT IDENT.
CD-115	0.000E+00	1.309E+07	0.000E+00	SHORT HLIF
SN-117M	1.129E-01	4.836E-01	9.055E-01	NOT IDENT.
SB-122	0.000E+00	1.689E+05	0.000E+00	SHORT HLIF
TE-123M	-1.045E-02	3.302E-02	5.844E-02	NOT IDENT.
SB-124	2.933E-02	1.439E-01	3.310E-01	NOT IDENT.
SB-125	5.999E-03	8.800E-02	1.739E-01	NOT IDENT.
TE-125M	-6.584E+00	1.539E+01	2.749E+01	NOT IDENT.
I-126	1.822E+00	2.525E+00	5.326E+00	NOT IDENT.
SB-126	1.216E+00	1.736E+00	3.716E+00	NOT IDENT.
SB-127	0.000E+00	3.939E+03	0.000E+00	SHORT HLIF
I-131	-5.380E+00	5.072E+00	7.779E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.049E+04	0.000E+00	SHORT HLIF
BA-133	3.067E-02	3.839E-02	7.735E-02	NOT IDENT.
I-133	0.000E+00	1.949E+19	0.000E+00	SHORT HLIF
CS-134	5.520E-03	4.138E-02	8.184E-02	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	-9.806E-01	1.122E+00	1.702E+00	NOT IDENT.
BA-137M	6.517E-03	3.466E-02	6.902E-02	NOT IDENT.
CS-137	6.885E-03	3.662E-02	7.291E-02	NOT IDENT.
LA-138	-3.278E-02	5.365E-02	9.597E-02	NOT IDENT.
CE-139	3.693E-03	3.737E-02	6.830E-02	NOT IDENT.
BA-140	-5.449E-01	3.293E+00	6.203E+00	NOT IDENT.
LA-140	1.449E-02	1.165E+00	2.422E+00	NOT IDENT.
CE-141	-8.733E-02	1.663E-01	2.879E-01	NOT IDENT.
CE-143	0.000E+00	8.727E+11	0.000E+00	SHORT HLIF
CE-144	6.145E-03	2.120E-01	3.904E-01	NOT IDENT.
PM-144	-2.054E-02	3.024E-02	5.171E-02	FAIL ABUN
PR-144	-1.574E+00	2.317E+00	3.961E+00	NOT IDENT.
PM-146	2.498E-02	3.182E-02	6.840E-02	FAIL ABUN
ND-147	-4.700E+00	8.521E+00	1.534E+01	NOT IDENT.
PM-147	2.826E+02	6.873E+02	1.328E+03	NOT IDENT.
PM-149	0.000E+00	1.029E+08	0.000E+00	SHORT HLIF
EU-150	6.408E-03	3.023E-02	5.096E-02	FAIL ABUN
EU-152	-2.326E-02	1.044E-01	1.786E-01	NOT IDENT.
GD-153	-4.032E-02	8.857E-02	1.589E-01	FAIL ABUN
EU-154	-4.394E-02	1.081E-01	2.062E-01	NOT IDENT.
EU-155	6.995E-02	9.606E-02	1.920E-01	FAIL ABUN
TB-160	-1.400E-01	1.973E-01	3.249E-01	FAIL ABUN

HO-166M	-2.658E-02	6.512E-02	1.020E-01	FAIL ABUN
TM-171	-1.021E+01	3.380E+01	6.367E+01	NOT IDENT.
HF-172	9.757E-02	1.811E-01	3.518E-01	FAIL ABUN
LU-172	-1.061E-02	8.504E-02	1.544E-01	FAIL ABUN
LU-176	-2.334E-02	2.991E-02	4.740E-02	NOT IDENT.
HF-181	-2.798E-02	9.512E-02	1.322E-01	NOT IDENT.
TA-182	2.140E-02	2.830E-01	5.646E-01	FAIL ABUN
RE-183	2.693E-01	4.753E-01	9.553E-01	NOT IDENT.
RE-184	-3.452E-02	2.896E-01	4.924E-01	NOT IDENT.
W-188	-5.768E-01	1.184E+01	1.933E+01	FAIL ABUN
IR-192	3.403E-02	4.872E-02	9.939E-02	FAIL ABUN
HG-203	-3.824E-02	7.932E-02	1.323E-01	FAIL ABUN
BI-207	-2.081E-02	5.126E-02	8.980E-02	FAIL ABUN
BI-210	7.956E+00	8.625E+00	1.801E+01	NOT IDENT.
PB-210	7.956E+00	8.625E+00	1.801E+01	NOT IDENT.
PB-211	2.525E-01	7.854E-01	1.441E+00	NOT IDENT.
BI-212	8.296E-01	4.891E-01	1.175E+00	NOT IDENT.
BI-213	-1.450E-02	9.180E-02	1.774E-01	NOT IDENT.
RN-219	-2.824E-01	3.865E-01	6.892E-01	NOT IDENT.
RA-223	1.329E-01	6.143E-01	1.131E+00	FAIL ABUN
AC-225	-1.239E+01	1.295E+01	2.068E+01	NOT IDENT.
AC-227	-4.615E-02	2.418E-01	4.238E-01	FAIL ABUN
TH-227	-4.615E-02	2.418E-01	4.238E-01	FAIL ABUN
TH-229	4.695E-01	5.993E-01	9.744E-01	FAIL ABUN
TH-231	1.329E-01	6.143E-01	1.131E+00	FAIL ABUN
PA-233	6.230E-02	5.555E-02	1.171E-01	FAIL ABUN
PA-234	-2.509E-02	2.775E-01	5.325E-01	NOT IDENT.
U-235	9.735E-02	2.031E-01	3.861E-01	FAIL ABUN
NP-237	6.230E-02	5.555E-02	1.171E-01	FAIL ABUN
NP-238	0.000E+00	4.466E+07	0.000E+00	SHORT HLIF
NP-239	1.774E-01	2.618E-01	5.123E-01	NOT IDENT.
PU-239	2.482E+02	3.275E+02	6.414E+02	NOT IDENT.
AM-241	-1.138E-01	2.342E-01	3.951E-01	NOT IDENT.
AM-243	0.000E+00	7.708E-02	1.560E-01	NOT IDENT.
CM-243	-8.873E-02	1.033E-01	1.770E-01	NOT IDENT.
BK-247	-8.549E-02	8.359E-02	1.293E-01	NOT IDENT.
CM-247	-4.398E-04	3.466E-02	6.782E-02	NOT IDENT.
CF-249	8.670E-03	3.727E-02	7.503E-02	NOT IDENT.
CF-251	-2.602E-02	1.237E-01	2.193E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:36.51

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	37	10.44*	3.018E+00	8.008E-01	1.748E+00	46.95
K-40	1460.82	223	10.66*	1.133E+00	1.247E+01	1.247E+01	13.90
CO-56	846.77	6	99.94*	1.864E+00	2.069E-02	3.544E-02	150.91
	1037.84	------	14.17	1.538E+00	------ Line Not Found		------
	1238.28	13	66.90	1.304E+00	9.902E-02	1.696E-01	93.44
	1771.35	------	15.47	1.003E+00	------ Line Not Found		------
CD-109	88.03	46	3.70*	4.852E+00	1.729E+00	1.891E+00	68.98
SN-126	64.28	7	9.60	2.031E+00	2.460E-01	2.460E-01	581.18
	86.94	46	8.90	4.852E+00	7.186E-01	7.186E-01	68.98
	87.57	46	37.00*	4.852E+00	1.729E-01	1.729E-01	68.98
TL-204	68.89	31	0.47	2.904E+00	1.531E+01	1.578E+01	105.48
	70.82	31	0.79*	2.904E+00	9.104E+00	9.382E+00	105.48
	80.03	------	0.28	4.161E+00	------ Line Not Found		------
	82.47	------	0.07	4.426E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.472E+00	------ Line Not Found		------
	583.19	73	85.00*	2.579E+00	2.249E-01	2.249E-01	37.39
	860.56	18	12.50	1.837E+00	5.165E-01	5.165E-01	80.17
BI-211	72.87	------	1.23	3.294E+00	------ Line Not Found		------
	351.06	225	12.92*	3.777E+00	3.105E+00	3.105E+00	17.80
PB-212	74.82	------	10.28	3.542E+00	------ Line Not Found		------
	77.11	192	17.10	3.729E+00	2.026E+00	2.026E+00	27.86
	238.63	230	43.60*	4.955E+00	7.183E-01	7.183E-01	17.98
	300.09	17	3.30	4.226E+00	8.370E-01	8.370E-01	150.36
BI-214	609.32	160	45.49*	2.488E+00	9.530E-01	9.531E-01	19.59
	1120.29	36	14.92	1.430E+00	1.134E+00	1.134E+00	49.37
	1764.49	19	15.30	1.004E+00	8.118E-01	8.119E-01	57.75
PB-214	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.573E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.817E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.123E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
RN-222	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.573E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.817E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.123E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
RA-224	240.99	96	4.10*	4.910E+00	3.212E+00	3.212E+00	34.85
RA-226	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.573E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.817E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.123E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
AC-228	338.32	45	11.27	3.884E+00	6.916E-01	6.916E-01	69.47
	911.20	45	25.80*	1.740E+00	6.778E-01	6.778E-01	50.78

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	21	15.80	1.640E+00	5.467E-01	5.467E-01	92.93
RA-228	338.32	45	11.27	3.884E+00	6.916E-01	6.916E-01	69.47
	911.20	45	25.80*	1.740E+00	6.778E-01	6.778E-01	50.78
	968.97	21	15.80	1.640E+00	5.467E-01	5.467E-01	92.93
TH-228	74.82	------	10.28	3.542E+00	------ Line Not Found		------
	77.11	192	17.10	3.729E+00	2.026E+00	2.026E+00	27.86
	238.63	230	43.60*	4.955E+00	7.183E-01	7.183E-01	17.98
	300.09	17	3.30	4.226E+00	8.370E-01	8.370E-01	150.36
TH-230	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.572E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.816E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.122E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
PA-231	283.69	------	1.70	4.402E+00	------ Line Not Found		------
	301.36	17	5.35*	4.226E+00	5.163E-01	5.163E-01	150.36
TH-232	338.32	45	11.27	3.884E+00	6.916E-01	6.916E-01	69.47
	911.20	45	25.80*	1.740E+00	6.778E-01	6.778E-01	50.78
	968.97	21	15.80	1.640E+00	5.467E-01	5.467E-01	92.93
PA-234M	63.29	7	3.70*	2.031E+00	6.384E-01	6.384E-01	581.18
	92.59	49	4.23	5.363E+00	1.470E+00	1.470E+00	93.93
TH-234	63.29	7	3.70*	2.031E+00	6.384E-01	6.384E-01	581.18
	92.59	49	4.23	5.363E+00	1.470E+00	1.470E+00	93.93
U-234	74.82	------	5.80	3.542E+00	------ Line Not Found		------
	77.11	192	9.70	3.729E+00	3.572E+00	3.572E+00	27.86
	87.09	46	3.41	4.852E+00	1.876E+00	1.876E+00	68.98
	242.00	96	7.25	4.910E+00	1.816E+00	1.816E+00	34.85
	295.22	95	18.42	4.279E+00	8.122E-01	8.122E-01	38.31
	351.93	225	35.60*	3.777E+00	1.127E+00	1.127E+00	17.80
U-238	63.29	7	3.70*	2.031E+00	6.384E-01	6.384E-01	581.18
	92.59	49	4.23	5.363E+00	1.470E+00	1.470E+00	93.93
ANH-511	511.00	29	100.00*	2.865E+00	6.885E-02	6.885E-02	135.67

Flag: "*" = Keyline

Sample ID : G1206156308 Acquisition date : 27-JUL-2025 10:05:41

Total number of lines in spectrum 43
Number of unidentified lines 10
Number of lines tentatively identified by NID 33 76.74%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	2.18	8.008E-01	1.748E+00	0.821E+00	46.95	
K-40	1.25E+09Y	1.00	1.247E+01	1.247E+01	0.173E+01	13.90	
CO-56	77.23D	1.71	2.069E-02	3.544E-02	5.348E-02	150.91	
CD-109	461.40D	1.09	1.729E+00	1.891E+00	1.305E+00	68.98	
SN-126	2.30E+05Y	1.00	1.729E-01	1.729E-01	1.192E-01	68.98	
TL-204	3.78Y	1.03	9.104E+00	9.382E+00	9.896E+00	105.48	
TL-208	1.41E+10Y	1.00	2.249E-01	2.249E-01	0.841E-01	37.39	
BI-211	7.04E+08Y	1.00	3.105E+00	3.105E+00	0.553E+00	17.80	
PB-212	1.41E+10Y	1.00	7.183E-01	7.183E-01	1.291E-01	17.98	
BI-214	1600.00Y	1.00	9.530E-01	9.531E-01	1.867E-01	19.59	
PB-214	1600.00Y	1.00	1.127E+00	1.127E+00	0.201E+00	17.80	
RN-222	1600.00Y	1.00	1.127E+00	1.127E+00	0.201E+00	17.80	
RA-224	1.41E+10Y	1.00	3.212E+00	3.212E+00	1.119E+00	34.85	
RA-226	1600.00Y	1.00	1.127E+00	1.127E+00	0.201E+00	17.80	
AC-228	1.41E+10Y	1.00	6.778E-01	6.778E-01	3.441E-01	50.78	
RA-228	1.41E+10Y	1.00	6.778E-01	6.778E-01	3.441E-01	50.78	
TH-228	1.41E+10Y	1.00	7.183E-01	7.183E-01	1.291E-01	17.98	
TH-230	7.54E+04Y	1.00	1.127E+00	1.127E+00	0.201E+00	17.80	
PA-231	7.04E+08Y	1.00	5.163E-01	5.163E-01	7.762E-01	150.36	
TH-232	1.41E+10Y	1.00	6.778E-01	6.778E-01	3.441E-01	50.78	
PA-234M	4.47E+09Y	1.00	6.384E-01	6.384E-01	37.10E-01	581.18	
TH-234	4.47E+09Y	1.00	6.384E-01	6.384E-01	37.10E-01	581.18	
U-234	2.45E+05Y	1.00	1.127E+00	1.127E+00	0.201E+00	17.80	
U-238	4.47E+09Y	1.00	6.384E-01	6.384E-01	37.10E-01	581.18	
ANH-511	1.00E+09Y	1.00	6.885E-02	6.885E-02	9.341E-02	135.67	
Total Activity :			4.339E+01	4.480E+01			

Grand Total Activity : 4.339E+01 4.480E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1206156308 Acquisition date : 27-JUL-2025 10:05:41

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	185.49	79	109	1.07	371.85	367	12	2.17E-02	59.1	5.78E+00	T
0	192.71	17	47	0.71	386.28	385	5	4.77E-03	****	5.66E+00	T
0	317.20	10	17	1.34	635.22	633	5	2.70E-03	****	4.07E+00	T
0	362.56	3	20	0.69	725.92	720	8	8.08E-04	****	3.70E+00	
0	411.21	30	42	2.13	823.21	813	15	8.52E-03	****	3.37E+00	T
0	456.89	18	10	0.79	914.55	911	7	4.95E-03	76.4	3.12E+00	
0	472.88	28	12	0.83	946.52	942	9	7.98E-03	58.8	3.04E+00	T
0	493.28	14	49	5.88	987.31	970	19	3.97E-03	****	2.94E+00	T
0	655.14	21	4	0.69	1311.00	1307	9	5.97E-03	55.9	2.34E+00	
0	709.39	11	13	1.33	1419.47	1416	10	3.19E-03	****	2.19E+00	
0	741.51	6	4	0.53	1483.71	1481	6	1.64E-03	****	2.10E+00	
0	747.14	14	6	1.91	1494.97	1488	12	4.17E-03	83.3	2.09E+00	T
6	767.62	19	5	2.52	1535.92	1532	18	5.46E-03	53.0	2.04E+00	T
6	772.35	15	2	2.77	1545.38	1532	18	4.42E-03	67.8	2.03E+00	T
0	901.60	7	10	0.63	1803.86	1799	10	1.94E-03	****	1.76E+00	T
0	1156.86	3	16	1.41	2314.33	2308	10	9.17E-04	****	1.39E+00	
0	1200.11	9	7	1.45	2400.83	2394	10	2.71E-03	****	1.34E+00	
3	1240.95	9	3	1.32	2482.49	2471	14	2.74E-03	67.2	1.30E+00	
0	1246.13	10	3	1.06	2492.86	2489	7	2.92E-03	85.4	1.30E+00	
0	1377.62	8	6	1.54	2755.82	2748	11	2.31E-03	****	1.19E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:47.24

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156308.CNF;1   *
* Acquisition date : 27-JUL-2025 10:05:41 Sensitivity     : 3.000       *
* Detector ID      : GAM32                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.59     Half life ratio : *****       *
* Sample date      : 28-MAY-2025 12:20:00 Nuclide Library : SOLID       *
* Sample ID        : G1206156308          Analyst initials: MXR1        *
* Batch Number     : 2822154              Sample Quantity : 1.1139E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 24-JUL-2025 06:17:00 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;25        *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	2.545E-01
K-40	2.825E-01
CO-56	4.081E-02
CD-109	8.314E-01
SN-126	6.846E-02
TL-204	4.856E+00
TL-208	2.626E-02
BI-211	1.772E-01
PB-212	4.292E-02
BI-214	4.738E-02
PB-214	6.443E-02
RN-222	6.443E-02
RA-224	4.599E-01
RA-226	6.443E-02
AC-228	1.095E-01
RA-228	1.095E-01
TH-228	4.292E-02
TH-230	6.443E-02
PA-231	3.204E-01
TH-232	1.095E-01
PA-234M	1.484E+00
TH-234	1.484E+00
U-234	6.443E-02
U-238	1.484E+00
ANH-511	2.532E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	2.864E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.598E-02	NOT IDENT.
SC-46	5.105E-02	FAIL ABUN
V-48	2.714E-01	NOT IDENT.
CR-51	8.947E-01	NOT IDENT.

MN-52	0.000E+00	SHORT HLIF
MN-54	3.537E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.255E-02	NOT IDENT.
CO-58	5.119E-02	NOT IDENT.
FE-59	1.232E-01	NOT IDENT.
CO-60	3.326E-02	NOT IDENT.
ZN-65	8.752E-02	NOT IDENT.
GE-68	9.340E-01	NOT IDENT.
AS-73	1.895E+00	NOT IDENT.
AS-74	4.951E-01	NOT IDENT.
SE-75	4.010E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.355E-01	NOT IDENT.
RB-83	7.731E-02	NOT IDENT.
RB-84	1.530E-01	NOT IDENT.
KR-85	5.409E+00	NOT IDENT.
SR-85	4.589E-02	NOT IDENT.
RB-86	2.833E+00	NOT IDENT.
Y-88	4.291E-02	NOT IDENT.
Y-91	2.220E+01	NOT IDENT.
NB-94	2.958E-02	NOT IDENT.
NB-95	4.667E-02	NOT IDENT.
NB-95M	1.656E-01	NOT IDENT.
ZR-95	6.544E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.473E-02	NOT IDENT.
RH-102	4.175E-02	FAIL ABUN
RU-103	6.701E-02	FAIL ABUN
RH-106	2.854E-01	NOT IDENT.
RU-106	2.854E-01	NOT IDENT.
AG-108M	2.354E-02	NOT IDENT.
AG-110	5.298E-01	NOT IDENT.
AG-110M	4.614E-02	NOT IDENT.
SN-113	3.759E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	4.165E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.672E-02	NOT IDENT.
SB-124	1.285E-01	NOT IDENT.
SB-125	7.723E-02	NOT IDENT.
TE-125M	1.260E+01	NOT IDENT.
I-126	2.365E+00	NOT IDENT.
SB-126	1.632E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	3.351E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.470E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.522E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	6.761E-01	NOT IDENT.
BA-137M	3.013E-02	NOT IDENT.
CS-137	3.183E-02	NOT IDENT.
LA-138	3.592E-02	NOT IDENT.
CE-139	3.161E-02	NOT IDENT.
BA-140	2.749E+00	NOT IDENT.
LA-140	9.788E-01	NOT IDENT.
CE-141	1.332E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.803E-01	NOT IDENT.
PM-144	2.123E-02	FAIL ABUN
PR-144	1.626E+00	NOT IDENT.
PM-146	2.963E-02	FAIL ABUN
ND-147	6.568E+00	NOT IDENT.
PM-147	6.112E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.304E-02	FAIL ABUN
EU-152	8.025E-02	NOT IDENT.
GD-153	7.277E-02	FAIL ABUN
EU-154	8.244E-02	NOT IDENT.
EU-155	8.861E-02	FAIL ABUN
TB-160	1.326E-01	FAIL ABUN
HO-166M	4.328E-02	FAIL ABUN

TM-171	2.907E+01	NOT IDENT.
HF-172	1.625E-01	FAIL ABUN
LU-172	6.673E-02	FAIL ABUN
LU-176	2.136E-02	NOT IDENT.
HF-181	5.602E-02	NOT IDENT.
TA-182	2.457E-01	FAIL ABUN
RE-183	4.415E-01	NOT IDENT.
RE-184	2.022E-01	NOT IDENT.
W-188	8.709E+00	FAIL ABUN
IR-192	4.493E-02	FAIL ABUN
HG-203	6.000E-02	FAIL ABUN
BI-207	3.677E-02	FAIL ABUN
BI-210	8.324E+00	NOT IDENT.
PB-210	8.324E+00	NOT IDENT.
PB-211	6.497E-01	NOT IDENT.
BI-212	5.235E-01	NOT IDENT.
BI-213	7.774E-02	NOT IDENT.
RN-219	3.042E-01	NOT IDENT.
RA-223	5.085E-01	FAIL ABUN
AC-225	9.367E+00	NOT IDENT.
AC-227	1.915E-01	FAIL ABUN
TH-227	1.915E-01	FAIL ABUN
TH-229	4.504E-01	FAIL ABUN
TH-231	5.085E-01	FAIL ABUN
PA-233	5.278E-02	FAIL ABUN
PA-234	2.212E-01	NOT IDENT.
U-235	1.800E-01	FAIL ABUN
NP-237	5.278E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.379E-01	NOT IDENT.
PU-239	2.981E+02	NOT IDENT.
AM-241	1.808E-01	NOT IDENT.
AM-243	7.413E-02	NOT IDENT.
CM-243	8.104E-02	NOT IDENT.
BK-247	5.806E-02	NOT IDENT.
CM-247	3.021E-02	NOT IDENT.
CF-249	3.358E-02	NOT IDENT.
CF-251	1.007E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 11:06:51.11

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156308.CNF;1		
Acquisition date	: 27-JUL-2025 10:05:41	Sensitivity	: 3.000
Detector ID	: GAM32	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.59	Half life ratio	: *****
Sample date	: 28-MAY-2025 12:20:00	Nuclide Library	: SOLID
Sample ID	: G1206156308	Analyst initials	: MXR1
Batch Number	: 2822154	Sample Quantity	: 1.1139E+02 GRAM
		Quantity Err(%)	: 1.7955E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 24-JUL-2025 06:17:00	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;25		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.748E+00	8.177E-01	8.177E-01
K-40	1.247E+01	2.181E+00	2.181E+00
CO-56	3.544E-02	5.255E-02	5.255E-02
CD-109	1.891E+00	1.292E+00	1.292E+00
SN-126	1.729E-01	1.177E-01	1.177E-01
TL-204	9.382E+00	9.745E+00	9.745E+00
TL-208	2.249E-01	8.455E-02	8.455E-02
BI-211	3.105E+00	6.044E-01	6.044E-01
PB-212	7.183E-01	1.405E-01	1.405E-01
BI-214	9.531E-01	1.995E-01	1.995E-01
PB-214	1.127E+00	2.186E-01	2.186E-01
RN-222	1.127E+00	2.186E-01	2.186E-01
RA-224	3.212E+00	1.131E+00	1.131E+00
RA-226	1.127E+00	2.186E-01	2.186E-01
AC-228	6.778E-01	3.470E-01	3.470E-01
RA-228	6.778E-01	3.470E-01	3.470E-01
TH-228	7.183E-01	1.405E-01	1.405E-01
TH-230	1.127E+00	2.186E-01	2.186E-01
PA-231	5.163E-01	7.696E-01	7.696E-01
TH-232	6.778E-01	3.470E-01	3.470E-01
PA-234M	6.384E-01	3.639E+00	3.639E+00
TH-234	6.384E-01	3.639E+00	3.639E+00
U-234	1.127E+00	2.186E-01	2.186E-01
U-238	6.384E-01	3.639E+00	3.639E+00
ANH-511	6.885E-02	9.173E-02	9.173E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	-1.809E-02	3.846E-02	3.931E-02	NOT IDENT.
NA-24	6.825E+26	2.415E+27	0.000E+00	SHORT HLIF
AL-26	-2.408E-03	3.241E-02	3.243E-02	NOT IDENT.
SC-46	-3.041E-02	6.834E-02	6.970E-02	FAIL ABUN
V-48	-3.858E-01	4.544E-01	4.866E-01	NOT IDENT.

CR-51	2.086E-01	1.174E+00	1.178E+00	NOT IDENT.
MN-52	2.612E+01	4.894E+01	5.034E+01	SHORT HLIF
MN-54	8.939E-03	4.109E-02	4.129E-02	NOT IDENT.
MN-56	1.000E+41	1.483E+41	0.000E+00	SHORT HLIF
CO-57	5.429E-03	2.590E-02	2.601E-02	NOT IDENT.
CO-58	3.076E-02	5.527E-02	5.698E-02	NOT IDENT.
FE-59	-9.791E-03	1.560E-01	1.561E-01	NOT IDENT.
CO-60	1.565E-02	3.486E-02	3.557E-02	NOT IDENT.
ZN-65	3.653E-02	1.017E-01	1.030E-01	NOT IDENT.
GE-68	-5.316E-01	1.316E+00	1.338E+00	NOT IDENT.
AS-73	2.173E-01	2.116E+00	2.118E+00	NOT IDENT.
AS-74	1.108E-01	5.670E-01	5.692E-01	NOT IDENT.
SE-75	-6.866E-02	5.964E-02	6.719E-02	NOT IDENT.
BR-77	5.280E+07	9.190E+07	9.493E+07	SHORT HLIF
SR-82	-5.844E-01	8.654E-01	9.046E-01	NOT IDENT.
RB-83	-2.377E-02	9.421E-02	9.482E-02	NOT IDENT.
RB-84	9.887E-02	1.640E-01	1.700E-01	NOT IDENT.
KR-85	-1.966E+00	6.604E+00	6.664E+00	NOT IDENT.
SR-85	-1.674E-02	5.605E-02	5.655E-02	NOT IDENT.
RB-86	-3.202E-01	3.610E+00	3.613E+00	NOT IDENT.
Y-88	-1.858E-02	5.873E-02	5.932E-02	NOT IDENT.
Y-91	-1.719E+01	3.136E+01	3.230E+01	NOT IDENT.
NB-94	2.483E-02	3.094E-02	3.290E-02	NOT IDENT.
NB-95	-5.300E-03	6.446E-02	6.450E-02	NOT IDENT.
NB-95M	-1.329E-02	2.213E-01	2.214E-01	NOT IDENT.
ZR-95	-3.803E-02	8.906E-02	9.070E-02	NOT IDENT.
NB-97	-1.000E+41	5.072E+41	0.000E+00	SHORT HLIF
ZR-97	-5.803E+24	2.451E+25	0.000E+00	SHORT HLIF
MO-99	3.657E+05	8.393E+05	8.553E+05	SHORT HLIF
TC-99M	1.000E+41	2.445E+41	0.000E+00	SHORT HLIF
RH-101	-1.084E-02	3.027E-02	3.066E-02	NOT IDENT.
RH-102	3.230E-02	4.279E-02	4.519E-02	FAIL ABUN
RU-103	1.938E-02	7.467E-02	7.518E-02	FAIL ABUN
RH-106	-6.205E-02	3.481E-01	3.492E-01	NOT IDENT.
RU-106	-6.205E-02	3.481E-01	3.492E-01	NOT IDENT.
AG-108M	9.629E-03	2.569E-02	2.606E-02	NOT IDENT.
AG-110	-2.196E-01	7.682E-01	7.746E-01	NOT IDENT.
AG-110M	-2.851E-02	6.242E-02	6.373E-02	NOT IDENT.
SN-113	-1.637E-02	4.559E-02	4.619E-02	NOT IDENT.
CD-115	8.714E+06	1.312E+07	1.370E+07	SHORT HLIF
SN-117M	1.129E-01	4.837E-01	4.864E-01	NOT IDENT.
SB-122	-5.383E+03	1.689E+05	1.689E+05	SHORT HLIF
TE-123M	-1.045E-02	3.303E-02	3.337E-02	NOT IDENT.
SB-124	2.933E-02	1.439E-01	1.445E-01	NOT IDENT.
SB-125	5.999E-03	8.800E-02	8.804E-02	NOT IDENT.
TE-125M	-6.584E+00	1.540E+01	1.568E+01	NOT IDENT.
I-126	1.822E+00	2.530E+00	2.660E+00	NOT IDENT.
SB-126	1.216E+00	1.743E+00	1.827E+00	NOT IDENT.
SB-127	-1.676E+03	3.969E+03	4.040E+03	SHORT HLIF
I-131	-5.380E+00	5.093E+00	5.641E+00	NOT IDENT.
I-132	-1.000E+41	7.854E+41	0.000E+00	SHORT HLIF
TE-132	-7.687E+01	1.049E+04	1.049E+04	SHORT HLIF
BA-133	3.067E-02	3.847E-02	4.088E-02	NOT IDENT.
I-133	-1.132E+19	1.994E+19	0.000E+00	SHORT HLIF
CS-134	5.520E-03	4.139E-02	4.146E-02	NOT IDENT.
I-135	-1.000E+41	2.562E+41	0.000E+00	SHORT HLIF
CS-136	-9.806E-01	1.129E+00	1.212E+00	NOT IDENT.
BA-137M	6.517E-03	3.467E-02	3.479E-02	NOT IDENT.
CS-137	6.885E-03	3.662E-02	3.675E-02	NOT IDENT.
LA-138	-3.278E-02	5.377E-02	5.576E-02	NOT IDENT.
CE-139	3.693E-03	3.738E-02	3.742E-02	NOT IDENT.
BA-140	-5.449E-01	3.293E+00	3.302E+00	NOT IDENT.
LA-140	1.449E-02	1.165E+00	1.165E+00	NOT IDENT.
CE-141	-8.733E-02	1.664E-01	1.710E-01	NOT IDENT.
CE-143	-8.159E+09	8.727E+11	8.727E+11	SHORT HLIF
CE-144	6.145E-03	2.120E-01	2.121E-01	NOT IDENT.
PM-144	-2.054E-02	3.029E-02	3.167E-02	FAIL ABUN
PR-144	-1.574E+00	2.320E+00	2.427E+00	NOT IDENT.
PM-146	2.498E-02	3.192E-02	3.385E-02	FAIL ABUN
ND-147	-4.700E+00	8.530E+00	8.790E+00	NOT IDENT.
PM-147	2.826E+02	6.877E+02	6.994E+02	NOT IDENT.
PM-149	-2.379E+07	1.030E+08	1.035E+08	SHORT HLIF
EU-150	6.408E-03	3.024E-02	3.037E-02	FAIL ABUN
EU-152	-2.326E-02	1.044E-01	1.049E-01	NOT IDENT.
GD-153	-4.032E-02	8.863E-02	9.047E-02	FAIL ABUN
EU-154	-4.394E-02	1.082E-01	1.100E-01	NOT IDENT.
EU-155	6.995E-02	9.627E-02	1.013E-01	FAIL ABUN
TB-160	-1.400E-01	1.980E-01	2.078E-01	FAIL ABUN

HO-166M	-2.658E-02	6.517E-02	6.626E-02	FAIL ABUN
TM-171	-1.021E+01	3.382E+01	3.413E+01	NOT IDENT.
HF-172	9.757E-02	1.819E-01	1.871E-01	FAIL ABUN
LU-172	-1.061E-02	8.505E-02	8.519E-02	FAIL ABUN
LU-176	-2.334E-02	2.998E-02	3.177E-02	NOT IDENT.
HF-181	-2.798E-02	9.515E-02	9.598E-02	NOT IDENT.
TA-182	2.140E-02	2.830E-01	2.832E-01	FAIL ABUN
RE-183	2.693E-01	4.765E-01	4.917E-01	NOT IDENT.
RE-184	-3.452E-02	2.896E-01	2.900E-01	NOT IDENT.
W-188	-5.768E-01	1.184E+01	1.185E+01	FAIL ABUN
IR-192	3.403E-02	4.881E-02	5.116E-02	FAIL ABUN
HG-203	-3.824E-02	7.939E-02	8.124E-02	FAIL ABUN
BI-207	-2.081E-02	5.131E-02	5.216E-02	FAIL ABUN
BI-210	7.956E+00	8.672E+00	9.384E+00	NOT IDENT.
PB-210	7.956E+00	8.672E+00	9.384E+00	NOT IDENT.
PB-211	2.525E-01	7.857E-01	7.939E-01	NOT IDENT.
BI-212	8.296E-01	4.953E-01	6.206E-01	NOT IDENT.
BI-213	-1.450E-02	9.181E-02	9.204E-02	NOT IDENT.
RN-219	-2.824E-01	3.886E-01	4.089E-01	NOT IDENT.
RA-223	1.329E-01	6.145E-01	6.174E-01	FAIL ABUN
AC-225	-1.239E+01	1.305E+01	1.419E+01	NOT IDENT.
AC-227	-4.615E-02	2.419E-01	2.428E-01	FAIL ABUN
TH-227	-4.615E-02	2.419E-01	2.428E-01	FAIL ABUN
TH-229	4.695E-01	6.004E-01	6.366E-01	FAIL ABUN
TH-231	1.329E-01	6.145E-01	6.174E-01	FAIL ABUN
PA-233	6.230E-02	5.582E-02	6.249E-02	FAIL ABUN
PA-234	-2.509E-02	2.790E-01	2.792E-01	NOT IDENT.
U-235	9.735E-02	2.033E-01	2.080E-01	FAIL ABUN
NP-237	6.230E-02	5.582E-02	6.249E-02	FAIL ABUN
NP-238	-4.281E+07	4.492E+07	4.889E+07	SHORT HLIF
NP-239	1.774E-01	2.624E-01	2.743E-01	NOT IDENT.
PU-239	2.482E+02	3.281E+02	3.467E+02	NOT IDENT.
AM-241	-1.138E-01	2.345E-01	2.401E-01	NOT IDENT.
AM-243	1.805E-01	7.847E-02	1.130E-01	NOT IDENT.
CM-243	-8.873E-02	1.038E-01	1.112E-01	NOT IDENT.
BK-247	-8.549E-02	8.556E-02	9.384E-02	NOT IDENT.
CM-247	-4.398E-04	3.466E-02	3.466E-02	NOT IDENT.
CF-249	8.670E-03	3.728E-02	3.748E-02	NOT IDENT.
CF-251	-2.602E-02	1.237E-01	1.243E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	30.4647	81.75	57.5810	125.81	39.0836
879.38	34.9105	82.47	64.1753	127.23	50.2132
46.54	34.1525	83.79	57.8156	127.91	57.3016
228.16	0.0000	265.00	54.7301	129.30	43.3163
52.39	38.9440	193.51	57.3788	131.20	59.5996
1093.63	39.8655	105.31	63.7542	133.02	58.7443
52.39	39.0535	86.79	60.9697	133.52	48.6511
125.81	39.1142	86.94	60.9876	136.00	44.7560
53.44	33.9414	87.09	61.0049	136.47	49.8748
54.07	35.7414	87.57	61.0615	739.50	0.0000
293.27	0.0000	88.03	76.4722	140.51	0.0000
482.18	36.9418	306.78	76.5174	143.76	44.2145
57.98	39.6253	88.47	82.8102	144.24	46.3019
59.27	53.0042	143.76	60.3960	145.44	62.8672
59.32	53.0109	90.64	81.2608	152.43	52.0134
59.54	48.3251	531.02	75.6580	1048.07	40.6145
60.96	40.2143	92.59	62.5900	154.21	49.0066
61.17	40.2349	93.35	62.6776	158.56	44.9415
62.93	48.1306	94.56	39.3397	159.00	44.0649
63.29	48.1718	311.90	39.3463	162.33	41.0900
290.67	48.2050	946.00	39.3476	537.26	46.3774
87.57	48.2849	94.87	40.6318	163.33	39.0319
66.73	34.1722	97.43	47.8355	165.86	49.7374
67.24	49.2176	98.43	46.0042	427.87	45.0127
67.68	49.2672	98.44	46.0049	176.60	45.0281
1221.41	51.6784	103.37	39.3718	177.52	46.1501
70.82	45.1851	116.74	39.3718	181.07	0.0000
97.43	45.2644	100.11	49.0245	181.52	27.3171
70.82	49.6151	102.03	42.4373	184.41	42.1945
279.20	49.6163	103.18	47.3536	185.72	42.2575
1063.66	52.8705	103.37	56.0698	193.51	34.9785
72.87	52.8776	105.31	34.9173	197.03	47.1854
351.06	52.8776	106.12	41.7639	198.01	38.4479
74.66	57.3525	106.47	51.5067	201.83	34.1953
351.93	50.3527	109.28	48.8197	203.43	55.2483
238.63	50.3527	111.00	43.0829	205.31	42.0728
351.93	50.3527	111.76	0.0000	210.85	52.3421
238.63	50.3527	114.06	52.1537	215.65	36.9342
74.97	50.3691	116.30	0.0000	218.12	48.2477
77.11	50.5970	116.74	43.4824	222.11	56.3293
78.74	47.9990	119.76	60.5686	227.09	36.2300
256.23	53.0252	264.66	37.8107	227.38	36.2407
80.03	49.3595	121.22	37.8165	228.16	0.0000
133.52	49.3693	344.28	41.8331	228.18	31.7354
364.49	49.3762	122.06	40.8545	235.69	47.1919
711.68	52.8117	122.92	44.8994	235.96	47.2039
356.01	56.5671	1274.44	44.9097	238.63	34.3488
323.87	56.5750	123.68	41.9548	238.98	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
240.99	34.4257	911.20	32.3540	537.26	22.4941
242.00	34.4586	340.48	33.2365	1260.41	0.0000
244.70	41.4558	340.55	33.2381	552.55	5.6680
685.70	0.0000	344.28	29.9956	795.86	16.1457
388.16	38.2872	345.93	24.1926	564.24	0.0000
507.63	0.0000	351.06	30.1436	569.33	11.4312
256.23	32.5876	351.93	30.1619	569.50	9.5268
527.90	0.0000	355.39	0.0000	569.70	9.5280
264.66	43.3887	356.01	15.1249	583.19	13.4275
264.80	43.3932	364.49	20.2871	584.27	11.5151
265.00	43.4012	366.42	0.0000	595.83	18.3344
269.46	44.7493	372.51	18.6999	600.60	18.3761
270.03	40.0585	375.05	21.2870	602.52	0.0000
401.81	47.1777	377.52	13.6465	604.72	18.8962
273.65	33.0936	383.85	18.8445	607.14	13.0974
276.40	37.9102	388.16	21.4757	609.32	11.6538
583.19	30.8282	666.33	18.0452	610.33	11.6592
277.60	28.4619	391.69	18.0819	614.28	14.6008
402.40	32.0312	400.66	23.3849	618.01	10.7261
279.20	40.3760	401.81	28.6031	884.68	18.5470
279.54	36.8248	402.40	22.5442	621.93	17.5840
279.70	33.2654	404.85	23.4487	630.19	0.0000
280.46	33.2867	410.95	21.7967	631.29	5.8865
301.36	23.8409	413.71	13.1009	633.25	9.8193
284.31	26.2391	720.70	10.4873	634.78	11.7915
285.41	32.2322	423.72	21.9721	635.95	11.7979
285.90	0.0000	427.09	14.9725	636.99	7.8688
287.50	19.1338	427.87	20.2668	657.50	11.9121
290.67	28.7761	433.94	15.0355	657.76	11.9136
293.27	0.0000	439.40	16.8604	657.90	0.0000
295.22	33.6978	440.45	18.6467	661.66	13.9231
316.51	33.7183	453.88	6.7133	664.57	0.0000
298.58	24.1357	463.37	20.7020	666.33	12.9550
299.98	24.1632	468.07	18.9531	666.50	11.9595
300.09	24.1650	473.00	0.0000	667.71	0.0000
300.13	24.1656	631.29	2.7184	677.62	13.0190
311.90	24.1656	696.49	5.4423	685.70	0.0000
301.36	20.9647	477.60	5.4448	692.65	0.0000
302.85	38.7500	482.18	10.9177	695.00	11.0980
304.50	30.3131	487.02	13.6844	696.49	13.1243
304.85	24.2578	492.35	0.0000	696.51	13.1243
306.78	41.3016	497.08	12.8436	697.00	12.1172
308.46	21.8947	505.52	5.5298	697.30	12.1187
311.90	13.4163	507.63	0.0000	697.49	7.0698
316.51	24.4806	511.00	21.2602	702.65	9.1095
319.41	24.5355	514.00	21.2948	706.68	13.6873
320.08	22.9118	514.00	21.2948	711.68	15.2399
321.04	23.3383	520.40	17.6517	720.70	10.1978
323.87	23.3888	520.69	0.0000	721.93	0.0000
325.23	23.4131	667.71	0.0000	1690.97	17.3514
1596.21	13.5912	527.90	0.0000	722.91	18.3728
333.37	19.8374	528.26	15.8593	723.31	16.3340
333.97	26.4616	529.59	21.4717	756.73	15.3186
334.37	28.1237	529.87	0.0000	727.33	5.1127
338.28	32.3532	531.02	17.7507	733.00	14.3486

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
735.93	17.4441	983.53	12.1781	1368.63	0.0000
737.46	6.1606	946.00	8.8623	1384.29	9.3970
739.50	0.0000	949.00	5.5444	1408.01	5.6704
1434.09	0.0000	954.55	0.0000	1434.09	0.0000
747.24	9.2772	962.31	13.3647	1435.80	6.6586
748.06	7.7335	964.08	18.3873	1457.56	0.0000
752.31	7.4367	966.17	16.7273	1460.82	4.7839
753.82	8.2682	968.97	14.5102	1489.16	3.8521
756.73	9.3124	983.53	11.2138	1505.03	5.7990
756.80	9.3127	984.45	0.0000	1584.12	2.9504
763.94	9.3387	996.26	10.1334	1596.21	5.9161
765.81	10.9033	1002.74	10.1543	1620.50	1.9823
766.84	14.0240	1004.73	2.2579	1621.92	3.9658
772.60	0.0000	1021.30	0.0000	1678.03	0.0000
776.52	7.8204	1025.87	0.0000	1690.97	3.0172
777.92	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	7.3059	1037.84	7.9844	1764.49	4.8993
783.70	0.0000	1038.76	0.0000	1770.23	4.0874
1435.80	14.6671	1046.59	9.1491	1771.35	2.0442
903.28	9.4409	1048.07	12.5863	1791.20	0.0000
795.86	11.5555	1049.04	10.3008	1808.65	3.0884
801.95	7.3706	1050.41	8.0151	1810.72	0.0000
810.06	7.3931	1063.66	10.3462	1836.06	5.1746
810.29	7.3936	1077.00	6.9248		
810.45	7.3942	1077.34	9.2344		
810.76	7.3951	1085.87	9.2578		
815.77	9.5255	1093.63	15.0778		
818.51	10.5949	1099.45	6.9707		
832.01	11.7126	1112.07	6.9966		
834.85	11.7247	1112.84	13.9961		
836.80	0.0000	1115.54	7.0034		
846.75	0.0000	1120.29	11.3964		
846.77	8.0286	1120.55	11.3972		
856.80	11.2806	1121.30	11.3996		
860.56	3.2274	1808.65	4.3951		
871.09	9.7185	1131.51	0.0000		
873.19	8.6452	1147.95	0.0000		
875.33	0.0000	1332.49	9.7881		
879.38	12.9956	1177.95	8.0189		
880.51	9.7507	1189.05	10.7249		
881.60	6.5029	1204.77	10.2581		
883.24	10.8443	1221.41	14.4258		
884.68	15.1900	1231.02	10.8472		
889.28	17.3874	1235.36	13.0315		
894.76	14.1542	1238.28	10.8677		
1836.06	4.9050	1260.41	0.0000		
900.72	6.5461	1271.87	3.6545		
903.28	8.1900	1274.44	8.2282		
911.20	9.8544	1274.54	8.2288		
912.08	9.8577	1291.59	6.4279		
984.45	0.0000	1298.22	0.0000		
926.50	7.7044	1312.11	0.9231		
929.11	11.0160	1332.49	3.7112		
935.54	0.0000	1362.66	0.0000		
937.49	8.8376	1365.19	5.6122		

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 10:36:45.89

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*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156309.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM33.CNF;646
                                       Background date  : 20-JUL-2025 10:27:58
Sample date      : 1-JUL-2025 00:00:00. Acquisition date : 27-JUL-2025 10:06:09
Sample ID        : G1206156309          Sample quantity  : 1.15000E+02 GRAM
Detector name    : GAM33                Detector geometry: CAN
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:04.59  0.3%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2822154              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.61	4250	5041	1.31	93.66	87	14	2.36E+00	3.9	
2	0	59.69	22338	5040	1.33	119.81	112	16	1.24E+01	1.0	
3	0	149.00	71	836	1.13	298.38	296	8	3.95E-02	71.2	
4	0	246.28	68	915	1.31	492.88	489	10	3.79E-02	83.7	
5	2	471.13	162	1016	2.69	942.43	936	29	9.00E-02	38.6	3.85E+00
6	2	473.91	195	1004	2.22	948.00	936	29	1.08E-01	34.2	
7	2	477.91	104	876	2.22	956.00	936	29	5.78E-02	62.8	
8	2	480.41	135	556	2.23	961.00	936	29	7.51E-02	34.7	
9	0	620.55	52	280	1.42	1241.19	1236	11	2.86E-02	64.7	
10	0	661.60	20264	582	1.80	1323.28	1315	18	1.13E+01	0.8	
11	0	1000.41*	41	231	3.23	2000.76	1994	14	2.25E-02	81.2	
12	0	1010.47	80	271	3.51	2020.88	2011	17	4.47E-02	48.3	
13	0	1016.85*	26	207	3.36	2033.64	2027	11	1.44E-02	109.5	
14	8	1040.71*	57	250	4.38	2081.36	2074	17	3.18E-02	59.5	3.36E+00
15	8	1044.14	26	84	1.14	2088.21	2074	17	1.44E-02	55.2	
16	0	1064.55*	29	165	1.35	2129.03	2123	11	1.62E-02	87.2	
17	0	1084.78	22	254	3.76	2169.49	2164	14	1.24E-02	153.2	
18	0	1103.98	84	305	4.19	2207.88	2198	18	4.68E-02	49.9	
19	0	1172.94	5055	197	2.10	2345.77	2335	22	2.81E+00	1.6	
20	0	1332.17	4635	70	2.29	2664.19	2654	22	2.57E+00	1.5	
21	0	1361.91	16	9	2.92	2723.66	2716	14	8.86E-03	49.3	
22	0	1444.33	7	9	0.49	2888.50	2879	13	3.72E-03	103.3	
23	0	1555.62	6	10	4.95	3111.06	3101	14	3.47E-03	129.0	
24	0	1579.76	6	6	0.63	3159.33	3154	10	3.52E-03	78.2	
25	0	1639.48	18	4	1.54	3278.77	3271	15	1.02E-02	32.6	
26	0	1767.21	7	7	2.40	3534.21	3527	12	4.09E-03	76.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 27-JUL-2025 10:36:47

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156309.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 1-JUL-2025 00:00:00	Acquisition date	: 27-JUL-2025 10:06:09
Sample ID	: G1206156309	Sample quantity	: 115.00 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA33	Detector geometry	: CAN
Elapsed live time	: 0 00:30:00.00	Elapsed real time	: 0 00:30:04.59 0.3%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	103	10.44*	2.824E+00	4.564E+00	6.439E+00	125.70
CO-60	1173.23	4815	99.85	1.288E+00	4.889E+01	4.936E+01	3.15
	1332.49	4390	99.98*	1.146E+00	5.003E+01	5.050E+01	3.08
RH-106	621.93	50	9.93*	2.308E+00	2.874E+00	3.019E+00	129.44
	1050.41	------	1.56	1.431E+00	------ Line Not Found		------
RU-106	621.93	50	9.93*	2.308E+00	2.874E+00	3.019E+00	129.44
	1050.41	------	1.56	1.431E+00	------ Line Not Found		------
BA-137M	661.66	19791	89.90*	2.189E+00	1.313E+02	1.316E+02	1.51
CS-137	661.66	19791	85.10*	2.189E+00	1.387E+02	1.390E+02	1.51
BI-210	46.54	4627	4.25*	3.311E-01	4.293E+03	4.302E+03	7.72
PB-210	46.54	4627	4.25*	3.311E-01	4.293E+03	4.302E+03	7.72
AM-241	59.54	24086	35.90*	1.592E+00	5.503E+02	5.504E+02	1.97

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 10:36:48.02

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156309.CNF;1  *
* Acquisition date : 27-JUL-2025 10:06:09 Sensitivity     : 3.000       *
* Detector ID      : GAM33                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:04.59     Half life ratio : *****       *
* Sample date      :  1-JUL-2025 00:00:00 Analyst initials: MXR1        *
* Sample ID        : G1206156309          Sample Quantity : 1.1500E+02 GRAM  *
* Batch Number     : 2822154              Wet Weight      :    0.00000  *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000  *
* Nuclide Library  : SOLID.NLB;19                                       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-NOV-2024 09:05:04 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;17        *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	6.439E+00	7.932E+00	7.980E+00
CO-60	5.050E+01	1.525E+00	3.227E-01
RH-106	3.019E+00	3.829E+00	4.278E+00
RU-106	3.019E+00	3.829E+00	4.278E+00
BA-137M	1.316E+02	1.951E+00	5.143E-01
CS-137	1.390E+02	2.061E+00	5.433E-01
BI-210	4.302E+03	3.253E+02	2.410E+02
PB-210	4.302E+03	3.253E+02	2.410E+02
AM-241	5.504E+02	1.064E+01	5.384E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	4.998E-02	1.611E-01	3.094E-01	NOT IDENT.
NA-24	0.000E+00	7.619E+11	0.000E+00	SHORT HLIF
AL-26	-9.861E-02	1.240E-01	1.975E-01	NOT IDENT.
K-40	-5.835E-01	1.304E+00	2.400E+00	NOT IDENT.
SC-46	7.889E-02	4.053E-01	7.184E-01	NOT IDENT.
V-48	1.222E-01	1.081E+00	1.905E+00	NOT IDENT.
CR-51	1.895E+00	4.996E+00	8.612E+00	NOT IDENT.
MN-52	-8.659E-01	3.875E+00	7.031E+00	NOT IDENT.
MN-54	-2.152E-01	2.951E-01	5.043E-01	NOT IDENT.
CO-56	2.932E-01	3.860E-01	7.027E-01	NOT IDENT.
MN-56	0.000E+00	1.313E+41	0.000E+00	SHORT HLIF
CO-57	1.420E-01	2.250E-01	3.994E-01	NOT IDENT.
CO-58	7.276E-02	3.507E-01	6.275E-01	NOT IDENT.
FE-59	-4.869E-01	1.192E+00	1.751E+00	NOT IDENT.
ZN-65	9.897E-01	7.620E-01	1.415E+00	NOT IDENT.
GE-68	6.779E+00	1.253E+01	2.129E+01	NOT IDENT.
AS-73	2.945E+01	3.472E+01	5.125E+01	NOT IDENT.
AS-74	2.729E-01	1.216E+00	2.183E+00	NOT IDENT.
SE-75	-4.336E-02	4.751E-01	8.129E-01	NOT IDENT.
BR-77	0.000E+00	2.239E+03	0.000E+00	SHORT HLIF
SR-82	-1.466E+00	3.190E+00	5.554E+00	NOT IDENT.

RB-83	5.561E-01	7.950E-01	1.372E+00	NOT IDENT.
RB-84	4.263E-01	8.289E-01	1.488E+00	NOT IDENT.
KR-85	-3.790E+01	7.083E+01	1.170E+02	NOT IDENT.
SR-85	-2.263E-01	4.228E-01	6.983E-01	NOT IDENT.
RB-86	9.711E+00	1.125E+01	2.000E+01	NOT IDENT.
Y-88	-3.218E-02	1.428E-01	2.648E-01	NOT IDENT.
Y-91	-5.852E+00	1.120E+02	2.007E+02	NOT IDENT.
NB-94	-1.146E-01	2.326E-01	4.055E-01	NOT IDENT.
NB-95	1.377E-01	3.162E-01	5.756E-01	NOT IDENT.
NB-95M	-1.746E-01	1.258E+00	2.155E+00	NOT IDENT.
ZR-95	-4.104E-02	6.047E-01	1.072E+00	NOT IDENT.
NB-97	0.000E+00	1.049E+40	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.141E+12	0.000E+00	SHORT HLIF
MO-99	2.262E+01	1.511E+03	2.698E+03	NOT IDENT.
TC-99M	0.000E+00	1.073E+31	0.000E+00	SHORT HLIF
RH-101	-7.766E-02	2.679E-01	4.656E-01	NOT IDENT.
RH-102	-2.132E-02	4.545E-01	8.079E-01	FAIL ABUN
RU-103	-2.703E-02	5.313E-01	8.930E-01	NOT IDENT.
AG-108M	-4.041E-01	3.777E-01	6.181E-01	NOT IDENT.
CD-109	1.927E+00	6.816E+00	1.209E+01	NOT IDENT.
AG-110	0.000E+00	9.301E+00	1.643E+01	NOT IDENT.
AG-110M	-2.116E-01	4.941E-01	8.524E-01	FAIL ABUN
SN-113	3.942E-01	5.486E-01	9.464E-01	NOT IDENT.
CD-115	0.000E+00	3.538E+03	0.000E+00	SHORT HLIF
SN-117M	7.829E-02	8.117E-01	1.416E+00	NOT IDENT.
SB-122	8.343E+01	2.934E+02	5.289E+02	NOT IDENT.
TE-123M	-5.654E-03	2.549E-01	4.434E-01	NOT IDENT.
SB-124	2.243E-01	3.322E-01	7.307E-01	NOT IDENT.
SB-125	5.673E-01	1.154E+00	1.969E+00	NOT IDENT.
TE-125M	6.510E+01	9.602E+01	1.709E+02	NOT IDENT.
I-126	0.000E+00	3.851E+00	6.816E+00	NOT IDENT.
SB-126	1.923E-01	1.936E+00	3.467E+00	NOT IDENT.
SN-126	2.033E-01	6.624E-01	1.175E+00	NOT IDENT.
SB-127	-5.567E+01	6.671E+01	1.144E+02	FAIL ABUN
I-131	-9.953E-02	3.267E+00	5.548E+00	NOT IDENT.
I-132	0.000E+00	1.549E+41	0.000E+00	SHORT HLIF
TE-132	4.962E+00	8.008E+01	1.380E+02	NOT IDENT.
BA-133	-1.234E-01	4.537E-01	7.652E-01	NOT IDENT.
I-133	0.000E+00	4.547E+08	0.000E+00	SHORT HLIF
CS-134	8.953E-02	3.235E-01	5.806E-01	NOT IDENT.
I-135	0.000E+00	5.413E+28	0.000E+00	SHORT HLIF
CS-136	-3.986E-01	1.987E+00	2.974E+00	NOT IDENT.
LA-138	-6.900E-02	2.656E-01	4.055E-01	NOT IDENT.
CE-139	2.587E-02	2.696E-01	4.696E-01	NOT IDENT.
BA-140	2.057E+00	4.603E+00	8.315E+00	NOT IDENT.
LA-140	8.608E-02	4.950E-01	1.003E+00	NOT IDENT.
CE-141	-3.899E-02	7.388E-01	1.129E+00	NOT IDENT.
CE-143	0.000E+00	3.446E+05	0.000E+00	SHORT HLIF
CE-144	1.291E+00	1.765E+00	3.130E+00	NOT IDENT.
PM-144	8.685E-02	2.503E-01	4.534E-01	FAIL ABUN
PR-144	6.518E+00	1.885E+01	3.413E+01	NOT IDENT.
PM-146	-1.152E-01	5.725E-01	9.569E-01	NOT IDENT.
ND-147	-3.697E+00	1.058E+01	1.864E+01	NOT IDENT.
PM-147	3.182E+03	6.451E+03	1.142E+04	NOT IDENT.
PM-149	0.000E+00	3.123E+04	0.000E+00	SHORT HLIF
EU-150	-4.003E-02	2.777E-01	4.712E-01	NOT IDENT.
EU-152	-8.521E-01	9.734E-01	1.616E+00	FAIL ABUN
GD-153	4.333E-01	7.548E-01	1.345E+00	NOT IDENT.
EU-154	1.345E-01	4.531E-01	8.688E-01	NOT IDENT.
EU-155	-7.608E-01	9.297E-01	1.605E+00	NOT IDENT.
TB-160	7.056E-02	1.383E+00	2.437E+00	FAIL ABUN
HO-166M	-2.260E-01	4.329E-01	7.531E-01	NOT IDENT.
TM-171	-6.001E+02	7.799E+02	1.010E+03	NOT IDENT.
HF-172	7.564E-01	1.626E+00	2.875E+00	FAIL ABUN
LU-172	-2.311E-02	6.136E-01	1.041E+00	FAIL ABUN
LU-176	-2.823E-01	2.726E-01	4.527E-01	NOT IDENT.
HF-181	5.486E-01	6.942E-01	1.052E+00	NOT IDENT.
TA-182	-5.037E-01	7.771E-01	1.319E+00	NOT IDENT.
RE-183	0.000E+00	9.727E+00	2.241E+01	FAIL ABUN
RE-184	-9.861E-01	1.427E+00	2.432E+00	NOT IDENT.
W-188	2.222E+01	7.799E+01	1.345E+02	NOT IDENT.
IR-192	-2.359E-01	3.969E-01	6.664E-01	NOT IDENT.
HG-203	-5.854E-02	4.385E-01	7.485E-01	NOT IDENT.
TL-204	1.904E+01	4.800E+01	8.579E+01	NOT IDENT.
BI-207	3.471E-01	5.931E-01	8.035E-01	FAIL ABUN
TL-208	-4.917E-03	3.013E-01	5.373E-01	NOT IDENT.
BI-211	1.803E+00	2.131E+00	3.705E+00	NOT IDENT.
PB-211	-4.986E+00	7.989E+00	1.328E+01	NOT IDENT.

BI-212	-2.934E-01	3.464E+00	6.157E+00	NOT IDENT.
PB-212	1.913E-01	5.326E-01	9.248E-01	NOT IDENT.
BI-213	-3.261E-01	1.333E+00	2.229E+00	NOT IDENT.
BI-214	-2.206E-01	5.572E-01	9.790E-01	NOT IDENT.
PB-214	8.753E-01	7.714E-01	1.352E+00	NOT IDENT.
RN-219	4.158E-01	4.589E+00	7.783E+00	NOT IDENT.
RN-222	8.753E-01	7.714E-01	1.352E+00	NOT IDENT.
RA-223	5.702E-01	6.619E+00	1.131E+01	NOT IDENT.
RA-224	-9.539E-01	6.058E+00	9.585E+00	NOT IDENT.
AC-225	1.057E+01	1.268E+01	2.224E+01	NOT IDENT.
RA-226	8.753E-01	7.714E-01	1.352E+00	NOT IDENT.
AC-227	5.599E-01	2.453E+00	4.236E+00	NOT IDENT.
TH-227	5.599E-01	2.453E+00	4.236E+00	NOT IDENT.
AC-228	5.214E-01	1.403E+00	2.493E+00	NOT IDENT.
RA-228	5.214E-01	1.403E+00	2.493E+00	NOT IDENT.
TH-228	1.913E-01	5.326E-01	9.248E-01	NOT IDENT.
TH-229	-6.981E-01	4.813E+00	8.294E+00	NOT IDENT.
TH-230	8.753E-01	7.714E-01	1.352E+00	NOT IDENT.
PA-231	-1.699E+00	4.647E+00	7.865E+00	NOT IDENT.
TH-231	5.702E-01	6.619E+00	1.131E+01	NOT IDENT.
TH-232	5.214E-01	1.403E+00	2.493E+00	NOT IDENT.
PA-233	5.982E-01	6.643E-01	1.161E+00	NOT IDENT.
PA-234	-9.292E-01	3.178E+00	5.489E+00	NOT IDENT.
PA-234M	0.000E+00	1.902E+01	3.344E+01	NOT IDENT.
TH-234	0.000E+00	1.902E+01	3.344E+01	NOT IDENT.
U-234	8.753E-01	7.714E-01	1.352E+00	NOT IDENT.
U-235	-1.550E-01	1.700E+00	2.862E+00	NOT IDENT.
NP-237	5.982E-01	6.643E-01	1.161E+00	NOT IDENT.
NP-238	0.000E+00	7.796E+03	0.000E+00	SHORT HLIF
U-238	0.000E+00	1.902E+01	3.344E+01	NOT IDENT.
NP-239	1.131E-01	2.303E+00	4.041E+00	NOT IDENT.
PU-239	-4.238E+02	2.845E+03	4.958E+03	NOT IDENT.
AM-243	-4.285E-01	4.871E-01	8.471E-01	NOT IDENT.
CM-243	8.181E-01	9.363E-01	1.676E+00	NOT IDENT.
BK-247	6.665E-02	7.931E-01	1.363E+00	NOT IDENT.
CM-247	1.010E-01	4.188E-01	7.132E-01	NOT IDENT.
CF-249	-2.087E-01	4.570E-01	7.643E-01	NOT IDENT.
CF-251	-6.261E-01	1.097E+00	1.879E+00	NOT IDENT.
ANH-511	7.668E-02	3.036E-01	5.260E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 10:36:46.64

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	103	10.44*	2.824E+00	4.564E+00	6.439E+00	125.70
CO-60	1173.23	4815	99.85	1.288E+00	4.889E+01	4.936E+01	3.15
	1332.49	4390	99.98*	1.146E+00	5.003E+01	5.050E+01	3.08
RH-106	621.93	50	9.93*	2.308E+00	2.874E+00	3.019E+00	129.44
	1050.41	------	1.56	1.431E+00	------ Line Not Found		------
RU-106	621.93	50	9.93*	2.308E+00	2.874E+00	3.019E+00	129.44
	1050.41	------	1.56	1.431E+00	------ Line Not Found		------
BA-137M	661.66	19791	89.90*	2.189E+00	1.313E+02	1.316E+02	1.51
CS-137	661.66	19791	85.10*	2.189E+00	1.387E+02	1.390E+02	1.51
BI-210	46.54	4627	4.25*	3.311E-01	4.293E+03	4.302E+03	7.72
PB-210	46.54	4627	4.25*	3.311E-01	4.293E+03	4.302E+03	7.72
AM-241	59.54	24086	35.90*	1.592E+00	5.503E+02	5.504E+02	1.97

Flag: "*" = Keyline

Sample ID : G1206156309 Acquisition date : 27-JUL-2025 10:06:09

Total number of lines in spectrum	26	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	11	42.31%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.41	4.564E+00	6.439E+00	8.094E+00	125.70	
CO-60	5.27Y	1.01	5.003E+01	5.050E+01	0.156E+01	3.08	
RH-106	371.80D	1.05	2.874E+00	3.019E+00	3.907E+00	129.44	
RU-106	371.80D	1.05	2.874E+00	3.019E+00	3.907E+00	129.44	
BA-137M	30.08Y	1.00	1.313E+02	1.316E+02	0.020E+02	1.51	
CS-137	30.08Y	1.00	1.387E+02	1.390E+02	0.021E+02	1.51	
BI-210	22.20Y	1.00	4.293E+03	4.302E+03	0.332E+03	7.72	
PB-210	22.20Y	1.00	4.293E+03	4.302E+03	0.332E+03	7.72	
AM-241	432.60Y	1.00	5.503E+02	5.504E+02	0.109E+02	1.97	
	Total Activity :		9.466E+03	9.489E+03			

Grand Total Activity : 9.466E+03 9.489E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1206156309 Acquisition date : 27-JUL-2025 10:06:09

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	149.00	74	869	1.13	298.38	296	8	3.95E-02	****	5.99E+00	
0	246.28	69	932	1.31	492.88	489	10	3.79E-02	****	4.50E+00	
2	471.13	160	1007	2.69	942.43	936	29	9.00E-02	77.2	2.85E+00	
2	473.91	193	995	2.22	948.00	936	29	1.08E-01	68.4	2.84E+00	T
2	480.41	134	551	2.23	961.00	936	29	7.51E-02	69.5	2.81E+00	
0	1000.41	39	222	3.23	2000.76	1994	14	2.25E-02	****	1.50E+00	
0	1010.47	77	259	3.51	2020.88	2011	17	4.47E-02	96.5	1.49E+00	
0	1016.85	25	198	3.36	2033.64	2027	11	1.44E-02	****	1.48E+00	
8	1040.71	55	240	4.38	2081.36	2074	17	3.18E-02	****	1.44E+00	
8	1044.14	25	80	1.14	2088.21	2074	17	1.44E-02	****	1.44E+00	
0	1064.55	28	158	1.35	2129.03	2123	11	1.62E-02	****	1.41E+00	T
0	1084.78	21	242	3.76	2169.49	2164	14	1.24E-02	****	1.39E+00	T
0	1103.98	80	291	4.19	2207.88	2198	18	4.68E-02	99.8	1.36E+00	
0	1361.91	15	9	2.92	2723.66	2716	14	8.86E-03	98.6	1.12E+00	T
0	1444.33	6	9	0.49	2888.50	2879	13	3.72E-03	****	1.07E+00	
0	1555.62	6	9	4.95	3111.06	3101	14	3.47E-03	****	1.01E+00	
0	1579.76	6	5	0.63	3159.33	3154	10	3.52E-03	****	1.00E+00	
0	1639.48	17	3	1.54	3278.77	3271	15	1.02E-02	65.2	9.79E-01	
0	1767.21	7	6	2.40	3534.21	3527	12	4.09E-03	****	9.41E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 10:36:58.52

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156309.CNF;1   *
* Acquisition date : 27-JUL-2025 10:06:09 Sensitivity     : 3.000    *
* Detector ID      : GAM33                Energy tolerance: 1.500    *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000   *
* Elapsed real time:    0 00:30:04.59     Half life ratio : *****    *
* Sample date      :  1-JUL-2025 00:00:00 Nuclide Library : SOLID    *
* Sample ID        : G1206156309          Analyst initials: MXR1     *
* Batch Number     : 2822154              Sample Quantity : 1.1500E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 25-NOV-2024 09:05:04 Eff. Geometry   : CAN      *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;17     *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	3.907E+00
CO-60	1.459E-01
RH-106	2.059E+00
RU-106	2.059E+00
BA-137M	2.482E-01
CS-137	2.622E-01
BI-210	1.193E+02
PB-210	1.193E+02
AM-241	2.661E+00

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	1.397E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	7.987E-02	NOT IDENT.
K-40	1.045E+00	NOT IDENT.
SC-46	3.463E-01	NOT IDENT.
V-48	9.166E-01	NOT IDENT.
CR-51	4.215E+00	NOT IDENT.
MN-52	3.084E+00	NOT IDENT.
MN-54	2.417E-01	NOT IDENT.
CO-56	3.388E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.961E-01	NOT IDENT.
CO-58	3.013E-01	NOT IDENT.
FE-59	8.414E-01	NOT IDENT.
ZN-65	6.802E-01	NOT IDENT.
GE-68	1.023E+01	NOT IDENT.
AS-73	2.538E+01	NOT IDENT.
AS-74	1.057E+00	NOT IDENT.
SE-75	3.984E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	2.651E+00	NOT IDENT.
RB-83	6.679E-01	NOT IDENT.

RB-84	7.181E-01	NOT IDENT.
KR-85	5.699E+01	NOT IDENT.
SR-85	3.402E-01	NOT IDENT.
RB-86	9.616E+00	NOT IDENT.
Y-88	1.097E-01	NOT IDENT.
Y-91	9.302E+01	NOT IDENT.
NB-94	1.943E-01	NOT IDENT.
NB-95	2.757E-01	NOT IDENT.
NB-95M	1.058E+00	NOT IDENT.
ZR-95	5.142E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	1.292E+03	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.286E-01	NOT IDENT.
RH-102	3.901E-01	FAIL ABUN
RU-103	4.354E-01	NOT IDENT.
AG-108M	3.027E-01	NOT IDENT.
CD-109	5.943E+00	NOT IDENT.
AG-110	8.028E+00	NOT IDENT.
AG-110M	4.109E-01	FAIL ABUN
SN-113	4.636E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	6.946E-01	NOT IDENT.
SB-122	2.561E+02	NOT IDENT.
TE-123M	2.175E-01	NOT IDENT.
SB-124	3.134E-01	NOT IDENT.
SB-125	9.652E-01	NOT IDENT.
TE-125M	8.398E+01	NOT IDENT.
I-126	3.308E+00	NOT IDENT.
SB-126	1.663E+00	NOT IDENT.
SN-126	5.778E-01	NOT IDENT.
SB-127	5.460E+01	FAIL ABUN
I-131	2.713E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	6.773E+01	NOT IDENT.
BA-133	3.745E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.790E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.426E+00	NOT IDENT.
LA-138	1.779E-01	NOT IDENT.
CE-139	2.304E-01	NOT IDENT.
BA-140	4.041E+00	NOT IDENT.
LA-140	4.236E-01	NOT IDENT.
CE-141	5.539E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.538E+00	NOT IDENT.
PM-144	2.179E-01	FAIL ABUN
PR-144	1.640E+01	NOT IDENT.
PM-146	4.693E-01	NOT IDENT.
ND-147	9.051E+00	NOT IDENT.
PM-147	5.608E+03	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.306E-01	NOT IDENT.
EU-152	7.896E-01	FAIL ABUN
GD-153	6.607E-01	NOT IDENT.
EU-154	3.921E-01	NOT IDENT.
EU-155	7.884E-01	NOT IDENT.
TB-160	1.175E+00	FAIL ABUN
HO-166M	3.608E-01	NOT IDENT.
TM-171	5.000E+02	NOT IDENT.
HF-172	1.412E+00	FAIL ABUN
LU-172	4.999E-01	FAIL ABUN
LU-176	2.215E-01	NOT IDENT.
HF-181	5.144E-01	NOT IDENT.
TA-182	5.979E-01	NOT IDENT.
RE-183	1.116E+01	FAIL ABUN
RE-184	1.169E+00	NOT IDENT.
W-188	6.585E+01	NOT IDENT.
IR-192	3.261E-01	NOT IDENT.
HG-203	3.666E-01	NOT IDENT.
TL-204	4.216E+01	NOT IDENT.
BI-207	3.852E-01	FAIL ABUN
TL-208	2.602E-01	NOT IDENT.
BI-211	1.814E+00	NOT IDENT.
PB-211	6.495E+00	NOT IDENT.
BI-212	2.949E+00	NOT IDENT.

PB-212	4.537E-01	NOT IDENT.
BI-213	1.092E+00	NOT IDENT.
BI-214	4.731E-01	NOT IDENT.
PB-214	6.621E-01	NOT IDENT.
RN-219	3.809E+00	NOT IDENT.
RN-222	6.621E-01	NOT IDENT.
RA-223	5.537E+00	NOT IDENT.
RA-224	4.700E+00	NOT IDENT.
AC-225	1.092E+01	NOT IDENT.
RA-226	6.621E-01	NOT IDENT.
AC-227	2.076E+00	NOT IDENT.
TH-227	2.076E+00	NOT IDENT.
AC-228	1.206E+00	NOT IDENT.
RA-228	1.206E+00	NOT IDENT.
TH-228	4.537E-01	NOT IDENT.
TH-229	4.072E+00	NOT IDENT.
TH-230	6.621E-01	NOT IDENT.
PA-231	3.849E+00	NOT IDENT.
TH-231	5.537E+00	NOT IDENT.
TH-232	1.206E+00	NOT IDENT.
PA-233	5.686E-01	NOT IDENT.
PA-234	2.653E+00	NOT IDENT.
PA-234M	1.649E+01	NOT IDENT.
TH-234	1.649E+01	NOT IDENT.
U-234	6.621E-01	NOT IDENT.
U-235	1.405E+00	NOT IDENT.
NP-237	5.686E-01	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	1.649E+01	NOT IDENT.
NP-239	1.985E+00	NOT IDENT.
PU-239	2.434E+03	NOT IDENT.
AM-243	4.162E-01	NOT IDENT.
CM-243	8.235E-01	NOT IDENT.
BK-247	6.680E-01	NOT IDENT.
CM-247	3.491E-01	NOT IDENT.
CF-249	3.741E-01	NOT IDENT.
CF-251	9.211E-01	NOT IDENT.
ANH-511	2.565E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 27-JUL-2025 10:37:02.49

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206156309.CNF;1  *
* Acquisition date : 27-JUL-2025 10:06:09 Sensitivity     : 3.000       *
* Detector ID      : GAM33                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:04.59     Half life ratio : *****       *
* Sample date      :  1-JUL-2025 00:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1206156309          Analyst initials: MXR1        *
* Batch Number     : 2822154              Sample Quantity : 1.1500E+02 GRAM  *
*                                         Quantity Err(%) : 1.7391E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-NOV-2024 09:05:04 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;17        *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	6.439E+00	7.953E+00	7.953E+00
CO-60	5.050E+01	6.209E+00	6.209E+00
RH-106	3.019E+00	3.840E+00	3.840E+00
RU-106	3.019E+00	3.840E+00	3.840E+00
BA-137M	1.316E+02	1.084E+01	1.084E+01
CS-137	1.390E+02	1.144E+01	1.144E+01
BI-210	4.302E+03	6.250E+02	6.250E+02
PB-210	4.302E+03	6.250E+02	6.250E+02
AM-241	5.504E+02	7.193E+01	7.193E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	4.998E-02	1.612E-01	1.628E-01	NOT IDENT.
NA-24	3.385E+11	7.630E+11	7.781E+11	SHORT HLIF
AL-26	-9.861E-02	1.242E-01	1.320E-01	NOT IDENT.
K-40	-5.835E-01	1.306E+00	1.332E+00	NOT IDENT.
SC-46	7.889E-02	4.054E-01	4.070E-01	NOT IDENT.
V-48	1.222E-01	1.081E+00	1.083E+00	NOT IDENT.
CR-51	1.895E+00	4.999E+00	5.072E+00	NOT IDENT.
MN-52	-8.659E-01	3.877E+00	3.896E+00	NOT IDENT.
MN-54	-2.152E-01	2.962E-01	3.117E-01	NOT IDENT.
CO-56	2.932E-01	3.876E-01	4.096E-01	NOT IDENT.
MN-56	1.000E+41	1.319E+41	0.000E+00	SHORT HLIF
CO-57	1.420E-01	2.252E-01	2.342E-01	NOT IDENT.
CO-58	7.276E-02	3.508E-01	3.523E-01	NOT IDENT.
FE-59	-4.869E-01	1.194E+00	1.214E+00	NOT IDENT.
ZN-65	9.897E-01	7.689E-01	8.889E-01	NOT IDENT.
GE-68	6.779E+00	1.256E+01	1.292E+01	NOT IDENT.
AS-73	2.945E+01	3.543E+01	3.783E+01	NOT IDENT.
AS-74	2.729E-01	1.216E+00	1.222E+00	NOT IDENT.
SE-75	-4.336E-02	4.752E-01	4.756E-01	NOT IDENT.
BR-77	7.039E+02	2.304E+03	2.325E+03	SHORT HLIF
SR-82	-1.466E+00	3.194E+00	3.261E+00	NOT IDENT.

RB-83	5.561E-01	7.998E-01	8.381E-01	NOT IDENT.
RB-84	4.263E-01	8.307E-01	8.527E-01	NOT IDENT.
KR-85	-3.790E+01	7.091E+01	7.294E+01	NOT IDENT.
SR-85	-2.263E-01	4.232E-01	4.353E-01	NOT IDENT.
RB-86	9.711E+00	1.130E+01	1.212E+01	NOT IDENT.
Y-88	-3.218E-02	1.428E-01	1.435E-01	NOT IDENT.
Y-91	-5.852E+00	1.120E+02	1.120E+02	NOT IDENT.
NB-94	-1.146E-01	2.329E-01	2.385E-01	NOT IDENT.
NB-95	1.377E-01	3.165E-01	3.225E-01	NOT IDENT.
NB-95M	-1.746E-01	1.258E+00	1.260E+00	NOT IDENT.
ZR-95	-4.104E-02	6.047E-01	6.050E-01	NOT IDENT.
NB-97	1.000E+41	1.327E+40	0.000E+00	SHORT HLIF
ZR-97	3.631E+10	1.141E+12	1.141E+12	SHORT HLIF
MO-99	2.262E+01	1.511E+03	1.511E+03	NOT IDENT.
TC-99M	-7.642E+29	1.073E+31	0.000E+00	SHORT HLIF
RH-101	-7.766E-02	2.683E-01	2.705E-01	NOT IDENT.
RH-102	-2.132E-02	4.545E-01	4.546E-01	FAIL ABUN
RU-103	-2.703E-02	5.313E-01	5.314E-01	NOT IDENT.
AG-108M	-4.041E-01	3.793E-01	4.208E-01	NOT IDENT.
CD-109	1.927E+00	6.820E+00	6.875E+00	NOT IDENT.
AG-110	3.445E+01	9.714E+00	1.832E+01	NOT IDENT.
AG-110M	-2.116E-01	4.949E-01	5.040E-01	FAIL ABUN
SN-113	3.942E-01	5.497E-01	5.777E-01	NOT IDENT.
CD-115	9.280E+01	3.538E+03	3.538E+03	SHORT HLIF
SN-117M	7.829E-02	8.117E-01	8.125E-01	NOT IDENT.
SB-122	8.343E+01	2.935E+02	2.959E+02	NOT IDENT.
TE-123M	-5.654E-03	2.549E-01	2.550E-01	NOT IDENT.
SB-124	2.243E-01	3.329E-01	3.480E-01	NOT IDENT.
SB-125	5.673E-01	1.155E+00	1.183E+00	NOT IDENT.
TE-125M	6.510E+01	9.617E+01	1.005E+02	NOT IDENT.
I-126	1.074E+01	3.977E+00	6.267E+00	NOT IDENT.
SB-126	1.923E-01	1.936E+00	1.938E+00	NOT IDENT.
SN-126	2.033E-01	6.627E-01	6.690E-01	NOT IDENT.
SB-127	-5.567E+01	6.722E+01	7.175E+01	FAIL ABUN
I-131	-9.953E-02	3.267E+00	3.268E+00	NOT IDENT.
I-132	1.000E+41	2.249E+41	0.000E+00	SHORT HLIF
TE-132	4.962E+00	8.009E+01	8.012E+01	NOT IDENT.
BA-133	-1.234E-01	4.538E-01	4.572E-01	NOT IDENT.
I-133	-5.954E+07	4.548E+08	4.556E+08	SHORT HLIF
CS-134	8.953E-02	3.237E-01	3.262E-01	NOT IDENT.
I-135	2.860E+28	5.687E+28	0.000E+00	SHORT HLIF
CS-136	-3.986E-01	1.988E+00	1.996E+00	NOT IDENT.
LA-138	-6.900E-02	2.657E-01	2.676E-01	NOT IDENT.
CE-139	2.587E-02	2.697E-01	2.699E-01	NOT IDENT.
BA-140	2.057E+00	4.606E+00	4.699E+00	NOT IDENT.
LA-140	8.608E-02	4.951E-01	4.966E-01	NOT IDENT.
CE-141	-3.899E-02	7.388E-01	7.390E-01	NOT IDENT.
CE-143	-1.426E+05	3.449E+05	3.508E+05	SHORT HLIF
CE-144	1.291E+00	1.768E+00	1.861E+00	NOT IDENT.
PM-144	8.685E-02	2.505E-01	2.535E-01	FAIL ABUN
PR-144	6.518E+00	1.885E+01	1.908E+01	NOT IDENT.
PM-146	-1.152E-01	5.726E-01	5.750E-01	NOT IDENT.
ND-147	-3.697E+00	1.058E+01	1.071E+01	NOT IDENT.
PM-147	3.182E+03	6.455E+03	6.613E+03	NOT IDENT.
PM-149	1.159E+04	3.128E+04	3.172E+04	SHORT HLIF
EU-150	-4.003E-02	2.777E-01	2.783E-01	NOT IDENT.
EU-152	-8.521E-01	9.772E-01	1.050E+00	FAIL ABUN
GD-153	4.333E-01	7.557E-01	7.805E-01	NOT IDENT.
EU-154	1.345E-01	4.533E-01	4.574E-01	NOT IDENT.
EU-155	-7.608E-01	9.325E-01	9.936E-01	NOT IDENT.
TB-160	7.056E-02	1.383E+00	1.383E+00	FAIL ABUN
HO-166M	-2.260E-01	4.334E-01	4.452E-01	NOT IDENT.
TM-171	-6.001E+02	7.852E+02	8.304E+02	NOT IDENT.
HF-172	7.564E-01	1.631E+00	1.667E+00	FAIL ABUN
LU-172	-2.311E-02	6.136E-01	6.137E-01	FAIL ABUN
LU-176	-2.823E-01	2.741E-01	3.022E-01	NOT IDENT.
HF-181	5.486E-01	6.959E-01	7.386E-01	NOT IDENT.
TA-182	-5.037E-01	7.787E-01	8.112E-01	NOT IDENT.
RE-183	5.264E+02	8.039E+01	2.505E+02	FAIL ABUN
RE-184	-9.861E-01	1.434E+00	1.501E+00	NOT IDENT.
W-188	2.222E+01	7.805E+01	7.869E+01	NOT IDENT.
IR-192	-2.359E-01	3.976E-01	4.115E-01	NOT IDENT.
HG-203	-5.854E-02	4.385E-01	4.393E-01	NOT IDENT.
TL-204	1.904E+01	4.805E+01	4.881E+01	NOT IDENT.
BI-207	3.471E-01	5.944E-01	6.147E-01	FAIL ABUN
TL-208	-4.917E-03	3.013E-01	3.013E-01	NOT IDENT.
BI-211	1.803E+00	2.138E+00	2.287E+00	NOT IDENT.
PB-211	-4.986E+00	8.003E+00	8.312E+00	NOT IDENT.

BI-212	-2.934E-01	3.464E+00	3.467E+00	NOT IDENT.
PB-212	1.913E-01	5.329E-01	5.399E-01	NOT IDENT.
BI-213	-3.261E-01	1.333E+00	1.341E+00	NOT IDENT.
BI-214	-2.206E-01	5.575E-01	5.663E-01	NOT IDENT.
PB-214	8.753E-01	7.758E-01	8.704E-01	NOT IDENT.
RN-219	4.158E-01	4.589E+00	4.593E+00	NOT IDENT.
RN-222	8.753E-01	7.758E-01	8.704E-01	NOT IDENT.
RA-223	5.702E-01	6.619E+00	6.624E+00	NOT IDENT.
RA-224	-9.539E-01	6.059E+00	6.074E+00	NOT IDENT.
AC-225	1.057E+01	1.273E+01	1.359E+01	NOT IDENT.
RA-226	8.753E-01	7.758E-01	8.704E-01	NOT IDENT.
AC-227	5.599E-01	2.455E+00	2.468E+00	NOT IDENT.
TH-227	5.599E-01	2.455E+00	2.468E+00	NOT IDENT.
AC-228	5.214E-01	1.405E+00	1.424E+00	NOT IDENT.
RA-228	5.214E-01	1.405E+00	1.424E+00	NOT IDENT.
TH-228	1.913E-01	5.329E-01	5.399E-01	NOT IDENT.
TH-229	-6.981E-01	4.813E+00	4.824E+00	NOT IDENT.
TH-230	8.753E-01	7.758E-01	8.703E-01	NOT IDENT.
PA-231	-1.699E+00	4.663E+00	4.726E+00	NOT IDENT.
TH-231	5.702E-01	6.619E+00	6.624E+00	NOT IDENT.
TH-232	5.214E-01	1.405E+00	1.424E+00	NOT IDENT.
PA-233	5.982E-01	6.670E-01	7.194E-01	NOT IDENT.
PA-234	-9.292E-01	3.353E+00	3.379E+00	NOT IDENT.
PA-234M	9.862E+01	3.048E+01	5.390E+01	NOT IDENT.
TH-234	9.862E+01	3.048E+01	5.390E+01	NOT IDENT.
U-234	8.753E-01	7.758E-01	8.703E-01	NOT IDENT.
U-235	-1.550E-01	1.700E+00	1.701E+00	NOT IDENT.
NP-237	5.982E-01	6.670E-01	7.194E-01	NOT IDENT.
NP-238	1.953E+03	7.800E+03	7.849E+03	SHORT HLIF
U-238	9.862E+01	3.048E+01	5.390E+01	NOT IDENT.
NP-239	1.131E-01	2.303E+00	2.303E+00	NOT IDENT.
PU-239	-4.238E+02	2.845E+03	2.851E+03	NOT IDENT.
AM-243	-4.285E-01	4.889E-01	5.257E-01	NOT IDENT.
CM-243	8.181E-01	9.407E-01	1.010E+00	NOT IDENT.
BK-247	6.665E-02	7.932E-01	7.938E-01	NOT IDENT.
CM-247	1.010E-01	4.192E-01	4.216E-01	NOT IDENT.
CF-249	-2.087E-01	4.576E-01	4.672E-01	NOT IDENT.
CF-251	-6.261E-01	1.100E+00	1.136E+00	NOT IDENT.
ANH-511	7.668E-02	3.037E-01	3.057E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	2477.3911	81.75	1144.8102	125.81	920.4931
879.38	2799.9314	82.47	1148.2581	127.23	957.6169
46.54	2802.4478	83.79	1097.5392	127.91	945.1740
228.16	3228.1018	265.00	1102.4943	129.30	950.8072
52.39	3514.0059	193.51	1111.2461	131.20	988.2702
1093.63	3496.9480	105.31	1147.6228	133.02	941.8377
52.39	3380.0774	86.79	1128.5996	133.52	948.0176
125.81	3326.9133	86.94	1128.7115	136.00	989.7927
53.44	3247.1489	87.09	1108.6533	136.47	989.0442
54.07	3204.7263	87.57	1104.2048	739.50	943.5457
293.27	0.0000	88.03	1097.8175	140.51	0.0000
482.18	2319.0081	306.78	1109.5822	143.76	911.0698
57.98	2319.8835	88.47	1099.1016	144.24	871.1954
59.27	2322.3926	143.76	1087.6742	145.44	888.6818
59.32	2322.4915	90.64	1033.2717	152.43	896.5519
59.54	2322.9153	531.02	1033.5909	1048.07	864.9968
60.96	2325.6360	92.59	1042.3033	154.21	871.7871
61.17	2326.0361	93.35	1018.7018	158.56	864.9627
62.93	1069.1669	94.56	1044.5966	159.00	880.2081
63.29	1045.3079	311.90	1050.4514	162.33	870.5779
290.67	1045.5508	946.00	1050.4639	537.26	891.7587
87.57	1008.3408	94.87	1050.6008	163.33	891.0348
66.73	1017.3593	97.43	959.4598	165.86	889.0824
67.24	1035.8000	98.43	1014.2626	427.87	835.8813
67.68	1044.0044	98.44	1014.2706	176.60	873.3008
1221.41	1044.0591	103.37	991.7188	177.52	862.5668
70.82	1057.3029	116.74	991.7188	181.07	873.0242
97.43	1023.7790	100.11	1007.5793	181.52	869.1595
70.82	1010.4233	102.03	1026.2371	184.41	940.0852
279.20	1010.4315	103.18	961.9252	185.72	949.7436
1063.66	1070.8993	103.37	962.0386	193.51	952.9425
72.87	1070.9465	105.31	1046.7578	197.03	921.8083
351.06	1070.9465	106.12	1040.4646	198.01	954.7603
74.66	1094.2640	106.47	1040.6809	201.83	1000.1302
351.93	1094.3911	109.28	955.7213	203.43	906.9330
238.63	1094.3911	111.00	978.1454	205.31	959.7076
351.93	1094.3911	111.76	1023.4617	210.85	915.8400
238.63	1094.3911	114.06	1013.1068	215.65	994.5105
74.97	1098.3242	116.30	959.6320	218.12	925.7006
77.11	1096.2145	116.74	966.7207	222.11	951.8361
78.74	1057.3771	119.76	987.9799	227.09	904.2585
256.23	1130.7306	264.66	931.8403	227.38	910.5392
80.03	1126.2190	121.22	931.8947	228.16	890.2090
133.52	1126.2953	344.28	927.2784	228.18	890.2156
364.49	1140.6915	122.06	923.4969	235.69	891.7531
711.68	1155.3427	122.92	943.5759	235.96	891.8387
356.01	1136.5588	1274.44	957.4001	238.63	835.8453
323.87	1136.6133	123.68	985.2276	238.98	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
240.99	831.0692	911.20	668.7451	537.26	369.8909
242.00	888.2800	340.48	645.6377	1260.41	0.0000
244.70	764.7580	340.55	652.0712	552.55	315.9575
685.70	804.0845	344.28	653.8866	795.86	304.0190
388.16	810.5410	345.93	648.8500	564.24	294.0996
507.63	0.0000	351.06	660.5883	569.33	281.7095
256.23	770.4984	351.93	642.5015	569.50	289.9037
527.90	0.0000	355.39	0.0000	569.70	289.9115
264.66	793.7115	356.01	711.0571	583.19	305.3685
264.80	770.7808	364.49	639.5001	584.27	294.4930
265.00	770.8370	366.42	643.0991	595.83	291.5782
269.46	772.0532	372.51	672.3401	600.60	313.8416
270.03	769.0606	375.05	689.0595	602.52	0.0000
401.81	752.6373	377.52	679.8031	604.72	269.2440
273.65	742.7969	383.85	690.7994	607.14	294.1272
276.40	729.8782	388.16	732.8945	609.32	286.9268
583.19	695.5046	666.33	723.2242	610.33	270.4839
277.60	702.8989	391.69	691.2385	614.28	285.7905
402.40	695.6563	400.66	655.9206	618.01	295.4135
279.20	744.2250	401.81	683.3799	884.68	244.4135
279.54	752.7100	402.40	670.4088	621.93	215.9980
279.70	752.7537	404.85	697.0439	630.19	0.0000
280.46	765.5524	410.95	725.5205	631.29	260.6281
301.36	698.0632	413.71	728.2546	633.25	269.9520
284.31	702.4111	720.70	727.3539	634.78	256.2134
285.41	707.9357	423.72	732.4088	635.95	244.2904
285.90	0.0000	427.09	740.7532	636.99	268.3154
287.50	748.4399	427.87	758.4699	657.50	344.1365
290.67	686.0155	433.94	820.1492	657.76	330.2650
293.27	0.0000	439.40	759.6675	657.90	0.0000
295.22	693.3909	440.45	789.6124	661.66	255.7717
316.51	681.9492	453.88	856.4545	664.57	0.0000
298.58	695.2194	463.37	859.6317	666.33	211.7992
299.98	718.7958	468.07	869.5227	666.50	204.0747
300.09	745.2436	473.00	712.9143	667.71	0.0000
300.13	745.2544	631.29	713.2866	677.62	169.2031
311.90	745.2544	696.49	713.5902	685.70	172.2677
301.36	715.9449	477.60	713.7372	692.65	194.8864
302.85	682.4387	482.18	546.7014	695.00	183.7785
304.50	687.0372	487.02	557.1594	696.49	187.5689
304.85	672.2943	492.35	0.0000	696.51	187.5689
306.78	759.5916	497.08	500.4385	697.00	186.6504
308.46	732.4478	505.52	537.2754	697.30	175.4651
311.90	674.8960	507.63	0.0000	697.49	181.0698
316.51	716.2793	511.00	448.3215	702.65	193.4005
319.41	685.0263	514.00	497.9858	706.68	159.8909
320.08	667.0869	514.00	497.9858	711.68	192.8031
321.04	691.7656	520.40	403.2615	720.70	180.0094
323.87	711.5541	520.69	0.0000	721.93	0.0000
325.23	678.8245	667.71	0.0000	1690.97	166.9532
1596.21	693.4418	527.90	0.0000	722.91	166.9554
333.37	706.1906	528.26	384.4251	723.31	168.8423
333.97	699.9053	529.59	377.3353	756.73	184.8222
334.37	713.8883	529.87	0.0000	727.33	172.7291
338.28	668.7355	531.02	382.8735	733.00	177.6120

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
735.93	169.2510	983.53	303.2250	1368.63	0.0000
737.46	158.0127	946.00	288.6867	1384.29	16.6000
739.50	168.4243	949.00	274.1877	1408.01	11.4463
1434.09	169.5146	954.55	0.0000	1434.09	19.8350
747.24	172.4382	962.31	268.9038	1435.80	20.8828
748.06	181.8893	964.08	290.5031	1457.56	0.0000
752.31	174.4854	966.17	248.5244	1460.82	16.7570
753.82	169.8179	968.97	233.9528	1489.16	15.7632
756.73	183.1254	983.53	208.9802	1505.03	12.6340
756.80	183.1301	984.45	0.0000	1584.12	12.3964
763.94	181.4813	996.26	226.1086	1596.21	8.5121
765.81	156.0128	1002.74	162.3695	1620.50	10.6694
766.84	145.6420	1004.73	201.7969	1621.92	12.8057
772.60	0.0000	1021.30	0.0000	1678.03	0.0000
776.52	162.9507	1025.87	0.0000	1690.97	6.4518
777.92	168.6785	1028.54	0.0000	1750.46	0.0000
778.90	161.1265	1037.84	197.8711	1764.49	9.0320
783.70	176.4457	1038.76	0.0000	1770.23	7.2298
1435.80	199.3975	1046.59	198.1348	1771.35	10.8462
903.28	196.6652	1048.07	188.2744	1791.20	0.0000
795.86	192.0480	1049.04	176.9758	1808.65	13.0664
801.95	195.1104	1050.41	199.2432	1810.72	0.0000
810.06	190.6299	1063.66	157.2587	1836.06	9.8279
810.29	186.8221	1077.00	171.3897		
810.45	179.2059	1077.34	179.1387		
810.76	185.8879	1085.87	184.3496		
815.77	224.2139	1093.63	195.0877		
818.51	187.0948	1099.45	221.3203		
832.01	201.8924	1112.07	213.8126		
834.85	205.8247	1112.84	207.0809		
836.80	0.0000	1115.54	154.1203		
846.75	0.0000	1120.29	176.2578		
846.77	207.2092	1120.55	165.2498		
856.80	229.6699	1121.30	154.2481		
860.56	223.0848	1808.65	117.3313		
871.09	227.3401	1131.51	0.0000		
873.19	223.5662	1147.95	0.0000		
875.33	0.0000	1332.49	82.7407		
879.38	232.4803	1177.95	72.3595		
880.51	247.0000	1189.05	62.6963		
881.60	226.7784	1204.77	54.7251		
883.24	250.9736	1221.41	42.6604		
884.68	255.8647	1231.02	45.7668		
889.28	228.0373	1235.36	32.5656		
894.76	215.6719	1238.28	44.7949		
1836.06	230.3068	1260.41	0.0000		
900.72	213.9535	1271.87	33.7477		
903.28	237.2839	1274.44	24.5520		
911.20	263.7789	1274.54	24.5520		
912.08	264.7887	1291.59	20.5059		
984.45	0.0000	1298.22	0.0000		
926.50	305.2761	1312.11	25.7007		
929.11	277.2001	1332.49	29.8921		
935.54	290.1498	1362.66	0.0000		
937.49	283.4195	1365.19	18.9761		

Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
26-JUL-2025 10:22:50

Run Date	Detector	Parameter	Flag	Status	Comments
26-JUL-25	GAM01	All Parameters Passed			
26-JUL-25	GAM02	Bkg Check BACKRATE	Investigate		
26-JUL-25	GAM04	All Parameters Passed			
26-JUL-25	GAM05	Cal Check PSFWHM-59	Investigate		
26-JUL-25	GAM06	All Parameters Passed			
26-JUL-25	GAM07	All Parameters Passed			
26-JUL-25	GAM16	Cal Check PSFWHM-662	Investigate		
26-JUL-25	GAM16	Cal Check NLACTVTY-59	Investigate		
26-JUL-25	GAM19	Cal Check PSFWHM-662	Investigate		
26-JUL-25	GAM20	All Parameters Passed			
26-JUL-25	GAM21	Cal Check NLACTVTY-662	Investigate		
26-JUL-25	GAM23	Cal Check PSFWHM-59	Investigate		
26-JUL-25	GAM24	All Parameters Passed			
26-JUL-25	GAM27	All Parameters Passed			
26-JUL-25	GAM28	All Parameters Passed			
26-JUL-25	GAM29	All Parameters Passed			
26-JUL-25	GAM31	All Parameters Passed			
26-JUL-25	GAM32	All Parameters Passed			
26-JUL-25	GAM33	All Parameters Passed			
26-JUL-25	GAM38	All Parameters Passed			
26-JUL-25	GAM40	All Parameters Passed			
26-JUL-25	GAM41	Bkg Check BACKRATE	Investigate		
26-JUL-25	GAM43	Cal Check PSFWHM-1332	Investigate		
26-JUL-25	GAM46	Cal Check NLACTVTY-59	Investigate		
26-JUL-25	GAM47	All Parameters Passed			
26-JUL-25	GAM48	All Parameters Passed			
25-JUL-25	GAM50	Cal Check may not have run since 26-JUL-2025			See attached reports. Approved for use.

24-JUL-25	GAM50	Bkg Check may not have run since 26-JUL-2025			
26-JUL-25	GAM52	Cal Check PSFWHM-59	Investigate		
26-JUL-25	GAM52	Cal Check PSFWHM-662	Action	Lockout	Detector locked out.
26-JUL-25	GAM52	Cal Check PSFWHM-1332	Action		
25-JUL-25	GAM53	Cal Check may not have run since 26-JUL-2025			Not used.
20-JUL-25	GAM53	Bkg Check may not have run since 26-JUL-2025			
02-MAY-25	GAM56	Cal Check may not have run since 26-JUL-2025			Detector locked out.
04-MAY-25	GAM56	Bkg Check may not have run since 26-JUL-2025			
26-JUL-25	GAM61	Cal Check PSFWHM-1332	Investigate		
26-JUL-25	GAM61	Cal Check NLACTVTY-662	Investigate		
	GAM63	Cal Check may not have run since 26-JUL-2025			Detector locked out.
	GAM63	Bkg Check may not have run since 26-JUL-2025			
26-JUL-25	XRAY1	All Parameters Passed			
26-JUL-25	XRAY3	Cal Check PSFWHM-34	Investigate		
26-JUL-25	XRAY6	Cal Check NLACTVTY-29	Investigate		
26-JUL-25	XRAY7	Cal Check NLACTVTY-34	Investigate		
26-JUL-25	XRAY7	Bkg Check BACKRATE	Investigate		
26-JUL-25	XRAY8	All Parameters Passed			

APPROVAL DATE: 27-JUL-2025 APPROVAL TIME: 08:43:49

APPROVED BY: Michael Hilton PROCEDURE # GL-RAD-I-001

The Investigate flag does not indicate a lockout and is approved for use. Action flags that have not been approved are locked out of service.

QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM50_400JAR.QAF;1

Sample ID : Calib Check Sample quantity : 1.00 EACH
Sample date : 1-JAN-2021 12:00:00 Acquisition date : 26-JUL-2025 16:05:43
Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:01.28

Out-of-range Test: N-SIGMA

Parameter Description [Mean+/-Stdev]	Value	Deviation	Flag
*PEAK FWHM AM-241 [0.97795+/-0.07581]	9.9077E-01	0.17	
*PEAK FWHM CS-137 [1.43611+/-0.07761]	1.3635E+00	-0.94	
*PEAK FWHM CO-60 [1.9179+/-0.1258]	1.8966E+00	-0.17	
*DECAY CORRECTED ACTIVITY AM-241 [6.9020E+04+/-3747]	7.7673E+04	2.31	Investigate
*DECAY CORRECTED ACTIVITY CS-137 [2.4226E+04+/-686.4]	2.5018E+04	1.15	
*DECAY CORRECTED ACTIVITY CO-60 [4.0100E+04+/-1136]	4.1144E+04	0.92	

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
*PEAK ENERGY AM-241	5.8040E+01	6.1040E+01	5.9374E+01	
*PEAK ENERGY CS-137	6.6017E+02	6.6317E+02	6.6171E+02	
*PEAK ENERGY CO-60	1.3310E+03	1.3340E+03	1.3326E+03	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: MMH Approval Date: 7 / 27 / 25

VMS Gamma Spectroscopy Report generated 26-JUL-2025 15:25:53

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]BKG_BKG_GAM50__875021.CN

---- Sample Information ----

Sample Title : Weekly Background
Sample ID : Bkg
Sample Type : bkg
Sample Number : 875021
Sample Collector :
Sample Quantity : 1.00000E+00 ea
Sample Geometry :
Spctrm Collector : gamma spec user
Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No
Deposition Start :
Dep. Duration :
Deposition End : 25-JUL-2025 22:45:23

---- Sample Decay/Count Information ----

Sample Date : 25-JUL-2025 22:45:23
Decay time : 0 00:00:00.00
Elapsed live time: 0 16:40:00.00
Acquisition date : 25-JUL-2025 22:45:23
% dead time : 0.0%
Elapsed real time: 0 16:40:07.58

---- Detector Parameters ----

Energy cal. time : 25-JUL-2025 12:19:17
Detector name : GAMMA50
Effic. cal. time : 2-JUN-2025 09:46:28.
Energy cal. oper.: gamma spec user
Counting geometry:
Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1
Sensitivity : 3.00000
Critical level? : No
Efficiency Type : SPLINE
Energy tolerance : 2.00000
Abundance limit : 75.00000
MDA Width (FWHM) : 3.00000
End channel : 4096
Gaussian Sens. : 10.00000
Propagate Errors?: No
Library-based eff: No
Half life ratio : 8.00000
WTM error limit : 3.00000
MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	33.98	141	420	1.78	68.18	67	5	2.35E-03	23.1	
2	0	63.30	127	602	0.72	126.83	123	8	2.12E-03	34.4	
3	0	66.74	53	454	0.91	133.72	131	6	8.81E-04	65.4	
4	0	84.32	67	565	1.39	168.88	166	8	1.11E-03	62.6	
5	0	92.77	468	556	1.04	185.80	182	8	7.80E-03	9.9	
6	0	98.80	45	451	0.62	197.85	195	7	7.43E-04	80.4	
7	0	139.41	61	352	1.34	279.09	277	6	1.01E-03	50.3	
8	0	144.10	95	461	1.13	288.49	285	8	1.58E-03	40.6	
9	0	163.04	131	507	1.98	326.37	322	9	2.19E-03	32.3	
10	0	185.80	361	476	0.83	371.90	367	8	6.01E-03	11.7	
11	0	198.63	88	453	0.74	397.57	394	8	1.46E-03	43.4	
12	0	238.47	198	489	1.13	477.28	473	9	3.30E-03	21.3	
13	0	295.68	78	320	1.41	591.73	588	8	1.31E-03	41.2	
14	0	338.04	32	317	0.70	676.48	674	8	5.40E-04	96.6	
15	0	351.80	157	402	0.94	704.03	698	12	2.62E-03	26.8	
16	0	405.88	42	185	1.69	812.23	809	8	6.98E-04	59.0	
17	0	445.39	41	186	0.81	891.28	888	8	6.81E-04	60.1	
18	0	511.39	1253	377	2.28	1023.33	1014	21	2.09E-02	4.8	
19	0	556.75	3	204	1.32	1114.10	1106	11	5.16E-05	894.1	
20	0	583.31	74	200	1.05	1167.24	1162	10	1.23E-03	37.6	
21	1	596.52	76	180	1.72	1193.68	1187	19	1.27E-03	35.1	1.47E+00
22	1	599.68	46	186	1.63	1200.00	1187	19	7.68E-04	58.0	
23	0	609.58	111	304	1.38	1219.81	1214	14	1.85E-03	34.7	

24	0	661.69	56	131	1.45	1324.07	1319	11	9.26E-04	42.2
25	0	700.96	21	105	0.82	1402.65	1400	7	3.47E-04	85.8
26	0	773.61	38	93	1.43	1548.04	1542	10	6.32E-04	50.6
27	0	794.43	20	77	0.80	1589.69	1586	8	3.38E-04	77.7
28	0	804.18	19	141	0.89	1609.22	1604	9	3.15E-04	115.9
29	0	869.89	13	74	1.16	1740.71	1735	7	2.23E-04	110.5
30	0	912.74	77	166	1.83	1826.45	1818	19	1.29E-03	41.5
31	0	970.60	21	89	2.79	1942.26	1936	10	3.58E-04	85.3
32	0	1001.46	64	47	2.78	2004.01	1999	10	1.07E-03	23.6
33	0	1120.76	48	84	2.36	2242.77	2236	12	8.00E-04	40.8
34	0	1353.97	20	38	1.46	2709.52	2705	10	3.38E-04	60.7
35	0	1370.82	7	52	1.25	2743.25	2734	11	1.09E-04	218.5
36	0	1455.19	11	38	0.86	2912.14	2909	9	1.90E-04	99.8
37	0	1461.21	69	52	1.48	2924.19	2917	13	1.16E-03	24.6
38	0	1474.87	40	26	3.86	2951.54	2944	15	6.63E-04	33.6
39	0	1715.67	18	19	3.91	3433.55	3428	11	3.02E-04	52.4
40	0	1736.43	16	15	0.96	3475.10	3470	9	2.59E-04	52.5
41	0	1766.13	52	55	2.40	3534.56	3523	25	8.62E-04	41.4
42	0	1854.27	7	23	1.28	3711.01	3705	9	1.22E-04	130.5
43	0	1868.15	10	16	1.53	3738.81	3734	9	1.66E-04	78.7
44	0	1903.85	15	26	0.73	3810.27	3802	13	2.50E-04	74.7

QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM50.QAF;1

Sample ID : Bkg Sample quantity : 1.00 ea
Sample date : 25-JUL-2025 22:45:23 Acquisition date : 25-JUL-2025 22:45:23
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:07.58

Out-of-range Test: N-SIGMA

Parameter Description [Mean+/-Stdev]	Value	Deviation	Flag
*Spectrum Background Rate [1.24858+/-0.01883]	1.2202E+00	-1.51	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: MMH Approval Date: 7 / 27 / 25

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
27-JUL-2025 13:11:26

Run Date	Detector	Parameter	Flag	Status	Comments
27-JUL-25	GAM01	All Parameters Passed			
27-JUL-25	GAM02	Cal Check PSFWHM-1332	Investigate		
27-JUL-25	GAM04	All Parameters Passed			
27-JUL-25	GAM05	Cal Check PSFWHM-59	Investigate		
27-JUL-25	GAM06	Cal Check PSFWHM-662	Investigate		
27-JUL-25	GAM06	Cal Check PSFWHM-1332	Investigate		
27-JUL-25	GAM06	Cal Check NLACTVTY-59	Investigate		
27-JUL-25	GAM07	All Parameters Passed			
27-JUL-25	GAM16	Bkg Check BACKRATE	Investigate		
27-JUL-25	GAM19	All Parameters Passed			
27-JUL-25	GAM20	All Parameters Passed			
27-JUL-25	GAM21	Cal Check NLACTVTY-1332	Investigate		
27-JUL-25	GAM23	All Parameters Passed			
27-JUL-25	GAM24	All Parameters Passed			
27-JUL-25	GAM27	Cal Check NLACTVTY-59	Investigate		
27-JUL-25	GAM27	Cal Check NLACTVTY-662	Investigate		
27-JUL-25	GAM28	Bkg Check BACKRATE	Investigate		
27-JUL-25	GAM29	All Parameters Passed			
27-JUL-25	GAM31	All Parameters Passed			
27-JUL-25	GAM32	Cal Check PSFWHM-59	Investigate		
27-JUL-25	GAM32	Cal Check NLACTVTY-1332	Investigate		
27-JUL-25	GAM33	All Parameters Passed			
27-JUL-25	GAM38	All Parameters Passed			
27-JUL-25	GAM40	Cal Check NLACTVTY-1332	Investigate		
27-JUL-25	GAM41	All Parameters Passed			
27-JUL-25	GAM43	Cal Check NLACTVTY-1332	Investigate		
27-JUL-25	GAM43	Bkg Check BACKRATE	Investigate		
27-JUL-25	GAM46	Cal Check NLACTVTY-59	Investigate		

27-JUL-25	GAM47	All Parameters Passed			
26-JUL-25	GAM48	Cal Check may not have run since 27-JUL-2025			Not used.
21-JUL-25	GAM48	Bkg Check may not have run since 27-JUL-2025			
27-JUL-25	GAM50	Cal Check NLACTVTY-59	Investigate		
27-JUL-25	GAM52	All Parameters Passed			
25-JUL-25	GAM53	Cal Check may not have run since 27-JUL-2025			Not used.
20-JUL-25	GAM53	Bkg Check may not have run since 27-JUL-2025			
02-MAY-25	GAM56	Cal Check may not have run since 27-JUL-2025			Detector locked out.
04-MAY-25	GAM56	Bkg Check may not have run since 27-JUL-2025			
26-JUL-25	GAM61	Cal Check may not have run since 27-JUL-2025			Not used.
20-JUL-25	GAM61	Bkg Check may not have run since 27-JUL-2025			
	GAM63	Cal Check may not have run since 27-JUL-2025			Detector locked out.
	GAM63	Bkg Check may not have run since 27-JUL-2025			
27-JUL-25	XRAY1	All Parameters Passed			
27-JUL-25	XRAY3	All Parameters Passed			
27-JUL-25	XRAY6	Bkg Check BACKRATE	Action	Approved	No spectral abnormalities observed, approved for use.
27-JUL-25	XRAY7	Cal Check NLACTVTY-40	Investigate		
27-JUL-25	XRAY7	Bkg Check BACKRATE	Investigate		
27-JUL-25	XRAY8	All Parameters Passed			

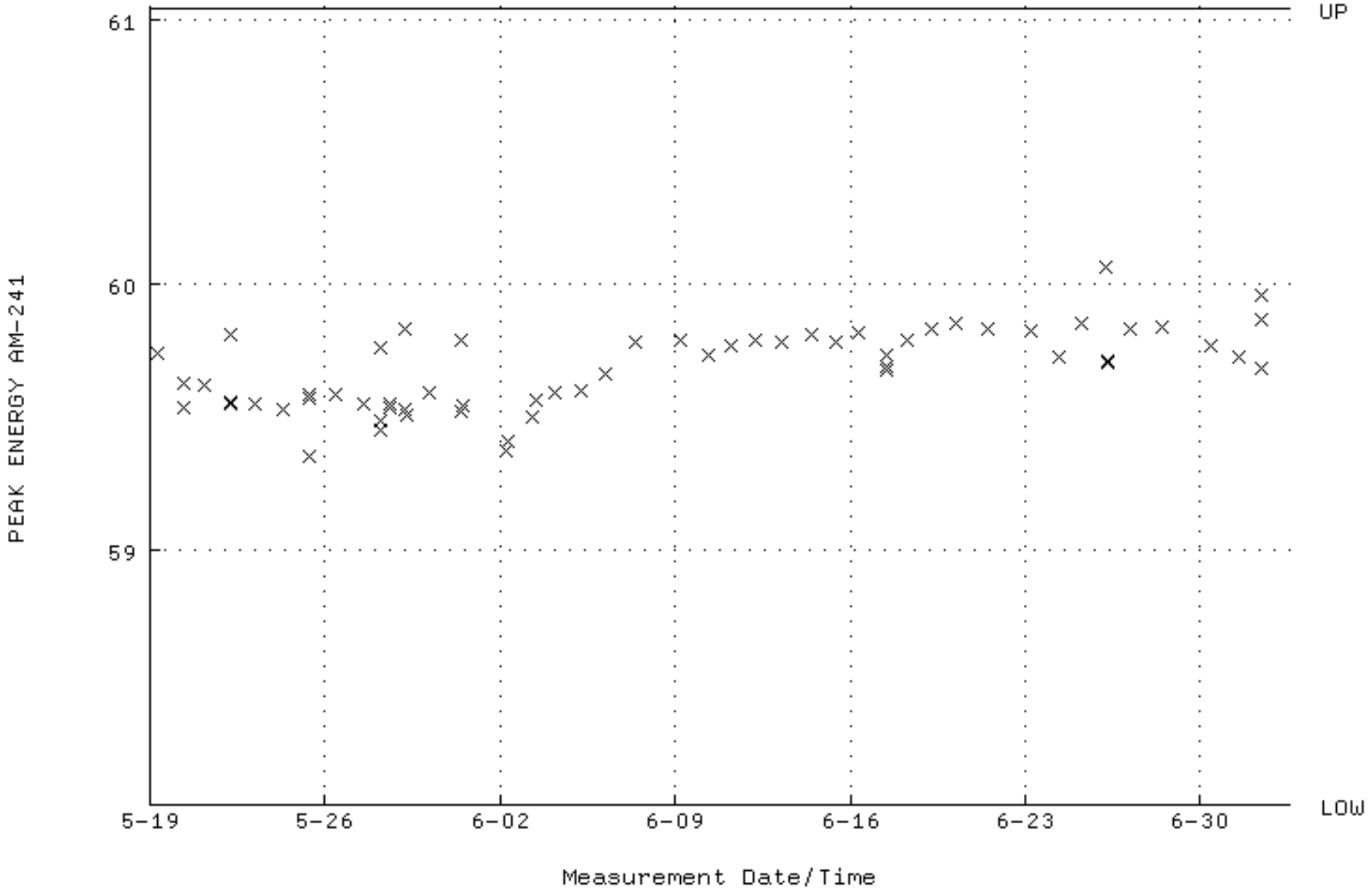
APPROVAL DATE: 27-JUL-2025 APPROVAL TIME: 14:06:47

APPROVED BY: Michael Hilton PROCEDURE # GL-RAD-I-001

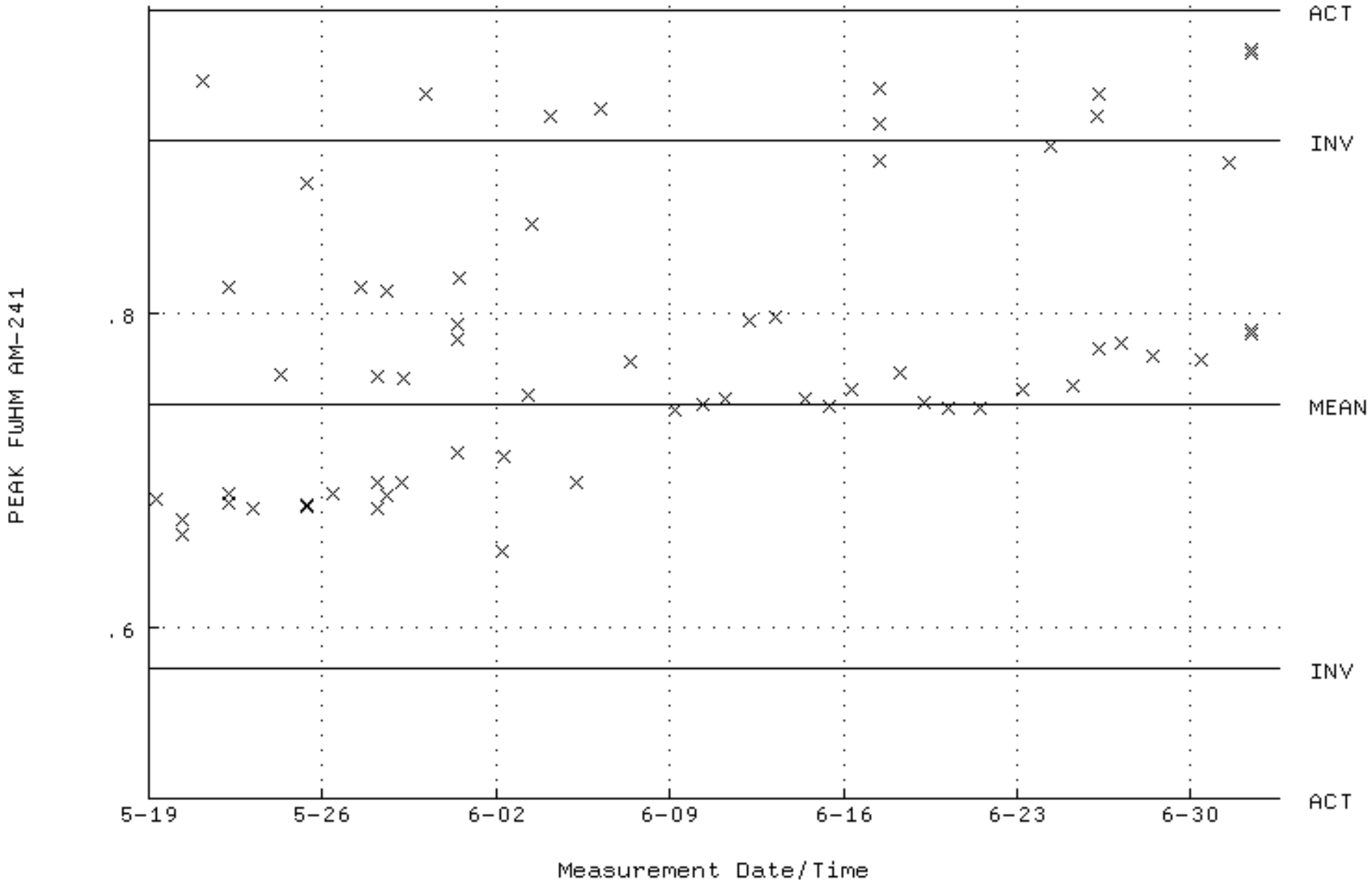
The Investigate flag does not indicate a lockout and is approved for use. Action flags that have not been approved are locked out of service.

Background and Efficiency Data

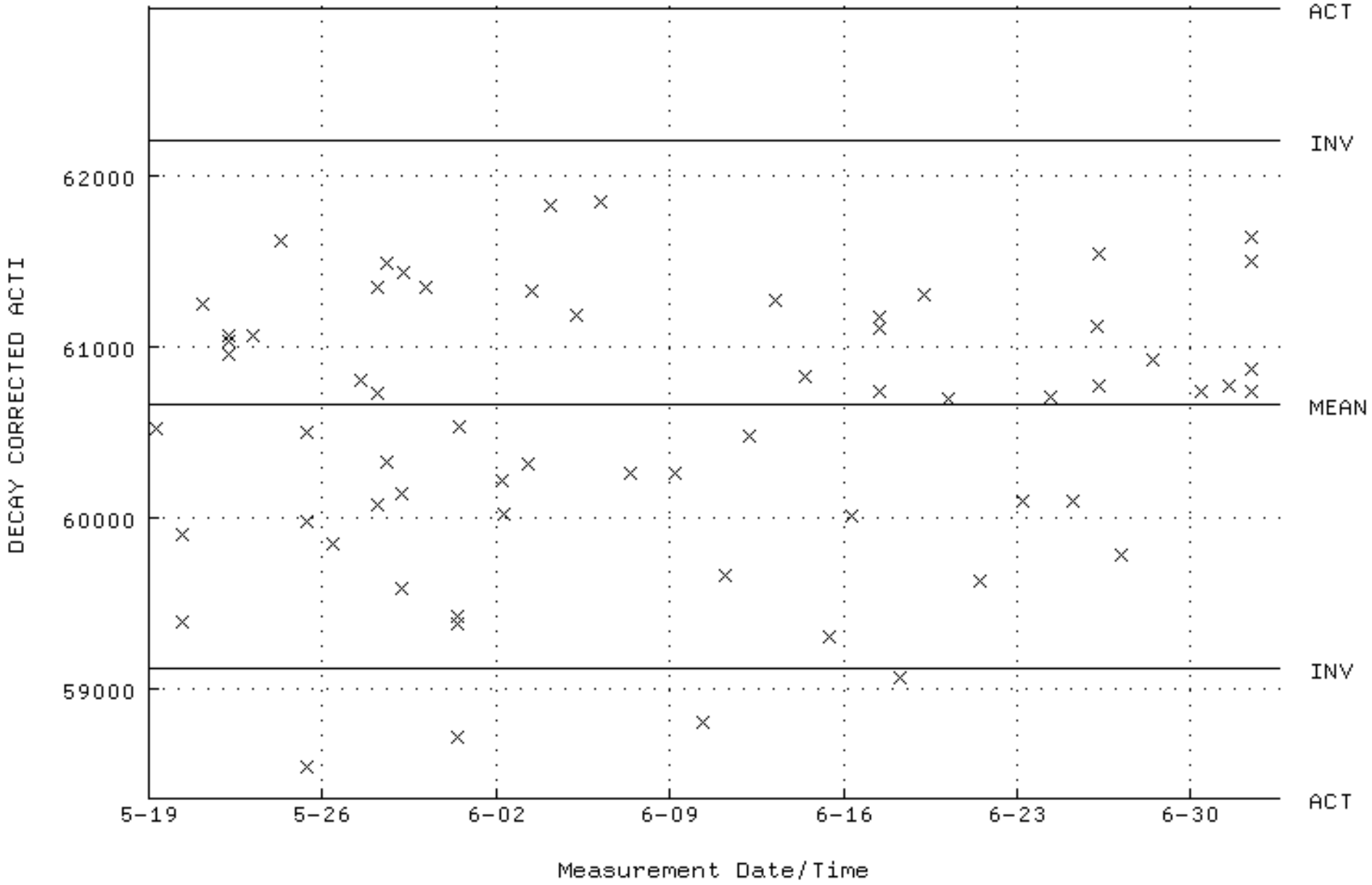
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM21_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 19-MAY-2025 07:20:20 through 3-JUL-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



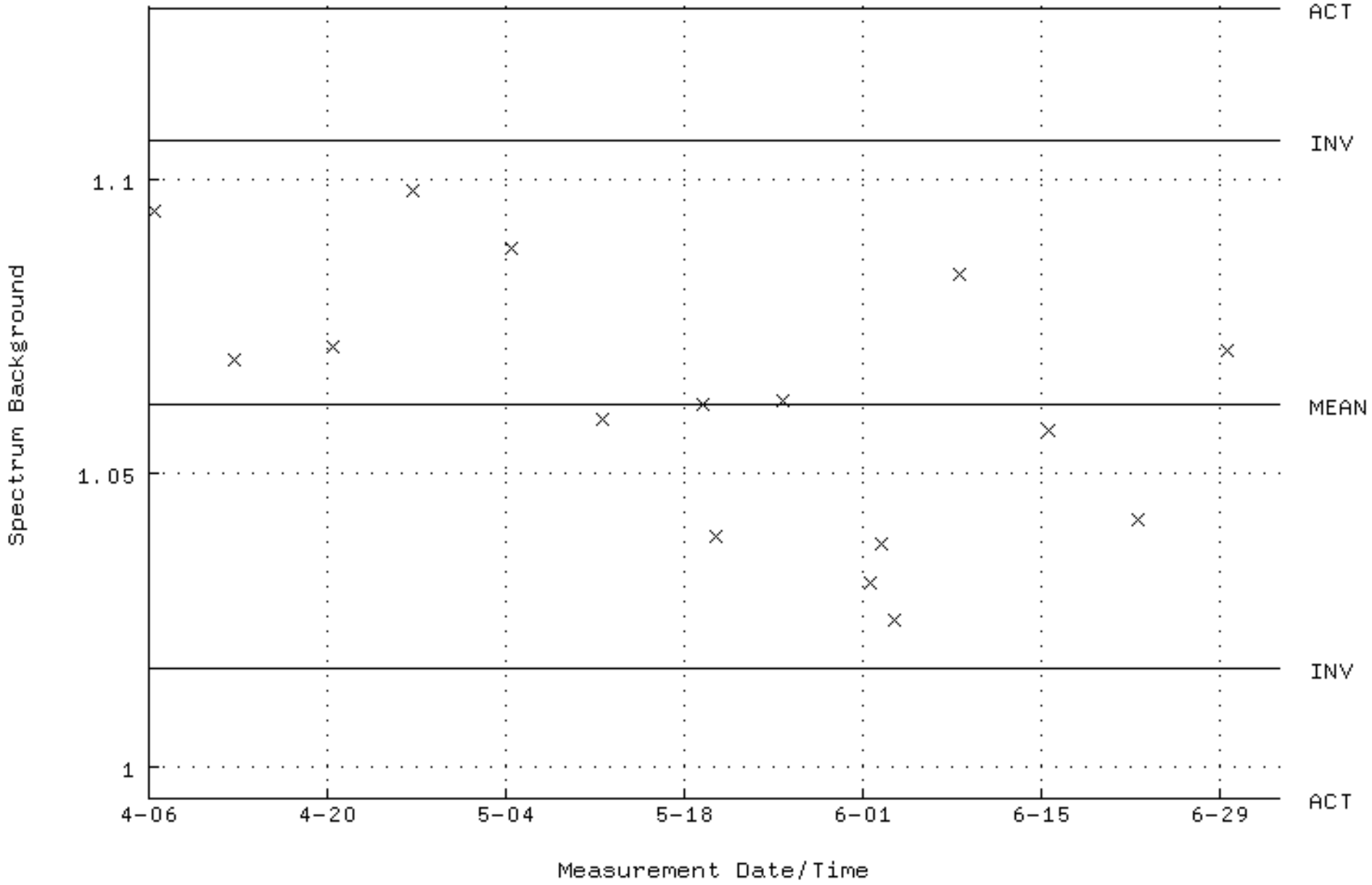
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM21_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 19-MAY-2025 07:20:20 through 3-JUL-2025 12:00:00
Mean +- Std Dev : 0.742690 +- 8.367599E-02 (11.27 %)



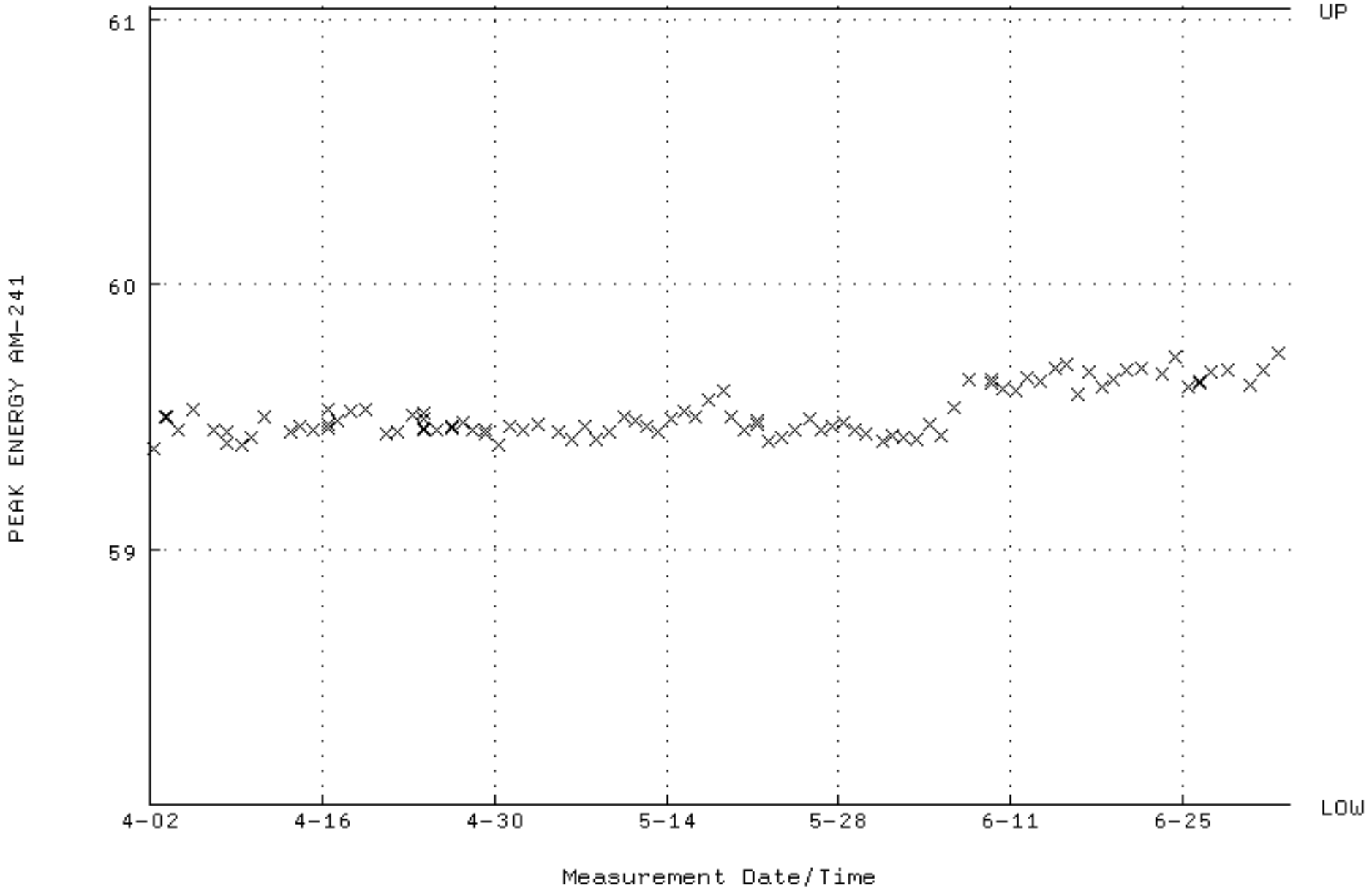
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM21_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 19-MAY-2025 07:20:20 through 3-JUL-2025 12:00:00
Mean +- Std Dev : 60673.1 +- 769.738 (1.27 %)



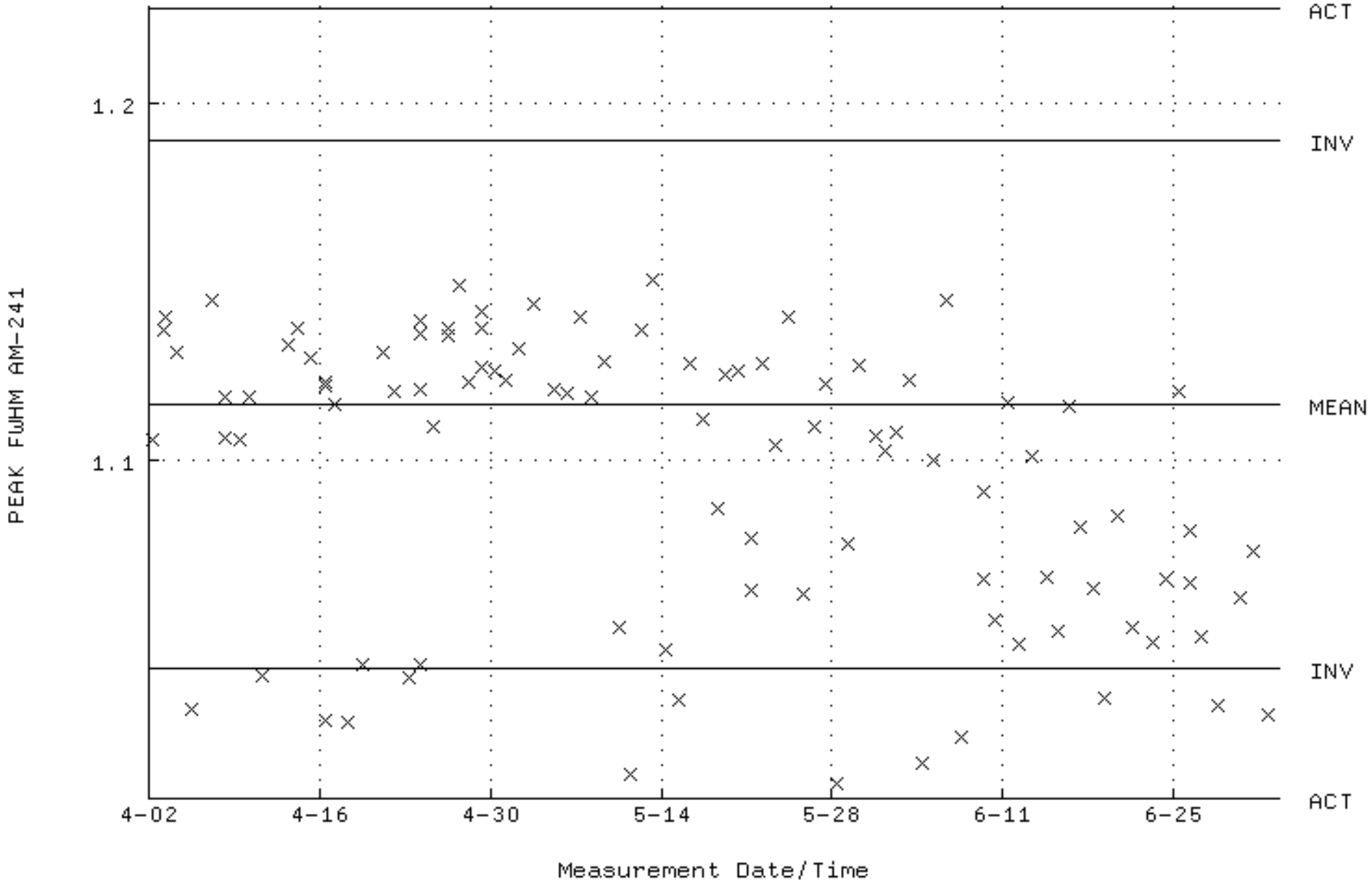
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM21.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-APR-2025 11:01:37 through 3-JUL-2025 12:00:00
Mean +- Std Dev : 1.06195 +- 2.244644E-02 (2.11 %)



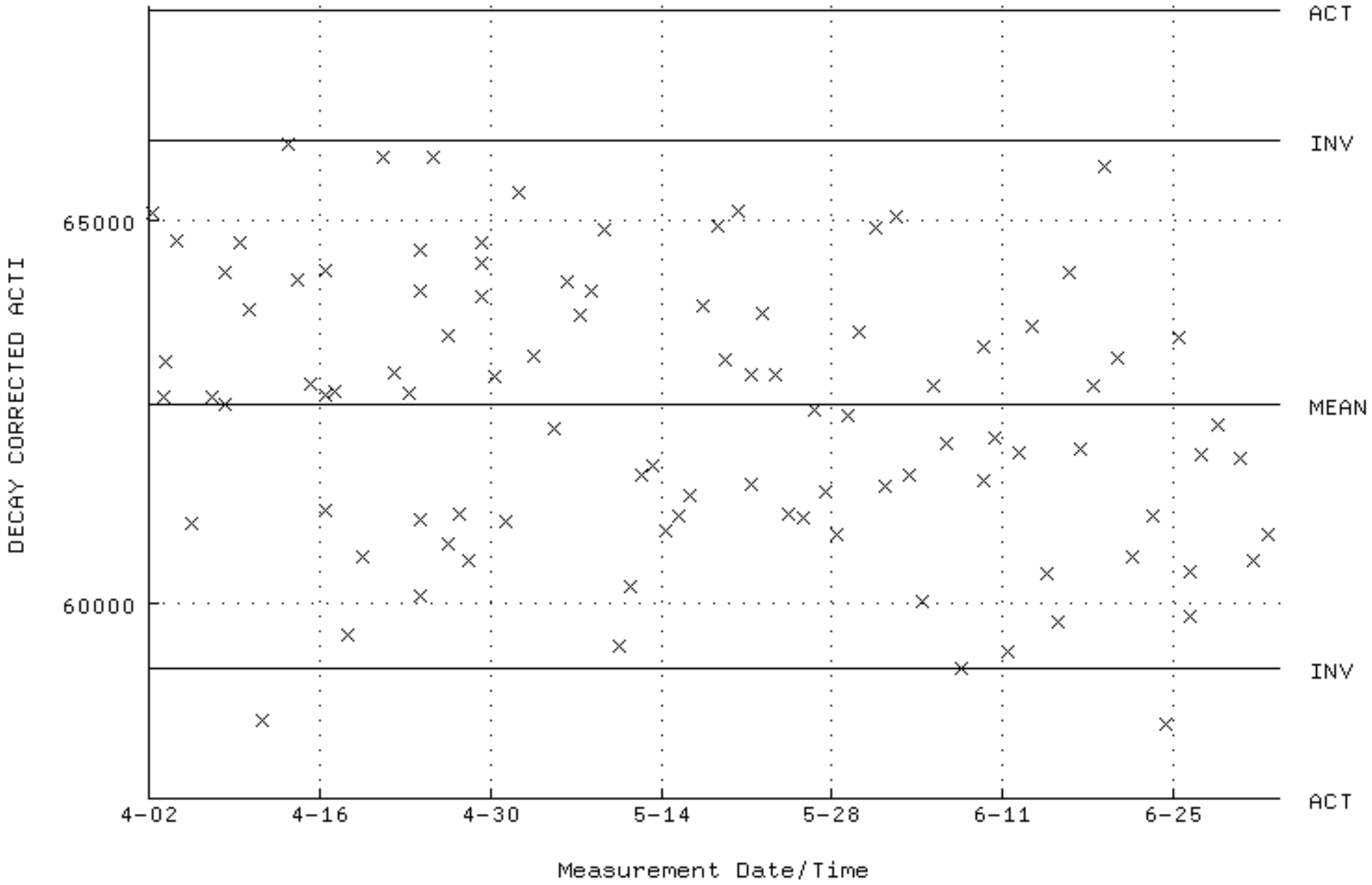
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-APR-2025 07:24:59 through 3-JUL-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



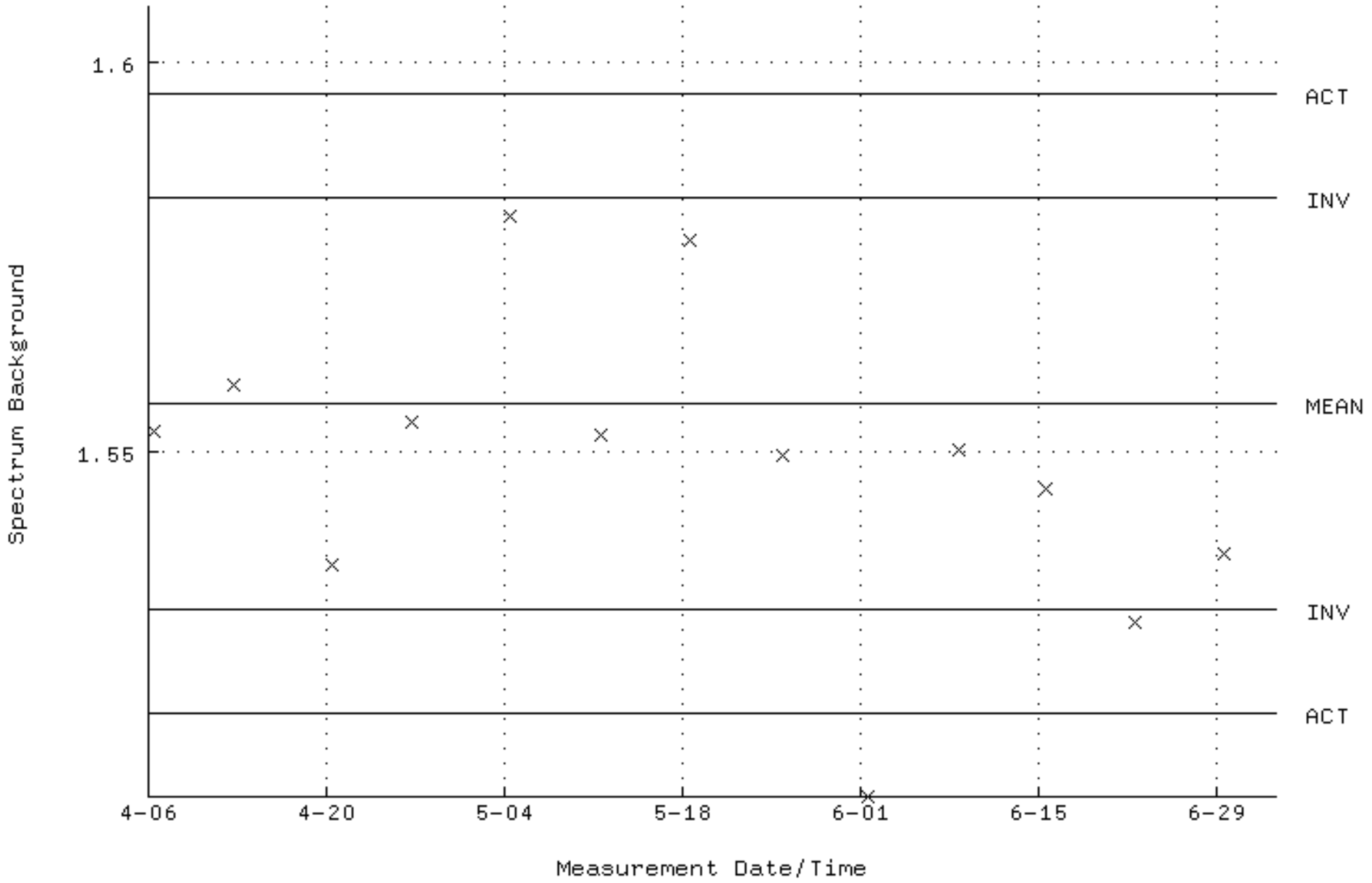
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-APR-2025 07:24:59 through 3-JUL-2025 12:00:00
Mean +- Std Dev : 1.11603 +- 3.692300E-02 (3.31 %)



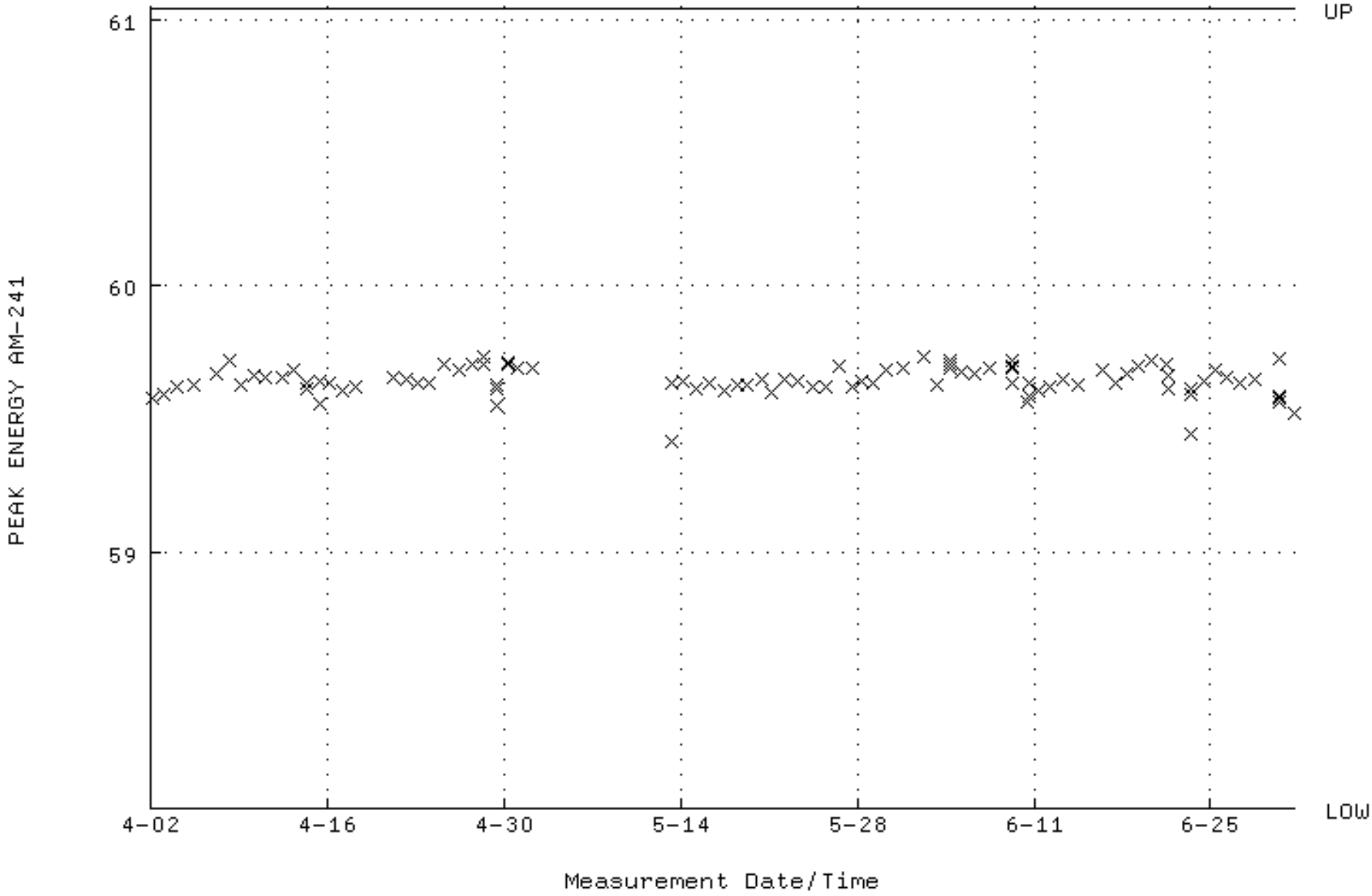
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-APR-2025 07:24:59 through 3-JUL-2025 12:00:00
Mean +- Std Dev : 62615.7 +- 1723.14 (2.75 %)



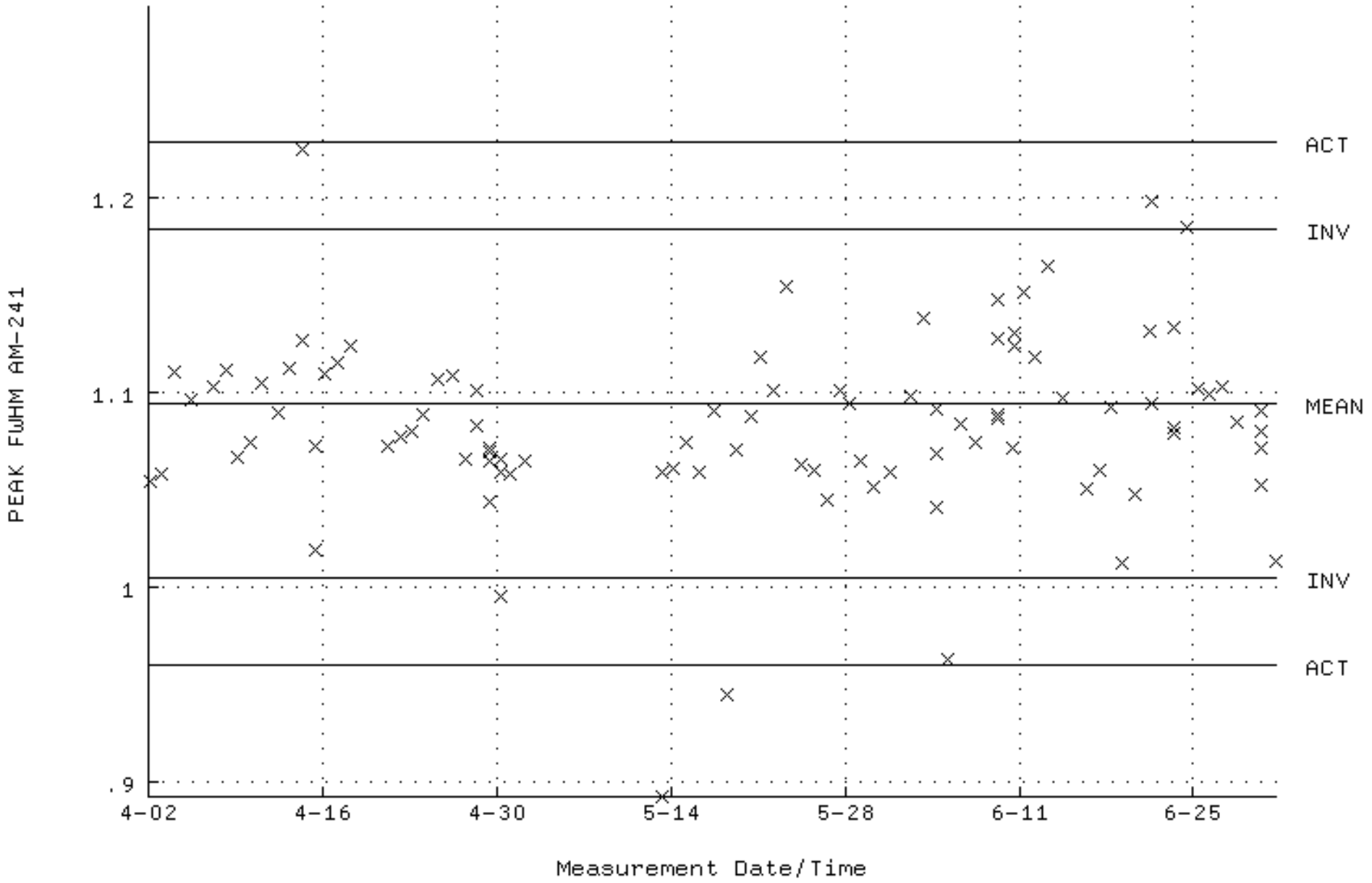
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM29.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-APR-2025 11:02:03 through 3-JUL-2025 12:00:00
Mean +- Std Dev : 1.55639 +- 1.323348E-02 (0.85 %)



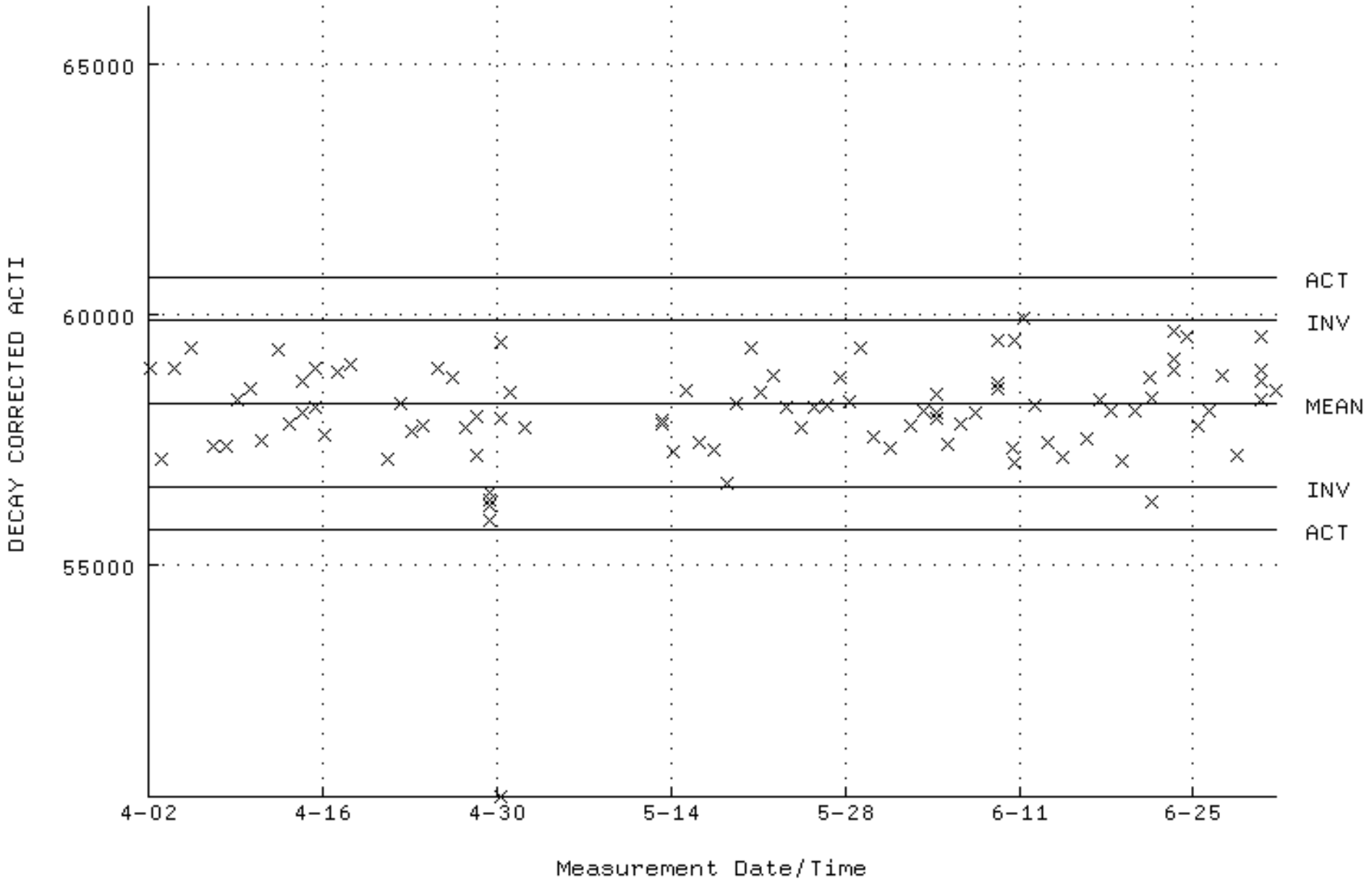
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-APR-2025 04:56:49 through 1-JUL-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



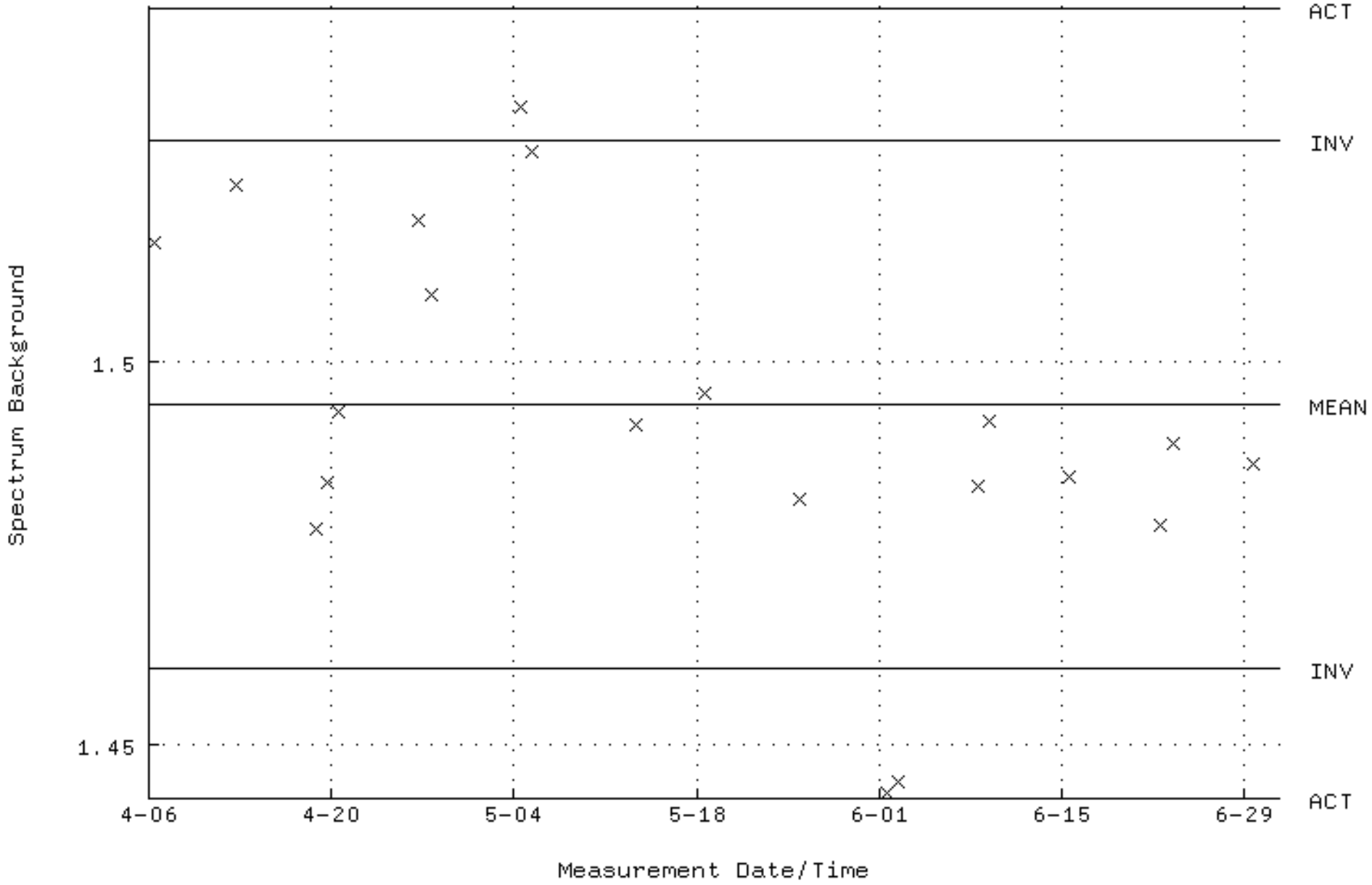
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-APR-2025 04:56:49 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 1.09499 +- 4.460993E-02 (4.07 %)



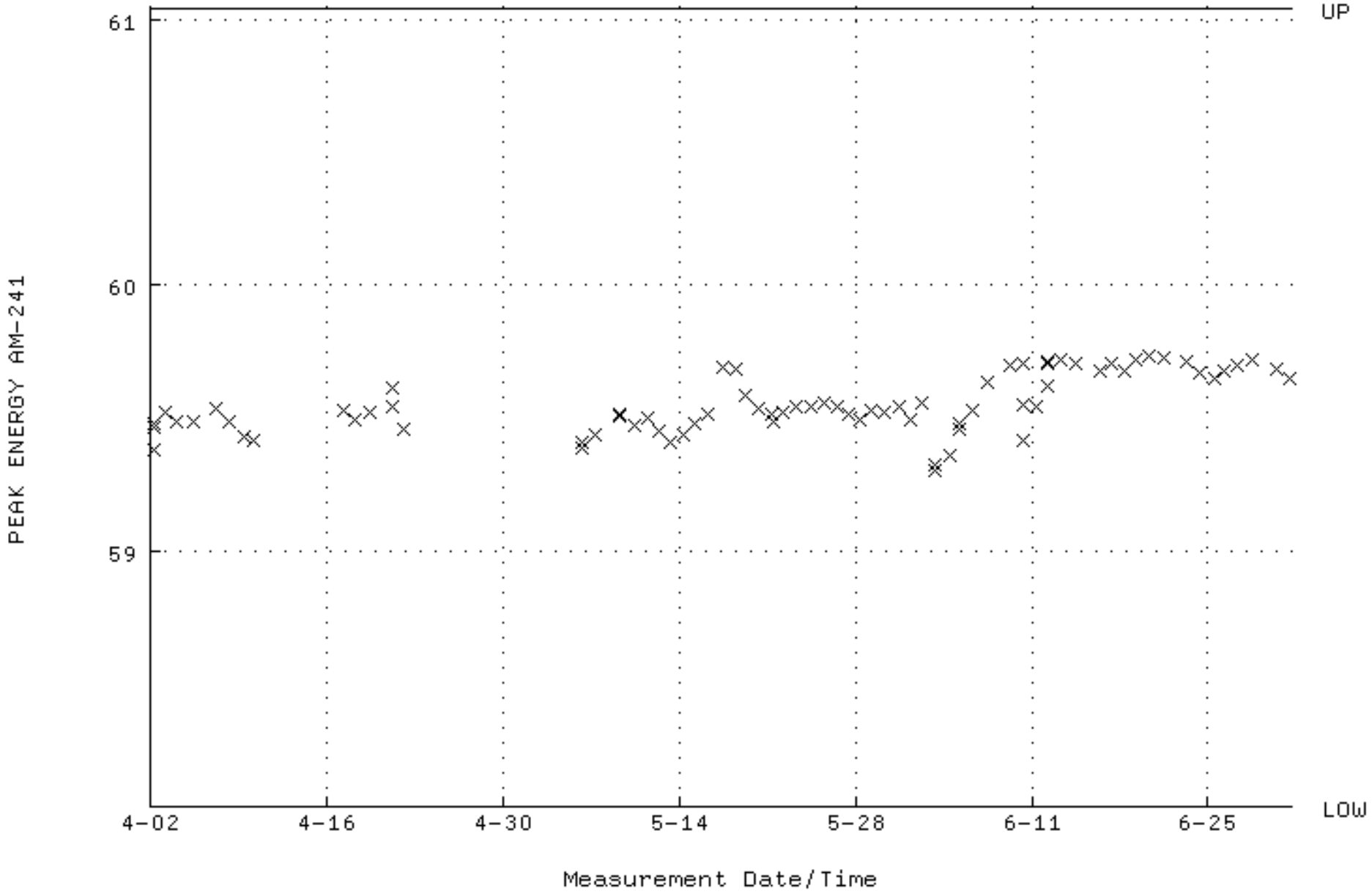
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-APR-2025 04:56:49 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 58245.2 +- 836.455 (1.44 %)



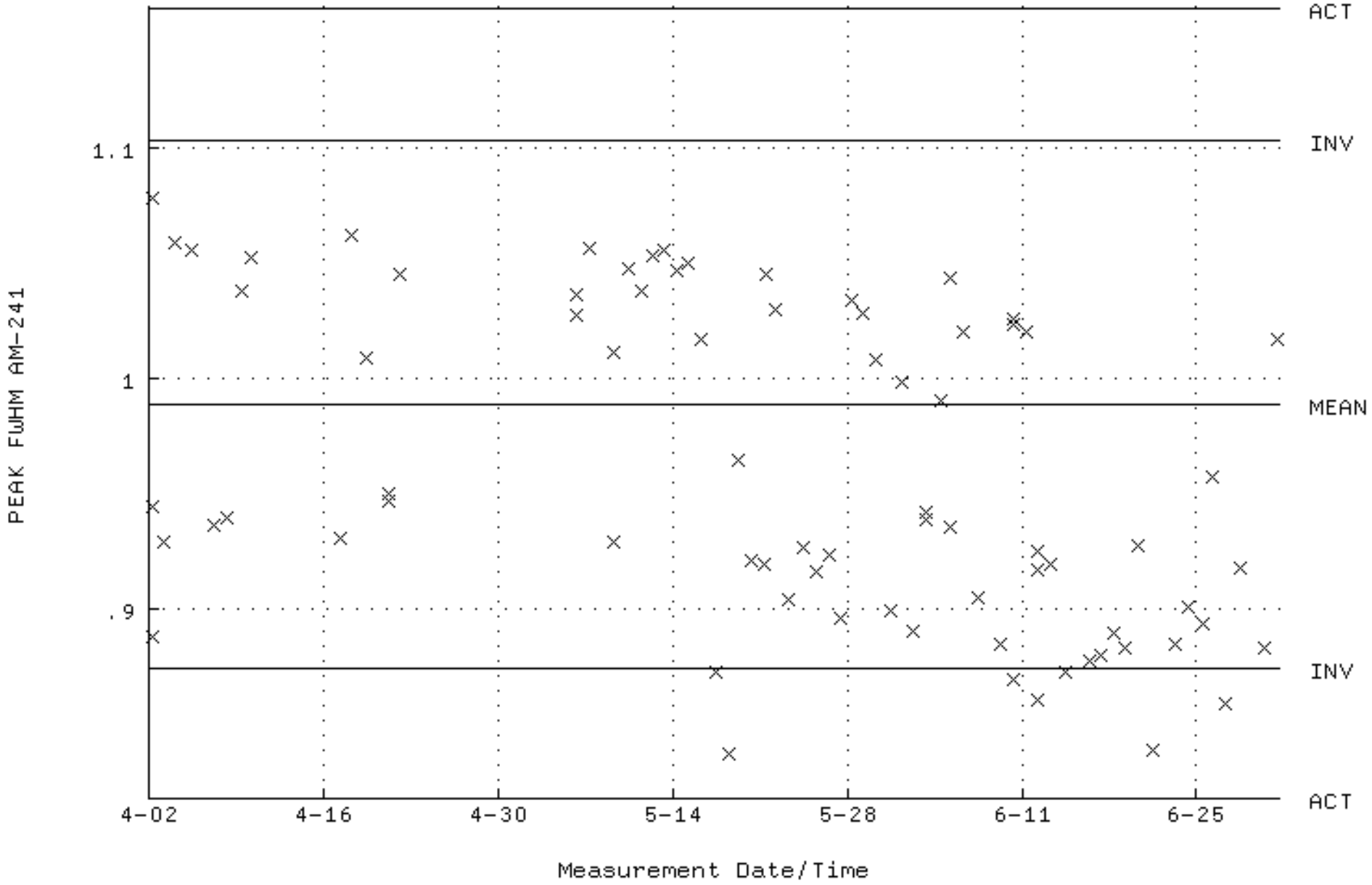
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM31.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-APR-2025 11:02:07 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 1.49443 +- 1.718477E-02 (1.15 %)



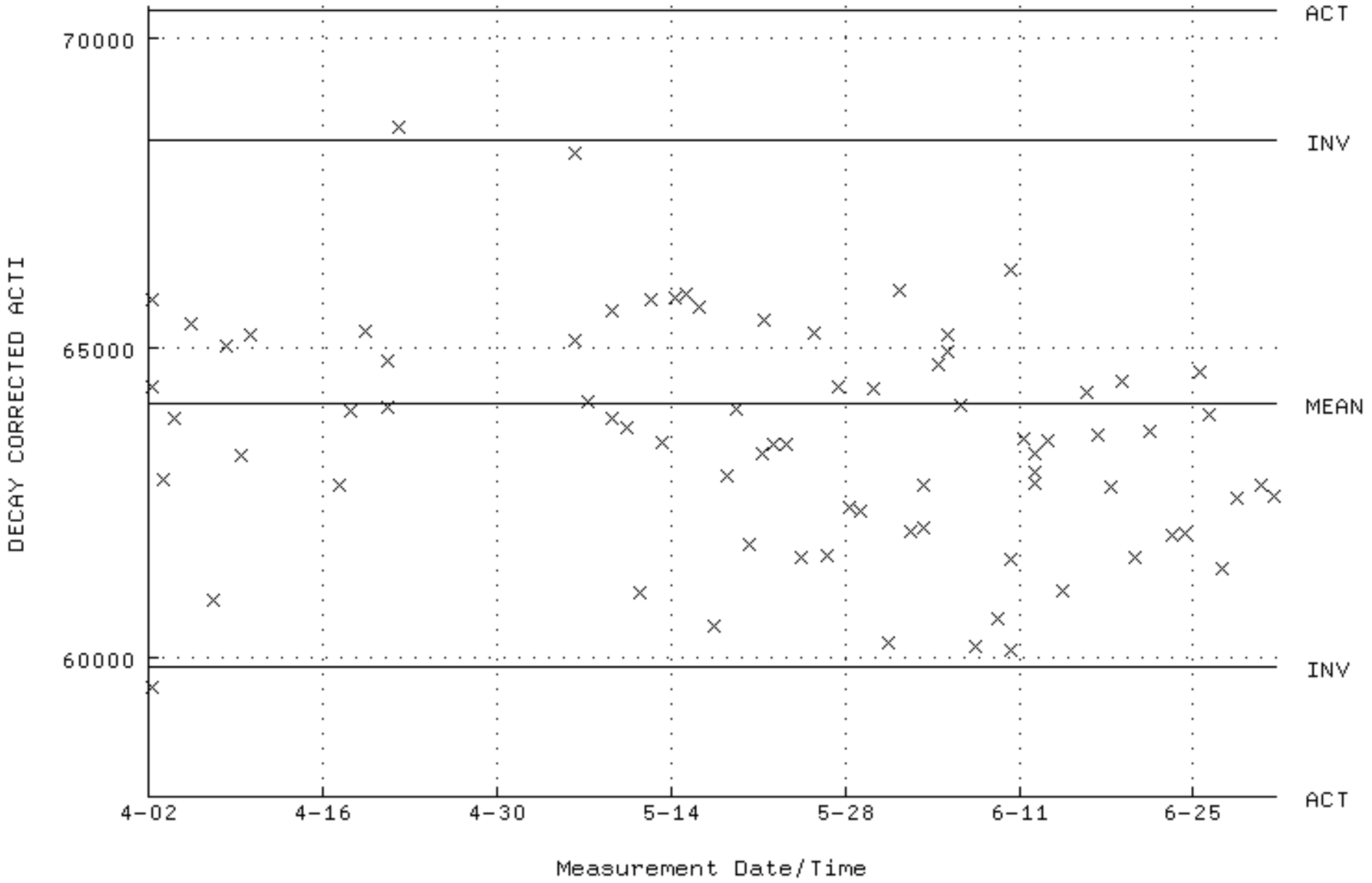
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-APR-2025 07:25:04 through 1-JUL-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



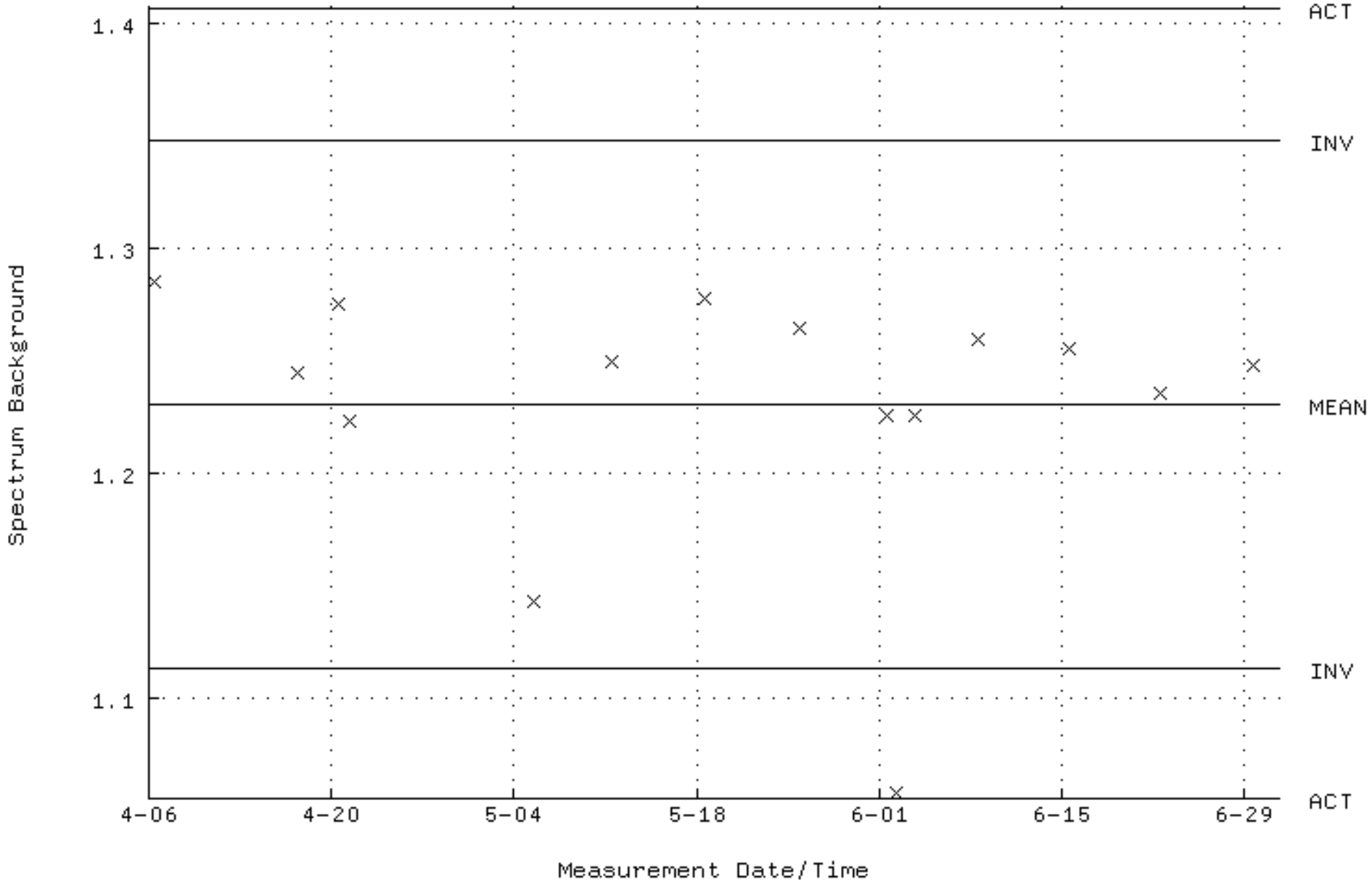
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-APR-2025 07:25:04 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 0.989093 +- 5.693431E-02 (5.76 %)



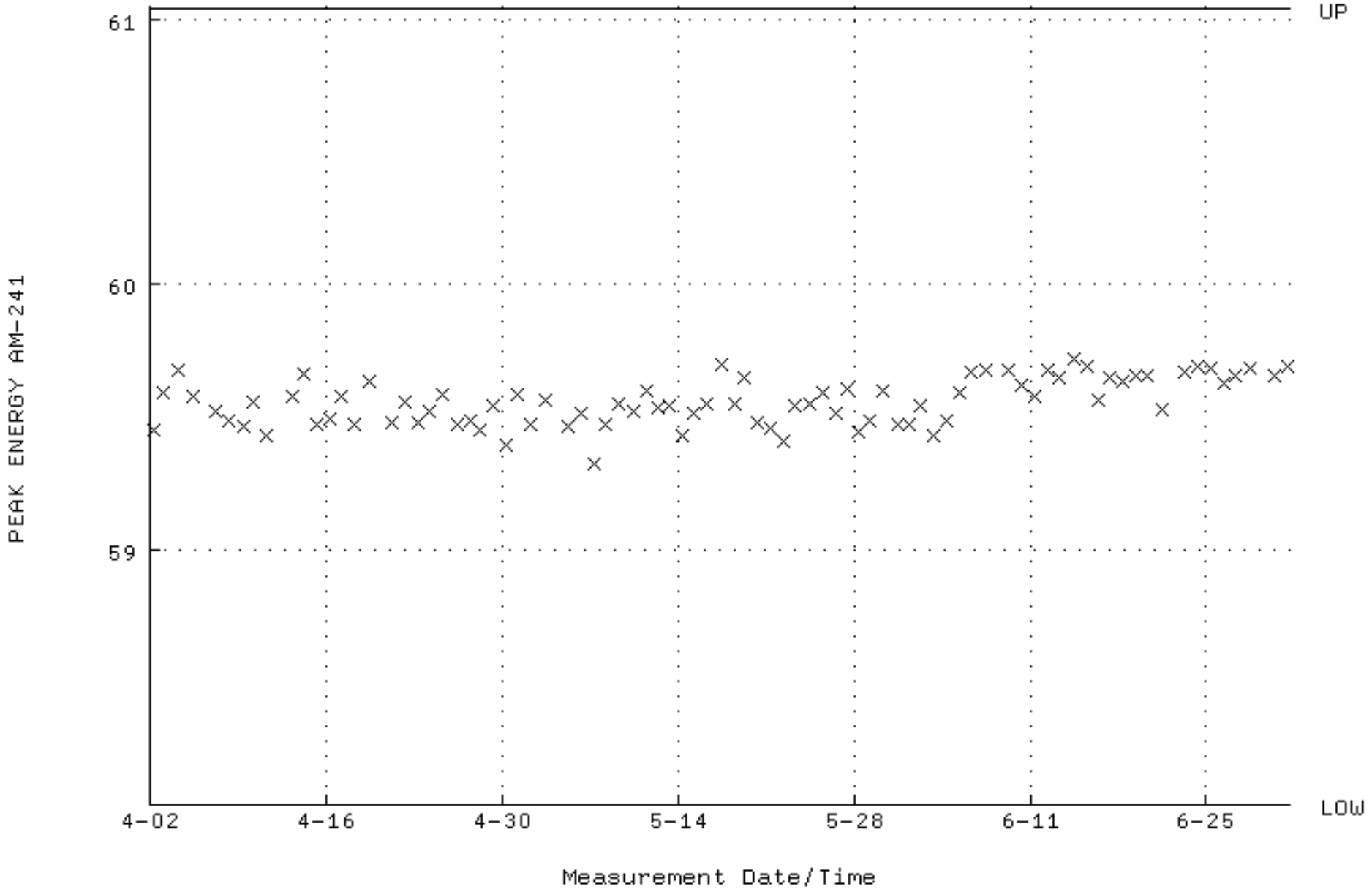
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-APR-2025 07:25:04 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 64123.1 +- 2120.97 (3.31 %)



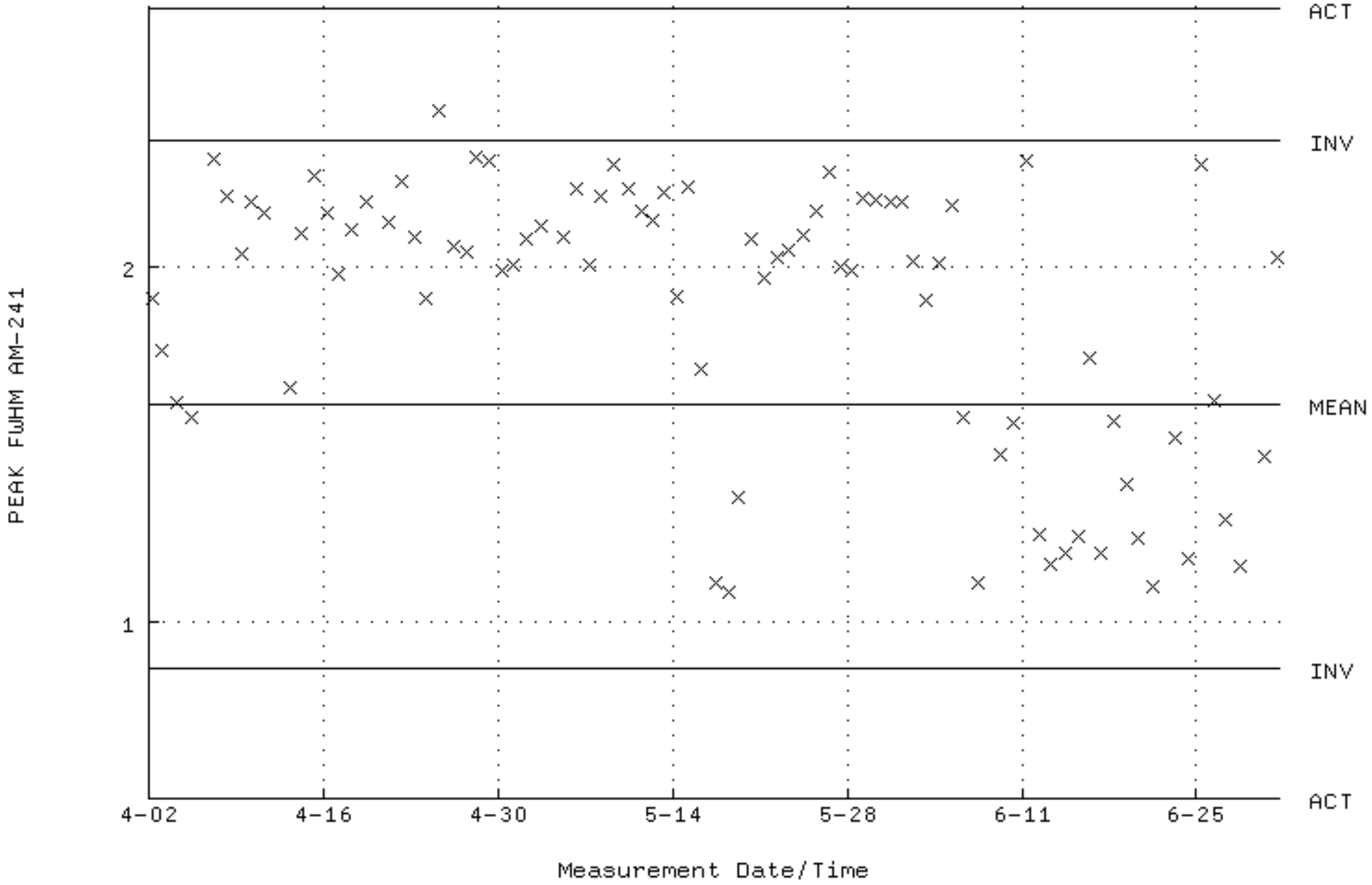
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM32.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-APR-2025 11:02:13 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 1.23079 +- 5.862652E-02 (4.76 %)



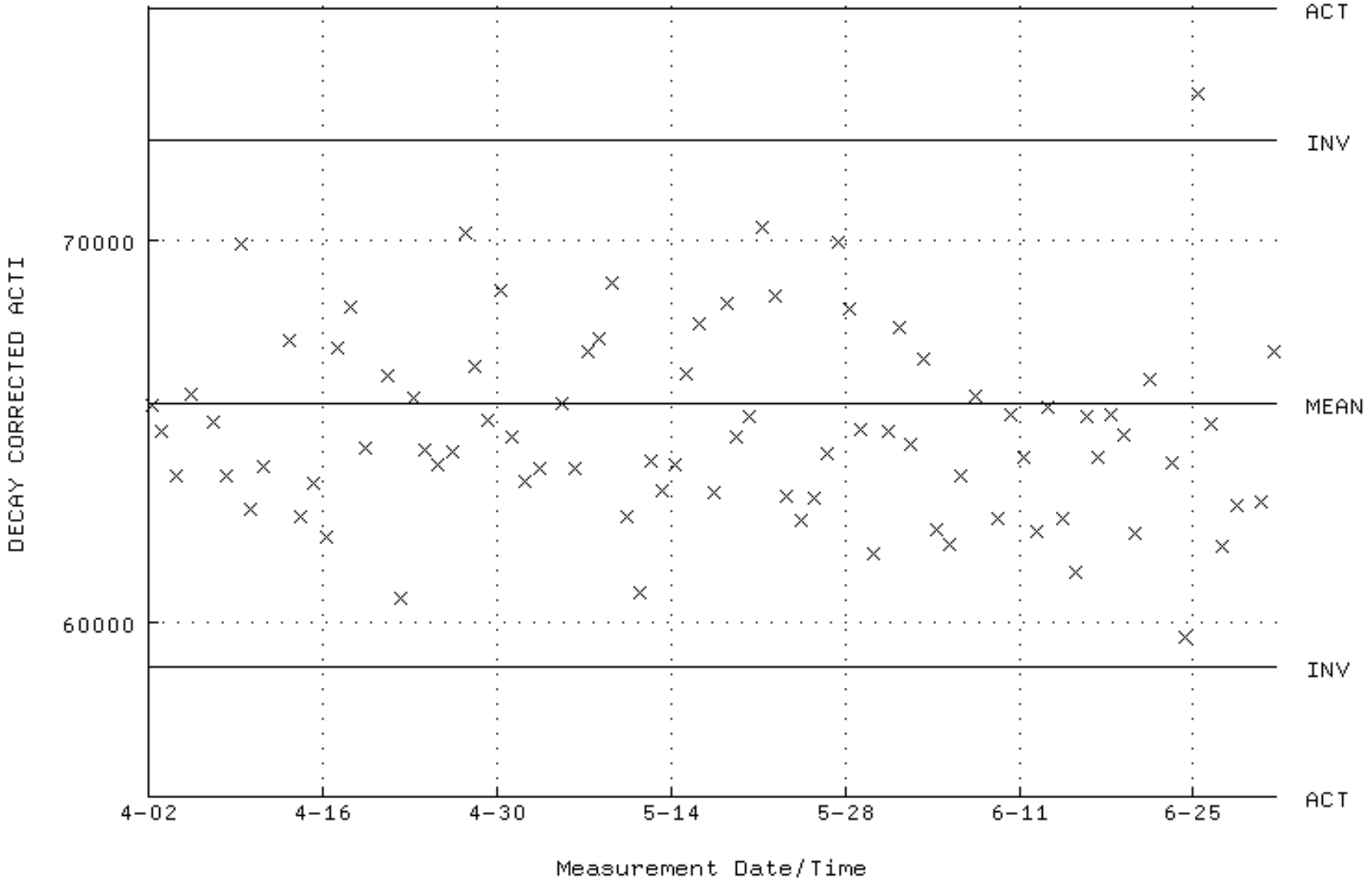
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 2-APR-2025 06:45:11 through 1-JUL-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



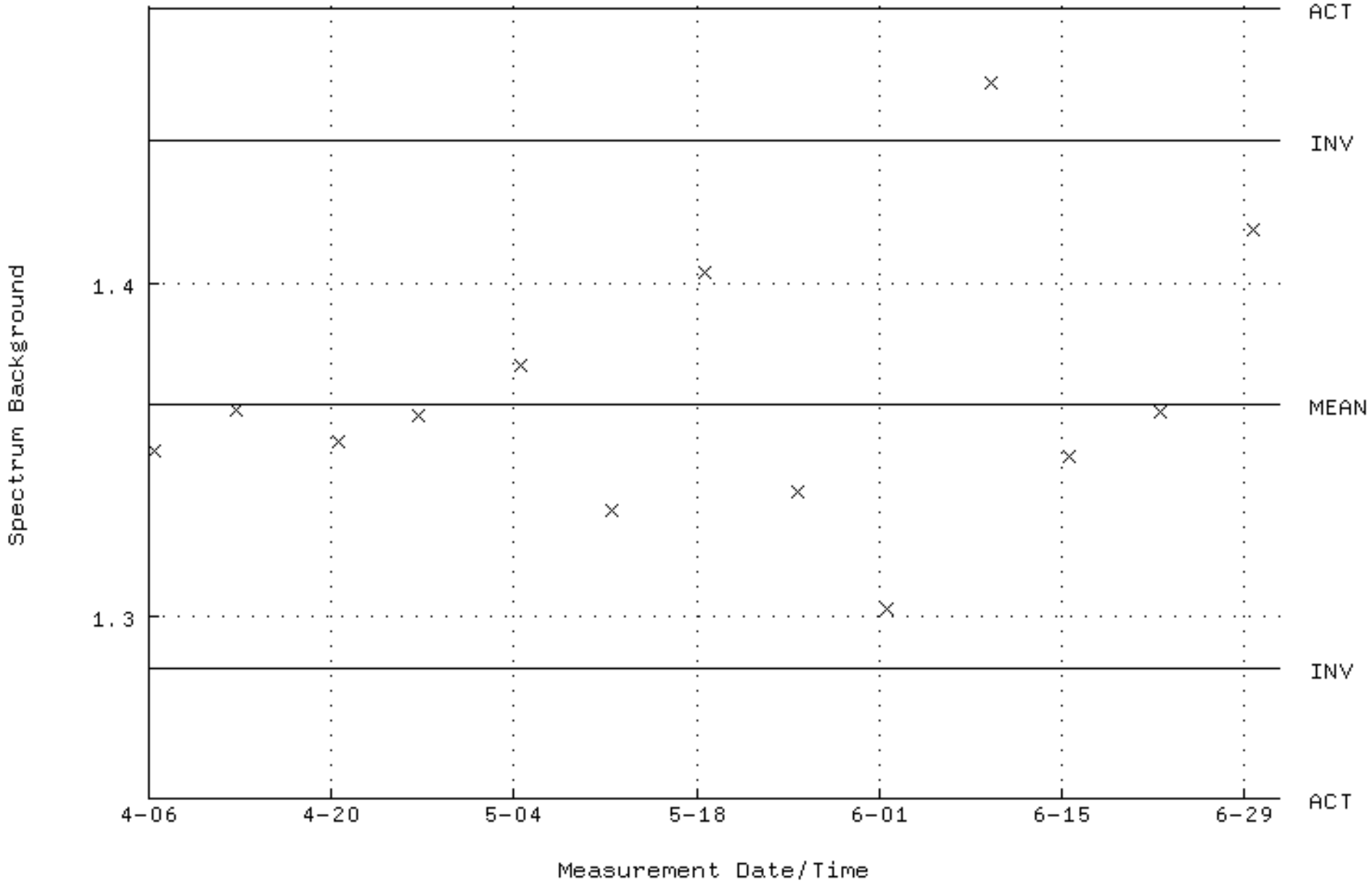
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 2-APR-2025 06:45:11 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 1.61458 +- 0.369176 (22.87 %)



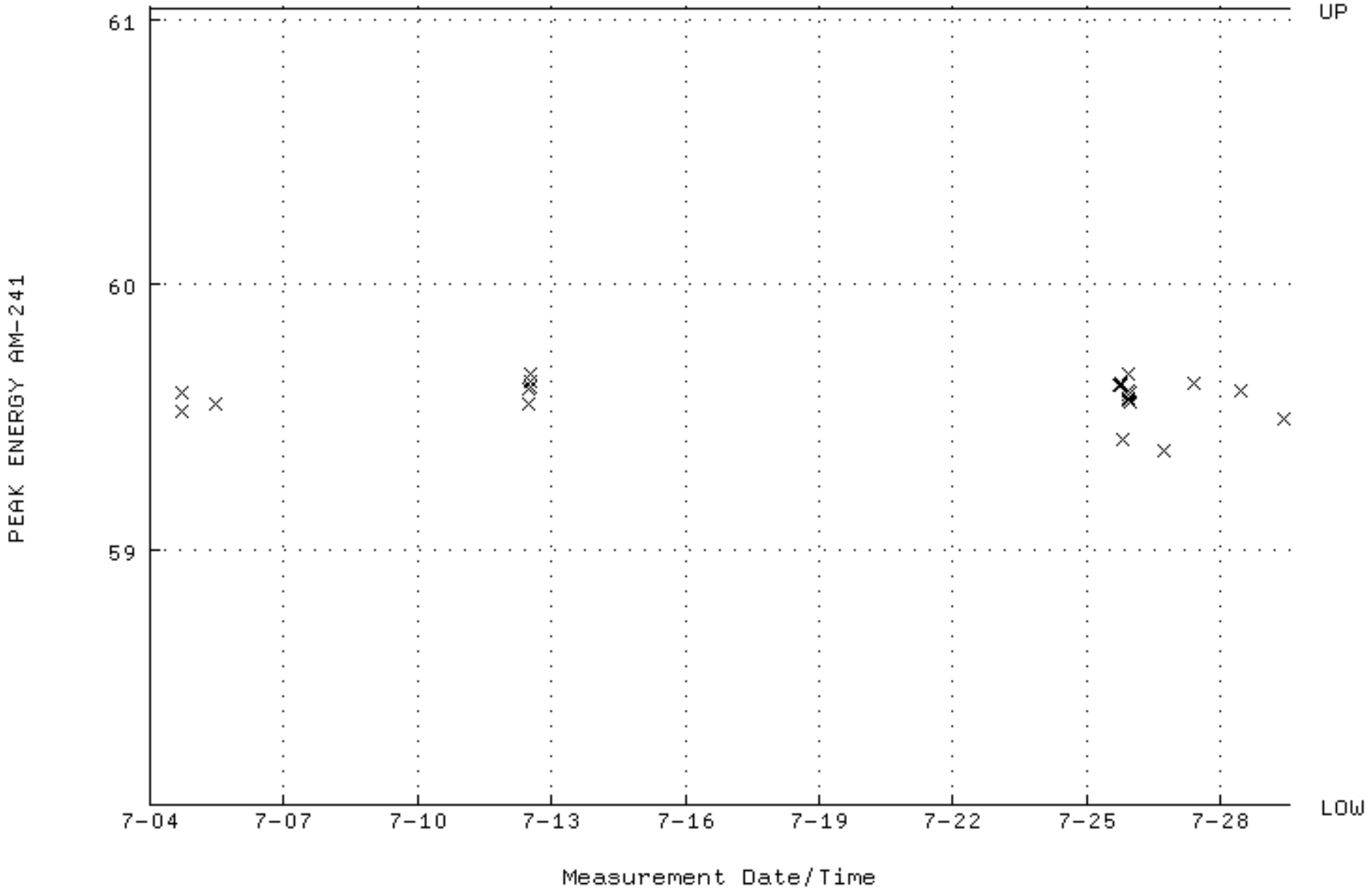
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 2-APR-2025 06:45:11 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 65732.7 +- 3437.16 (5.23 %)



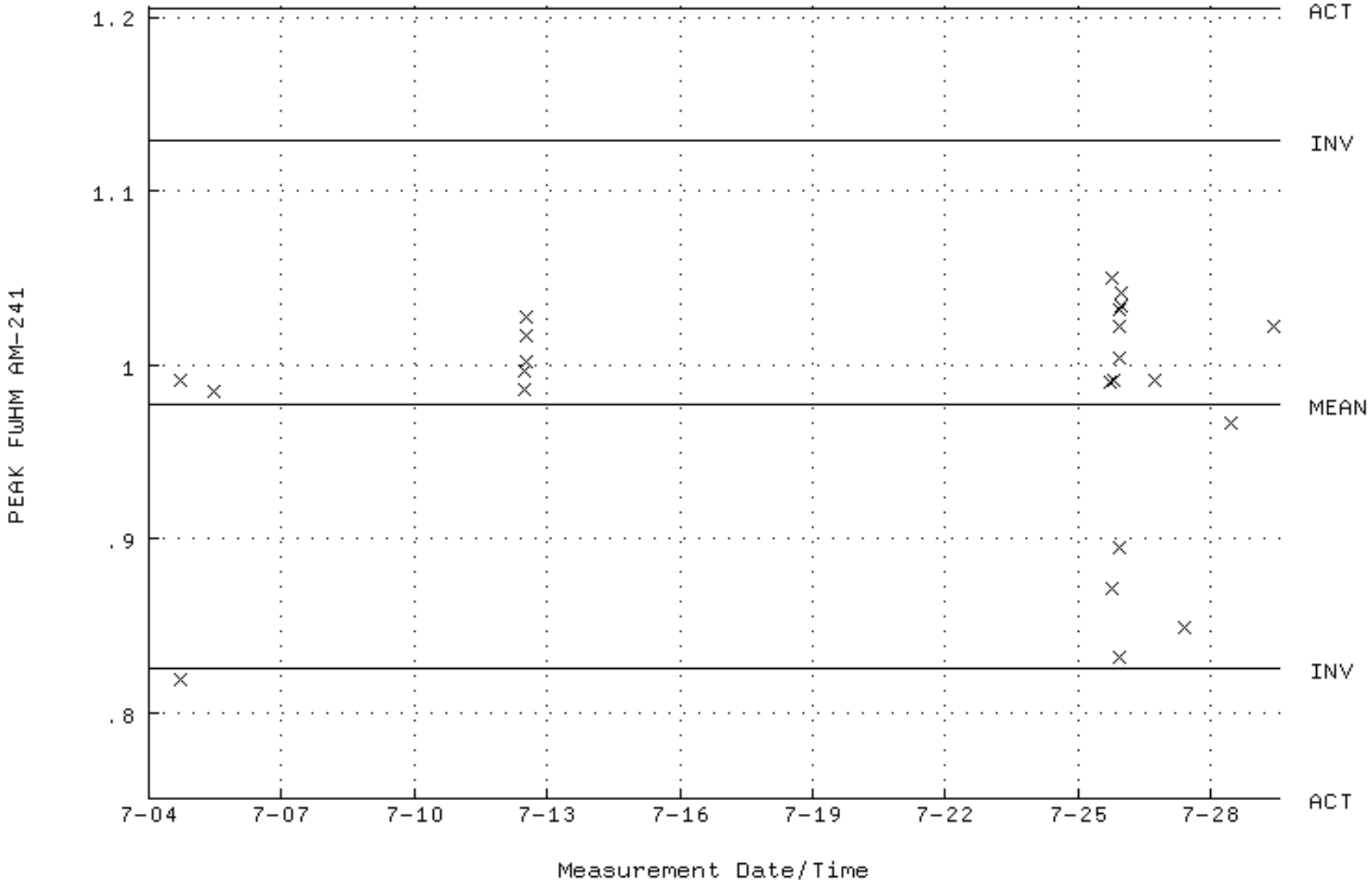
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM33.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-APR-2025 11:02:18 through 1-JUL-2025 12:00:00
Mean +- Std Dev : 1.36407 +- 3.947293E-02 (2.89 %)



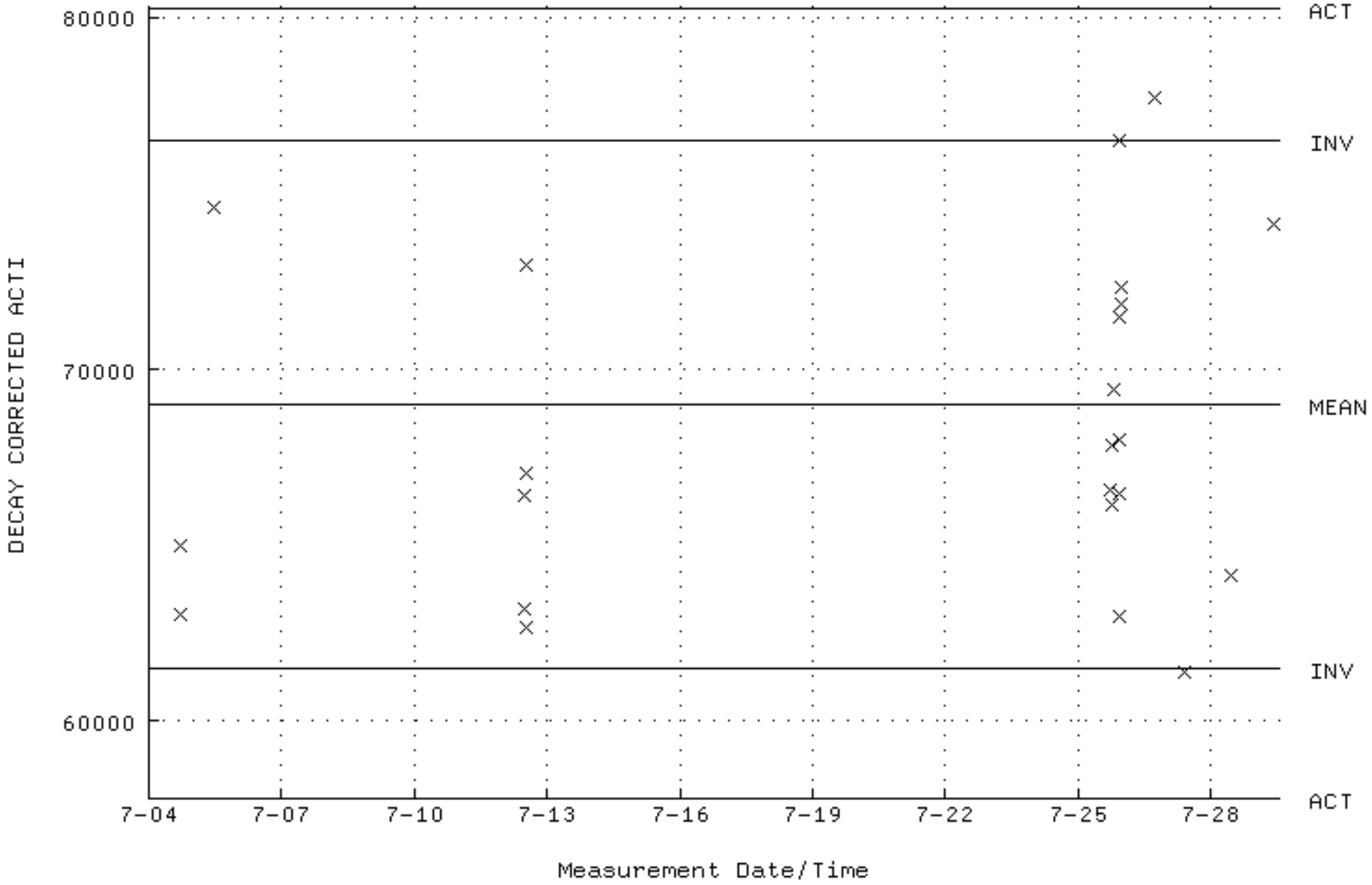
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM50_400JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-JUL-2025 16:44:23 through 29-JUL-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



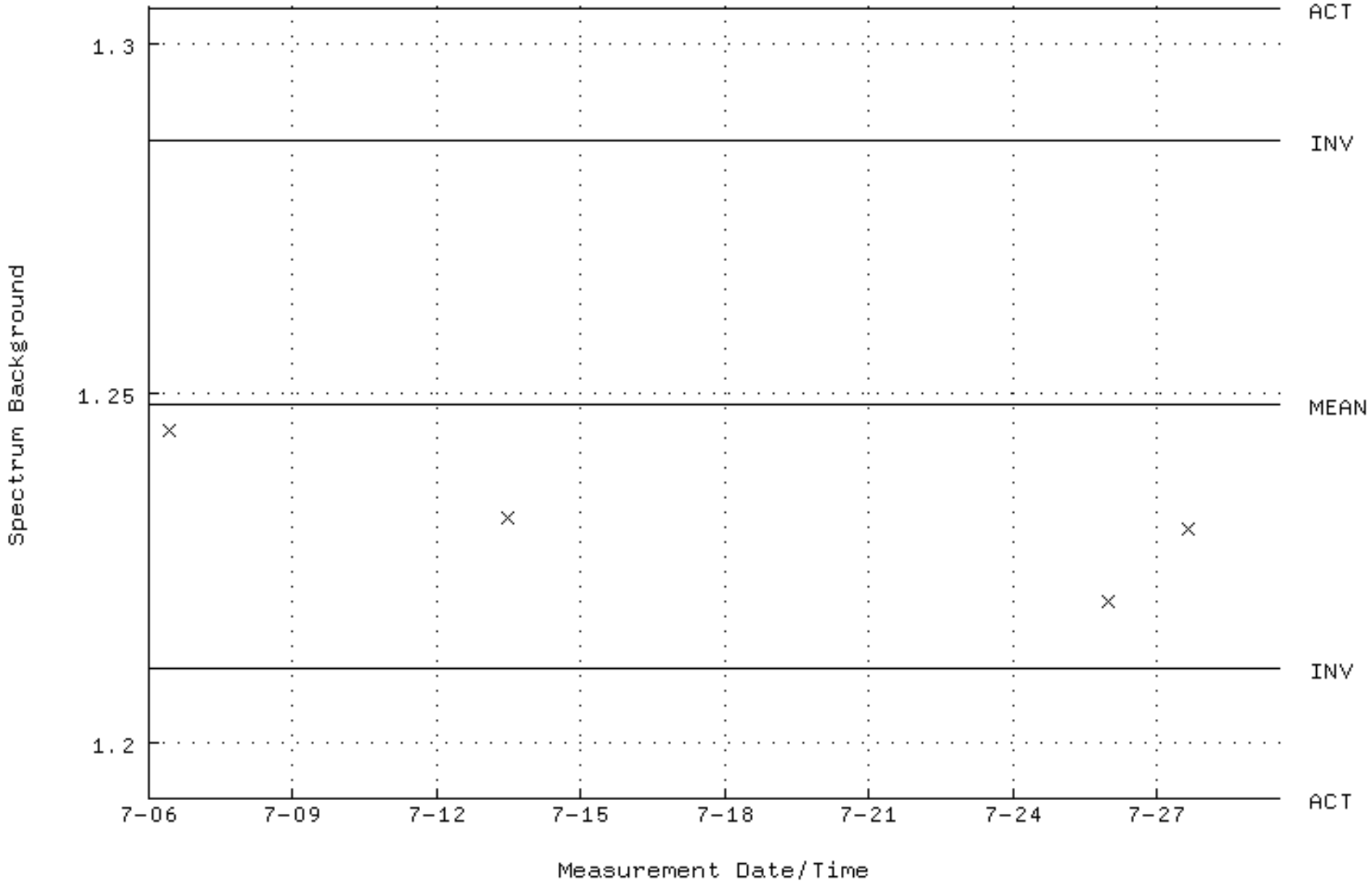
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM50_400JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-JUL-2025 16:44:23 through 29-JUL-2025 12:00:00
Mean +- Std Dev : 0.977950 +- 7.580584E-02 (7.75 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM50_400JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-JUL-2025 16:44:23 through 29-JUL-2025 12:00:00
Mean +- Std Dev : 69020.4 +- 3747.26 (5.43 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM50.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 6-JUL-2025 10:23:14 through 29-JUL-2025 12:00:00
Mean +- Std Dev : 1.24858 +- 1.883305E-02 (1.51 %)



RAD Standards Traceability

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

1556

Standard Radionuclide Source

84680-278

100 mL Solid in Aluminum Can

Customer: GEL Labs
P.O. No.: 489884RD, Item 3
Reference Date: 01-Apr-2011 12:00 PM EST **Grams of Master Source:** 0.0066498

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	1.129E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	7.538E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.659E+05	1.103E+03	0.6	2.3	4.8	HPGe
Co-57	122.1	2.718E+02	8.949E+04	5.951E+02	0.6	2.0	4.2	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	8.292E+02	0.6	1.9	4.0	HPGe
Hg-203	279.2	4.661E+01	2.899E+05	1.928E+03	0.6	1.9	4.0	HPGe
Sn-113	391.7	1.151E+02	1.739E+05	1.156E+03	0.6	1.9	4.0	HPGe
Cs-137	661.7	1.098E+04	1.107E+05	7.361E+02	0.8	1.9	4.1	HPGe
Y-88	898.0	1.066E+02	4.246E+05	2.824E+03	0.6	1.9	4.0	HPGe
Zn-65	1115.6	2.441E+02	———	1.445E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.118E+05	1.408E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.118E+05	1.408E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.495E+05	2.989E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

RC-S-060-101

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

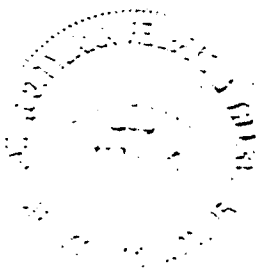
Page 193 of 210 GEL Laboratories

This standard will expire one year after the reference date.

Source Prepared by: M Williford
M. Williford, Radiochemist

QA Approved:
J. D. McCorvey, QA Manager Alternate

Date: 6/27/11



ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

Standard Logbook

Serial ID:	1556	**Open/Reference Date:**	01-APR-11	**Aliquot :**	1 mL
Name:	Mixed Gamma LCS CAN	**Received:**	01-APR-11	**Density :**	Hand Calculated
Type:	Source Material	**Expires:**	01-APR-37	**Lot Number :**	84680-278
Employee:	Maggie Stamps	**Verified:**	14-JUL-11		
Supplier:	Eckert & Zeigler Analytics				
Description:	84680-278				
Comments:	None				

Analyte	Concentration	Analyte	Concentration
Americium-241	125983.3 dpm/mL	Cesium-137	51898.9 dpm/mL
Cobalt-60	84496.9 dpm/mL		

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Pb-210	pCi/L
Mixed Gamma N1	722900
Mixed Gamma N2	752300
Mixed Gamma N3	692100

Isotopic Abundance: 0.0425
Certificate Value (dps): 1129

Mean Value (Counting) =	722433.33	pCi/L	100.622	**Pass**
Stdev =	30102.713	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	717965.0	pCi/L		
Lower Limit =	662227.9072	pCi/L		
Upper Limit =	782638.7594	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	60205.42611			
10 % of Mean =	72243.33333			
Rule 2 (Pass/Fail)	**Pass**			

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

mgH 7/20/11

H.Stamper 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Am-241**	**pCi/L**			
	Mixed Gamma N1	58390		Isotopic Abundance:	0.359
	Mixed Gamma N2	60740		Certificate Value (dps):	753.8
	Mixed Gamma N3	57770			
Mean Value (Counting) =	58966.67	pCi/L	**103.9074**	**Pass**	
Stdev =	1566.727	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	56749.2	pCi/L			
Lower Limit =	55833.21277	pCi/L			
Upper Limit =	62100.12057	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	3133.453898				
10 % of Mean =	5896.666667				
Rule 2 (Pass/Fail)	**Pass**				

Verification Rules

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Rule 3 = The determined mean value shall be within 5% of the certificate value.

MGH 7/20/11

M. Stamps 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Cd-109**	**pCi/L**			
	Mixed Gamma N1	818400		Isotopic Abundance:	0.037
	Mixed Gamma N2	798000		Certificate Value (dps):	1103
	Mixed Gamma N3	764700			
Mean Value (Counting) =	793700.00	pCi/L	**98.51091**	**Pass**	
Stdev =	27107.010	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	805697.6	pCi/L			
Lower Limit =	739485.9797	pCi/L			
Upper Limit =	847914.0203	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	54214.02033				
10 % of Mean =	79370				
Rule 2 (Pass/Fail)	**Pass**				

mgh 7/20/11

MStamps 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Co-57**	**pCi/L**			
	Mixed Gamma N1	19090		Isotopic Abundance:	0.856
	Mixed Gamma N2	18820		Certificate Value (dps):	595.1
	Mixed Gamma N3	18830			
Mean Value (Counting) =	18913.33	pCi/L	**100.6592**	**Pass**	
Stdev =	153.080	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	18789.5	pCi/L			
Lower Limit =	18607.17433	pCi/L			
Upper Limit =	19219.49233	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	306.1590001				
10 % of Mean =	1891.333333				
Rule 2 (Pass/Fail)	**Pass**				

mgh 7/20/11

MStamper 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Ce-139**	**pCi/L**			
	Mixed Gamma N1	28740		Isotopic Abundance:	0.8
	Mixed Gamma N2	29410		Certificate Value (dps):	829.2
	Mixed Gamma N3	27560			
Mean Value (Counting) =	28570.00	pCi/L	**101.9865**	**Pass**	
Stdev =	936.643	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	28013.5	pCi/L			
Lower Limit =	26696.71412	pCi/L			
Upper Limit =	30443.28588	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	1873.285883				
10 % of Mean =	2857				
Rule 2 (Pass/Fail)	**Pass**				

mgH 7/20/11

Verification Rules

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Rule 3 = The determined mean value shall be within 5% of the certificate value.

pl Stamp 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Hg-203**	**pCi/L**			
	Mixed Gamma N1	66300		Isotopic Abundance:	0.8156
	Mixed Gamma N2	68180		Certificate Value (dps):	1928
	Mixed Gamma N3	64480			
Mean Value (Counting) =	66320.00	pCi/L	**103.8046**	**Pass**	
Stdev =	1850.081	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	63889.3	pCi/L			
Lower Limit =	62619.83784	pCi/L			
Upper Limit =	70020.16216	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	3700.162159				
10 % of Mean =	6632				
Rule 2 (Pass/Fail)	**Pass**				

mgH 7/20/11

MStamper 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Sn-113	pCi/L
Mixed Gamma N1	49560
Mixed Gamma N2	49620
Mixed Gamma N3	48300

Isotopic Abundance: 0.6497
Certificate Value (dps): 1156

Mean Value (Counting) =	49160.00	pCi/L	**102.2277**	**Pass**
Stdev =	745.386	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	48088.7	pCi/L		
Lower Limit =	47669.22839	pCi/L		
Upper Limit =	50650.77161	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	1490.771612			
10 % of Mean =	4916			
Rule 2 (Pass/Fail)	**Pass**			

mgH 7/20/11

Hoffampl 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Cs-137**	**pCi/L**			
	Mixed Gamma N1	23710		Isotopic Abundance:	0.851
	Mixed Gamma N2	23950		Certificate Value (dps):	736.1
	Mixed Gamma N3	24040			
Mean Value (Counting) =	23900.00	pCi/L	**102.2333**	**Pass**	
Stdev =	170.587	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	23377.9	pCi/L			
Lower Limit =	23558.82556	pCi/L			
Upper Limit =	24241.17444	pCi/L			
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**			
Two sigma =	341.1744422				
10 % of Mean =	2390				
Rule 2 (Pass/Fail)	**Pass**				

7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
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Rule 3 = The determined mean value shall be within 5% of the certificate value.

MStamps
7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Y-88 (898)	pCi/L
Mixed Gamma N1	82690
Mixed Gamma N2	81320
Mixed Gamma N3	80940

Isotopic Abundance: 0.937
Certificate Value (dps): 2824

Mean Value (Counting) =	81650.00	pCi/L	**100.2381**	**Pass**
Stdev =	920.489	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	81456.1	pCi/L		
Lower Limit =	79809.022	pCi/L		
Upper Limit =	83490.978	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	1840.978001			
10 % of Mean =	8165			
Rule 2 (Pass/Fail)	**Pass**			

MJH 7/20/11

Mstamper 7/20/11

Verification Rules

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Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Co-60 (1173)	pCi/L
Mixed Gamma N1	38910
Mixed Gamma N2	39750
Mixed Gamma N3	38840

Isotopic Abundance: 0.9985
Certificate Value (dps): 1408

Mean Value (Counting) =	39166.67	pCi/L	**102.7694**	**Pass**
Stdev =	506.392	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	38111.2	pCi/L		
Lower Limit =	38153.88173	pCi/L		
Upper Limit =	40179.45161	pCi/L		
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**		
Two sigma =	1012.784939			
10 % of Mean =	3916.666667			
Rule 2 (Pass/Fail)	**Pass**			

msgd 7/20/11

MStamper 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Co-60 (1332.50)**	**pCi/L**			
	Mixed Gamma N1	38940		Isotopic Abundance:	0.9998
	Mixed Gamma N2	40200		Certificate Value (dps):	1408
	Mixed Gamma N3	39150			
Mean Value (Counting) =	39430.00	pCi/L	**103.595**	**Pass**	
Stdev =	675.056	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	38061.7	pCi/L			
Lower Limit =	38079.88889	pCi/L			
Upper Limit =	40780.11111	pCi/L			
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**			
Two sigma =	1350.111107				
10 % of Mean =	3943				
Rule 2 (Pass/Fail)	**Pass**				

mgw 7/20/11

MStamps 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Y-88 (1836.1)	pCi/L
Mixed Gamma N1	82870
Mixed Gamma N2	83080
Mixed Gamma N3	84640

Isotopic Abundance: 0.992
Certificate Value (dps): 2989

Mean Value (Counting) =	83530.00	pCi/L	102.5723	**Pass**
Stdev =	967.006	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	81435.3	pCi/L		
Lower Limit =	81595.98862	pCi/L		
Upper Limit =	85464.01138	pCi/L		
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**		
Two sigma =	1934.011375			
10 % of Mean =	8353			
Rule 2 (Pass/Fail)	**Pass**			

mgh 7/20/11

MStamper 7/20/11

Verification Rules

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Standard Logbook

Serial ID:	1556	**Open/Reference Date:**	01-APR-11	**Aliquot :**	1 mL
Name:	Mixed Gamma LCS CAN	**Received:**	01-APR-11	**Density :**	Hand Calculated
Type:	Source Material	**Expires:**	01-APR-37	**Lot Number :**	84680-278
Employee:	Maggie Stamps	**Verified:**	14-JUL-11		
Supplier:	Eckert & Ziegler				

Description: 84680-278

Comments: None

Analyte	Concentration	Analyte	Concentration
Americium-241	125983.3 dpm/mL	Cesium-137	51898.9 dpm/mL
Cobalt-60	84496.9 dpm/mL		

Runlogs

Instrument Run Log

Instrument Type: GAMMA SPECTROMETER **Batch ID: 2822154**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
730947001	SAMPLE	MXR1	GAM50	JUL-26-25 22:26:16	DONE	CAN	25-JUL-25 00:00
730947002	SAMPLE	MXR1	GAM29	JUL-26-25 22:29:08	DONE	CAN	24-JUL-25 00:00
730947003	SAMPLE	MXR1	GAM21	JUL-27-25 10:04:35	DONE	CAN	24-JUL-25 00:00
1206156307	MB	MXR1	GAM31	JUL-27-25 10:05:17	DONE	CAN	22-AUG-24 00:00
1206156308	DUP	MXR1	GAM32	JUL-27-25 10:05:41	DONE	CAN	24-JUL-25 00:00
1206156309	LCS	MXR1	GAM33	JUL-27-25 10:06:09	DONE	CAN	25-NOV-24 00:00

GEL Laboratories LLC
a member of The GEL Group INC

2040 Savage Road | Charleston, SC 29407
843.556.8171
gel.com

April 11, 2025

Alex Bartels
MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Re: WYE Yard
Work Order: 714507

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 17, 2025. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4422.

Sincerely,

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

Purchase Order: GELP24-1624
Enclosures

problem solved

MJW Technical Services
WYE Yard
SDG: 714507

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Case Narrative

Page 3 of 14 SDG: 714507

Case Narrative
for
MJW Technical Services
SDG: 714507

April 11, 2025

Laboratory Identification:

GEL Laboratories, LLC.

Summary

Sample Receipt The samples arrived at GEL Laboratories, LLC., Charleston, South Carolina on March 17, 2025 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
714507001	030725-WYE-BKG
714507002	030625-WYE-001 U6S
714507003	030625-WYE-002 U6S
714507004	030625-WYE-002-DUP U6S
714507005	030625-WYE-003 U6S
714507006	030625-WYE-004 U6S
714507007	030625-WYE-005 U6S
714507008	030625-WYE-006 U6S
714507009	030625-WYE-007 U6S
714507010	030625-WYE-008 U6S
714507011	030625-WYE-010 U6S
714507012	030625-WYE-011 U6S
714507013	030625-WYE-011-DUP U6S
714507014	030625-WYE-012 U6S
714507015	030625-WYE-013 U6S
714507016	030625-WYE-014 U6S
714507017	030725-WYE-015 BS
714507018	030725-WYE-016 BS
714507019	030725-WYE-017 BS
714507020	030725-WYE-017-DUP BS
714507021	030725-WYE-018 BS
714507022	030725-WYE-019 BS
714507023	030725-WYE-020 BS
714507024	030625-WYE-009

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

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List of current GEL Certifications as of 11 April 2025

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-00651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	525-24-281-19660
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	KY90129
Kentucky Wastewater	KY90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2023019
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	NV-C24-00175
New Hampshire NELAP	205424
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2023-152
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235
Utah NELAP	SC000122024-45
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Chain of Custody and Supporting Documentation

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Page: 1 of 3

Project #

GEL Quote #:

PO Number:

QC Number [1]:

GEL Laboratories LLC
gel.com | Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

714507

GEL Work Order Number:

GEL Project Manager:

Client Name: MJW for Roux & CES

Phone # (347) 486-8080

Project/Site Name: WYE Yard

Fax #

Address: 15 Hazelwood Drive Suite 112 Amherst NY 14228

Collected By: P. Hoch / L. Alexander

Send Results To: fshostak@mjwcorp.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	Should this sample be considered: (7) Known or possible Hazards	Total number of containers	Gamma Spec	<-- Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
030725-WYE-BKG	030725	0800	N	N	SD			1	X		21 day in growth
030625-WYE-001 U6S	030625	0830	N	N	SD			1	X		
030625-WYE-002 U6S	030625	0900	N	N	SD			1	X		
030625-WYE-002-Dup U6S	030625	0930	FD	N	SD			1	X		
030625-WYE-003 U6S	030625	1000	N	N	SD			1	X		
030625-WYE-004 U6S	030625	1030	N	N	SD			1	X		Please store
030625-WYE-005 U6S	030625	1100	N	N	SD			1	X		samples after
030625-WYE-006 U6S	030625	1130	N	N	SD			1	X		analysis until
030625-WYE-007 U6S	030625	1200	N	N	SD			1	X		May 31.
030625-WYE-008 U6S	030625	1230	N	N	SD			1	X		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1		3-10-25	1400		3/17/25	13:30
2						
3						

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks: hold samples after analysis until May 31

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: 21 °C

Sample Collection Time Zone: [X] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. *8260B - 3, 6010B/7470A - 1*).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) KNOWN OR POSSIBLE HAZARDS

RCRA Metals
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg= Mercury
Se= Selenium
Ag= Silver
MR= Misc. RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)

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Page: 2 of 3

Project #

GEL Quote #:

COC Number (1):

PO Number:

GEL Laboratories LLC

gel.com Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number: GEL Project Manager:

Client Name: MJW for Roux & C&S Phone # (347) 486-8080

Project/Site Name: WYE Yard Fax #

Address: 15 Hazelwood Drive Suite 112 Amherst NY 14228

Collected By: P. Koch / L Alexander Send Results To: fshostak@mjwcorp.com

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	Should this sample be considered: (7) Known or possible Hazards	Total number of containers	Sample Analysis Requested (5) (Fill in the number of containers for each test): Gamma Spec	<-- Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
030625-WYE-010-U6S	030625	1300	N	N	SD			1	X		21 day ingrowth
030625-WYE-011-U6S	030625	1330	N	N	SD			1	X		
030625-WYE-011-DUP U6S	030625	1400	FD	N	SD			1	X		
030625-WYE-012-U6S	030625	1430	N	N	SD			1	X		
030625-WYE-013-U6S	030625	1500	N	N	SD			1	X		Please store
030625-WYE-014-U6S	030625	1530	N	N	SD			1	X		samples after
030725-WYE-015-BS	030725	0800	N	N	SD			1	X		analysis until
030725-WYE-016-BS	030725	0830	N	N	SD			1	X		May 31.
030725-WYE-017-BS	030725	0900	N	N	SD			1	X		
030725-WYE-017 Dup-BS	030725	0930	FD	N	SD			1	X		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	PaW	3-10-25	1400	[signature]	3/11/25	1330
2						
3						

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks: hold samples after analysis until May 31

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: 21 °C

Sample Collection Time Zone: [X] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. *8260B - 3, 6010B/7470A - 1*).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) KNOWN OR POSSIBLE HAZARDS

RCRA Metals
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg= Mercury
Se= Selenium
Ag= Silver
MR= Misc. RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)

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Page: 3 of 3

Project #

GEL Quote #:

COC Number [1]:

PO Number:

GEL Laboratories LLC

gel.com

Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number:

GEL Project Manager:

Client Name: MW for Roux & CES

Phone # (347) 486-8080

Project/Site Name: WYE Yard

Fax #

Address: 15 Hazelwood Drive Suite 112 Amherst NY 14228

Collected By: P. Koch / L Alexander

Send Results To: fshostak@mswcorp.com

Page 1 of 1

SDG: 145507

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	Should this sample be considered: (7) Known or possible Hazards	Total number of containers	Sample Analysis Requested [5] (Fill in the number of containers for each test): Gamma Spec	<-- Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
030725-WYE-018-BS	030725	1000	N	N	SD			1	X		21 day ingrowth
030725-WYE-019-BS	030725	1030	N	N	SD			1	X		
030725-WYE-020-BS	030725	1100	N	N	SD			1	X		
											Please store samples after analysis until May 31.

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	PdK	2-10-25	1400	[signature]	3/11/25	1330
2						
3						

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks: hold samples after analysis until May 31

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: 21 °C

Sample Collection Time Zone: [X] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. *8260B - 3, 6010B/7470A - 1*).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) KNOWN OR POSSIBLE HAZARDS

RCRA Metals
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg= Mercury
Se= Selenium
Ag= Silver
MR= Misc. RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: MJWC | SDG/AR/COC/Work Order: 714507 | GEL PM:

Received By: LLB | Date Received at GEL: 3.17.25

Carrier (Circle Applicable)
FedEx Express (FedEx Ground) UPS Field Services Courier Client Other:

IR Temp gun # IR4-24 Daily Calibration Performed? (Y)N

Tracking Number	Temp (C)	If over 6 °C, check if samples do not require cold preservation (le radiochem only).	Tracking Number	Temp (C)	If over 6 °C, check if samples do not require cold preservation (le radiochem only).
7726 1107 0330	21c	✓			

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): Ø CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Are there any sample hazards to document?		✓	If yes, select Hazards below. PCBs Flammable Foreign Soil RCRA Asbestos Beryllium Corrosive Other:
E) Was a SDS received and reviewed by Lab Safety?		✓	Circle Applicable: See additional Comments below. No additional comments needed after review.

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Direct client dropoff Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	If there are samples requiring cold preservation, did they arrive within (0 < 6 °C)?			✓	Preservation Method: Wet Ice Ice Packs Dry Ice None Other: *all temperatures recorded next to tracking numbers are in Celcius
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?			✓	Preserved per COC request or list Sample IDs and Containers Affected: If Preservation added, Lot#:
6	Do any samples require Volatile Analysis? (If yes, answer all three additional questions.)			✓	If Yes, are Encores or Soil Kits present? Yes___ No___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___ (If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample IDs and containers affected:
7	Samples received within holding time?	✓			IDs and tests affected:
8	Sample IDs on COC match IDs on bottles?	✓			IDs and containers affected:
9	Date & time on COC match date & time on bottles?			✓	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
10	Number of containers received match number indicated on COC? 3/11/25 CG	X		!	Circle Applicable: No container count on COC Missing Container (provide details) Other (describe) Received WYE-009 not on COC
11	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
12	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments:

PM (or PMA) review: Initials AM Date 3/19/25

Continuation Form Required when selected

GL-CHL-SR-001 Rev 8

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Data Review Qualifier Definitions

Page 21 of 45 SDG: 714507

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.
P	Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

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For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
MJW Technical Services
SDG #: 714507

Product: **Dry Weight**
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2767432

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
714507001	030725-WYE-BKG
714507002	030625-WYE-001 U6S
714507003	030625-WYE-002 U6S
714507004	030625-WYE-002-DUP U6S
714507005	030625-WYE-003 U6S
714507006	030625-WYE-004 U6S
714507007	030625-WYE-005 U6S
714507008	030625-WYE-006 U6S
714507009	030625-WYE-007 U6S
714507010	030625-WYE-008 U6S
714507011	030625-WYE-010 U6S
714507012	030625-WYE-011 U6S
714507013	030625-WYE-011-DUP U6S
714507014	030625-WYE-012 U6S
714507015	030625-WYE-013 U6S
714507016	030625-WYE-014 U6S
714507017	030725-WYE-015 BS
714507018	030725-WYE-016 BS
714507019	030725-WYE-017 BS
714507020	030725-WYE-017-DUP BS

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Dry Weight**
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2767433

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
714507021	030725-WYE-018 BS

714507022	030725-WYE-019 BS
714507023	030725-WYE-020 BS
714507024	030625-WYE-009

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Gammaspec, Gamma, Solid (Standard List)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 29
Analytical Batch: 2767515

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2767432

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
714507001	030725-WYE-BKG
714507002	030625-WYE-001 U6S
714507003	030625-WYE-002 U6S
714507004	030625-WYE-002-DUP U6S
714507005	030625-WYE-003 U6S
714507006	030625-WYE-004 U6S
714507007	030625-WYE-005 U6S
714507008	030625-WYE-006 U6S
714507009	030625-WYE-007 U6S
714507010	030625-WYE-008 U6S
714507011	030625-WYE-010 U6S
714507012	030625-WYE-011 U6S
714507013	030625-WYE-011-DUP U6S
714507014	030625-WYE-012 U6S
714507015	030625-WYE-013 U6S
714507016	030625-WYE-014 U6S
714507017	030725-WYE-015 BS
714507018	030725-WYE-016 BS
714507019	030725-WYE-017 BS
714507020	030725-WYE-017-DUP BS
1206041221	Method Blank (MB)
1206041222	714507001(030725-WYE-BKG) Sample Duplicate (DUP)
1206041223	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample
The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1206041222 (030725-WYE-BKGDUP)	Bismuth-214	RPD 21.5* (0.00%-20.00%) RER 1.29 (0-3)

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high peak-width.	Thorium-234	714507014	030625-WYE-012 U6S
		Thorium-234	714507017	030725-WYE-015 BS
		Uranium-238	714507014	030625-WYE-012 U6S
		Uranium-238	714507017	030725-WYE-015 BS
UI	Results are considered a false positive due to interference.	Europium-155	714507013	030625-WYE-011-DUP U6S
		Manganese-54	714507020	030725-WYE-017-DUP BS
UI	Results are considered a false positive due to low abundance.	Barium-140	714507015	030625-WYE-013 U6S
		Cesium-134	714507002	030625-WYE-001 U6S
		Niobium-94	714507020	030725-WYE-017-DUP BS
		Zirconium-95	714507006	030625-WYE-004 U6S
UI	Results are considered a false positive due to no valid peak.	Neodymium-147	714507019	030725-WYE-017 BS

Product: **Gammaspec, Gamma, Solid (Standard List)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 29
Analytical Batch: 2767517

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2767433

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
714507021	030725-WYE-018 BS
714507022	030725-WYE-019 BS
714507023	030725-WYE-020 BS
714507024	030625-WYE-009
1206041224	Method Blank (MB)
1206041225	714507021(030725-WYE-018 BS) Sample Duplicate (DUP)
1206041226	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high peak-width.	Beryllium-7	714507022	030725-WYE-019 BS
UI	Results are considered a false positive due to interference.	Cesium-134	714507021	030725-WYE-018 BS
		Europium-155	714507022	030725-WYE-019 BS
UI	Results are considered a false positive due to low abundance.	Neodymium-147	714507021	030725-WYE-018 BS
UI	Results are considered a false positive due to no valid peak.	Uranium-235	714507022	030725-WYE-019 BS

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Moisture LogBook

Batch: 2767432
Analyst: DT2
Date/Time: 18-MAR-2025
Procedure Code:___PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
714507001	SAMPLE		SP-C234673837	10:57	68.6	335.01	259.84	266.41	191.24	28.215
714507002	SAMPLE		SP-C234673837	10:57	68.31	356.66	315.2	288.35	246.89	14.378
714507003	SAMPLE		SP-C234673837	10:57	68.17	432.14	404.25	363.97	336.08	7.662
714507004	SAMPLE		SP-C234673837	10:57	68.04	445.94	410.46	377.9	342.42	9.388
714507005	SAMPLE		SP-C234673837	10:57	68.19	475.81	450.64	407.62	382.45	6.174
714507006	SAMPLE		SP-C234673837	10:57	68.52	446.05	400.58	377.53	332.06	12.044
714507007	SAMPLE		SP-C234673837	10:57	68.16	461.82	440.19	393.66	372.03	5.494
714507008	SAMPLE		SP-C234673837	10:57	68.48	397.45	372.5	328.97	304.02	7.584
714507009	SAMPLE		SP-C234673837	10:57	68.02	387.76	342.18	319.74	274.16	14.255
714507010	SAMPLE		SP-C234673837	10:57	68.42	454.43	414.49	386.01	346.07	10.346
714507011	SAMPLE		SP-C234673837	10:57	68.63	379.19	363.7	310.56	295.07	4.987
714507012	SAMPLE		SP-C234673837	10:57	68.65	377.99	330.88	309.34	262.23	15.229
714507013	SAMPLE		SP-C234673837	10:57	67.93	528.68	472.01	460.75	404.08	12.299
714507014	SAMPLE		SP-C234673837	10:57	68.15	487.14	469.2	418.99	401.05	4.281
714507015	SAMPLE		SP-C234673837	10:57	68.25	463.23	449.86	394.98	381.61	3.384
714507016	SAMPLE		SP-C234673837	10:57	68.22	439.39	424.59	371.17	356.37	3.987
714507017	SAMPLE		SP-C234673837	10:57	68.27	464.41	452.75	396.14	384.48	2.943
714507018	SAMPLE		SP-C234673837	10:57	68.68	438.74	419.39	370.06	350.71	5.228
714507019	SAMPLE		SP-C234673837	10:57	68.59	455.7	437.91	387.11	369.32	4.595

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
714507020	SAMPLE		SP-C234673837	10:57	68.37	446.28	430.46	377.91	362.09	4.186

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

Evaporative Loss LogBook **GEL Laboratories, LLC.**

Moisture LogBook

Batch: 2767433
Analyst: GG
Date/Time: 18-MAR-2025
Procedure Code:___PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
714507021	SAMPLE		SP-C234673837	10:44	67.04	457.14	442.61	390.1	375.57	3.724
714507022	SAMPLE		SP-C234673837	10:44	67.12	428.58	413.81	361.46	346.69	4.086
714507023	SAMPLE		SP-C234673837	10:44	67.22	528.91	508.48	461.69	441.26	4.425
714507024	SAMPLE		SP-C234673837	10:44	67.27	530.66	509.2	463.39	441.93	4.631

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

MJWC001 MJW Technical Services

Client SDG: 714507 GEL Work Order: 714507

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI Gamma Spectroscopy--Uncertain identification

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: John Petrovic **Name: John Petrovic**

Date: 14 APR 2025 **Title: Data Validator**

Sample Data Summary

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-BKG
Sample ID: 714507001
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 28.2%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.559	+/-0.290	0.269	+/-0.297		pCi/g			MXR1	04/10/25	1421	2767515	1
Americium-241	U	-0.0655	+/-0.158	0.263	+/-0.161		pCi/g							
Antimony-124	U	-0.00162	+/-0.0774	0.170	+/-0.0774		pCi/g							
Antimony-125	U	0.0319	+/-0.0738	0.151	+/-0.0752		pCi/g							
Barium-133	U	0.00595	+/-0.0366	0.0657	+/-0.0367		pCi/g							
Barium-140	U	-0.758	+/-0.718	0.968	+/-0.798		pCi/g							
Beryllium-7	U	-0.148	+/-0.381	0.614	+/-0.387		pCi/g							
Bismuth-212		1.69	+/-0.488	0.797	+/-0.516		pCi/g							
Bismuth-214		0.706	+/-0.164	0.110	+/-0.176		pCi/g							
Cerium-139	U	0.00636	+/-0.0259	0.0478	+/-0.0260		pCi/g							
Cerium-141	U	0.0505	+/-0.0748	0.144	+/-0.0783		pCi/g							
Cerium-144	U	-0.0162	+/-0.180	0.322	+/-0.180		pCi/g							
Cesium-134	U	0.0121	+/-0.0379	0.0748	+/-0.0383		pCi/g							
Cesium-136	U	-0.0393	+/-0.249	0.489	+/-0.249		pCi/g							
Cesium-137		0.112	+/-0.0487	0.0547	+/-0.0497	0.100	pCi/g							
Chromium-51	U	0.165	+/-0.494	0.990	+/-0.499		pCi/g							
Cobalt-56	U	0.0126	+/-0.0314	0.0672	+/-0.0320		pCi/g							
Cobalt-57	U	-0.000123	+/-0.0216	0.0394	+/-0.0216		pCi/g							
Cobalt-58	U	-0.0176	+/-0.0427	0.0750	+/-0.0435		pCi/g							
Cobalt-60	U	0.00118	+/-0.0308	0.0644	+/-0.0308		pCi/g							
Europium-152	U	0.0449	+/-0.0731	0.152	+/-0.0759		pCi/g							
Europium-154	U	0.0185	+/-0.0817	0.179	+/-0.0821		pCi/g							
Europium-155	U	-0.0353	+/-0.0931	0.165	+/-0.0945		pCi/g							
Iridium-192	U	0.00459	+/-0.0339	0.0668	+/-0.0339		pCi/g							
Iron-59	U	-0.0714	+/-0.108	0.193	+/-0.113		pCi/g							
Lead-210	U	0.775	+/-3.14	6.08	+/-3.16		pCi/g							
Lead-212		0.664	+/-0.106	0.0772	+/-0.119		pCi/g							
Lead-214		0.874	+/-0.195	0.110	+/-0.207		pCi/g							
Manganese-54	U	0.0113	+/-0.0321	0.0645	+/-0.0325		pCi/g							
Mercury-203	U	-0.0155	+/-0.0409	0.0769	+/-0.0415		pCi/g							
Neodymium-147	U	0.756	+/-1.40	2.76	+/-1.44		pCi/g							
Neptunium-239	U	0.0135	+/-0.233	0.426	+/-0.233		pCi/g							
Niobium-94	U	-0.000730	+/-0.0277	0.0526	+/-0.0277		pCi/g							
Niobium-95	U	-0.00875	+/-0.0537	0.0865	+/-0.0539		pCi/g							
Potassium-40		12.7	+/-1.56	0.710	+/-1.94		pCi/g							
Promethium-144	U	-0.0239	+/-0.0320	0.0534	+/-0.0338		pCi/g							
Promethium-146	U	-0.0110	+/-0.0321	0.0596	+/-0.0325		pCi/g							
Radium-226		0.874	+/-0.195	0.110	+/-0.207		pCi/g							

GEL LABORATORIES LLC
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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-BKG
Sample ID: 714507001

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		0.559	+/-0.290	0.269	+/-0.297		pCi/g							
Ruthenium-106	U	-0.00408	+/-0.271	0.518	+/-0.271		pCi/g							
Silver-110m	U	0.00220	+/-0.0452	0.0868	+/-0.0452		pCi/g							
Sodium-22	U	0.00490	+/-0.0286	0.0623	+/-0.0287		pCi/g							
Thallium-208		0.201	+/-0.0620	0.0510	+/-0.0645		pCi/g							
Thorium-234	U	1.41	+/-2.45	2.12	+/-2.47		pCi/g							
Tin-113	U	-0.00215	+/-0.0393	0.0760	+/-0.0393		pCi/g							
Uranium-235	U	-0.0222	+/-0.173	0.309	+/-0.173		pCi/g							
Uranium-238	U	1.41	+/-2.45	2.12	+/-2.47		pCi/g							
Yttrium-88	U	-0.0189	+/-0.0375	0.0673	+/-0.0385		pCi/g							
Zinc-65	U	0.0126	+/-0.0897	0.162	+/-0.0899		pCi/g							
Zirconium-95	U	-0.0200	+/-0.0794	0.144	+/-0.0800		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-001 U6S
Sample ID: 714507002
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 14.4%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.39	+/-0.386	0.339	+/-0.424		pCi/g			MXR1	04/10/25	1931	2767515	1
Americium-241	U	0.151	+/-0.340	0.688	+/-0.348		pCi/g							
Antimony-124	U	-0.00871	+/-0.128	0.270	+/-0.128		pCi/g							
Antimony-125	U	-0.0417	+/-0.122	0.230	+/-0.124		pCi/g							
Barium-133	U	-0.00242	+/-0.0601	0.0976	+/-0.0601		pCi/g							
Barium-140	U	-0.240	+/-0.872	1.65	+/-0.879		pCi/g							
Beryllium-7	U	0.818	+/-0.923	0.985	+/-0.926		pCi/g							
Bismuth-212		3.33	+/-1.49	1.19	+/-1.52		pCi/g							
Bismuth-214		2.04	+/-0.254	0.156	+/-0.306		pCi/g							
Cerium-139	U	-0.0303	+/-0.0433	0.0752	+/-0.0459		pCi/g							
Cerium-141	U	-0.0791	+/-0.127	0.224	+/-0.132		pCi/g							
Cerium-144	U	-0.0519	+/-0.257	0.473	+/-0.258		pCi/g							
Cesium-134	UI	0.000	+/-0.0665	0.127	+/-0.0955		pCi/g							
Cesium-136	U	0.144	+/-0.378	0.774	+/-0.384		pCi/g							
Cesium-137	U	-0.00148	+/-0.0406	0.0806	+/-0.0406	0.100	pCi/g							
Chromium-51	U	-0.327	+/-0.722	1.22	+/-0.738		pCi/g							
Cobalt-56	U	0.0165	+/-0.0586	0.117	+/-0.0591		pCi/g							
Cobalt-57	U	-0.0305	+/-0.0321	0.0558	+/-0.0350		pCi/g							
Cobalt-58	U	-0.00314	+/-0.0524	0.0913	+/-0.0524		pCi/g							
Cobalt-60	U	0.0344	+/-0.0497	0.114	+/-0.0522		pCi/g							
Europium-152	U	0.0477	+/-0.150	0.255	+/-0.152		pCi/g							
Europium-154	U	0.0802	+/-0.165	0.353	+/-0.169		pCi/g							
Europium-155	U	0.0722	+/-0.256	0.266	+/-0.256		pCi/g							
Iridium-192	U	0.0470	+/-0.0477	0.0971	+/-0.0524		pCi/g							
Iron-59	U	-0.0470	+/-0.121	0.235	+/-0.123		pCi/g							
Lead-210	U	10.9	+/-14.9	31.3	+/-15.7		pCi/g							
Lead-212		1.53	+/-0.182	0.139	+/-0.241		pCi/g							
Lead-214		2.61	+/-0.312	0.176	+/-0.404		pCi/g							
Manganese-54	U	0.0280	+/-0.0511	0.104	+/-0.0527		pCi/g							
Mercury-203	U	0.0177	+/-0.0713	0.131	+/-0.0718		pCi/g							
Neodymium-147	U	-1.39	+/-2.34	4.21	+/-2.42		pCi/g							
Neptunium-239	U	-0.0174	+/-0.363	0.632	+/-0.363		pCi/g							
Niobium-94	U	-0.0105	+/-0.0404	0.0746	+/-0.0407		pCi/g							
Niobium-95	U	0.0161	+/-0.0501	0.0969	+/-0.0507		pCi/g							
Potassium-40		9.74	+/-1.62	0.809	+/-1.98		pCi/g							
Promethium-144	U	-0.00314	+/-0.0505	0.0946	+/-0.0505		pCi/g							
Promethium-146	U	0.0558	+/-0.0526	0.114	+/-0.0586		pCi/g							
Radium-226		2.61	+/-0.312	0.176	+/-0.404		pCi/g							
Radium-228		1.39	+/-0.386	0.339	+/-0.424		pCi/g							

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-001 U6S
Sample ID: 714507002

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.0290	+/-0.348	0.675	+/-0.348		pCi/g							
Silver-110m	U	0.0209	+/-0.0499	0.102	+/-0.0508		pCi/g							
Sodium-22	U	0.0277	+/-0.0612	0.127	+/-0.0625		pCi/g							
Thallium-208		0.552	+/-0.112	0.0751	+/-0.121		pCi/g							
Thorium-234	U	4.46	+/-4.10	4.60	+/-4.24		pCi/g							
Tin-113	U	-0.0642	+/-0.0634	0.111	+/-0.0699		pCi/g							
Uranium-235	U	0.0512	+/-0.272	0.505	+/-0.272		pCi/g							
Uranium-238	U	4.46	+/-4.10	4.60	+/-4.24		pCi/g							
Yttrium-88	U	-0.0220	+/-0.0552	0.103	+/-0.0562		pCi/g							
Zinc-65	U	0.0151	+/-0.127	0.231	+/-0.127		pCi/g							
Zirconium-95	U	-0.00854	+/-0.124	0.210	+/-0.124		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-002 U6S
Sample ID: 714507003
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 7.66%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.22	+/-0.457	0.381	+/-0.473		pCi/g			MXR1	04/10/25	1932	2767515	1
Americium-241	U	0.0192	+/-0.0723	0.124	+/-0.0728		pCi/g							
Antimony-124	U	0.0299	+/-0.106	0.286	+/-0.107		pCi/g							
Antimony-125	U	0.0924	+/-0.149	0.291	+/-0.155		pCi/g							
Barium-133	U	0.0363	+/-0.0587	0.108	+/-0.0610		pCi/g							
Barium-140	U	-1.34	+/-1.17	1.72	+/-1.33		pCi/g							
Beryllium-7		1.50	+/-0.926	1.22	+/-0.936		pCi/g							
Bismuth-212		2.32	+/-1.38	1.28	+/-1.40		pCi/g							
Bismuth-214		2.41	+/-0.297	0.191	+/-0.369		pCi/g							
Cerium-139	U	-0.0312	+/-0.0377	0.0677	+/-0.0408		pCi/g							
Cerium-141	U	-0.0148	+/-0.131	0.209	+/-0.131		pCi/g							
Cerium-144	U	-0.0369	+/-0.266	0.457	+/-0.267		pCi/g							
Cesium-134	U	0.0202	+/-0.0622	0.127	+/-0.0629		pCi/g							
Cesium-136	U	-0.0467	+/-0.389	0.755	+/-0.389		pCi/g							
Cesium-137	U	-0.0211	+/-0.0567	0.0907	+/-0.0576	0.100	pCi/g							
Chromium-51	U	0.985	+/-1.39	1.20	+/-1.39		pCi/g							
Cobalt-56	U	-0.0491	+/-0.0733	0.126	+/-0.0767		pCi/g							
Cobalt-57	U	0.00457	+/-0.0306	0.0544	+/-0.0306		pCi/g							
Cobalt-58	U	0.0586	+/-0.0629	0.138	+/-0.0684		pCi/g							
Cobalt-60	U	0.00668	+/-0.0655	0.135	+/-0.0656		pCi/g							
Europium-152	U	-0.0581	+/-0.142	0.251	+/-0.145		pCi/g							
Europium-154	U	0.0829	+/-0.173	0.385	+/-0.178		pCi/g							
Europium-155	U	-0.0609	+/-0.116	0.197	+/-0.120		pCi/g							
Iridium-192	U	0.0339	+/-0.0605	0.109	+/-0.0625		pCi/g							
Iron-59	U	-0.0377	+/-0.163	0.305	+/-0.164		pCi/g							
Lead-210		3.99	+/-1.30	1.05	+/-1.35		pCi/g							
Lead-212		1.24	+/-0.160	0.129	+/-0.204		pCi/g							
Lead-214		2.98	+/-0.346	0.178	+/-0.423		pCi/g							
Manganese-54	U	-0.00626	+/-0.0708	0.123	+/-0.0709		pCi/g							
Mercury-203	U	0.00503	+/-0.0626	0.119	+/-0.0626		pCi/g							
Neodymium-147	U	-1.96	+/-3.47	5.78	+/-3.58		pCi/g							
Neptunium-239	U	0.0708	+/-0.295	0.530	+/-0.296		pCi/g							
Niobium-94	U	0.0148	+/-0.0527	0.105	+/-0.0531		pCi/g							
Niobium-95	U	-0.00890	+/-0.107	0.176	+/-0.107		pCi/g							
Potassium-40		3.45	+/-1.26	0.957	+/-1.30		pCi/g							
Promethium-144	U	-0.00389	+/-0.0631	0.120	+/-0.0632		pCi/g							
Promethium-146	U	-0.0446	+/-0.0623	0.103	+/-0.0656		pCi/g							
Radium-226		2.98	+/-0.346	0.178	+/-0.423		pCi/g							
Radium-228		1.22	+/-0.457	0.381	+/-0.473		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-002 U6S
Sample ID: 714507003

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.134	+/-0.467	0.882	+/-0.471		pCi/g							
Silver-110m	U	-0.00813	+/-0.0675	0.132	+/-0.0676		pCi/g							
Sodium-22	U	0.0284	+/-0.0616	0.136	+/-0.0629		pCi/g							
Thallium-208		0.254	+/-0.139	0.0994	+/-0.141		pCi/g							
Thorium-234		2.13	+/-1.37	1.26	+/-1.45		pCi/g							
Tin-113	U	-0.0271	+/-0.0728	0.128	+/-0.0738		pCi/g							
Uranium-235	U	0.401	+/-0.417	0.414	+/-0.419		pCi/g							
Uranium-238		2.13	+/-1.37	1.26	+/-1.45		pCi/g							
Yttrium-88	U	-0.0207	+/-0.0807	0.156	+/-0.0813		pCi/g							
Zinc-65	U	-0.121	+/-0.161	0.207	+/-0.170		pCi/g							
Zirconium-95	U	0.175	+/-0.142	0.286	+/-0.164		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-002-DUP U6S
Sample ID: 714507004
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 9.39%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.17	+/-0.341	0.304	+/-0.361		pCi/g			MXR1	04/10/25	1933	2767515	1
Americium-241	U	-0.00876	+/-0.0569	0.0937	+/-0.0571		pCi/g							
Antimony-124	U	-0.122	+/-0.134	0.194	+/-0.145		pCi/g							
Antimony-125	U	0.0748	+/-0.0982	0.207	+/-0.104		pCi/g							
Barium-133	U	0.0215	+/-0.0395	0.0770	+/-0.0407		pCi/g							
Barium-140	U	0.129	+/-0.876	1.73	+/-0.878		pCi/g							
Beryllium-7	U	0.388	+/-0.449	0.959	+/-0.483		pCi/g							
Bismuth-212	U	0.857	+/-1.20	1.05	+/-1.20		pCi/g							
Bismuth-214		2.04	+/-0.244	0.149	+/-0.302		pCi/g							
Cerium-139	U	0.0126	+/-0.0297	0.0578	+/-0.0304		pCi/g							
Cerium-141	U	0.153	+/-0.131	0.156	+/-0.149		pCi/g							
Cerium-144	U	0.0179	+/-0.177	0.340	+/-0.177		pCi/g							
Cesium-134	U	0.0235	+/-0.0484	0.0984	+/-0.0496		pCi/g							
Cesium-136	U	0.186	+/-0.291	0.666	+/-0.304		pCi/g							
Cesium-137	U	-0.00313	+/-0.0379	0.0725	+/-0.0379	0.100	pCi/g							
Chromium-51	U	0.136	+/-0.665	1.33	+/-0.668		pCi/g							
Cobalt-56	U	-0.0178	+/-0.0467	0.0834	+/-0.0474		pCi/g							
Cobalt-57	U	-0.00686	+/-0.0231	0.0433	+/-0.0233		pCi/g							
Cobalt-58	U	-0.0283	+/-0.0483	0.0824	+/-0.0500		pCi/g							
Cobalt-60	U	0.0156	+/-0.0418	0.0916	+/-0.0424		pCi/g							
Europium-152	U	0.177	+/-0.113	0.200	+/-0.139		pCi/g							
Europium-154	U	0.0497	+/-0.107	0.243	+/-0.109		pCi/g							
Europium-155	U	0.0680	+/-0.0827	0.169	+/-0.0885		pCi/g							
Iridium-192	U	0.00297	+/-0.0399	0.0794	+/-0.0400		pCi/g							
Iron-59	U	0.000	+/-0.105	0.219	+/-0.000		pCi/g							
Lead-210		3.29	+/-1.01	0.715	+/-1.05		pCi/g							
Lead-212		1.06	+/-0.164	0.126	+/-0.205		pCi/g							
Lead-214		2.18	+/-0.250	0.127	+/-0.317		pCi/g							
Manganese-54	U	0.0226	+/-0.0377	0.0806	+/-0.0392		pCi/g							
Mercury-203	U	-0.0484	+/-0.0550	0.0899	+/-0.0594		pCi/g							
Neodymium-147	U	1.13	+/-4.80	4.26	+/-4.80		pCi/g							
Neptunium-239	U	-0.225	+/-0.204	0.360	+/-0.229		pCi/g							
Niobium-94	U	0.0284	+/-0.0276	0.0622	+/-0.0306		pCi/g							
Niobium-95	U	-0.0128	+/-0.0688	0.113	+/-0.0691		pCi/g							
Potassium-40		3.07	+/-0.970	0.675	+/-1.01		pCi/g							
Promethium-144	U	0.00847	+/-0.0364	0.0727	+/-0.0366		pCi/g							
Promethium-146	U	-0.0378	+/-0.0465	0.0725	+/-0.0497		pCi/g							
Radium-226		2.18	+/-0.250	0.127	+/-0.317		pCi/g							
Radium-228		1.17	+/-0.341	0.304	+/-0.361		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-002-DUP U6S
Sample ID: 714507004

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.271	+/-0.377	0.790	+/-0.398		pCi/g							
Silver-110m	U	0.00835	+/-0.0509	0.108	+/-0.0511		pCi/g							
Sodium-22	U	0.0156	+/-0.0376	0.0849	+/-0.0382		pCi/g							
Thallium-208		0.429	+/-0.0940	0.0683	+/-0.101		pCi/g							
Thorium-234		3.65	+/-1.49	0.954	+/-1.70		pCi/g							
Tin-113	U	0.000326	+/-0.0515	0.102	+/-0.0515		pCi/g							
Uranium-235		0.318	+/-0.271	0.311	+/-0.273		pCi/g							
Uranium-238		3.65	+/-1.49	0.954	+/-1.70		pCi/g							
Yttrium-88	U	0.00425	+/-0.0423	0.0994	+/-0.0424		pCi/g							
Zinc-65	U	-0.0295	+/-0.104	0.172	+/-0.105		pCi/g							
Zirconium-95	U	-0.0822	+/-0.0967	0.157	+/-0.104		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-003 U6S
Sample ID: 714507005
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 6.17%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.03	+/-0.332	0.358	+/-0.357		pCi/g			MXR1	04/10/25	1934	2767515	1
Americium-241	U	-0.0265	+/-0.148	0.248	+/-0.149		pCi/g							
Antimony-124	U	-0.123	+/-0.165	0.269	+/-0.174		pCi/g							
Antimony-125	U	0.00454	+/-0.108	0.207	+/-0.108		pCi/g							
Barium-133	U	0.0133	+/-0.0488	0.0877	+/-0.0492		pCi/g							
Barium-140	U	0.0642	+/-0.840	1.64	+/-0.840		pCi/g							
Beryllium-7		2.08	+/-1.04	1.01	+/-1.05		pCi/g							
Bismuth-212		1.40	+/-0.849	1.08	+/-0.859		pCi/g							
Bismuth-214		2.30	+/-0.288	0.166	+/-0.349		pCi/g							
Cerium-139	U	0.0192	+/-0.0375	0.0689	+/-0.0388		pCi/g							
Cerium-141	U	0.155	+/-0.166	0.197	+/-0.166		pCi/g							
Cerium-144	U	-0.133	+/-0.224	0.379	+/-0.232		pCi/g							
Cesium-134	U	0.110	+/-0.0848	0.116	+/-0.0990		pCi/g							
Cesium-136	U	-0.115	+/-0.402	0.709	+/-0.406		pCi/g							
Cesium-137	U	-0.0294	+/-0.0387	0.0643	+/-0.0409	0.100	pCi/g							
Chromium-51	U	-0.179	+/-0.768	1.29	+/-0.773		pCi/g							
Cobalt-56	U	0.00593	+/-0.0589	0.113	+/-0.0590		pCi/g							
Cobalt-57	U	0.0165	+/-0.0282	0.0528	+/-0.0292		pCi/g							
Cobalt-58	U	-0.0447	+/-0.0599	0.0809	+/-0.0634		pCi/g							
Cobalt-60	U	0.0366	+/-0.0548	0.122	+/-0.0574		pCi/g							
Europium-152	U	-0.00663	+/-0.111	0.211	+/-0.111		pCi/g							
Europium-154	U	-0.0719	+/-0.121	0.218	+/-0.126		pCi/g							
Europium-155	U	0.0386	+/-0.125	0.227	+/-0.126		pCi/g							
Iridium-192	U	0.0269	+/-0.0499	0.0921	+/-0.0514		pCi/g							
Iron-59	U	-0.0181	+/-0.127	0.255	+/-0.127		pCi/g							
Lead-210		5.22	+/-5.36	4.89	+/-5.38		pCi/g							
Lead-212		1.03	+/-0.140	0.121	+/-0.172		pCi/g							
Lead-214		2.96	+/-0.289	0.165	+/-0.387		pCi/g							
Manganese-54	U	-0.0283	+/-0.0486	0.0696	+/-0.0503		pCi/g							
Mercury-203	U	-0.0283	+/-0.0658	0.108	+/-0.0671		pCi/g							
Neodymium-147	U	0.222	+/-2.12	4.14	+/-2.12		pCi/g							
Neptunium-239	U	-0.292	+/-0.272	0.443	+/-0.304		pCi/g							
Niobium-94	U	0.0580	+/-0.0402	0.0902	+/-0.0482		pCi/g							
Niobium-95	U	0.0162	+/-0.0695	0.133	+/-0.0699		pCi/g							
Potassium-40		3.84	+/-1.13	0.904	+/-1.21		pCi/g							
Promethium-144	U	0.00683	+/-0.0424	0.0819	+/-0.0425		pCi/g							
Promethium-146	U	-0.000919	+/-0.0482	0.0917	+/-0.0482		pCi/g							
Radium-226		2.96	+/-0.289	0.165	+/-0.387		pCi/g							
Radium-228		1.03	+/-0.332	0.358	+/-0.357		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-003 U6S
Sample ID: 714507005

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.265	+/-0.350	0.586	+/-0.370		pCi/g							
Silver-110m	U	-0.00579	+/-0.0691	0.128	+/-0.0691		pCi/g							
Sodium-22	U	-0.0269	+/-0.0428	0.0762	+/-0.0446		pCi/g							
Thallium-208		0.269	+/-0.108	0.0847	+/-0.110		pCi/g							
Thorium-234		3.10	+/-2.33	2.17	+/-2.44		pCi/g							
Tin-113	U	-0.0212	+/-0.0577	0.106	+/-0.0585		pCi/g							
Uranium-235	U	0.380	+/-0.335	0.441	+/-0.337		pCi/g							
Uranium-238		3.10	+/-2.33	2.17	+/-2.44		pCi/g							
Yttrium-88	U	0.0289	+/-0.0690	0.155	+/-0.0702		pCi/g							
Zinc-65	U	0.0430	+/-0.0969	0.198	+/-0.0989		pCi/g							
Zirconium-95	U	0.0723	+/-0.0921	0.202	+/-0.0979		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-004 U6S
Sample ID: 714507006
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 12%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.907	+/-0.287	0.303	+/-0.310		pCi/g			MXR1	04/10/25	2042	2767515	1
Americium-241	U	0.0106	+/-0.0589	0.101	+/-0.0591		pCi/g							
Antimony-124	U	-0.192	+/-0.150	0.204	+/-0.174		pCi/g							
Antimony-125	U	-0.0199	+/-0.0971	0.180	+/-0.0975		pCi/g							
Barium-133	U	-0.00103	+/-0.0410	0.0708	+/-0.0410		pCi/g							
Barium-140	U	-0.125	+/-0.855	1.59	+/-0.857		pCi/g							
Beryllium-7		0.944	+/-0.877	0.779	+/-0.881		pCi/g							
Bismuth-212	U	0.410	+/-0.713	1.31	+/-0.738		pCi/g							
Bismuth-214		3.03	+/-0.313	0.143	+/-0.433		pCi/g							
Cerium-139	U	-0.0147	+/-0.0354	0.0599	+/-0.0362		pCi/g							
Cerium-141	U	-0.0314	+/-0.111	0.175	+/-0.112		pCi/g							
Cerium-144	U	-0.161	+/-0.210	0.350	+/-0.224		pCi/g							
Cesium-134	U	0.0207	+/-0.0505	0.0984	+/-0.0515		pCi/g							
Cesium-136	U	-0.0972	+/-0.280	0.495	+/-0.283		pCi/g							
Cesium-137	U	-0.00394	+/-0.0386	0.0646	+/-0.0387	0.100	pCi/g							
Chromium-51	U	-0.213	+/-0.611	1.13	+/-0.619		pCi/g							
Cobalt-56	U	-0.0126	+/-0.0617	0.0979	+/-0.0620		pCi/g							
Cobalt-57	U	-0.0128	+/-0.0253	0.0432	+/-0.0260		pCi/g							
Cobalt-58	U	-0.0239	+/-0.0667	0.102	+/-0.0677		pCi/g							
Cobalt-60	U	0.00126	+/-0.0354	0.0742	+/-0.0354		pCi/g							
Europium-152	U	0.00129	+/-0.0997	0.190	+/-0.0997		pCi/g							
Europium-154	U	0.0276	+/-0.125	0.259	+/-0.126		pCi/g							
Europium-155	U	0.0922	+/-0.0998	0.189	+/-0.109		pCi/g							
Iridium-192	U	0.0129	+/-0.0413	0.0811	+/-0.0417		pCi/g							
Iron-59	U	-0.0551	+/-0.110	0.203	+/-0.113		pCi/g							
Lead-210		3.49	+/-0.990	0.808	+/-1.05		pCi/g							
Lead-212		1.15	+/-0.133	0.107	+/-0.197		pCi/g							
Lead-214		3.86	+/-0.295	0.123	+/-0.445		pCi/g							
Manganese-54	U	-0.00583	+/-0.0523	0.0841	+/-0.0524		pCi/g							
Mercury-203	U	-0.0241	+/-0.0548	0.0900	+/-0.0559		pCi/g							
Neodymium-147	U	-0.0357	+/-1.70	3.29	+/-1.70		pCi/g							
Neptunium-239	U	-0.117	+/-0.228	0.391	+/-0.235		pCi/g							
Niobium-94	U	0.0197	+/-0.0371	0.0739	+/-0.0382		pCi/g							
Niobium-95	U	0.0159	+/-0.0648	0.0942	+/-0.0652		pCi/g							
Potassium-40		3.57	+/-1.11	0.695	+/-1.16		pCi/g							
Promethium-144	U	-0.00436	+/-0.0376	0.0693	+/-0.0376		pCi/g							
Promethium-146	U	-0.0375	+/-0.0477	0.0824	+/-0.0508		pCi/g							
Radium-226		3.86	+/-0.295	0.123	+/-0.445		pCi/g							
Radium-228		0.907	+/-0.287	0.303	+/-0.310		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-004 U6S
Sample ID: 714507006

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0923	+/-0.301	0.603	+/-0.304		pCi/g							
Silver-110m	U	-0.0349	+/-0.0559	0.0933	+/-0.0583		pCi/g							
Sodium-22	U	0.00886	+/-0.0443	0.0917	+/-0.0445		pCi/g							
Thallium-208		0.355	+/-0.106	0.0654	+/-0.112		pCi/g							
Thorium-234		2.68	+/-1.42	1.03	+/-1.54		pCi/g							
Tin-113	U	-0.0168	+/-0.0518	0.0952	+/-0.0524		pCi/g							
Uranium-235	U	0.147	+/-0.394	0.375	+/-0.395		pCi/g							
Uranium-238		2.68	+/-1.42	1.03	+/-1.54		pCi/g							
Yttrium-88	U	-0.00923	+/-0.0428	0.0865	+/-0.0430		pCi/g							
Zinc-65	U	0.0495	+/-0.0982	0.192	+/-0.101		pCi/g							
Zirconium-95	UI	0.000	+/-0.240	0.206	+/-0.287		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-005 U6S
Sample ID: 714507007
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 5.49%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.24	+/-0.291	0.211	+/-0.334		pCi/g			MXR1	04/10/25	2043	2767515	1
Americium-241	U	0.00758	+/-0.0482	0.0865	+/-0.0483		pCi/g							
Antimony-124	U	0.00956	+/-0.0967	0.204	+/-0.0968		pCi/g							
Antimony-125	U	0.0450	+/-0.0832	0.155	+/-0.0857		pCi/g							
Barium-133	U	0.00197	+/-0.0436	0.0757	+/-0.0437		pCi/g							
Barium-140	U	0.0610	+/-0.692	1.34	+/-0.693		pCi/g							
Beryllium-7	U	-0.128	+/-0.405	0.746	+/-0.410		pCi/g							
Bismuth-212		1.22	+/-0.762	0.862	+/-0.773		pCi/g							
Bismuth-214		2.89	+/-0.242	0.116	+/-0.361		pCi/g							
Cerium-139	U	-0.00112	+/-0.0326	0.0585	+/-0.0326		pCi/g							
Cerium-141	U	-0.0158	+/-0.0953	0.171	+/-0.0956		pCi/g							
Cerium-144	U	-0.0461	+/-0.191	0.343	+/-0.192		pCi/g							
Cesium-134	U	0.0407	+/-0.0594	0.0855	+/-0.0624		pCi/g							
Cesium-136	U	0.0430	+/-0.295	0.533	+/-0.295		pCi/g							
Cesium-137	U	-0.00706	+/-0.0337	0.0618	+/-0.0339	0.100	pCi/g							
Chromium-51	U	-0.184	+/-0.525	0.990	+/-0.532		pCi/g							
Cobalt-56	U	-0.00993	+/-0.0478	0.0858	+/-0.0481		pCi/g							
Cobalt-57	U	-0.0144	+/-0.0231	0.0408	+/-0.0241		pCi/g							
Cobalt-58	U	-0.0246	+/-0.0425	0.0724	+/-0.0440		pCi/g							
Cobalt-60	U	-0.00968	+/-0.0372	0.0702	+/-0.0375		pCi/g							
Europium-152	U	0.0277	+/-0.0869	0.158	+/-0.0879		pCi/g							
Europium-154	U	-0.0503	+/-0.0957	0.173	+/-0.0984		pCi/g							
Europium-155	U	0.0897	+/-0.0787	0.157	+/-0.0890		pCi/g							
Iridium-192	U	-0.00204	+/-0.0373	0.0721	+/-0.0373		pCi/g							
Iron-59	U	-0.0567	+/-0.0873	0.157	+/-0.0912		pCi/g							
Lead-210		1.13	+/-0.841	0.732	+/-0.847		pCi/g							
Lead-212		1.06	+/-0.125	0.0967	+/-0.199		pCi/g							
Lead-214		3.58	+/-0.274	0.133	+/-0.442		pCi/g							
Manganese-54	U	-0.00952	+/-0.0361	0.0611	+/-0.0364		pCi/g							
Mercury-203	U	0.0396	+/-0.0446	0.0921	+/-0.0482		pCi/g							
Neodymium-147	U	-0.0446	+/-2.03	3.45	+/-2.03		pCi/g							
Neptunium-239	U	-0.255	+/-0.217	0.369	+/-0.248		pCi/g							
Niobium-94	U	-0.00787	+/-0.0285	0.0517	+/-0.0288		pCi/g							
Niobium-95	U	0.0622	+/-0.0536	0.105	+/-0.0609		pCi/g							
Potassium-40		4.13	+/-0.855	0.612	+/-0.951		pCi/g							
Promethium-144	U	0.0344	+/-0.0327	0.0689	+/-0.0364		pCi/g							
Promethium-146	U	-0.0259	+/-0.0355	0.0628	+/-0.0374		pCi/g							
Radium-226		3.58	+/-0.274	0.133	+/-0.442		pCi/g							
Radium-228		1.24	+/-0.291	0.211	+/-0.334		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-005 U6S
Sample ID: 714507007

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.0604	+/-0.282	0.520	+/-0.283		pCi/g							
Silver-110m	U	-0.00680	+/-0.0476	0.0870	+/-0.0477		pCi/g							
Sodium-22	U	-0.0172	+/-0.0343	0.0623	+/-0.0352		pCi/g							
Thallium-208		0.323	+/-0.0904	0.0475	+/-0.0951		pCi/g							
Thorium-234		4.51	+/-1.50	0.863	+/-1.82		pCi/g							
Tin-113	U	0.00850	+/-0.0466	0.0907	+/-0.0468		pCi/g							
Uranium-235	U	0.118	+/-0.202	0.380	+/-0.203		pCi/g							
Uranium-238		4.51	+/-1.50	0.863	+/-1.82		pCi/g							
Yttrium-88	U	-0.000715	+/-0.0364	0.0758	+/-0.0364		pCi/g							
Zinc-65	U	-0.0612	+/-0.0864	0.127	+/-0.0909		pCi/g							
Zirconium-95	U	-0.0440	+/-0.0827	0.143	+/-0.0852		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Company : MJW Technical Services
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-006 U6S
Sample ID: 714507008
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 7.58%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.01	+/-0.350	0.373	+/-0.366		pCi/g			MXR1	04/10/25	2229	2767515	1
Americium-241	U	-0.0653	+/-0.286	0.447	+/-0.288		pCi/g							
Antimony-124	U	0.0293	+/-0.169	0.369	+/-0.169		pCi/g							
Antimony-125	U	0.0702	+/-0.130	0.254	+/-0.134		pCi/g							
Barium-133	U	0.0140	+/-0.0626	0.107	+/-0.0629		pCi/g							
Barium-140	U	0.498	+/-1.08	1.97	+/-1.11		pCi/g							
Beryllium-7		1.15	+/-0.882	1.10	+/-0.888		pCi/g							
Bismuth-212	U	0.662	+/-0.857	1.69	+/-0.910		pCi/g							
Bismuth-214		1.97	+/-0.326	0.158	+/-0.371		pCi/g							
Cerium-139	U	-0.0120	+/-0.0451	0.0825	+/-0.0455		pCi/g							
Cerium-141	U	0.0634	+/-0.131	0.252	+/-0.135		pCi/g							
Cerium-144	U	-0.135	+/-0.275	0.500	+/-0.282		pCi/g							
Cesium-134	U	0.0154	+/-0.0544	0.106	+/-0.0549		pCi/g							
Cesium-136	U	-0.156	+/-0.305	0.563	+/-0.313		pCi/g							
Cesium-137	U	-0.00871	+/-0.0584	0.0984	+/-0.0585	0.100	pCi/g							
Chromium-51	U	0.744	+/-0.760	1.55	+/-0.833		pCi/g							
Cobalt-56	U	-0.00916	+/-0.0687	0.132	+/-0.0688		pCi/g							
Cobalt-57	U	-0.00727	+/-0.0343	0.0638	+/-0.0345		pCi/g							
Cobalt-58	U	0.0201	+/-0.0771	0.133	+/-0.0777		pCi/g							
Cobalt-60	U	0.0521	+/-0.0503	0.121	+/-0.0557		pCi/g							
Europium-152	U	0.0452	+/-0.121	0.234	+/-0.123		pCi/g							
Europium-154	U	-0.0610	+/-0.128	0.235	+/-0.131		pCi/g							
Europium-155	U	0.0810	+/-0.139	0.272	+/-0.144		pCi/g							
Iridium-192	U	-0.0297	+/-0.0513	0.0899	+/-0.0531		pCi/g							
Iron-59	U	0.0598	+/-0.130	0.288	+/-0.133		pCi/g							
Lead-210	U	-1.53	+/-6.65	10.7	+/-6.69		pCi/g							
Lead-212		0.941	+/-0.158	0.126	+/-0.175		pCi/g							
Lead-214		2.77	+/-0.324	0.183	+/-0.392		pCi/g							
Manganese-54	U	-0.0102	+/-0.0515	0.0987	+/-0.0517		pCi/g							
Mercury-203	U	0.0251	+/-0.103	0.137	+/-0.103		pCi/g							
Neodymium-147	U	1.56	+/-2.64	5.30	+/-2.74		pCi/g							
Neptunium-239	U	0.262	+/-0.369	0.721	+/-0.388		pCi/g							
Niobium-94	U	-0.00533	+/-0.0478	0.0860	+/-0.0478		pCi/g							
Niobium-95	U	0.0157	+/-0.0700	0.133	+/-0.0704		pCi/g							
Potassium-40		2.41	+/-1.30	1.12	+/-1.32		pCi/g							
Promethium-144	U	-0.0393	+/-0.0485	0.0777	+/-0.0518		pCi/g							
Promethium-146	U	-0.0163	+/-0.0531	0.0951	+/-0.0536		pCi/g							
Radium-226		2.77	+/-0.324	0.183	+/-0.392		pCi/g							
Radium-228		1.01	+/-0.350	0.373	+/-0.366		pCi/g							

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Certificate of Analysis

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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-006 U6S
Sample ID: 714507008

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.123	+/-0.453	0.803	+/-0.456		pCi/g							
Silver-110m	U	0.0374	+/-0.0617	0.136	+/-0.0641		pCi/g							
Sodium-22	U	-0.0205	+/-0.0459	0.0850	+/-0.0469		pCi/g							
Thallium-208		0.299	+/-0.132	0.0945	+/-0.135		pCi/g							
Thorium-234	U	2.33	+/-4.65	3.75	+/-4.68		pCi/g							
Tin-113	U	-0.0336	+/-0.0690	0.121	+/-0.0707		pCi/g							
Uranium-235	U	0.104	+/-0.281	0.538	+/-0.281		pCi/g							
Uranium-238	U	2.33	+/-4.65	3.75	+/-4.68		pCi/g							
Yttrium-88	U	-0.0358	+/-0.0638	0.111	+/-0.0658		pCi/g							
Zinc-65	U	0.0651	+/-0.139	0.262	+/-0.142		pCi/g							
Zirconium-95	U	-0.0477	+/-0.101	0.172	+/-0.103		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-007 U6S
Sample ID: 714507009
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 14.3%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.976	+/-0.384	0.326	+/-0.404		pCi/g			MXR1	04/10/25	2229	2767515	1
Americium-241	U	-0.170	+/-0.283	0.488	+/-0.294		pCi/g							
Antimony-124	U	-0.0524	+/-0.165	0.313	+/-0.167		pCi/g							
Antimony-125	U	0.0495	+/-0.0958	0.203	+/-0.0985		pCi/g							
Barium-133	U	0.0123	+/-0.0488	0.0852	+/-0.0491		pCi/g							
Barium-140	U	0.215	+/-0.835	1.72	+/-0.841		pCi/g							
Beryllium-7	U	-0.325	+/-0.463	0.828	+/-0.487		pCi/g							
Bismuth-212		1.50	+/-1.20	1.10	+/-1.21		pCi/g							
Bismuth-214		1.54	+/-0.233	0.139	+/-0.267		pCi/g							
Cerium-139	U	0.00404	+/-0.0382	0.0713	+/-0.0383		pCi/g							
Cerium-141	U	-0.0473	+/-0.121	0.216	+/-0.123		pCi/g							
Cerium-144	U	0.0462	+/-0.245	0.466	+/-0.246		pCi/g							
Cesium-134	U	0.0154	+/-0.0395	0.0846	+/-0.0402		pCi/g							
Cesium-136	U	0.0584	+/-0.266	0.535	+/-0.267		pCi/g							
Cesium-137	U	0.0197	+/-0.0389	0.0843	+/-0.0399	0.100	pCi/g							
Chromium-51	U	0.557	+/-0.764	1.49	+/-0.806		pCi/g							
Cobalt-56	U	0.0103	+/-0.0639	0.124	+/-0.0641		pCi/g							
Cobalt-57	U	-0.0171	+/-0.0314	0.0564	+/-0.0324		pCi/g							
Cobalt-58	U	-0.0185	+/-0.0475	0.0865	+/-0.0483		pCi/g							
Cobalt-60	U	-0.00919	+/-0.0352	0.0720	+/-0.0354		pCi/g							
Europium-152	U	0.00220	+/-0.104	0.190	+/-0.104		pCi/g							
Europium-154	U	0.0280	+/-0.0785	0.200	+/-0.0796		pCi/g							
Europium-155	U	-0.0163	+/-0.117	0.220	+/-0.117		pCi/g							
Iridium-192	U	0.0171	+/-0.0464	0.0885	+/-0.0471		pCi/g							
Iron-59	U	-0.0467	+/-0.132	0.256	+/-0.134		pCi/g							
Lead-210	U	2.49	+/-13.9	28.2	+/-14.0		pCi/g							
Lead-212		0.674	+/-0.178	0.122	+/-0.191		pCi/g							
Lead-214		2.10	+/-0.289	0.146	+/-0.355		pCi/g							
Manganese-54	U	0.0415	+/-0.0481	0.0858	+/-0.0483		pCi/g							
Mercury-203	U	-0.0186	+/-0.0618	0.108	+/-0.0625		pCi/g							
Neodymium-147	U	-0.199	+/-2.27	4.42	+/-2.28		pCi/g							
Neptunium-239	U	-0.126	+/-0.288	0.525	+/-0.294		pCi/g							
Niobium-94	U	0.0187	+/-0.0420	0.0852	+/-0.0429		pCi/g							
Niobium-95	U	0.0254	+/-0.0654	0.122	+/-0.0665		pCi/g							
Potassium-40		4.71	+/-1.17	0.899	+/-1.30		pCi/g							
Promethium-144	U	0.0228	+/-0.0373	0.0801	+/-0.0388		pCi/g							
Promethium-146	U	-0.0196	+/-0.0419	0.0782	+/-0.0428		pCi/g							
Radium-226		2.10	+/-0.289	0.146	+/-0.355		pCi/g							
Radium-228		0.976	+/-0.384	0.326	+/-0.404		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-007 U6S
Sample ID: 714507009

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.0614	+/-0.330	0.634	+/-0.331		pCi/g							
Silver-110m	U	-0.0354	+/-0.0600	0.102	+/-0.0622		pCi/g							
Sodium-22	U	0.00874	+/-0.0275	0.0698	+/-0.0278		pCi/g							
Thallium-208		0.349	+/-0.0868	0.0601	+/-0.0916		pCi/g							
Thorium-234	U	3.63	+/-4.09	4.29	+/-4.18		pCi/g							
Tin-113	U	0.0464	+/-0.0571	0.122	+/-0.0609		pCi/g							
Uranium-235	U	0.0776	+/-0.235	0.443	+/-0.235		pCi/g							
Uranium-238	U	3.63	+/-4.09	4.29	+/-4.18		pCi/g							
Yttrium-88	U	0.0381	+/-0.0627	0.149	+/-0.0651		pCi/g							
Zinc-65	U	-0.0319	+/-0.156	0.187	+/-0.157		pCi/g							
Zirconium-95	U	0.0605	+/-0.0982	0.211	+/-0.102		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-008 U6S
Sample ID: 714507010
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 10.3%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228	U	0.230	+/-0.219	0.355	+/-0.244		pCi/g			MXR1	04/10/25	2230	2767515	1
Americium-241	U	-0.00160	+/-0.102	0.210	+/-0.102		pCi/g							
Antimony-124	U	0.0284	+/-0.0684	0.189	+/-0.0696		pCi/g							
Antimony-125	U	0.0132	+/-0.0586	0.124	+/-0.0589		pCi/g							
Barium-133	U	0.00945	+/-0.0338	0.0638	+/-0.0340		pCi/g							
Barium-140	U	-0.288	+/-0.522	0.932	+/-0.538		pCi/g							
Beryllium-7	U	-0.230	+/-0.280	0.474	+/-0.299		pCi/g							
Bismuth-212	U	0.316	+/-0.591	0.682	+/-0.592		pCi/g							
Bismuth-214		0.516	+/-0.145	0.103	+/-0.151		pCi/g							
Cerium-139	U	-0.0120	+/-0.0214	0.0378	+/-0.0222		pCi/g							
Cerium-141	U	-0.0452	+/-0.0727	0.128	+/-0.0756		pCi/g							
Cerium-144	U	0.0764	+/-0.120	0.253	+/-0.125		pCi/g							
Cesium-134	U	-0.0140	+/-0.0322	0.0590	+/-0.0328		pCi/g							
Cesium-136	U	0.0743	+/-0.241	0.529	+/-0.244		pCi/g							
Cesium-137		0.0747	+/-0.0427	0.0522	+/-0.0432	0.100	pCi/g							
Chromium-51	U	0.180	+/-0.390	0.847	+/-0.399		pCi/g							
Cobalt-56	U	0.0187	+/-0.0272	0.0683	+/-0.0285		pCi/g							
Cobalt-57	U	-0.000431	+/-0.0178	0.0345	+/-0.0178		pCi/g							
Cobalt-58	U	0.0126	+/-0.0358	0.0794	+/-0.0363		pCi/g							
Cobalt-60	U	-0.00214	+/-0.0297	0.0614	+/-0.0297		pCi/g							
Europium-152	U	0.0485	+/-0.0694	0.152	+/-0.0729		pCi/g							
Europium-154	U	-0.00325	+/-0.0877	0.183	+/-0.0877		pCi/g							
Europium-155	U	-0.0527	+/-0.0645	0.116	+/-0.0688		pCi/g							
Iridium-192	U	-0.00285	+/-0.0274	0.0552	+/-0.0275		pCi/g							
Iron-59	U	0.0207	+/-0.101	0.217	+/-0.101		pCi/g							
Lead-210	U	0.967	+/-3.03	6.57	+/-3.07		pCi/g							
Lead-212		0.281	+/-0.0711	0.0680	+/-0.0754		pCi/g							
Lead-214		0.474	+/-0.160	0.110	+/-0.165		pCi/g							
Manganese-54	U	0.0129	+/-0.0274	0.0621	+/-0.0281		pCi/g							
Mercury-203	U	-0.0134	+/-0.0338	0.0656	+/-0.0343		pCi/g							
Neodymium-147	U	0.203	+/-1.13	2.45	+/-1.14		pCi/g							
Neptunium-239	U	-0.0528	+/-0.143	0.271	+/-0.145		pCi/g							
Niobium-94	U	-0.000968	+/-0.0253	0.0489	+/-0.0253		pCi/g							
Niobium-95	U	0.0532	+/-0.0703	0.0726	+/-0.0705		pCi/g							
Potassium-40		1.05	+/-0.584	0.431	+/-0.597		pCi/g							
Promethium-144	U	0.0176	+/-0.0305	0.0643	+/-0.0316		pCi/g							
Promethium-146	U	-0.00220	+/-0.0264	0.0531	+/-0.0264		pCi/g							
Radium-226		0.474	+/-0.160	0.110	+/-0.165		pCi/g							
Radium-228	U	0.230	+/-0.219	0.355	+/-0.244		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-008 U6S
Sample ID: 714507010

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.123	+/-0.194	0.331	+/-0.202		pCi/g							
Silver-110m	U	0.00281	+/-0.0440	0.0913	+/-0.0440		pCi/g							
Sodium-22	U	-0.00116	+/-0.0313	0.0653	+/-0.0313		pCi/g							
Thallium-208		0.0747	+/-0.0423	0.0515	+/-0.0428		pCi/g							
Thorium-234	U	-0.502	+/-0.975	1.87	+/-1.01		pCi/g							
Tin-113	U	0.00775	+/-0.0355	0.0735	+/-0.0356		pCi/g							
Uranium-235	U	0.0610	+/-0.142	0.282	+/-0.145		pCi/g							
Uranium-238	U	-0.502	+/-0.975	1.87	+/-1.01		pCi/g							
Yttrium-88	U	-0.000138	+/-0.0438	0.0945	+/-0.0438		pCi/g							
Zinc-65	U	-0.0147	+/-0.0620	0.106	+/-0.0623		pCi/g							
Zirconium-95	U	0.0284	+/-0.0709	0.145	+/-0.0721		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-010 U6S
Sample ID: 714507011
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.99%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.45	+/-0.316	0.273	+/-0.362		pCi/g			MXR1	04/10/25	2231	2767515	1
Americium-241	U	0.0502	+/-0.184	0.342	+/-0.185		pCi/g							
Antimony-124	U	0.0768	+/-0.0870	0.273	+/-0.0939		pCi/g							
Antimony-125	U	0.0571	+/-0.114	0.227	+/-0.117		pCi/g							
Barium-133	U	0.0280	+/-0.0464	0.0885	+/-0.0481		pCi/g							
Barium-140	U	0.0558	+/-0.772	1.52	+/-0.773		pCi/g							
Beryllium-7		0.905	+/-0.975	0.662	+/-0.978		pCi/g							
Bismuth-212		1.21	+/-1.23	1.11	+/-1.23		pCi/g							
Bismuth-214		1.88	+/-0.262	0.149	+/-0.304		pCi/g							
Cerium-139	U	-0.0124	+/-0.0423	0.0717	+/-0.0428		pCi/g							
Cerium-141	U	-0.0248	+/-0.118	0.203	+/-0.118		pCi/g							
Cerium-144	U	0.0985	+/-0.232	0.428	+/-0.237		pCi/g							
Cesium-134	U	0.0544	+/-0.107	0.115	+/-0.110		pCi/g							
Cesium-136	U	-0.292	+/-0.349	0.584	+/-0.375		pCi/g							
Cesium-137	U	0.00248	+/-0.0453	0.0858	+/-0.0453	0.100	pCi/g							
Chromium-51	U	0.887	+/-0.704	1.51	+/-0.814		pCi/g							
Cobalt-56	U	-0.000773	+/-0.0492	0.0945	+/-0.0492		pCi/g							
Cobalt-57	U	-0.00761	+/-0.0301	0.0527	+/-0.0303		pCi/g							
Cobalt-58	U	0.0348	+/-0.0520	0.107	+/-0.0545		pCi/g							
Cobalt-60	U	0.0136	+/-0.0331	0.0817	+/-0.0337		pCi/g							
Europium-152	U	0.0287	+/-0.124	0.230	+/-0.124		pCi/g							
Europium-154	U	0.0499	+/-0.131	0.289	+/-0.133		pCi/g							
Europium-155	U	0.0662	+/-0.188	0.204	+/-0.188		pCi/g							
Iridium-192	U	-0.0255	+/-0.0475	0.0853	+/-0.0489		pCi/g							
Iron-59	U	0.0183	+/-0.143	0.294	+/-0.143		pCi/g							
Lead-210	U	-1.43	+/-5.10	9.29	+/-5.14		pCi/g							
Lead-212		0.888	+/-0.190	0.151	+/-0.207		pCi/g							
Lead-214		2.22	+/-0.284	0.147	+/-0.344		pCi/g							
Manganese-54	U	0.0691	+/-0.0713	0.0926	+/-0.0717		pCi/g							
Mercury-203	U	0.0240	+/-0.0961	0.111	+/-0.0967		pCi/g							
Neodymium-147	U	3.03	+/-2.72	5.76	+/-3.05		pCi/g							
Neptunium-239	U	0.208	+/-0.476	0.498	+/-0.486		pCi/g							
Niobium-94	U	-0.00536	+/-0.0455	0.0823	+/-0.0456		pCi/g							
Niobium-95	U	0.0369	+/-0.0706	0.130	+/-0.0726		pCi/g							
Potassium-40		3.04	+/-1.06	1.04	+/-1.12		pCi/g							
Promethium-144	U	-0.0164	+/-0.0530	0.0816	+/-0.0535		pCi/g							
Promethium-146	U	-0.0236	+/-0.0467	0.0827	+/-0.0480		pCi/g							
Radium-226		2.22	+/-0.284	0.147	+/-0.344		pCi/g							
Radium-228		1.45	+/-0.316	0.273	+/-0.362		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-010 U6S
Sample ID: 714507011

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.161	+/-0.370	0.753	+/-0.378		pCi/g							
Silver-110m	U	-0.0132	+/-0.0423	0.0846	+/-0.0428		pCi/g							
Sodium-22	U	0.0151	+/-0.0458	0.101	+/-0.0463		pCi/g							
Thallium-208		0.403	+/-0.0957	0.0696	+/-0.102		pCi/g							
Thorium-234	U	0.927	+/-2.24	2.83	+/-2.25		pCi/g							
Tin-113	U	0.00675	+/-0.0671	0.116	+/-0.0672		pCi/g							
Uranium-235	U	0.231	+/-0.262	0.489	+/-0.262		pCi/g							
Uranium-238	U	0.927	+/-2.24	2.83	+/-2.25		pCi/g							
Yttrium-88	U	-0.0173	+/-0.0481	0.0982	+/-0.0488		pCi/g							
Zinc-65	U	0.0285	+/-0.124	0.229	+/-0.124		pCi/g							
Zirconium-95	U	0.109	+/-0.121	0.255	+/-0.131		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-011 U6S
Sample ID: 714507012
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 15.2%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.607	+/-0.260	0.209	+/-0.270		pCi/g			MXR1	04/10/25	2231	2767515	1
Americium-241	U	-0.0373	+/-0.114	0.205	+/-0.115		pCi/g							
Antimony-124	U	0.0161	+/-0.0889	0.198	+/-0.0892		pCi/g							
Antimony-125	U	0.0610	+/-0.0730	0.153	+/-0.0782		pCi/g							
Barium-133	U	0.0131	+/-0.0305	0.0591	+/-0.0311		pCi/g							
Barium-140	U	-0.248	+/-0.622	1.16	+/-0.633		pCi/g							
Beryllium-7	U	0.288	+/-0.345	0.738	+/-0.369		pCi/g							
Bismuth-212	U	0.749	+/-0.541	1.11	+/-0.642		pCi/g							
Bismuth-214		0.953	+/-0.190	0.115	+/-0.207		pCi/g							
Cerium-139	U	-0.00227	+/-0.0277	0.0512	+/-0.0277		pCi/g							
Cerium-141	U	0.0544	+/-0.0739	0.148	+/-0.0780		pCi/g							
Cerium-144	U	-0.0586	+/-0.155	0.285	+/-0.157		pCi/g							
Cesium-134	U	0.00522	+/-0.0365	0.0712	+/-0.0366		pCi/g							
Cesium-136	U	0.0533	+/-0.173	0.398	+/-0.175		pCi/g							
Cesium-137		0.0524	+/-0.0438	0.0509	+/-0.0440	0.100	pCi/g							
Chromium-51	U	0.169	+/-0.489	0.970	+/-0.495		pCi/g							
Cobalt-56	U	-0.0112	+/-0.0404	0.0741	+/-0.0408		pCi/g							
Cobalt-57	U	-0.00487	+/-0.0191	0.0357	+/-0.0192		pCi/g							
Cobalt-58	U	0.0183	+/-0.0317	0.0699	+/-0.0328		pCi/g							
Cobalt-60	U	-0.0186	+/-0.0197	0.0297	+/-0.0215		pCi/g							
Europium-152	U	0.0253	+/-0.0916	0.169	+/-0.0923		pCi/g							
Europium-154	U	-0.00560	+/-0.0743	0.156	+/-0.0744		pCi/g							
Europium-155	U	-0.0371	+/-0.0831	0.154	+/-0.0848		pCi/g							
Iridium-192	U	-0.00847	+/-0.0319	0.0624	+/-0.0321		pCi/g							
Iron-59	U	-0.00680	+/-0.0801	0.166	+/-0.0801		pCi/g							
Lead-210	U	-2.42	+/-2.51	4.81	+/-2.74		pCi/g							
Lead-212		0.677	+/-0.141	0.102	+/-0.153		pCi/g							
Lead-214		1.17	+/-0.193	0.0944	+/-0.219		pCi/g							
Manganese-54	U	-0.00603	+/-0.0296	0.0552	+/-0.0297		pCi/g							
Mercury-203	U	0.0557	+/-0.0956	0.0637	+/-0.0959		pCi/g							
Neodymium-147	U	-0.494	+/-1.55	2.92	+/-1.56		pCi/g							
Neptunium-239	U	-0.0333	+/-0.185	0.350	+/-0.185		pCi/g							
Niobium-94	U	-0.00334	+/-0.0281	0.0532	+/-0.0281		pCi/g							
Niobium-95	U	-0.0211	+/-0.0418	0.0741	+/-0.0429		pCi/g							
Potassium-40		3.92	+/-0.782	0.293	+/-0.884		pCi/g							
Promethium-144	U	0.00515	+/-0.0290	0.0573	+/-0.0290		pCi/g							
Promethium-146	U	-0.0106	+/-0.0336	0.0639	+/-0.0339		pCi/g							
Radium-226		1.17	+/-0.193	0.0944	+/-0.219		pCi/g							
Radium-228		0.607	+/-0.260	0.209	+/-0.270		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-011 U6S
Sample ID: 714507012

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0878	+/-0.282	0.568	+/-0.285		pCi/g							
Silver-110m	U	0.0142	+/-0.0358	0.0765	+/-0.0364		pCi/g							
Sodium-22	U	-0.00200	+/-0.0265	0.0555	+/-0.0265		pCi/g							
Thallium-208		0.246	+/-0.0867	0.0504	+/-0.0892		pCi/g							
Thorium-234	U	1.17	+/-2.05	1.81	+/-2.06		pCi/g							
Tin-113	U	0.0118	+/-0.0365	0.0755	+/-0.0369		pCi/g							
Uranium-235	U	-0.00838	+/-0.162	0.301	+/-0.162		pCi/g							
Uranium-238	U	1.17	+/-2.05	1.81	+/-2.06		pCi/g							
Yttrium-88	U	-0.00683	+/-0.0218	0.0458	+/-0.0220		pCi/g							
Zinc-65	U	0.00953	+/-0.0621	0.121	+/-0.0622		pCi/g							
Zirconium-95	U	-0.0639	+/-0.0691	0.112	+/-0.0751		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-011-DUP U6S
Sample ID: 714507013
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 12.3%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.909	+/-0.262	0.206	+/-0.289		pCi/g			MXR1	04/10/25	2232	2767515	1
Americium-241	U	0.00174	+/-0.0281	0.0535	+/-0.0281		pCi/g							
Antimony-124	U	0.0215	+/-0.105	0.238	+/-0.105		pCi/g							
Antimony-125	U	0.0125	+/-0.0807	0.144	+/-0.0809		pCi/g							
Barium-133	U	0.00285	+/-0.0313	0.0563	+/-0.0313		pCi/g							
Barium-140	U	-0.541	+/-0.683	1.22	+/-0.728		pCi/g							
Beryllium-7	U	0.197	+/-0.330	0.684	+/-0.342		pCi/g							
Bismuth-212		1.86	+/-0.843	0.937	+/-0.873		pCi/g							
Bismuth-214		1.21	+/-0.184	0.0968	+/-0.226		pCi/g							
Cerium-139	U	0.0156	+/-0.0229	0.0420	+/-0.0243		pCi/g							
Cerium-141	U	-0.0210	+/-0.0642	0.118	+/-0.0650		pCi/g							
Cerium-144	U	-0.0351	+/-0.121	0.225	+/-0.122		pCi/g							
Cesium-134	U	0.0794	+/-0.0498	0.0874	+/-0.0621		pCi/g							
Cesium-136	U	0.152	+/-0.262	0.541	+/-0.272		pCi/g							
Cesium-137		0.0527	+/-0.0300	0.0491	+/-0.0306	0.100	pCi/g							
Chromium-51	U	0.245	+/-0.442	0.914	+/-0.456		pCi/g							
Cobalt-56	U	-0.00947	+/-0.0375	0.0732	+/-0.0377		pCi/g							
Cobalt-57	U	-0.00526	+/-0.0161	0.0301	+/-0.0163		pCi/g							
Cobalt-58	U	-0.0312	+/-0.0388	0.0685	+/-0.0414		pCi/g							
Cobalt-60	U	-0.0163	+/-0.0289	0.0501	+/-0.0298		pCi/g							
Europium-152	U	-0.0517	+/-0.0692	0.126	+/-0.0731		pCi/g							
Europium-154	U	-0.0287	+/-0.116	0.216	+/-0.117		pCi/g							
Europium-155	UI	0.000	+/-0.127	0.0992	+/-0.128		pCi/g							
Iridium-192	U	-0.00861	+/-0.0298	0.0574	+/-0.0300		pCi/g							
Iron-59	U	0.0186	+/-0.101	0.209	+/-0.101		pCi/g							
Lead-210		0.666	+/-0.597	0.454	+/-0.601		pCi/g							
Lead-212		1.08	+/-0.109	0.0721	+/-0.182		pCi/g							
Lead-214		1.76	+/-0.206	0.101	+/-0.256		pCi/g							
Manganese-54	U	-0.0278	+/-0.0366	0.0649	+/-0.0388		pCi/g							
Mercury-203	U	-0.0165	+/-0.0403	0.0689	+/-0.0410		pCi/g							
Neodymium-147	U	0.431	+/-1.54	3.11	+/-1.55		pCi/g							
Neptunium-239	U	-0.0123	+/-0.152	0.291	+/-0.152		pCi/g							
Niobium-94	U	-0.0105	+/-0.0283	0.0550	+/-0.0287		pCi/g							
Niobium-95	U	0.0195	+/-0.0519	0.106	+/-0.0527		pCi/g							
Potassium-40		3.92	+/-0.840	0.637	+/-0.923		pCi/g							
Promethium-144	U	-0.00377	+/-0.0280	0.0559	+/-0.0280		pCi/g							
Promethium-146	U	-0.00252	+/-0.0347	0.0665	+/-0.0347		pCi/g							
Radium-226		1.76	+/-0.206	0.101	+/-0.256		pCi/g							
Radium-228		0.909	+/-0.262	0.206	+/-0.289		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-011-DUP U6S
Sample ID: 714507013

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.00335	+/-0.267	0.511	+/-0.267		pCi/g							
Silver-110m	U	0.0500	+/-0.0476	0.109	+/-0.0531		pCi/g							
Sodium-22	U	-0.0216	+/-0.0430	0.0756	+/-0.0442		pCi/g							
Thallium-208		0.285	+/-0.0840	0.0605	+/-0.0893		pCi/g							
Thorium-234		1.91	+/-0.885	0.570	+/-0.987		pCi/g							
Tin-113	U	-0.0107	+/-0.0394	0.0746	+/-0.0397		pCi/g							
Uranium-235	U	-0.00171	+/-0.128	0.241	+/-0.128		pCi/g							
Uranium-238		1.91	+/-0.885	0.570	+/-0.987		pCi/g							
Yttrium-88	U	0.0170	+/-0.0486	0.111	+/-0.0493		pCi/g							
Zinc-65	U	0.0371	+/-0.0756	0.152	+/-0.0775		pCi/g							
Zirconium-95	U	-0.0181	+/-0.0754	0.147	+/-0.0758		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Company : MJW Technical Services
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-012 U6S
Sample ID: 714507014
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.28%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.944	+/-0.271	0.293	+/-0.291		pCi/g			MXR1	04/10/25	2233	2767515	1
Americium-241	U	0.0122	+/-0.157	0.303	+/-0.157		pCi/g							
Antimony-124	U	-0.0233	+/-0.126	0.255	+/-0.127		pCi/g							
Antimony-125	U	0.0190	+/-0.102	0.199	+/-0.102		pCi/g							
Barium-133	U	-0.00585	+/-0.0441	0.0759	+/-0.0442		pCi/g							
Barium-140	U	-0.336	+/-0.604	1.06	+/-0.624		pCi/g							
Beryllium-7		1.70	+/-0.916	0.678	+/-0.927		pCi/g							
Bismuth-212	U	0.591	+/-0.790	1.12	+/-0.792		pCi/g							
Bismuth-214		1.35	+/-0.201	0.117	+/-0.231		pCi/g							
Cerium-139	U	-0.0259	+/-0.0315	0.0541	+/-0.0341		pCi/g							
Cerium-141	U	0.00655	+/-0.166	0.156	+/-0.166		pCi/g							
Cerium-144	U	0.0340	+/-0.178	0.344	+/-0.179		pCi/g							
Cesium-134	U	0.00331	+/-0.0451	0.0900	+/-0.0451		pCi/g							
Cesium-136	U	0.0584	+/-0.285	0.598	+/-0.286		pCi/g							
Cesium-137	U	-0.0242	+/-0.0533	0.0867	+/-0.0544	0.100	pCi/g							
Chromium-51	U	0.403	+/-0.567	1.20	+/-0.597		pCi/g							
Cobalt-56	U	0.00871	+/-0.0513	0.104	+/-0.0515		pCi/g							
Cobalt-57	U	-0.00442	+/-0.0205	0.0388	+/-0.0206		pCi/g							
Cobalt-58	U	-0.0457	+/-0.0605	0.0873	+/-0.0641		pCi/g							
Cobalt-60	U	0.0202	+/-0.0444	0.0990	+/-0.0454		pCi/g							
Europium-152	U	0.0548	+/-0.0885	0.185	+/-0.0920		pCi/g							
Europium-154	U	0.0579	+/-0.121	0.271	+/-0.123		pCi/g							
Europium-155	U	0.0750	+/-0.0883	0.184	+/-0.0948		pCi/g							
Iridium-192	U	-0.00792	+/-0.0374	0.0722	+/-0.0376		pCi/g							
Iron-59	U	-0.0153	+/-0.121	0.234	+/-0.121		pCi/g							
Lead-210	U	1.23	+/-5.81	10.6	+/-5.84		pCi/g							
Lead-212		0.866	+/-0.127	0.0867	+/-0.150		pCi/g							
Lead-214		1.62	+/-0.234	0.134	+/-0.275		pCi/g							
Manganese-54	U	-0.00641	+/-0.0437	0.0837	+/-0.0438		pCi/g							
Mercury-203	U	0.00518	+/-0.0570	0.102	+/-0.0570		pCi/g							
Neodymium-147	U	0.442	+/-1.77	3.58	+/-1.78		pCi/g							
Neptunium-239	U	0.0760	+/-0.225	0.446	+/-0.227		pCi/g							
Niobium-94	U	0.0439	+/-0.0404	0.0882	+/-0.0451		pCi/g							
Niobium-95	U	0.00858	+/-0.0581	0.105	+/-0.0582		pCi/g							
Potassium-40		4.16	+/-1.05	0.733	+/-1.14		pCi/g							
Promethium-144	U	-0.0231	+/-0.0312	0.0559	+/-0.0330		pCi/g							
Promethium-146	U	0.0450	+/-0.0419	0.0914	+/-0.0468		pCi/g							
Radium-226		1.62	+/-0.234	0.134	+/-0.275		pCi/g							
Radium-228		0.944	+/-0.271	0.293	+/-0.291		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-012 U6S
Sample ID: 714507014

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.0647	+/-0.365	0.664	+/-0.366		pCi/g							
Silver-110m	U	-0.00256	+/-0.0554	0.109	+/-0.0554		pCi/g							
Sodium-22	U	0.0206	+/-0.0430	0.0967	+/-0.0440		pCi/g							
Thallium-208		0.307	+/-0.0740	0.0631	+/-0.0785		pCi/g							
Thorium-234	UI	0.000	+/-4.48	2.17	+/-4.55		pCi/g							
Tin-113	U	-0.0253	+/-0.0467	0.0848	+/-0.0481		pCi/g							
Uranium-235	U	0.197	+/-0.329	0.377	+/-0.329		pCi/g							
Uranium-238	UI	0.000	+/-4.48	2.17	+/-4.55		pCi/g							
Yttrium-88	U	-0.00247	+/-0.0569	0.117	+/-0.0569		pCi/g							
Zinc-65	U	0.0717	+/-0.0689	0.170	+/-0.0764		pCi/g							
Zirconium-95	U	0.0611	+/-0.0905	0.198	+/-0.0948		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-013 U6S
Sample ID: 714507015
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 3.38%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.02	+/-0.347	0.281	+/-0.371		pCi/g			MXR1	04/10/25	2233	2767515	1
Americium-241	U	0.0286	+/-0.0968	0.173	+/-0.0977		pCi/g							
Antimony-124	U	-0.0415	+/-0.104	0.200	+/-0.105		pCi/g							
Antimony-125	U	-0.0957	+/-0.0883	0.145	+/-0.0986		pCi/g							
Barium-133	U	-0.00884	+/-0.0462	0.0762	+/-0.0464		pCi/g							
Barium-140	UI	0.000	+/-1.13	1.39	+/-1.37		pCi/g							
Beryllium-7		0.647	+/-0.891	0.642	+/-0.893		pCi/g							
Bismuth-212		1.58	+/-0.817	0.814	+/-0.831		pCi/g							
Bismuth-214		1.74	+/-0.225	0.125	+/-0.267		pCi/g							
Cerium-139	U	0.000712	+/-0.0348	0.0613	+/-0.0348		pCi/g							
Cerium-141	U	0.0787	+/-0.139	0.167	+/-0.144		pCi/g							
Cerium-144	U	-0.132	+/-0.214	0.331	+/-0.222		pCi/g							
Cesium-134	U	0.0882	+/-0.0561	0.101	+/-0.0694		pCi/g							
Cesium-136	U	0.397	+/-0.290	0.654	+/-0.344		pCi/g							
Cesium-137	U	0.0162	+/-0.0418	0.0795	+/-0.0424	0.100	pCi/g							
Chromium-51	U	-0.534	+/-0.560	0.967	+/-0.612		pCi/g							
Cobalt-56	U	0.0301	+/-0.0464	0.0982	+/-0.0485		pCi/g							
Cobalt-57	U	0.0111	+/-0.0260	0.0482	+/-0.0265		pCi/g							
Cobalt-58	U	0.0287	+/-0.0483	0.0937	+/-0.0501		pCi/g							
Cobalt-60	U	0.0451	+/-0.0307	0.0815	+/-0.0372		pCi/g							
Europium-152	U	0.0137	+/-0.0984	0.188	+/-0.0986		pCi/g							
Europium-154	U	-0.0978	+/-0.118	0.191	+/-0.127		pCi/g							
Europium-155	U	0.138	+/-0.0968	0.192	+/-0.116		pCi/g							
Iridium-192	U	-0.0155	+/-0.0393	0.0721	+/-0.0399		pCi/g							
Iron-59	U	-0.0614	+/-0.101	0.176	+/-0.105		pCi/g							
Lead-210	U	1.55	+/-3.94	3.13	+/-3.94		pCi/g							
Lead-212		1.39	+/-0.146	0.106	+/-0.205		pCi/g							
Lead-214		2.25	+/-0.233	0.126	+/-0.314		pCi/g							
Manganese-54	U	0.0108	+/-0.0374	0.0755	+/-0.0378		pCi/g							
Mercury-203	U	-0.0284	+/-0.0536	0.0974	+/-0.0552		pCi/g							
Neodymium-147	U	-0.125	+/-2.02	3.35	+/-2.02		pCi/g							
Neptunium-239	U	0.0220	+/-0.250	0.454	+/-0.251		pCi/g							
Niobium-94	U	0.00917	+/-0.0291	0.0574	+/-0.0294		pCi/g							
Niobium-95	U	0.0443	+/-0.0532	0.105	+/-0.0569		pCi/g							
Potassium-40		5.56	+/-1.10	0.809	+/-1.28		pCi/g							
Promethium-144	U	0.00566	+/-0.0329	0.0623	+/-0.0330		pCi/g							
Promethium-146	U	0.0175	+/-0.0416	0.0814	+/-0.0424		pCi/g							
Radium-226		2.25	+/-0.233	0.126	+/-0.314		pCi/g							
Radium-228		1.02	+/-0.347	0.281	+/-0.371		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-013 U6S
Sample ID: 714507015

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.369	+/-0.310	0.466	+/-0.354		pCi/g							
Silver-110m	U	0.000512	+/-0.0523	0.102	+/-0.0523		pCi/g							
Sodium-22	U	-0.0340	+/-0.0423	0.0690	+/-0.0452		pCi/g							
Thallium-208		0.406	+/-0.0854	0.0575	+/-0.0919		pCi/g							
Thorium-234		3.02	+/-2.02	1.53	+/-2.13		pCi/g							
Tin-113	U	-0.0587	+/-0.0510	0.0842	+/-0.0577		pCi/g							
Uranium-235	U	0.163	+/-0.289	0.338	+/-0.289		pCi/g							
Uranium-238		3.02	+/-2.02	1.53	+/-2.13		pCi/g							
Yttrium-88	U	0.00571	+/-0.0395	0.0884	+/-0.0396		pCi/g							
Zinc-65	U	-0.0117	+/-0.0968	0.160	+/-0.0970		pCi/g							
Zirconium-95	U	0.0415	+/-0.0843	0.176	+/-0.0864		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-014 U6S
Sample ID: 714507016
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 3.99%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.67	+/-0.303	0.239	+/-0.375		pCi/g			MXR1	04/10/25	2234	2767515	1
Americium-241	U	-0.0598	+/-0.127	0.239	+/-0.130		pCi/g							
Antimony-124	U	-0.0490	+/-0.0908	0.161	+/-0.0936		pCi/g							
Antimony-125	U	-0.0191	+/-0.0831	0.157	+/-0.0836		pCi/g							
Barium-133	U	-0.00940	+/-0.0327	0.0560	+/-0.0330		pCi/g							
Barium-140	U	0.191	+/-0.713	1.41	+/-0.719		pCi/g							
Beryllium-7	U	0.331	+/-0.372	0.735	+/-0.402		pCi/g							
Bismuth-212		1.53	+/-0.683	0.728	+/-0.699		pCi/g							
Bismuth-214		1.84	+/-0.188	0.0898	+/-0.243		pCi/g							
Cerium-139	U	-0.00746	+/-0.0305	0.0546	+/-0.0307		pCi/g							
Cerium-141	U	0.0499	+/-0.0915	0.174	+/-0.0943		pCi/g							
Cerium-144	U	-0.190	+/-0.200	0.344	+/-0.218		pCi/g							
Cesium-134	U	0.0332	+/-0.0399	0.0826	+/-0.0428		pCi/g							
Cesium-136	U	-0.217	+/-0.304	0.451	+/-0.321		pCi/g							
Cesium-137	U	0.0131	+/-0.0342	0.0678	+/-0.0348	0.100	pCi/g							
Chromium-51	U	0.509	+/-0.842	0.926	+/-0.844		pCi/g							
Cobalt-56	U	0.00125	+/-0.0387	0.0742	+/-0.0387		pCi/g							
Cobalt-57	U	0.00182	+/-0.0235	0.0440	+/-0.0235		pCi/g							
Cobalt-58	U	0.0109	+/-0.0424	0.0832	+/-0.0427		pCi/g							
Cobalt-60	U	0.0331	+/-0.0367	0.0840	+/-0.0399		pCi/g							
Europium-152	U	0.000735	+/-0.0963	0.179	+/-0.0963		pCi/g							
Europium-154	U	-0.0115	+/-0.100	0.197	+/-0.100		pCi/g							
Europium-155	U	0.0443	+/-0.0952	0.184	+/-0.0974		pCi/g							
Iridium-192	U	0.00328	+/-0.0343	0.0636	+/-0.0343		pCi/g							
Iron-59	U	0.0389	+/-0.0843	0.188	+/-0.0862		pCi/g							
Lead-210	U	-2.08	+/-3.35	6.49	+/-3.49		pCi/g							
Lead-212		1.31	+/-0.139	0.0900	+/-0.189		pCi/g							
Lead-214		2.03	+/-0.230	0.116	+/-0.298		pCi/g							
Manganese-54	U	0.00935	+/-0.0365	0.0704	+/-0.0367		pCi/g							
Mercury-203	U	0.0589	+/-0.0802	0.0753	+/-0.0805		pCi/g							
Neodymium-147	U	-0.889	+/-1.46	2.60	+/-1.51		pCi/g							
Neptunium-239	U	-0.0477	+/-0.228	0.420	+/-0.229		pCi/g							
Niobium-94	U	0.0376	+/-0.0670	0.0586	+/-0.0691		pCi/g							
Niobium-95	U	0.00860	+/-0.0624	0.0858	+/-0.0626		pCi/g							
Potassium-40		2.99	+/-0.866	0.607	+/-0.939		pCi/g							
Promethium-144	U	-0.0107	+/-0.0302	0.0479	+/-0.0306		pCi/g							
Promethium-146	U	0.0205	+/-0.0386	0.0783	+/-0.0398		pCi/g							
Radium-226		2.03	+/-0.230	0.116	+/-0.298		pCi/g							
Radium-228		1.67	+/-0.303	0.239	+/-0.375		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-014 U6S
Sample ID: 714507016

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0224	+/-0.274	0.531	+/-0.274		pCi/g							
Silver-110m	U	-0.0196	+/-0.0498	0.0871	+/-0.0506		pCi/g							
Sodium-22	U	-0.00489	+/-0.0355	0.0695	+/-0.0356		pCi/g							
Thallium-208		0.347	+/-0.0852	0.0524	+/-0.0901		pCi/g							
Thorium-234		2.33	+/-2.38	2.08	+/-2.45		pCi/g							
Tin-113	U	-0.00242	+/-0.0438	0.0767	+/-0.0438		pCi/g							
Uranium-235	U	0.0866	+/-0.200	0.376	+/-0.200		pCi/g							
Uranium-238		2.33	+/-2.38	2.08	+/-2.45		pCi/g							
Yttrium-88	U	-0.00774	+/-0.0285	0.0572	+/-0.0287		pCi/g							
Zinc-65	U	0.0480	+/-0.0368	0.108	+/-0.0430		pCi/g							
Zirconium-95	U	0.0302	+/-0.0761	0.153	+/-0.0773		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-015 BS
Sample ID: 714507017
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 2.94%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.20	+/-0.312	0.198	+/-0.352		pCi/g			MXR1	04/10/25	2234	2767515	1
Americium-241	U	0.00469	+/-0.175	0.313	+/-0.175		pCi/g							
Antimony-124	U	0.0370	+/-0.102	0.241	+/-0.104		pCi/g							
Antimony-125	U	0.00557	+/-0.0972	0.189	+/-0.0973		pCi/g							
Barium-133	U	0.0359	+/-0.0467	0.0900	+/-0.0495		pCi/g							
Barium-140	U	0.186	+/-0.611	1.27	+/-0.617		pCi/g							
Beryllium-7		1.90	+/-0.920	0.764	+/-0.935		pCi/g							
Bismuth-212		2.30	+/-1.13	0.722	+/-1.15		pCi/g							
Bismuth-214		2.15	+/-0.246	0.132	+/-0.307		pCi/g							
Cerium-139	U	-0.00102	+/-0.0387	0.0696	+/-0.0387		pCi/g							
Cerium-141	U	0.0619	+/-0.185	0.203	+/-0.187		pCi/g							
Cerium-144	U	-0.102	+/-0.239	0.421	+/-0.243		pCi/g							
Cesium-134	U	0.0213	+/-0.0436	0.0886	+/-0.0447		pCi/g							
Cesium-136	U	0.172	+/-0.287	0.611	+/-0.298		pCi/g							
Cesium-137	U	0.0249	+/-0.0291	0.0628	+/-0.0312	0.100	pCi/g							
Chromium-51	U	0.187	+/-0.721	1.30	+/-0.726		pCi/g							
Cobalt-56	U	-0.0213	+/-0.0515	0.0909	+/-0.0524		pCi/g							
Cobalt-57	U	0.0240	+/-0.0303	0.0586	+/-0.0323		pCi/g							
Cobalt-58	U	-0.0176	+/-0.0406	0.0728	+/-0.0414		pCi/g							
Cobalt-60	U	0.0435	+/-0.0390	0.0954	+/-0.0440		pCi/g							
Europium-152	U	-0.0324	+/-0.107	0.181	+/-0.108		pCi/g							
Europium-154	U	0.00546	+/-0.101	0.213	+/-0.102		pCi/g							
Europium-155	U	-0.0132	+/-0.109	0.201	+/-0.109		pCi/g							
Iridium-192	U	-0.0141	+/-0.0446	0.0761	+/-0.0451		pCi/g							
Iron-59	U	-0.0311	+/-0.110	0.199	+/-0.111		pCi/g							
Lead-210	U	5.85	+/-9.32	10.0	+/-9.34		pCi/g							
Lead-212		1.23	+/-0.151	0.113	+/-0.191		pCi/g							
Lead-214		2.67	+/-0.285	0.133	+/-0.379		pCi/g							
Manganese-54	U	-0.00567	+/-0.0406	0.0752	+/-0.0407		pCi/g							
Mercury-203	U	-0.0108	+/-0.0634	0.110	+/-0.0636		pCi/g							
Neodymium-147	U	0.205	+/-1.99	3.55	+/-1.99		pCi/g							
Neptunium-239	U	-0.132	+/-0.268	0.476	+/-0.275		pCi/g							
Niobium-94	U	0.0198	+/-0.0295	0.0630	+/-0.0309		pCi/g							
Niobium-95	U	0.00880	+/-0.0646	0.111	+/-0.0647		pCi/g							
Potassium-40		2.17	+/-0.956	0.814	+/-0.989		pCi/g							
Promethium-144	U	0.00854	+/-0.0323	0.0650	+/-0.0326		pCi/g							
Promethium-146	U	-0.0202	+/-0.0388	0.0711	+/-0.0399		pCi/g							
Radium-226		2.67	+/-0.285	0.133	+/-0.379		pCi/g							
Radium-228		1.20	+/-0.312	0.198	+/-0.352		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-015 BS
Sample ID: 714507017

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.289	+/-0.316	0.684	+/-0.343		pCi/g							
Silver-110m	U	-0.0376	+/-0.0538	0.0896	+/-0.0567		pCi/g							
Sodium-22	U	0.000968	+/-0.0359	0.0752	+/-0.0359		pCi/g							
Thallium-208		0.335	+/-0.0879	0.0608	+/-0.0925		pCi/g							
Thorium-234	UI	0.000	+/-4.83	2.56	+/-5.13		pCi/g							
Tin-113	U	-0.00217	+/-0.0512	0.0991	+/-0.0512		pCi/g							
Uranium-235	U	0.130	+/-0.389	0.402	+/-0.389		pCi/g							
Uranium-238	UI	0.000	+/-4.83	2.56	+/-5.13		pCi/g							
Yttrium-88	U	-0.000798	+/-0.0534	0.109	+/-0.0534		pCi/g							
Zinc-65	U	0.0276	+/-0.0846	0.160	+/-0.0855		pCi/g							
Zirconium-95	U	0.0204	+/-0.0874	0.174	+/-0.0879		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-016 BS
Sample ID: 714507018
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 5.23%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.767	+/-0.500	0.549	+/-0.505		pCi/g			MXR1	04/10/25	2235	2767515	1
Americium-241	U	-0.0485	+/-0.135	0.171	+/-0.137		pCi/g							
Antimony-124	U	-0.0608	+/-0.152	0.312	+/-0.154		pCi/g							
Antimony-125	U	0.0885	+/-0.218	0.377	+/-0.222		pCi/g							
Barium-133	U	0.0428	+/-0.100	0.172	+/-0.102		pCi/g							
Barium-140	U	-0.539	+/-1.70	2.94	+/-1.72		pCi/g							
Beryllium-7	U	1.63	+/-1.16	1.79	+/-1.19		pCi/g							
Bismuth-212	U	1.63	+/-1.21	2.67	+/-1.43		pCi/g							
Bismuth-214		2.72	+/-0.424	0.242	+/-0.562		pCi/g							
Cerium-139	U	-0.00403	+/-0.0666	0.120	+/-0.0667		pCi/g							
Cerium-141	U	0.0315	+/-0.175	0.321	+/-0.175		pCi/g							
Cerium-144	U	-0.0288	+/-0.403	0.726	+/-0.403		pCi/g							
Cesium-134	U	0.104	+/-0.100	0.216	+/-0.111		pCi/g							
Cesium-136	U	0.772	+/-0.900	1.36	+/-0.969		pCi/g							
Cesium-137	U	-0.0305	+/-0.0763	0.140	+/-0.0776	0.100	pCi/g							
Chromium-51	U	0.857	+/-1.36	2.59	+/-1.41		pCi/g							
Cobalt-56	U	-0.0212	+/-0.0947	0.179	+/-0.0952		pCi/g							
Cobalt-57	U	0.0653	+/-0.0470	0.0936	+/-0.0561		pCi/g							
Cobalt-58	U	-0.0148	+/-0.0984	0.188	+/-0.0987		pCi/g							
Cobalt-60	U	-0.0142	+/-0.0652	0.127	+/-0.0655		pCi/g							
Europium-152	U	0.0683	+/-0.212	0.381	+/-0.215		pCi/g							
Europium-154	U	-0.0139	+/-0.250	0.484	+/-0.250		pCi/g							
Europium-155	U	0.192	+/-0.157	0.313	+/-0.181		pCi/g							
Iridium-192	U	-0.0553	+/-0.0843	0.141	+/-0.0882		pCi/g							
Iron-59	U	-0.0541	+/-0.217	0.410	+/-0.218		pCi/g							
Lead-210		3.58	+/-1.58	1.42	+/-1.67		pCi/g							
Lead-212		1.15	+/-0.272	0.232	+/-0.293		pCi/g							
Lead-214		3.39	+/-0.418	0.294	+/-0.648		pCi/g							
Manganese-54	U	0.0156	+/-0.0877	0.173	+/-0.0880		pCi/g							
Mercury-203	U	0.0479	+/-0.112	0.209	+/-0.114		pCi/g							
Neodymium-147	U	1.30	+/-3.32	6.65	+/-3.38		pCi/g							
Neptunium-239	U	-0.257	+/-0.445	0.779	+/-0.461		pCi/g							
Niobium-94	U	0.0669	+/-0.0685	0.150	+/-0.0752		pCi/g							
Niobium-95	U	0.00643	+/-0.126	0.240	+/-0.126		pCi/g							
Potassium-40		2.01	+/-1.54	1.83	+/-1.55		pCi/g							
Promethium-144	U	0.0676	+/-0.0701	0.155	+/-0.0769		pCi/g							
Promethium-146	U	-0.00838	+/-0.0882	0.158	+/-0.0883		pCi/g							
Radium-226		3.39	+/-0.418	0.294	+/-0.648		pCi/g							
Radium-228		0.767	+/-0.500	0.549	+/-0.505		pCi/g							

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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-016 BS
Sample ID: 714507018

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.608	+/-0.698	1.19	+/-0.754		pCi/g							
Silver-110m	U	0.0314	+/-0.0837	0.184	+/-0.0849		pCi/g							
Sodium-22	U	-0.00495	+/-0.0892	0.172	+/-0.0892		pCi/g							
Thallium-208		0.551	+/-0.180	0.106	+/-0.197		pCi/g							
Thorium-234		1.99	+/-1.98	1.83	+/-2.05		pCi/g							
Tin-113	U	-0.0607	+/-0.0993	0.166	+/-0.104		pCi/g							
Uranium-235	U	0.00554	+/-0.398	0.721	+/-0.398		pCi/g							
Uranium-238		1.99	+/-1.98	1.83	+/-2.05		pCi/g							
Yttrium-88	U	-0.0568	+/-0.0931	0.168	+/-0.0967		pCi/g							
Zinc-65	U	0.0580	+/-0.155	0.309	+/-0.157		pCi/g							
Zirconium-95	U	0.164	+/-0.230	0.357	+/-0.242		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-017 BS
Sample ID: 714507019
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.6%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.872	+/-0.250	0.197	+/-0.279		pCi/g			MXR1	04/10/25	2236	2767515	1
Americium-241	U	-0.0501	+/-0.237	0.422	+/-0.238		pCi/g							
Antimony-124	U	0.0532	+/-0.0903	0.227	+/-0.0936		pCi/g							
Antimony-125	U	0.0152	+/-0.0856	0.171	+/-0.0859		pCi/g							
Barium-133	U	-0.00926	+/-0.0354	0.0614	+/-0.0357		pCi/g							
Barium-140	U	0.0244	+/-0.691	1.30	+/-0.691		pCi/g							
Beryllium-7	U	-0.0757	+/-0.387	0.739	+/-0.389		pCi/g							
Bismuth-212		1.31	+/-0.679	0.757	+/-0.691		pCi/g							
Bismuth-214		2.52	+/-0.256	0.142	+/-0.331		pCi/g							
Cerium-139	U	-0.00680	+/-0.0345	0.0622	+/-0.0347		pCi/g							
Cerium-141	U	0.00588	+/-0.111	0.188	+/-0.111		pCi/g							
Cerium-144	U	0.0768	+/-0.219	0.416	+/-0.222		pCi/g							
Cesium-134	U	0.0183	+/-0.0437	0.0872	+/-0.0445		pCi/g							
Cesium-136	U	-0.193	+/-0.253	0.403	+/-0.269		pCi/g							
Cesium-137	U	-0.00708	+/-0.0379	0.0630	+/-0.0380	0.100	pCi/g							
Chromium-51	U	0.203	+/-0.538	1.10	+/-0.546		pCi/g							
Cobalt-56	U	0.0447	+/-0.0511	0.102	+/-0.0552		pCi/g							
Cobalt-57	U	-0.000935	+/-0.0270	0.0503	+/-0.0270		pCi/g							
Cobalt-58	U	7.97E-05	+/-0.0409	0.0795	+/-0.0409		pCi/g							
Cobalt-60	U	0.0197	+/-0.0377	0.0843	+/-0.0388		pCi/g							
Europium-152	U	-0.0149	+/-0.0896	0.174	+/-0.0899		pCi/g							
Europium-154	U	0.0495	+/-0.0614	0.167	+/-0.0656		pCi/g							
Europium-155	U	0.0129	+/-0.102	0.195	+/-0.102		pCi/g							
Iridium-192	U	0.00352	+/-0.0368	0.0737	+/-0.0368		pCi/g							
Iron-59	U	0.0713	+/-0.101	0.230	+/-0.106		pCi/g							
Lead-210	U	-3.76	+/-9.56	18.4	+/-9.72		pCi/g							
Lead-212		1.02	+/-0.137	0.111	+/-0.168		pCi/g							
Lead-214		2.95	+/-0.284	0.135	+/-0.394		pCi/g							
Manganese-54	U	-0.00879	+/-0.0347	0.0638	+/-0.0350		pCi/g							
Mercury-203	U	0.00973	+/-0.101	0.0976	+/-0.101		pCi/g							
Neodymium-147	UI	0.000	+/-3.60	3.26	+/-3.62		pCi/g							
Neptunium-239	U	-0.362	+/-0.281	0.473	+/-0.327		pCi/g							
Niobium-94	U	-0.0130	+/-0.0331	0.0597	+/-0.0337		pCi/g							
Niobium-95	U	0.0226	+/-0.0553	0.101	+/-0.0562		pCi/g							
Potassium-40		2.90	+/-0.810	0.606	+/-0.889		pCi/g							
Promethium-144	U	0.000107	+/-0.0348	0.0664	+/-0.0348		pCi/g							
Promethium-146	U	0.0209	+/-0.0382	0.0794	+/-0.0394		pCi/g							
Radium-226		2.95	+/-0.284	0.135	+/-0.394		pCi/g							
Radium-228		0.872	+/-0.250	0.197	+/-0.279		pCi/g							

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Certificate of Analysis

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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-017 BS
Sample ID: 714507019

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.121	+/-0.281	0.514	+/-0.287		pCi/g							
Silver-110m	U	0.0682	+/-0.0684	0.0975	+/-0.0755		pCi/g							
Sodium-22	U	0.0204	+/-0.0230	0.0623	+/-0.0248		pCi/g							
Thallium-208		0.306	+/-0.0808	0.0627	+/-0.0848		pCi/g							
Thorium-234		4.57	+/-3.62	3.56	+/-3.79		pCi/g							
Tin-113	U	-0.00363	+/-0.0467	0.0910	+/-0.0468		pCi/g							
Uranium-235	U	0.243	+/-0.321	0.384	+/-0.321		pCi/g							
Uranium-238		4.57	+/-3.62	3.56	+/-3.79		pCi/g							
Yttrium-88	U	-0.0307	+/-0.0412	0.0665	+/-0.0435		pCi/g							
Zinc-65	U	0.0472	+/-0.0795	0.165	+/-0.0824		pCi/g							
Zirconium-95	U	-0.00996	+/-0.0862	0.162	+/-0.0864		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-017-DUP BS
Sample ID: 714507020
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.19%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.28	+/-0.350	0.295	+/-0.390		pCi/g			MXR1	04/10/25	2236	2767515	1
Americium-241	U	0.215	+/-0.365	0.642	+/-0.379		pCi/g							
Antimony-124	U	0.0172	+/-0.144	0.290	+/-0.144		pCi/g							
Antimony-125	U	-0.00731	+/-0.125	0.227	+/-0.125		pCi/g							
Barium-133	U	0.0187	+/-0.0814	0.112	+/-0.0818		pCi/g							
Barium-140	U	-0.708	+/-0.888	1.58	+/-0.946		pCi/g							
Beryllium-7	U	0.488	+/-0.540	1.07	+/-0.585		pCi/g							
Bismuth-212		1.25	+/-1.03	1.09	+/-1.03		pCi/g							
Bismuth-214		2.59	+/-0.307	0.151	+/-0.377		pCi/g							
Cerium-139	U	-0.0124	+/-0.0501	0.0913	+/-0.0505		pCi/g							
Cerium-141	U	0.0436	+/-0.148	0.278	+/-0.150		pCi/g							
Cerium-144	U	0.0412	+/-0.310	0.580	+/-0.310		pCi/g							
Cesium-134	U	0.0138	+/-0.0525	0.103	+/-0.0529		pCi/g							
Cesium-136	U	0.178	+/-0.313	0.607	+/-0.324		pCi/g							
Cesium-137	U	0.00320	+/-0.0417	0.0814	+/-0.0418	0.100	pCi/g							
Chromium-51	U	0.0733	+/-0.757	1.41	+/-0.758		pCi/g							
Cobalt-56	U	0.0458	+/-0.0677	0.124	+/-0.0710		pCi/g							
Cobalt-57	U	-0.0203	+/-0.0381	0.0694	+/-0.0392		pCi/g							
Cobalt-58	U	-0.0293	+/-0.0545	0.0983	+/-0.0562		pCi/g							
Cobalt-60	U	0.0287	+/-0.0411	0.0913	+/-0.0432		pCi/g							
Europium-152	U	0.0111	+/-0.173	0.258	+/-0.173		pCi/g							
Europium-154	U	-0.105	+/-0.132	0.220	+/-0.141		pCi/g							
Europium-155	U	0.0959	+/-0.159	0.298	+/-0.165		pCi/g							
Iridium-192	U	0.00136	+/-0.0508	0.0940	+/-0.0508		pCi/g							
Iron-59	U	-0.126	+/-0.133	0.218	+/-0.145		pCi/g							
Lead-210	U	6.02	+/-12.8	25.4	+/-13.2		pCi/g							
Lead-212		1.31	+/-0.228	0.142	+/-0.258		pCi/g							
Lead-214		3.32	+/-0.332	0.194	+/-0.455		pCi/g							
Manganese-54	UI	0.000	+/-0.0422	0.0584	+/-0.0428		pCi/g							
Mercury-203	U	0.0334	+/-0.0703	0.133	+/-0.0719		pCi/g							
Neodymium-147	U	0.197	+/-2.18	4.27	+/-2.18		pCi/g							
Neptunium-239	U	0.263	+/-0.379	0.734	+/-0.398		pCi/g							
Niobium-94	UI	0.000	+/-0.137	0.0933	+/-0.148		pCi/g							
Niobium-95	U	0.144	+/-0.0926	0.177	+/-0.114		pCi/g							
Potassium-40		3.35	+/-1.21	0.852	+/-1.27		pCi/g							
Promethium-144	U	0.0171	+/-0.0423	0.0763	+/-0.0431		pCi/g							
Promethium-146	U	-0.0467	+/-0.0615	0.0870	+/-0.0652		pCi/g							
Radium-226		3.32	+/-0.332	0.194	+/-0.455		pCi/g							
Radium-228		1.28	+/-0.350	0.295	+/-0.390		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-017-DUP BS
Sample ID: 714507020

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0220	+/-0.376	0.648	+/-0.376		pCi/g							
Silver-110m	U	0.0321	+/-0.0584	0.121	+/-0.0603		pCi/g							
Sodium-22	U	-0.0375	+/-0.0470	0.0784	+/-0.0501		pCi/g							
Thallium-208		0.301	+/-0.0820	0.0738	+/-0.0860		pCi/g							
Thorium-234	U	2.73	+/-5.79	4.78	+/-5.82		pCi/g							
Tin-113	U	-0.00120	+/-0.0729	0.117	+/-0.0729		pCi/g							
Uranium-235	U	0.246	+/-0.313	0.600	+/-0.333		pCi/g							
Uranium-238	U	2.73	+/-5.79	4.78	+/-5.82		pCi/g							
Yttrium-88	U	-0.0244	+/-0.0391	0.0656	+/-0.0406		pCi/g							
Zinc-65	U	0.0836	+/-0.0868	0.195	+/-0.0950		pCi/g							
Zirconium-95	U	-0.0304	+/-0.0994	0.185	+/-0.100		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DT2	03/18/25	1057	2767432

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-018 BS
Sample ID: 714507021
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 3.72%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.835	+/-0.326	0.316	+/-0.337		pCi/g			MXR1	04/10/25	2045	2767517	1
Americium-241	U	0.162	+/-0.205	0.372	+/-0.218		pCi/g							
Antimony-124	U	-0.0982	+/-0.116	0.193	+/-0.124		pCi/g							
Antimony-125	U	-0.0954	+/-0.0985	0.163	+/-0.108		pCi/g							
Barium-133	U	0.0756	+/-0.0475	0.0981	+/-0.0588		pCi/g							
Barium-140	U	0.392	+/-0.845	1.37	+/-0.864		pCi/g							
Beryllium-7		1.21	+/-1.10	0.820	+/-1.11		pCi/g							
Bismuth-212		1.61	+/-0.895	0.846	+/-0.909		pCi/g							
Bismuth-214		1.71	+/-0.230	0.148	+/-0.277		pCi/g							
Cerium-139	U	-0.00787	+/-0.0372	0.0702	+/-0.0374		pCi/g							
Cerium-141	U	-0.142	+/-0.104	0.181	+/-0.122		pCi/g							
Cerium-144	U	-0.193	+/-0.217	0.395	+/-0.234		pCi/g							
Cesium-134	UI	0.000	+/-0.0649	0.0789	+/-0.0658		pCi/g							
Cesium-136	U	-0.0513	+/-0.213	0.433	+/-0.215		pCi/g							
Cesium-137	U	0.0118	+/-0.0454	0.0849	+/-0.0457	0.100	pCi/g							
Chromium-51	U	-0.0326	+/-0.604	1.15	+/-0.604		pCi/g							
Cobalt-56	U	0.0266	+/-0.0476	0.104	+/-0.0491		pCi/g							
Cobalt-57	U	0.0131	+/-0.0293	0.0584	+/-0.0299		pCi/g							
Cobalt-58	U	-0.00797	+/-0.0429	0.0799	+/-0.0431		pCi/g							
Cobalt-60	U	0.00839	+/-0.0388	0.0821	+/-0.0390		pCi/g							
Europium-152	U	0.118	+/-0.105	0.221	+/-0.118		pCi/g							
Europium-154	U	-0.0281	+/-0.126	0.244	+/-0.127		pCi/g							
Europium-155	U	-0.0501	+/-0.117	0.222	+/-0.119		pCi/g							
Iridium-192	U	0.0131	+/-0.0462	0.0898	+/-0.0466		pCi/g							
Iron-59	U	0.0939	+/-0.100	0.245	+/-0.109		pCi/g							
Lead-210	U	-3.48	+/-6.27	10.0	+/-6.47		pCi/g							
Lead-212		0.947	+/-0.138	0.117	+/-0.157		pCi/g							
Lead-214		1.99	+/-0.250	0.153	+/-0.296		pCi/g							
Manganese-54	U	-0.000122	+/-0.0390	0.0787	+/-0.0390		pCi/g							
Mercury-203	U	-0.0325	+/-0.0570	0.103	+/-0.0589		pCi/g							
Neodymium-147	UI	0.000	+/-3.44	3.95	+/-3.99		pCi/g							
Neptunium-239	U	-0.0879	+/-0.288	0.550	+/-0.291		pCi/g							
Niobium-94	U	0.000274	+/-0.0396	0.0665	+/-0.0396		pCi/g							
Niobium-95	U	0.0657	+/-0.0590	0.127	+/-0.0663		pCi/g							
Potassium-40		2.77	+/-0.883	0.815	+/-0.917		pCi/g							
Promethium-144	U	0.00417	+/-0.0368	0.0708	+/-0.0368		pCi/g							
Promethium-146	U	0.0259	+/-0.0452	0.0918	+/-0.0468		pCi/g							
Radium-226		1.99	+/-0.250	0.153	+/-0.296		pCi/g							
Radium-228		0.835	+/-0.326	0.316	+/-0.337		pCi/g							

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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-018 BS
Sample ID: 714507021

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.402	+/-0.288	0.686	+/-0.291		pCi/g							
Silver-110m	U	-0.0491	+/-0.0561	0.0973	+/-0.0605		pCi/g							
Sodium-22	U	-0.0100	+/-0.0450	0.0870	+/-0.0453		pCi/g							
Thallium-208		0.212	+/-0.0977	0.0672	+/-0.0996		pCi/g							
Thorium-234	U	0.819	+/-3.69	3.05	+/-3.70		pCi/g							
Tin-113	U	-0.0118	+/-0.0561	0.104	+/-0.0564		pCi/g							
Uranium-235	U	0.172	+/-0.222	0.450	+/-0.236		pCi/g							
Uranium-238	U	0.819	+/-3.69	3.05	+/-3.70		pCi/g							
Yttrium-88	U	-0.0288	+/-0.0470	0.0803	+/-0.0489		pCi/g							
Zinc-65	U	0.0445	+/-0.0936	0.188	+/-0.0959		pCi/g							
Zirconium-95	U	-0.0785	+/-0.0917	0.145	+/-0.0986		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	03/18/25	1044	2767433

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-019 BS
Sample ID: 714507022
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.09%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.911	+/-0.429	0.421	+/-0.445		pCi/g			MXR1	04/10/25	2046	2767517	1
Americium-241	U	0.000251	+/-0.383	0.746	+/-0.383		pCi/g							
Antimony-124	U	-0.0504	+/-0.159	0.301	+/-0.161		pCi/g							
Antimony-125	U	-0.0401	+/-0.125	0.234	+/-0.126		pCi/g							
Barium-133	U	-0.0278	+/-0.0650	0.0987	+/-0.0663		pCi/g							
Barium-140	U	-0.286	+/-1.08	2.02	+/-1.09		pCi/g							
Beryllium-7	UI	0.000	+/-1.52	1.05	+/-1.54		pCi/g							
Bismuth-212	U	0.940	+/-0.816	1.70	+/-0.923		pCi/g							
Bismuth-214		4.67	+/-0.368	0.167	+/-0.537		pCi/g							
Cerium-139	U	-0.0136	+/-0.0536	0.0957	+/-0.0541		pCi/g							
Cerium-141	U	0.0184	+/-0.155	0.265	+/-0.155		pCi/g							
Cerium-144	U	-0.124	+/-0.347	0.576	+/-0.352		pCi/g							
Cesium-134	U	0.0520	+/-0.0593	0.124	+/-0.0640		pCi/g							
Cesium-136	U	-0.0558	+/-0.503	0.808	+/-0.504		pCi/g							
Cesium-137	U	-0.0131	+/-0.0461	0.0787	+/-0.0465	0.100	pCi/g							
Chromium-51	U	-0.766	+/-0.851	1.35	+/-0.922		pCi/g							
Cobalt-56	U	0.0295	+/-0.0608	0.125	+/-0.0623		pCi/g							
Cobalt-57	U	0.0155	+/-0.0397	0.0756	+/-0.0403		pCi/g							
Cobalt-58	U	-0.0289	+/-0.0695	0.123	+/-0.0708		pCi/g							
Cobalt-60	U	0.0545	+/-0.0571	0.131	+/-0.0625		pCi/g							
Europium-152	U	0.0382	+/-0.154	0.277	+/-0.155		pCi/g							
Europium-154	U	0.0882	+/-0.118	0.284	+/-0.125		pCi/g							
Europium-155	UI	0.000	+/-0.332	0.274	+/-0.334		pCi/g							
Iridium-192	U	-0.00514	+/-0.0612	0.107	+/-0.0612		pCi/g							
Iron-59	U	-0.0889	+/-0.146	0.266	+/-0.152		pCi/g							
Lead-210	U	8.04	+/-21.0	42.0	+/-21.4		pCi/g							
Lead-212		0.835	+/-0.185	0.174	+/-0.204		pCi/g							
Lead-214		5.85	+/-0.439	0.193	+/-0.722		pCi/g							
Manganese-54	U	-0.00738	+/-0.0517	0.0955	+/-0.0519		pCi/g							
Mercury-203	U	0.00777	+/-0.0922	0.163	+/-0.0923		pCi/g							
Neodymium-147	U	-1.80	+/-2.60	4.59	+/-2.73		pCi/g							
Neptunium-239	U	-0.150	+/-0.395	0.719	+/-0.401		pCi/g							
Niobium-94	U	0.0465	+/-0.0391	0.100	+/-0.0446		pCi/g							
Niobium-95	U	-0.0203	+/-0.0859	0.137	+/-0.0865		pCi/g							
Potassium-40		2.63	+/-1.14	0.985	+/-1.18		pCi/g							
Promethium-144	U	0.0220	+/-0.0541	0.106	+/-0.0550		pCi/g							
Promethium-146	U	0.0111	+/-0.0583	0.115	+/-0.0585		pCi/g							
Radium-226		5.85	+/-0.439	0.193	+/-0.722		pCi/g							
Radium-228		0.911	+/-0.429	0.421	+/-0.445		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-019 BS
Sample ID: 714507022

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.544	+/-0.520	0.722	+/-0.578		pCi/g							
Silver-110m	U	0.0187	+/-0.0630	0.128	+/-0.0636		pCi/g							
Sodium-22	U	0.0122	+/-0.0457	0.0996	+/-0.0460		pCi/g							
Thallium-208		0.267	+/-0.100	0.0904	+/-0.103		pCi/g							
Thorium-234	U	2.13	+/-2.91	5.85	+/-3.11		pCi/g							
Tin-113	U	-0.0138	+/-0.0734	0.139	+/-0.0737		pCi/g							
Uranium-235	UI	0.000	+/-0.583	0.556	+/-0.585		pCi/g							
Uranium-238	U	2.13	+/-2.91	5.85	+/-3.11		pCi/g							
Yttrium-88	U	-0.0429	+/-0.0678	0.115	+/-0.0706		pCi/g							
Zinc-65	U	-0.0137	+/-0.135	0.234	+/-0.136		pCi/g							
Zirconium-95	U	-0.0680	+/-0.0977	0.166	+/-0.103		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	03/18/25	1044	2767433

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-020 BS
Sample ID: 714507023
Matrix: Solid
Collect Date: 07-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.43%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.20	+/-0.458	0.468	+/-0.473		pCi/g			MXR1	04/10/25	2052	2767517	1
Americium-241	U	0.0346	+/-0.0781	0.134	+/-0.0797		pCi/g							
Antimony-124	U	0.0809	+/-0.240	0.524	+/-0.243		pCi/g							
Antimony-125	U	0.0644	+/-0.166	0.314	+/-0.169		pCi/g							
Barium-133	U	0.119	+/-0.140	0.146	+/-0.151		pCi/g							
Barium-140	U	-0.114	+/-1.28	2.30	+/-1.29		pCi/g							
Beryllium-7		1.85	+/-1.48	1.30	+/-1.49		pCi/g							
Bismuth-212	U	0.955	+/-0.892	1.75	+/-0.896		pCi/g							
Bismuth-214		2.74	+/-0.353	0.193	+/-0.432		pCi/g							
Cerium-139	U	-0.0179	+/-0.0403	0.0735	+/-0.0413		pCi/g							
Cerium-141	U	-0.130	+/-0.134	0.210	+/-0.147		pCi/g							
Cerium-144	U	-0.0464	+/-0.278	0.470	+/-0.279		pCi/g							
Cesium-134	U	0.0111	+/-0.0647	0.130	+/-0.0649		pCi/g							
Cesium-136	U	-0.221	+/-0.510	0.894	+/-0.520		pCi/g							
Cesium-137	U	0.00782	+/-0.0651	0.115	+/-0.0652	0.100	pCi/g							
Chromium-51	U	-0.0886	+/-0.854	1.56	+/-0.855		pCi/g							
Cobalt-56	U	-0.0174	+/-0.0655	0.123	+/-0.0660		pCi/g							
Cobalt-57	U	-0.00633	+/-0.0345	0.0585	+/-0.0346		pCi/g							
Cobalt-58	U	0.0172	+/-0.0717	0.147	+/-0.0721		pCi/g							
Cobalt-60	U	-0.0235	+/-0.0561	0.106	+/-0.0571		pCi/g							
Europium-152	U	-0.0122	+/-0.166	0.270	+/-0.167		pCi/g							
Europium-154	U	0.0464	+/-0.201	0.386	+/-0.202		pCi/g							
Europium-155	U	0.0683	+/-0.129	0.233	+/-0.133		pCi/g							
Iridium-192	U	0.0236	+/-0.0653	0.114	+/-0.0662		pCi/g							
Iron-59	U	-0.0263	+/-0.216	0.402	+/-0.217		pCi/g							
Lead-210		3.09	+/-1.51	1.03	+/-1.53		pCi/g							
Lead-212		1.12	+/-0.157	0.136	+/-0.194		pCi/g							
Lead-214		3.31	+/-0.318	0.205	+/-0.418		pCi/g							
Manganese-54	U	-0.0480	+/-0.0859	0.126	+/-0.0887		pCi/g							
Mercury-203	U	-0.0252	+/-0.0753	0.134	+/-0.0762		pCi/g							
Neodymium-147	U	-2.38	+/-3.48	4.76	+/-3.64		pCi/g							
Neptunium-239	U	-0.108	+/-0.348	0.584	+/-0.351		pCi/g							
Niobium-94	U	-0.0505	+/-0.0594	0.100	+/-0.0638		pCi/g							
Niobium-95	U	0.0529	+/-0.0894	0.184	+/-0.0927		pCi/g							
Potassium-40		2.91	+/-1.05	0.772	+/-1.08		pCi/g							
Promethium-144	U	0.00912	+/-0.0609	0.119	+/-0.0611		pCi/g							
Promethium-146	U	-0.0159	+/-0.0678	0.120	+/-0.0682		pCi/g							
Radium-226		3.31	+/-0.318	0.205	+/-0.418		pCi/g							
Radium-228		1.20	+/-0.458	0.468	+/-0.473		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030725-WYE-020 BS
Sample ID: 714507023

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.271	+/-0.553	0.999	+/-0.567		pCi/g							
Silver-110m	U	0.0193	+/-0.120	0.206	+/-0.121		pCi/g							
Sodium-22	U	0.00197	+/-0.0762	0.137	+/-0.0762		pCi/g							
Thallium-208		0.387	+/-0.117	0.114	+/-0.122		pCi/g							
Thorium-234		3.43	+/-1.33	1.24	+/-1.54		pCi/g							
Tin-113	U	-0.0400	+/-0.0874	0.150	+/-0.0893		pCi/g							
Uranium-235	U	0.0757	+/-0.284	0.499	+/-0.284		pCi/g							
Uranium-238		3.43	+/-1.33	1.24	+/-1.54		pCi/g							
Yttrium-88	U	0.0129	+/-0.0667	0.158	+/-0.0670		pCi/g							
Zinc-65	U	0.0974	+/-0.162	0.317	+/-0.168		pCi/g							
Zirconium-95	U	0.0300	+/-0.164	0.321	+/-0.165		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	03/18/25	1044	2767433

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-009
Sample ID: 714507024
Matrix: Solid
Collect Date: 06-MAR-25
Receive Date: 17-MAR-25
Collector: Client
Moisture: 4.63%

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.934	+/-0.442	0.348	+/-0.452		pCi/g			MXR1	04/10/25	2052	2767517	1
Americium-241	U	0.00773	+/-0.0515	0.0947	+/-0.0516		pCi/g							
Antimony-124	U	-0.0450	+/-0.177	0.333	+/-0.178		pCi/g							
Antimony-125	U	-0.0381	+/-0.111	0.205	+/-0.112		pCi/g							
Barium-133	U	0.0361	+/-0.0462	0.0910	+/-0.0490		pCi/g							
Barium-140	U	-0.403	+/-0.886	1.60	+/-0.905		pCi/g							
Beryllium-7		1.08	+/-0.641	1.06	+/-0.648		pCi/g							
Bismuth-212		1.56	+/-1.22	1.19	+/-1.22		pCi/g							
Bismuth-214		1.75	+/-0.251	0.108	+/-0.293		pCi/g							
Cerium-139	U	-0.000873	+/-0.0345	0.0628	+/-0.0345		pCi/g							
Cerium-141	U	-0.0675	+/-0.0999	0.158	+/-0.105		pCi/g							
Cerium-144	U	-0.0981	+/-0.192	0.341	+/-0.197		pCi/g							
Cesium-134	U	-0.0106	+/-0.0457	0.0840	+/-0.0459		pCi/g							
Cesium-136	U	0.000	+/-0.320	0.663	+/-0.000		pCi/g							
Cesium-137	U	0.0185	+/-0.0488	0.0903	+/-0.0496	0.100	pCi/g							
Chromium-51	U	-0.205	+/-0.583	1.11	+/-0.590		pCi/g							
Cobalt-56	U	-0.0648	+/-0.0576	0.0812	+/-0.0649		pCi/g							
Cobalt-57	U	-0.00135	+/-0.0223	0.0416	+/-0.0223		pCi/g							
Cobalt-58	U	0.0105	+/-0.0537	0.108	+/-0.0540		pCi/g							
Cobalt-60	U	-0.00325	+/-0.0453	0.0919	+/-0.0453		pCi/g							
Europium-152	U	-0.0183	+/-0.0848	0.165	+/-0.0853		pCi/g							
Europium-154	U	0.158	+/-0.147	0.352	+/-0.164		pCi/g							
Europium-155	U	-0.0313	+/-0.0897	0.164	+/-0.0908		pCi/g							
Iridium-192	U	0.000925	+/-0.0454	0.0880	+/-0.0454		pCi/g							
Iron-59	U	-0.143	+/-0.133	0.205	+/-0.149		pCi/g							
Lead-210		3.78	+/-1.13	0.783	+/-1.18		pCi/g							
Lead-212		1.06	+/-0.144	0.109	+/-0.189		pCi/g							
Lead-214		2.02	+/-0.274	0.148	+/-0.329		pCi/g							
Manganese-54	U	-0.00703	+/-0.0616	0.0990	+/-0.0617		pCi/g							
Mercury-203	U	-0.0646	+/-0.0584	0.0891	+/-0.0655		pCi/g							
Neodymium-147	U	0.725	+/-2.42	4.92	+/-2.44		pCi/g							
Neptunium-239	U	-0.0795	+/-0.213	0.388	+/-0.216		pCi/g							
Niobium-94	U	0.0138	+/-0.0440	0.0867	+/-0.0445		pCi/g							
Niobium-95	U	0.0656	+/-0.0738	0.147	+/-0.0797		pCi/g							
Potassium-40		2.09	+/-1.01	0.992	+/-1.03		pCi/g							
Promethium-144	U	0.0113	+/-0.0503	0.0969	+/-0.0506		pCi/g							
Promethium-146	U	-0.0373	+/-0.0508	0.0899	+/-0.0536		pCi/g							
Radium-226		2.02	+/-0.274	0.148	+/-0.329		pCi/g							
Radium-228		0.934	+/-0.442	0.348	+/-0.452		pCi/g							

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Certificate of Analysis

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Report Date: April 14, 2025

Contact: Alex Bartels
Project: WYE Yard

Client Sample ID: 030625-WYE-009
Sample ID: 714507024

Project: MJWC01425
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.152	+/-0.374	0.769	+/-0.381		pCi/g							
Silver-110m	U	-0.00981	+/-0.0631	0.125	+/-0.0632		pCi/g							
Sodium-22	U	0.0552	+/-0.0519	0.125	+/-0.0578		pCi/g							
Thallium-208		0.295	+/-0.0983	0.0821	+/-0.102		pCi/g							
Thorium-234		1.84	+/-1.05	0.890	+/-1.13		pCi/g							
Tin-113	U	-0.0462	+/-0.0688	0.108	+/-0.0720		pCi/g							
Uranium-235	U	0.0607	+/-0.276	0.357	+/-0.276		pCi/g							
Uranium-238		1.84	+/-1.05	0.890	+/-1.13		pCi/g							
Yttrium-88	U	-0.0269	+/-0.0466	0.0864	+/-0.0482		pCi/g							
Zinc-65	U	0.0322	+/-0.113	0.217	+/-0.114		pCi/g							
Zirconium-95	U	-0.0326	+/-0.118	0.211	+/-0.119		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	03/18/25	1044	2767433

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Quality Control Data

QC Summary

Client : **MJW Technical Services**
15 Hazelwood Drive
Suite 112
Amherst, New York

Contact: **Alex Bartels**

Workorder: **714507**

Report Date: April 14, 2025

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
QC1206041222 714507001 DUP										
Actinium-228		0.559	U	0.383	pCi/g	7.83		(0% - 100%)	MXR1	04/10/2519:25
	Uncert:	+/-0.290		+/-0.388						
	TPU:	+/-0.297		+/-0.427						
Americium-241	U	-0.0655	U	-0.109	pCi/g	0		N/A		
	Uncert:	+/-0.158		+/-0.199						
	TPU:	+/-0.161		+/-0.205						
Antimony-124	U	-0.00162	U	-0.0393	pCi/g	0		N/A		
	Uncert:	+/-0.0774		+/-0.0721						
	TPU:	+/-0.0774		+/-0.0743						
Antimony-125	U	0.0319	U	0.0652	pCi/g	0		N/A		
	Uncert:	+/-0.0738		+/-0.0924						
	TPU:	+/-0.0752		+/-0.0971						
Barium-133	U	0.00595	U	-0.000202	pCi/g	0		N/A		
	Uncert:	+/-0.0366		+/-0.0445						
	TPU:	+/-0.0367		+/-0.0445						
Barium-140	U	-0.758	U	-0.303	pCi/g	0		N/A		
	Uncert:	+/-0.718		+/-0.800						
	TPU:	+/-0.798		+/-0.812						
Beryllium-7	U	-0.148	U	-0.267	pCi/g	0		N/A		
	Uncert:	+/-0.381		+/-0.404						
	TPU:	+/-0.387		+/-0.422						
Bismuth-212		1.69	U	-0.0874	pCi/g	31		(0% - 100%)		
	Uncert:	+/-0.488		+/-0.686						
	TPU:	+/-0.516		+/-0.687						
Bismuth-214		0.706		0.876	pCi/g	21.5*		(0%-20%)		
	Uncert:	+/-0.164		+/-0.172						
	TPU:	+/-0.176		+/-0.189						
Cerium-139	U	0.00636	U	0.00251	pCi/g	0		N/A		
	Uncert:	+/-0.0259		+/-0.0314						
	TPU:	+/-0.0260		+/-0.0315						
Cerium-141	U	0.0505	U	-0.0484	pCi/g	0		N/A		
	Uncert:	+/-0.0748		+/-0.0954						
	TPU:	+/-0.0783		+/-0.0979						
Cerium-144	U	-0.0162	U	0.0254	pCi/g	0		N/A		
	Uncert:	+/-0.180		+/-0.203						
	TPU:	+/-0.180		+/-0.203						
Cesium-134	U	0.0121	U	0.0295	pCi/g	0		N/A		
	Uncert:	+/-0.0379		+/-0.0787						
	TPU:	+/-0.0383		+/-0.0799						
Cesium-136	U	-0.0393	U	0.208	pCi/g	0		N/A		
	Uncert:	+/-0.249		+/-0.333						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
	TPU:	+/-0.249		+/-0.347						
Cesium-137		0.112		0.150	pCi/g	29.1		(0% - 100%)		
	Uncert:	+/-0.0487		+/-0.0991						
	TPU:	+/-0.0497		+/-0.100						
Chromium-51	U	0.165	U	-0.0902	pCi/g	0		N/A		
	Uncert:	+/-0.494		+/-0.585						
	TPU:	+/-0.499		+/-0.587						
Cobalt-56	U	0.0126	U	-0.0293	pCi/g	0		N/A		
	Uncert:	+/-0.0314		+/-0.0488						
	TPU:	+/-0.0320		+/-0.0507						
Cobalt-57	U	-0.000123	U	0.00533	pCi/g	0		N/A		
	Uncert:	+/-0.0216		+/-0.0274						
	TPU:	+/-0.0216		+/-0.0275						
Cobalt-58	U	-0.0176	U	-0.0369	pCi/g	0		N/A		
	Uncert:	+/-0.0427		+/-0.0523						
	TPU:	+/-0.0435		+/-0.0550						
Cobalt-60	U	0.00118	U	0.0565	pCi/g	0		N/A		
	Uncert:	+/-0.0308		+/-0.0469						
	TPU:	+/-0.0308		+/-0.0536						
Europium-152	U	0.0449	U	-0.0188	pCi/g	0		N/A		
	Uncert:	+/-0.0731		+/-0.115						
	TPU:	+/-0.0759		+/-0.115						
Europium-154	U	0.0185	U	-0.0500	pCi/g	0		N/A		
	Uncert:	+/-0.0817		+/-0.114						
	TPU:	+/-0.0821		+/-0.116						
Europium-155	U	-0.0353	U	0.101	pCi/g	0		N/A		
	Uncert:	+/-0.0931		+/-0.109						
	TPU:	+/-0.0945		+/-0.118						
Iridium-192	U	0.00459	U	0.0105	pCi/g	0		N/A		
	Uncert:	+/-0.0339		+/-0.0426						
	TPU:	+/-0.0339		+/-0.0428						
Iron-59	U	-0.0714	U	-0.0743	pCi/g	0		N/A		
	Uncert:	+/-0.108		+/-0.140						
	TPU:	+/-0.113		+/-0.144						
Lead-210	U	0.775	U	-1.77	pCi/g	0		N/A		
	Uncert:	+/-3.14		+/-5.09						
	TPU:	+/-3.16		+/-5.15						
Lead-212		0.664		0.652	pCi/g	1.76		(0%-20%)		
	Uncert:	+/-0.106		+/-0.159						
	TPU:	+/-0.119		+/-0.167						
Lead-214		0.874		0.762	pCi/g	13.7		(0%-20%)		
	Uncert:	+/-0.195		+/-0.175						
	TPU:	+/-0.207		+/-0.185						
Manganese-54	U	0.0113	U	0.0744	pCi/g	0		N/A		
	Uncert:	+/-0.0321		+/-0.0337						
	TPU:	+/-0.0325		+/-0.0481						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
Mercury-203	U	-0.0155	U	0.0133	pCi/g	0			N/A	
	Uncert:	+/-0.0409		+/-0.0532						
	TPU:	+/-0.0415		+/-0.0535						
Neodymium-147	U	0.756	U	0.247	pCi/g	0			N/A	
	Uncert:	+/-1.40		+/-1.79						
	TPU:	+/-1.44		+/-1.79						
Neptunium-239	U	0.0135	U	-0.0167	pCi/g	0			N/A	
	Uncert:	+/-0.233		+/-0.277						
	TPU:	+/-0.233		+/-0.278						
Niobium-94	U	-0.000730	U	0.0123	pCi/g	0			N/A	
	Uncert:	+/-0.0277		+/-0.0379						
	TPU:	+/-0.0277		+/-0.0383						
Niobium-95	U	-0.00875	U	0.0265	pCi/g	0			N/A	
	Uncert:	+/-0.0537		+/-0.0600						
	TPU:	+/-0.0539		+/-0.0612						
Potassium-40		12.7		13.9	pCi/g	9.18		(0%-20%)		
	Uncert:	+/-1.56		+/-1.73						
	TPU:	+/-1.94		+/-2.13						
Promethium-144	U	-0.0239	U	0.0294	pCi/g	0			N/A	
	Uncert:	+/-0.0320		+/-0.0376						
	TPU:	+/-0.0338		+/-0.0400						
Promethium-146	U	-0.0110	U	-0.0105	pCi/g	0			N/A	
	Uncert:	+/-0.0321		+/-0.0423						
	TPU:	+/-0.0325		+/-0.0426						
Radium-226		0.874		0.762	pCi/g	13.7		(0%-20%)		
	Uncert:	+/-0.195		+/-0.175						
	TPU:	+/-0.207		+/-0.185						
Radium-228		0.559	U	0.383	pCi/g	7.83		(0% - 100%)		
	Uncert:	+/-0.290		+/-0.388						
	TPU:	+/-0.297		+/-0.427						
Ruthenium-106	U	-0.00408	U	-0.0580	pCi/g	0			N/A	
	Uncert:	+/-0.271		+/-0.341						
	TPU:	+/-0.271		+/-0.342						
Silver-110m	U	0.00220	U	0.00258	pCi/g	0			N/A	
	Uncert:	+/-0.0452		+/-0.0522						
	TPU:	+/-0.0452		+/-0.0522						
Sodium-22	U	0.00490	U	-0.0178	pCi/g	0			N/A	
	Uncert:	+/-0.0286		+/-0.0406						
	TPU:	+/-0.0287		+/-0.0414						
Thallium-208		0.201		0.0918	pCi/g	74.4		(0% - 100%)		
	Uncert:	+/-0.0620		+/-0.102						
	TPU:	+/-0.0645		+/-0.103						
Thorium-234	U	1.41	U	0.830	pCi/g	0			N/A	
	Uncert:	+/-2.45		+/-1.82						
	TPU:	+/-2.47		+/-1.87						
Tin-113	U	-0.00215	U	-0.00115	pCi/g	0			N/A	

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
	Uncert:	+/-0.0393		+/-0.0543						
	TPU:	+/-0.0393		+/-0.0543						
Uranium-235	U	-0.0222	U	0.125	pCi/g	0			N/A	
	Uncert:	+/-0.173		+/-0.206						
	TPU:	+/-0.173		+/-0.213						
Uranium-238	U	1.41	U	0.830	pCi/g	0			N/A	
	Uncert:	+/-2.45		+/-1.82						
	TPU:	+/-2.47		+/-1.87						
Yttrium-88	U	-0.0189	U	-0.00104	pCi/g	0			N/A	
	Uncert:	+/-0.0375		+/-0.0259						
	TPU:	+/-0.0385		+/-0.0259						
Zinc-65	U	0.0126	U	0.104	pCi/g	0			N/A	
	Uncert:	+/-0.0897		+/-0.0944						
	TPU:	+/-0.0899		+/-0.106						
Zirconium-95	U	-0.0200	U	-0.0492	pCi/g	0			N/A	
	Uncert:	+/-0.0794		+/-0.0948						
	TPU:	+/-0.0800		+/-0.0975						
QC1206041223 LCS										
Actinium-228			U	0.319	pCi/g				MXR1	04/10/2522:07
	Uncert:			+/-1.71						
	TPU:			+/-1.72						
Americium-241	483			543	pCi/g		112	(75%-125%)		
	Uncert:			+/-11.9						
	TPU:			+/-66.7						
Antimony-124			U	-0.0233	pCi/g					
	Uncert:			+/-0.394						
	TPU:			+/-0.394						
Antimony-125			U	-0.0331	pCi/g					
	Uncert:			+/-1.29						
	TPU:			+/-1.29						
Barium-133			U	-0.178	pCi/g					
	Uncert:			+/-0.479						
	TPU:			+/-0.486						
Barium-140			U	-3.50	pCi/g					
	Uncert:			+/-5.25						
	TPU:			+/-5.49						
Beryllium-7			U	-0.0211	pCi/g					
	Uncert:			+/-5.41						
	TPU:			+/-5.41						
Bismuth-212			U	3.82	pCi/g					
	Uncert:			+/-4.35						
	TPU:			+/-4.70						
Bismuth-214			U	-0.441	pCi/g					
	Uncert:			+/-0.701						
	TPU:			+/-0.730						
Cerium-139			U	0.0727	pCi/g					

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
	Uncert:			+/-0.287						
	TPU:			+/-0.290						
Cerium-141			U	-0.0591	pCi/g					
	Uncert:			+/-0.672						
	TPU:			+/-0.672						
Cerium-144			U	0.616	pCi/g					
	Uncert:			+/-1.86						
	TPU:			+/-1.88						
Cesium-134			U	-0.139	pCi/g					
	Uncert:			+/-0.400						
	TPU:			+/-0.405						
Cesium-136			U	0.871	pCi/g					
	Uncert:			+/-1.99						
	TPU:			+/-2.03						
Cesium-137	147			139	pCi/g		94	(75%-125%)		
	Uncert:			+/-2.88						
	TPU:			+/-11.6						
Chromium-51			U	-3.21	pCi/g					
	Uncert:			+/-5.63						
	TPU:			+/-5.82						
Cobalt-56			U	0.0751	pCi/g					
	Uncert:			+/-0.461						
	TPU:			+/-0.463						
Cobalt-57			U	-0.0458	pCi/g					
	Uncert:			+/-0.253						
	TPU:			+/-0.254						
Cobalt-58			U	-0.132	pCi/g					
	Uncert:			+/-0.468						
	TPU:			+/-0.472						
Cobalt-60	52.7			50.2	pCi/g		95.2	(75%-125%)		
	Uncert:			+/-2.19						
	TPU:			+/-6.23						
Europium-152			U	-0.133	pCi/g					
	Uncert:			+/-1.07						
	TPU:			+/-1.08						
Europium-154			U	-0.251	pCi/g					
	Uncert:			+/-0.622						
	TPU:			+/-0.633						
Europium-155			U	-0.382	pCi/g					
	Uncert:			+/-0.947						
	TPU:			+/-0.963						
Iridium-192			U	0.193	pCi/g					
	Uncert:			+/-0.416						
	TPU:			+/-0.425						
Iron-59			U	0.580	pCi/g					
	Uncert:			+/-1.22						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
	TPU:			+/-1.25						
Lead-210				4730	pCi/g					
	Uncert:			+/-298						
	TPU:			+/-601						
Lead-212			U	0.0962	pCi/g					
	Uncert:			+/-0.601						
	TPU:			+/-0.603						
Lead-214			U	-0.143	pCi/g					
	Uncert:			+/-0.839						
	TPU:			+/-0.842						
Manganese-54			U	0.0146	pCi/g					
	Uncert:			+/-0.395						
	TPU:			+/-0.395						
Mercury-203			U	-0.103	pCi/g					
	Uncert:			+/-0.428						
	TPU:			+/-0.431						
Neodymium-147			U	6.62	pCi/g					
	Uncert:			+/-11.4						
	TPU:			+/-11.8						
Neptunium-239			U	0.129	pCi/g					
	Uncert:			+/-2.60						
	TPU:			+/-2.61						
Niobium-94			U	0.0559	pCi/g					
	Uncert:			+/-0.303						
	TPU:			+/-0.304						
Niobium-95			U	0.291	pCi/g					
	Uncert:			+/-0.422						
	TPU:			+/-0.443						
Potassium-40			U	-1.58	pCi/g					
	Uncert:			+/-1.93						
	TPU:			+/-2.07						
Promethium-144			U	0.0551	pCi/g					
	Uncert:			+/-0.295						
	TPU:			+/-0.296						
Promethium-146			U	0.580	pCi/g					
	Uncert:			+/-0.658						
	TPU:			+/-0.711						
Radium-226			U	-0.143	pCi/g					
	Uncert:			+/-0.839						
	TPU:			+/-0.842						
Radium-228			U	0.319	pCi/g					
	Uncert:			+/-1.71						
	TPU:			+/-1.72						
Ruthenium-106			U	-1.91	pCi/g					
	Uncert:			+/-3.67						
	TPU:			+/-3.77						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
Silver-110m			U	0.201	pCi/g					
	Uncert:			+/-0.594						
	TPU:			+/-0.602						
Sodium-22			U	-0.0889	pCi/g					
	Uncert:			+/-0.221						
	TPU:			+/-0.224						
Thallium-208			U	0.277	pCi/g					
	Uncert:			+/-0.380						
	TPU:			+/-0.401						
Thorium-234			U	4.90	pCi/g					
	Uncert:			+/-14.4						
	TPU:			+/-14.6						
Tin-113			U	-0.288	pCi/g					
	Uncert:			+/-0.580						
	TPU:			+/-0.595						
Uranium-235			U	-1.10	pCi/g					
	Uncert:			+/-1.99						
	TPU:			+/-2.06						
Uranium-238			U	4.90	pCi/g					
	Uncert:			+/-14.4						
	TPU:			+/-14.6						
Yttrium-88			U	0.00434	pCi/g					
	Uncert:			+/-0.160						
	TPU:			+/-0.160						
Zinc-65			U	0.483	pCi/g					
	Uncert:			+/-1.04						
	TPU:			+/-1.07						
Zirconium-95			U	0.0291	pCi/g					
	Uncert:			+/-0.818						
	TPU:			+/-0.818						
QC1206041221 MB										
Actinium-228			U	0.0655	pCi/g				MXR1	04/10/2522:37
	Uncert:			+/-0.120						
	TPU:			+/-0.124						
Americium-241			U	-0.000364	pCi/g					
	Uncert:			+/-0.0183						
	TPU:			+/-0.0183						
Antimony-124			U	-0.0499	pCi/g					
	Uncert:			+/-0.0922						
	TPU:			+/-0.0950						
Antimony-125			U	0.0367	pCi/g					
	Uncert:			+/-0.0492						
	TPU:			+/-0.0520						
Barium-133			U	0.00668	pCi/g					
	Uncert:			+/-0.0236						
	TPU:			+/-0.0238						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
Barium-140			U	0.0496	pCi/g					
	Uncert:			+/-0.252						
	TPU:			+/-0.253						
Beryllium-7			U	-0.0360	pCi/g					
	Uncert:			+/-0.283						
	TPU:			+/-0.284						
Bismuth-212			U	-0.0232	pCi/g					
	Uncert:			+/-0.314						
	TPU:			+/-0.314						
Bismuth-214			U	0.0412	pCi/g					
	Uncert:			+/-0.0866						
	TPU:			+/-0.0886						
Cerium-139			U	-0.0131	pCi/g					
	Uncert:			+/-0.0142						
	TPU:			+/-0.0156						
Cerium-141			U	-0.0351	pCi/g					
	Uncert:			+/-0.0367						
	TPU:			+/-0.0401						
Cerium-144			U	-0.0140	pCi/g					
	Uncert:			+/-0.0752						
	TPU:			+/-0.0755						
Cesium-134			U	-0.00550	pCi/g					
	Uncert:			+/-0.0212						
	TPU:			+/-0.0214						
Cesium-136			U	-0.0294	pCi/g					
	Uncert:			+/-0.131						
	TPU:			+/-0.132						
Cesium-137			U	0.0132	pCi/g					
	Uncert:			+/-0.0244						
	TPU:			+/-0.0251						
Chromium-51			U	-0.383	pCi/g					
	Uncert:			+/-0.296						
	TPU:			+/-0.344						
Cobalt-56			U	0.0238	pCi/g					
	Uncert:			+/-0.0303						
	TPU:			+/-0.0322						
Cobalt-57			U	0.0148	pCi/g					
	Uncert:			+/-0.0186						
	TPU:			+/-0.0186						
Cobalt-58			U	0.0140	pCi/g					
	Uncert:			+/-0.0295						
	TPU:			+/-0.0302						
Cobalt-60			U	0.00191	pCi/g					
	Uncert:			+/-0.0227						
	TPU:			+/-0.0227						
Europium-152			U	-0.0216	pCi/g					

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
	Uncert:			+/-0.0625						
	TPU:			+/-0.0633						
Europium-154			U	0.0337	pCi/g					
	Uncert:			+/-0.0741						
	TPU:			+/-0.0757						
Europium-155			U	0.0202	pCi/g					
	Uncert:			+/-0.0406						
	TPU:			+/-0.0417						
Iridium-192			U	0.0186	pCi/g					
	Uncert:			+/-0.0242						
	TPU:			+/-0.0256						
Iron-59			U	-0.0442	pCi/g					
	Uncert:			+/-0.0765						
	TPU:			+/-0.0792						
Lead-210			U	0.0232	pCi/g					
	Uncert:			+/-0.463						
	TPU:			+/-0.463						
Lead-212			U	-0.00982	pCi/g					
	Uncert:			+/-0.0387						
	TPU:			+/-0.0390						
Lead-214			U	0.00104	pCi/g					
	Uncert:			+/-0.0533						
	TPU:			+/-0.0533						
Manganese-54			U	-0.00542	pCi/g					
	Uncert:			+/-0.0293						
	TPU:			+/-0.0294						
Mercury-203			U	-0.00745	pCi/g					
	Uncert:			+/-0.0209						
	TPU:			+/-0.0212						
Neodymium-147			U	0.305	pCi/g					
	Uncert:			+/-0.615						
	TPU:			+/-0.631						
Neptunium-239			U	-0.116	pCi/g					
	Uncert:			+/-0.125						
	TPU:			+/-0.137						
Niobium-94			U	0.000345	pCi/g					
	Uncert:			+/-0.0169						
	TPU:			+/-0.0169						
Niobium-95			U	-0.0125	pCi/g					
	Uncert:			+/-0.0253						
	TPU:			+/-0.0260						
Potassium-40			U	-0.0670	pCi/g					
	Uncert:			+/-0.430						
	TPU:			+/-0.431						
Promethium-144			U	0.00943	pCi/g					
	Uncert:			+/-0.0239						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767515										
	TPU:			+/-0.0243						
Promethium-146			U	-0.00511	pCi/g					
	Uncert:			+/-0.0288						
	TPU:			+/-0.0289						
Radium-226			U	0.00104	pCi/g					
	Uncert:			+/-0.0533						
	TPU:			+/-0.0533						
Radium-228			U	0.0655	pCi/g					
	Uncert:			+/-0.120						
	TPU:			+/-0.124						
Ruthenium-106			U	-0.0626	pCi/g					
	Uncert:			+/-0.224						
	TPU:			+/-0.226						
Silver-110m			U	-6.13E-05	pCi/g					
	Uncert:			+/-0.0362						
	TPU:			+/-0.0362						
Sodium-22			U	0.0119	pCi/g					
	Uncert:			+/-0.0263						
	TPU:			+/-0.0268						
Thallium-208			U	-0.00570	pCi/g					
	Uncert:			+/-0.0238						
	TPU:			+/-0.0239						
Thorium-234			U	-0.00566	pCi/g					
	Uncert:			+/-0.273						
	TPU:			+/-0.273						
Tin-113			U	0.0171	pCi/g					
	Uncert:			+/-0.0279						
	TPU:			+/-0.0289						
Uranium-235			U	-0.00614	pCi/g					
	Uncert:			+/-0.0970						
	TPU:			+/-0.0971						
Uranium-238			U	-0.00566	pCi/g					
	Uncert:			+/-0.273						
	TPU:			+/-0.273						
Yttrium-88			U	-0.00954	pCi/g					
	Uncert:			+/-0.0187						
	TPU:			+/-0.0192						
Zinc-65			U	0.0265	pCi/g					
	Uncert:			+/-0.0447						
	TPU:			+/-0.0463						
Zirconium-95			U	-0.0168	pCi/g					
	Uncert:			+/-0.0566						
	TPU:			+/-0.0571						
Batch 2767517										
QC1206041225 714507021 DUP										
Actinium-228		0.835		1.03	pCi/g	20.6		(0% - 100%)	MXR1	04/10/2522:03

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	Uncert:	+/-0.326		+/-0.260						
	TPU:	+/-0.337		+/-0.287						
Americium-241	U	0.162	U	0.147	pCi/g	0			N/A	
	Uncert:	+/-0.205		+/-0.152						
	TPU:	+/-0.218		+/-0.167						
Antimony-124	U	-0.0982	U	0.0767	pCi/g	0			N/A	
	Uncert:	+/-0.116		+/-0.0900						
	TPU:	+/-0.124		+/-0.0966						
Antimony-125	U	-0.0954	U	0.00646	pCi/g	0			N/A	
	Uncert:	+/-0.0985		+/-0.0760						
	TPU:	+/-0.108		+/-0.0761						
Barium-133	U	0.0756	U	0.0252	pCi/g	0			N/A	
	Uncert:	+/-0.0475		+/-0.0378						
	TPU:	+/-0.0588		+/-0.0395						
Barium-140	U	0.392	U	-0.0479	pCi/g	0			N/A	
	Uncert:	+/-0.845		+/-0.719						
	TPU:	+/-0.864		+/-0.719						
Beryllium-7		1.21		1.21	pCi/g	.248		(0% - 100%)		
	Uncert:	+/-1.10		+/-0.986						
	TPU:	+/-1.11		+/-0.992						
Bismuth-212		1.61		1.36	pCi/g	16.5		(0% - 100%)		
	Uncert:	+/-0.895		+/-0.886						
	TPU:	+/-0.909		+/-0.896						
Bismuth-214		1.71		1.61	pCi/g	6.51		(0%-20%)		
	Uncert:	+/-0.230		+/-0.209						
	TPU:	+/-0.277		+/-0.254						
Cerium-139	U	-0.00787	U	0.0173	pCi/g	0			N/A	
	Uncert:	+/-0.0372		+/-0.0301						
	TPU:	+/-0.0374		+/-0.0313						
Cerium-141	U	-0.142	U	-0.00238	pCi/g	0			N/A	
	Uncert:	+/-0.104		+/-0.0894						
	TPU:	+/-0.122		+/-0.0894						
Cerium-144	U	-0.193	U	-0.0249	pCi/g	0			N/A	
	Uncert:	+/-0.217		+/-0.186						
	TPU:	+/-0.234		+/-0.186						
Cesium-134	UI	0.000	U	-0.0343	pCi/g	0			N/A	
	Uncert:	+/-0.0649		+/-0.0388						
	TPU:	+/-0.0658		+/-0.0419						
Cesium-136	U	-0.0513	U	-0.00890	pCi/g	0			N/A	
	Uncert:	+/-0.213		+/-0.268						
	TPU:	+/-0.215		+/-0.268						
Cesium-137	U	0.0118		0.115	pCi/g	30		(0% - 100%)		
	Uncert:	+/-0.0454		+/-0.0459						
	TPU:	+/-0.0457		+/-0.0470						
Chromium-51	U	-0.0326	U	-0.158	pCi/g	0			N/A	
	Uncert:	+/-0.604		+/-0.547						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	TPU:	+/-0.604		+/-0.551						
Cobalt-56	U	0.0266	U	-0.00469	pCi/g	0			N/A	
	Uncert:	+/-0.0476		+/-0.0388						
	TPU:	+/-0.0491		+/-0.0389						
Cobalt-57	U	0.0131	U	0.00903	pCi/g	0			N/A	
	Uncert:	+/-0.0293		+/-0.0250						
	TPU:	+/-0.0299		+/-0.0253						
Cobalt-58	U	-0.00797	U	-0.00689	pCi/g	0			N/A	
	Uncert:	+/-0.0429		+/-0.0328						
	TPU:	+/-0.0431		+/-0.0330						
Cobalt-60	U	0.00839	U	0.0379	pCi/g	0			N/A	
	Uncert:	+/-0.0388		+/-0.0378						
	TPU:	+/-0.0390		+/-0.0416						
Europium-152	U	0.118	U	-0.00917	pCi/g	0			N/A	
	Uncert:	+/-0.105		+/-0.0868						
	TPU:	+/-0.118		+/-0.0869						
Europium-154	U	-0.0281	U	-0.0310	pCi/g	0			N/A	
	Uncert:	+/-0.126		+/-0.0958						
	TPU:	+/-0.127		+/-0.0968						
Europium-155	U	-0.0501	U	-0.00724	pCi/g	0			N/A	
	Uncert:	+/-0.117		+/-0.0924						
	TPU:	+/-0.119		+/-0.0925						
Iridium-192	U	0.0131	U	-0.00547	pCi/g	0			N/A	
	Uncert:	+/-0.0462		+/-0.0354						
	TPU:	+/-0.0466		+/-0.0355						
Iron-59	U	0.0939	U	-0.0159	pCi/g	0			N/A	
	Uncert:	+/-0.100		+/-0.0715						
	TPU:	+/-0.109		+/-0.0718						
Lead-210	U	-3.48	U	6.52	pCi/g	0			N/A	
	Uncert:	+/-6.27		+/-8.47						
	TPU:	+/-6.47		+/-8.49						
Lead-212		0.947		1.01	pCi/g	6.76		(0%-20%)		
	Uncert:	+/-0.138		+/-0.137						
	TPU:	+/-0.157		+/-0.159						
Lead-214		1.99		1.92	pCi/g	3.68		(0%-20%)		
	Uncert:	+/-0.250		+/-0.232						
	TPU:	+/-0.296		+/-0.279						
Manganese-54	U	-0.000122	U	0.0219	pCi/g	0			N/A	
	Uncert:	+/-0.0390		+/-0.0335						
	TPU:	+/-0.0390		+/-0.0350						
Mercury-203	U	-0.0325	U	0.0215	pCi/g	0			N/A	
	Uncert:	+/-0.0570		+/-0.0835						
	TPU:	+/-0.0589		+/-0.0837						
Neodymium-147	UI	0.000	U	-1.82	pCi/g	0			N/A	
	Uncert:	+/-3.44		+/-1.82						
	TPU:	+/-3.99		+/-2.00						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
Neptunium-239	U	-0.0879	U	-0.0940	pCi/g	0		N/A		
	Uncert:	+/-0.288		+/-0.249						
	TPU:	+/-0.291		+/-0.253						
Niobium-94	U	0.000274	U	0.0308	pCi/g	0		N/A		
	Uncert:	+/-0.0396		+/-0.0265						
	TPU:	+/-0.0396		+/-0.0301						
Niobium-95	U	0.0657	U	0.0141	pCi/g	0		N/A		
	Uncert:	+/-0.0590		+/-0.0629						
	TPU:	+/-0.0663		+/-0.0632						
Potassium-40		2.77		3.12	pCi/g	12.1		(0%-20%)		
	Uncert:	+/-0.883		+/-0.708						
	TPU:	+/-0.917		+/-0.763						
Promethium-144	U	0.00417	U	0.0122	pCi/g	0		N/A		
	Uncert:	+/-0.0368		+/-0.0283						
	TPU:	+/-0.0368		+/-0.0289						
Promethium-146	U	0.0259	U	-0.00599	pCi/g	0		N/A		
	Uncert:	+/-0.0452		+/-0.0358						
	TPU:	+/-0.0468		+/-0.0359						
Radium-226		1.99		1.92	pCi/g	3.68		(0%-20%)		
	Uncert:	+/-0.250		+/-0.232						
	TPU:	+/-0.296		+/-0.279						
Radium-228		0.835		1.03	pCi/g	20.6		(0% - 100%)		
	Uncert:	+/-0.326		+/-0.260						
	TPU:	+/-0.337		+/-0.287						
Ruthenium-106	U	0.402	U	-0.158	pCi/g	0		N/A		
	Uncert:	+/-0.288		+/-0.282						
	TPU:	+/-0.291		+/-0.291						
Silver-110m	U	-0.0491	U	0.0193	pCi/g	0		N/A		
	Uncert:	+/-0.0561		+/-0.0423						
	TPU:	+/-0.0605		+/-0.0432						
Sodium-22	U	-0.0100	U	-0.0111	pCi/g	0		N/A		
	Uncert:	+/-0.0450		+/-0.0341						
	TPU:	+/-0.0453		+/-0.0345						
Thallium-208		0.212		0.285	pCi/g	29.4		(0% - 100%)		
	Uncert:	+/-0.0977		+/-0.0659						
	TPU:	+/-0.0996		+/-0.0706						
Thorium-234	U	0.819		2.49	pCi/g	20.1		(0% - 100%)		
	Uncert:	+/-3.69		+/-2.44						
	TPU:	+/-3.70		+/-2.50						
Tin-113	U	-0.0118	U	0.00535	pCi/g	0		N/A		
	Uncert:	+/-0.0561		+/-0.0409						
	TPU:	+/-0.0564		+/-0.0410						
Uranium-235	U	0.172	U	0.144	pCi/g	0		N/A		
	Uncert:	+/-0.222		+/-0.332						
	TPU:	+/-0.236		+/-0.332						
Uranium-238	U	0.819		2.49	pCi/g	20.1		(0% - 100%)		

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	Uncert:	+/-3.69		+/-2.44						
	TPU:	+/-3.70		+/-2.50						
Yttrium-88	U	-0.0288	U	0.00120	pCi/g	0		N/A		
	Uncert:	+/-0.0470		+/-0.0325						
	TPU:	+/-0.0489		+/-0.0325						
Zinc-65	U	0.0445	U	-0.0143	pCi/g	0		N/A		
	Uncert:	+/-0.0936		+/-0.0756						
	TPU:	+/-0.0959		+/-0.0759						
Zirconium-95	U	-0.0785	U	-0.0114	pCi/g	0		N/A		
	Uncert:	+/-0.0917		+/-0.0743						
	TPU:	+/-0.0986		+/-0.0745						
QC1206041226 LCS										
Actinium-228			U	1.12	pCi/g				MXR1	04/10/2520:56
	Uncert:			+/-1.67						
	TPU:			+/-1.75						
Americium-241	483			564	pCi/g		117	(75%-125%)		
	Uncert:			+/-12.5						
	TPU:			+/-69.4						
Antimony-124			U	0.0275	pCi/g					
	Uncert:			+/-0.458						
	TPU:			+/-0.459						
Antimony-125			U	-0.876	pCi/g					
	Uncert:			+/-1.27						
	TPU:			+/-1.34						
Barium-133			U	-0.00912	pCi/g					
	Uncert:			+/-0.479						
	TPU:			+/-0.479						
Barium-140			U	2.70	pCi/g					
	Uncert:			+/-4.37						
	TPU:			+/-4.54						
Beryllium-7			U	3.17	pCi/g					
	Uncert:			+/-5.30						
	TPU:			+/-5.50						
Bismuth-212				9.50	pCi/g					
	Uncert:			+/-8.47						
	TPU:			+/-8.52						
Bismuth-214			U	0.315	pCi/g					
	Uncert:			+/-0.744						
	TPU:			+/-0.758						
Cerium-139			U	0.00520	pCi/g					
	Uncert:			+/-0.277						
	TPU:			+/-0.277						
Cerium-141			U	-0.161	pCi/g					
	Uncert:			+/-0.649						
	TPU:			+/-0.653						
Cerium-144			U	1.05	pCi/g					

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	Uncert:			+/-1.83						
	TPU:			+/-1.89						
Cesium-134			U	0.206	pCi/g					
	Uncert:			+/-0.430						
	TPU:			+/-0.440						
Cesium-136				4.27	pCi/g					
	Uncert:			+/-3.89						
	TPU:			+/-4.38						
Cesium-137	147			140	pCi/g		95.1	(75%-125%)		
	Uncert:			+/-2.90						
	TPU:			+/-11.8						
Chromium-51			U	-1.76	pCi/g					
	Uncert:			+/-4.86						
	TPU:			+/-4.93						
Cobalt-56			U	0.360	pCi/g					
	Uncert:			+/-0.461						
	TPU:			+/-0.490						
Cobalt-57			U	-0.184	pCi/g					
	Uncert:			+/-0.237						
	TPU:			+/-0.252						
Cobalt-58			U	-0.175	pCi/g					
	Uncert:			+/-0.396						
	TPU:			+/-0.404						
Cobalt-60	52.7			51.3	pCi/g		97.2	(75%-125%)		
	Uncert:			+/-2.13						
	TPU:			+/-6.33						
Europium-152			U	1.12	pCi/g					
	Uncert:			+/-1.10						
	TPU:			+/-1.22						
Europium-154			U	-0.0536	pCi/g					
	Uncert:			+/-0.686						
	TPU:			+/-0.687						
Europium-155			U	-0.0985	pCi/g					
	Uncert:			+/-0.976						
	TPU:			+/-0.977						
Iridium-192			U	-0.323	pCi/g					
	Uncert:			+/-0.390						
	TPU:			+/-0.417						
Iron-59			U	-0.165	pCi/g					
	Uncert:			+/-1.41						
	TPU:			+/-1.42						
Lead-210				4750	pCi/g					
	Uncert:			+/-301						
	TPU:			+/-604						
Lead-212			U	-0.229	pCi/g					
	Uncert:			+/-0.614						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	TPU:			+/-0.623						
Lead-214			U	0.317	pCi/g					
	Uncert:			+/-0.845						
	TPU:			+/-0.858						
Manganese-54			U	-0.00336	pCi/g					
	Uncert:			+/-0.414						
	TPU:			+/-0.414						
Mercury-203			U	0.156	pCi/g					
	Uncert:			+/-0.423						
	TPU:			+/-0.429						
Neodymium-147			U	-1.88	pCi/g					
	Uncert:			+/-10.6						
	TPU:			+/-10.7						
Neptunium-239			U	-0.0969	pCi/g					
	Uncert:			+/-2.47						
	TPU:			+/-2.47						
Niobium-94			U	0.0938	pCi/g					
	Uncert:			+/-0.298						
	TPU:			+/-0.301						
Niobium-95			U	0.309	pCi/g					
	Uncert:			+/-0.404						
	TPU:			+/-0.429						
Potassium-40			U	-2.94	pCi/g					
	Uncert:			+/-2.24						
	TPU:			+/-2.62						
Promethium-144			U	-0.0728	pCi/g					
	Uncert:			+/-0.317						
	TPU:			+/-0.319						
Promethium-146			U	0.673	pCi/g					
	Uncert:			+/-0.978						
	TPU:			+/-1.03						
Radium-226			U	0.317	pCi/g					
	Uncert:			+/-0.845						
	TPU:			+/-0.858						
Radium-228			U	1.12	pCi/g					
	Uncert:			+/-1.67						
	TPU:			+/-1.75						
Ruthenium-106			U	-1.20	pCi/g					
	Uncert:			+/-3.59						
	TPU:			+/-3.63						
Silver-110m			U	0.251	pCi/g					
	Uncert:			+/-0.592						
	TPU:			+/-0.603						
Sodium-22			U	-0.0328	pCi/g					
	Uncert:			+/-0.241						
	TPU:			+/-0.241						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
Thallium-208			U	-0.166	pCi/g					
	Uncert:			+/-0.374						
	TPU:			+/-0.381						
Thorium-234			U	-4.87	pCi/g					
	Uncert:			+/-14.1						
	TPU:			+/-14.4						
Tin-113			U	0.0973	pCi/g					
	Uncert:			+/-0.587						
	TPU:			+/-0.589						
Uranium-235			U	1.94	pCi/g					
	Uncert:			+/-1.79						
	TPU:			+/-2.00						
Uranium-238			U	-4.87	pCi/g					
	Uncert:			+/-14.1						
	TPU:			+/-14.4						
Yttrium-88			U	0.0222	pCi/g					
	Uncert:			+/-0.191						
	TPU:			+/-0.191						
Zinc-65			U	0.997	pCi/g					
	Uncert:			+/-1.08						
	TPU:			+/-1.17						
Zirconium-95			U	0.436	pCi/g					
	Uncert:			+/-0.766						
	TPU:			+/-0.792						
QC1206041224 MB										
Actinium-228			U	-0.0549	pCi/g				MXR1	04/10/2520:53
	Uncert:			+/-0.0704						
	TPU:			+/-0.0749						
Americium-241			U	0.0311	pCi/g					
	Uncert:			+/-0.0452						
	TPU:			+/-0.0474						
Antimony-124			U	-0.00117	pCi/g					
	Uncert:			+/-0.0752						
	TPU:			+/-0.0752						
Antimony-125			U	0.0379	pCi/g					
	Uncert:			+/-0.0477						
	TPU:			+/-0.0508						
Barium-133			U	-0.000748	pCi/g					
	Uncert:			+/-0.0211						
	TPU:			+/-0.0211						
Barium-140			U	-0.0595	pCi/g					
	Uncert:			+/-0.207						
	TPU:			+/-0.208						
Beryllium-7			U	-0.0888	pCi/g					
	Uncert:			+/-0.194						
	TPU:			+/-0.198						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
Bismuth-212			U	0.0831	pCi/g					
	Uncert:			+/-0.246						
	TPU:			+/-0.249						
Bismuth-214			U	-0.0294	pCi/g					
	Uncert:			+/-0.0435						
	TPU:			+/-0.0456						
Cerium-139			U	0.0176	pCi/g					
	Uncert:			+/-0.0224						
	TPU:			+/-0.0227						
Cerium-141			U	-0.0197	pCi/g					
	Uncert:			+/-0.0327						
	TPU:			+/-0.0339						
Cerium-144			U	0.0468	pCi/g					
	Uncert:			+/-0.0725						
	TPU:			+/-0.0756						
Cesium-134			U	0.0141	pCi/g					
	Uncert:			+/-0.0216						
	TPU:			+/-0.0226						
Cesium-136			U	-0.0103	pCi/g					
	Uncert:			+/-0.0926						
	TPU:			+/-0.0928						
Cesium-137			U	-0.00585	pCi/g					
	Uncert:			+/-0.0203						
	TPU:			+/-0.0205						
Chromium-51			U	-0.0781	pCi/g					
	Uncert:			+/-0.261						
	TPU:			+/-0.263						
Cobalt-56			U	-0.000412	pCi/g					
	Uncert:			+/-0.0285						
	TPU:			+/-0.0285						
Cobalt-57			U	-0.00287	pCi/g					
	Uncert:			+/-0.0105						
	TPU:			+/-0.0105						
Cobalt-58			U	0.0152	pCi/g					
	Uncert:			+/-0.0233						
	TPU:			+/-0.0243						
Cobalt-60			U	-0.00784	pCi/g					
	Uncert:			+/-0.0282						
	TPU:			+/-0.0284						
Europium-152			U	0.0836	pCi/g					
	Uncert:			+/-0.0930						
	TPU:			+/-0.101						
Europium-154			U	0.0197	pCi/g					
	Uncert:			+/-0.0662						
	TPU:			+/-0.0668						
Europium-155			U	0.00406	pCi/g					

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	Uncert:			+/-0.0336						
	TPU:			+/-0.0337						
Iridium-192			U	-0.00620	pCi/g					
	Uncert:			+/-0.0203						
	TPU:			+/-0.0204						
Iron-59			U	-0.00646	pCi/g					
	Uncert:			+/-0.0401						
	TPU:			+/-0.0402						
Lead-210			U	-0.391	pCi/g					
	Uncert:			+/-1.14						
	TPU:			+/-1.15						
Lead-212			U	0.00564	pCi/g					
	Uncert:			+/-0.0283						
	TPU:			+/-0.0285						
Lead-214			U	0.0147	pCi/g					
	Uncert:			+/-0.0412						
	TPU:			+/-0.0417						
Manganese-54			U	0.000495	pCi/g					
	Uncert:			+/-0.0131						
	TPU:			+/-0.0131						
Mercury-203			U	0.000794	pCi/g					
	Uncert:			+/-0.0210						
	TPU:			+/-0.0210						
Neodymium-147			U	-0.188	pCi/g					
	Uncert:			+/-0.418						
	TPU:			+/-0.427						
Neptunium-239			U	0.0185	pCi/g					
	Uncert:			+/-0.0977						
	TPU:			+/-0.0981						
Niobium-94			U	0.0136	pCi/g					
	Uncert:			+/-0.0152						
	TPU:			+/-0.0164						
Niobium-95			U	0.00347	pCi/g					
	Uncert:			+/-0.0254						
	TPU:			+/-0.0255						
Potassium-40			U	-0.0568	pCi/g					
	Uncert:			+/-0.248						
	TPU:			+/-0.249						
Promethium-144			U	-0.000184	pCi/g					
	Uncert:			+/-0.0163						
	TPU:			+/-0.0163						
Promethium-146			U	-0.00336	pCi/g					
	Uncert:			+/-0.0181						
	TPU:			+/-0.0182						
Radium-226			U	0.0147	pCi/g					
	Uncert:			+/-0.0412						

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2767517										
	TPU:			+/-0.0417						
Radium-228			U	-0.0549	pCi/g					
	Uncert:			+/-0.0704						
	TPU:			+/-0.0749						
Ruthenium-106			U	-0.0924	pCi/g					
	Uncert:			+/-0.181						
	TPU:			+/-0.186						
Silver-110m			U	0.0128	pCi/g					
	Uncert:			+/-0.0244						
	TPU:			+/-0.0252						
Sodium-22			U	0.00606	pCi/g					
	Uncert:			+/-0.0231						
	TPU:			+/-0.0233						
Thallium-208			U	0.00452	pCi/g					
	Uncert:			+/-0.0188						
	TPU:			+/-0.0189						
Thorium-234			U	-0.187	pCi/g					
	Uncert:			+/-0.469						
	TPU:			+/-0.478						
Tin-113			U	0.00416	pCi/g					
	Uncert:			+/-0.0218						
	TPU:			+/-0.0219						
Uranium-235			U	0.0489	pCi/g					
	Uncert:			+/-0.0855						
	TPU:			+/-0.0884						
Uranium-238			U	-0.187	pCi/g					
	Uncert:			+/-0.469						
	TPU:			+/-0.478						
Yttrium-88			U	0.00618	pCi/g					
	Uncert:			+/-0.0312						
	TPU:			+/-0.0313						
Zinc-65			U	0.0135	pCi/g					
	Uncert:			+/-0.0515						
	TPU:			+/-0.0519						
Zirconium-95			U	-0.000955	pCi/g					
	Uncert:			+/-0.0310						
	TPU:			+/-0.0310						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- U Analyte was analyzed for, but not detected above the Lc.
- J Value is estimated
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- H Analytical holding time was exceeded

QC Summary

Workorder: **714507**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time

<	Result is less than value reported
>	Result is greater than value reported
UI	Gamma Spectroscopy--Uncertain identification
BD	Results are either below the MDC or tracer recovery is low
h	Preparation or preservation holding time was exceeded
R	Sample results are rejected
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
N/A	RPD or %Recovery limits do not apply.
ND	Analyte concentration is not detected above the detection limit
M	M if above MDC and less than LLD
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
FA	Failed analysis.
M	REMP Result > MDC/CL and < RDL
UJ	Gamma Spectroscopy--Uncertain identification
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
N1	See case narrative
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
**	Analyte is a Tracer compound
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Gamma Spectroscopy Raw Data

Batch 2767515 Check-list

This check-list was completed on 11-APR-25 by Spencer Collins

This batch was reviewed by Michael Hilton on 11-APR-25 and Spencer Collins on 11-APR-25.

Batch ID: 2767515 **Product:** GSCGAMMS **Description:** Gamma Spec Solid RAD A-013

#	Criteria	Yes	No	Comments
Preparation Information				
1	Did any sample(s) require dilution?		No	
2	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
3	Was the preservation correct for this analysis?	Yes		
Internal Checklist Information				
4	Are instrument source checks within limits?	Yes		
5	Have sample historical results been reviewed for this batch?	Yes		
Technical Information				
6	Were any additional radionuclides added that were not requested by the client?		No	
7	Were all the samples prepared/analyzed within the required holding time period?	Yes		
Quality Control (QC) Information				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?		No	
11	Has the method required detection limit been met?	Yes		
Miscellaneous Information				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

Prep Logbook

Gamma Spectroscopy

Batch ID: **2767515**
Analyst: Maggie Stamps (MXR1)
Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Lab SOP: GL-RAD-A-013 REV# 29
Instrument: No instrument-manual method

Due Dates for Lab: 12-APR-2025 **Hold: 18-MAR-2025** **Package: 13-APR-2025** **SDG: 14-AP**

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1206041223	84680-278	1556	1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Adjusted Aliquot (g)
1	714507001	19-MAR-2025	.1	Dry to Dry	127.47	127.47	127.47
2	714507002	19-MAR-2025	.1	Dry to Dry	129.11	129.11	129.11
3	714507003	19-MAR-2025	.1	Dry to Dry	117.8	117.8	117.8
4	714507004	19-MAR-2025	.1	Dry to Dry	146.86	146.86	146.86
5	714507005	19-MAR-2025	.1	Dry to Dry	97.53	97.53	97.53
6	714507006	19-MAR-2025	.1	Dry to Dry	111.21	111.21	111.21
7	714507007	19-MAR-2025	.1	Dry to Dry	146.08	146.08	146.08
8	714507008	19-MAR-2025	.1	Dry to Dry	112.61	112.61	112.61
9	714507009	19-MAR-2025	.1	Dry to Dry	124.78	124.78	124.78
10	714507010	19-MAR-2025	.1	Dry to Dry	142.05	142.05	142.05
11	714507011	19-MAR-2025	.1	Dry to Dry	97.49	97.49	97.49
12	714507012	19-MAR-2025	.1	Dry to Dry	151.88	151.88	151.88
13	714507013	19-MAR-2025	.1	Dry to Dry	162.48	162.48	162.48
14	714507014	19-MAR-2025	.1	Dry to Dry	130.38	130.38	130.38
15	714507015	19-MAR-2025	.1	Dry to Dry	120.01	120.01	120.01
16	714507016	19-MAR-2025	.1	Dry to Dry	139.6	139.6	139.6
17	714507017	19-MAR-2025	.1	Dry to Dry	118.53	118.53	118.53
18	714507018	19-MAR-2025	.1	Dry to Dry	96.86	96.86	96.86
19	714507019	19-MAR-2025	.1	Dry to Dry	138.13	138.13	138.13
20	714507020	19-MAR-2025	.1	Dry to Dry	144.84	144.84	144.84
21	1206041221 MB	19-MAR-2025	.1	Dry to Wet	162.48	162.48	162.48
22	1206041222 DUP (714507001)	19-MAR-2025	.1	Dry to Dry	127.47	127.47	127.47
23	1206041223 LCS	19-MAR-2025	.1	Dry to Wet	115	115	115

Reagent/Solvent Lot ID	Description	Amount

Comments:

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 15:22:08.08

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507001.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;812
                                       Background date  : 6-APR-2025 11:02:03.
Sample date      : 7-MAR-2025 08:00:00. Acquisition date : 10-APR-2025 14:21:39
Sample ID        : G714507001           Sample quantity  : 1.27470E+02 GRAM
Detector name    : GAM29                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.36  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.56*	27	153	0.72	127.52	123	9	7.49E-03	88.4	
2	3	72.64	40	21	1.07	145.67	144	22	1.11E-02	16.8	1.31E+00
3	3	74.66*	125	92	1.38	149.72	144	22	3.46E-02	17.3	
4	3	77.03	175	88	1.08	154.45	144	22	4.86E-02	12.0	
5	0	86.83	41	124	1.00	174.05	172	7	1.13E-02	48.0	
6	1	89.92	43	78	1.17	180.21	178	14	1.20E-02	33.8	1.29E+00
7	1	92.85*	24	103	1.17	186.08	178	14	6.70E-03	84.7	
8	0	128.63	42	83	2.28	257.59	254	8	1.16E-02	40.5	
9	0	185.66*	69	79	1.19	371.61	367	10	1.91E-02	28.8	
10	0	209.18	41	80	0.79	418.61	414	10	1.14E-02	43.7	
11	0	226.10	13	73	1.23	452.43	446	8	3.70E-03	114.9	
12	4	238.55*	253	49	1.36	477.34	471	19	7.03E-02	8.1	1.94E+00
13	4	241.44	85	71	1.82	483.11	471	19	2.36E-02	25.2	
14	5	295.08	116	30	1.20	590.34	587	20	3.23E-02	12.4	8.67E-01
15	5	300.22	43	62	2.11	600.60	587	20	1.19E-02	41.0	
16	0	328.67	26	68	3.69	657.48	650	11	7.18E-03	65.1	
17	0	339.80	30	77	1.77	679.73	671	11	8.42E-03	58.9	
18	0	351.60	213	84	1.13	703.32	696	14	5.93E-02	11.4	
19	0	445.02	9	34	1.37	890.08	886	8	2.61E-03	112.3	
20	0	467.20	40	67	6.35	934.42	921	26	1.12E-02	61.4	
21	0	474.90*	11	20	1.63	949.82	946	9	2.96E-03	81.1	
22	1	507.65	20	3	1.62	1015.30	1013	20	5.53E-03	27.5	1.83E+00
23	0	534.94	10	20	0.73	1069.85	1066	8	2.78E-03	83.7	
24	0	569.50*	12	31	0.87	1138.95	1134	12	3.40E-03	100.2	
25	1	580.15	13	8	1.37	1160.24	1158	13	3.64E-03	37.4	9.23E+00
26	1	582.88*	83	20	1.68	1165.69	1158	13	2.29E-02	15.8	
27	0	609.03*	151	33	1.44	1217.97	1211	15	4.18E-02	11.9	
28	0	658.87	8	11	1.49	1317.61	1310	9	2.14E-03	86.3	
29	0	661.38	42	14	1.22	1322.63	1319	9	1.16E-02	22.3	
30	0	727.70	46	0	1.32	1455.24	1449	14	1.28E-02	14.7	
31	0	767.94	6	14	0.72	1535.69	1530	8	1.74E-03	110.4	
32	0	822.34	9	5	1.36	1644.45	1641	9	2.56E-03	53.3	
33	0	828.76	7	9	0.89	1657.29	1650	9	1.94E-03	86.0	
34	0	860.40	22	6	0.97	1720.54	1715	12	6.02E-03	31.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	910.22*	49	23	1.69	1820.17	1811	15	1.36E-02	26.5	
36	0	963.40*	16	9	1.14	1926.50	1920	12	4.37E-03	47.7	
37	0	968.26	30	14	1.12	1936.22	1932	9	8.19E-03	29.0	
38	0	982.26	7	4	0.65	1964.21	1960	8	1.94E-03	62.3	
39	0	986.08	13	5	1.43	1971.85	1968	10	3.61E-03	42.5	
40	0	991.17	7	5	0.82	1982.01	1978	6	1.81E-03	64.8	
41	0	1062.85*	9	8	2.63	2125.34	2119	11	2.48E-03	83.7	
42	0	1120.78	22	34	2.28	2241.19	2232	14	6.22E-03	59.7	
43	0	1158.67	11	8	2.26	2316.95	2313	7	3.04E-03	55.8	
44	0	1227.57	15	2	3.11	2454.73	2450	10	4.13E-03	32.5	
45	0	1238.98*	14	22	2.26	2477.53	2469	11	3.80E-03	72.7	
46	0	1405.23	9	0	0.67	2810.00	2804	11	2.50E-03	33.3	
47	0	1459.83*	311	13	1.94	2919.18	2913	14	8.65E-02	6.3	
48	0	1763.17*	28	0	1.81	3525.84	3521	10	7.82E-03	19.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 15:22:09

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507001.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 08:00:00	Acquisition date	: 10-APR-2025 14:21:39
Sample ID	: G714507001	Sample quantity	: 127.47 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA29	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.36 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	296	10.66*	1.291E+00	1.268E+01	1.268E+01	12.52
CD-109	88.03	46	3.70*	6.237E+00	1.173E+00	1.235E+00	96.08
AG-110	657.50	8	4.50*	2.606E+00	3.880E-01	4.268E-01	172.67
SN-126	64.28	31	9.60	3.500E+00	5.447E-01	5.447E-01	176.77
	86.94	46	8.90	6.237E+00	4.875E-01	4.875E-01	96.08
	87.57	46	37.00*	6.237E+00	1.173E-01	1.173E-01	96.08
BA-137M	661.66	42	89.90*	2.598E+00	1.054E-01	1.057E-01	44.54
CS-137	661.66	42	85.10*	2.598E+00	1.114E-01	1.116E-01	44.54
BI-207	72.81	46	21.40	4.794E+00	2.635E-01	2.641E-01	33.54
	74.97	143	35.70	5.047E+00	4.660E-01	4.669E-01	34.70
	569.70	12	97.76	2.935E+00	2.539E-02	2.544E-02	200.41
	1063.66	9	74.60*	1.705E+00	4.016E-02	4.024E-02	167.35
	1770.23	------	6.87	1.127E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.970E+00	------ Line Not Found		------
	583.19	83	85.00*	2.881E+00	2.005E-01	2.005E-01	31.55
	860.56	21	12.50	2.068E+00	4.866E-01	4.866E-01	62.57
BI-211	72.87	46	1.23	4.794E+00	4.585E+00	4.585E+00	33.54
	351.06	223	12.92*	4.213E+00	2.409E+00	2.409E+00	22.78
BI-212	727.33	46	6.67*	2.396E+00	1.688E+00	1.688E+00	29.49
	1620.50	------	1.47	1.193E+00	------ Line Not Found		------
PB-212	74.82	143	10.28	5.047E+00	1.618E+00	1.618E+00	34.70
	77.11	200	17.10	5.322E+00	1.293E+00	1.293E+00	24.07
	238.63	270	43.60*	5.496E+00	6.640E-01	6.640E-01	16.24
	300.09	45	3.30	4.707E+00	1.705E+00	1.705E+00	81.94
BI-214	609.32	152	45.49*	2.781E+00	7.061E-01	7.061E-01	23.70
	1120.29	22	14.92	1.625E+00	5.267E-01	5.267E-01	119.33
	1764.49	26	15.30	1.130E+00	9.000E-01	9.001E-01	39.89
PB-214	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
RN-222	609.32	152	45.49*	2.781E+00	7.061E-01	7.061E-01	23.70
	1120.29	22	14.92	1.625E+00	5.267E-01	5.267E-01	119.33
	1764.49	26	15.30	1.130E+00	9.000E-01	9.001E-01	39.89
RA-224	240.99	91	4.10*	5.453E+00	2.389E+00	2.389E+00	50.31
RA-226	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
AC-228	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	32	11.27	4.316E+00	3.837E-01	3.837E-01	117.74
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	48	25.80*	1.965E+00	5.588E-01	5.588E-01	52.95
	968.97	29	15.80	1.857E+00	5.786E-01	5.786E-01	58.07
RA-228	105.21	------	1.10	7.119E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	32	11.27	4.316E+00	3.837E-01	3.837E-01	117.74
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	48	25.80*	1.965E+00	5.588E-01	5.588E-01	52.95
	968.97	29	15.80	1.857E+00	5.786E-01	5.786E-01	58.07
TH-228	74.82	143	10.28	5.047E+00	1.618E+00	1.618E+00	34.70
	77.11	200	17.10	5.322E+00	1.293E+00	1.293E+00	24.07
	238.63	270	43.60*	5.496E+00	6.640E-01	6.640E-01	16.24
	300.09	45	3.30	4.707E+00	1.705E+00	1.705E+00	81.94
TH-229	85.43	46	14.70	6.237E+00	2.951E-01	2.951E-01	96.08
	88.47	49	24.00	6.453E+00	1.857E-01	1.857E-01	67.70
	193.51	------	4.41*	6.247E+00	------ Line Not Found		------
	210.85	------	2.80	5.941E+00	------ Line Not Found		------
TH-230	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
PA-231	283.69	------	1.70	4.895E+00	------ Line Not Found		------
	301.36	45	5.35*	4.707E+00	1.052E+00	1.052E+00	81.94
TH-232	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	32	11.27	4.316E+00	3.837E-01	3.837E-01	117.74
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	48	25.80*	1.965E+00	5.588E-01	5.588E-01	52.95
	968.97	29	15.80	1.857E+00	5.786E-01	5.786E-01	58.07
PA-234M	63.29	31	3.70*	3.500E+00	1.413E+00	1.413E+00	176.77
	92.59	27	4.23	6.631E+00	5.720E-01	5.720E-01	169.32
TH-234	63.29	31	3.70*	3.500E+00	1.413E+00	1.413E+00	176.77
	92.59	27	4.23	6.631E+00	5.720E-01	5.720E-01	169.32
U-234	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
U-235	89.96	49	3.47	6.453E+00	1.285E+00	1.285E+00	67.70
	93.35	27	5.60	6.631E+00	4.321E-01	4.321E-01	169.32
	143.76	------	10.96*	7.129E+00	------ Line Not Found		------
	163.33	------	5.08	6.806E+00	------ Line Not Found		------
	185.72	75	57.20	6.392E+00	1.204E-01	1.204E-01	57.70
	205.31	------	5.01	6.036E+00	------ Line Not Found		------
U-238	63.29	31	3.70*	3.500E+00	1.413E+00	1.413E+00	176.77
	92.59	27	4.23	6.631E+00	5.720E-01	5.720E-01	169.32
AM-243	43.53	------	5.90	6.496E-01	------ Line Not Found		------
	74.66	143	67.20*	5.047E+00	2.476E-01	2.476E-01	34.70

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 15:22:10.44

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507001.CNF;1    *
* Acquisition date : 10-APR-2025 14:21:39 Sensitivity     : 3.000            *
* Detector ID      : GAM29                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****            *
* Sample date      :  7-MAR-2025 08:00:00 Analyst initials: MXR1             *
* Sample ID        : G714507001           Sample Quantity : 1.2747E+02 GRAM  *
* Batch Number     : 2767515              Wet Weight      :    0.00000       *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000       *
* Nuclide Library  : SOLID.NLB;18                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 29-JUL-2024 09:02:37 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;19             *
**********************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.268E+01	1.555E+00	7.098E-01
CD-109	1.235E+00	1.162E+00	1.064E+00
AG-110	4.268E-01	7.221E-01	1.181E+00
SN-126	1.173E-01	1.104E-01	1.200E-01
BA-137M	1.057E-01	4.612E-02	5.177E-02
CS-137	1.116E-01	4.872E-02	5.469E-02
BI-207	4.024E-02	6.599E-02	8.620E-02
TL-208	2.005E-01	6.199E-02	5.095E-02
BI-211	2.409E+00	5.377E-01	3.018E-01
BI-212	1.688E+00	4.878E-01	7.972E-01
PB-212	6.640E-01	1.057E-01	7.719E-02
BI-214	7.061E-01	1.640E-01	1.099E-01
PB-214	8.742E-01	1.951E-01	1.097E-01
RN-222	7.061E-01	1.640E-01	1.099E-01
RA-224	2.389E+00	1.178E+00	8.268E-01
RA-226	8.742E-01	1.951E-01	1.097E-01
AC-228	5.588E-01	2.900E-01	2.686E-01
RA-228	5.588E-01	2.900E-01	2.686E-01
TH-228	6.640E-01	1.057E-01	7.719E-02
TH-229	-3.029E-01	4.238E-01	6.974E-01
TH-230	8.742E-01	1.951E-01	1.097E-01
PA-231	1.052E+00	8.445E-01	7.172E-01
TH-232	5.588E-01	2.900E-01	2.686E-01
PA-234M	1.413E+00	2.448E+00	2.123E+00
TH-234	1.413E+00	2.448E+00	2.123E+00
U-234	8.742E-01	1.951E-01	1.097E-01
U-235	-2.218E-02	1.725E-01	3.094E-01
U-238	1.413E+00	2.448E+00	2.123E+00
AM-243	2.476E-01	8.418E-02	7.412E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-1.480E-01	3.810E-01	6.135E-01	NOT IDENT.

NA-22	4.904E-03	2.864E-02	6.229E-02	NOT IDENT.
NA-24	0.000E+00	1.157E+15	0.000E+00	SHORT HLIF
AL-26	-2.793E-03	1.333E-02	3.219E-02	NOT IDENT.
SC-46	-2.653E-02	3.809E-02	6.230E-02	FAIL ABUN
V-48	9.727E-02	1.187E-01	2.605E-01	FAIL ABUN
CR-51	1.652E-01	4.936E-01	9.898E-01	NOT IDENT.
MN-52	-4.107E-01	2.173E+00	4.324E+00	NOT IDENT.
MN-54	1.127E-02	3.205E-02	6.446E-02	NOT IDENT.
CO-56	1.258E-02	3.143E-02	6.721E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.231E-04	2.158E-02	3.944E-02	NOT IDENT.
CO-58	-1.761E-02	4.268E-02	7.497E-02	NOT IDENT.
FE-59	-7.144E-02	1.080E-01	1.928E-01	NOT IDENT.
CO-60	1.184E-03	3.080E-02	6.439E-02	NOT IDENT.
ZN-65	1.263E-02	8.968E-02	1.623E-01	NOT IDENT.
GE-68	-1.535E-01	1.065E+00	2.111E+00	NOT IDENT.
AS-73	5.617E-01	9.330E-01	1.841E+00	NOT IDENT.
AS-74	-3.885E-02	1.635E-01	3.024E-01	NOT IDENT.
SE-75	-1.136E-02	4.296E-02	8.161E-02	NOT IDENT.
BR-77	0.000E+00	4.391E+03	0.000E+00	SHORT HLIF
SR-82	-6.570E-02	4.005E-01	7.572E-01	NOT IDENT.
RB-83	-3.922E-02	7.120E-02	1.265E-01	NOT IDENT.
RB-84	2.148E-02	9.227E-02	1.818E-01	NOT IDENT.
KR-85	4.727E+00	6.192E+00	1.278E+01	NOT IDENT.
SR-85	3.061E-02	4.013E-02	8.285E-02	NOT IDENT.
RB-86	-8.904E-02	1.321E+00	2.649E+00	NOT IDENT.
Y-88	-1.891E-02	3.752E-02	6.725E-02	NOT IDENT.
Y-91	-3.423E+01	2.458E+01	3.718E+01	NOT IDENT.
NB-94	-7.296E-04	2.774E-02	5.260E-02	NOT IDENT.
NB-95	-8.753E-03	5.371E-02	8.653E-02	NOT IDENT.
NB-95M	6.128E-02	1.124E-01	2.007E-01	NOT IDENT.
ZR-95	-2.001E-02	7.944E-02	1.442E-01	NOT IDENT.
NB-97	0.000E+00	1.692E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.719E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.308E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	2.923E+39	0.000E+00	SHORT HLIF
RH-101	0.000E+00	4.474E-02	4.744E-02	FAIL ABUN
RH-102	-2.858E-02	4.743E-02	8.222E-02	FAIL ABUN
RU-103	-8.121E-03	4.525E-02	8.544E-02	FAIL ABUN
RH-106	-4.080E-03	2.706E-01	5.183E-01	NOT IDENT.
RU-106	-4.080E-03	2.706E-01	5.183E-01	NOT IDENT.
AG-108M	7.047E-03	2.497E-02	4.977E-02	NOT IDENT.
AG-110M	2.204E-03	4.520E-02	8.675E-02	FAIL ABUN
SN-113	-2.154E-03	3.932E-02	7.599E-02	NOT IDENT.
CD-115	0.000E+00	3.224E+03	0.000E+00	SHORT HLIF
SN-117M	2.301E-02	1.337E-01	2.427E-01	NOT IDENT.
SB-122	0.000E+00	2.153E+02	0.000E+00	SHORT HLIF
TE-123M	1.570E-02	2.757E-02	5.205E-02	NOT IDENT.
SB-124	-1.616E-03	7.739E-02	1.702E-01	NOT IDENT.
SB-125	3.189E-02	7.378E-02	1.505E-01	NOT IDENT.
TE-125M	-5.604E+00	1.003E+01	1.745E+01	NOT IDENT.
I-126	-1.843E-01	5.164E-01	8.171E-01	NOT IDENT.
SB-126	1.670E-01	3.569E-01	7.271E-01	NOT IDENT.
SB-127	1.241E+00	2.676E+01	5.355E+01	NOT IDENT.
I-131	4.856E-01	4.906E-01	1.051E+00	NOT IDENT.
I-132	0.000E+00	1.264E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.189E+01	0.000E+00	SHORT HLIF
BA-133	5.945E-03	3.664E-02	6.565E-02	NOT IDENT.
I-133	0.000E+00	1.930E+10	0.000E+00	SHORT HLIF
CS-134	1.211E-02	3.791E-02	7.484E-02	FAIL ABUN
I-135	0.000E+00	5.209E+36	0.000E+00	SHORT HLIF
CS-136	-3.929E-02	2.486E-01	4.889E-01	FAIL ABUN
LA-138	-5.077E-02	5.049E-02	7.778E-02	NOT IDENT.
CE-139	6.360E-03	2.585E-02	4.782E-02	NOT IDENT.
BA-140	-7.578E-01	7.183E-01	9.676E-01	NOT IDENT.
LA-140	1.981E-01	1.585E-01	4.648E-01	FAIL ABUN
CE-141	5.053E-02	7.482E-02	1.441E-01	NOT IDENT.
CE-143	0.000E+00	1.652E+06	0.000E+00	SHORT HLIF
CE-144	-1.618E-02	1.795E-01	3.223E-01	NOT IDENT.
PM-144	-2.386E-02	3.199E-02	5.344E-02	NOT IDENT.
PR-144	-1.819E+00	2.416E+00	4.030E+00	NOT IDENT.
PM-146	-1.104E-02	3.207E-02	5.963E-02	NOT IDENT.
ND-147	7.562E-01	1.400E+00	2.764E+00	FAIL ABUN
PM-147	-2.661E+02	6.153E+02	1.078E+03	NOT IDENT.
PM-149	0.000E+00	2.759E+04	0.000E+00	SHORT HLIF
EU-150	4.796E-03	2.634E-02	4.670E-02	FAIL ABUN
EU-152	4.490E-02	7.309E-02	1.524E-01	FAIL ABUN
GD-153	-3.014E-02	8.230E-02	1.345E-01	NOT IDENT.

EU-154	1.845E-02	8.166E-02	1.789E-01	NOT IDENT.
EU-155	-3.530E-02	9.309E-02	1.648E-01	FAIL ABUN
TB-160	-2.320E-02	1.247E-01	2.315E-01	FAIL ABUN
HO-166M	-4.053E-03	4.621E-02	8.786E-02	FAIL ABUN
TM-171	-1.164E+00	1.783E+01	3.344E+01	NOT IDENT.
HF-172	3.136E-02	1.676E-01	2.884E-01	FAIL ABUN
LU-172	-1.573E-02	5.075E-02	9.784E-02	FAIL ABUN
LU-176	1.042E-02	2.067E-02	4.240E-02	NOT IDENT.
HF-181	-2.514E-02	4.630E-02	8.118E-02	NOT IDENT.
TA-182	8.847E-02	2.099E-01	4.203E-01	FAIL ABUN
RE-183	1.276E-01	2.165E-01	4.248E-01	NOT IDENT.
RE-184	-5.021E-02	1.623E-01	2.533E-01	NOT IDENT.
W-188	4.936E+00	7.070E+00	1.419E+01	FAIL ABUN
IR-192	4.590E-03	3.388E-02	6.681E-02	FAIL ABUN
HG-203	-1.550E-02	4.090E-02	7.691E-02	FAIL ABUN
TL-204	-7.328E-01	4.105E+00	6.962E+00	NOT IDENT.
BI-210	7.746E-01	3.138E+00	6.079E+00	NOT IDENT.
PB-210	7.746E-01	3.138E+00	6.079E+00	NOT IDENT.
PB-211	-1.876E-01	6.045E-01	1.125E+00	NOT IDENT.
BI-213	2.710E-02	9.889E-02	1.781E-01	NOT IDENT.
RN-219	3.882E-01	3.259E-01	7.125E-01	NOT IDENT.
RA-223	-2.128E-01	5.927E-01	9.840E-01	NOT IDENT.
AC-225	3.703E-01	1.897E+00	3.440E+00	NOT IDENT.
AC-227	-1.634E-01	1.812E-01	3.250E-01	FAIL ABUN
TH-227	-1.634E-01	1.812E-01	3.250E-01	FAIL ABUN
TH-231	-2.128E-01	5.927E-01	9.840E-01	NOT IDENT.
PA-233	3.092E-02	5.023E-02	1.042E-01	FAIL ABUN
PA-234	4.399E-02	2.495E-01	4.923E-01	FAIL ABUN
NP-237	3.092E-02	5.023E-02	1.042E-01	FAIL ABUN
NP-238	0.000E+00	9.176E+03	0.000E+00	SHORT HLIF
NP-239	1.348E-02	2.325E-01	4.257E-01	NOT IDENT.
PU-239	0.000E+00	4.728E+02	5.833E+02	FAIL ABUN
AM-241	-6.554E-02	1.580E-01	2.630E-01	NOT IDENT.
CM-243	1.369E-02	9.224E-02	1.711E-01	NOT IDENT.
BK-247	4.099E-03	6.906E-02	1.349E-01	NOT IDENT.
CM-247	2.171E-02	3.165E-02	6.541E-02	NOT IDENT.
CF-249	1.644E-02	3.150E-02	6.482E-02	NOT IDENT.
CF-251	-3.944E-02	1.205E-01	2.078E-01	FAIL ABUN
ANH-511	-1.978E-02	4.397E-02	9.590E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 15:22:08.90

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	296	10.66*	1.291E+00	1.268E+01	1.268E+01	12.52
CD-109	88.03	46	3.70*	6.237E+00	1.173E+00	1.235E+00	96.08
AG-110	657.50	8	4.50*	2.606E+00	3.880E-01	4.268E-01	172.67
SN-126	64.28	31	9.60	3.500E+00	5.447E-01	5.447E-01	176.77
	86.94	46	8.90	6.237E+00	4.875E-01	4.875E-01	96.08
	87.57	46	37.00*	6.237E+00	1.173E-01	1.173E-01	96.08
BA-137M	661.66	42	89.90*	2.598E+00	1.054E-01	1.057E-01	44.54
CS-137	661.66	42	85.10*	2.598E+00	1.114E-01	1.116E-01	44.54
BI-207	72.81	46	21.40	4.794E+00	2.635E-01	2.641E-01	33.54
	74.97	143	35.70	5.047E+00	4.660E-01	4.669E-01	34.70
	569.70	12	97.76	2.935E+00	2.539E-02	2.544E-02	200.41
	1063.66	9	74.60*	1.705E+00	4.016E-02	4.024E-02	167.35
	1770.23	------	6.87	1.127E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.970E+00	------ Line Not Found		------
	583.19	83	85.00*	2.881E+00	2.005E-01	2.005E-01	31.55
	860.56	21	12.50	2.068E+00	4.866E-01	4.866E-01	62.57
BI-211	72.87	46	1.23	4.794E+00	4.585E+00	4.585E+00	33.54
	351.06	223	12.92*	4.213E+00	2.409E+00	2.409E+00	22.78
BI-212	727.33	46	6.67*	2.396E+00	1.688E+00	1.688E+00	29.49
	1620.50	------	1.47	1.193E+00	------ Line Not Found		------
PB-212	74.82	143	10.28	5.047E+00	1.618E+00	1.618E+00	34.70
	77.11	200	17.10	5.322E+00	1.293E+00	1.293E+00	24.07
	238.63	270	43.60*	5.496E+00	6.640E-01	6.640E-01	16.24
	300.09	45	3.30	4.707E+00	1.705E+00	1.705E+00	81.94
BI-214	609.32	152	45.49*	2.781E+00	7.061E-01	7.061E-01	23.70
	1120.29	22	14.92	1.625E+00	5.267E-01	5.267E-01	119.33
	1764.49	26	15.30	1.130E+00	9.000E-01	9.001E-01	39.89
PB-214	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
RN-222	609.32	152	45.49*	2.781E+00	7.061E-01	7.061E-01	23.70
	1120.29	22	14.92	1.625E+00	5.267E-01	5.267E-01	119.33
	1764.49	26	15.30	1.130E+00	9.000E-01	9.001E-01	39.89
RA-224	240.99	91	4.10*	5.453E+00	2.389E+00	2.389E+00	50.31
RA-226	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
AC-228	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	32	11.27	4.316E+00	3.837E-01	3.837E-01	117.74
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	48	25.80*	1.965E+00	5.588E-01	5.588E-01	52.95

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	29	15.80	1.857E+00	5.786E-01	5.786E-01	58.07
RA-228	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	32	11.27	4.316E+00	3.837E-01	3.837E-01	117.74
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	48	25.80*	1.965E+00	5.588E-01	5.588E-01	52.95
	968.97	29	15.80	1.857E+00	5.786E-01	5.786E-01	58.07
TH-228	74.82	143	10.28	5.047E+00	1.618E+00	1.618E+00	34.70
	77.11	200	17.10	5.322E+00	1.293E+00	1.293E+00	24.07
	238.63	270	43.60*	5.496E+00	6.640E-01	6.640E-01	16.24
	300.09	45	3.30	4.707E+00	1.705E+00	1.705E+00	81.94
TH-229	85.43	46	14.70	6.237E+00	2.951E-01	2.951E-01	96.08
	88.47	49	24.00	6.453E+00	1.857E-01	1.857E-01	67.70
	193.51	------	4.41*	6.247E+00	------ Line Not Found		------
	210.85	------	2.80	5.941E+00	------ Line Not Found		------
TH-230	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
PA-231	283.69	------	1.70	4.895E+00	------ Line Not Found		------
	301.36	45	5.35*	4.707E+00	1.052E+00	1.052E+00	81.94
TH-232	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	32	11.27	4.316E+00	3.837E-01	3.837E-01	117.74
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	48	25.80*	1.965E+00	5.588E-01	5.588E-01	52.95
	968.97	29	15.80	1.857E+00	5.786E-01	5.786E-01	58.07
PA-234M	63.29	31	3.70*	3.500E+00	1.413E+00	1.413E+00	176.77
	92.59	27	4.23	6.631E+00	5.720E-01	5.720E-01	169.32
TH-234	63.29	31	3.70*	3.500E+00	1.413E+00	1.413E+00	176.77
	92.59	27	4.23	6.631E+00	5.720E-01	5.720E-01	169.32
U-234	74.82	143	5.80	5.047E+00	2.868E+00	2.868E+00	34.70
	77.11	200	9.70	5.322E+00	2.279E+00	2.279E+00	24.07
	87.09	46	3.41	6.237E+00	1.272E+00	1.272E+00	96.08
	242.00	91	7.25	5.453E+00	1.351E+00	1.351E+00	50.31
	295.22	123	18.42	4.764E+00	8.223E-01	8.223E-01	24.88
	351.93	223	35.60*	4.213E+00	8.742E-01	8.742E-01	22.78
U-235	89.96	49	3.47	6.453E+00	1.285E+00	1.285E+00	67.70
	93.35	27	5.60	6.631E+00	4.321E-01	4.321E-01	169.32
	143.76	------	10.96*	7.129E+00	------ Line Not Found		------
	163.33	------	5.08	6.806E+00	------ Line Not Found		------
	185.72	75	57.20	6.392E+00	1.204E-01	1.204E-01	57.70
	205.31	------	5.01	6.036E+00	------ Line Not Found		------
U-238	63.29	31	3.70*	3.500E+00	1.413E+00	1.413E+00	176.77
	92.59	27	4.23	6.631E+00	5.720E-01	5.720E-01	169.32
AM-243	43.53	------	5.90	6.496E-01	------ Line Not Found		------
	74.66	143	67.20*	5.047E+00	2.476E-01	2.476E-01	34.70

Flag: "*" = Keyline

Sample ID : G714507001 Acquisition date : 10-APR-2025 14:21:39

Total number of lines in spectrum 48
Number of unidentified lines 11
Number of lines tentatively identified by NID 37 77.08%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.268E+01	1.268E+01	0.159E+01	12.52	
CD-109	461.40D	1.05	1.173E+00	1.235E+00	1.186E+00	96.08	
AG-110	249.76D	1.10	3.880E-01	4.268E-01	7.369E-01	172.67	
SN-126	2.30E+05Y	1.00	1.173E-01	1.173E-01	1.127E-01	96.08	
BA-137M	30.08Y	1.00	1.054E-01	1.057E-01	0.471E-01	44.54	
CS-137	30.08Y	1.00	1.114E-01	1.116E-01	0.497E-01	44.54	
BI-207	32.90Y	1.00	4.016E-02	4.024E-02	6.733E-02	167.35	
TL-208	1.41E+10Y	1.00	2.005E-01	2.005E-01	0.633E-01	31.55	
BI-211	7.04E+08Y	1.00	2.409E+00	2.409E+00	0.549E+00	22.78	
BI-212	1.41E+10Y	1.00	1.688E+00	1.688E+00	0.498E+00	29.49	
PB-212	1.41E+10Y	1.00	6.640E-01	6.640E-01	1.078E-01	16.24	
BI-214	1600.00Y	1.00	7.061E-01	7.061E-01	1.674E-01	23.70	
PB-214	1600.00Y	1.00	8.742E-01	8.742E-01	1.991E-01	22.78	
RN-222	1600.00Y	1.00	7.061E-01	7.061E-01	1.674E-01	23.70	
RA-224	1.41E+10Y	1.00	2.389E+00	2.389E+00	1.202E+00	50.31	
RA-226	1600.00Y	1.00	8.742E-01	8.742E-01	1.991E-01	22.78	
AC-228	1.41E+10Y	1.00	5.588E-01	5.588E-01	2.959E-01	52.95	
RA-228	1.41E+10Y	1.00	5.588E-01	5.588E-01	2.959E-01	52.95	
TH-228	1.41E+10Y	1.00	6.640E-01	6.640E-01	1.078E-01	16.24	
TH-229	7340.00Y	1.00	1.857E-01	1.857E-01	1.257E-01	67.70	K
TH-230	7.54E+04Y	1.00	8.742E-01	8.742E-01	1.991E-01	22.78	
PA-231	7.04E+08Y	1.00	1.052E+00	1.052E+00	0.862E+00	81.94	
TH-232	1.41E+10Y	1.00	5.588E-01	5.588E-01	2.959E-01	52.95	
PA-234M	4.47E+09Y	1.00	1.413E+00	1.413E+00	2.498E+00	176.77	
TH-234	4.47E+09Y	1.00	1.413E+00	1.413E+00	2.498E+00	176.77	
U-234	2.45E+05Y	1.00	8.742E-01	8.742E-01	1.991E-01	22.78	
U-235	7.04E+08Y	1.00	1.204E-01	1.204E-01	0.695E-01	57.70	K
U-238	4.47E+09Y	1.00	1.413E+00	1.413E+00	2.498E+00	176.77	
AM-243	7370.00Y	1.00	2.476E-01	2.476E-01	0.859E-01	34.70	
Total Activity :			3.506E+01	3.516E+01			

Grand Total Activity : 3.506E+01 3.516E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	128.63	46	92	2.28	257.59	254	8	1.16E-02	81.1	7.29E+00	T
0	209.18	44	86	0.79	418.61	414	10	1.14E-02	87.4	5.97E+00	
0	226.10	14	78	1.23	452.43	446	8	3.70E-03	****	5.69E+00	T
0	328.67	27	71	3.69	657.48	650	11	7.18E-03	****	4.42E+00	T
0	445.02	10	35	1.37	890.08	886	8	2.61E-03	****	3.55E+00	
0	467.20	41	68	6.35	934.42	921	26	1.12E-02	****	3.42E+00	T
0	474.90	11	20	1.63	949.82	946	9	2.96E-03	****	3.38E+00	T
1	507.65	20	3	1.62	1015.30	1013	20	5.53E-03	55.0	3.21E+00	T
0	534.94	10	20	0.73	1069.85	1066	8	2.78E-03	****	3.08E+00	
1	580.15	13	8	1.37	1160.24	1158	13	3.64E-03	74.8	2.89E+00	
0	767.94	6	14	0.72	1535.69	1530	8	1.74E-03	****	2.29E+00	T
0	822.34	9	5	1.36	1644.45	1641	9	2.56E-03	****	2.15E+00	
0	828.76	7	9	0.89	1657.29	1650	9	1.94E-03	****	2.14E+00	
0	963.40	15	9	1.14	1926.50	1920	12	4.37E-03	95.5	1.87E+00	T
0	982.26	7	4	0.65	1964.21	1960	8	1.94E-03	****	1.83E+00	T
0	986.08	13	5	1.43	1971.85	1968	10	3.61E-03	85.0	1.83E+00	
0	991.17	6	4	0.82	1982.01	1978	6	1.81E-03	****	1.82E+00	
0	1158.67	11	8	2.26	2316.95	2313	7	3.04E-03	****	1.58E+00	
0	1227.57	14	2	3.11	2454.73	2450	10	4.13E-03	64.9	1.50E+00	
0	1238.98	13	21	2.26	2477.53	2469	11	3.80E-03	****	1.48E+00	T
0	1405.23	9	0	0.67	2810.00	2804	11	2.50E-03	66.7	1.33E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 15:22:21.37

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507001.CNF;1   *
* Acquisition date : 10-APR-2025 14:21:39 Sensitivity     : 3.000           *
* Detector ID      : GAM29                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****           *
* Sample date      :  7-MAR-2025 08:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507001           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.2747E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 29-JUL-2024 09:02:37 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;19            *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.970E-01
CD-109	4.947E-01
AG-110	5.153E-01
SN-126	5.644E-02
BA-137M	2.243E-02
CS-137	2.369E-02
BI-207	3.680E-02
TL-208	2.218E-02
BI-211	1.360E-01
BI-212	3.483E-01
PB-212	3.519E-02
BI-214	4.857E-02
PB-214	4.946E-02
RN-222	4.857E-02
RA-224	3.770E-01
RA-226	4.946E-02
AC-228	1.185E-01
RA-228	1.185E-01
TH-228	3.519E-02
TH-229	3.190E-01
TH-230	4.946E-02
PA-231	3.263E-01
TH-232	1.185E-01
PA-234M	9.967E-01
TH-234	9.967E-01
U-234	4.946E-02
U-235	1.442E-01
U-238	9.967E-01
AM-243	3.462E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	2.708E-01	NOT IDENT.
NA-22	2.549E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	8.944E-03	NOT IDENT.
SC-46	2.584E-02	FAIL ABUN
V-48	1.109E-01	FAIL ABUN
CR-51	4.520E-01	NOT IDENT.
MN-52	1.735E+00	NOT IDENT.
MN-54	2.815E-02	NOT IDENT.
CO-56	2.840E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.829E-02	NOT IDENT.
CO-58	3.231E-02	NOT IDENT.
FE-59	8.180E-02	NOT IDENT.
CO-60	2.640E-02	NOT IDENT.
ZN-65	7.049E-02	NOT IDENT.
GE-68	8.948E-01	NOT IDENT.
AS-73	8.637E-01	NOT IDENT.
AS-74	1.329E-01	NOT IDENT.
SE-75	3.752E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	3.185E-01	NOT IDENT.
RB-83	5.574E-02	NOT IDENT.
RB-84	7.906E-02	NOT IDENT.
KR-85	5.804E+00	NOT IDENT.
SR-85	3.762E-02	NOT IDENT.
RB-86	1.128E+00	NOT IDENT.
Y-88	2.457E-02	NOT IDENT.
Y-91	1.556E+01	NOT IDENT.
NB-94	2.304E-02	NOT IDENT.
NB-95	3.818E-02	NOT IDENT.
NB-95M	9.177E-02	NOT IDENT.
ZR-95	6.285E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.203E-02	FAIL ABUN
RH-102	3.569E-02	FAIL ABUN
RU-103	3.774E-02	FAIL ABUN
RH-106	2.275E-01	NOT IDENT.
RU-106	2.275E-01	NOT IDENT.
AG-108M	2.242E-02	NOT IDENT.
AG-110M	3.736E-02	FAIL ABUN
SN-113	3.406E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.135E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.430E-02	NOT IDENT.
SB-124	6.371E-02	NOT IDENT.
SB-125	6.763E-02	NOT IDENT.
TE-125M	8.085E+00	NOT IDENT.
I-126	3.490E-01	NOT IDENT.
SB-126	3.212E-01	NOT IDENT.
SB-127	2.262E+01	NOT IDENT.
I-131	4.790E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.967E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.305E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.092E-01	FAIL ABUN
LA-138	2.959E-02	NOT IDENT.
CE-139	2.211E-02	NOT IDENT.
BA-140	4.144E-01	NOT IDENT.
LA-140	1.879E-01	FAIL ABUN
CE-141	6.709E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.501E-01	NOT IDENT.
PM-144	2.325E-02	NOT IDENT.
PR-144	1.753E+00	NOT IDENT.
PM-146	2.621E-02	NOT IDENT.
ND-147	1.209E+00	FAIL ABUN
PM-147	4.987E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.141E-02	FAIL ABUN
EU-152	6.902E-02	FAIL ABUN
GD-153	6.266E-02	NOT IDENT.
EU-154	7.358E-02	NOT IDENT.

EU-155	7.684E-02	FAIL ABUN
TB-160	9.751E-02	FAIL ABUN
HO-166M	3.785E-02	FAIL ABUN
TM-171	1.568E+01	NOT IDENT.
HF-172	1.339E-01	FAIL ABUN
LU-172	4.102E-02	FAIL ABUN
LU-176	1.933E-02	NOT IDENT.
HF-181	3.533E-02	NOT IDENT.
TA-182	1.860E-01	FAIL ABUN
RE-183	1.995E-01	NOT IDENT.
RE-184	1.058E-01	NOT IDENT.
W-188	6.507E+00	FAIL ABUN
IR-192	3.042E-02	FAIL ABUN
HG-203	3.510E-02	FAIL ABUN
TL-204	3.247E+00	NOT IDENT.
BI-210	2.837E+00	NOT IDENT.
PB-210	2.837E+00	NOT IDENT.
PB-211	5.060E-01	NOT IDENT.
BI-213	8.034E-02	NOT IDENT.
RN-219	3.242E-01	NOT IDENT.
RA-223	4.464E-01	NOT IDENT.
AC-225	1.588E+00	NOT IDENT.
AC-227	1.461E-01	FAIL ABUN
TH-227	1.461E-01	FAIL ABUN
TH-231	4.464E-01	NOT IDENT.
PA-233	4.748E-02	FAIL ABUN
PA-234	2.110E-01	FAIL ABUN
NP-237	4.748E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.986E-01	NOT IDENT.
PU-239	2.738E+02	FAIL ABUN
AM-241	1.234E-01	NOT IDENT.
CM-243	7.996E-02	NOT IDENT.
BK-247	6.214E-02	NOT IDENT.
CM-247	2.976E-02	NOT IDENT.
CF-249	2.928E-02	NOT IDENT.
CF-251	9.667E-02	FAIL ABUN
ANH-511	4.544E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 15:22:25.61

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507001.CNF;1		
Acquisition date	: 10-APR-2025 14:21:39	Sensitivity	: 3.000
Detector ID	: GAM29	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.36	Half life ratio	: *****
Sample date	: 7-MAR-2025 08:00:00	Nuclide Library	: SOLID
Sample ID	: G714507001	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.2747E+02 GRAM
		Quantity Err(%)	: 1.5690E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 29-JUL-2024 09:02:37	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;19		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.268E+01	1.936E+00	1.936E+00
CD-109	1.235E+00	1.169E+00	1.169E+00
AG-110	4.268E-01	7.231E-01	7.231E-01
SN-126	1.173E-01	1.108E-01	1.108E-01
BA-137M	1.057E-01	4.707E-02	4.707E-02
CS-137	1.116E-01	4.973E-02	4.973E-02
BI-207	4.024E-02	6.612E-02	6.612E-02
TL-208	2.005E-01	6.454E-02	6.454E-02
BI-211	2.409E+00	5.728E-01	5.728E-01
BI-212	1.688E+00	5.160E-01	5.160E-01
PB-212	6.640E-01	1.186E-01	1.186E-01
BI-214	7.061E-01	1.758E-01	1.758E-01
PB-214	8.742E-01	2.074E-01	2.074E-01
RN-222	7.061E-01	1.758E-01	1.758E-01
RA-224	2.389E+00	1.194E+00	1.194E+00
RA-226	8.742E-01	2.074E-01	2.074E-01
AC-228	5.588E-01	2.973E-01	2.973E-01
RA-228	5.588E-01	2.973E-01	2.973E-01
TH-228	6.640E-01	1.186E-01	1.186E-01
TH-229	-3.029E-01	4.244E-01	4.244E-01
TH-230	8.742E-01	2.074E-01	2.074E-01
PA-231	1.052E+00	8.763E-01	8.763E-01
TH-232	5.588E-01	2.973E-01	2.973E-01
PA-234M	1.413E+00	2.469E+00	2.469E+00
TH-234	1.413E+00	2.469E+00	2.469E+00
U-234	8.742E-01	2.074E-01	2.074E-01
U-235	-2.218E-02	1.725E-01	1.725E-01
U-238	1.413E+00	2.469E+00	2.469E+00
AM-243	2.476E-01	8.621E-02	8.621E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.480E-01	3.813E-01	3.870E-01	NOT IDENT.

NA-22	4.904E-03	2.864E-02	2.873E-02	NOT IDENT.
NA-24	-5.210E+14	1.158E+15	1.182E+15	SHORT HLIF
AL-26	-2.793E-03	1.333E-02	1.339E-02	NOT IDENT.
SC-46	-2.653E-02	3.821E-02	4.004E-02	FAIL ABUN
V-48	9.727E-02	1.192E-01	1.270E-01	FAIL ABUN
CR-51	1.652E-01	4.938E-01	4.994E-01	NOT IDENT.
MN-52	-4.107E-01	2.173E+00	2.181E+00	NOT IDENT.
MN-54	1.127E-02	3.207E-02	3.247E-02	NOT IDENT.
CO-56	1.258E-02	3.146E-02	3.197E-02	FAIL ABUN
MN-56	1.000E+41	2.397E+41	0.000E+00	SHORT HLIF
CO-57	-1.231E-04	2.158E-02	2.158E-02	NOT IDENT.
CO-58	-1.761E-02	4.272E-02	4.345E-02	NOT IDENT.
FE-59	-7.144E-02	1.083E-01	1.130E-01	NOT IDENT.
CO-60	1.184E-03	3.080E-02	3.080E-02	NOT IDENT.
ZN-65	1.263E-02	8.969E-02	8.987E-02	NOT IDENT.
GE-68	-1.535E-01	1.065E+00	1.067E+00	NOT IDENT.
AS-73	5.617E-01	9.403E-01	9.738E-01	NOT IDENT.
AS-74	-3.885E-02	1.635E-01	1.645E-01	NOT IDENT.
SE-75	-1.136E-02	4.297E-02	4.327E-02	NOT IDENT.
BR-77	2.759E+04	2.773E+04	3.040E+04	SHORT HLIF
SR-82	-6.570E-02	4.005E-01	4.016E-01	NOT IDENT.
RB-83	-3.922E-02	7.147E-02	7.362E-02	NOT IDENT.
RB-84	2.148E-02	9.231E-02	9.281E-02	NOT IDENT.
KR-85	4.727E+00	6.206E+00	6.561E+00	NOT IDENT.
SR-85	3.061E-02	4.022E-02	4.252E-02	NOT IDENT.
RB-86	-8.904E-02	1.321E+00	1.322E+00	NOT IDENT.
Y-88	-1.891E-02	3.755E-02	3.850E-02	NOT IDENT.
Y-91	-3.423E+01	2.478E+01	2.919E+01	NOT IDENT.
NB-94	-7.296E-04	2.774E-02	2.774E-02	NOT IDENT.
NB-95	-8.753E-03	5.371E-02	5.386E-02	NOT IDENT.
NB-95M	6.128E-02	1.126E-01	1.159E-01	NOT IDENT.
ZR-95	-2.001E-02	7.947E-02	7.998E-02	NOT IDENT.
NB-97	1.000E+41	1.694E+41	0.000E+00	SHORT HLIF
ZR-97	3.188E+14	1.741E+14	2.258E+14	SHORT HLIF
MO-99	-7.025E+02	1.310E+03	1.348E+03	SHORT HLIF
TC-99M	-1.232E+39	2.926E+39	0.000E+00	SHORT HLIF
RH-101	5.631E-02	4.596E-02	5.251E-02	FAIL ABUN
RH-102	-2.858E-02	4.754E-02	4.926E-02	FAIL ABUN
RU-103	-8.121E-03	4.525E-02	4.540E-02	FAIL ABUN
RH-106	-4.080E-03	2.706E-01	2.706E-01	NOT IDENT.
RU-106	-4.080E-03	2.706E-01	2.706E-01	NOT IDENT.
AG-108M	7.047E-03	2.498E-02	2.518E-02	NOT IDENT.
AG-110M	2.204E-03	4.520E-02	4.521E-02	FAIL ABUN
SN-113	-2.154E-03	3.932E-02	3.933E-02	NOT IDENT.
CD-115	3.706E+02	3.224E+03	3.228E+03	SHORT HLIF
SN-117M	2.301E-02	1.337E-01	1.341E-01	NOT IDENT.
SB-122	-2.073E+02	2.161E+02	2.355E+02	SHORT HLIF
TE-123M	1.570E-02	2.760E-02	2.849E-02	NOT IDENT.
SB-124	-1.616E-03	7.739E-02	7.739E-02	NOT IDENT.
SB-125	3.189E-02	7.383E-02	7.521E-02	NOT IDENT.
TE-125M	-5.604E+00	1.004E+01	1.035E+01	NOT IDENT.
I-126	-1.843E-01	5.167E-01	5.233E-01	NOT IDENT.
SB-126	1.670E-01	3.575E-01	3.654E-01	NOT IDENT.
SB-127	1.241E+00	2.676E+01	2.677E+01	NOT IDENT.
I-131	4.856E-01	4.923E-01	5.388E-01	NOT IDENT.
I-132	-1.000E+41	2.464E+41	0.000E+00	SHORT HLIF
TE-132	-1.446E+01	4.192E+01	4.242E+01	SHORT HLIF
BA-133	5.945E-03	3.664E-02	3.674E-02	NOT IDENT.
I-133	-5.222E+09	1.934E+10	1.948E+10	SHORT HLIF
CS-134	1.211E-02	3.793E-02	3.832E-02	FAIL ABUN
I-135	-1.137E+36	5.284E+36	0.000E+00	SHORT HLIF
CS-136	-3.929E-02	2.486E-01	2.493E-01	FAIL ABUN
LA-138	-5.077E-02	5.067E-02	5.560E-02	NOT IDENT.
CE-139	6.360E-03	2.588E-02	2.604E-02	NOT IDENT.
BA-140	-7.578E-01	7.215E-01	7.983E-01	NOT IDENT.
LA-140	1.981E-01	1.593E-01	1.827E-01	FAIL ABUN
CE-141	5.053E-02	7.491E-02	7.830E-02	NOT IDENT.
CE-143	1.076E+06	1.655E+06	1.724E+06	SHORT HLIF
CE-144	-1.618E-02	1.795E-01	1.796E-01	NOT IDENT.
PM-144	-2.386E-02	3.207E-02	3.383E-02	NOT IDENT.
PR-144	-1.819E+00	2.422E+00	2.557E+00	NOT IDENT.
PM-146	-1.104E-02	3.209E-02	3.247E-02	NOT IDENT.
ND-147	7.562E-01	1.402E+00	1.443E+00	FAIL ABUN
PM-147	-2.661E+02	6.156E+02	6.272E+02	NOT IDENT.
PM-149	1.593E+04	2.769E+04	2.861E+04	SHORT HLIF
EU-150	4.796E-03	2.635E-02	2.643E-02	FAIL ABUN
EU-152	4.490E-02	7.320E-02	7.594E-02	FAIL ABUN
GD-153	-3.014E-02	8.233E-02	8.344E-02	NOT IDENT.

EU-154	1.845E-02	8.168E-02	8.210E-02	NOT IDENT.
EU-155	-3.530E-02	9.314E-02	9.449E-02	FAIL ABUN
TB-160	-2.320E-02	1.247E-01	1.252E-01	FAIL ABUN
HO-166M	-4.053E-03	4.622E-02	4.625E-02	FAIL ABUN
TM-171	-1.164E+00	1.783E+01	1.784E+01	NOT IDENT.
HF-172	3.136E-02	1.677E-01	1.683E-01	FAIL ABUN
LU-172	-1.573E-02	5.079E-02	5.128E-02	FAIL ABUN
LU-176	1.042E-02	2.069E-02	2.122E-02	NOT IDENT.
HF-181	-2.514E-02	4.636E-02	4.772E-02	NOT IDENT.
TA-182	8.847E-02	2.100E-01	2.138E-01	FAIL ABUN
RE-183	1.276E-01	2.169E-01	2.244E-01	NOT IDENT.
RE-184	-5.021E-02	1.624E-01	1.640E-01	NOT IDENT.
W-188	4.936E+00	7.098E+00	7.438E+00	FAIL ABUN
IR-192	4.590E-03	3.388E-02	3.394E-02	FAIL ABUN
HG-203	-1.550E-02	4.091E-02	4.150E-02	FAIL ABUN
TL-204	-7.328E-01	4.105E+00	4.119E+00	NOT IDENT.
BI-210	7.746E-01	3.139E+00	3.159E+00	NOT IDENT.
PB-210	7.746E-01	3.139E+00	3.159E+00	NOT IDENT.
PB-211	-1.876E-01	6.048E-01	6.106E-01	NOT IDENT.
BI-213	2.710E-02	9.892E-02	9.967E-02	NOT IDENT.
RN-219	3.882E-01	3.307E-01	3.741E-01	NOT IDENT.
RA-223	-2.128E-01	5.930E-01	6.007E-01	NOT IDENT.
AC-225	3.703E-01	1.898E+00	1.905E+00	NOT IDENT.
AC-227	-1.634E-01	1.827E-01	1.970E-01	FAIL ABUN
TH-227	-1.634E-01	1.827E-01	1.970E-01	FAIL ABUN
TH-231	-2.128E-01	5.930E-01	6.007E-01	NOT IDENT.
PA-233	3.092E-02	5.029E-02	5.219E-02	FAIL ABUN
PA-234	4.399E-02	2.546E-01	2.553E-01	FAIL ABUN
NP-237	3.092E-02	5.029E-02	5.219E-02	FAIL ABUN
NP-238	8.229E+03	9.220E+03	9.938E+03	SHORT HLIF
NP-239	1.348E-02	2.325E-01	2.325E-01	NOT IDENT.
PU-239	5.950E+02	4.746E+02	5.452E+02	FAIL ABUN
AM-241	-6.554E-02	1.580E-01	1.608E-01	NOT IDENT.
CM-243	1.369E-02	9.225E-02	9.246E-02	NOT IDENT.
BK-247	4.099E-03	6.906E-02	6.909E-02	NOT IDENT.
CM-247	2.171E-02	3.190E-02	3.337E-02	NOT IDENT.
CF-249	1.644E-02	3.155E-02	3.241E-02	NOT IDENT.
CF-251	-3.944E-02	1.206E-01	1.219E-01	FAIL ABUN
ANH-511	-1.978E-02	4.401E-02	4.490E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	56.2169	85.43	74.4428	131.20	52.4445
45.60	50.6581	86.55	92.8716	133.02	56.3164
46.54	51.7489	86.79	84.4611	133.52	63.1136
49.72	0.0000	86.94	84.4818	136.00	71.2163
51.35	67.1391	87.09	84.5026	136.47	62.2082
51.87	74.1368	87.57	84.5679	140.51	0.0000
52.39	77.1916	88.03	59.2411	143.76	57.0435
52.97	71.3455	88.34	59.2706	144.24	58.2162
53.44	63.4836	88.47	59.2830	145.44	46.8663
54.07	66.5512	89.96	70.7423	152.43	64.5236
57.36	0.0000	1093.63	70.8181	153.25	58.8162
57.53	64.0432	91.11	70.8705	323.87	70.4233
57.98	65.1049	92.59	71.0342	156.02	71.7216
59.27	87.0389	93.35	71.1182	158.56	64.9611
59.32	87.0479	94.56	61.2753	159.00	53.3868
59.54	89.7668	94.65	61.2837	162.33	44.2610
60.96	77.9337	94.67	61.2854	162.66	44.2767
61.17	77.9667	94.87	61.3042	163.33	47.8060
62.93	78.9161	97.43	65.8363	165.86	45.5966
63.29	78.9724	98.43	65.5767	176.31	56.7290
63.58	79.0176	98.44	65.5776	176.60	53.1992
64.28	79.1264	99.53	68.9141	177.52	67.4483
66.73	62.5144	100.11	66.8177	181.07	0.0000
67.24	73.4579	102.03	67.0065	181.52	60.1945
125.81	77.6038	103.18	64.9530	184.41	41.7008
67.75	77.6137	103.37	64.9709	143.76	41.7548
68.89	75.7338	105.21	72.7430	193.51	52.8878
69.67	62.8621	105.31	72.7535	197.03	61.5057
70.82	68.4733	106.12	57.6178	198.01	55.5269
70.83	68.4748	106.47	61.9972	201.83	58.1477
72.81	67.0050	109.28	65.5183	203.43	49.7410
72.87	67.0119	111.00	58.0128	205.31	45.3707
74.66	67.2276	111.76	0.0000	210.85	43.9706
74.82	67.2470	114.06	69.2475	215.65	46.6117
74.97	67.2648	116.30	0.0000	218.12	44.2546
77.11	67.5187	116.74	63.9822	222.11	50.9880
78.74	67.7097	119.76	55.3780	227.09	49.5544
79.69	67.8197	121.12	66.5717	227.38	49.5667
80.03	67.8584	121.22	59.9223	228.16	0.0000
80.12	67.8698	121.78	49.9717	228.18	46.2941
80.19	67.8778	122.06	54.4334	116.74	46.2941
80.57	67.9214	122.92	51.1576	235.69	28.2849
81.00	67.9710	123.07	56.7291	235.96	36.6121
81.07	67.9789	265.00	63.4531	238.63	35.8591
81.75	75.3860	125.81	52.0916	238.98	0.0000
82.47	96.4438	127.23	64.1131	240.99	35.9287
83.79	56.7323	127.91	59.3185	242.00	35.9584
84.00	56.7521	129.30	59.4212	244.70	47.7702

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	37.9468	344.28	22.4965	563.25	19.1848
252.80	42.1763	345.93	39.1847	564.24	0.0000
254.15	0.0000	351.06	28.0149	569.33	11.1365
256.23	40.5986	351.93	28.0300	946.00	11.1374
260.90	0.0000	355.39	0.0000	569.70	11.1383
264.66	48.5263	356.01	27.1954	583.19	15.2783
264.80	48.5321	364.49	20.9589	584.27	19.8713
265.00	45.1328	366.42	0.0000	595.83	20.4818
269.46	47.8504	372.51	22.8917	427.87	22.5747
270.03	42.7419	375.05	22.0098	602.52	0.0000
271.23	31.6576	377.52	18.3683	604.72	16.9606
273.65	41.1436	356.01	27.6556	607.14	19.5505
276.40	27.4857	388.16	22.1807	609.32	19.5682
277.37	26.6457	388.63	25.8843	610.33	19.5767
277.60	32.6678	391.69	25.9304	614.28	18.5764
278.00	36.9776	264.66	25.1334	618.01	18.6050
279.20	43.0349	401.81	17.6981	620.36	14.4848
279.54	47.3507	402.40	24.2264	621.93	17.5997
279.70	47.3563	404.85	31.7249	630.19	0.0000
280.46	38.7671	410.95	28.0884	631.29	21.8246
283.69	37.1325	413.71	25.3185	633.25	13.5210
284.31	41.4688	414.70	27.2093	634.78	15.6110
285.41	29.3972	423.72	23.5728	635.95	15.6183
285.90	0.0000	427.09	24.5607	636.99	18.7500
287.50	33.7711	427.87	20.7911	657.50	15.7532
290.67	29.1614	433.94	23.7040	657.76	25.2080
293.27	0.0000	439.40	36.1353	657.90	0.0000
351.93	33.9584	440.45	24.2621	661.66	14.2009
295.96	33.9766	453.88	22.0384	664.57	0.0000
879.38	34.0393	463.37	23.1094	666.33	15.8081
299.98	34.0726	468.07	23.1650	666.50	16.4411
300.09	34.0750	473.00	0.0000	667.71	0.0000
300.13	34.0758	475.06	18.8882	677.62	11.6432
301.36	34.1052	476.78	30.5381	685.70	9.5559
302.85	39.3933	477.60	24.7311	692.65	0.0000
256.23	23.6635	482.18	19.4413	695.00	19.1792
304.85	23.6689	487.02	12.6673	696.49	24.5208
306.78	28.0898	492.35	0.0000	696.51	24.5208
308.46	46.5766	497.08	21.5426	697.00	21.3265
311.90	26.4264	505.52	13.2734	697.30	23.4618
316.51	32.6949	507.63	0.0000	697.49	21.3306
319.41	36.3004	511.00	21.6874	702.65	17.0970
320.08	31.8875	514.00	21.7180	706.68	10.7019
321.04	35.4533	514.00	21.7180	711.68	13.9384
323.87	38.6280	520.40	25.7450	720.70	13.9849
325.23	26.6644	520.69	0.0000	721.93	0.0000
328.76	34.7447	522.65	0.0000	722.78	16.1487
333.37	30.8283	527.90	0.0000	722.91	16.1493
333.97	37.5447	528.26	20.8701	723.31	19.3821
334.37	44.2602	529.59	22.8718	724.19	12.9258
338.28	35.8561	529.87	0.0000	727.33	16.1755
338.32	35.8569	531.02	10.4483	733.00	9.7255
311.90	37.7028	537.26	26.9451	735.93	14.0627
340.48	37.7028	546.56	0.0000	333.97	12.9883
340.55	37.7045	552.55	15.0739	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	14.1050	667.71	0.0000	1434.09	6.8757
747.24	11.9476	962.31	12.2256	1435.80	10.8087
748.06	13.0376	964.08	12.2321	1457.56	0.0000
752.31	15.2339	966.17	10.4908	1460.82	8.8901
753.82	13.0645	911.20	12.2496	1489.16	1.9874
756.73	18.5273	983.53	3.5146	1505.03	7.9756
756.80	18.5273	984.45	0.0000	1584.12	9.1165
884.68	14.7502	1274.44	12.3466	1596.21	0.0000
765.81	21.3194	1002.74	15.9033	1620.50	7.1414
766.84	13.1245	1004.73	11.4924	1621.92	5.1022
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	10.9741	1025.87	0.0000	1690.97	3.1020
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	9.8848	1037.84	8.0305	1764.49	1.6769
783.70	20.9026	1038.76	0.0000	1063.66	2.0983
788.74	18.7349	631.29	9.8385	1771.35	2.0986
792.07	17.6530	1048.07	13.4216	1791.20	0.0000
795.86	15.4663	1049.04	13.4253	1808.65	1.0563
810.06	15.5404	1050.41	10.7446	1810.72	0.0000
810.29	14.4314	1063.66	11.5023	1836.06	5.3073
344.28	14.4325	1077.00	11.7241		
810.76	17.7650	1077.34	11.7249		
815.77	18.9071	1085.87	11.7519		
1048.07	8.3490	1093.63	11.7765		
832.01	20.1270	1099.45	17.2385		
834.85	12.3114	1112.07	11.8336		
835.71	20.1511	1112.84	10.9255		
836.80	0.0000	1115.54	13.1203		
846.75	0.0000	1120.29	15.5079		
846.77	6.7415	1120.55	15.5090		
856.80	6.7632	1221.41	13.1396		
860.56	10.1572	1129.67	9.1449		
871.09	15.8531	1131.51	0.0000		
873.19	7.9320	1147.95	0.0000		
875.33	0.0000	1173.23	15.7196		
879.38	11.3534	1177.95	13.8867		
880.51	9.0859	1189.05	12.0685		
881.60	12.4976	1204.77	24.2306		
883.24	12.5039	1221.41	14.9717		
884.68	12.5097	1231.02	7.5034		
889.28	14.8054	1235.36	18.0270		
894.76	17.1124	1238.28	13.5299		
898.04	11.4197	1260.41	0.0000		
900.72	11.4294	1271.87	9.4714		
903.28	12.0103	1274.44	5.6862		
911.20	18.9197	1274.54	5.6862		
912.08	12.0428	1291.59	8.5633		
923.98	0.0000	1298.22	0.0000		
926.50	12.6718	1312.11	3.8242		
929.11	9.2230	1332.49	6.7236		
935.54	19.6369	1362.66	0.0000		
937.49	12.7138	1365.19	7.7407		
944.13	11.5808	1368.63	0.0000		
946.00	10.4286	1384.29	5.8301		
949.00	19.7164	1408.01	3.1256		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:32:29.74

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507002.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;814
                                       Background date  : 6-APR-2025 11:01:07.
Sample date      : 6-MAR-2025 08:30:00. Acquisition date : 10-APR-2025 19:31:57
Sample ID        : G714507002           Sample quantity  : 1.29110E+02 GRAM
Detector name    : GAM04                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.54  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.63*	36	91	0.87	128.09	125	6	9.95E-03	46.9	
2	3	74.83	87	176	1.02	150.49	147	18	2.42E-02	24.8	1.83E+00
3	3	77.11	191	121	0.81	155.06	147	18	5.31E-02	11.3	
4	4	84.00*	58	104	1.32	168.83	166	27	1.62E-02	29.4	2.32E+00
5	4	87.11	114	126	1.33	175.05	166	27	3.17E-02	19.8	
6	4	89.93	107	113	1.33	180.69	166	27	2.98E-02	20.3	
7	4	92.82*	122	101	1.34	186.46	166	27	3.39E-02	19.3	
8	4	94.39	49	68	1.35	189.60	166	27	1.37E-02	36.2	
9	0	98.50	70	139	3.48	197.82	193	11	1.95E-02	34.5	
10	0	105.68	11	141	0.68	212.18	208	7	3.06E-03	180.9	
11	0	112.57	76	155	2.24	225.96	221	10	2.12E-02	32.6	
12	0	128.84	47	172	1.26	258.50	254	10	1.32E-02	53.9	
13	0	185.83*	136	187	1.41	372.44	367	12	3.77E-02	22.2	
14	0	209.53	36	113	1.12	419.84	415	8	1.00E-02	53.8	
15	5	238.70*	419	83	0.98	478.17	473	18	1.16E-01	6.1	8.85E-01
16	5	241.82	163	150	1.82	484.41	473	18	4.54E-02	18.0	
17	0	270.32	58	67	1.59	541.39	538	10	1.61E-02	29.5	
18	5	295.28*	297	46	1.24	591.31	587	19	8.25E-02	6.8	3.71E+00
19	5	299.97	41	61	1.92	600.69	587	19	1.13E-02	40.6	
20	0	329.15	20	85	0.63	659.04	654	9	5.54E-03	87.2	
21	1	338.25	82	43	1.36	677.25	673	26	2.27E-02	18.3	1.37E+00
22	1	341.25	18	47	1.36	683.25	673	26	5.11E-03	69.6	
23	0	352.07*	456	76	1.22	704.87	700	12	1.27E-01	6.1	
24	0	379.79	26	48	1.79	760.32	756	11	7.24E-03	54.6	
25	0	477.72	22	41	0.62	956.16	952	9	5.97E-03	57.6	
26	0	487.78	21	29	1.44	976.28	970	11	5.74E-03	55.9	
27	0	511.12*	33	61	2.58	1022.95	1015	17	9.14E-03	62.3	
28	0	583.50*	162	26	1.28	1167.71	1161	13	4.51E-02	10.3	
29	1	609.56*	311	24	1.47	1219.83	1215	23	8.63E-02	6.4	1.69E+00
30	1	614.50	15	11	1.61	1229.71	1215	23	4.16E-03	63.8	
31	0	727.91	64	26	2.14	1456.54	1448	20	1.79E-02	22.8	
32	1	734.80	20	11	1.70	1470.31	1467	15	5.55E-03	30.8	1.83E+00
33	1	738.99	18	10	1.71	1478.69	1467	15	4.92E-03	34.7	
34	0	753.86	25	18	4.40	1508.44	1498	18	6.94E-03	44.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	768.96	41	30	1.75	1538.63	1533	13	1.13E-02	31.6	
36	0	795.12	33	6	1.72	1590.97	1585	12	9.17E-03	22.9	
37	0	807.58	12	11	1.34	1615.88	1610	10	3.21E-03	63.8	
38	0	838.45	12	44	3.32	1677.63	1667	16	3.21E-03	131.6	
39	0	861.42	26	19	1.61	1723.58	1717	11	7.18E-03	38.3	
40	0	869.14	14	18	3.62	1739.02	1733	14	3.88E-03	69.1	
41	0	888.80	10	4	1.09	1778.34	1773	9	2.72E-03	50.2	
42	0	911.34*	85	11	1.67	1823.43	1816	15	2.37E-02	14.2	
43	1	930.79	13	15	1.84	1862.33	1859	16	3.72E-03	48.6	1.90E+00
44	1	934.66	15	13	1.84	1870.07	1859	16	4.29E-03	54.4	
45	4	964.87	23	12	2.48	1930.51	1926	19	6.43E-03	31.5	9.83E-01
46	4	969.22*	63	7	1.56	1939.20	1926	19	1.76E-02	15.7	
47	0	1013.54	3	8	0.76	2027.84	2022	8	7.32E-04	197.1	
48	0	1038.37	11	5	2.59	2077.52	2073	9	2.92E-03	47.7	
49	0	1120.82*	51	18	1.50	2242.46	2236	12	1.41E-02	22.3	
50	0	1138.34	10	4	0.73	2277.50	2274	8	2.78E-03	46.9	
51	0	1175.24	11	5	1.05	2351.32	2346	10	3.06E-03	48.5	
52	0	1238.26	27	14	1.49	2477.39	2472	11	7.46E-03	33.0	
53	0	1282.40	9	15	3.89	2565.68	2558	12	2.45E-03	94.3	
54	0	1299.90	21	4	5.60	2600.71	2592	16	5.93E-03	30.0	
55	0	1377.81	30	0	1.60	2756.57	2751	12	8.33E-03	18.3	
56	0	1408.38	12	3	3.92	2817.74	2812	12	3.30E-03	41.3	
57	0	1461.19*	164	5	1.59	2923.37	2918	11	4.56E-02	8.5	
58	0	1625.88	6	5	3.38	3252.88	3245	11	1.69E-03	83.9	
59	0	1631.33	10	0	1.58	3263.80	3260	8	2.78E-03	31.6	
60	0	1730.07	15	2	1.46	3461.37	3457	9	4.16E-03	31.4	
61	0	1764.69*	58	4	1.48	3530.62	3523	14	1.61E-02	15.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 20:32:31

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507002.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 08:30:00	Acquisition date	: 10-APR-2025 19:31:57
Sample ID	: G714507002	Sample quantity	: 129.11 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA4	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.54 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	22	10.44*	2.386E+00	5.155E-01	8.184E-01	115.11
K-40	1460.82	156	10.66*	8.745E-01	9.739E+00	9.739E+00	17.00
SC-46	889.28	10	99.98*	1.397E+00	4.015E-02	5.384E-02	100.39
	1120.55	49	99.99	1.112E+00	2.569E-01	3.445E-01	44.57
CD-109	88.03	130	3.70*	3.808E+00	5.378E+00	5.672E+00	39.59
SN-126	64.28	42	9.60	1.470E+00	1.718E+00	1.718E+00	93.89
	86.94	130	8.90	3.808E+00	2.236E+00	2.236E+00	39.59
	87.57	130	37.00*	3.808E+00	5.378E-01	5.378E-01	39.59
EU-155	86.55	130	30.70	3.808E+00	6.481E-01	6.574E-01	39.59
	105.31	12	21.10*	4.815E+00	7.117E-02	7.218E-02	361.84
TL-208	277.37	------	6.60	3.532E+00	------ Line Not Found		------
	583.19	165	85.00*	2.039E+00	5.520E-01	5.520E-01	20.64
	860.56	26	12.50	1.440E+00	8.242E-01	8.242E-01	76.62
BI-211	72.87	------	1.23	2.469E+00	------ Line Not Found		------
	351.06	477	12.92*	2.983E+00	7.203E+00	7.203E+00	12.17
BI-212	727.33	64	6.67*	1.685E+00	3.325E+00	3.325E+00	45.57
	1620.50	------	1.47	8.135E-01	------ Line Not Found		------
PB-212	74.82	100	10.28	2.676E+00	2.119E+00	2.119E+00	49.64
	77.11	220	17.10	2.911E+00	2.570E+00	2.570E+00	22.60
	238.63	450	43.60*	3.920E+00	1.532E+00	1.532E+00	12.13
	300.09	43	3.30	3.342E+00	2.272E+00	2.272E+00	81.24
BI-214	609.32	314	45.49*	1.967E+00	2.041E+00	2.041E+00	12.71
	1120.29	49	14.92	1.112E+00	1.721E+00	1.721E+00	44.57
	1764.49	54	15.30	7.787E-01	2.650E+00	2.650E+00	30.97
PB-214	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
RN-222	609.32	314	45.49*	1.967E+00	2.041E+00	2.041E+00	12.71
	1120.29	49	14.92	1.112E+00	1.721E+00	1.721E+00	44.57
	1764.49	54	15.30	7.787E-01	2.650E+00	2.650E+00	30.97
RA-224	240.99	175	4.10*	3.885E+00	6.397E+00	6.397E+00	36.00
RA-226	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
AC-228	105.21	12	1.10	4.815E+00	1.365E+00	1.365E+00	361.84
	338.32	86	11.27	3.069E+00	1.442E+00	1.442E+00	36.57
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	84	25.80*	1.363E+00	1.387E+00	1.387E+00	28.37
	968.97	62	15.80	1.283E+00	1.776E+00	1.776E+00	31.40
RA-228	105.21	12	1.10	4.815E+00	1.365E+00	1.365E+00	361.84
	338.32	86	11.27	3.069E+00	1.442E+00	1.442E+00	36.57
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	84	25.80*	1.363E+00	1.387E+00	1.387E+00	28.37

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	62	15.80	1.283E+00	1.776E+00	1.776E+00	31.40
TH-228	74.82	100	10.28	2.676E+00	2.119E+00	2.119E+00	49.64
	77.11	220	17.10	2.911E+00	2.570E+00	2.570E+00	22.60
	238.63	450	43.60*	3.920E+00	1.532E+00	1.532E+00	12.13
	300.09	43	3.30	3.342E+00	2.272E+00	2.272E+00	81.24
TH-229	85.43	67	14.70	3.555E+00	7.428E-01	7.428E-01	58.75
	88.47	130	24.00	3.808E+00	8.291E-01	8.291E-01	39.59
	193.51	------	4.41*	4.488E+00	------ Line Not Found		------
	210.85	39	2.80	4.273E+00	1.900E+00	1.900E+00	107.56
TH-230	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
PA-231	283.69	------	1.70	3.477E+00	------ Line Not Found		------
	301.36	43	5.35*	3.342E+00	1.401E+00	1.401E+00	81.24
TH-232	105.21	12	1.10	4.815E+00	1.365E+00	1.365E+00	361.84
	338.32	86	11.27	3.069E+00	1.442E+00	1.442E+00	36.57
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	84	25.80*	1.363E+00	1.387E+00	1.387E+00	28.37
	968.97	62	15.80	1.283E+00	1.776E+00	1.776E+00	31.40
PA-234M	63.29	42	3.70*	1.470E+00	4.457E+00	4.457E+00	93.89
	92.59	139	4.23	4.208E+00	4.532E+00	4.532E+00	38.63
TH-234	63.29	42	3.70*	1.470E+00	4.457E+00	4.457E+00	93.89
	92.59	139	4.23	4.208E+00	4.532E+00	4.532E+00	38.63
U-234	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
U-235	89.96	122	3.47	4.016E+00	5.104E+00	5.104E+00	40.54
	93.35	139	5.60	4.208E+00	3.423E+00	3.423E+00	38.63
	143.76	------	10.96*	5.110E+00	------ Line Not Found		------
	163.33	------	5.08	4.900E+00	------ Line Not Found		------
	185.72	148	57.20	4.594E+00	3.279E-01	3.279E-01	44.46
	205.31	------	5.01	4.329E+00	------ Line Not Found		------
U-238	63.29	42	3.70*	1.470E+00	4.457E+00	4.457E+00	93.89
	92.59	139	4.23	4.208E+00	4.532E+00	4.532E+00	38.63
AM-243	43.53	------	5.90	9.616E-02	------ Line Not Found		------
	74.66	100	67.20*	2.676E+00	3.242E-01	3.242E-01	49.64
ANH-511	511.00	34	100.00*	2.266E+00	8.633E-02	8.633E-02	124.51

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:32:32.36

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507002.CNF;1    *
* Acquisition date : 10-APR-2025 19:31:57 Sensitivity     : 3.000            *
* Detector ID      : GAM04                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.54     Half life ratio : *****            *
* Sample date      :  6-MAR-2025 08:30:00 Analyst initials: MXR1             *
* Sample ID        : G714507002           Sample Quantity : 1.2911E+02 GRAM  *
* Batch Number     : 2767515              Wet Weight      :    0.00000       *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000       *
* Nuclide Library  : SOLID.NLB;18                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20             *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	8.184E-01	9.232E-01	9.854E-01
K-40	9.739E+00	1.623E+00	8.093E-01
SC-46	5.384E-02	5.297E-02	9.041E-02
CD-109	5.672E+00	2.201E+00	1.823E+00
SN-126	5.378E-01	2.087E-01	1.744E-01
EU-155	7.218E-02	2.560E-01	2.655E-01
TL-208	5.520E-01	1.117E-01	7.505E-02
BI-211	7.203E+00	8.593E-01	4.845E-01
BI-212	3.325E+00	1.485E+00	1.188E+00
PB-212	1.532E+00	1.821E-01	1.388E-01
BI-214	2.041E+00	2.543E-01	1.564E-01
PB-214	2.614E+00	3.119E-01	1.762E-01
RN-222	2.041E+00	2.543E-01	1.564E-01
RA-224	6.397E+00	2.257E+00	1.488E+00
RA-226	2.614E+00	3.119E-01	1.762E-01
AC-228	1.387E+00	3.855E-01	3.389E-01
RA-228	1.387E+00	3.855E-01	3.389E-01
TH-228	1.532E+00	1.821E-01	1.388E-01
TH-229	1.713E-01	6.840E-01	1.272E+00
TH-230	2.614E+00	3.119E-01	1.762E-01
PA-231	1.401E+00	1.116E+00	9.242E-01
TH-232	1.387E+00	3.855E-01	3.389E-01
PA-234M	4.457E+00	4.101E+00	4.599E+00
TH-234	4.457E+00	4.101E+00	4.599E+00
U-234	2.614E+00	3.119E-01	1.762E-01
U-235	5.120E-02	2.717E-01	5.045E-01
U-238	4.457E+00	4.101E+00	4.599E+00
AM-243	3.242E-01	1.577E-01	1.677E-01
ANH-511	8.633E-02	1.053E-01	6.421E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	2.774E-02	6.121E-02	1.268E-01	NOT IDENT.

NA-24	0.000E+00	5.436E+15	0.000E+00	SHORT HLIF
AL-26	1.597E-02	2.153E-02	7.133E-02	NOT IDENT.
V-48	5.754E-02	2.276E-01	4.495E-01	NOT IDENT.
CR-51	-3.274E-01	7.217E-01	1.223E+00	NOT IDENT.
MN-52	-1.600E+00	3.657E+00	6.851E+00	FAIL ABUN
MN-54	2.800E-02	5.111E-02	1.042E-01	NOT IDENT.
CO-56	1.645E-02	5.862E-02	1.174E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-3.049E-02	3.205E-02	5.576E-02	NOT IDENT.
CO-58	-3.138E-03	5.239E-02	9.125E-02	NOT IDENT.
FE-59	-4.697E-02	1.211E-01	2.345E-01	NOT IDENT.
CO-60	3.438E-02	4.967E-02	1.140E-01	NOT IDENT.
ZN-65	1.505E-02	1.266E-01	2.307E-01	NOT IDENT.
GE-68	-1.525E-02	1.663E+00	3.357E+00	NOT IDENT.
AS-73	6.728E-01	2.944E+00	5.925E+00	NOT IDENT.
AS-74	-9.229E-03	2.691E-01	5.139E-01	NOT IDENT.
SE-75	-1.653E-02	6.659E-02	1.168E-01	NOT IDENT.
BR-77	0.000E+00	1.072E+04	0.000E+00	SHORT HLIF
SR-82	4.048E-01	5.805E-01	1.288E+00	NOT IDENT.
RB-83	-1.005E-02	9.302E-02	1.803E-01	NOT IDENT.
RB-84	3.130E-02	1.069E-01	2.239E-01	NOT IDENT.
KR-85	1.826E+00	7.925E+00	1.585E+01	NOT IDENT.
SR-85	1.192E-02	5.201E-02	1.040E-01	NOT IDENT.
RB-86	5.861E-01	2.022E+00	4.294E+00	NOT IDENT.
Y-88	-2.200E-02	5.524E-02	1.031E-01	NOT IDENT.
Y-91	-8.915E+00	3.228E+01	6.172E+01	NOT IDENT.
NB-94	-1.050E-02	4.040E-02	7.456E-02	NOT IDENT.
NB-95	1.609E-02	5.014E-02	9.693E-02	NOT IDENT.
NB-95M	7.637E-02	2.197E-01	3.772E-01	NOT IDENT.
ZR-95	-8.537E-03	1.242E-01	2.096E-01	NOT IDENT.
NB-97	0.000E+00	1.470E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	9.160E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.674E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.227E+41	0.000E+00	SHORT HLIF
RH-101	-1.299E-03	4.432E-02	7.661E-02	NOT IDENT.
RH-102	-6.347E-03	5.755E-02	1.115E-01	NOT IDENT.
RU-103	6.295E-02	6.422E-02	1.409E-01	FAIL ABUN
RH-106	-2.901E-02	3.480E-01	6.753E-01	NOT IDENT.
RU-106	-2.901E-02	3.480E-01	6.753E-01	NOT IDENT.
AG-108M	-1.823E-02	3.664E-02	6.776E-02	FAIL ABUN
AG-110	6.474E-01	8.604E-01	1.855E+00	NOT IDENT.
AG-110M	2.094E-02	4.985E-02	1.020E-01	NOT IDENT.
SN-113	-6.423E-02	6.338E-02	1.113E-01	NOT IDENT.
CD-115	0.000E+00	7.702E+03	0.000E+00	SHORT HLIF
SN-117M	-2.411E-02	2.030E-01	3.706E-01	NOT IDENT.
SB-122	0.000E+00	3.929E+02	0.000E+00	SHORT HLIF
TE-123M	-1.588E-02	4.211E-02	7.535E-02	NOT IDENT.
SB-124	-8.706E-03	1.279E-01	2.702E-01	NOT IDENT.
SB-125	-4.167E-02	1.223E-01	2.295E-01	NOT IDENT.
TE-125M	-7.606E+00	1.693E+01	2.850E+01	NOT IDENT.
I-126	6.328E-01	8.027E-01	1.701E+00	FAIL ABUN
SB-126	4.257E-02	5.519E-01	1.028E+00	NOT IDENT.
SB-127	4.645E+00	5.979E+01	1.172E+02	NOT IDENT.
I-131	6.330E-02	8.248E-01	1.633E+00	NOT IDENT.
I-132	0.000E+00	1.884E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.558E+01	0.000E+00	SHORT HLIF
BA-133	-2.415E-03	6.009E-02	9.756E-02	NOT IDENT.
I-133	0.000E+00	7.939E+10	0.000E+00	SHORT HLIF
CS-134	0.000E+00	6.647E-02	1.268E-01	FAIL ABUN
I-135	0.000E+00	1.622E+38	0.000E+00	SHORT HLIF
CS-136	1.441E-01	3.779E-01	7.743E-01	FAIL ABUN
BA-137M	-1.396E-03	3.845E-02	7.629E-02	NOT IDENT.
CS-137	-1.475E-03	4.062E-02	8.059E-02	NOT IDENT.
LA-138	3.163E-02	6.989E-02	1.589E-01	NOT IDENT.
CE-139	-3.027E-02	4.333E-02	7.524E-02	NOT IDENT.
BA-140	-2.402E-01	8.720E-01	1.653E+00	NOT IDENT.
LA-140	-1.532E-01	3.628E-01	6.711E-01	FAIL ABUN
CE-141	-7.911E-02	1.269E-01	2.239E-01	NOT IDENT.
CE-143	0.000E+00	5.083E+06	0.000E+00	SHORT HLIF
CE-144	-5.191E-02	2.569E-01	4.729E-01	NOT IDENT.
PM-144	-3.136E-03	5.052E-02	9.456E-02	FAIL ABUN
PR-144	-2.264E-01	3.823E+00	7.158E+00	NOT IDENT.
PM-146	5.581E-02	5.264E-02	1.136E-01	FAIL ABUN
ND-147	-1.387E+00	2.339E+00	4.213E+00	FAIL ABUN
PM-147	-9.834E+02	9.249E+02	1.594E+03	NOT IDENT.
PM-149	0.000E+00	6.653E+04	0.000E+00	SHORT HLIF
EU-150	6.620E-03	3.270E-02	5.619E-02	FAIL ABUN
EU-152	4.774E-02	1.501E-01	2.547E-01	FAIL ABUN

GD-153	0.000E+00	2.644E-01	2.071E-01	FAIL ABUN
EU-154	8.021E-02	1.649E-01	3.530E-01	NOT IDENT.
TB-160	1.469E-02	1.646E-01	3.307E-01	FAIL ABUN
HO-166M	-3.403E-02	7.540E-02	1.348E-01	FAIL ABUN
TM-171	-6.488E+00	5.608E+01	1.103E+02	NOT IDENT.
HF-172	-6.726E-02	2.731E-01	4.630E-01	FAIL ABUN
LU-172	2.794E-02	7.347E-02	1.597E-01	FAIL ABUN
LU-176	8.369E-03	3.693E-02	6.742E-02	FAIL ABUN
HF-181	2.905E-03	1.022E-01	1.441E-01	NOT IDENT.
TA-182	-1.920E-02	2.402E-01	4.777E-01	FAIL ABUN
RE-183	-5.731E-02	5.289E-01	1.039E+00	NOT IDENT.
RE-184	6.265E-02	2.319E-01	4.637E-01	NOT IDENT.
W-188	-1.861E+00	1.151E+01	2.028E+01	FAIL ABUN
IR-192	4.701E-02	4.765E-02	9.711E-02	FAIL ABUN
HG-203	1.772E-02	7.132E-02	1.306E-01	NOT IDENT.
TL-204	-4.297E+00	8.451E+00	1.579E+01	NOT IDENT.
BI-207	-3.976E-03	5.323E-02	1.051E-01	FAIL ABUN
BI-210	1.088E+01	1.485E+01	3.127E+01	NOT IDENT.
PB-210	1.088E+01	1.485E+01	3.127E+01	NOT IDENT.
PB-211	-1.477E-01	8.669E-01	1.667E+00	NOT IDENT.
BI-213	-6.732E-02	1.331E-01	2.453E-01	NOT IDENT.
RN-219	4.147E-01	4.902E-01	1.038E+00	FAIL ABUN
RA-223	-6.678E-01	9.570E-01	1.562E+00	FAIL ABUN
AC-225	-1.522E+00	3.152E+00	5.466E+00	NOT IDENT.
AC-227	-3.366E-02	3.350E-01	5.975E-01	FAIL ABUN
TH-227	-3.366E-02	3.350E-01	5.975E-01	FAIL ABUN
TH-231	-6.678E-01	9.570E-01	1.562E+00	FAIL ABUN
PA-233	-3.225E-02	7.042E-02	1.171E-01	FAIL ABUN
PA-234	-2.383E-01	3.738E-01	6.249E-01	FAIL ABUN
NP-237	-3.225E-02	7.042E-02	1.171E-01	FAIL ABUN
NP-238	0.000E+00	2.022E+04	0.000E+00	SHORT HLIF
NP-239	-1.741E-02	3.631E-01	6.320E-01	FAIL ABUN
PU-239	0.000E+00	9.949E+02	9.246E+02	FAIL ABUN
AM-241	1.513E-01	3.402E-01	6.879E-01	NOT IDENT.
CM-243	3.926E-02	1.345E-01	2.434E-01	FAIL ABUN
BK-247	-4.745E-02	1.096E-01	1.882E-01	FAIL ABUN
CM-247	1.657E-02	4.649E-02	9.386E-02	NOT IDENT.
CF-249	3.832E-02	5.503E-02	1.130E-01	NOT IDENT.
CF-251	4.856E-02	1.826E-01	3.394E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:32:30.56

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	22	10.44*	2.386E+00	5.155E-01	8.184E-01	115.11
K-40	1460.82	156	10.66*	8.745E-01	9.739E+00	9.739E+00	17.00
SC-46	889.28	10	99.98*	1.397E+00	4.015E-02	5.384E-02	100.39
	1120.55	49	99.99	1.112E+00	2.569E-01	3.445E-01	44.57
CD-109	88.03	130	3.70*	3.808E+00	5.378E+00	5.672E+00	39.59
SN-126	64.28	42	9.60	1.470E+00	1.718E+00	1.718E+00	93.89
	86.94	130	8.90	3.808E+00	2.236E+00	2.236E+00	39.59
	87.57	130	37.00*	3.808E+00	5.378E-01	5.378E-01	39.59
EU-155	86.55	130	30.70	3.808E+00	6.481E-01	6.574E-01	39.59
	105.31	12	21.10*	4.815E+00	7.117E-02	7.218E-02	361.84
TL-208	277.37	------	6.60	3.532E+00	------ Line Not Found		------
	583.19	165	85.00*	2.039E+00	5.520E-01	5.520E-01	20.64
	860.56	26	12.50	1.440E+00	8.242E-01	8.242E-01	76.62
BI-211	72.87	------	1.23	2.469E+00	------ Line Not Found		------
	351.06	477	12.92*	2.983E+00	7.203E+00	7.203E+00	12.17
BI-212	727.33	64	6.67*	1.685E+00	3.325E+00	3.325E+00	45.57
	1620.50	------	1.47	8.135E-01	------ Line Not Found		------
PB-212	74.82	100	10.28	2.676E+00	2.119E+00	2.119E+00	49.64
	77.11	220	17.10	2.911E+00	2.570E+00	2.570E+00	22.60
	238.63	450	43.60*	3.920E+00	1.532E+00	1.532E+00	12.13
	300.09	43	3.30	3.342E+00	2.272E+00	2.272E+00	81.24
BI-214	609.32	314	45.49*	1.967E+00	2.041E+00	2.041E+00	12.71
	1120.29	49	14.92	1.112E+00	1.721E+00	1.721E+00	44.57
	1764.49	54	15.30	7.787E-01	2.650E+00	2.650E+00	30.97
PB-214	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
RN-222	609.32	314	45.49*	1.967E+00	2.041E+00	2.041E+00	12.71
	1120.29	49	14.92	1.112E+00	1.721E+00	1.721E+00	44.57
	1764.49	54	15.30	7.787E-01	2.650E+00	2.650E+00	30.97
RA-224	240.99	175	4.10*	3.885E+00	6.397E+00	6.397E+00	36.00
RA-226	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
AC-228	105.21	12	1.10	4.815E+00	1.365E+00	1.365E+00	361.84
	338.32	86	11.27	3.069E+00	1.442E+00	1.442E+00	36.57
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	84	25.80*	1.363E+00	1.387E+00	1.387E+00	28.37
	968.97	62	15.80	1.283E+00	1.776E+00	1.776E+00	31.40
RA-228	105.21	12	1.10	4.815E+00	1.365E+00	1.365E+00	361.84
	338.32	86	11.27	3.069E+00	1.442E+00	1.442E+00	36.57

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	84	25.80*	1.363E+00	1.387E+00	1.387E+00	28.37
	968.97	62	15.80	1.283E+00	1.776E+00	1.776E+00	31.40
TH-228	74.82	100	10.28	2.676E+00	2.119E+00	2.119E+00	49.64
	77.11	220	17.10	2.911E+00	2.570E+00	2.570E+00	22.60
	238.63	450	43.60*	3.920E+00	1.532E+00	1.532E+00	12.13
	300.09	43	3.30	3.342E+00	2.272E+00	2.272E+00	81.24
TH-229	85.43	67	14.70	3.555E+00	7.428E-01	7.428E-01	58.75
	88.47	130	24.00	3.808E+00	8.291E-01	8.291E-01	39.59
	193.51	------	4.41*	4.488E+00	------ Line Not Found		------
	210.85	39	2.80	4.273E+00	1.900E+00	1.900E+00	107.56
TH-230	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
PA-231	283.69	------	1.70	3.477E+00	------ Line Not Found		------
	301.36	43	5.35*	3.342E+00	1.401E+00	1.401E+00	81.24
TH-232	105.21	12	1.10	4.815E+00	1.365E+00	1.365E+00	361.84
	338.32	86	11.27	3.069E+00	1.442E+00	1.442E+00	36.57
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	84	25.80*	1.363E+00	1.387E+00	1.387E+00	28.37
	968.97	62	15.80	1.283E+00	1.776E+00	1.776E+00	31.40
PA-234M	63.29	42	3.70*	1.470E+00	4.457E+00	4.457E+00	93.89
	92.59	139	4.23	4.208E+00	4.532E+00	4.532E+00	38.63
TH-234	63.29	42	3.70*	1.470E+00	4.457E+00	4.457E+00	93.89
	92.59	139	4.23	4.208E+00	4.532E+00	4.532E+00	38.63
U-234	74.82	100	5.80	2.676E+00	3.756E+00	3.756E+00	49.64
	77.11	220	9.70	2.911E+00	4.530E+00	4.530E+00	22.60
	87.09	130	3.41	3.808E+00	5.835E+00	5.835E+00	39.59
	242.00	175	7.25	3.885E+00	3.618E+00	3.618E+00	36.00
	295.22	315	18.42	3.380E+00	2.939E+00	2.939E+00	13.57
	351.93	477	35.60*	2.983E+00	2.614E+00	2.614E+00	12.17
U-235	89.96	122	3.47	4.016E+00	5.104E+00	5.104E+00	40.54
	93.35	139	5.60	4.208E+00	3.423E+00	3.423E+00	38.63
	143.76	------	10.96*	5.110E+00	------ Line Not Found		------
	163.33	------	5.08	4.900E+00	------ Line Not Found		------
	185.72	148	57.20	4.594E+00	3.279E-01	3.279E-01	44.46
	205.31	------	5.01	4.329E+00	------ Line Not Found		------
U-238	63.29	42	3.70*	1.470E+00	4.457E+00	4.457E+00	93.89
	92.59	139	4.23	4.208E+00	4.532E+00	4.532E+00	38.63
AM-243	43.53	------	5.90	9.616E-02	------ Line Not Found		------
	74.66	100	67.20*	2.676E+00	3.242E-01	3.242E-01	49.64
ANH-511	511.00	34	100.00*	2.266E+00	8.633E-02	8.633E-02	124.51

Flag: "*" = Keyline

Sample ID : G714507002 Acquisition date : 10-APR-2025 19:31:57

Total number of lines in spectrum 61
Number of unidentified lines 15
Number of lines tentatively identified by NID 46 75.41%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	5.155E-01	8.184E-01	9.420E-01	115.11	
K-40	1.25E+09Y	1.00	9.739E+00	9.739E+00	1.656E+00	17.00	
SC-46	83.79D	1.34	4.015E-02	5.384E-02	5.405E-02	100.39	
CD-109	461.40D	1.05	5.378E+00	5.672E+00	2.246E+00	39.59	
SN-126	2.30E+05Y	1.00	5.378E-01	5.378E-01	2.129E-01	39.59	
EU-155	4.75Y	1.01	7.117E-02	7.218E-02	26.12E-02	361.84	
TL-208	1.41E+10Y	1.00	5.520E-01	5.520E-01	1.139E-01	20.64	
BI-211	7.04E+08Y	1.00	7.203E+00	7.203E+00	0.877E+00	12.17	
BI-212	1.41E+10Y	1.00	3.325E+00	3.325E+00	1.515E+00	45.57	
PB-212	1.41E+10Y	1.00	1.532E+00	1.532E+00	0.186E+00	12.13	
BI-214	1600.00Y	1.00	2.041E+00	2.041E+00	0.260E+00	12.71	
PB-214	1600.00Y	1.00	2.614E+00	2.614E+00	0.318E+00	12.17	
RN-222	1600.00Y	1.00	2.041E+00	2.041E+00	0.260E+00	12.71	
RA-224	1.41E+10Y	1.00	6.397E+00	6.397E+00	2.303E+00	36.00	
RA-226	1600.00Y	1.00	2.614E+00	2.614E+00	0.318E+00	12.17	
AC-228	1.41E+10Y	1.00	1.387E+00	1.387E+00	0.393E+00	28.37	
RA-228	1.41E+10Y	1.00	1.387E+00	1.387E+00	0.393E+00	28.37	
TH-228	1.41E+10Y	1.00	1.532E+00	1.532E+00	0.186E+00	12.13	
TH-229	7340.00Y	1.00	8.291E-01	8.291E-01	3.282E-01	39.59	K
TH-230	7.54E+04Y	1.00	2.614E+00	2.614E+00	0.318E+00	12.17	
PA-231	7.04E+08Y	1.00	1.401E+00	1.401E+00	1.139E+00	81.24	
TH-232	1.41E+10Y	1.00	1.387E+00	1.387E+00	0.393E+00	28.37	
PA-234M	4.47E+09Y	1.00	4.457E+00	4.457E+00	4.185E+00	93.89	
TH-234	4.47E+09Y	1.00	4.457E+00	4.457E+00	4.185E+00	93.89	
U-234	2.45E+05Y	1.00	2.614E+00	2.614E+00	0.318E+00	12.17	
U-235	7.04E+08Y	1.00	3.279E-01	3.279E-01	1.458E-01	44.46	K
U-238	4.47E+09Y	1.00	4.457E+00	4.457E+00	4.185E+00	93.89	
AM-243	7370.00Y	1.00	3.242E-01	3.242E-01	1.609E-01	49.64	
ANH-511	1.00E+09Y	1.00	8.633E-02	8.633E-02	10.75E-02	124.51	
Total Activity :			7.186E+01	7.247E+01			

Grand Total Activity : 7.186E+01 7.247E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	94.39	56	78	1.35	189.60	166	27	1.37E-02	72.5	4.30E+00	T
0	98.50	80	157	3.48	197.82	193	11	1.95E-02	69.0	4.52E+00	T
0	112.57	86	174	2.24	225.96	221	10	2.12E-02	65.1	5.00E+00	T
0	128.84	53	192	1.26	258.50	254	10	1.32E-02	****	5.17E+00	T
0	270.32	62	71	1.59	541.39	538	10	1.61E-02	59.1	3.60E+00	T
0	329.15	21	90	0.63	659.04	654	9	5.54E-03	****	3.13E+00	T
1	341.25	19	49	1.36	683.25	673	26	5.11E-03	****	3.05E+00	T
0	379.79	27	50	1.79	760.32	756	11	7.24E-03	****	2.83E+00	
0	487.78	21	30	1.44	976.28	970	11	5.74E-03	****	2.35E+00	T
1	614.50	15	12	1.61	1229.71	1215	23	4.16E-03	****	1.95E+00	T
1	734.80	20	11	1.70	1470.31	1467	15	5.55E-03	61.5	1.67E+00	T
1	738.99	18	10	1.71	1478.69	1467	15	4.92E-03	69.4	1.66E+00	T
0	753.86	25	18	4.40	1508.44	1498	18	6.94E-03	89.1	1.63E+00	T
0	768.96	41	30	1.75	1538.63	1533	13	1.13E-02	63.2	1.60E+00	
0	795.12	33	6	1.72	1590.97	1585	12	9.17E-03	45.8	1.55E+00	T
0	807.58	11	11	1.34	1615.88	1610	10	3.21E-03	****	1.53E+00	
0	838.45	11	44	3.32	1677.63	1667	16	3.21E-03	****	1.48E+00	
0	869.14	14	18	3.62	1739.02	1733	14	3.88E-03	****	1.43E+00	
1	930.79	13	15	1.84	1862.33	1859	16	3.72E-03	97.3	1.34E+00	
1	934.66	15	12	1.84	1870.07	1859	16	4.29E-03	****	1.33E+00	T
4	964.87	23	12	2.48	1930.51	1926	19	6.43E-03	63.0	1.29E+00	T
0	1013.54	3	8	0.76	2027.84	2022	8	7.32E-04	****	1.23E+00	
0	1038.37	10	4	2.59	2077.52	2073	9	2.92E-03	95.5	1.20E+00	T
0	1138.34	10	4	0.73	2277.50	2274	8	2.78E-03	93.8	1.09E+00	
0	1175.24	11	5	1.05	2351.32	2346	10	3.06E-03	97.1	1.06E+00	
0	1238.26	26	14	1.49	2477.39	2472	11	7.46E-03	66.1	1.01E+00	T
0	1282.40	8	15	3.89	2565.68	2558	12	2.45E-03	****	9.78E-01	
0	1299.90	20	4	5.60	2600.71	2592	16	5.93E-03	60.0	9.66E-01	
0	1377.81	29	0	1.60	2756.57	2751	12	8.33E-03	36.5	9.18E-01	
0	1408.38	11	3	3.92	2817.74	2812	12	3.30E-03	82.6	9.01E-01	T
0	1625.88	6	5	3.38	3252.88	3245	11	1.69E-03	****	8.12E-01	
0	1631.33	9	0	1.58	3263.80	3260	8	2.78E-03	63.2	8.10E-01	
0	1730.07	14	2	1.46	3461.37	3457	9	4.16E-03	62.8	7.85E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:32:43.11

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507002.CNF;1   *
* Acquisition date : 10-APR-2025 19:31:57 Sensitivity     : 3.000           *
* Detector ID      : GAM04                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.54     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 08:30:00 Nuclide Library : SOLID            *
* Sample ID        : G714507002           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.2911E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20            *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	4.419E-01
K-40	3.203E-01
SC-46	3.759E-02
CD-109	8.517E-01
SN-126	8.145E-02
EU-155	1.246E-01
TL-208	3.293E-02
BI-211	2.215E-01
BI-212	5.233E-01
PB-212	6.470E-02
BI-214	6.933E-02
PB-214	8.056E-02
RN-222	6.933E-02
RA-224	6.934E-01
RA-226	8.056E-02
AC-228	1.470E-01
RA-228	1.470E-01
TH-228	6.470E-02
TH-229	5.955E-01
TH-230	8.055E-02
PA-231	4.170E-01
TH-232	1.470E-01
PA-234M	2.145E+00
TH-234	2.145E+00
U-234	8.055E-02
U-235	2.378E-01
U-238	2.145E+00
AM-243	7.926E-02
ANH-511	2.858E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	5.519E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF

AL-26	2.547E-02	NOT IDENT.
V-48	1.956E-01	NOT IDENT.
CR-51	5.500E-01	NOT IDENT.
MN-52	2.704E+00	FAIL ABUN
MN-54	4.634E-02	NOT IDENT.
CO-56	5.127E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.585E-02	NOT IDENT.
CO-58	3.823E-02	NOT IDENT.
FE-59	9.581E-02	NOT IDENT.
CO-60	4.859E-02	NOT IDENT.
ZN-65	9.989E-02	NOT IDENT.
GE-68	1.446E+00	NOT IDENT.
AS-73	2.765E+00	NOT IDENT.
AS-74	2.301E-01	NOT IDENT.
SE-75	5.379E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.567E-01	NOT IDENT.
RB-83	7.958E-02	NOT IDENT.
RB-84	9.468E-02	NOT IDENT.
KR-85	7.108E+00	NOT IDENT.
SR-85	4.664E-02	NOT IDENT.
RB-86	1.852E+00	NOT IDENT.
Y-88	3.861E-02	NOT IDENT.
Y-91	2.641E+01	NOT IDENT.
NB-94	3.271E-02	NOT IDENT.
NB-95	4.121E-02	NOT IDENT.
NB-95M	1.765E-01	NOT IDENT.
ZR-95	9.163E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.595E-02	NOT IDENT.
RH-102	4.818E-02	NOT IDENT.
RU-103	6.335E-02	FAIL ABUN
RH-106	2.934E-01	NOT IDENT.
RU-106	2.934E-01	NOT IDENT.
AG-108M	3.043E-02	FAIL ABUN
AG-110	8.218E-01	NOT IDENT.
AG-110M	4.240E-02	NOT IDENT.
SN-113	5.012E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.738E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.528E-02	NOT IDENT.
SB-124	1.038E-01	NOT IDENT.
SB-125	1.041E-01	NOT IDENT.
TE-125M	1.331E+01	NOT IDENT.
I-126	7.616E-01	FAIL ABUN
SB-126	4.506E-01	NOT IDENT.
SB-127	5.137E+01	NOT IDENT.
I-131	7.443E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.439E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.724E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	3.333E-01	FAIL ABUN
BA-137M	3.331E-02	NOT IDENT.
CS-137	3.519E-02	NOT IDENT.
LA-138	6.592E-02	NOT IDENT.
CE-139	3.514E-02	NOT IDENT.
BA-140	7.230E-01	NOT IDENT.
LA-140	2.666E-01	FAIL ABUN
CE-141	1.050E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.210E-01	NOT IDENT.
PM-144	4.241E-02	FAIL ABUN
PR-144	3.211E+00	NOT IDENT.
PM-146	5.181E-02	FAIL ABUN
ND-147	1.846E+00	FAIL ABUN
PM-147	7.401E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.539E-02	FAIL ABUN
EU-152	1.174E-01	FAIL ABUN
GD-153	9.660E-02	FAIL ABUN

EU-154	1.534E-01	NOT IDENT.
TB-160	1.391E-01	FAIL ABUN
HO-166M	5.885E-02	FAIL ABUN
TM-171	5.138E+01	NOT IDENT.
HF-172	2.171E-01	FAIL ABUN
LU-172	6.845E-02	FAIL ABUN
LU-176	3.110E-02	FAIL ABUN
HF-181	6.455E-02	NOT IDENT.
TA-182	2.035E-01	FAIL ABUN
RE-183	4.820E-01	NOT IDENT.
RE-184	2.016E-01	NOT IDENT.
W-188	9.306E+00	FAIL ABUN
IR-192	4.435E-02	FAIL ABUN
HG-203	6.056E-02	NOT IDENT.
TL-204	7.423E+00	NOT IDENT.
BI-207	4.349E-02	FAIL ABUN
BI-210	1.458E+01	NOT IDENT.
PB-210	1.458E+01	NOT IDENT.
PB-211	7.552E-01	NOT IDENT.
BI-213	1.105E-01	NOT IDENT.
RN-219	4.742E-01	FAIL ABUN
RA-223	7.175E-01	FAIL ABUN
AC-225	2.534E+00	NOT IDENT.
AC-227	2.761E-01	FAIL ABUN
TH-227	2.761E-01	FAIL ABUN
TH-231	7.175E-01	FAIL ABUN
PA-233	5.214E-02	FAIL ABUN
PA-234	2.623E-01	FAIL ABUN
NP-237	5.214E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.958E-01	FAIL ABUN
PU-239	4.374E+02	FAIL ABUN
AM-241	3.224E-01	NOT IDENT.
CM-243	1.135E-01	FAIL ABUN
BK-247	8.673E-02	FAIL ABUN
CM-247	4.283E-02	NOT IDENT.
CF-249	5.214E-02	NOT IDENT.
CF-251	1.598E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:32:47.32

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507002.CNF;1   *
* Acquisition date : 10-APR-2025 19:31:57 Sensitivity     : 3.000           *
* Detector ID      : GAM04                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.54     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 08:30:00 Nuclide Library : SOLID           *
* Sample ID        : G714507002           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.2911E+02 GRAM *
*                                         Quantity Err(%) : 1.5491E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	8.184E-01	9.258E-01	9.258E-01
K-40	9.739E+00	1.978E+00	1.978E+00
SC-46	5.384E-02	5.338E-02	5.338E-02
CD-109	5.672E+00	2.285E+00	2.285E+00
SN-126	5.378E-01	2.147E-01	2.147E-01
EU-155	7.218E-02	2.560E-01	2.560E-01
TL-208	5.520E-01	1.210E-01	1.210E-01
BI-211	7.203E+00	1.118E+00	1.118E+00
BI-212	3.325E+00	1.519E+00	1.519E+00
PB-212	1.532E+00	2.412E-01	2.412E-01
BI-214	2.041E+00	3.064E-01	3.064E-01
PB-214	2.614E+00	4.036E-01	4.036E-01
RN-222	2.041E+00	3.064E-01	3.064E-01
RA-224	6.397E+00	2.354E+00	2.354E+00
RA-226	2.614E+00	4.036E-01	4.036E-01
AC-228	1.387E+00	4.241E-01	4.241E-01
RA-228	1.387E+00	4.241E-01	4.241E-01
TH-228	1.532E+00	2.412E-01	2.412E-01
TH-229	1.713E-01	6.841E-01	6.841E-01
TH-230	2.614E+00	4.036E-01	4.036E-01
PA-231	1.401E+00	1.165E+00	1.165E+00
TH-232	1.387E+00	4.241E-01	4.241E-01
PA-234M	4.457E+00	4.241E+00	4.241E+00
TH-234	4.457E+00	4.241E+00	4.241E+00
U-234	2.614E+00	4.036E-01	4.036E-01
U-235	5.120E-02	2.717E-01	2.717E-01
U-238	4.457E+00	4.241E+00	4.241E+00
AM-243	3.242E-01	1.609E-01	1.609E-01
ANH-511	8.633E-02	1.056E-01	1.056E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	2.774E-02	6.128E-02	6.254E-02	NOT IDENT.

NA-24	-1.195E+14	5.436E+15	5.436E+15	SHORT HLIF
AL-26	1.597E-02	2.157E-02	2.274E-02	NOT IDENT.
V-48	5.754E-02	2.277E-01	2.291E-01	NOT IDENT.
CR-51	-3.274E-01	7.226E-01	7.375E-01	NOT IDENT.
MN-52	-1.600E+00	3.661E+00	3.731E+00	FAIL ABUN
MN-54	2.800E-02	5.121E-02	5.274E-02	NOT IDENT.
CO-56	1.645E-02	5.865E-02	5.912E-02	FAIL ABUN
MN-56	1.000E+41	5.604E+41	0.000E+00	SHORT HLIF
CO-57	-3.049E-02	3.215E-02	3.497E-02	NOT IDENT.
CO-58	-3.138E-03	5.239E-02	5.241E-02	NOT IDENT.
FE-59	-4.697E-02	1.212E-01	1.231E-01	NOT IDENT.
CO-60	3.438E-02	4.983E-02	5.218E-02	NOT IDENT.
ZN-65	1.505E-02	1.267E-01	1.268E-01	NOT IDENT.
GE-68	-1.525E-02	1.663E+00	1.663E+00	NOT IDENT.
AS-73	6.728E-01	2.949E+00	2.965E+00	NOT IDENT.
AS-74	-9.229E-03	2.691E-01	2.691E-01	NOT IDENT.
SE-75	-1.653E-02	6.662E-02	6.703E-02	NOT IDENT.
BR-77	9.017E+04	9.340E+04	1.019E+05	SHORT HLIF
SR-82	4.048E-01	5.819E-01	6.098E-01	NOT IDENT.
RB-83	-1.005E-02	9.303E-02	9.315E-02	NOT IDENT.
RB-84	3.130E-02	1.070E-01	1.079E-01	NOT IDENT.
KR-85	1.826E+00	7.927E+00	7.970E+00	NOT IDENT.
SR-85	1.192E-02	5.202E-02	5.230E-02	NOT IDENT.
RB-86	5.861E-01	2.023E+00	2.040E+00	NOT IDENT.
Y-88	-2.200E-02	5.527E-02	5.615E-02	NOT IDENT.
Y-91	-8.915E+00	3.229E+01	3.254E+01	NOT IDENT.
NB-94	-1.050E-02	4.041E-02	4.069E-02	NOT IDENT.
NB-95	1.609E-02	5.016E-02	5.068E-02	NOT IDENT.
NB-95M	7.637E-02	2.199E-01	2.226E-01	NOT IDENT.
ZR-95	-8.537E-03	1.242E-01	1.243E-01	NOT IDENT.
NB-97	1.000E+41	1.472E+41	0.000E+00	SHORT HLIF
ZR-97	4.749E+13	9.160E+14	9.162E+14	SHORT HLIF
MO-99	3.929E+03	2.703E+03	3.231E+03	SHORT HLIF
TC-99M	5.109E+39	1.227E+41	0.000E+00	SHORT HLIF
RH-101	-1.299E-03	4.432E-02	4.432E-02	NOT IDENT.
RH-102	-6.347E-03	5.755E-02	5.762E-02	NOT IDENT.
RU-103	6.295E-02	6.446E-02	7.043E-02	FAIL ABUN
RH-106	-2.901E-02	3.480E-01	3.482E-01	NOT IDENT.
RU-106	-2.901E-02	3.480E-01	3.482E-01	NOT IDENT.
AG-108M	-1.823E-02	3.667E-02	3.758E-02	FAIL ABUN
AG-110	6.474E-01	8.620E-01	9.101E-01	NOT IDENT.
AG-110M	2.094E-02	4.992E-02	5.080E-02	NOT IDENT.
SN-113	-6.423E-02	6.359E-02	6.988E-02	NOT IDENT.
CD-115	1.158E+03	7.703E+03	7.721E+03	SHORT HLIF
SN-117M	-2.411E-02	2.030E-01	2.033E-01	NOT IDENT.
SB-122	-1.893E+01	3.929E+02	3.930E+02	SHORT HLIF
TE-123M	-1.588E-02	4.213E-02	4.273E-02	NOT IDENT.
SB-124	-8.706E-03	1.279E-01	1.280E-01	NOT IDENT.
SB-125	-4.167E-02	1.224E-01	1.238E-01	NOT IDENT.
TE-125M	-7.606E+00	1.695E+01	1.729E+01	NOT IDENT.
I-126	6.328E-01	8.049E-01	8.539E-01	FAIL ABUN
SB-126	4.257E-02	5.519E-01	5.522E-01	NOT IDENT.
SB-127	4.645E+00	5.980E+01	5.983E+01	NOT IDENT.
I-131	6.330E-02	8.248E-01	8.253E-01	NOT IDENT.
I-132	-1.000E+41	2.887E+41	0.000E+00	SHORT HLIF
TE-132	7.355E+00	7.558E+01	7.566E+01	SHORT HLIF
BA-133	-2.415E-03	6.009E-02	6.010E-02	NOT IDENT.
I-133	-8.784E+09	7.942E+10	7.952E+10	SHORT HLIF
CS-134	1.482E-01	6.825E-02	9.552E-02	FAIL ABUN
I-135	-1.551E+38	2.052E+38	0.000E+00	SHORT HLIF
CS-136	1.441E-01	3.784E-01	3.839E-01	FAIL ABUN
BA-137M	-1.396E-03	3.845E-02	3.846E-02	NOT IDENT.
CS-137	-1.475E-03	4.062E-02	4.063E-02	NOT IDENT.
LA-138	3.163E-02	6.998E-02	7.142E-02	NOT IDENT.
CE-139	-3.027E-02	4.379E-02	4.587E-02	NOT IDENT.
BA-140	-2.402E-01	8.723E-01	8.790E-01	NOT IDENT.
LA-140	-1.532E-01	3.631E-01	3.696E-01	FAIL ABUN
CE-141	-7.911E-02	1.270E-01	1.319E-01	NOT IDENT.
CE-143	2.817E+05	5.084E+06	5.085E+06	SHORT HLIF
CE-144	-5.191E-02	2.569E-01	2.580E-01	NOT IDENT.
PM-144	-3.136E-03	5.053E-02	5.054E-02	FAIL ABUN
PR-144	-2.264E-01	3.823E+00	3.825E+00	NOT IDENT.
PM-146	5.581E-02	5.295E-02	5.862E-02	FAIL ABUN
ND-147	-1.387E+00	2.342E+00	2.424E+00	FAIL ABUN
PM-147	-9.834E+02	9.286E+02	1.029E+03	NOT IDENT.
PM-149	2.317E+04	6.666E+04	6.747E+04	SHORT HLIF
EU-150	6.620E-03	3.270E-02	3.284E-02	FAIL ABUN
EU-152	4.774E-02	1.502E-01	1.517E-01	FAIL ABUN

GD-153	3.913E-01	2.665E-01	3.196E-01	FAIL ABUN
EU-154	8.021E-02	1.651E-01	1.690E-01	NOT IDENT.
TB-160	1.469E-02	1.646E-01	1.647E-01	FAIL ABUN
HO-166M	-3.403E-02	7.547E-02	7.701E-02	FAIL ABUN
TM-171	-6.488E+00	5.609E+01	5.617E+01	NOT IDENT.
HF-172	-6.726E-02	2.733E-01	2.750E-01	FAIL ABUN
LU-172	2.794E-02	7.358E-02	7.465E-02	FAIL ABUN
LU-176	8.369E-03	3.695E-02	3.714E-02	FAIL ABUN
HF-181	2.905E-03	1.022E-01	1.022E-01	NOT IDENT.
TA-182	-1.920E-02	2.402E-01	2.403E-01	FAIL ABUN
RE-183	-5.731E-02	5.290E-01	5.296E-01	NOT IDENT.
RE-184	6.265E-02	2.320E-01	2.338E-01	NOT IDENT.
W-188	-1.861E+00	1.152E+01	1.155E+01	FAIL ABUN
IR-192	4.701E-02	4.793E-02	5.241E-02	FAIL ABUN
HG-203	1.772E-02	7.135E-02	7.179E-02	NOT IDENT.
TL-204	-4.297E+00	8.466E+00	8.685E+00	NOT IDENT.
BI-207	-3.976E-03	5.324E-02	5.327E-02	FAIL ABUN
BI-210	1.088E+01	1.492E+01	1.570E+01	NOT IDENT.
PB-210	1.088E+01	1.492E+01	1.570E+01	NOT IDENT.
PB-211	-1.477E-01	8.669E-01	8.695E-01	NOT IDENT.
BI-213	-6.732E-02	1.332E-01	1.366E-01	NOT IDENT.
RN-219	4.147E-01	4.938E-01	5.280E-01	FAIL ABUN
RA-223	-6.678E-01	9.602E-01	1.006E+00	FAIL ABUN
AC-225	-1.522E+00	3.157E+00	3.231E+00	NOT IDENT.
AC-227	-3.366E-02	3.350E-01	3.354E-01	FAIL ABUN
TH-227	-3.366E-02	3.350E-01	3.354E-01	FAIL ABUN
TH-231	-6.678E-01	9.602E-01	1.006E+00	FAIL ABUN
PA-233	-3.225E-02	7.052E-02	7.200E-02	FAIL ABUN
PA-234	-2.383E-01	4.634E-01	4.757E-01	FAIL ABUN
NP-237	-3.225E-02	7.052E-02	7.200E-02	FAIL ABUN
NP-238	9.911E+03	2.025E+04	2.074E+04	SHORT HLIF
NP-239	-1.741E-02	3.631E-01	3.632E-01	FAIL ABUN
PU-239	9.424E+02	9.979E+02	1.085E+03	FAIL ABUN
AM-241	1.513E-01	3.408E-01	3.476E-01	NOT IDENT.
CM-243	3.926E-02	1.346E-01	1.358E-01	FAIL ABUN
BK-247	-4.745E-02	1.101E-01	1.122E-01	FAIL ABUN
CM-247	1.657E-02	4.659E-02	4.718E-02	NOT IDENT.
CF-249	3.832E-02	5.518E-02	5.782E-02	NOT IDENT.
CF-251	4.856E-02	1.827E-01	1.840E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	57.2785	81.75	78.7563	123.68	63.0521
879.38	68.2362	82.47	78.8832	125.81	81.7717
46.54	48.8901	83.79	66.5262	127.23	78.0597
228.16	0.0000	265.00	66.5572	127.91	69.3554
52.39	47.1531	193.51	66.7644	129.30	69.5125
1093.63	62.9703	105.31	66.9259	131.20	70.7080
52.39	63.8987	86.79	66.9597	133.02	82.7324
125.81	50.7092	86.94	66.9818	133.52	72.9409
53.44	60.7695	87.09	67.0032	136.00	89.0593
54.07	56.7128	87.57	67.0721	136.47	90.1155
293.27	0.0000	88.03	67.1376	739.50	0.0000
482.18	58.1240	306.78	67.1816	140.51	0.0000
57.98	58.1974	88.47	67.2003	143.76	79.1097
59.27	64.3326	143.76	67.4108	144.24	71.1506
59.32	64.3416	90.64	67.5063	145.44	90.3529
59.54	64.3807	531.02	67.5723	152.43	100.4109
60.96	60.0962	92.59	67.7784	1048.07	98.4993
61.17	69.2067	93.35	67.8840	154.21	91.5161
62.93	64.1200	94.56	68.0505	158.56	93.7913
63.29	64.1813	311.90	68.0629	159.00	81.9006
290.67	64.2308	946.00	68.0658	162.33	85.3658
87.57	57.1992	94.87	68.0928	537.26	90.5486
66.73	69.0765	97.43	45.6278	163.33	76.2131
67.24	67.4371	98.43	45.7178	165.86	83.7117
67.68	70.9749	98.44	45.7185	427.87	56.5865
1221.41	74.4502	103.37	45.8162	176.60	56.6079
70.82	76.4005	116.74	45.8162	177.52	79.7643
97.43	82.6394	100.11	45.8680	181.07	0.0000
70.82	95.9588	102.03	69.0571	181.52	66.1091
279.20	95.9613	103.18	52.3740	184.41	76.2319
1063.66	99.3474	103.37	54.8877	185.72	76.3572
72.87	99.3621	911.20	77.9240	193.51	65.3142
351.06	99.3621	105.31	77.9385	197.03	60.2152
74.66	99.7884	106.12	84.0124	198.01	66.7454
351.93	99.8264	106.47	82.8125	201.83	70.2914
238.63	99.8264	109.28	78.1975	203.43	73.6736
351.93	99.8264	111.00	73.0646	205.31	68.0444
238.63	99.8264	111.76	0.0000	210.85	74.3065
74.97	99.8619	114.06	81.4167	215.65	56.0326
77.11	100.3634	116.30	0.0000	218.12	65.0012
78.74	100.7412	116.74	72.8538	222.11	56.4349
256.23	100.9600	119.76	63.5986	227.09	70.0915
80.03	101.0361	264.66	80.1656	227.38	55.6450
133.52	101.0577	121.22	80.1796	228.16	0.0000
364.49	101.0741	344.28	81.2225	228.18	54.5792
711.68	101.1606	122.06	75.4566	235.69	62.8752
356.01	64.3288	122.92	66.8469	235.96	62.8923
323.87	64.3392	1274.44	66.8638	238.63	63.0675

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	39.4404	531.02	24.2745
240.99	63.2222	338.32	39.4414	537.26	19.6738
242.00	63.2871	340.48	39.5098	1260.41	0.0000
244.70	52.8852	340.55	39.5117	552.55	20.7843
685.70	51.3934	344.28	39.6279	795.86	24.7051
388.16	58.2691	345.93	39.6797	564.24	0.0000
507.63	0.0000	351.06	38.1780	569.33	12.3927
256.23	51.5887	351.93	38.2042	569.50	15.2539
527.90	0.0000	355.39	0.0000	569.70	15.2552
264.66	50.8562	356.01	34.9915	583.19	17.2837
264.80	55.4883	364.49	34.3785	584.27	17.2939
265.00	55.4985	366.42	0.0000	595.83	25.1283
269.46	52.6380	372.51	35.4281	600.60	29.0649
270.03	48.7945	375.05	21.2969	602.52	0.0000
401.81	48.8496	377.52	34.2889	604.72	27.6697
273.65	43.5210	383.85	29.3438	607.14	32.0775
276.40	67.7864	388.16	35.8340	609.32	20.4352
583.19	45.6210	666.33	33.2855	610.33	20.4454
277.60	50.3106	391.69	43.6227	614.28	20.4856
402.40	55.0121	400.66	35.2911	618.01	17.5920
279.20	49.2136	401.81	24.9821	884.68	13.2094
279.54	57.4338	402.40	31.0247	621.93	15.6673
279.70	64.4766	404.85	33.6680	630.19	0.0000
280.46	53.9638	410.95	34.6761	631.29	14.7559
301.36	47.0630	413.71	22.5823	633.25	10.8313
284.31	42.3809	720.70	33.8957	634.78	11.8247
285.41	44.7806	423.72	29.7306	635.95	12.8170
285.90	0.0000	427.09	24.5393	636.99	18.7426
287.50	44.8652	427.87	37.7046	657.50	11.9536
290.67	44.9928	433.94	33.4541	657.76	11.9551
293.27	0.0000	439.40	28.2721	657.90	0.0000
295.22	41.6084	440.45	35.3646	661.66	12.9751
316.51	41.6362	453.88	20.5106	664.57	0.0000
298.58	41.7313	463.37	36.7809	666.33	15.0043
299.98	41.7825	468.07	40.4874	666.50	14.0051
300.09	41.7868	473.00	34.6539	667.71	0.0000
300.13	41.7879	631.29	35.2398	677.62	21.1154
311.90	41.7879	696.49	25.3271	685.70	16.1478
301.36	28.6853	477.60	25.3397	692.65	0.0000
302.85	49.4668	482.18	24.5023	695.00	26.3512
304.50	43.1455	487.02	16.3824	696.49	26.3682
304.85	40.7610	492.35	0.0000	696.51	26.3682
306.78	43.2301	497.08	14.6497	697.00	19.2737
308.46	40.8876	505.52	28.9846	697.30	19.2760
311.90	26.5339	507.63	0.0000	697.49	15.2191
316.51	21.7941	511.00	22.1533	702.65	20.3394
319.41	37.6252	514.00	22.1914	706.68	22.4136
320.08	34.0028	514.00	22.1914	711.68	21.4426
321.04	30.3841	520.40	20.4173	720.70	15.9916
323.87	57.2569	520.69	0.0000	721.93	0.0000
325.23	50.4091	667.71	0.0000	1690.97	13.8516
1596.21	55.0401	527.90	0.0000	722.91	13.8527
333.37	40.5128	528.26	20.5077	723.31	9.2366
333.97	26.2031	529.59	18.6572	756.73	13.8604
334.37	22.9351	529.87	0.0000	727.33	18.5054

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	0.0000	935.54	10.0364	1362.66	0.0000
735.93	20.1221	937.49	6.6956	1365.19	6.6582
737.46	20.1356	983.53	12.3038	1368.63	0.0000
739.50	0.0000	946.00	15.6697	1384.29	4.3694
1434.09	12.4268	949.00	12.3244	1408.01	6.7308
747.24	12.4429	954.55	0.0000	1434.09	7.7427
748.06	10.8914	962.31	10.1305	1435.80	4.8410
752.31	10.3914	964.08	10.1367	1457.56	0.0000
753.82	10.3979	966.17	10.1437	1460.82	4.8706
756.73	17.1774	968.97	10.1536	1489.16	2.9425
756.80	17.1781	983.53	12.4717	1505.03	8.8605
763.94	20.3625	984.45	0.0000	1584.12	7.0188
765.81	7.8378	996.26	14.8022	1596.21	8.0435
766.84	9.4094	1002.74	13.6934	1620.50	8.0869
772.60	0.0000	1004.73	7.9932	1621.92	8.0894
776.52	7.3478	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	4.1060
778.90	22.0647	1028.54	0.0000	1750.46	0.0000
783.70	18.9500	1037.84	8.0806	1764.49	2.0850
1435.80	10.5493	1038.76	0.0000	1770.23	8.3496
903.28	9.5072	1046.59	16.2069	1771.35	1.1931
795.86	8.4639	1048.07	9.2650	1791.20	0.0000
801.95	15.9082	1049.04	16.2194	1808.65	0.0000
810.06	9.5760	1050.41	16.2262	1810.72	0.0000
810.29	9.5768	1063.66	5.8195	1836.06	5.2884
810.45	9.5775	1077.00	10.5198		
810.76	9.5786	1077.34	13.1506		
815.77	13.8633	1085.87	15.8225		
818.51	19.2158	1093.63	8.8116		
832.01	12.8784	1099.45	9.7103		
834.85	15.0413	1112.07	19.4957		
835.71	15.0465	1112.84	14.1826		
836.80	0.0000	1115.54	12.7749		
846.75	0.0000	1120.29	7.9958		
846.77	12.9521	1120.55	7.9964		
856.80	16.2524	1121.30	7.9980		
860.56	16.2756	1808.65	10.6912		
871.09	9.8038	1131.51	0.0000		
873.19	6.5410	1147.95	0.0000		
875.33	0.0000	1332.49	8.6643		
879.38	8.7415	1177.95	4.3380		
880.51	14.2113	1189.05	8.1601		
881.60	7.6551	1204.77	14.5723		
883.24	13.1313	1221.41	11.8963		
884.68	4.9268	1231.02	10.0930		
889.28	8.2254	1235.36	7.3496		
894.76	9.8903	1238.28	12.8721		
1836.06	13.2026	1260.41	0.0000		
900.72	14.3171	1271.87	11.1357		
903.28	12.1257	1274.44	10.2151		
911.20	14.3716	1274.54	10.6131		
912.08	14.3759	1291.59	6.3976		
984.45	0.0000	1298.22	0.0000		
926.50	16.6736	1312.11	1.8762		
929.11	11.6822	1332.49	5.6591		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:33:24.15

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM38.CNF;181
                                       Background date  : 6-APR-2025 11:02:24.
Sample date      : 6-MAR-2025 09:00:00. Acquisition date : 10-APR-2025 19:32:55
Sample ID        : G714507003           Sample quantity  : 1.17800E+02 GRAM
Detector name    : GAM38                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.42  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.56*	163	172	0.92	93.44	89	8	4.52E-02	16.6	
2	0	53.06	32	115	1.77	106.46	103	7	9.01E-03	57.6	
3	0	63.38*	85	216	0.97	127.11	122	8	2.36E-02	32.7	
4	5	74.72*	310	167	1.18	149.80	144	23	8.61E-02	9.1	2.71E+00
5	5	77.07	525	142	0.94	154.50	144	23	1.46E-01	5.7	
6	5	80.44	39	236	1.75	161.26	144	23	1.07E-02	77.9	
7	1	83.92*	85	95	1.20	168.22	166	12	2.37E-02	20.5	2.05E+00
8	1	87.20	153	133	1.21	174.78	166	12	4.24E-02	15.0	
9	0	89.59	36	149	0.64	179.56	178	6	9.99E-03	55.7	
10	0	92.81*	133	187	1.12	186.01	183	10	3.68E-02	22.3	
11	0	112.10	34	76	1.24	224.61	222	6	9.52E-03	43.8	
12	0	143.48*	39	119	1.79	287.42	283	9	1.09E-02	53.1	
13	0	185.82*	138	110	1.14	372.17	368	10	3.82E-02	17.0	
14	0	209.94	54	92	1.03	420.43	415	11	1.50E-02	37.2	
15	2	238.58*	338	71	1.18	477.75	473	18	9.40E-02	6.6	4.07E+00
16	2	241.76	191	58	1.64	484.12	473	18	5.30E-02	11.8	
17	0	253.53	10	61	0.53	507.67	500	10	2.84E-03	145.4	
18	0	270.13	59	62	1.02	540.89	536	10	1.64E-02	28.8	
19	5	295.16	295	51	1.52	590.99	583	25	8.20E-02	7.0	3.06E+00
20	5	300.32	21	72	2.37	601.30	583	25	5.97E-03	91.0	
21	0	319.68	20	50	0.99	640.04	634	10	5.47E-03	72.0	
22	0	323.26*	17	33	1.47	647.21	644	8	4.72E-03	64.1	
23	0	338.69	64	64	1.47	678.09	671	12	1.78E-02	26.9	
24	0	351.80*	478	67	1.14	704.32	697	14	1.33E-01	5.9	
25	0	383.24	29	49	2.09	767.24	759	13	8.11E-03	52.7	
26	0	401.50	13	40	0.54	803.78	799	9	3.68E-03	90.5	
27	0	462.99	19	20	0.72	926.82	923	8	5.28E-03	46.8	
28	0	477.68	33	22	1.00	956.22	951	10	9.29E-03	31.6	
29	0	511.17*	25	55	1.03	1023.22	1017	14	7.04E-03	72.5	
30	0	583.23*	61	53	1.13	1167.41	1161	13	1.69E-02	27.9	
31	0	609.27*	297	11	1.29	1219.50	1214	11	8.24E-02	6.3	
32	0	647.13	16	11	0.63	1295.25	1290	9	4.54E-03	44.3	
33	0	664.91	23	9	2.01	1330.82	1326	10	6.28E-03	33.4	
34	0	720.26	12	16	0.56	1441.57	1433	11	3.23E-03	73.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	726.53*	35	18	1.60	1454.11	1446	14	9.86E-03	30.4	
36	1	753.16	14	11	2.14	1507.39	1504	15	3.97E-03	44.4	1.95E+00
37	1	757.00	14	11	2.14	1515.06	1504	15	3.98E-03	41.5	
38	0	768.58	19	21	0.66	1538.23	1533	11	5.23E-03	53.3	
39	0	806.02	16	16	0.95	1613.13	1610	8	4.44E-03	50.0	
40	0	840.26	8	8	1.06	1681.63	1678	8	2.22E-03	70.7	
41	0	860.77	20	25	0.97	1722.65	1717	16	5.52E-03	59.8	
42	0	911.25*	59	13	1.24	1823.63	1817	14	1.64E-02	19.1	
43	0	935.99	27	9	4.93	1873.11	1866	14	7.41E-03	32.0	
44	5	964.64	9	14	1.94	1930.42	1928	22	2.57E-03	62.9	3.51E+00
45	5	969.23*	39	30	3.21	1939.61	1928	22	1.09E-02	37.7	
46	0	1033.92	8	2	0.94	2069.01	2065	8	2.21E-03	47.1	
47	0	1108.98	7	2	0.56	2219.14	2214	9	1.91E-03	54.4	
48	0	1120.42	50	12	2.40	2242.01	2235	12	1.38E-02	19.9	
49	0	1185.97*	5	10	0.57	2373.10	2363	14	1.43E-03	143.6	
50	0	1238.21	23	14	1.76	2477.59	2472	13	6.38E-03	38.8	
51	0	1377.93*	13	3	0.87	2756.99	2751	11	3.57E-03	39.7	
52	0	1385.49*	7	0	1.46	2772.11	2768	8	2.06E-03	42.2	
53	0	1408.19	12	0	0.88	2817.50	2813	9	3.33E-03	28.9	
54	0	1460.52*	45	4	1.93	2922.15	2913	16	1.26E-02	18.6	
55	0	1764.34*	29	3	2.27	3529.58	3523	12	8.19E-03	22.6	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 20:33:25

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507003.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 09:00:00	Acquisition date	: 10-APR-2025 19:32:55
Sample ID	: G714507003	Sample quantity	: 117.80 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA38	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.42 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	33	10.44*	2.158E+00	9.435E-01	1.497E+00	63.11
K-40	1460.82	43	10.66*	7.423E-01	3.445E+00	3.445E+00	37.28
CR-51	320.08	20	9.91*	3.176E+00	4.056E-01	9.850E-01	144.02
AS-73	53.44	36	10.30*	7.192E+00	3.072E-01	4.173E-01	115.27
CD-109	88.03	165	3.70*	7.411E+00	3.829E+00	4.038E+00	30.01
SN-126	64.28	93	9.60	7.508E+00	8.224E-01	8.224E-01	65.38
	86.94	165	8.90	7.411E+00	1.592E+00	1.592E+00	30.01
	87.57	165	37.00*	7.411E+00	3.829E-01	3.829E-01	30.01
TL-208	277.37	------	6.60	3.618E+00	------ Line Not Found		------
	583.19	60	85.00*	1.774E+00	2.543E-01	2.543E-01	55.77
	860.56	19	12.50	1.215E+00	8.088E-01	8.088E-01	119.54
BI-210	46.54	180	4.25*	6.790E+00	3.982E+00	3.994E+00	33.24
PB-210	46.54	180	4.25*	6.790E+00	3.982E+00	3.994E+00	33.24
BI-211	72.87	------	1.23	7.566E+00	------ Line Not Found		------
	351.06	484	12.92*	2.902E+00	8.218E+00	8.218E+00	11.82
BI-212	727.33	35	6.67*	1.431E+00	2.318E+00	2.318E+00	60.79
	1620.50	------	1.47	6.759E-01	------ Line Not Found		------
PB-212	74.82	337	10.28	7.560E+00	2.760E+00	2.760E+00	18.12
	77.11	569	17.10	7.544E+00	2.809E+00	2.809E+00	11.31
	238.63	349	43.60*	4.129E+00	1.235E+00	1.235E+00	13.21
	300.09	22	3.30	3.365E+00	1.257E+00	1.257E+00	182.05
BI-214	609.32	292	45.49*	1.699E+00	2.411E+00	2.411E+00	12.55
	1120.29	48	14.92	9.468E-01	2.146E+00	2.146E+00	39.86
	1764.49	28	15.30	6.264E-01	1.834E+00	1.834E+00	45.26
PB-214	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.049E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
RN-219	271.23	60	10.80	3.705E+00	9.635E-01	9.635E-01	57.67
	401.81	13	6.60*	2.556E+00	5.040E-01	5.040E-01	181.02
RN-222	609.32	292	45.49*	1.699E+00	2.411E+00	2.411E+00	12.55
	1120.29	48	14.92	9.468E-01	2.146E+00	2.146E+00	39.86
	1764.49	28	15.30	6.264E-01	1.834E+00	1.834E+00	45.26
RA-223	81.07	42	15.00	7.511E+00	2.367E-01	2.367E-01	155.81
	83.79	92	24.70	7.464E+00	3.179E-01	3.179E-01	41.02
	94.56	------	8.67	7.266E+00	------ Line Not Found		------
	144.24	41	3.27	6.019E+00	1.343E+00	1.343E+00	106.20
	154.21	------	5.70	5.753E+00	------ Line Not Found		------
	269.46	60	13.90	3.705E+00	7.487E-01	7.487E-01	57.67
	323.87	17	3.99*	3.143E+00	8.768E-01	8.768E-01	128.18
	338.28	65	2.84	3.008E+00	4.859E+00	4.859E+00	53.83
RA-224	240.99	197	4.10*	4.083E+00	7.485E+00	7.485E+00	23.67
RA-226	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.049E+00	14.01

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
AC-228	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	65	11.27	3.008E+00	1.224E+00	1.224E+00	53.83
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	57	25.80*	1.150E+00	1.224E+00	1.224E+00	38.12
	968.97	38	15.80	1.085E+00	1.413E+00	1.413E+00	75.42
RA-228	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	65	11.27	3.008E+00	1.224E+00	1.224E+00	53.83
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	57	25.80*	1.150E+00	1.224E+00	1.224E+00	38.12
	968.97	38	15.80	1.085E+00	1.413E+00	1.413E+00	75.42
TH-228	74.82	337	10.28	7.560E+00	2.760E+00	2.760E+00	18.12
	77.11	569	17.10	7.544E+00	2.809E+00	2.809E+00	11.31
	238.63	349	43.60*	4.129E+00	1.235E+00	1.235E+00	13.21
	300.09	22	3.30	3.365E+00	1.257E+00	1.257E+00	182.05
TH-230	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.048E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
PA-231	283.69	------	1.70	3.545E+00	------ Line Not Found		------
	301.36	22	5.35*	3.365E+00	7.755E-01	7.755E-01	182.05
TH-231	81.07	42	15.00	7.511E+00	2.367E-01	2.367E-01	155.81
	83.79	92	24.70	7.464E+00	3.179E-01	3.179E-01	41.02
	94.87	------	5.69	7.259E+00	------ Line Not Found		------
	144.24	41	3.27	6.019E+00	1.343E+00	1.343E+00	106.20
	154.21	------	5.70	5.753E+00	------ Line Not Found		------
	269.46	60	13.90	3.705E+00	7.487E-01	7.487E-01	57.67
	323.87	17	3.99*	3.143E+00	8.768E-01	8.768E-01	128.18
	338.28	65	2.84	3.008E+00	4.859E+00	4.859E+00	53.83
TH-232	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	65	11.27	3.008E+00	1.224E+00	1.224E+00	53.83
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	57	25.80*	1.150E+00	1.224E+00	1.224E+00	38.12
	968.97	38	15.80	1.085E+00	1.413E+00	1.413E+00	75.42
PA-234M	63.29	93	3.70*	7.508E+00	2.134E+00	2.134E+00	65.38
	92.59	142	4.23	7.303E+00	2.940E+00	2.940E+00	44.64
TH-234	63.29	93	3.70*	7.508E+00	2.134E+00	2.134E+00	65.38
	92.59	142	4.23	7.303E+00	2.940E+00	2.940E+00	44.64
U-234	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.048E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
U-235	89.96	39	3.47	7.367E+00	9.657E-01	9.657E-01	111.33
	93.35	142	5.60	7.303E+00	2.220E+00	2.220E+00	44.64
	143.76	41	10.96*	6.019E+00	4.006E-01	4.006E-01	106.20

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	163.33	------	5.08	5.537E+00	------ Line Not Found		------
	185.72	143	57.20	5.048E+00	3.163E-01	3.163E-01	34.01
	205.31	------	5.01	4.674E+00	------ Line Not Found		------
U-238	63.29	93	3.70*	7.508E+00	2.134E+00	2.134E+00	65.38
	92.59	142	4.23	7.303E+00	2.940E+00	2.940E+00	44.64
AM-243	43.53	------	5.90	6.533E+00	------ Line Not Found		------
	74.66	337	67.20*	7.560E+00	4.222E-01	4.222E-01	18.12
CM-247	278.00	------	3.40	3.610E+00	------ Line Not Found		------
	287.50	------	2.00	3.502E+00	------ Line Not Found		------
	402.40	13	72.00*	2.556E+00	4.620E-02	4.620E-02	181.02
ANH-511	511.00	25	100.00*	2.019E+00	7.952E-02	7.952E-02	145.09

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:33:26.72

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507003.CNF;1		
Acquisition date	: 10-APR-2025 19:32:55	Sensitivity	: 3.000
Detector ID	: GAM38	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.42	Half life ratio	: *****
Sample date	: 6-MAR-2025 09:00:00	Analyst initials	: MXR1
Sample ID	: G714507003	Sample Quantity	: 1.1780E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 29-JUL-2024 10:22:36	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.497E+00	9.260E-01	1.217E+00
K-40	3.445E+00	1.258E+00	9.569E-01
CR-51	9.850E-01	1.390E+00	1.199E+00
AS-73	4.173E-01	4.714E-01	5.380E-01
CD-109	4.038E+00	1.188E+00	1.143E+00
SN-126	3.829E-01	1.126E-01	1.082E-01
TL-208	2.543E-01	1.390E-01	9.943E-02
BI-210	3.994E+00	1.301E+00	1.048E+00
PB-210	3.994E+00	1.301E+00	1.048E+00
BI-211	8.218E+00	9.521E-01	4.898E-01
BI-212	2.318E+00	1.381E+00	1.278E+00
PB-212	1.235E+00	1.598E-01	1.291E-01
BI-214	2.411E+00	2.965E-01	1.911E-01
PB-214	2.983E+00	3.455E-01	1.782E-01
RN-219	5.040E-01	8.941E-01	1.058E+00
RN-222	2.411E+00	2.965E-01	1.911E-01
RA-223	8.768E-01	1.101E+00	1.389E+00
RA-224	7.485E+00	1.737E+00	1.386E+00
RA-226	2.983E+00	3.455E-01	1.782E-01
AC-228	1.224E+00	4.573E-01	3.806E-01
RA-228	1.224E+00	4.573E-01	3.806E-01
TH-228	1.235E+00	1.598E-01	1.291E-01
TH-230	2.983E+00	3.455E-01	1.782E-01
PA-231	7.755E-01	1.384E+00	1.066E+00
TH-231	8.768E-01	1.101E+00	1.389E+00
TH-232	1.224E+00	4.573E-01	3.806E-01
PA-234M	2.134E+00	1.367E+00	1.260E+00
TH-234	2.134E+00	1.367E+00	1.260E+00
U-234	2.983E+00	3.455E-01	1.782E-01
U-235	4.006E-01	4.170E-01	4.143E-01
U-238	2.134E+00	1.367E+00	1.260E+00
AM-243	4.222E-01	7.495E-02	7.073E-02
CM-247	4.620E-02	8.196E-02	1.018E-01
ANH-511	7.952E-02	1.131E-01	8.462E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	2.840E-02	6.156E-02	1.364E-01	NOT IDENT.
NA-24	0.000E+00	7.330E+15	0.000E+00	SHORT HLIF
AL-26	-6.288E-04	2.979E-02	7.632E-02	NOT IDENT.
SC-46	2.354E-02	6.987E-02	1.442E-01	FAIL ABUN
V-48	-8.686E-02	3.185E-01	5.755E-01	NOT IDENT.
MN-52	1.793E-01	4.976E+00	1.031E+01	FAIL ABUN
MN-54	-6.259E-03	7.079E-02	1.231E-01	NOT IDENT.
CO-56	-4.910E-02	7.329E-02	1.256E-01	FAIL ABUN
MN-56	0.000E+00	1.483E+41	0.000E+00	SHORT HLIF
CO-57	4.574E-03	3.055E-02	5.438E-02	NOT IDENT.
CO-58	5.859E-02	6.290E-02	1.382E-01	NOT IDENT.
FE-59	-3.769E-02	1.634E-01	3.053E-01	NOT IDENT.
CO-60	6.681E-03	6.551E-02	1.353E-01	NOT IDENT.
ZN-65	-1.207E-01	1.608E-01	2.066E-01	NOT IDENT.
GE-68	-1.193E+00	1.817E+00	3.023E+00	NOT IDENT.
AS-74	-1.518E-01	3.022E-01	5.520E-01	NOT IDENT.
SE-75	4.287E-03	6.601E-02	1.192E-01	FAIL ABUN
BR-77	0.000E+00	9.349E+03	0.000E+00	SHORT HLIF
SR-82	-8.461E-02	8.810E-01	1.641E+00	NOT IDENT.
RB-83	6.845E-03	1.321E-01	2.430E-01	NOT IDENT.
RB-84	-1.288E-01	1.490E-01	2.412E-01	NOT IDENT.
KR-85	1.160E+01	1.184E+01	2.234E+01	NOT IDENT.
SR-85	7.602E-02	7.771E-02	1.466E-01	NOT IDENT.
RB-86	-1.518E+00	2.311E+00	3.845E+00	NOT IDENT.
Y-88	-2.069E-02	8.071E-02	1.564E-01	NOT IDENT.
Y-91	1.602E+00	2.936E+01	6.240E+01	NOT IDENT.
NB-94	1.480E-02	5.268E-02	1.054E-01	NOT IDENT.
NB-95	-8.895E-03	1.073E-01	1.757E-01	NOT IDENT.
NB-95M	-8.486E-02	2.231E-01	3.591E-01	NOT IDENT.
ZR-95	1.749E-01	1.424E-01	2.864E-01	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.455E+15	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.567E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.088E+41	0.000E+00	SHORT HLIF
RH-101	-4.113E-02	4.140E-02	6.622E-02	NOT IDENT.
RH-102	6.779E-04	6.891E-02	1.382E-01	NOT IDENT.
RU-103	-3.213E-02	9.028E-02	1.568E-01	FAIL ABUN
RH-106	-1.340E-01	4.673E-01	8.819E-01	NOT IDENT.
RU-106	-1.340E-01	4.673E-01	8.819E-01	NOT IDENT.
AG-108M	7.380E-03	5.063E-02	9.352E-02	NOT IDENT.
AG-110	3.550E-02	1.111E+00	2.187E+00	NOT IDENT.
AG-110M	-8.130E-03	6.749E-02	1.316E-01	FAIL ABUN
SN-113	-2.707E-02	7.277E-02	1.283E-01	NOT IDENT.
CD-115	0.000E+00	8.925E+03	0.000E+00	SHORT HLIF
SN-117M	2.387E-02	1.979E-01	3.786E-01	NOT IDENT.
SB-122	0.000E+00	4.851E+02	0.000E+00	SHORT HLIF
TE-123M	6.965E-03	4.051E-02	7.780E-02	NOT IDENT.
SB-124	2.992E-02	1.064E-01	2.863E-01	NOT IDENT.
SB-125	9.243E-02	1.486E-01	2.905E-01	FAIL ABUN
TE-125M	5.569E+00	1.431E+01	2.420E+01	NOT IDENT.
I-126	1.844E+00	1.208E+00	1.979E+00	FAIL ABUN
SB-126	6.843E-01	9.868E-01	1.485E+00	FAIL ABUN
SB-127	1.254E+01	7.637E+01	1.525E+02	FAIL ABUN
I-131	3.865E-01	9.352E-01	1.783E+00	FAIL ABUN
I-132	0.000E+00	1.499E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.126E+01	0.000E+00	SHORT HLIF
BA-133	3.634E-02	5.871E-02	1.077E-01	FAIL ABUN
I-133	0.000E+00	1.064E+11	0.000E+00	SHORT HLIF
CS-134	2.019E-02	6.218E-02	1.269E-01	NOT IDENT.
I-135	0.000E+00	1.874E+38	0.000E+00	SHORT HLIF
CS-136	-4.665E-02	3.885E-01	7.554E-01	NOT IDENT.
BA-137M	-1.994E-02	5.371E-02	8.586E-02	NOT IDENT.
CS-137	-2.106E-02	5.674E-02	9.070E-02	NOT IDENT.
LA-138	-2.347E-02	9.314E-02	1.811E-01	NOT IDENT.
CE-139	-3.120E-02	3.767E-02	6.766E-02	NOT IDENT.
BA-140	-1.343E+00	1.174E+00	1.724E+00	NOT IDENT.
LA-140	-1.330E-01	4.969E-01	9.484E-01	NOT IDENT.
CE-141	-1.476E-02	1.309E-01	2.090E-01	NOT IDENT.
CE-143	0.000E+00	5.528E+06	0.000E+00	SHORT HLIF
CE-144	-3.686E-02	2.661E-01	4.573E-01	FAIL ABUN
PM-144	-3.891E-03	6.313E-02	1.195E-01	FAIL ABUN
PR-144	-2.943E-01	4.775E+00	9.037E+00	NOT IDENT.
PM-146	-4.464E-02	6.227E-02	1.031E-01	NOT IDENT.
ND-147	-1.961E+00	3.467E+00	5.778E+00	FAIL ABUN

PM-147	7.759E+02	8.297E+02	1.578E+03	NOT IDENT.
PM-149	0.000E+00	6.861E+04	0.000E+00	SHORT HLIF
EU-150	-1.673E-02	4.580E-02	7.174E-02	FAIL ABUN
EU-152	-5.811E-02	1.421E-01	2.511E-01	FAIL ABUN
GD-153	2.381E-02	9.247E-02	1.556E-01	NOT IDENT.
EU-154	8.294E-02	1.734E-01	3.848E-01	FAIL ABUN
EU-155	-6.088E-02	1.164E-01	1.970E-01	FAIL ABUN
TB-160	1.488E-01	2.327E-01	5.063E-01	FAIL ABUN
HO-166M	-1.209E-02	9.717E-02	1.844E-01	FAIL ABUN
TM-171	6.973E+00	7.877E+00	9.537E+00	FAIL ABUN
HF-172	8.236E-02	2.345E-01	4.216E-01	FAIL ABUN
LU-172	1.725E-02	8.972E-02	1.831E-01	FAIL ABUN
LU-176	2.529E-02	3.414E-02	6.865E-02	FAIL ABUN
HF-181	8.417E-02	1.099E-01	2.008E-01	NOT IDENT.
TA-182	-1.266E-01	3.000E-01	5.592E-01	FAIL ABUN
RE-183	4.173E-03	9.472E-02	1.736E-01	NOT IDENT.
RE-184	1.284E-01	3.484E-01	6.943E-01	NOT IDENT.
W-188	-5.872E+00	1.244E+01	1.950E+01	FAIL ABUN
IR-192	3.394E-02	6.052E-02	1.092E-01	FAIL ABUN
HG-203	5.031E-03	6.257E-02	1.186E-01	NOT IDENT.
TL-204	-1.083E+00	3.558E+00	5.759E+00	FAIL ABUN
BI-207	-5.452E-02	8.175E-02	1.359E-01	FAIL ABUN
PB-211	-4.701E-01	1.230E+00	1.889E+00	NOT IDENT.
BI-213	8.570E-02	1.517E-01	2.997E-01	NOT IDENT.
AC-225	-3.545E-02	3.106E+00	5.835E+00	NOT IDENT.
AC-227	1.579E-01	3.939E-01	6.873E-01	FAIL ABUN
TH-227	1.579E-01	3.939E-01	6.873E-01	FAIL ABUN
TH-229	-1.237E-01	6.403E-01	1.194E+00	FAIL ABUN
PA-233	8.925E-02	8.411E-02	1.739E-01	FAIL ABUN
PA-234	-3.512E-01	4.480E-01	7.348E-01	FAIL ABUN
NP-237	8.925E-02	8.411E-02	1.739E-01	FAIL ABUN
NP-238	0.000E+00	2.634E+04	0.000E+00	SHORT HLIF
NP-239	7.076E-02	2.946E-01	5.297E-01	NOT IDENT.
PU-239	3.385E+02	4.380E+02	8.062E+02	NOT IDENT.
AM-241	1.915E-02	7.226E-02	1.242E-01	NOT IDENT.
CM-243	8.568E-02	1.117E-01	2.096E-01	NOT IDENT.
BK-247	-2.701E-02	1.106E-01	1.926E-01	FAIL ABUN
CF-249	3.953E-02	5.670E-02	1.098E-01	FAIL ABUN
CF-251	3.379E-02	1.657E-01	3.178E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:33:25.19

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	33	10.44*	2.158E+00	9.435E-01	1.497E+00	63.11
K-40	1460.82	43	10.66*	7.423E-01	3.445E+00	3.445E+00	37.28
CR-51	320.08	20	9.91*	3.176E+00	4.056E-01	9.850E-01	144.02
AS-73	53.44	36	10.30*	7.192E+00	3.072E-01	4.173E-01	115.27
CD-109	88.03	165	3.70*	7.411E+00	3.829E+00	4.038E+00	30.01
SN-126	64.28	93	9.60	7.508E+00	8.224E-01	8.224E-01	65.38
	86.94	165	8.90	7.411E+00	1.592E+00	1.592E+00	30.01
	87.57	165	37.00*	7.411E+00	3.829E-01	3.829E-01	30.01
TL-208	277.37	------	6.60	3.618E+00	------ Line Not Found		------
	583.19	60	85.00*	1.774E+00	2.543E-01	2.543E-01	55.77
	860.56	19	12.50	1.215E+00	8.088E-01	8.088E-01	119.54
BI-210	46.54	180	4.25*	6.790E+00	3.982E+00	3.994E+00	33.24
PB-210	46.54	180	4.25*	6.790E+00	3.982E+00	3.994E+00	33.24
BI-211	72.87	------	1.23	7.566E+00	------ Line Not Found		------
	351.06	484	12.92*	2.902E+00	8.218E+00	8.218E+00	11.82
BI-212	727.33	35	6.67*	1.431E+00	2.318E+00	2.318E+00	60.79
	1620.50	------	1.47	6.759E-01	------ Line Not Found		------
PB-212	74.82	337	10.28	7.560E+00	2.760E+00	2.760E+00	18.12
	77.11	569	17.10	7.544E+00	2.809E+00	2.809E+00	11.31
	238.63	349	43.60*	4.129E+00	1.235E+00	1.235E+00	13.21
	300.09	22	3.30	3.365E+00	1.257E+00	1.257E+00	182.05
BI-214	609.32	292	45.49*	1.699E+00	2.411E+00	2.411E+00	12.55
	1120.29	48	14.92	9.468E-01	2.146E+00	2.146E+00	39.86
	1764.49	28	15.30	6.264E-01	1.834E+00	1.834E+00	45.26
PB-214	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.049E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
RN-219	271.23	60	10.80	3.705E+00	9.635E-01	9.635E-01	57.67
	401.81	13	6.60*	2.556E+00	5.040E-01	5.040E-01	181.02
RN-222	609.32	292	45.49*	1.699E+00	2.411E+00	2.411E+00	12.55
	1120.29	48	14.92	9.468E-01	2.146E+00	2.146E+00	39.86
	1764.49	28	15.30	6.264E-01	1.834E+00	1.834E+00	45.26
RA-223	81.07	42	15.00	7.511E+00	2.367E-01	2.367E-01	155.81
	83.79	92	24.70	7.464E+00	3.179E-01	3.179E-01	41.02
	94.56	------	8.67	7.266E+00	------ Line Not Found		------
	144.24	41	3.27	6.019E+00	1.343E+00	1.343E+00	106.20
	154.21	------	5.70	5.753E+00	------ Line Not Found		------
	269.46	60	13.90	3.705E+00	7.487E-01	7.487E-01	57.67
	323.87	17	3.99*	3.143E+00	8.768E-01	8.768E-01	128.18
	338.28	65	2.84	3.008E+00	4.859E+00	4.859E+00	53.83
RA-224	240.99	197	4.10*	4.083E+00	7.485E+00	7.485E+00	23.67
RA-226	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.049E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
AC-228	105.21	------	1.10	7.016E+00	------	Line Not Found	------
	338.32	65	11.27	3.008E+00	1.224E+00	1.224E+00	53.83
	835.71	------	1.61	1.250E+00	------	Line Not Found	------
	911.20	57	25.80*	1.150E+00	1.224E+00	1.224E+00	38.12
	968.97	38	15.80	1.085E+00	1.413E+00	1.413E+00	75.42
RA-228	105.21	------	1.10	7.016E+00	------	Line Not Found	------
	338.32	65	11.27	3.008E+00	1.224E+00	1.224E+00	53.83
	835.71	------	1.61	1.250E+00	------	Line Not Found	------
	911.20	57	25.80*	1.150E+00	1.224E+00	1.224E+00	38.12
	968.97	38	15.80	1.085E+00	1.413E+00	1.413E+00	75.42
TH-228	74.82	337	10.28	7.560E+00	2.760E+00	2.760E+00	18.12
	77.11	569	17.10	7.544E+00	2.809E+00	2.809E+00	11.31
	238.63	349	43.60*	4.129E+00	1.235E+00	1.235E+00	13.21
	300.09	22	3.30	3.365E+00	1.257E+00	1.257E+00	182.05
TH-230	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.048E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
PA-231	283.69	------	1.70	3.545E+00	------	Line Not Found	------
	301.36	22	5.35*	3.365E+00	7.755E-01	7.755E-01	182.05
TH-231	81.07	42	15.00	7.511E+00	2.367E-01	2.367E-01	155.81
	83.79	92	24.70	7.464E+00	3.179E-01	3.179E-01	41.02
	94.87	------	5.69	7.259E+00	------	Line Not Found	------
	144.24	41	3.27	6.019E+00	1.343E+00	1.343E+00	106.20
	154.21	------	5.70	5.753E+00	------	Line Not Found	------
	269.46	60	13.90	3.705E+00	7.487E-01	7.487E-01	57.67
	323.87	17	3.99*	3.143E+00	8.768E-01	8.768E-01	128.18
	338.28	65	2.84	3.008E+00	4.859E+00	4.859E+00	53.83
TH-232	105.21	------	1.10	7.016E+00	------	Line Not Found	------
	338.32	65	11.27	3.008E+00	1.224E+00	1.224E+00	53.83
	835.71	------	1.61	1.250E+00	------	Line Not Found	------
	911.20	57	25.80*	1.150E+00	1.224E+00	1.224E+00	38.12
	968.97	38	15.80	1.085E+00	1.413E+00	1.413E+00	75.42
PA-234M	63.29	93	3.70*	7.508E+00	2.134E+00	2.134E+00	65.38
	92.59	142	4.23	7.303E+00	2.940E+00	2.940E+00	44.64
TH-234	63.29	93	3.70*	7.508E+00	2.134E+00	2.134E+00	65.38
	92.59	142	4.23	7.303E+00	2.940E+00	2.940E+00	44.64
U-234	74.82	337	5.80	7.560E+00	4.891E+00	4.891E+00	18.12
	77.11	569	9.70	7.544E+00	4.952E+00	4.952E+00	11.31
	87.09	165	3.41	7.411E+00	4.154E+00	4.154E+00	30.01
	242.00	197	7.25	4.083E+00	4.233E+00	4.233E+00	23.67
	295.22	301	18.42	3.419E+00	3.048E+00	3.048E+00	14.01
	351.93	484	35.60*	2.902E+00	2.983E+00	2.983E+00	11.82
U-235	89.96	39	3.47	7.367E+00	9.657E-01	9.657E-01	111.33

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	93.35	142	5.60	7.303E+00	2.220E+00	2.220E+00	44.64
	143.76	41	10.96*	6.019E+00	4.006E-01	4.006E-01	106.20
	163.33	------	5.08	5.537E+00	------ Line Not Found		------
	185.72	143	57.20	5.048E+00	3.163E-01	3.163E-01	34.01
	205.31	------	5.01	4.674E+00	------ Line Not Found		------
U-238	63.29	93	3.70*	7.508E+00	2.134E+00	2.134E+00	65.38
	92.59	142	4.23	7.303E+00	2.940E+00	2.940E+00	44.64
AM-243	43.53	------	5.90	6.533E+00	------ Line Not Found		------
	74.66	337	67.20*	7.560E+00	4.222E-01	4.222E-01	18.12
CM-247	278.00	------	3.40	3.610E+00	------ Line Not Found		------
	287.50	------	2.00	3.502E+00	------ Line Not Found		------
	402.40	13	72.00*	2.556E+00	4.620E-02	4.620E-02	181.02
ANH-511	511.00	25	100.00*	2.019E+00	7.952E-02	7.952E-02	145.09

Flag: "*" = Keyline

Sample ID : G714507003 Acquisition date : 10-APR-2025 19:32:55

Total number of lines in spectrum 55
Number of unidentified lines 8
Number of lines tentatively identified by NID 47 85.45%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	9.435E-01	1.497E+00	0.945E+00	63.11	
K-40	1.25E+09Y	1.00	3.445E+00	3.445E+00	1.284E+00	37.28	
CR-51	27.70D	2.43	4.056E-01	9.850E-01	14.19E-01	144.02	
AS-73	80.30D	1.36	3.072E-01	4.173E-01	4.810E-01	115.27	
CD-109	461.40D	1.05	3.829E+00	4.038E+00	1.212E+00	30.01	
SN-126	2.30E+05Y	1.00	3.829E-01	3.829E-01	1.149E-01	30.01	
TL-208	1.41E+10Y	1.00	2.543E-01	2.543E-01	1.418E-01	55.77	
BI-210	22.20Y	1.00	3.982E+00	3.994E+00	1.328E+00	33.24	
PB-210	22.20Y	1.00	3.982E+00	3.994E+00	1.328E+00	33.24	
BI-211	7.04E+08Y	1.00	8.218E+00	8.218E+00	0.972E+00	11.82	
BI-212	1.41E+10Y	1.00	2.318E+00	2.318E+00	1.409E+00	60.79	
PB-212	1.41E+10Y	1.00	1.235E+00	1.235E+00	0.163E+00	13.21	
BI-214	1600.00Y	1.00	2.411E+00	2.411E+00	0.303E+00	12.55	
PB-214	1600.00Y	1.00	2.983E+00	2.983E+00	0.353E+00	11.82	
RN-219	7.04E+08Y	1.00	5.040E-01	5.040E-01	9.124E-01	181.02	
RN-222	1600.00Y	1.00	2.411E+00	2.411E+00	0.303E+00	12.55	
RA-223	7.04E+08Y	1.00	8.768E-01	8.768E-01	11.24E-01	128.18	
RA-224	1.41E+10Y	1.00	7.485E+00	7.485E+00	1.772E+00	23.67	
RA-226	1600.00Y	1.00	2.983E+00	2.983E+00	0.353E+00	11.82	
AC-228	1.41E+10Y	1.00	1.224E+00	1.224E+00	0.467E+00	38.12	
RA-228	1.41E+10Y	1.00	1.224E+00	1.224E+00	0.467E+00	38.12	
TH-228	1.41E+10Y	1.00	1.235E+00	1.235E+00	0.163E+00	13.21	
TH-230	7.54E+04Y	1.00	2.983E+00	2.983E+00	0.353E+00	11.82	
PA-231	7.04E+08Y	1.00	7.755E-01	7.755E-01	14.12E-01	182.05	
TH-231	7.04E+08Y	1.00	8.768E-01	8.768E-01	11.24E-01	128.18	
TH-232	1.41E+10Y	1.00	1.224E+00	1.224E+00	0.467E+00	38.12	
PA-234M	4.47E+09Y	1.00	2.134E+00	2.134E+00	1.395E+00	65.38	
TH-234	4.47E+09Y	1.00	2.134E+00	2.134E+00	1.395E+00	65.38	
U-234	2.45E+05Y	1.00	2.983E+00	2.983E+00	0.353E+00	11.82	
U-235	7.04E+08Y	1.00	4.006E-01	4.006E-01	4.255E-01	106.20	
U-238	4.47E+09Y	1.00	2.134E+00	2.134E+00	1.395E+00	65.38	
AM-243	7370.00Y	1.00	4.222E-01	4.222E-01	0.765E-01	18.12	
CM-247	1.56E+07Y	1.00	4.620E-02	4.620E-02	8.363E-02	181.02	
ANH-511	1.00E+09Y	1.00	7.952E-02	7.952E-02	11.54E-02	145.09	
	Total Activity :		6.883E+01	7.031E+01			

Grand Total Activity : 6.883E+01 7.031E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	112.10	37	81	1.24	224.61	222	6	9.52E-03	87.5	6.84E+00	T
0	209.94	56	95	1.03	420.43	415	11	1.50E-02	74.4	4.59E+00	T
0	253.53	11	62	0.53	507.67	500	10	2.84E-03	****	3.92E+00	T
0	383.24	29	49	2.09	767.24	759	13	8.11E-03	****	2.67E+00	T
0	462.99	19	20	0.72	926.82	923	8	5.28E-03	93.6	2.23E+00	T
0	647.13	16	10	0.63	1295.25	1290	9	4.54E-03	88.6	1.60E+00	
0	664.91	22	9	2.01	1330.82	1326	10	6.28E-03	66.8	1.56E+00	T
0	720.26	11	16	0.56	1441.57	1433	11	3.23E-03	****	1.44E+00	T
1	753.16	14	10	2.14	1507.39	1504	15	3.97E-03	88.9	1.38E+00	T
1	757.00	14	10	2.14	1515.06	1504	15	3.98E-03	83.1	1.37E+00	T
0	768.58	18	21	0.66	1538.23	1533	11	5.23E-03	****	1.35E+00	
0	806.02	16	16	0.95	1613.13	1610	8	4.44E-03	****	1.29E+00	
0	840.26	8	8	1.06	1681.63	1678	8	2.22E-03	****	1.24E+00	
0	935.99	26	9	4.93	1873.11	1866	14	7.41E-03	64.0	1.12E+00	T
5	964.64	9	13	1.94	1930.42	1928	22	2.57E-03	****	1.09E+00	T
0	1033.92	8	2	0.94	2069.01	2065	8	2.21E-03	94.1	1.02E+00	
0	1108.98	7	2	0.56	2219.14	2214	9	1.91E-03	****	9.56E-01	
0	1185.97	5	10	0.57	2373.10	2363	14	1.43E-03	****	8.98E-01	
0	1238.21	22	13	1.76	2477.59	2472	13	6.38E-03	77.5	8.63E-01	T
0	1377.93	12	3	0.87	2756.99	2751	11	3.57E-03	79.3	7.83E-01	
0	1385.49	7	0	1.46	2772.11	2768	8	2.06E-03	84.3	7.79E-01	T
0	1408.19	11	0	0.88	2817.50	2813	9	3.33E-03	57.7	7.67E-01	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:33:36.57

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507003.CNF;1   *
* Acquisition date : 10-APR-2025 19:32:55 Sensitivity     : 3.000           *
* Detector ID      : GAM38                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 09:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507003           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.1780E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5             *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	5.472E-01
K-40	3.698E-01
CR-51	5.321E-01
AS-73	2.529E-01
CD-109	5.376E-01
SN-126	5.089E-02
TL-208	4.397E-02
BI-210	4.932E-01
PB-210	4.932E-01
BI-211	2.218E-01
BI-212	5.483E-01
PB-212	5.971E-02
BI-214	8.435E-02
PB-214	8.070E-02
RN-219	4.773E-01
RN-222	8.435E-02
RA-223	6.247E-01
RA-224	6.411E-01
RA-226	8.070E-02
AC-228	1.612E-01
RA-228	1.612E-01
TH-228	5.971E-02
TH-230	8.069E-02
PA-231	4.846E-01
TH-231	6.247E-01
TH-232	1.612E-01
PA-234M	5.983E-01
TH-234	5.983E-01
U-234	8.069E-02
U-235	1.939E-01
U-238	5.983E-01
AM-243	3.363E-02
CM-247	4.620E-02
ANH-511	3.802E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	5.769E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.412E-02	NOT IDENT.
SC-46	6.227E-02	FAIL ABUN
V-48	2.502E-01	NOT IDENT.
MN-52	4.231E+00	FAIL ABUN
MN-54	5.408E-02	NOT IDENT.
CO-56	5.318E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.549E-02	NOT IDENT.
CO-58	5.953E-02	NOT IDENT.
FE-59	1.252E-01	NOT IDENT.
CO-60	5.684E-02	NOT IDENT.
ZN-65	8.349E-02	NOT IDENT.
GE-68	1.213E+00	NOT IDENT.
AS-74	2.423E-01	NOT IDENT.
SE-75	5.480E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	7.080E-01	NOT IDENT.
RB-83	1.086E-01	NOT IDENT.
RB-84	9.830E-02	NOT IDENT.
KR-85	1.017E+01	NOT IDENT.
SR-85	6.674E-02	NOT IDENT.
RB-86	1.543E+00	NOT IDENT.
Y-88	6.022E-02	NOT IDENT.
Y-91	2.551E+01	NOT IDENT.
NB-94	4.683E-02	NOT IDENT.
NB-95	7.850E-02	NOT IDENT.
NB-95M	1.672E-01	NOT IDENT.
ZR-95	1.263E-01	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.107E-02	NOT IDENT.
RH-102	5.950E-02	NOT IDENT.
RU-103	6.979E-02	FAIL ABUN
RH-106	3.850E-01	NOT IDENT.
RU-106	3.850E-01	NOT IDENT.
AG-108M	4.272E-02	NOT IDENT.
AG-110	9.592E-01	NOT IDENT.
AG-110M	5.475E-02	FAIL ABUN
SN-113	5.785E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.784E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.664E-02	NOT IDENT.
SB-124	1.014E-01	NOT IDENT.
SB-125	1.328E-01	FAIL ABUN
TE-125M	1.138E+01	NOT IDENT.
I-126	8.764E-01	FAIL ABUN
SB-126	6.611E-01	FAIL ABUN
SB-127	6.706E+01	FAIL ABUN
I-131	8.105E-01	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.894E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	5.547E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	3.085E-01	NOT IDENT.
BA-137M	3.677E-02	NOT IDENT.
CS-137	3.885E-02	NOT IDENT.
LA-138	7.316E-02	NOT IDENT.
CE-139	3.144E-02	NOT IDENT.
BA-140	7.348E-01	NOT IDENT.
LA-140	3.840E-01	NOT IDENT.
CE-141	9.804E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.149E-01	FAIL ABUN
PM-144	5.350E-02	FAIL ABUN
PR-144	4.047E+00	NOT IDENT.
PM-146	4.558E-02	NOT IDENT.
ND-147	2.570E+00	FAIL ABUN
PM-147	7.412E+02	NOT IDENT.

PM-149	0.000E+00	SHORT HLIF
EU-150	3.289E-02	FAIL ABUN
EU-152	1.145E-01	FAIL ABUN
GD-153	7.313E-02	NOT IDENT.
EU-154	1.630E-01	FAIL ABUN
EU-155	9.248E-02	FAIL ABUN
TB-160	2.193E-01	FAIL ABUN
HO-166M	8.128E-02	FAIL ABUN
TM-171	4.497E+00	FAIL ABUN
HF-172	1.984E-01	FAIL ABUN
LU-172	7.694E-02	FAIL ABUN
LU-176	3.151E-02	FAIL ABUN
HF-181	9.144E-02	NOT IDENT.
TA-182	2.344E-01	FAIL ABUN
RE-183	8.186E-02	NOT IDENT.
RE-184	3.081E-01	NOT IDENT.
W-188	8.863E+00	FAIL ABUN
IR-192	5.003E-02	FAIL ABUN
HG-203	5.426E-02	NOT IDENT.
TL-204	2.729E+00	FAIL ABUN
BI-207	5.631E-02	FAIL ABUN
PB-211	8.541E-01	NOT IDENT.
BI-213	1.355E-01	NOT IDENT.
AC-225	2.717E+00	NOT IDENT.
AC-227	3.201E-01	FAIL ABUN
TH-227	3.201E-01	FAIL ABUN
TH-229	5.568E-01	FAIL ABUN
PA-233	7.999E-02	FAIL ABUN
PA-234	3.026E-01	FAIL ABUN
NP-237	7.999E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.484E-01	NOT IDENT.
PU-239	3.814E+02	NOT IDENT.
AM-241	5.881E-02	NOT IDENT.
CM-243	9.885E-02	NOT IDENT.
BK-247	8.859E-02	FAIL ABUN
CF-249	4.990E-02	FAIL ABUN
CF-251	1.492E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:33:40.64

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507003.CNF;1    *
* Acquisition date : 10-APR-2025 19:32:55 Sensitivity     : 3.000          *
* Detector ID      : GAM38                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 09:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507003           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 1.1780E+02 GRAM   *
*                                         Quantity Err(%) : 1.6978E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5           *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.497E+00	9.357E-01	9.357E-01
K-40	3.445E+00	1.297E+00	1.297E+00
CR-51	9.850E-01	1.392E+00	1.392E+00
AS-73	4.173E-01	4.793E-01	4.793E-01
CD-109	4.038E+00	1.253E+00	1.253E+00
SN-126	3.829E-01	1.171E-01	1.171E-01
TL-208	2.543E-01	1.409E-01	1.409E-01
BI-210	3.994E+00	1.353E+00	1.353E+00
PB-210	3.994E+00	1.353E+00	1.353E+00
BI-211	8.218E+00	1.173E+00	1.173E+00
BI-212	2.318E+00	1.398E+00	1.398E+00
PB-212	1.235E+00	2.037E-01	2.037E-01
BI-214	2.411E+00	3.687E-01	3.687E-01
PB-214	2.983E+00	4.231E-01	4.231E-01
RN-219	5.040E-01	8.971E-01	8.971E-01
RN-222	2.411E+00	3.687E-01	3.687E-01
RA-223	8.768E-01	1.104E+00	1.104E+00
RA-224	7.485E+00	1.895E+00	1.895E+00
RA-226	2.983E+00	4.231E-01	4.231E-01
AC-228	1.224E+00	4.729E-01	4.729E-01
RA-228	1.224E+00	4.729E-01	4.729E-01
TH-228	1.235E+00	2.037E-01	2.037E-01
TH-230	2.983E+00	4.231E-01	4.231E-01
PA-231	7.755E-01	1.394E+00	1.394E+00
TH-231	8.768E-01	1.104E+00	1.104E+00
TH-232	1.224E+00	4.729E-01	4.729E-01
PA-234M	2.134E+00	1.450E+00	1.450E+00
TH-234	2.134E+00	1.450E+00	1.450E+00
U-234	2.983E+00	4.231E-01	4.231E-01
U-235	4.006E-01	4.194E-01	4.194E-01
U-238	2.134E+00	1.450E+00	1.450E+00
AM-243	4.222E-01	8.215E-02	8.215E-02
CM-247	4.620E-02	8.240E-02	8.240E-02
ANH-511	7.952E-02	1.133E-01	1.133E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	2.840E-02	6.160E-02	6.292E-02	NOT IDENT.
NA-24	-1.985E+15	7.332E+15	7.387E+15	SHORT HLIF
AL-26	-6.288E-04	2.979E-02	2.979E-02	NOT IDENT.
SC-46	2.354E-02	6.991E-02	7.071E-02	FAIL ABUN
V-48	-8.686E-02	3.186E-01	3.210E-01	NOT IDENT.
MN-52	1.793E-01	4.976E+00	4.977E+00	FAIL ABUN
MN-54	-6.259E-03	7.080E-02	7.085E-02	NOT IDENT.
CO-56	-4.910E-02	7.344E-02	7.670E-02	FAIL ABUN
MN-56	-1.000E+41	1.486E+41	0.000E+00	SHORT HLIF
CO-57	4.574E-03	3.056E-02	3.063E-02	NOT IDENT.
CO-58	5.859E-02	6.314E-02	6.844E-02	NOT IDENT.
FE-59	-3.769E-02	1.634E-01	1.643E-01	NOT IDENT.
CO-60	6.681E-03	6.551E-02	6.558E-02	NOT IDENT.
ZN-65	-1.207E-01	1.611E-01	1.700E-01	NOT IDENT.
GE-68	-1.193E+00	1.820E+00	1.898E+00	NOT IDENT.
AS-74	-1.518E-01	3.027E-01	3.103E-01	NOT IDENT.
SE-75	4.287E-03	6.601E-02	6.604E-02	FAIL ABUN
BR-77	7.225E+04	7.488E+04	8.165E+04	SHORT HLIF
SR-82	-8.461E-02	8.811E-01	8.819E-01	NOT IDENT.
RB-83	6.845E-03	1.321E-01	1.322E-01	NOT IDENT.
RB-84	-1.288E-01	1.495E-01	1.603E-01	NOT IDENT.
KR-85	1.160E+01	1.189E+01	1.299E+01	NOT IDENT.
SR-85	7.602E-02	7.801E-02	8.520E-02	NOT IDENT.
RB-86	-1.518E+00	2.315E+00	2.414E+00	NOT IDENT.
Y-88	-2.069E-02	8.073E-02	8.126E-02	NOT IDENT.
Y-91	1.602E+00	2.936E+01	2.937E+01	NOT IDENT.
NB-94	1.480E-02	5.269E-02	5.311E-02	NOT IDENT.
NB-95	-8.895E-03	1.073E-01	1.073E-01	NOT IDENT.
NB-95M	-8.486E-02	2.234E-01	2.266E-01	NOT IDENT.
ZR-95	1.749E-01	1.433E-01	1.636E-01	FAIL ABUN
NB-97	1.000E+41	2.375E+42	0.000E+00	SHORT HLIF
ZR-97	-3.122E+14	1.455E+15	1.462E+15	SHORT HLIF
MO-99	-1.665E+03	2.572E+03	2.679E+03	SHORT HLIF
TC-99M	4.319E+40	1.090E+41	0.000E+00	SHORT HLIF
RH-101	-4.113E-02	4.221E-02	4.611E-02	NOT IDENT.
RH-102	6.779E-04	6.891E-02	6.891E-02	NOT IDENT.
RU-103	-3.213E-02	9.033E-02	9.148E-02	FAIL ABUN
RH-106	-1.340E-01	4.675E-01	4.714E-01	NOT IDENT.
RU-106	-1.340E-01	4.675E-01	4.714E-01	NOT IDENT.
AG-108M	7.380E-03	5.063E-02	5.074E-02	NOT IDENT.
AG-110	3.550E-02	1.111E+00	1.111E+00	NOT IDENT.
AG-110M	-8.130E-03	6.749E-02	6.759E-02	FAIL ABUN
SN-113	-2.707E-02	7.280E-02	7.382E-02	NOT IDENT.
CD-115	2.531E+03	8.928E+03	9.001E+03	SHORT HLIF
SN-117M	2.387E-02	1.979E-01	1.982E-01	NOT IDENT.
SB-122	1.653E+02	4.853E+02	4.910E+02	SHORT HLIF
TE-123M	6.965E-03	4.052E-02	4.064E-02	NOT IDENT.
SB-124	2.992E-02	1.064E-01	1.072E-01	NOT IDENT.
SB-125	9.243E-02	1.488E-01	1.546E-01	FAIL ABUN
TE-125M	5.569E+00	1.432E+01	1.454E+01	NOT IDENT.
I-126	1.844E+00	1.222E+00	1.478E+00	FAIL ABUN
SB-126	6.843E-01	9.907E-01	1.038E+00	FAIL ABUN
SB-127	1.254E+01	7.641E+01	7.661E+01	FAIL ABUN
I-131	3.865E-01	9.358E-01	9.518E-01	FAIL ABUN
I-132	1.000E+41	2.652E+41	0.000E+00	SHORT HLIF
TE-132	-2.279E+01	7.132E+01	7.206E+01	SHORT HLIF
BA-133	3.634E-02	5.879E-02	6.103E-02	FAIL ABUN
I-133	-3.200E+10	1.067E+11	1.077E+11	SHORT HLIF
CS-134	2.019E-02	6.221E-02	6.287E-02	NOT IDENT.
I-135	4.340E+37	1.907E+38	0.000E+00	SHORT HLIF
CS-136	-4.665E-02	3.885E-01	3.891E-01	NOT IDENT.
BA-137M	-1.994E-02	5.374E-02	5.449E-02	NOT IDENT.
CS-137	-2.106E-02	5.677E-02	5.756E-02	NOT IDENT.
LA-138	-2.347E-02	9.316E-02	9.376E-02	NOT IDENT.
CE-139	-3.120E-02	3.835E-02	4.084E-02	NOT IDENT.
BA-140	-1.343E+00	1.180E+00	1.327E+00	NOT IDENT.
LA-140	-1.330E-01	4.971E-01	5.007E-01	NOT IDENT.
CE-141	-1.476E-02	1.309E-01	1.311E-01	NOT IDENT.
CE-143	1.625E+07	5.680E+06	9.271E+06	SHORT HLIF
CE-144	-3.686E-02	2.661E-01	2.666E-01	FAIL ABUN
PM-144	-3.891E-03	6.313E-02	6.316E-02	FAIL ABUN
PR-144	-2.943E-01	4.775E+00	4.777E+00	NOT IDENT.
PM-146	-4.464E-02	6.245E-02	6.561E-02	NOT IDENT.
ND-147	-1.961E+00	3.472E+00	3.583E+00	FAIL ABUN

PM-147	7.759E+02	8.333E+02	9.037E+02	NOT IDENT.
PM-149	-8.970E+03	6.862E+04	6.874E+04	SHORT HLIF
EU-150	-1.673E-02	4.582E-02	4.644E-02	FAIL ABUN
EU-152	-5.811E-02	1.422E-01	1.446E-01	FAIL ABUN
GD-153	2.381E-02	9.250E-02	9.312E-02	NOT IDENT.
EU-154	8.294E-02	1.736E-01	1.775E-01	FAIL ABUN
EU-155	-6.088E-02	1.166E-01	1.198E-01	FAIL ABUN
TB-160	1.488E-01	2.332E-01	2.426E-01	FAIL ABUN
HO-166M	-1.209E-02	9.718E-02	9.733E-02	FAIL ABUN
TM-171	6.973E+00	7.904E+00	8.506E+00	FAIL ABUN
HF-172	8.236E-02	2.350E-01	2.379E-01	FAIL ABUN
LU-172	1.725E-02	8.974E-02	9.008E-02	FAIL ABUN
LU-176	2.529E-02	3.419E-02	3.604E-02	FAIL ABUN
HF-181	8.417E-02	1.101E-01	1.165E-01	NOT IDENT.
TA-182	-1.266E-01	3.001E-01	3.055E-01	FAIL ABUN
RE-183	4.173E-03	9.472E-02	9.474E-02	NOT IDENT.
RE-184	1.284E-01	3.487E-01	3.535E-01	NOT IDENT.
W-188	-5.872E+00	1.246E+01	1.274E+01	FAIL ABUN
IR-192	3.394E-02	6.058E-02	6.248E-02	FAIL ABUN
HG-203	5.031E-03	6.257E-02	6.262E-02	NOT IDENT.
TL-204	-1.083E+00	3.560E+00	3.593E+00	FAIL ABUN
BI-207	-5.452E-02	8.189E-02	8.550E-02	FAIL ABUN
PB-211	-4.701E-01	1.231E+00	1.249E+00	NOT IDENT.
BI-213	8.570E-02	1.519E-01	1.567E-01	NOT IDENT.
AC-225	-3.545E-02	3.106E+00	3.106E+00	NOT IDENT.
AC-227	1.579E-01	3.947E-01	4.010E-01	FAIL ABUN
TH-227	1.579E-01	3.947E-01	4.010E-01	FAIL ABUN
TH-229	-1.237E-01	6.405E-01	6.429E-01	FAIL ABUN
PA-233	8.925E-02	8.443E-02	9.353E-02	FAIL ABUN
PA-234	-3.512E-01	6.025E-01	6.229E-01	FAIL ABUN
NP-237	8.925E-02	8.443E-02	9.353E-02	FAIL ABUN
NP-238	3.087E+04	2.650E+04	2.993E+04	SHORT HLIF
NP-239	7.076E-02	2.947E-01	2.964E-01	NOT IDENT.
PU-239	3.385E+02	4.394E+02	4.652E+02	NOT IDENT.
AM-241	1.915E-02	7.228E-02	7.279E-02	NOT IDENT.
CM-243	8.568E-02	1.122E-01	1.187E-01	NOT IDENT.
BK-247	-2.701E-02	1.107E-01	1.114E-01	FAIL ABUN
CF-249	3.953E-02	5.687E-02	5.959E-02	FAIL ABUN
CF-251	3.379E-02	1.658E-01	1.665E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	80.4709	81.75	127.6029	123.68	93.5835
879.38	85.3190	82.47	74.0782	125.81	76.0991
46.54	85.6001	83.79	109.2758	127.23	104.8951
228.16	0.0000	265.00	89.6500	127.91	97.8592
52.39	74.6638	193.51	89.9471	129.30	76.5605
1093.63	82.8032	105.31	90.1786	131.20	96.0120
52.39	81.2701	86.79	90.2274	133.02	75.8421
125.81	81.4212	86.94	90.2587	133.52	85.5443
53.44	81.5429	87.09	90.2893	136.00	76.2198
54.07	78.0068	87.57	83.7738	136.47	67.8040
293.27	0.0000	88.03	83.8608	739.50	0.0000
482.18	89.7184	306.78	83.9194	140.51	0.0000
57.98	89.8393	88.47	83.9437	143.76	71.0592
59.27	97.0176	143.76	124.1193	144.24	71.1132
59.32	97.0320	90.64	88.7903	145.44	73.7054
59.54	97.0952	531.02	88.8824	152.43	79.4746
60.96	109.8584	92.59	112.9493	1048.07	90.7632
61.17	108.5511	93.35	96.7608	154.21	85.9152
62.93	118.0774	94.56	97.0133	158.56	98.6343
63.29	118.1976	311.90	97.0325	159.00	82.7689
290.67	112.0688	946.00	97.0365	162.33	76.4526
87.57	108.1305	94.87	97.0781	537.26	76.4897
66.73	128.7544	97.43	75.0814	163.33	63.1020
67.24	122.6433	98.43	80.1296	165.86	75.9988
67.68	107.0474	98.44	80.1312	427.87	83.1156
1221.41	107.0676	103.37	72.3945	176.60	83.1482
70.82	125.2954	116.74	72.3945	177.52	74.6700
97.43	128.0187	100.11	83.8064	181.07	0.0000
70.82	119.9394	102.03	86.4103	181.52	64.7194
279.20	119.9428	103.18	75.2153	184.41	76.6624
1063.66	124.8162	103.37	71.8238	185.72	68.5520
72.87	124.8359	911.20	92.6860	193.51	67.4941
351.06	124.8359	105.31	92.7039	197.03	73.9589
74.66	125.4061	106.12	74.5116	198.01	70.5241
351.93	125.4571	106.47	84.8873	201.83	67.3172
238.63	125.4571	109.28	72.2824	203.43	74.5502
351.93	125.4571	111.00	86.4091	205.31	60.0451
238.63	125.4571	111.76	0.0000	210.85	69.8512
74.97	125.5046	114.06	68.2881	215.65	61.2439
77.11	126.1768	116.30	0.0000	218.12	61.4209
78.74	126.6826	116.74	70.1894	222.11	50.8167
256.23	126.9744	119.76	72.9311	227.09	50.1934
80.03	127.0774	264.66	56.6016	227.38	49.2968
133.52	127.1060	121.22	57.7912	228.16	0.0000
364.49	127.1275	344.28	61.3910	228.18	54.8242
711.68	127.2439	122.06	70.8714	235.69	70.4876
356.01	127.3746	122.92	83.9929	235.96	62.2135
323.87	127.3961	1274.44	84.0157	238.63	50.8408

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	39.6245	531.02	30.1799
240.99	50.9711	338.32	39.6260	537.26	25.6291
242.00	51.0265	340.48	39.6974	1260.41	0.0000
244.70	34.8919	340.55	39.6998	552.55	18.5089
685.70	49.7166	344.28	42.8853	795.86	19.5065
388.16	49.7376	345.93	44.4771	564.24	0.0000
507.63	0.0000	351.06	30.8020	569.33	23.1309
256.23	52.2695	351.93	30.8234	569.50	23.1332
527.90	0.0000	355.39	0.0000	569.70	19.5763
264.66	42.1760	356.01	23.1935	583.19	19.7206
264.80	42.1824	364.49	25.9445	584.27	19.7321
265.00	49.0322	366.42	0.0000	595.83	22.5616
269.46	46.7699	372.51	42.8151	600.60	22.6181
270.03	46.7968	375.05	40.8067	602.52	0.0000
401.81	40.1586	377.52	40.8837	604.72	13.0566
273.65	34.5037	383.85	31.6003	607.14	23.2406
276.40	43.2458	388.16	22.8261	609.32	19.0864
583.19	36.5535	666.33	26.4287	610.33	21.8247
277.60	38.4855	391.69	33.9056	614.28	18.9535
402.40	38.5010	400.66	33.0636	618.01	21.9111
279.20	37.5821	401.81	28.8215	884.68	21.0234
279.54	45.3056	402.40	32.0374	621.93	19.2107
279.70	45.3132	404.85	36.9082	630.19	0.0000
280.46	46.3105	410.95	44.0546	631.29	12.8682
301.36	47.4219	413.71	31.2220	633.25	13.8011
284.31	40.6721	720.70	30.1670	634.78	14.7324
285.41	51.3772	423.72	30.3584	635.95	16.5839
285.90	0.0000	427.09	35.8635	636.99	18.4363
287.50	33.9960	427.87	28.2714	657.50	16.7618
290.67	42.3787	433.94	34.9414	657.76	14.9014
293.27	0.0000	439.40	30.6877	657.90	0.0000
295.22	33.2640	440.45	21.9352	661.66	16.4227
316.51	33.2868	453.88	29.8795	664.57	0.0000
298.58	33.3671	463.37	25.0548	666.33	11.9707
299.98	33.4100	468.07	20.1046	666.50	10.4754
300.09	33.4134	473.00	23.5297	667.71	0.0000
300.13	33.4144	631.29	20.1947	677.62	20.6868
311.90	33.4144	696.49	26.9561	685.70	16.0464
301.36	33.4521	477.60	26.9697	692.65	0.0000
302.85	44.3344	482.18	21.9764	695.00	17.0651
304.50	42.9212	487.02	24.8695	696.49	25.6149
304.85	42.9345	492.35	0.0000	696.51	25.6157
306.78	29.6613	497.08	27.2993	697.00	24.6725
308.46	37.6281	505.52	22.2953	697.30	21.8285
311.90	26.8176	507.63	0.0000	697.49	21.8306
316.51	29.9188	511.00	26.3839	702.65	18.0769
319.41	34.4937	514.00	18.9613	706.68	20.9701
320.08	21.0085	514.00	18.9613	711.68	20.0630
321.04	21.0261	520.40	23.0713	720.70	19.1864
323.87	27.1000	520.69	0.0000	721.93	0.0000
325.23	49.7407	667.71	0.0000	1690.97	19.2047
1596.21	41.3245	527.90	0.0000	722.91	19.2059
333.37	44.0151	528.26	16.2245	723.31	11.5254
333.97	48.5938	529.59	24.3556	756.73	15.3735
334.37	48.6094	529.87	0.0000	727.33	12.3160

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	16.5370	935.54	13.6062	1362.66	0.0000
735.93	10.6250	937.49	11.7305	1365.19	3.8244
737.46	7.7324	983.53	12.5988	1368.63	0.0000
739.50	0.0000	946.00	14.7088	1384.29	7.2067
1434.09	13.5728	949.00	7.3623	1408.01	6.7679
747.24	16.5030	954.55	0.0000	1434.09	6.8130
748.06	22.0116	962.31	13.5266	1435.80	7.7898
752.31	9.3401	964.08	13.5352	1457.56	0.0000
753.82	16.5507	966.17	14.8152	1460.82	3.9193
756.73	16.5715	968.97	14.8297	1489.16	7.8941
756.80	21.8360	983.53	18.1004	1505.03	9.9058
763.94	21.9037	984.45	0.0000	1584.12	11.1031
765.81	25.0531	996.26	10.6943	1596.21	8.0977
766.84	25.0641	1002.74	10.7184	1620.50	4.0715
772.60	0.0000	1004.73	17.1611	1621.92	6.1090
776.52	13.7637	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	1.0340
778.90	17.7144	1028.54	0.0000	1750.46	0.0000
783.70	20.7090	1037.84	3.4709	1764.49	3.5018
1435.80	24.7055	1038.76	0.0000	1770.23	14.7253
903.28	19.7925	1046.59	8.7026	1771.35	3.9452
795.86	12.8853	1048.07	7.6187	1791.20	0.0000
801.95	9.5396	1049.04	7.6208	1808.65	1.0603
810.06	6.3811	1050.41	9.8026	1810.72	0.0000
810.29	4.7862	1063.66	14.2211	1836.06	5.3313
810.45	4.7865	1077.00	10.9869		
810.76	4.7871	1077.34	10.9882		
815.77	4.9968	1085.87	11.0187		
818.51	11.0054	1093.63	7.7323		
832.01	20.1196	1099.45	8.8530		
834.85	18.7994	1112.07	5.3332		
835.71	14.5077	1112.84	6.6680		
836.80	0.0000	1115.54	14.2375		
846.75	0.0000	1120.29	7.7977		
846.77	17.2029	1120.55	7.1297		
856.80	9.7529	1121.30	7.1316		
860.56	14.2440	1808.65	5.5859		
871.09	19.4105	1131.51	0.0000		
873.19	16.3589	1147.95	0.0000		
875.33	0.0000	1332.49	8.1519		
879.38	8.1990	1177.95	18.1406		
880.51	8.2026	1189.05	7.5838		
881.60	14.3606	1204.77	6.4001		
883.24	12.3168	1221.41	12.8625		
884.68	9.2425	1231.02	6.9100		
889.28	10.2875	1235.36	10.7620		
894.76	13.4019	1238.28	9.2324		
1836.06	17.5468	1260.41	0.0000		
900.72	10.3323	1271.87	11.1850		
903.28	15.5132	1274.44	6.5293		
911.20	10.3729	1274.54	6.5297		
912.08	10.3763	1291.59	8.4353		
984.45	0.0000	1298.22	0.0000		
926.50	15.6477	1312.11	3.7701		
929.11	10.0242	1332.49	8.5302		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:08.47

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507004.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM41.CNF;698
                                       Background date  : 6-APR-2025 11:02:34.
Sample date      : 6-MAR-2025 09:30:00. Acquisition date : 10-APR-2025 19:33:36
Sample ID        : G714507004           Sample quantity  : 1.46860E+02 GRAM
Detector name    : GAM41                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.43  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.61*	146	119	1.01	93.98	90	7	4.05E-02	15.7	
2	0	57.82	38	129	1.15	116.38	114	6	1.06E-02	49.3	
3	0	63.35*	161	248	1.04	127.43	123	10	4.48E-02	20.8	
4	4	74.87*	258	237	0.92	150.46	147	15	7.17E-02	11.2	2.27E+00
5	4	77.10*	419	181	0.83	154.91	147	15	1.17E-01	7.0	
6	8	83.62*	68	130	1.60	167.94	165	14	1.88E-02	31.1	1.68E+00
7	8	84.83*	38	155	1.17	170.37	165	14	1.06E-02	62.5	
8	8	87.19	216	188	1.25	175.09	165	14	6.00E-02	12.9	
9	2	89.83	82	143	0.88	180.36	178	12	2.29E-02	23.9	4.31E+00
10	2	92.60*	143	200	1.10	185.89	178	12	3.96E-02	19.9	
11	0	144.09*	37	82	0.82	288.82	287	6	1.02E-02	43.5	
12	0	186.04*	175	98	1.09	372.66	369	10	4.86E-02	14.0	
13	0	209.88	18	131	0.58	420.33	414	9	5.13E-03	114.0	
14	0	238.62*	362	139	1.11	477.77	474	8	1.01E-01	7.8	
15	0	242.00	144	80	1.22	484.53	482	7	3.99E-02	13.5	
16	0	258.75	27	90	1.21	518.01	514	11	7.41E-03	71.8	
17	0	270.90	48	117	1.81	542.29	536	13	1.33E-02	48.6	
18	0	295.17*	300	57	1.08	590.82	587	9	8.35E-02	7.4	
19	0	300.85*	33	84	1.45	602.17	596	12	9.24E-03	58.3	
20	0	327.51	32	64	1.36	655.46	651	11	8.76E-03	52.1	
21	0	338.73	89	65	1.30	677.88	671	14	2.48E-02	22.0	
22	0	344.50	28	19	2.36	689.42	686	7	7.66E-03	32.6	
23	0	351.94*	450	65	1.17	704.30	698	11	1.25E-01	5.9	
24	0	371.50	28	38	3.81	743.40	736	13	7.71E-03	50.0	
25	0	403.14	18	30	0.75	806.65	799	10	5.06E-03	60.9	
26	0	408.25	61	43	6.98	816.86	808	17	1.68E-02	27.8	
27	0	451.95*	18	90	8.23	904.23	885	24	4.97E-03	142.8	
28	0	463.67	26	49	2.86	927.66	921	12	7.26E-03	58.9	
29	0	484.24	7	18	0.57	968.79	966	6	2.08E-03	100.4	
30	0	487.37	10	17	0.99	975.04	971	8	2.83E-03	75.4	
31	0	512.13*	55	67	2.53	1024.53	1014	25	1.53E-02	46.9	
32	0	529.76*	7	42	2.75	1059.78	1050	14	1.82E-03	215.7	
33	0	582.75*	139	20	1.53	1165.72	1158	14	3.85E-02	11.2	
34	0	609.23*	339	22	1.47	1218.67	1214	12	9.41E-02	6.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	653.31	11	23	0.93	1306.79	1303	11	3.05E-03	88.6	
36	0	707.28	18	18	1.04	1414.70	1410	10	5.04E-03	49.2	
37	0	727.84	18	33	1.71	1455.82	1451	15	4.99E-03	71.2	
38	0	768.94	38	33	1.26	1537.99	1532	13	1.04E-02	35.3	
39	0	786.58	26	14	0.75	1573.25	1567	13	7.09E-03	37.8	
40	0	862.63	20	25	2.28	1725.32	1713	15	5.61E-03	59.3	
41	0	910.91*	78	14	1.50	1821.85	1816	11	2.17E-02	14.9	
42	0	934.55	34	11	1.84	1869.13	1863	12	9.56E-03	26.1	
43	0	968.97*	32	15	1.45	1937.96	1932	10	9.02E-03	28.7	
44	0	1120.00*	81	4	1.70	2239.98	2233	15	2.26E-02	12.5	
45	0	1206.16	10	7	1.91	2412.28	2406	10	2.67E-03	62.2	
46	0	1238.19	39	3	0.77	2476.34	2470	12	1.08E-02	18.3	
47	0	1321.81	8	2	1.55	2643.57	2639	9	2.22E-03	48.5	
48	0	1376.89	16	7	1.83	2753.75	2745	14	4.44E-03	43.1	
49	0	1460.46*	58	6	2.73	2920.89	2915	12	1.62E-02	16.1	
50	0	1509.39	14	5	1.57	3018.76	3012	10	3.79E-03	41.2	
51	0	1764.62*	34	14	2.35	3529.31	3521	14	9.31E-03	29.8	
52	0	1849.18	7	7	0.61	3698.47	3691	10	1.95E-03	81.3	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 20:34:09

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507004.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 09:30:00 Acquisition date : 10-APR-2025 19:33:36
Sample ID : G714507004 Sample quantity : 146.86 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA41 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.43 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	8.770E-01	3.072E+00	3.072E+00	32.21	OK
Y-91	1204.77	0.26*	1.038E+00	1.789E+01	2.722E+01	124.34	OK
CD-109	88.03	3.70*	7.762E+00	4.777E+00	5.039E+00	25.89	OK
SN-126	64.28	9.60	7.782E+00	1.406E+00	1.406E+00	41.63	OK
	86.94	8.90	7.762E+00	1.986E+00	1.986E+00	25.89	OK
	87.57	37.00*	7.762E+00	4.777E-01	4.777E-01	25.89	OK
ND-147	91.11	27.90	7.720E+00	2.423E-01	2.270E+00	47.77	OK
	319.41	1.95	3.569E+00	----- Line	Not Found	-----	Absent
	531.02	13.10*	2.241E+00	1.211E-01	1.134E+00	431.33	OK
TL-208	277.37	6.60	4.030E+00	----- Line	Not Found	-----	Absent
	583.19	85.00*	2.047E+00	4.293E-01	4.293E-01	22.33	OK
	860.56	12.50	1.415E+00	----- Line	Not Found	-----	Absent
BI-210	46.54	4.25*	6.976E+00	3.279E+00	3.289E+00	31.31	OK
PB-210	46.54	4.25*	6.976E+00	3.279E+00	3.289E+00	31.31	OK
BI-211	72.87	1.23	7.876E+00	----- Line	Not Found	-----	Absent
	351.06	12.92*	3.275E+00	5.996E+00	5.996E+00	11.74	OK
BI-212	727.33	6.67*	1.657E+00	8.571E-01	8.571E-01	142.38	OK
	1620.50	1.47	8.028E-01	----- Line	Not Found	-----	Absent
PB-212	74.82	10.28	7.875E+00	2.049E+00	2.049E+00	22.31	OK
	77.11	17.10	7.868E+00	2.000E+00	2.000E+00	13.99	OK
	238.63	43.60*	4.558E+00	1.064E+00	1.064E+00	15.70	OK
	300.09	3.30	3.760E+00	1.534E+00	1.534E+00	116.60	OK
BI-214	609.32	45.49*	1.962E+00	2.036E+00	2.036E+00	12.24	OK
	1120.29	14.92	1.109E+00	2.488E+00	2.488E+00	24.98	OK
	1764.49	15.30	7.481E-01	1.413E+00	1.413E+00	59.51	OK
PB-214	74.82	5.80	7.875E+00	3.631E+00	3.631E+00	22.31	OK
	77.11	9.70	7.868E+00	3.526E+00	3.526E+00	13.99	OK
	87.09	3.41	7.762E+00	5.184E+00	5.184E+00	25.89	OK
	242.00	7.25	4.507E+00	2.564E+00	2.564E+00	27.04	OK
	295.22	18.42	3.823E+00	2.446E+00	2.446E+00	14.75	OK
	351.93	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74	OK
RN-219	271.23	10.80	4.111E+00	6.245E-01	6.245E-01	97.29	OK
	401.81	6.60*	2.894E+00	5.314E-01	5.314E-01	121.82	OK
RN-222	609.32	45.49*	1.962E+00	2.036E+00	2.036E+00	12.24	OK
	1120.29	14.92	1.109E+00	2.488E+00	2.488E+00	24.98	OK
	1764.49	15.30	7.481E-01	1.413E+00	1.413E+00	59.51	OK
RA-224	240.99	4.10*	4.507E+00	4.535E+00	4.535E+00	27.04	OK
RA-226	74.82	5.80	7.875E+00	3.631E+00	3.631E+00	22.31	OK
	77.11	9.70	7.868E+00	3.526E+00	3.526E+00	13.99	OK
	87.09	3.41	7.762E+00	5.184E+00	5.184E+00	25.89	OK
	242.00	7.25	4.507E+00	2.564E+00	2.564E+00	27.04	OK
	295.22	18.42	3.823E+00	2.446E+00	2.446E+00	14.75	OK
	351.93	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74	OK
AC-228	105.21	1.10	7.404E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.389E+00	1.324E+00	1.324E+00	44.05	OK
	835.71	1.61	1.454E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.342E+00	1.166E+00	1.166E+00	29.79	OK
	968.97	15.80	1.267E+00	8.318E-01	8.318E-01	57.36	OK
RA-228	105.21	1.10	7.404E+00	----- Line	Not Found	-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	338.32	11.27	3.389E+00	1.324E+00	1.324E+00	44.05	OK
	835.71	1.61	1.454E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.342E+00	1.166E+00	1.166E+00	29.79	OK
	968.97	15.80	1.267E+00	8.318E-01	8.318E-01	57.36	OK
TH-228	74.82	10.28	7.875E+00	2.049E+00	2.049E+00	22.31	OK
	77.11	17.10	7.868E+00	2.000E+00	2.000E+00	13.99	OK
	238.63	43.60*	4.558E+00	1.064E+00	1.064E+00	15.70	OK
	300.09	3.30	3.760E+00	1.534E+00	1.534E+00	116.60	OK
TH-229	85.43	14.70	7.796E+00	2.114E-01	2.114E-01	125.08	OK
	88.47	24.00	7.762E+00	7.365E-01	7.365E-01	25.89	OK
	193.51	4.41*	5.337E+00	----- Line Not Found		-----	Absent
	210.85	2.80	5.031E+00	7.739E-01	7.739E-01	227.94	OK
TH-230	74.82	5.80	7.875E+00	3.631E+00	3.631E+00	22.31	OK
	77.11	9.70	7.868E+00	3.526E+00	3.526E+00	13.99	OK
	87.09	3.41	7.762E+00	5.184E+00	5.184E+00	25.89	OK
	242.00	7.25	4.507E+00	2.564E+00	2.564E+00	27.04	OK
	295.22	18.42	3.823E+00	2.446E+00	2.446E+00	14.75	OK
	351.93	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74	OK
PA-231	283.69	1.70	3.954E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	3.760E+00	9.465E-01	9.465E-01	116.60	OK
TH-232	105.21	1.10	7.404E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.389E+00	1.324E+00	1.324E+00	44.05	OK
	835.71	1.61	1.454E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.342E+00	1.166E+00	1.166E+00	29.79	OK
	968.97	15.80	1.267E+00	8.318E-01	8.318E-01	57.36	OK
PA-234M	63.29	3.70*	7.782E+00	3.648E+00	3.648E+00	41.63	OK
	92.59	4.23	7.671E+00	2.778E+00	2.778E+00	39.79	OK
TH-234	63.29	3.70*	7.782E+00	3.648E+00	3.648E+00	41.63	OK
	92.59	4.23	7.671E+00	2.778E+00	2.778E+00	39.79	OK
U-234	74.82	5.80	7.875E+00	3.631E+00	3.631E+00	22.31	OK
	77.11	9.70	7.868E+00	3.526E+00	3.526E+00	13.99	OK
	87.09	3.41	7.762E+00	5.184E+00	5.184E+00	25.89	OK
	242.00	7.25	4.507E+00	2.564E+00	2.564E+00	27.04	OK
	295.22	18.42	3.823E+00	2.446E+00	2.446E+00	14.75	OK
	351.93	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74	OK
U-235	89.96	3.47	7.720E+00	1.948E+00	1.948E+00	47.77	OK
	93.35	5.60	7.671E+00	2.098E+00	2.098E+00	39.79	OK
	143.76	10.96*	6.434E+00	3.175E-01	3.175E-01	87.08	OK
	163.33	5.08	5.977E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.486E+00	3.325E-01	3.325E-01	27.93	OK
	205.31	5.01	5.114E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	7.782E+00	3.648E+00	3.648E+00	41.63	OK
	92.59	4.23	7.671E+00	2.778E+00	2.778E+00	39.79	OK
AM-243	43.53	5.90	6.691E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	7.875E+00	3.134E-01	3.134E-01	22.31	OK
CM-247	278.00	3.40	4.022E+00	----- Line Not Found		-----	Absent
	287.50	2.00	3.910E+00	----- Line Not Found		-----	Absent
	402.40	72.00*	2.894E+00	4.871E-02	4.871E-02	121.82	OK
ANH-511	511.00	100.00*	2.314E+00	1.298E-01	1.298E-01	93.80	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:10.91

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507004.CNF;1		
Acquisition date	: 10-APR-2025 19:33:36	Sensitivity	: 3.000
Detector ID	: GAM41	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.43	Half life ratio	: *****
Sample date	: 6-MAR-2025 09:30:00	Analyst initials	: MXR1
Sample ID	: G714507004	Sample Quantity	: 1.4686E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 5-SEP-2024 06:18:38	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;12		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	3.072E+00	9.698E-01	6.754E-01
Y-91	2.722E+01	3.317E+01	4.342E+01
CD-109	5.039E+00	1.278E+00	9.071E-01
SN-126	4.777E-01	1.212E-01	9.423E-02
ND-147	1.134E+00	4.795E+00	4.263E+00
TL-208	4.293E-01	9.395E-02	6.826E-02
BI-210	3.289E+00	1.009E+00	7.154E-01
PB-210	3.289E+00	1.009E+00	7.154E-01
BI-211	5.996E+00	6.896E-01	3.497E-01
BI-212	8.571E-01	1.196E+00	1.048E+00
PB-212	1.064E+00	1.638E-01	1.259E-01
BI-214	2.036E+00	2.443E-01	1.491E-01
PB-214	2.176E+00	2.503E-01	1.272E-01
RN-219	5.314E-01	6.344E-01	7.598E-01
RN-222	2.036E+00	2.443E-01	1.491E-01
RA-224	4.535E+00	1.201E+00	1.236E+00
RA-226	2.176E+00	2.503E-01	1.272E-01
AC-228	1.166E+00	3.405E-01	3.043E-01
RA-228	1.166E+00	3.405E-01	3.043E-01
TH-228	1.064E+00	1.638E-01	1.259E-01
TH-229	8.375E-02	4.749E-01	8.978E-01
TH-230	2.176E+00	2.503E-01	1.272E-01
PA-231	9.465E-01	1.081E+00	8.322E-01
TH-232	1.166E+00	3.405E-01	3.043E-01
PA-234M	3.648E+00	1.488E+00	9.536E-01
TH-234	3.648E+00	1.488E+00	9.536E-01
U-234	2.176E+00	2.503E-01	1.272E-01
U-235	3.175E-01	2.709E-01	3.108E-01
U-238	3.648E+00	1.488E+00	9.536E-01
AM-243	3.134E-01	6.851E-02	6.132E-02
CM-247	4.871E-02	5.816E-02	6.975E-02
ANH-511	1.298E-01	1.194E-01	5.504E-02

---- Non-Identified Nuclides ----

	Key-Line Activity	K.L. Cnt Uncert	MDA

Nuclide	(pCi/GRAM)	(1.96-sigma)	(pCi/GRAM)	
BE-7	3.881E-01	4.490E-01	9.587E-01	NOT IDENT.
NA-22	1.558E-02	3.757E-02	8.488E-02	NOT IDENT.
NA-24	0.000E+00	4.095E+15	0.000E+00	SHORT HLIF
AL-26	8.114E-03	2.967E-02	7.528E-02	NOT IDENT.
SC-46	-1.643E-02	4.547E-02	8.828E-02	FAIL ABUN
V-48	-1.843E-02	1.596E-01	3.236E-01	NOT IDENT.
CR-51	1.357E-01	6.651E-01	1.334E+00	NOT IDENT.
MN-52	8.388E-01	3.497E+00	7.462E+00	FAIL ABUN
MN-54	2.257E-02	3.774E-02	8.056E-02	NOT IDENT.
CO-56	-1.778E-02	4.672E-02	8.335E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-6.863E-03	2.307E-02	4.332E-02	NOT IDENT.
CO-58	-2.833E-02	4.831E-02	8.236E-02	NOT IDENT.
FE-59	0.000E+00	1.052E-01	2.192E-01	NOT IDENT.
CO-60	1.563E-02	4.176E-02	9.158E-02	NOT IDENT.
ZN-65	-2.950E-02	1.042E-01	1.717E-01	NOT IDENT.
GE-68	7.226E-01	1.032E+00	2.500E+00	NOT IDENT.
AS-73	9.707E-02	2.215E-01	4.589E-01	NOT IDENT.
AS-74	1.458E-02	1.777E-01	3.574E-01	NOT IDENT.
SE-75	-2.893E-02	4.661E-02	7.917E-02	NOT IDENT.
BR-77	0.000E+00	9.526E+03	0.000E+00	SHORT HLIF
SR-82	1.010E-01	5.116E-01	1.050E+00	NOT IDENT.
RB-83	4.586E-02	9.211E-02	1.758E-01	FAIL ABUN
RB-84	-7.348E-02	9.915E-02	1.790E-01	NOT IDENT.
KR-85	4.435E+00	7.186E+00	1.495E+01	NOT IDENT.
SR-85	2.894E-02	4.713E-02	9.800E-02	NOT IDENT.
RB-86	6.813E-01	1.344E+00	3.133E+00	NOT IDENT.
Y-88	4.252E-03	4.234E-02	9.939E-02	NOT IDENT.
NB-94	2.842E-02	2.764E-02	6.224E-02	NOT IDENT.
NB-95	-1.282E-02	6.882E-02	1.125E-01	NOT IDENT.
NB-95M	3.900E-02	1.713E-01	2.936E-01	NOT IDENT.
ZR-95	-8.216E-02	9.668E-02	1.567E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	9.083E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.103E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	6.616E+40	0.000E+00	SHORT HLIF
RH-101	-1.091E-02	2.761E-02	5.127E-02	NOT IDENT.
RH-102	-2.072E-02	5.778E-02	1.059E-01	NOT IDENT.
RU-103	-6.492E-03	5.074E-02	9.918E-02	FAIL ABUN
RH-106	2.709E-01	3.774E-01	7.899E-01	NOT IDENT.
RU-106	2.709E-01	3.774E-01	7.899E-01	NOT IDENT.
AG-108M	-7.044E-04	2.714E-02	5.379E-02	NOT IDENT.
AG-110	0.000E+00	7.707E-01	1.357E+00	NOT IDENT.
AG-110M	8.346E-03	5.091E-02	1.079E-01	FAIL ABUN
SN-113	3.259E-04	5.151E-02	1.015E-01	NOT IDENT.
CD-115	0.000E+00	6.742E+03	0.000E+00	SHORT HLIF
SN-117M	1.051E-02	1.354E-01	2.571E-01	NOT IDENT.
SB-122	0.000E+00	3.621E+02	0.000E+00	SHORT HLIF
TE-123M	-7.723E-03	2.777E-02	5.124E-02	NOT IDENT.
SB-124	-1.218E-01	1.342E-01	1.941E-01	NOT IDENT.
SB-125	7.483E-02	9.815E-02	2.069E-01	FAIL ABUN
TE-125M	-8.247E-01	9.775E+00	1.865E+01	NOT IDENT.
I-126	3.036E-01	7.170E-01	1.456E+00	NOT IDENT.
SB-126	1.297E-01	4.817E-01	9.622E-01	NOT IDENT.
SB-127	-2.173E+01	5.842E+01	1.067E+02	NOT IDENT.
I-131	-3.058E-01	6.291E-01	1.189E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.263E+01	0.000E+00	SHORT HLIF
BA-133	2.150E-02	3.953E-02	7.695E-02	NOT IDENT.
I-133	0.000E+00	1.573E+11	0.000E+00	SHORT HLIF
CS-134	2.352E-02	4.841E-02	9.837E-02	NOT IDENT.
I-135	0.000E+00	1.224E+38	0.000E+00	SHORT HLIF
CS-136	1.861E-01	2.913E-01	6.656E-01	NOT IDENT.
BA-137M	-2.964E-03	3.587E-02	6.863E-02	NOT IDENT.
CS-137	-3.131E-03	3.790E-02	7.250E-02	NOT IDENT.
LA-138	6.814E-03	6.848E-02	1.410E-01	NOT IDENT.
CE-139	1.261E-02	2.972E-02	5.776E-02	NOT IDENT.
BA-140	1.293E-01	8.756E-01	1.731E+00	NOT IDENT.
LA-140	-1.565E-01	3.423E-01	6.094E-01	FAIL ABUN
CE-141	1.534E-01	1.309E-01	1.563E-01	FAIL ABUN
CE-143	0.000E+00	4.037E+06	0.000E+00	SHORT HLIF
CE-144	1.790E-02	1.765E-01	3.398E-01	NOT IDENT.
PM-144	8.473E-03	3.637E-02	7.266E-02	NOT IDENT.
PR-144	6.119E-01	2.746E+00	5.480E+00	NOT IDENT.
PM-146	-3.775E-02	4.654E-02	7.246E-02	NOT IDENT.
PM-147	8.474E+01	6.450E+02	1.250E+03	NOT IDENT.

PM-149	0.000E+00	5.216E+04	0.000E+00	SHORT HLIF
EU-150	5.492E-03	2.705E-02	4.997E-02	NOT IDENT.
EU-152	1.765E-01	1.127E-01	2.004E-01	FAIL ABUN
GD-153	2.446E-02	6.253E-02	1.246E-01	NOT IDENT.
EU-154	4.967E-02	1.069E-01	2.429E-01	NOT IDENT.
EU-155	6.798E-02	8.271E-02	1.690E-01	FAIL ABUN
TB-160	-2.513E-02	1.567E-01	3.155E-01	FAIL ABUN
HO-166M	5.603E-03	6.497E-02	1.150E-01	NOT IDENT.
TM-171	1.176E+00	3.487E+00	7.221E+00	NOT IDENT.
HF-172	-1.260E-01	1.563E-01	2.815E-01	FAIL ABUN
LU-172	1.219E-02	6.530E-02	1.370E-01	FAIL ABUN
LU-176	-1.396E-02	2.491E-02	4.197E-02	FAIL ABUN
HF-181	2.047E-02	7.026E-02	1.291E-01	FAIL ABUN
TA-182	1.563E-02	1.923E-01	3.953E-01	FAIL ABUN
RE-183	1.363E-01	1.317E-01	1.551E-01	FAIL ABUN
RE-184	-1.243E-03	2.132E-01	4.293E-01	NOT IDENT.
W-188	3.764E+00	9.042E+00	1.710E+01	FAIL ABUN
IR-192	2.971E-03	3.993E-02	7.943E-02	FAIL ABUN
HG-203	-4.844E-02	5.504E-02	8.990E-02	NOT IDENT.
TL-204	-3.194E+00	2.459E+00	4.499E+00	FAIL ABUN
BI-207	5.444E-03	5.744E-02	1.171E-01	FAIL ABUN
PB-211	0.000E+00	5.400E-01	1.460E+00	NOT IDENT.
BI-213	-6.026E-02	1.196E-01	1.942E-01	NOT IDENT.
RA-223	-3.020E-01	6.866E-01	1.163E+00	FAIL ABUN
AC-225	-9.325E-01	2.086E+00	3.694E+00	NOT IDENT.
AC-227	1.138E-01	2.617E-01	4.659E-01	FAIL ABUN
TH-227	1.138E-01	2.617E-01	4.659E-01	FAIL ABUN
TH-231	-3.020E-01	6.866E-01	1.163E+00	FAIL ABUN
PA-233	1.909E-02	5.842E-02	1.113E-01	FAIL ABUN
PA-234	5.785E-03	2.545E-01	5.380E-01	NOT IDENT.
NP-237	1.909E-02	5.842E-02	1.113E-01	FAIL ABUN
NP-238	0.000E+00	1.469E+04	0.000E+00	SHORT HLIF
NP-239	-2.246E-01	2.040E-01	3.602E-01	NOT IDENT.
PU-239	1.999E+02	3.132E+02	6.210E+02	NOT IDENT.
AM-241	-8.759E-03	5.693E-02	9.365E-02	NOT IDENT.
CM-243	-4.653E-02	7.499E-02	1.396E-01	NOT IDENT.
BK-247	-1.827E-02	7.536E-02	1.342E-01	FAIL ABUN
CF-249	3.351E-02	3.980E-02	8.496E-02	NOT IDENT.
CF-251	7.653E-02	1.090E-01	2.177E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:09.30

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	56	10.66*	8.770E-01	3.072E+00	3.072E+00	32.21
Y-91	1204.77	9	0.26*	1.038E+00	1.789E+01	2.722E+01	124.34
CD-109	88.03	268	3.70*	7.762E+00	4.777E+00	5.039E+00	25.89
SN-126	64.28	205	9.60	7.782E+00	1.406E+00	1.406E+00	41.63
	86.94	268	8.90	7.762E+00	1.986E+00	1.986E+00	25.89
	87.57	268	37.00*	7.762E+00	4.777E-01	4.777E-01	25.89
CE-141	145.44	44	48.29*	6.434E+00	7.206E-02	1.534E-01	87.08
ND-147	91.11	102	27.90	7.720E+00	2.423E-01	2.270E+00	47.77
	319.41	------	1.95	3.569E+00	------	Line Not Found	------
	531.02	7	13.10*	2.241E+00	1.211E-01	1.134E+00	431.33
TL-208	277.37	------	6.60	4.030E+00	------	Line Not Found	------
	583.19	146	85.00*	2.047E+00	4.293E-01	4.293E-01	22.33
	860.56	------	12.50	1.415E+00	------	Line Not Found	------
BI-210	46.54	190	4.25*	6.976E+00	3.279E+00	3.289E+00	31.31
PB-210	46.54	190	4.25*	6.976E+00	3.279E+00	3.289E+00	31.31
BI-211	72.87	------	1.23	7.876E+00	------	Line Not Found	------
	351.06	496	12.92*	3.275E+00	5.996E+00	5.996E+00	11.74
BI-212	727.33	19	6.67*	1.657E+00	8.571E-01	8.571E-01	142.38
	1620.50	------	1.47	8.028E-01	------	Line Not Found	------
PB-212	74.82	324	10.28	7.875E+00	2.049E+00	2.049E+00	22.31
	77.11	526	17.10	7.868E+00	2.000E+00	2.000E+00	13.99
	238.63	414	43.60*	4.558E+00	1.064E+00	1.064E+00	15.70
	300.09	37	3.30	3.760E+00	1.534E+00	1.534E+00	116.60
BI-214	609.32	356	45.49*	1.962E+00	2.036E+00	2.036E+00	12.24
	1120.29	81	14.92	1.109E+00	2.488E+00	2.488E+00	24.98
	1764.49	32	15.30	7.481E-01	1.413E+00	1.413E+00	59.51
PB-214	74.82	324	5.80	7.875E+00	3.631E+00	3.631E+00	22.31
	77.11	526	9.70	7.868E+00	3.526E+00	3.526E+00	13.99
	87.09	268	3.41	7.762E+00	5.184E+00	5.184E+00	25.89
	242.00	164	7.25	4.507E+00	2.564E+00	2.564E+00	27.04
	295.22	337	18.42	3.823E+00	2.446E+00	2.446E+00	14.75
	351.93	496	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74
RN-219	271.23	54	10.80	4.111E+00	6.245E-01	6.245E-01	97.29
	401.81	20	6.60*	2.894E+00	5.314E-01	5.314E-01	121.82
RN-222	609.32	356	45.49*	1.962E+00	2.036E+00	2.036E+00	12.24
	1120.29	81	14.92	1.109E+00	2.488E+00	2.488E+00	24.98
	1764.49	32	15.30	7.481E-01	1.413E+00	1.413E+00	59.51
RA-224	240.99	164	4.10*	4.507E+00	4.535E+00	4.535E+00	27.04
RA-226	74.82	324	5.80	7.875E+00	3.631E+00	3.631E+00	22.31
	77.11	526	9.70	7.868E+00	3.526E+00	3.526E+00	13.99
	87.09	268	3.41	7.762E+00	5.184E+00	5.184E+00	25.89
	242.00	164	7.25	4.507E+00	2.564E+00	2.564E+00	27.04
	295.22	337	18.42	3.823E+00	2.446E+00	2.446E+00	14.75
	351.93	496	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74
AC-228	105.21	------	1.10	7.404E+00	------	Line Not Found	------
	338.32	99	11.27	3.389E+00	1.324E+00	1.324E+00	44.05
	835.71	------	1.61	1.454E+00	------	Line Not Found	------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	79	25.80*	1.342E+00	1.166E+00	1.166E+00	29.79
	968.97	33	15.80	1.267E+00	8.318E-01	8.318E-01	57.36
RA-228	105.21	------	1.10	7.404E+00	------ Line Not Found		------
	338.32	99	11.27	3.389E+00	1.324E+00	1.324E+00	44.05
	835.71	------	1.61	1.454E+00	------ Line Not Found		------
	911.20	79	25.80*	1.342E+00	1.166E+00	1.166E+00	29.79
	968.97	33	15.80	1.267E+00	8.318E-01	8.318E-01	57.36
TH-228	74.82	324	10.28	7.875E+00	2.049E+00	2.049E+00	22.31
	77.11	526	17.10	7.868E+00	2.000E+00	2.000E+00	13.99
	238.63	414	43.60*	4.558E+00	1.064E+00	1.064E+00	15.70
	300.09	37	3.30	3.760E+00	1.534E+00	1.534E+00	116.60
TH-229	85.43	47	14.70	7.796E+00	2.114E-01	2.114E-01	125.08
	88.47	268	24.00	7.762E+00	7.365E-01	7.365E-01	25.89
	193.51	------	4.41*	5.337E+00	------ Line Not Found		------
	210.85	21	2.80	5.031E+00	7.739E-01	7.739E-01	227.94
TH-230	74.82	324	5.80	7.875E+00	3.631E+00	3.631E+00	22.31
	77.11	526	9.70	7.868E+00	3.526E+00	3.526E+00	13.99
	87.09	268	3.41	7.762E+00	5.184E+00	5.184E+00	25.89
	242.00	164	7.25	4.507E+00	2.564E+00	2.564E+00	27.04
	295.22	337	18.42	3.823E+00	2.446E+00	2.446E+00	14.75
	351.93	496	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74
PA-231	283.69	------	1.70	3.954E+00	------ Line Not Found		------
	301.36	37	5.35*	3.760E+00	9.465E-01	9.465E-01	116.60
TH-232	105.21	------	1.10	7.404E+00	------ Line Not Found		------
	338.32	99	11.27	3.389E+00	1.324E+00	1.324E+00	44.05
	835.71	------	1.61	1.454E+00	------ Line Not Found		------
	911.20	79	25.80*	1.342E+00	1.166E+00	1.166E+00	29.79
	968.97	33	15.80	1.267E+00	8.318E-01	8.318E-01	57.36
PA-234M	63.29	205	3.70*	7.782E+00	3.648E+00	3.648E+00	41.63
	92.59	176	4.23	7.671E+00	2.778E+00	2.778E+00	39.79
TH-234	63.29	205	3.70*	7.782E+00	3.648E+00	3.648E+00	41.63
	92.59	176	4.23	7.671E+00	2.778E+00	2.778E+00	39.79
U-234	74.82	324	5.80	7.875E+00	3.631E+00	3.631E+00	22.31
	77.11	526	9.70	7.868E+00	3.526E+00	3.526E+00	13.99
	87.09	268	3.41	7.762E+00	5.184E+00	5.184E+00	25.89
	242.00	164	7.25	4.507E+00	2.564E+00	2.564E+00	27.04
	295.22	337	18.42	3.823E+00	2.446E+00	2.446E+00	14.75
	351.93	496	35.60*	3.275E+00	2.176E+00	2.176E+00	11.74
U-235	89.96	102	3.47	7.720E+00	1.948E+00	1.948E+00	47.77
	93.35	176	5.60	7.671E+00	2.098E+00	2.098E+00	39.79
	143.76	44	10.96*	6.434E+00	3.175E-01	3.175E-01	87.08
	163.33	------	5.08	5.977E+00	------ Line Not Found		------
	185.72	204	57.20	5.486E+00	3.325E-01	3.325E-01	27.93
	205.31	------	5.01	5.114E+00	------ Line Not Found		------
U-238	63.29	205	3.70*	7.782E+00	3.648E+00	3.648E+00	41.63
	92.59	176	4.23	7.671E+00	2.778E+00	2.778E+00	39.79
AM-243	43.53	------	5.90	6.691E+00	------ Line Not Found		------
	74.66	324	67.20*	7.875E+00	3.134E-01	3.134E-01	22.31
CM-247	278.00	------	3.40	4.022E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	287.50	------	2.00	3.910E+00	------	Line Not Found	------
	402.40	20	72.00*	2.894E+00	4.871E-02	4.871E-02	121.82
ANH-511	511.00	59	100.00*	2.314E+00	1.298E-01	1.298E-01	93.80

Flag: "*" = Keyline

Sample ID : G714507004 Acquisition date : 10-APR-2025 19:33:36

Total number of lines in spectrum 52
Number of unidentified lines 12
Number of lines tentatively identified by NID 40 76.92%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	3.072E+00	3.072E+00	0.990E+00	32.21	
Y-91	58.51D	1.52	1.789E+01	2.722E+01	3.385E+01	124.34	
CD-109	461.40D	1.05	4.777E+00	5.039E+00	1.304E+00	25.89	
SN-126	2.30E+05Y	1.00	4.777E-01	4.777E-01	1.237E-01	25.89	
CE-141	32.51D	2.13	7.206E-02	1.534E-01	1.336E-01	87.08	
ND-147	10.98D	9.37	1.211E-01	1.134E+00	4.893E+00	431.33	
TL-208	1.41E+10Y	1.00	4.293E-01	4.293E-01	0.959E-01	22.33	
BI-210	22.20Y	1.00	3.279E+00	3.289E+00	1.030E+00	31.31	
PB-210	22.20Y	1.00	3.279E+00	3.289E+00	1.030E+00	31.31	
BI-211	7.04E+08Y	1.00	5.996E+00	5.996E+00	0.704E+00	11.74	
BI-212	1.41E+10Y	1.00	8.571E-01	8.571E-01	12.20E-01	142.38	
PB-212	1.41E+10Y	1.00	1.064E+00	1.064E+00	0.167E+00	15.70	
BI-214	1600.00Y	1.00	2.036E+00	2.036E+00	0.249E+00	12.24	
PB-214	1600.00Y	1.00	2.176E+00	2.176E+00	0.255E+00	11.74	
RN-219	7.04E+08Y	1.00	5.314E-01	5.314E-01	6.474E-01	121.82	
RN-222	1600.00Y	1.00	2.036E+00	2.036E+00	0.249E+00	12.24	
RA-224	1.41E+10Y	1.00	4.535E+00	4.535E+00	1.226E+00	27.04	
RA-226	1600.00Y	1.00	2.176E+00	2.176E+00	0.255E+00	11.74	
AC-228	1.41E+10Y	1.00	1.166E+00	1.166E+00	0.347E+00	29.79	
RA-228	1.41E+10Y	1.00	1.166E+00	1.166E+00	0.347E+00	29.79	
TH-228	1.41E+10Y	1.00	1.064E+00	1.064E+00	0.167E+00	15.70	
TH-229	7340.00Y	1.00	7.365E-01	7.365E-01	1.907E-01	25.89	K
TH-230	7.54E+04Y	1.00	2.176E+00	2.176E+00	0.255E+00	11.74	
PA-231	7.04E+08Y	1.00	9.465E-01	9.465E-01	11.04E-01	116.60	
TH-232	1.41E+10Y	1.00	1.166E+00	1.166E+00	0.347E+00	29.79	
PA-234M	4.47E+09Y	1.00	3.648E+00	3.648E+00	1.519E+00	41.63	
TH-234	4.47E+09Y	1.00	3.648E+00	3.648E+00	1.519E+00	41.63	
U-234	2.45E+05Y	1.00	2.176E+00	2.176E+00	0.255E+00	11.74	
U-235	7.04E+08Y	1.00	3.175E-01	3.175E-01	2.765E-01	87.08	
U-238	4.47E+09Y	1.00	3.648E+00	3.648E+00	1.519E+00	41.63	
AM-243	7370.00Y	1.00	3.134E-01	3.134E-01	0.699E-01	22.31	
CM-247	1.56E+07Y	1.00	4.871E-02	4.871E-02	5.934E-02	121.82	
ANH-511	1.00E+09Y	1.00	1.298E-01	1.298E-01	1.218E-01	93.80	
	Total Activity :		7.716E+01	8.787E+01			

Grand Total Activity : 7.716E+01 8.787E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G714507004 Acquisition date : 10-APR-2025 19:33:36

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	57.82	49	165	1.15	116.38	114	6	1.06E-02	98.6	7.63E+00	T
8	83.62	84	162	1.60	167.94	165	14	1.88E-02	62.2	7.81E+00	T
0	258.75	30	102	1.21	518.01	514	11	7.41E-03	****	4.27E+00	
0	327.51	35	72	1.36	655.46	651	11	8.76E-03	****	3.49E+00	T
0	344.50	31	21	2.36	689.42	686	7	7.66E-03	65.1	3.34E+00	T
0	371.50	30	42	3.81	743.40	736	13	7.71E-03	****	3.12E+00	T
0	408.25	66	46	6.98	816.86	808	17	1.68E-02	55.7	2.86E+00	
0	451.95	19	97	8.23	904.23	885	24	4.97E-03	****	2.60E+00	
0	463.67	28	53	2.86	927.66	921	12	7.26E-03	****	2.54E+00	T
0	484.24	8	19	0.57	968.79	966	6	2.08E-03	****	2.44E+00	
0	487.37	11	18	0.99	975.04	971	8	2.83E-03	****	2.42E+00	T
0	653.31	11	24	0.93	1306.79	1303	11	3.05E-03	****	1.84E+00	
0	707.28	19	18	1.04	1414.70	1410	10	5.04E-03	98.4	1.70E+00	T
0	768.94	38	33	1.26	1537.99	1532	13	1.04E-02	70.7	1.57E+00	
0	786.58	26	15	0.75	1573.25	1567	13	7.09E-03	75.5	1.54E+00	
0	862.63	20	25	2.28	1725.32	1713	15	5.61E-03	****	1.41E+00	
0	934.55	35	11	1.84	1869.13	1863	12	9.56E-03	52.3	1.31E+00	T
0	1238.19	38	3	0.77	2476.34	2470	12	1.08E-02	36.7	1.01E+00	T
0	1321.81	8	2	1.55	2643.57	2639	9	2.22E-03	97.0	9.57E-01	
0	1376.89	15	7	1.83	2753.75	2745	14	4.44E-03	86.2	9.23E-01	
0	1509.39	13	5	1.57	3018.76	3012	10	3.79E-03	82.3	8.53E-01	
0	1849.18	7	7	0.61	3698.47	3691	10	1.95E-03	****	7.20E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:22.37

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507004.CNF;1		
Acquisition date	: 10-APR-2025 19:33:36	Sensitivity	: 3.000
Detector ID	: GAM41	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.43	Half life ratio	: *****
Sample date	: 6-MAR-2025 09:30:00	Nuclide Library	: SOLID
Sample ID	: G714507004	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.4686E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 5-SEP-2024 06:18:38	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;12		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.633E-01
Y-91	1.778E+01
CD-109	4.265E-01
SN-126	4.455E-02
ND-147	1.904E+00
TL-208	3.005E-02
BI-210	3.324E-01
PB-210	3.324E-01
BI-211	1.580E-01
BI-212	4.602E-01
PB-212	5.933E-02
BI-214	6.661E-02
PB-214	5.748E-02
RN-219	3.426E-01
RN-222	6.661E-02
RA-224	5.792E-01
RA-226	5.748E-02
AC-228	1.318E-01
RA-228	1.318E-01
TH-228	5.933E-02
TH-229	4.181E-01
TH-230	5.747E-02
PA-231	3.803E-01
TH-232	1.318E-01
PA-234M	4.511E-01
TH-234	4.511E-01
U-234	5.747E-02
U-235	1.451E-01
U-238	4.511E-01
AM-243	2.927E-02
CM-247	3.145E-02
ANH-511	2.445E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

BE-7	4.356E-01	NOT IDENT.
NA-22	3.520E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.818E-02	NOT IDENT.
SC-46	3.727E-02	FAIL ABUN
V-48	1.357E-01	NOT IDENT.
CR-51	6.175E-01	NOT IDENT.
MN-52	3.099E+00	FAIL ABUN
MN-54	3.505E-02	NOT IDENT.
CO-56	3.494E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.032E-02	NOT IDENT.
CO-58	3.448E-02	NOT IDENT.
FE-59	9.055E-02	NOT IDENT.
CO-60	3.836E-02	NOT IDENT.
ZN-65	7.210E-02	NOT IDENT.
GE-68	1.043E+00	NOT IDENT.
AS-73	2.163E-01	NOT IDENT.
AS-74	1.548E-01	NOT IDENT.
SE-75	3.600E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.458E-01	NOT IDENT.
RB-83	7.869E-02	FAIL ABUN
RB-84	7.389E-02	NOT IDENT.
KR-85	6.759E+00	NOT IDENT.
SR-85	4.431E-02	NOT IDENT.
RB-86	1.303E+00	NOT IDENT.
Y-88	3.758E-02	NOT IDENT.
NB-94	2.699E-02	NOT IDENT.
NB-95	4.970E-02	NOT IDENT.
NB-95M	1.375E-01	NOT IDENT.
ZR-95	6.641E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.404E-02	NOT IDENT.
RH-102	4.616E-02	NOT IDENT.
RU-103	4.345E-02	FAIL ABUN
RH-106	3.554E-01	NOT IDENT.
RU-106	3.554E-01	NOT IDENT.
AG-108M	2.398E-02	NOT IDENT.
AG-110	5.833E-01	NOT IDENT.
AG-110M	4.624E-02	FAIL ABUN
SN-113	4.616E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.202E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.387E-02	NOT IDENT.
SB-124	6.878E-02	NOT IDENT.
SB-125	9.448E-02	FAIL ABUN
TE-125M	8.757E+00	NOT IDENT.
I-126	6.483E-01	NOT IDENT.
SB-126	4.238E-01	NOT IDENT.
SB-127	4.688E+01	NOT IDENT.
I-131	5.354E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.489E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.360E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.848E-01	NOT IDENT.
BA-137M	2.997E-02	NOT IDENT.
CS-137	3.166E-02	NOT IDENT.
LA-138	5.856E-02	NOT IDENT.
CE-139	2.705E-02	NOT IDENT.
BA-140	7.751E-01	NOT IDENT.
LA-140	2.433E-01	FAIL ABUN
CE-141	7.315E-02	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	1.592E-01	NOT IDENT.
PM-144	3.194E-02	NOT IDENT.
PR-144	2.407E+00	NOT IDENT.
PM-146	3.195E-02	NOT IDENT.
PM-147	5.873E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF

EU-150	2.280E-02	NOT IDENT.
EU-152	9.212E-02	FAIL ABUN
GD-153	5.862E-02	NOT IDENT.
EU-154	1.011E-01	NOT IDENT.
EU-155	7.976E-02	FAIL ABUN
TB-160	1.341E-01	FAIL ABUN
HO-166M	4.979E-02	NOT IDENT.
TM-171	3.388E+00	NOT IDENT.
HF-172	1.310E-01	FAIL ABUN
LU-172	5.836E-02	FAIL ABUN
LU-176	1.891E-02	FAIL ABUN
HF-181	5.810E-02	FAIL ABUN
TA-182	1.664E-01	FAIL ABUN
RE-183	7.354E-02	FAIL ABUN
RE-184	1.874E-01	NOT IDENT.
W-188	7.893E+00	FAIL ABUN
IR-192	3.635E-02	FAIL ABUN
HG-203	4.122E-02	NOT IDENT.
TL-204	2.129E+00	FAIL ABUN
BI-207	5.049E-02	FAIL ABUN
PB-211	6.647E-01	NOT IDENT.
BI-213	8.679E-02	NOT IDENT.
RA-223	5.306E-01	FAIL ABUN
AC-225	1.695E+00	NOT IDENT.
AC-227	2.153E-01	FAIL ABUN
TH-227	2.153E-01	FAIL ABUN
TH-231	5.306E-01	FAIL ABUN
PA-233	5.055E-02	FAIL ABUN
PA-234	2.238E-01	NOT IDENT.
NP-237	5.055E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.672E-01	NOT IDENT.
PU-239	2.935E+02	NOT IDENT.
AM-241	4.414E-02	NOT IDENT.
CM-243	6.505E-02	NOT IDENT.
BK-247	6.137E-02	FAIL ABUN
CF-249	3.887E-02	NOT IDENT.
CF-251	1.014E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:26.89

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507004.CNF;1    *
* Acquisition date : 10-APR-2025 19:33:36 Sensitivity     : 3.000            *
* Detector ID      : GAM41                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****            *
* Sample date      :  6-MAR-2025 09:30:00 Nuclide Library : SOLID            *
* Sample ID        : G714507004           Analyst initials: MXR1             *
* Batch Number     : 2767515              Sample Quantity : 1.4686E+02 GRAM  *
*                                         Quantity Err(%) : 1.3618E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   :  5-SEP-2024 06:18:38 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;12             *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	3.072E+00	1.008E+00	1.008E+00
Y-91	2.722E+01	3.325E+01	3.325E+01
CD-109	5.039E+00	1.375E+00	1.375E+00
SN-126	4.777E-01	1.279E-01	1.279E-01
ND-147	1.134E+00	4.796E+00	4.796E+00
TL-208	4.293E-01	1.012E-01	1.012E-01
BI-210	3.289E+00	1.053E+00	1.053E+00
PB-210	3.289E+00	1.053E+00	1.053E+00
BI-211	5.996E+00	8.788E-01	8.788E-01
BI-212	8.571E-01	1.199E+00	1.199E+00
PB-212	1.064E+00	2.046E-01	2.046E-01
BI-214	2.036E+00	3.018E-01	3.018E-01
PB-214	2.176E+00	3.170E-01	3.170E-01
RN-219	5.314E-01	6.391E-01	6.391E-01
RN-222	2.036E+00	3.018E-01	3.018E-01
RA-224	4.535E+00	1.309E+00	1.309E+00
RA-226	2.176E+00	3.170E-01	3.170E-01
AC-228	1.166E+00	3.613E-01	3.613E-01
RA-228	1.166E+00	3.613E-01	3.613E-01
TH-228	1.064E+00	2.046E-01	2.046E-01
TH-229	8.375E-02	4.750E-01	4.750E-01
TH-230	2.176E+00	3.170E-01	3.170E-01
PA-231	9.465E-01	1.103E+00	1.103E+00
TH-232	1.166E+00	3.613E-01	3.613E-01
PA-234M	3.648E+00	1.699E+00	1.699E+00
TH-234	3.648E+00	1.699E+00	1.699E+00
U-234	2.176E+00	3.170E-01	3.170E-01
U-235	3.175E-01	2.731E-01	2.731E-01
U-238	3.648E+00	1.699E+00	1.699E+00
AM-243	3.134E-01	7.287E-02	7.287E-02
CM-247	4.871E-02	5.883E-02	5.883E-02
ANH-511	1.298E-01	1.199E-01	1.199E-01

---- Non-Identified Nuclides ----

	Key-Line Activity	K.L Act error	TPU

Nuclide	(pCi/GRAM)	(1.96-sigma)	(1.96-sigma)	
BE-7	3.881E-01	4.502E-01	4.830E-01	NOT IDENT.
NA-22	1.558E-02	3.759E-02	3.824E-02	NOT IDENT.
NA-24	1.759E+15	4.099E+15	4.175E+15	SHORT HLIF
AL-26	8.114E-03	2.968E-02	2.990E-02	NOT IDENT.
SC-46	-1.643E-02	4.550E-02	4.610E-02	FAIL ABUN
V-48	-1.843E-02	1.596E-01	1.598E-01	NOT IDENT.
CR-51	1.357E-01	6.653E-01	6.681E-01	NOT IDENT.
MN-52	8.388E-01	3.498E+00	3.518E+00	FAIL ABUN
MN-54	2.257E-02	3.780E-02	3.915E-02	NOT IDENT.
CO-56	-1.778E-02	4.675E-02	4.743E-02	FAIL ABUN
MN-56	-1.000E+41	2.569E+41	0.000E+00	SHORT HLIF
CO-57	-6.863E-03	2.308E-02	2.329E-02	NOT IDENT.
CO-58	-2.833E-02	4.838E-02	5.004E-02	NOT IDENT.
FE-59	0.000E+00	1.052E-01	0.000E+00	NOT IDENT.
CO-60	1.563E-02	4.178E-02	4.237E-02	NOT IDENT.
ZN-65	-2.950E-02	1.042E-01	1.050E-01	NOT IDENT.
GE-68	7.226E-01	1.034E+00	1.084E+00	NOT IDENT.
AS-73	9.707E-02	2.224E-01	2.267E-01	NOT IDENT.
AS-74	1.458E-02	1.777E-01	1.778E-01	NOT IDENT.
SE-75	-2.893E-02	4.671E-02	4.849E-02	NOT IDENT.
BR-77	6.192E+04	6.443E+04	7.021E+04	SHORT HLIF
SR-82	1.010E-01	5.117E-01	5.137E-01	NOT IDENT.
RB-83	4.586E-02	9.239E-02	9.468E-02	FAIL ABUN
RB-84	-7.348E-02	9.941E-02	1.048E-01	NOT IDENT.
KR-85	4.435E+00	7.196E+00	7.469E+00	NOT IDENT.
SR-85	2.894E-02	4.719E-02	4.896E-02	NOT IDENT.
RB-86	6.813E-01	1.346E+00	1.380E+00	NOT IDENT.
Y-88	4.252E-03	4.234E-02	4.239E-02	NOT IDENT.
NB-94	2.842E-02	2.776E-02	3.057E-02	NOT IDENT.
NB-95	-1.282E-02	6.883E-02	6.907E-02	NOT IDENT.
NB-95M	3.900E-02	1.714E-01	1.723E-01	NOT IDENT.
ZR-95	-8.216E-02	9.697E-02	1.038E-01	NOT IDENT.
NB-97	1.000E+41	2.082E+41	0.000E+00	SHORT HLIF
ZR-97	1.288E+14	9.083E+14	9.102E+14	SHORT HLIF
MO-99	8.237E+02	2.104E+03	2.137E+03	SHORT HLIF
TC-99M	1.670E+39	6.616E+40	0.000E+00	SHORT HLIF
RH-101	-1.091E-02	2.769E-02	2.812E-02	NOT IDENT.
RH-102	-2.072E-02	5.783E-02	5.857E-02	NOT IDENT.
RU-103	-6.492E-03	5.074E-02	5.083E-02	FAIL ABUN
RH-106	2.709E-01	3.783E-01	3.975E-01	NOT IDENT.
RU-106	2.709E-01	3.783E-01	3.975E-01	NOT IDENT.
AG-108M	-7.044E-04	2.714E-02	2.714E-02	NOT IDENT.
AG-110	0.000E+00	7.707E-01	0.000E+00	NOT IDENT.
AG-110M	8.346E-03	5.092E-02	5.106E-02	FAIL ABUN
SN-113	3.259E-04	5.151E-02	5.151E-02	NOT IDENT.
CD-115	2.446E+03	6.747E+03	6.836E+03	SHORT HLIF
SN-117M	1.051E-02	1.354E-01	1.355E-01	NOT IDENT.
SB-122	3.935E+01	3.621E+02	3.626E+02	SHORT HLIF
TE-123M	-7.723E-03	2.779E-02	2.801E-02	NOT IDENT.
SB-124	-1.218E-01	1.345E-01	1.453E-01	NOT IDENT.
SB-125	7.483E-02	9.835E-02	1.040E-01	FAIL ABUN
TE-125M	-8.247E-01	9.776E+00	9.783E+00	NOT IDENT.
I-126	3.036E-01	7.176E-01	7.305E-01	NOT IDENT.
SB-126	1.297E-01	4.820E-01	4.855E-01	NOT IDENT.
SB-127	-2.173E+01	5.856E+01	5.937E+01	NOT IDENT.
I-131	-3.058E-01	6.297E-01	6.446E-01	NOT IDENT.
I-132	-1.000E+41	3.278E+42	0.000E+00	SHORT HLIF
TE-132	-6.674E+00	5.264E+01	5.272E+01	SHORT HLIF
BA-133	2.150E-02	3.957E-02	4.074E-02	NOT IDENT.
I-133	3.721E+10	1.575E+11	1.584E+11	SHORT HLIF
CS-134	2.352E-02	4.846E-02	4.961E-02	NOT IDENT.
I-135	-1.127E+38	1.525E+38	0.000E+00	SHORT HLIF
CS-136	1.861E-01	2.922E-01	3.040E-01	NOT IDENT.
BA-137M	-2.964E-03	3.587E-02	3.590E-02	NOT IDENT.
CS-137	-3.131E-03	3.790E-02	3.792E-02	NOT IDENT.
LA-138	6.814E-03	6.848E-02	6.855E-02	NOT IDENT.
CE-139	1.261E-02	2.987E-02	3.040E-02	NOT IDENT.
BA-140	1.293E-01	8.757E-01	8.776E-01	NOT IDENT.
LA-140	-1.565E-01	3.425E-01	3.497E-01	FAIL ABUN
CE-141	1.534E-01	1.319E-01	1.489E-01	FAIL ABUN
CE-143	1.029E+06	4.038E+06	4.065E+06	SHORT HLIF
CE-144	1.790E-02	1.765E-01	1.767E-01	NOT IDENT.
PM-144	8.473E-03	3.638E-02	3.658E-02	NOT IDENT.
PR-144	6.119E-01	2.747E+00	2.761E+00	NOT IDENT.
PM-146	-3.775E-02	4.670E-02	4.971E-02	NOT IDENT.
PM-147	8.474E+01	6.451E+02	6.462E+02	NOT IDENT.

PM-149	-1.822E+04	5.224E+04	5.288E+04	SHORT HLIF
EU-150	5.492E-03	2.706E-02	2.717E-02	NOT IDENT.
EU-152	1.765E-01	1.140E-01	1.390E-01	FAIL ABUN
GD-153	2.446E-02	6.257E-02	6.353E-02	NOT IDENT.
EU-154	4.967E-02	1.070E-01	1.094E-01	NOT IDENT.
EU-155	6.798E-02	8.298E-02	8.846E-02	FAIL ABUN
TB-160	-2.513E-02	1.567E-01	1.572E-01	FAIL ABUN
HO-166M	5.603E-03	6.497E-02	6.502E-02	NOT IDENT.
TM-171	1.176E+00	3.488E+00	3.528E+00	NOT IDENT.
HF-172	-1.260E-01	1.580E-01	1.679E-01	FAIL ABUN
LU-172	1.219E-02	6.532E-02	6.555E-02	FAIL ABUN
LU-176	-1.396E-02	2.495E-02	2.573E-02	FAIL ABUN
HF-181	2.047E-02	7.028E-02	7.089E-02	FAIL ABUN
TA-182	1.563E-02	1.923E-01	1.924E-01	FAIL ABUN
RE-183	1.363E-01	1.325E-01	1.461E-01	FAIL ABUN
RE-184	-1.243E-03	2.132E-01	2.132E-01	NOT IDENT.
W-188	3.764E+00	9.057E+00	9.215E+00	FAIL ABUN
IR-192	2.971E-03	3.993E-02	3.996E-02	FAIL ABUN
HG-203	-4.844E-02	5.524E-02	5.940E-02	NOT IDENT.
TL-204	-3.194E+00	2.478E+00	2.866E+00	FAIL ABUN
BI-207	5.444E-03	5.745E-02	5.750E-02	FAIL ABUN
PB-211	1.618E+00	5.585E-01	9.187E-01	NOT IDENT.
BI-213	-6.026E-02	1.197E-01	1.227E-01	NOT IDENT.
RA-223	-3.020E-01	6.873E-01	7.007E-01	FAIL ABUN
AC-225	-9.325E-01	2.090E+00	2.132E+00	NOT IDENT.
AC-227	1.138E-01	2.623E-01	2.673E-01	FAIL ABUN
TH-227	1.138E-01	2.623E-01	2.673E-01	FAIL ABUN
TH-231	-3.020E-01	6.873E-01	7.007E-01	FAIL ABUN
PA-233	1.909E-02	5.845E-02	5.908E-02	FAIL ABUN
PA-234	5.785E-03	2.545E-01	2.546E-01	NOT IDENT.
NP-237	1.909E-02	5.845E-02	5.908E-02	FAIL ABUN
NP-238	-4.649E+03	1.470E+04	1.485E+04	SHORT HLIF
NP-239	-2.246E-01	2.055E-01	2.291E-01	NOT IDENT.
PU-239	1.999E+02	3.138E+02	3.265E+02	NOT IDENT.
AM-241	-8.759E-03	5.693E-02	5.707E-02	NOT IDENT.
CM-243	-4.653E-02	7.518E-02	7.805E-02	NOT IDENT.
BK-247	-1.827E-02	7.547E-02	7.592E-02	FAIL ABUN
CF-249	3.351E-02	3.997E-02	4.273E-02	NOT IDENT.
CF-251	7.653E-02	1.097E-01	1.150E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	58.2425	85.43	99.8867	131.20	100.5027
45.60	57.4211	86.55	100.1721	133.02	66.2404
46.54	57.6347	86.79	100.2328	133.52	71.2496
49.72	0.0000	86.94	100.2712	136.00	70.5807
51.35	91.6618	87.09	100.3097	136.47	51.7374
51.87	74.9190	87.57	100.4310	140.51	0.0000
52.39	61.3398	88.03	82.5924	143.76	65.8537
52.97	80.0704	88.34	82.6570	144.24	62.5459
53.44	70.4834	88.47	82.6836	145.44	68.7429
54.07	63.3336	89.96	111.8566	152.43	70.5888
57.36	0.0000	1093.63	112.0439	153.25	75.8078
57.53	79.7113	91.11	112.1735	323.87	63.6158
57.98	79.8323	92.59	112.5775	156.02	74.0973
59.27	94.2293	93.35	112.7846	158.56	66.1387
59.32	94.2449	94.56	96.0844	159.00	68.2538
59.54	94.3136	94.65	96.1045	162.33	65.5013
60.96	94.7546	94.67	96.1093	162.66	55.1334
61.17	94.8194	94.87	96.1551	163.33	59.3579
62.93	102.0495	97.43	68.8786	165.86	62.7319
63.29	102.1663	98.43	70.8798	176.31	61.6206
63.58	102.2599	98.44	70.8816	176.60	64.8358
64.28	102.4858	99.53	92.2852	177.52	47.8956
66.73	93.6730	100.11	76.6986	181.07	0.0000
67.24	106.2530	102.03	64.9681	181.52	57.8150
125.81	108.6582	103.18	79.0935	184.41	61.6428
67.75	113.7761	103.37	77.2654	143.76	52.7825
68.89	110.7587	105.21	72.9084	193.51	57.7253
69.67	110.1626	105.31	72.9245	197.03	60.1965
70.82	136.2415	106.12	70.2444	198.01	53.7014
70.83	136.2464	106.47	74.9847	201.83	56.1851
72.81	121.8055	109.28	79.2140	203.43	57.4098
72.87	121.8271	111.00	87.0768	205.31	47.2246
74.66	146.4193	111.76	0.0000	210.85	63.9226
74.82	146.4851	114.06	75.2547	215.65	47.1193
74.97	146.5470	116.30	0.0000	218.12	50.6442
77.11	147.4237	116.74	80.4605	222.11	48.6381
78.74	148.0839	119.76	59.7513	227.09	50.0781
79.69	122.9881	121.12	78.2741	227.38	54.6500
80.03	123.0992	121.22	78.2895	228.16	0.0000
80.12	123.1313	121.78	87.0852	228.18	49.0055
80.19	123.1537	122.06	84.2288	116.74	49.0055
80.57	116.2352	122.92	78.5534	235.69	67.4717
81.00	116.3681	123.07	76.6361	235.96	67.4932
81.07	123.4442	265.00	64.1017	238.63	89.2515
81.75	72.4338	125.81	78.9971	238.98	0.0000
82.47	123.9035	127.23	85.0801	240.99	74.0693
83.79	99.4646	127.91	90.0877	242.00	58.7082
84.00	99.5184	129.30	82.4709	244.70	34.0962

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	38.6991	344.28	20.5674	563.25	18.0520
252.80	39.8899	345.93	30.8958	564.24	0.0000
254.15	0.0000	351.06	29.3114	569.33	11.0714
256.23	40.8292	351.93	29.3336	946.00	11.0725
260.90	0.0000	355.39	0.0000	569.70	15.1007
264.66	45.1749	356.01	23.3767	583.19	18.2629
264.80	45.1818	364.49	34.8836	584.27	10.6602
265.00	42.8126	366.42	0.0000	595.83	13.2856
269.46	37.0452	372.51	21.9498	427.87	18.4446
270.03	37.0679	375.05	26.3953	602.52	0.0000
271.23	37.1162	377.52	23.8041	604.72	13.8653
273.65	40.0126	356.01	31.0174	607.14	16.9693
276.40	40.9322	388.16	25.7898	609.32	23.6832
277.37	39.7696	388.63	36.4748	610.33	23.6963
277.60	39.7787	391.69	33.8886	614.28	17.0364
278.00	37.3839	264.66	28.2918	618.01	20.6925
279.20	59.1655	401.81	28.3174	620.36	25.8993
279.54	56.7706	402.40	28.3309	621.93	17.6267
279.70	56.7792	404.85	0.0000	630.19	0.0000
280.46	41.1075	410.95	21.7285	631.29	19.8002
283.69	41.2455	413.71	25.8571	633.25	18.7778
284.31	40.0586	414.70	26.1492	634.78	15.6616
285.41	36.4581	423.72	29.2533	635.95	13.5819
285.90	0.0000	427.09	36.6585	636.99	18.8159
287.50	36.5359	427.87	25.6758	657.50	12.6802
290.67	40.3195	433.94	23.0281	657.76	9.5116
293.27	0.0000	439.40	21.0855	657.90	0.0000
351.93	34.3677	440.45	31.9303	661.66	16.9434
295.96	34.3933	453.88	28.0334	664.57	0.0000
879.38	32.0200	463.37	22.5767	666.33	16.9844
299.98	37.8195	468.07	16.9878	666.50	16.9857
300.09	37.8242	473.00	22.7275	667.71	0.0000
300.13	37.8252	475.06	28.4491	677.62	14.9473
301.36	37.8719	476.78	19.9379	685.70	19.2964
302.85	39.5762	477.60	20.8989	692.65	0.0000
256.23	37.9889	482.18	22.8691	695.00	18.3088
304.85	28.0878	487.02	17.2079	696.49	15.0892
306.78	37.2455	492.35	0.0000	696.51	15.0892
308.46	29.8447	497.08	18.2853	697.00	15.0932
311.90	27.4483	505.52	21.7731	697.30	16.1737
316.51	35.9243	507.63	0.0000	697.49	16.1749
319.41	43.5619	511.00	21.3644	702.65	4.8649
320.08	48.6189	514.00	21.4056	706.68	16.2482
321.04	43.6285	514.00	21.4056	711.68	13.0303
323.87	42.9026	520.40	17.5847	720.70	15.2686
325.23	40.4307	520.69	0.0000	721.93	0.0000
328.76	32.9570	522.65	0.0000	722.78	14.7382
333.37	26.7313	527.90	0.0000	722.91	13.1011
333.97	33.1141	528.26	20.6172	723.31	13.1040
334.37	38.2224	529.59	20.6343	724.19	16.3867
338.28	30.6863	529.87	0.0000	727.33	17.5052
338.32	30.6870	531.02	23.6035	733.00	14.8101
311.90	30.7471	537.26	22.7071	735.93	14.2812
340.48	30.7471	546.56	0.0000	333.97	20.8879
340.55	30.7485	552.55	16.9405	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	8.8229	667.71	0.0000	1434.09	6.3058
747.24	13.2529	962.31	16.5703	1435.80	7.3597
748.06	12.1534	964.08	13.0579	1457.56	0.0000
752.31	17.7122	966.17	15.9726	1460.82	4.2334
753.82	9.9701	911.20	11.6285	1489.16	4.2646
756.73	19.9673	983.53	10.0473	1505.03	6.8512
756.80	19.9680	984.45	0.0000	1584.12	15.2843
884.68	10.0170	1274.44	11.9296	1596.21	8.7598
765.81	20.0508	1002.74	9.1983	1620.50	1.1014
766.84	20.0603	1004.73	15.6485	1621.92	3.3052
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	8.9548	1025.87	0.0000	1690.97	7.8378
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	14.5673	1037.84	6.5202	1764.49	9.1069
783.70	11.7916	1038.76	0.0000	1063.66	3.0396
788.74	21.9478	631.29	13.0806	1771.35	6.8405
792.07	20.2896	1048.07	6.5437	1791.20	0.0000
795.86	14.6779	1049.04	8.4161	1808.65	1.8391
810.06	12.4976	1050.41	7.4844	1810.72	0.0000
810.29	12.4990	1063.66	12.2184	1836.06	2.7749
344.28	14.7726	1077.00	4.7208		
810.76	14.7742	1077.34	3.7771		
815.77	13.6675	1085.87	8.5232		
1048.07	12.5433	1093.63	9.4952		
832.01	18.3509	1099.45	7.6108		
834.85	9.1865	1112.07	6.6877		
835.71	16.0821	1112.84	5.4607		
836.80	0.0000	1115.54	12.2430		
846.75	0.0000	1120.29	10.5374		
846.77	12.6955	1120.55	10.5388		
856.80	10.4308	1221.41	10.5414		
860.56	11.6077	1129.67	14.4141		
871.09	11.6581	1131.51	0.0000		
873.19	13.1268	1147.95	0.0000		
875.33	0.0000	1173.23	6.8214		
879.38	12.2825	1177.95	9.7595		
880.51	10.5326	1189.05	6.8556		
881.60	14.0498	1204.77	6.8893		
883.24	8.7869	1221.41	8.9028		
884.68	10.5505	1231.02	10.2047		
889.28	13.2124	1235.36	7.9473		
894.76	14.1245	1238.28	10.9376		
898.04	19.4467	1260.41	0.0000		
900.72	15.9280	1271.87	9.0390		
903.28	15.9439	1274.44	5.0253		
911.20	14.2168	1274.54	5.0256		
912.08	11.3773	1291.59	6.0608		
923.98	0.0000	1298.22	0.0000		
926.50	12.5145	1312.11	7.1132		
929.11	5.7268	1332.49	6.1326		
935.54	4.3058	1362.66	0.0000		
937.49	5.7453	1365.19	6.1890		
944.13	8.0999	1368.63	0.0000		
946.00	8.1057	1384.29	1.0369		
949.00	13.5246	1408.01	6.2618		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:54.79

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507005.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM52.CNF;102
                                       Background date  : 6-APR-2025 11:02:55.
Sample date      : 6-MAR-2025 10:00:00. Acquisition date : 10-APR-2025 19:34:13
Sample ID        : G714507005           Sample quantity  : 9.75300E+01 GRAM
Detector name    : GAM52                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.74  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.66*	51	199	0.95	93.57	89	9	1.41E-02	52.4	
2	0	63.28*	71	213	0.65	126.83	123	8	1.96E-02	38.4	
3	3	74.82*	202	137	0.91	149.91	144	18	5.61E-02	11.2	1.52E+00
4	3	77.15	386	125	0.91	154.58	144	18	1.07E-01	6.7	
5	0	83.74*	47	222	0.89	167.75	163	9	1.31E-02	59.4	
6	0	86.98*	122	177	1.06	174.24	172	7	3.38E-02	20.3	
7	3	90.04	82	112	1.09	180.36	178	12	2.29E-02	21.6	3.15E+00
8	3	92.66*	150	149	1.10	185.61	178	12	4.16E-02	16.3	
9	0	144.32*	41	98	2.56	288.95	286	8	1.15E-02	45.0	
10	1	184.34*	24	83	1.09	369.00	366	14	6.54E-03	79.8	1.72E+01
11	1	187.84	31	90	1.09	376.00	366	14	8.49E-03	60.1	
12	0	194.97	27	85	1.11	390.27	386	8	7.59E-03	61.6	
13	0	209.32	26	115	1.20	418.97	414	9	7.16E-03	77.5	
14	3	238.61*	334	84	0.92	477.57	472	22	9.28E-02	6.9	1.30E+00
15	3	241.89	198	63	1.22	484.15	472	22	5.50E-02	10.2	
16	0	295.30*	317	84	1.03	590.99	587	10	8.82E-02	7.9	
17	0	338.42	52	60	1.01	677.26	673	9	1.45E-02	30.3	
18	0	351.93*	589	68	1.14	704.29	700	11	1.64E-01	5.0	
19	0	409.80	11	27	0.84	820.06	816	6	2.95E-03	83.3	
20	0	416.52	25	52	3.32	833.50	826	14	6.91E-03	64.9	
21	0	477.81	60	43	1.10	956.11	950	11	1.66E-02	25.4	
22	0	481.09	14	20	1.28	962.68	960	7	3.98E-03	57.4	
23	0	500.81	17	43	1.40	1002.12	994	16	4.60E-03	92.7	
24	3	510.67*	12	25	1.87	1021.84	1014	21	3.27E-03	120.8	9.48E-01
25	3	513.58	19	23	1.87	1027.67	1014	21	5.19E-03	69.1	
26	0	549.35	11	5	1.55	1099.23	1096	7	3.08E-03	45.2	
27	0	552.48	13	6	1.61	1105.51	1102	8	3.52E-03	44.0	
28	0	583.37*	84	51	1.28	1167.29	1160	12	2.34E-02	20.4	
29	0	609.28*	371	45	1.17	1219.13	1214	12	1.03E-01	6.4	
30	0	633.55	24	42	6.34	1267.68	1252	19	6.74E-03	67.6	
31	0	728.03	28	11	1.12	1456.71	1451	12	7.76E-03	31.0	
32	0	749.31	8	9	1.33	1499.28	1493	8	2.23E-03	75.8	
33	0	767.83	50	26	1.39	1536.33	1528	15	1.38E-02	26.5	
34	0	794.95	25	16	0.60	1590.59	1584	15	6.99E-03	39.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	806.77	11	15	1.41	1614.24	1610	11	3.11E-03	75.5	
36	0	839.35	15	17	1.47	1679.41	1674	11	4.17E-03	58.6	
37	0	911.24*	64	11	1.56	1823.25	1818	11	1.78E-02	16.4	
38	0	934.50	19	13	1.91	1869.79	1865	12	5.22E-03	43.9	
39	0	958.38	10	6	1.67	1917.55	1910	11	2.85E-03	54.4	
40	4	964.39	27	7	2.49	1929.57	1924	19	7.57E-03	28.4	6.81E-01
41	4	968.95*	28	8	1.57	1938.70	1924	19	7.68E-03	27.8	
42	0	1000.57	17	17	3.06	2001.97	1995	16	4.68E-03	58.7	
43	0	1037.77	11	9	1.12	2076.39	2070	12	3.18E-03	59.9	
44	0	1120.41*	91	12	1.77	2241.72	2235	15	2.53E-02	13.4	
45	0	1155.54	15	7	1.45	2312.01	2306	9	4.17E-03	40.7	
46	0	1169.76	11	4	1.56	2340.45	2336	8	3.06E-03	43.6	
47	0	1238.94	35	14	1.55	2478.88	2470	18	9.83E-03	29.6	
48	0	1317.27	6	6	0.55	2635.59	2631	6	1.71E-03	74.3	
49	0	1377.81	27	3	4.17	2756.72	2751	12	7.57E-03	22.9	
50	0	1460.65*	63	6	1.97	2922.46	2917	11	1.75E-02	15.1	
51	0	1509.67	11	8	0.69	3020.54	3015	11	3.10E-03	57.9	
52	0	1593.64	10	6	1.26	3188.55	3184	9	2.69E-03	57.6	
53	0	1620.22	7	0	0.58	3241.71	3236	10	1.94E-03	37.8	
54	0	1730.50	5	5	0.55	3462.37	3456	10	1.42E-03	93.0	
55	0	1764.55*	65	0	2.41	3530.49	3524	13	1.81E-02	12.6	
56	0	1847.39	12	0	1.96	3696.25	3692	9	3.33E-03	28.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 20:34:56

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507005.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 10:00:00 Acquisition date : 10-APR-2025 19:34:13
Sample ID : G714507005 Sample quantity : 97.530 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA52 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.74 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	3.180E+00	1.311E+00	2.079E+00	50.85	OK
K-40	1460.82	10.66*	1.105E+00	3.843E+00	3.843E+00	30.10	OK
KR-85	514.00	0.43*	2.989E+00	1.047E+01	1.054E+01	138.25	OK
SR-85	514.00	96.00*	2.989E+00	4.735E-02	6.915E-02	138.25	OK
CD-109	88.03	3.70*	7.091E+00	3.439E+00	3.627E+00	40.65	OK
SN-126	64.28	9.60	4.588E+00	1.195E+00	1.195E+00	76.71	OK
	86.94	8.90	7.091E+00	1.430E+00	1.430E+00	40.65	OK
	87.57	37.00*	7.091E+00	3.439E-01	3.439E-01	40.65	OK
CE-141	145.44	48.29*	7.311E+00	7.284E-02	1.550E-01	108.98	OK
TL-208	277.37	6.60	4.896E+00	----- Line	Not Found	-----	Absent
	583.19	85.00*	2.670E+00	2.692E-01	2.692E-01	40.74	OK
	860.56	12.50	1.842E+00	----- Line	Not Found	-----	Absent
BI-210	46.54	4.25*	1.718E+00	5.201E+00	5.217E+00	104.84	OK
PB-210	46.54	4.25*	1.718E+00	5.201E+00	5.217E+00	104.84	OK
BI-211	72.87	1.23	5.896E+00	----- Line	Not Found	-----	Absent
	351.06	12.92*	4.083E+00	8.147E+00	8.147E+00	9.96	OK
BI-212	727.33	6.67*	2.171E+00	1.396E+00	1.396E+00	62.03	OK
	1620.50	1.47	1.018E+00	3.355E+00	3.355E+00	75.59	OK
PB-212	74.82	10.28	6.112E+00	2.387E+00	2.387E+00	22.42	OK
	77.11	17.10	6.347E+00	2.643E+00	2.643E+00	13.39	OK
	238.63	43.60*	5.458E+00	1.029E+00	1.029E+00	13.85	OK
	300.09	3.30	4.616E+00	----- Line	Not Found	-----	Absent
BI-214	609.32	45.49*	2.566E+00	2.303E+00	2.303E+00	12.75	OK
	1120.29	14.92	1.415E+00	3.105E+00	3.105E+00	26.80	OK
	1764.49	15.30	9.611E-01	3.172E+00	3.172E+00	25.21	OK
PB-214	74.82	5.80	6.112E+00	4.232E+00	4.232E+00	22.42	OK
	77.11	9.70	6.347E+00	4.659E+00	4.659E+00	13.39	OK
	87.09	3.41	7.091E+00	3.732E+00	3.732E+00	40.65	OK
	242.00	7.25	5.406E+00	3.702E+00	3.702E+00	20.41	OK
	295.22	18.42	4.672E+00	2.697E+00	2.697E+00	15.86	OK
	351.93	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96	OK
RN-222	609.32	45.49*	2.566E+00	2.303E+00	2.303E+00	12.75	OK
	1120.29	14.92	1.415E+00	3.105E+00	3.105E+00	26.80	OK
	1764.49	15.30	9.611E-01	3.172E+00	3.172E+00	25.21	OK
RA-224	240.99	4.10*	5.406E+00	6.547E+00	6.547E+00	20.41	OK
RA-226	74.82	5.80	6.112E+00	4.232E+00	4.232E+00	22.42	OK
	77.11	9.70	6.347E+00	4.659E+00	4.659E+00	13.39	OK
	87.09	3.41	7.091E+00	3.732E+00	3.732E+00	40.65	OK
	242.00	7.25	5.406E+00	3.702E+00	3.702E+00	20.41	OK
	295.22	18.42	4.672E+00	2.697E+00	2.697E+00	15.86	OK
	351.93	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96	OK
AC-228	105.21	1.10	7.666E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.209E+00	8.022E-01	8.022E-01	60.51	OK
	835.71	1.61	1.897E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.740E+00	1.033E+00	1.033E+00	32.82	OK
	968.97	15.80	1.636E+00	7.712E-01	7.712E-01	55.60	OK
RA-228	105.21	1.10	7.666E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.209E+00	8.022E-01	8.022E-01	60.51	OK
	835.71	1.61	1.897E+00	----- Line	Not Found	-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	911.20	25.80*	1.740E+00	1.033E+00	1.033E+00	32.82	OK
	968.97	15.80	1.636E+00	7.712E-01	7.712E-01	55.60	OK
TH-228	74.82	10.28	6.112E+00	2.387E+00	2.387E+00	22.42	OK
	77.11	17.10	6.347E+00	2.643E+00	2.643E+00	13.39	OK
	238.63	43.60*	5.458E+00	1.029E+00	1.029E+00	13.85	OK
	300.09	3.30	4.616E+00	----- Line Not Found		-----	Absent
TH-230	74.82	5.80	6.112E+00	4.232E+00	4.232E+00	22.42	OK
	77.11	9.70	6.347E+00	4.659E+00	4.659E+00	13.39	OK
	87.09	3.41	7.091E+00	3.732E+00	3.732E+00	40.65	OK
	242.00	7.25	5.406E+00	3.702E+00	3.702E+00	20.41	OK
	295.22	18.42	4.672E+00	2.697E+00	2.697E+00	15.86	OK
	351.93	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96	OK
TH-232	105.21	1.10	7.666E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.209E+00	8.022E-01	8.022E-01	60.51	OK
	835.71	1.61	1.897E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.740E+00	1.033E+00	1.033E+00	32.82	OK
	968.97	15.80	1.636E+00	7.712E-01	7.712E-01	55.60	OK
PA-234M	63.29	3.70*	4.588E+00	3.100E+00	3.100E+00	76.71	OK
	92.59	4.23	7.364E+00	3.560E+00	3.560E+00	32.59	OK
TH-234	63.29	3.70*	4.588E+00	3.100E+00	3.100E+00	76.71	OK
	92.59	4.23	7.364E+00	3.560E+00	3.560E+00	32.59	OK
U-234	74.82	5.80	6.112E+00	4.232E+00	4.232E+00	22.42	OK
	77.11	9.70	6.347E+00	4.659E+00	4.659E+00	13.39	OK
	87.09	3.41	7.091E+00	3.732E+00	3.732E+00	40.65	OK
	242.00	7.25	5.406E+00	3.702E+00	3.702E+00	20.41	OK
	295.22	18.42	4.672E+00	2.697E+00	2.697E+00	15.86	OK
	351.93	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96	OK
U-235	89.96	3.47	7.250E+00	2.428E+00	2.428E+00	43.22	OK
	93.35	5.60	7.364E+00	2.689E+00	2.689E+00	32.59	OK
	143.76	10.96*	7.322E+00	----- Line Not Found		-----	<<INT Reject
	163.33	5.08	6.913E+00	----- Line Not Found		-----	Absent
	185.72	57.20	6.464E+00	4.684E-02	4.684E-02	159.58	OK
	205.31	5.01	6.044E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	4.588E+00	3.100E+00	3.100E+00	76.71	OK
	92.59	4.23	7.364E+00	3.560E+00	3.560E+00	32.59	OK
AM-243	43.53	5.90	1.233E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	6.112E+00	3.652E-01	3.652E-01	22.42	OK
ANH-511	511.00	100.00*	3.004E+00	2.851E-02	2.851E-02	241.51	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:57.14

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507005.CNF;1		
Acquisition date	: 10-APR-2025 19:34:13	Sensitivity	: 3.000
Detector ID	: GAM52	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.74	Half life ratio	: *****
Sample date	: 6-MAR-2025 10:00:00	Analyst initials	: MXR1
Sample ID	: G714507005	Sample Quantity	: 9.7530E+01 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 3-SEP-2024 08:39:54	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM52_CAN.CNF;5		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	2.079E+00	1.036E+00	1.011E+00
K-40	3.843E+00	1.134E+00	9.035E-01
KR-85	1.054E+01	1.428E+01	1.262E+01
SR-85	6.915E-02	9.369E-02	8.276E-02
CD-109	3.627E+00	1.445E+00	1.489E+00
SN-126	3.439E-01	1.370E-01	1.416E-01
CE-141	1.550E-01	1.655E-01	1.971E-01
TL-208	2.692E-01	1.075E-01	8.468E-02
BI-210	5.217E+00	5.360E+00	4.888E+00
PB-210	5.217E+00	5.360E+00	4.888E+00
BI-211	8.147E+00	7.949E-01	4.541E-01
BI-212	1.396E+00	8.485E-01	1.076E+00
PB-212	1.029E+00	1.397E-01	1.211E-01
BI-214	2.303E+00	2.877E-01	1.656E-01
PB-214	2.957E+00	2.885E-01	1.652E-01
RN-222	2.303E+00	2.877E-01	1.656E-01
RA-224	6.547E+00	1.309E+00	1.298E+00
RA-226	2.957E+00	2.885E-01	1.652E-01
AC-228	1.033E+00	3.323E-01	3.580E-01
RA-228	1.033E+00	3.323E-01	3.580E-01
TH-228	1.029E+00	1.397E-01	1.211E-01
TH-230	2.957E+00	2.885E-01	1.652E-01
TH-232	1.033E+00	3.323E-01	3.580E-01
PA-234M	3.100E+00	2.330E+00	2.174E+00
TH-234	3.100E+00	2.330E+00	2.174E+00
U-234	2.957E+00	2.885E-01	1.652E-01
U-235	3.798E-01	3.349E-01	4.412E-01
U-238	3.100E+00	2.330E+00	2.174E+00
AM-243	3.652E-01	8.026E-02	9.833E-02
ANH-511	2.851E-02	6.747E-02	5.409E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)

NA-22	-2.691E-02	4.283E-02	7.621E-02	NOT IDENT.
NA-24	0.000E+00	4.757E+15	0.000E+00	SHORT HLIF
AL-26	1.629E-02	2.258E-02	7.490E-02	NOT IDENT.
SC-46	-1.907E-02	6.604E-02	1.167E-01	FAIL ABUN
V-48	-1.340E-01	2.208E-01	3.634E-01	NOT IDENT.
CR-51	-1.786E-01	7.683E-01	1.293E+00	NOT IDENT.
MN-52	-3.356E-01	3.877E+00	7.830E+00	FAIL ABUN
MN-54	-2.832E-02	4.856E-02	6.956E-02	NOT IDENT.
CO-56	5.933E-03	5.894E-02	1.130E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.649E-02	2.819E-02	5.279E-02	NOT IDENT.
CO-58	-4.472E-02	5.993E-02	8.086E-02	NOT IDENT.
FE-59	-1.813E-02	1.271E-01	2.546E-01	NOT IDENT.
CO-60	3.661E-02	5.484E-02	1.223E-01	NOT IDENT.
ZN-65	4.295E-02	9.692E-02	1.984E-01	NOT IDENT.
GE-68	-3.212E-01	1.339E+00	2.647E+00	NOT IDENT.
AS-73	6.863E-01	8.448E-01	1.632E+00	NOT IDENT.
AS-74	6.537E-05	2.811E-01	5.235E-01	FAIL ABUN
SE-75	1.230E-02	5.775E-02	1.030E-01	NOT IDENT.
BR-77	0.000E+00	8.076E+03	0.000E+00	SHORT HLIF
SR-82	-3.554E-01	6.754E-01	1.162E+00	NOT IDENT.
RB-83	-8.341E-02	7.918E-02	1.268E-01	FAIL ABUN
RB-84	-5.719E-02	1.182E-01	2.037E-01	NOT IDENT.
RB-86	-2.317E-01	1.650E+00	3.342E+00	NOT IDENT.
Y-88	2.889E-02	6.898E-02	1.546E-01	NOT IDENT.
Y-91	-5.035E+00	2.680E+01	5.276E+01	NOT IDENT.
NB-94	5.795E-02	4.017E-02	9.015E-02	NOT IDENT.
NB-95	1.617E-02	6.950E-02	1.329E-01	NOT IDENT.
NB-95M	1.148E-01	2.088E-01	3.504E-01	NOT IDENT.
ZR-95	7.227E-02	9.205E-02	2.018E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.127E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.437E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	8.202E+40	0.000E+00	SHORT HLIF
RH-101	-9.831E-03	3.697E-02	6.427E-02	NOT IDENT.
RH-102	3.160E-02	6.570E-02	1.329E-01	FAIL ABUN
RU-103	4.995E-02	6.081E-02	1.222E-01	FAIL ABUN
RH-106	-2.646E-01	3.497E-01	5.863E-01	NOT IDENT.
RU-106	-2.646E-01	3.497E-01	5.863E-01	NOT IDENT.
AG-108M	-1.561E-03	3.653E-02	6.878E-02	NOT IDENT.
AG-110	2.322E-01	7.111E-01	1.473E+00	NOT IDENT.
AG-110M	-5.790E-03	6.908E-02	1.277E-01	NOT IDENT.
SN-113	-2.123E-02	5.767E-02	1.055E-01	NOT IDENT.
CD-115	0.000E+00	6.259E+03	0.000E+00	SHORT HLIF
SN-117M	-3.451E-03	1.781E-01	3.132E-01	NOT IDENT.
SB-122	0.000E+00	4.634E+02	0.000E+00	SHORT HLIF
TE-123M	3.242E-03	3.654E-02	6.487E-02	NOT IDENT.
SB-124	-1.232E-01	1.645E-01	2.691E-01	NOT IDENT.
SB-125	4.539E-03	1.082E-01	2.065E-01	NOT IDENT.
TE-125M	-3.792E+00	1.402E+01	2.454E+01	NOT IDENT.
I-126	4.793E-01	7.525E-01	1.555E+00	NOT IDENT.
SB-126	1.172E-01	5.451E-01	1.060E+00	NOT IDENT.
SB-127	-4.251E-01	6.015E+01	1.138E+02	NOT IDENT.
I-131	-3.982E-01	6.493E-01	1.167E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.833E+01	0.000E+00	SHORT HLIF
BA-133	1.332E-02	4.884E-02	8.771E-02	NOT IDENT.
I-133	0.000E+00	7.002E+10	0.000E+00	SHORT HLIF
CS-134	1.103E-01	8.476E-02	1.157E-01	FAIL ABUN
I-135	0.000E+00	1.391E+38	0.000E+00	SHORT HLIF
CS-136	-1.151E-01	4.019E-01	7.093E-01	NOT IDENT.
BA-137M	-2.781E-02	3.660E-02	6.087E-02	NOT IDENT.
CS-137	-2.938E-02	3.867E-02	6.431E-02	NOT IDENT.
LA-138	-2.096E-02	7.481E-02	1.439E-01	NOT IDENT.
CE-139	1.924E-02	3.753E-02	6.889E-02	NOT IDENT.
BA-140	6.422E-02	8.398E-01	1.635E+00	NOT IDENT.
LA-140	-6.618E-02	4.155E-01	7.092E-01	NOT IDENT.
CE-143	0.000E+00	5.136E+06	0.000E+00	SHORT HLIF
CE-144	-1.328E-01	2.243E-01	3.794E-01	NOT IDENT.
PM-144	6.834E-03	4.242E-02	8.185E-02	FAIL ABUN
PR-144	5.059E-01	3.207E+00	6.185E+00	NOT IDENT.
PM-146	-9.188E-04	4.818E-02	9.165E-02	FAIL ABUN
ND-147	2.217E-01	2.116E+00	4.139E+00	FAIL ABUN
PM-147	1.169E+02	8.059E+02	1.458E+03	NOT IDENT.
PM-149	0.000E+00	6.319E+04	0.000E+00	SHORT HLIF
EU-150	2.055E-02	3.457E-02	6.339E-02	FAIL ABUN
EU-152	-6.628E-03	1.113E-01	2.108E-01	FAIL ABUN
GD-153	4.920E-02	9.027E-02	1.691E-01	NOT IDENT.

EU-154	-7.190E-02	1.211E-01	2.177E-01	NOT IDENT.
EU-155	3.855E-02	1.246E-01	2.268E-01	FAIL ABUN
TB-160	-1.237E-01	1.711E-01	2.764E-01	FAIL ABUN
HO-166M	-2.592E-02	7.517E-02	1.339E-01	FAIL ABUN
TM-171	-1.076E+01	1.427E+01	2.493E+01	NOT IDENT.
HF-172	-3.042E-02	2.122E-01	3.738E-01	FAIL ABUN
LU-172	-2.526E-02	5.537E-02	1.059E-01	FAIL ABUN
LU-176	7.659E-03	3.550E-02	6.232E-02	FAIL ABUN
HF-181	7.303E-02	8.222E-02	1.349E-01	FAIL ABUN
TA-182	2.717E-02	2.068E-01	4.344E-01	FAIL ABUN
RE-183	4.766E-02	2.087E-01	3.880E-01	NOT IDENT.
RE-184	-8.779E-02	2.329E-01	4.076E-01	NOT IDENT.
W-188	-9.107E+00	1.155E+01	1.808E+01	FAIL ABUN
IR-192	2.688E-02	4.990E-02	9.214E-02	FAIL ABUN
HG-203	-2.832E-02	6.584E-02	1.081E-01	NOT IDENT.
TL-204	-5.854E-01	5.167E+00	8.597E+00	FAIL ABUN
BI-207	4.396E-02	5.747E-02	1.316E-01	FAIL ABUN
PB-211	4.632E-01	8.938E-01	1.711E+00	NOT IDENT.
BI-213	-1.267E-02	1.245E-01	2.335E-01	NOT IDENT.
RN-219	1.560E-01	5.050E-01	9.812E-01	NOT IDENT.
RA-223	3.900E-01	8.354E-01	1.508E+00	FAIL ABUN
AC-225	-6.405E-01	2.736E+00	4.668E+00	NOT IDENT.
AC-227	-2.529E-02	3.185E-01	5.463E-01	NOT IDENT.
TH-227	-2.529E-02	3.185E-01	5.463E-01	NOT IDENT.
TH-229	7.293E-01	8.811E-01	1.082E+00	FAIL ABUN
PA-231	-8.747E-03	6.051E-01	1.039E+00	NOT IDENT.
TH-231	3.900E-01	8.354E-01	1.508E+00	FAIL ABUN
PA-233	1.793E-02	7.318E-02	1.314E-01	NOT IDENT.
PA-234	-2.017E-01	2.994E-01	4.912E-01	NOT IDENT.
NP-237	1.793E-02	7.318E-02	1.314E-01	NOT IDENT.
NP-238	0.000E+00	1.626E+04	0.000E+00	SHORT HLIF
NP-239	-2.916E-01	2.721E-01	4.432E-01	NOT IDENT.
PU-239	1.712E+02	3.833E+02	7.033E+02	NOT IDENT.
AM-241	-2.648E-02	1.481E-01	2.477E-01	NOT IDENT.
CM-243	5.194E-02	1.162E-01	2.148E-01	NOT IDENT.
BK-247	-6.146E-03	9.524E-02	1.643E-01	FAIL ABUN
CM-247	-1.170E-02	4.783E-02	8.794E-02	NOT IDENT.
CF-249	1.478E-02	4.496E-02	8.859E-02	NOT IDENT.
CF-251	8.614E-03	1.476E-01	2.606E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:34:55.60

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	57	10.44*	3.180E+00	1.311E+00	2.079E+00	50.85
K-40	1460.82	59	10.66*	1.105E+00	3.843E+00	3.843E+00	30.10
KR-85	514.00	18	0.43*	2.989E+00	1.047E+01	1.054E+01	138.25
SR-85	514.00	18	96.00*	2.989E+00	4.735E-02	6.915E-02	138.25
CD-109	88.03	117	3.70*	7.091E+00	3.439E+00	3.627E+00	40.65
SN-126	64.28	68	9.60	4.588E+00	1.195E+00	1.195E+00	76.71
	86.94	117	8.90	7.091E+00	1.430E+00	1.430E+00	40.65
	87.57	117	37.00*	7.091E+00	3.439E-01	3.439E-01	40.65
CE-141	145.44	40	48.29*	7.311E+00	8.619E-02	1.834E-01	89.98
TL-208	277.37	------	6.60	4.896E+00	------ Line Not Found		------
	583.19	79	85.00*	2.670E+00	2.692E-01	2.692E-01	40.74
	860.56	------	12.50	1.842E+00	------ Line Not Found		------
BI-210	46.54	49	4.25*	1.718E+00	5.201E+00	5.217E+00	104.84
PB-210	46.54	49	4.25*	1.718E+00	5.201E+00	5.217E+00	104.84
BI-211	72.87	------	1.23	5.896E+00	------ Line Not Found		------
	351.06	558	12.92*	4.083E+00	8.147E+00	8.147E+00	9.96
BI-212	727.33	26	6.67*	2.171E+00	1.396E+00	1.396E+00	62.03
	1620.50	7	1.47	1.018E+00	3.355E+00	3.355E+00	75.59
PB-212	74.82	195	10.28	6.112E+00	2.387E+00	2.387E+00	22.42
	77.11	373	17.10	6.347E+00	2.643E+00	2.643E+00	13.39
	238.63	318	43.60*	5.458E+00	1.029E+00	1.029E+00	13.85
	300.09	------	3.30	4.616E+00	------ Line Not Found		------
BI-214	609.32	349	45.49*	2.566E+00	2.303E+00	2.303E+00	12.75
	1120.29	85	14.92	1.415E+00	3.105E+00	3.105E+00	26.80
	1764.49	61	15.30	9.611E-01	3.172E+00	3.172E+00	25.21
PB-214	74.82	195	5.80	6.112E+00	4.232E+00	4.232E+00	22.42
	77.11	373	9.70	6.347E+00	4.659E+00	4.659E+00	13.39
	87.09	117	3.41	7.091E+00	3.732E+00	3.732E+00	40.65
	242.00	189	7.25	5.406E+00	3.702E+00	3.702E+00	20.41
	295.22	302	18.42	4.672E+00	2.697E+00	2.697E+00	15.86
	351.93	558	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96
RN-222	609.32	349	45.49*	2.566E+00	2.303E+00	2.303E+00	12.75
	1120.29	85	14.92	1.415E+00	3.105E+00	3.105E+00	26.80
	1764.49	61	15.30	9.611E-01	3.172E+00	3.172E+00	25.21
RA-224	240.99	189	4.10*	5.406E+00	6.547E+00	6.547E+00	20.41
RA-226	74.82	195	5.80	6.112E+00	4.232E+00	4.232E+00	22.42
	77.11	373	9.70	6.347E+00	4.659E+00	4.659E+00	13.39
	87.09	117	3.41	7.091E+00	3.732E+00	3.732E+00	40.65
	242.00	189	7.25	5.406E+00	3.702E+00	3.702E+00	20.41
	295.22	302	18.42	4.672E+00	2.697E+00	2.697E+00	15.86
	351.93	558	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96
AC-228	105.21	------	1.10	7.666E+00	------ Line Not Found		------
	338.32	49	11.27	4.209E+00	8.022E-01	8.022E-01	60.51
	835.71	------	1.61	1.897E+00	------ Line Not Found		------
	911.20	60	25.80*	1.740E+00	1.033E+00	1.033E+00	32.82
	968.97	26	15.80	1.636E+00	7.712E-01	7.712E-01	55.60
RA-228	105.21	------	1.10	7.666E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	49	11.27	4.209E+00	8.022E-01	8.022E-01	60.51
	835.71	------	1.61	1.897E+00	------ Line Not Found		------
	911.20	60	25.80*	1.740E+00	1.033E+00	1.033E+00	32.82
	968.97	26	15.80	1.636E+00	7.712E-01	7.712E-01	55.60
TH-228	74.82	195	10.28	6.112E+00	2.387E+00	2.387E+00	22.42
	77.11	373	17.10	6.347E+00	2.643E+00	2.643E+00	13.39
	238.63	318	43.60*	5.458E+00	1.029E+00	1.029E+00	13.85
	300.09	------	3.30	4.616E+00	------ Line Not Found		------
TH-230	74.82	195	5.80	6.112E+00	4.232E+00	4.232E+00	22.42
	77.11	373	9.70	6.347E+00	4.659E+00	4.659E+00	13.39
	87.09	117	3.41	7.091E+00	3.732E+00	3.732E+00	40.65
	242.00	189	7.25	5.406E+00	3.702E+00	3.702E+00	20.41
	295.22	302	18.42	4.672E+00	2.697E+00	2.697E+00	15.86
	351.93	558	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96
TH-232	105.21	------	1.10	7.666E+00	------ Line Not Found		------
	338.32	49	11.27	4.209E+00	8.022E-01	8.022E-01	60.51
	835.71	------	1.61	1.897E+00	------ Line Not Found		------
	911.20	60	25.80*	1.740E+00	1.033E+00	1.033E+00	32.82
	968.97	26	15.80	1.636E+00	7.712E-01	7.712E-01	55.60
PA-234M	63.29	68	3.70*	4.588E+00	3.100E+00	3.100E+00	76.71
	92.59	144	4.23	7.364E+00	3.560E+00	3.560E+00	32.59
TH-234	63.29	68	3.70*	4.588E+00	3.100E+00	3.100E+00	76.71
	92.59	144	4.23	7.364E+00	3.560E+00	3.560E+00	32.59
U-234	74.82	195	5.80	6.112E+00	4.232E+00	4.232E+00	22.42
	77.11	373	9.70	6.347E+00	4.659E+00	4.659E+00	13.39
	87.09	117	3.41	7.091E+00	3.732E+00	3.732E+00	40.65
	242.00	189	7.25	5.406E+00	3.702E+00	3.702E+00	20.41
	295.22	302	18.42	4.672E+00	2.697E+00	2.697E+00	15.86
	351.93	558	35.60*	4.083E+00	2.957E+00	2.957E+00	9.96
U-235	89.96	79	3.47	7.250E+00	2.428E+00	2.428E+00	43.22
	93.35	144	5.60	7.364E+00	2.689E+00	2.689E+00	32.59
	143.76	40	10.96*	7.311E+00	3.798E-01	3.798E-01	89.98
	163.33	------	5.08	6.913E+00	------ Line Not Found		------
	185.72	22	57.20	6.464E+00	4.684E-02	4.684E-02	159.58
	205.31	------	5.01	6.044E+00	------ Line Not Found		------
U-238	63.29	68	3.70*	4.588E+00	3.100E+00	3.100E+00	76.71
	92.59	144	4.23	7.364E+00	3.560E+00	3.560E+00	32.59
AM-243	43.53	------	5.90	1.233E+00	------ Line Not Found		------
	74.66	195	67.20*	6.112E+00	3.652E-01	3.652E-01	22.42
ANH-511	511.00	11	100.00*	3.004E+00	2.851E-02	2.851E-02	241.51

Flag: "*" = Keyline

Sample ID : G714507005 Acquisition date : 10-APR-2025 19:34:13

Total number of lines in spectrum 56
Number of unidentified lines 17
Number of lines tentatively identified by NID 39 69.64%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	1.311E+00	2.079E+00	1.057E+00	50.85	
K-40	1.25E+09Y	1.00	3.843E+00	3.843E+00	1.157E+00	30.10	
KR-85	10.56Y	1.01	1.047E+01	1.054E+01	1.457E+01	138.25	
SR-85	64.84D	1.46	4.735E-02	6.915E-02	9.560E-02	138.25	
CD-109	461.40D	1.05	3.439E+00	3.627E+00	1.474E+00	40.65	
SN-126	2.30E+05Y	1.00	3.439E-01	3.439E-01	1.398E-01	40.65	
CE-141	32.51D	2.13	8.619E-02	1.834E-01	1.650E-01	89.98	
TL-208	1.41E+10Y	1.00	2.692E-01	2.692E-01	1.097E-01	40.74	
BI-210	22.20Y	1.00	5.201E+00	5.217E+00	5.470E+00	104.84	
PB-210	22.20Y	1.00	5.201E+00	5.217E+00	5.470E+00	104.84	
BI-211	7.04E+08Y	1.00	8.147E+00	8.147E+00	0.811E+00	9.96	
BI-212	1.41E+10Y	1.00	1.396E+00	1.396E+00	0.866E+00	62.03	
PB-212	1.41E+10Y	1.00	1.029E+00	1.029E+00	0.143E+00	13.85	
BI-214	1600.00Y	1.00	2.303E+00	2.303E+00	0.294E+00	12.75	
PB-214	1600.00Y	1.00	2.957E+00	2.957E+00	0.294E+00	9.96	
RN-222	1600.00Y	1.00	2.303E+00	2.303E+00	0.294E+00	12.75	
RA-224	1.41E+10Y	1.00	6.547E+00	6.547E+00	1.336E+00	20.41	
RA-226	1600.00Y	1.00	2.957E+00	2.957E+00	0.294E+00	9.96	
AC-228	1.41E+10Y	1.00	1.033E+00	1.033E+00	0.339E+00	32.82	
RA-228	1.41E+10Y	1.00	1.033E+00	1.033E+00	0.339E+00	32.82	
TH-228	1.41E+10Y	1.00	1.029E+00	1.029E+00	0.143E+00	13.85	
TH-230	7.54E+04Y	1.00	2.957E+00	2.957E+00	0.294E+00	9.96	
TH-232	1.41E+10Y	1.00	1.033E+00	1.033E+00	0.339E+00	32.82	
PA-234M	4.47E+09Y	1.00	3.100E+00	3.100E+00	2.378E+00	76.71	
TH-234	4.47E+09Y	1.00	3.100E+00	3.100E+00	2.378E+00	76.71	
U-234	2.45E+05Y	1.00	2.957E+00	2.957E+00	0.294E+00	9.96	
U-235	7.04E+08Y	1.00	3.798E-01	3.798E-01	3.417E-01	89.98	
U-238	4.47E+09Y	1.00	3.100E+00	3.100E+00	2.378E+00	76.71	
AM-243	7370.00Y	1.00	3.652E-01	3.652E-01	0.819E-01	22.42	
ANH-511	1.00E+09Y	1.00	2.851E-02	2.851E-02	6.885E-02	241.51	
	Total Activity :		7.797E+01	7.914E+01			

Grand Total Activity : 7.797E+01 7.914E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	83.74	45	214	0.89	167.75	163	9	1.31E-02	****	6.89E+00	T
1	187.84	29	86	1.09	376.00	366	14	8.49E-03	****	6.39E+00	
0	194.97	26	81	1.11	390.27	386	8	7.59E-03	****	6.25E+00	T
0	209.32	25	110	1.20	418.97	414	9	7.16E-03	****	5.97E+00	
0	409.80	10	26	0.84	820.06	816	6	2.95E-03	****	3.61E+00	T
0	416.52	24	49	3.32	833.50	826	14	6.91E-03	****	3.57E+00	
0	481.09	14	19	1.28	962.68	960	7	3.98E-03	****	3.16E+00	T
0	500.81	16	41	1.40	1002.12	994	16	4.60E-03	****	3.05E+00	
0	549.35	10	5	1.55	1099.23	1096	7	3.08E-03	90.5	2.82E+00	
0	552.48	12	6	1.61	1105.51	1102	8	3.52E-03	88.0	2.80E+00	T
0	633.55	23	39	6.34	1267.68	1252	19	6.74E-03	****	2.48E+00	T
0	749.31	8	8	1.33	1499.28	1493	8	2.23E-03	****	2.11E+00	T
0	767.83	47	25	1.39	1536.33	1528	15	1.38E-02	53.0	2.06E+00	T
0	794.95	24	15	0.60	1590.59	1584	15	6.99E-03	78.4	1.99E+00	T
0	806.77	11	14	1.41	1614.24	1610	11	3.11E-03	****	1.96E+00	
0	839.35	14	16	1.47	1679.41	1674	11	4.17E-03	****	1.89E+00	
0	934.50	18	12	1.91	1869.79	1865	12	5.22E-03	87.8	1.70E+00	T
0	958.38	10	5	1.67	1917.55	1910	11	2.85E-03	****	1.65E+00	
4	964.39	26	6	2.49	1929.57	1924	19	7.57E-03	56.7	1.64E+00	T
0	1000.57	16	16	3.06	2001.97	1995	16	4.68E-03	****	1.58E+00	
0	1037.77	11	8	1.12	2076.39	2070	12	3.18E-03	****	1.53E+00	T
0	1155.54	14	7	1.45	2312.01	2306	9	4.17E-03	81.3	1.37E+00	
0	1169.76	10	4	1.56	2340.45	2336	8	3.06E-03	87.2	1.36E+00	
0	1238.94	33	13	1.55	2478.88	2470	18	9.83E-03	59.2	1.28E+00	T
0	1317.27	6	5	0.55	2635.59	2631	6	1.71E-03	****	1.21E+00	
0	1377.81	25	3	4.17	2756.72	2751	12	7.57E-03	45.8	1.16E+00	
0	1509.67	10	7	0.69	3020.54	3015	11	3.10E-03	****	1.08E+00	
0	1593.64	9	6	1.26	3188.55	3184	9	2.69E-03	****	1.03E+00	
0	1730.50	5	5	0.55	3462.37	3456	10	1.42E-03	****	9.73E-01	
0	1847.39	11	0	1.96	3696.25	3692	9	3.33E-03	57.7	9.36E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:35:06.75

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507005.CNF;1    *
* Acquisition date : 10-APR-2025 19:34:13 Sensitivity     : 3.000          *
* Detector ID      : GAM52                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.74     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 10:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507005           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 9.7530E+01 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-SEP-2024 08:39:54 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM52_CAN.CNF;5           *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	4.565E-01
K-40	3.642E-01
KR-85	5.508E+00
SR-85	3.613E-02
CD-109	7.036E-01
SN-126	6.692E-02
CE-141	9.234E-02
TL-208	3.780E-02
BI-210	2.301E+00
PB-210	2.301E+00
BI-211	2.076E-01
BI-212	4.671E-01
PB-212	5.623E-02
BI-214	7.398E-02
PB-214	7.552E-02
RN-222	7.398E-02
RA-224	6.028E-01
RA-226	7.552E-02
AC-228	1.560E-01
RA-228	1.560E-01
TH-228	5.623E-02
TH-230	7.551E-02
TH-232	1.560E-01
PA-234M	1.027E+00
TH-234	1.027E+00
U-234	7.551E-02
U-235	2.078E-01
U-238	1.027E+00
AM-243	4.666E-02
ANH-511	2.361E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	2.962E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	2.654E-02	NOT IDENT.
SC-46	5.060E-02	FAIL ABUN
V-48	1.519E-01	NOT IDENT.
CR-51	5.890E-01	NOT IDENT.
MN-52	3.173E+00	FAIL ABUN
MN-54	2.890E-02	NOT IDENT.
CO-56	4.896E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.468E-02	NOT IDENT.
CO-58	3.293E-02	NOT IDENT.
FE-59	1.053E-01	NOT IDENT.
CO-60	5.247E-02	NOT IDENT.
ZN-65	8.334E-02	NOT IDENT.
GE-68	1.085E+00	NOT IDENT.
AS-73	7.694E-01	NOT IDENT.
AS-74	2.352E-01	FAIL ABUN
SE-75	4.726E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.926E-01	NOT IDENT.
RB-83	5.309E-02	FAIL ABUN
RB-84	8.429E-02	NOT IDENT.
RB-86	1.368E+00	NOT IDENT.
Y-88	6.338E-02	NOT IDENT.
Y-91	2.180E+01	NOT IDENT.
NB-94	4.049E-02	NOT IDENT.
NB-95	5.914E-02	NOT IDENT.
NB-95M	1.642E-01	NOT IDENT.
ZR-95	8.763E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.010E-02	NOT IDENT.
RH-102	5.891E-02	FAIL ABUN
RU-103	5.421E-02	FAIL ABUN
RH-106	2.491E-01	NOT IDENT.
RU-106	2.491E-01	NOT IDENT.
AG-108M	3.109E-02	NOT IDENT.
AG-110	6.309E-01	NOT IDENT.
AG-110M	5.511E-02	NOT IDENT.
SN-113	4.753E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.463E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.029E-02	NOT IDENT.
SB-124	1.016E-01	NOT IDENT.
SB-125	9.309E-02	NOT IDENT.
TE-125M	1.151E+01	NOT IDENT.
I-126	6.892E-01	NOT IDENT.
SB-126	4.662E-01	NOT IDENT.
SB-127	4.975E+01	NOT IDENT.
I-131	5.157E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.973E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.160E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.996E-01	NOT IDENT.
BA-137M	2.560E-02	NOT IDENT.
CS-137	2.705E-02	NOT IDENT.
LA-138	5.793E-02	NOT IDENT.
CE-139	3.221E-02	NOT IDENT.
BA-140	7.169E-01	NOT IDENT.
LA-140	2.826E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.762E-01	NOT IDENT.
PM-144	3.604E-02	FAIL ABUN
PR-144	2.723E+00	NOT IDENT.
PM-146	4.100E-02	FAIL ABUN
ND-147	1.816E+00	FAIL ABUN
PM-147	6.806E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.917E-02	FAIL ABUN
EU-152	9.604E-02	FAIL ABUN
GD-153	7.933E-02	NOT IDENT.
EU-154	8.507E-02	NOT IDENT.

EU-155	1.070E-01	FAIL ABUN
TB-160	1.115E-01	FAIL ABUN
HO-166M	5.835E-02	FAIL ABUN
TM-171	1.163E+01	NOT IDENT.
HF-172	1.745E-01	FAIL ABUN
LU-172	4.123E-02	FAIL ABUN
LU-176	2.874E-02	FAIL ABUN
HF-181	6.023E-02	FAIL ABUN
TA-182	1.808E-01	FAIL ABUN
RE-183	1.825E-01	NOT IDENT.
RE-184	1.730E-01	NOT IDENT.
W-188	8.272E+00	FAIL ABUN
IR-192	4.216E-02	FAIL ABUN
HG-203	4.966E-02	NOT IDENT.
TL-204	4.064E+00	FAIL ABUN
BI-207	5.650E-02	FAIL ABUN
PB-211	7.811E-01	NOT IDENT.
BI-213	1.051E-01	NOT IDENT.
RN-219	4.481E-01	NOT IDENT.
RA-223	6.948E-01	FAIL ABUN
AC-225	2.153E+00	NOT IDENT.
AC-227	2.523E-01	NOT IDENT.
TH-227	2.523E-01	NOT IDENT.
TH-229	5.041E-01	FAIL ABUN
PA-231	4.775E-01	NOT IDENT.
TH-231	6.948E-01	FAIL ABUN
PA-233	5.971E-02	NOT IDENT.
PA-234	1.943E-01	NOT IDENT.
NP-237	5.971E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.047E-01	NOT IDENT.
PU-239	3.301E+02	NOT IDENT.
AM-241	1.167E-01	NOT IDENT.
CM-243	1.010E-01	NOT IDENT.
BK-247	7.536E-02	FAIL ABUN
CM-247	4.007E-02	NOT IDENT.
CF-249	4.017E-02	NOT IDENT.
CF-251	1.213E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:35:11.26

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507005.CNF;1    *
* Acquisition date : 10-APR-2025 19:34:13 Sensitivity     : 3.000          *
* Detector ID      : GAM52                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.74     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 10:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507005           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 9.7530E+01 GRAM   *
*                                         Quantity Err(%) : 1.0253E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-SEP-2024 08:39:54 Eff. Geometry   : CAN            *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM52_CAN.CNF;5            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	2.079E+00	1.052E+00	1.052E+00
K-40	3.843E+00	1.208E+00	1.208E+00
KR-85	1.054E+01	1.431E+01	1.431E+01
SR-85	6.915E-02	9.388E-02	9.388E-02
CD-109	3.627E+00	1.493E+00	1.493E+00
SN-126	3.439E-01	1.404E-01	1.404E-01
CE-141	1.553E-01	1.661E-01	1.661E-01
TL-208	2.692E-01	1.100E-01	1.100E-01
BI-210	5.217E+00	5.383E+00	5.383E+00
PB-210	5.217E+00	5.383E+00	5.383E+00
BI-211	8.147E+00	1.074E+00	1.074E+00
BI-212	1.396E+00	8.592E-01	8.592E-01
PB-212	1.029E+00	1.723E-01	1.723E-01
BI-214	2.303E+00	3.487E-01	3.487E-01
PB-214	2.957E+00	3.868E-01	3.868E-01
RN-222	2.303E+00	3.487E-01	3.487E-01
RA-224	6.547E+00	1.459E+00	1.459E+00
RA-226	2.957E+00	3.868E-01	3.868E-01
AC-228	1.033E+00	3.570E-01	3.570E-01
RA-228	1.033E+00	3.570E-01	3.570E-01
TH-228	1.029E+00	1.723E-01	1.723E-01
TH-230	2.957E+00	3.868E-01	3.868E-01
TH-232	1.033E+00	3.570E-01	3.570E-01
PA-234M	3.100E+00	2.435E+00	2.435E+00
TH-234	3.100E+00	2.435E+00	2.435E+00
U-234	2.957E+00	3.868E-01	3.868E-01
U-235	3.798E-01	3.366E-01	3.366E-01
U-238	3.100E+00	2.435E+00	2.435E+00
AM-243	3.652E-01	8.577E-02	8.577E-02
ANH-511	2.851E-02	6.752E-02	6.752E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)

NA-22	-2.691E-02	4.291E-02	4.459E-02	NOT IDENT.
NA-24	-2.045E+15	4.763E+15	4.852E+15	SHORT HLIF
AL-26	1.629E-02	2.262E-02	2.378E-02	NOT IDENT.
SC-46	-1.907E-02	6.608E-02	6.663E-02	FAIL ABUN
V-48	-1.340E-01	2.213E-01	2.294E-01	NOT IDENT.
CR-51	-1.786E-01	7.685E-01	7.727E-01	NOT IDENT.
MN-52	-3.356E-01	3.877E+00	3.880E+00	FAIL ABUN
MN-54	-2.832E-02	4.867E-02	5.031E-02	NOT IDENT.
CO-56	5.933E-03	5.894E-02	5.900E-02	FAIL ABUN
MN-56	-1.000E+41	9.229E+41	0.000E+00	SHORT HLIF
CO-57	1.649E-02	2.821E-02	2.918E-02	NOT IDENT.
CO-58	-4.472E-02	6.012E-02	6.341E-02	NOT IDENT.
FE-59	-1.813E-02	1.271E-01	1.274E-01	NOT IDENT.
CO-60	3.661E-02	5.498E-02	5.740E-02	NOT IDENT.
ZN-65	4.295E-02	9.701E-02	9.892E-02	NOT IDENT.
GE-68	-3.212E-01	1.340E+00	1.347E+00	NOT IDENT.
AS-73	6.863E-01	8.570E-01	9.112E-01	NOT IDENT.
AS-74	6.537E-05	2.811E-01	2.811E-01	FAIL ABUN
SE-75	1.230E-02	5.776E-02	5.803E-02	NOT IDENT.
BR-77	5.949E+04	6.161E+04	6.719E+04	SHORT HLIF
SR-82	-3.554E-01	6.764E-01	6.951E-01	NOT IDENT.
RB-83	-8.341E-02	8.025E-02	8.862E-02	FAIL ABUN
RB-84	-5.719E-02	1.184E-01	1.211E-01	NOT IDENT.
RB-86	-2.317E-01	1.650E+00	1.653E+00	NOT IDENT.
Y-88	2.889E-02	6.901E-02	7.023E-02	NOT IDENT.
Y-91	-5.035E+00	2.680E+01	2.690E+01	NOT IDENT.
NB-94	5.795E-02	4.050E-02	4.820E-02	NOT IDENT.
NB-95	1.617E-02	6.952E-02	6.990E-02	NOT IDENT.
NB-95M	1.148E-01	2.092E-01	2.155E-01	NOT IDENT.
ZR-95	7.227E-02	9.232E-02	9.790E-02	NOT IDENT.
NB-97	1.000E+41	4.127E+41	0.000E+00	SHORT HLIF
ZR-97	5.572E+14	8.142E+14	8.520E+14	SHORT HLIF
MO-99	1.088E+03	2.440E+03	2.489E+03	SHORT HLIF
TC-99M	3.966E+40	8.217E+40	0.000E+00	SHORT HLIF
RH-101	-9.831E-03	3.702E-02	3.728E-02	NOT IDENT.
RH-102	3.160E-02	6.579E-02	6.732E-02	FAIL ABUN
RU-103	4.995E-02	6.098E-02	6.501E-02	FAIL ABUN
RH-106	-2.646E-01	3.506E-01	3.703E-01	NOT IDENT.
RU-106	-2.646E-01	3.506E-01	3.703E-01	NOT IDENT.
AG-108M	-1.561E-03	3.653E-02	3.654E-02	NOT IDENT.
AG-110	2.322E-01	7.114E-01	7.191E-01	NOT IDENT.
AG-110M	-5.790E-03	6.909E-02	6.914E-02	NOT IDENT.
SN-113	-2.123E-02	5.769E-02	5.848E-02	NOT IDENT.
CD-115	1.057E+02	6.259E+03	6.260E+03	SHORT HLIF
SN-117M	-3.451E-03	1.781E-01	1.781E-01	NOT IDENT.
SB-122	1.567E+01	4.634E+02	4.635E+02	SHORT HLIF
TE-123M	3.242E-03	3.654E-02	3.657E-02	NOT IDENT.
SB-124	-1.232E-01	1.649E-01	1.740E-01	NOT IDENT.
SB-125	4.539E-03	1.082E-01	1.082E-01	NOT IDENT.
TE-125M	-3.792E+00	1.403E+01	1.413E+01	NOT IDENT.
I-126	4.793E-01	7.539E-01	7.843E-01	NOT IDENT.
SB-126	1.172E-01	5.453E-01	5.479E-01	NOT IDENT.
SB-127	-4.251E-01	6.015E+01	6.015E+01	NOT IDENT.
I-131	-3.982E-01	6.503E-01	6.746E-01	NOT IDENT.
I-132	-1.000E+41	3.395E+41	0.000E+00	SHORT HLIF
TE-132	4.476E+00	6.833E+01	6.836E+01	SHORT HLIF
BA-133	1.332E-02	4.885E-02	4.922E-02	NOT IDENT.
I-133	2.896E+10	7.035E+10	7.155E+10	SHORT HLIF
CS-134	1.103E-01	8.555E-02	9.896E-02	FAIL ABUN
I-135	-1.858E+37	1.400E+38	0.000E+00	SHORT HLIF
CS-136	-1.151E-01	4.022E-01	4.055E-01	NOT IDENT.
BA-137M	-2.781E-02	3.667E-02	3.876E-02	NOT IDENT.
CS-137	-2.938E-02	3.874E-02	4.094E-02	NOT IDENT.
LA-138	-2.096E-02	7.485E-02	7.544E-02	NOT IDENT.
CE-139	1.924E-02	3.776E-02	3.875E-02	NOT IDENT.
BA-140	6.422E-02	8.398E-01	8.403E-01	NOT IDENT.
LA-140	-6.618E-02	4.156E-01	4.167E-01	NOT IDENT.
CE-143	2.060E+06	5.139E+06	5.223E+06	SHORT HLIF
CE-144	-1.328E-01	2.246E-01	2.324E-01	NOT IDENT.
PM-144	6.834E-03	4.243E-02	4.254E-02	FAIL ABUN
PR-144	5.059E-01	3.207E+00	3.215E+00	NOT IDENT.
PM-146	-9.188E-04	4.818E-02	4.819E-02	FAIL ABUN
ND-147	2.217E-01	2.116E+00	2.119E+00	FAIL ABUN
PM-147	1.169E+02	8.059E+02	8.076E+02	NOT IDENT.
PM-149	-8.233E+03	6.320E+04	6.331E+04	SHORT HLIF
EU-150	2.055E-02	3.462E-02	3.583E-02	FAIL ABUN
EU-152	-6.628E-03	1.113E-01	1.114E-01	FAIL ABUN
GD-153	4.920E-02	9.037E-02	9.305E-02	NOT IDENT.

EU-154	-7.190E-02	1.213E-01	1.256E-01	NOT IDENT.
EU-155	3.855E-02	1.246E-01	1.259E-01	FAIL ABUN
TB-160	-1.237E-01	1.718E-01	1.807E-01	FAIL ABUN
HO-166M	-2.592E-02	7.521E-02	7.612E-02	FAIL ABUN
TM-171	-1.076E+01	1.431E+01	1.511E+01	NOT IDENT.
HF-172	-3.042E-02	2.122E-01	2.127E-01	FAIL ABUN
LU-172	-2.526E-02	5.548E-02	5.664E-02	FAIL ABUN
LU-176	7.659E-03	3.550E-02	3.567E-02	FAIL ABUN
HF-181	7.303E-02	8.246E-02	8.879E-02	FAIL ABUN
TA-182	2.717E-02	2.068E-01	2.071E-01	FAIL ABUN
RE-183	4.766E-02	2.088E-01	2.099E-01	NOT IDENT.
RE-184	-8.779E-02	2.332E-01	2.365E-01	NOT IDENT.
W-188	-9.107E+00	1.161E+01	1.232E+01	FAIL ABUN
IR-192	2.688E-02	4.995E-02	5.140E-02	FAIL ABUN
HG-203	-2.832E-02	6.589E-02	6.711E-02	NOT IDENT.
TL-204	-5.854E-01	5.168E+00	5.174E+00	FAIL ABUN
BI-207	4.396E-02	5.766E-02	6.097E-02	FAIL ABUN
PB-211	4.632E-01	8.947E-01	9.187E-01	NOT IDENT.
BI-213	-1.267E-02	1.245E-01	1.247E-01	NOT IDENT.
RN-219	1.560E-01	5.055E-01	5.104E-01	NOT IDENT.
RA-223	3.900E-01	8.363E-01	8.546E-01	FAIL ABUN
AC-225	-6.405E-01	2.738E+00	2.753E+00	NOT IDENT.
AC-227	-2.529E-02	3.185E-01	3.187E-01	NOT IDENT.
TH-227	-2.529E-02	3.185E-01	3.187E-01	NOT IDENT.
TH-229	7.293E-01	8.840E-01	9.431E-01	FAIL ABUN
PA-231	-8.747E-03	6.051E-01	6.051E-01	NOT IDENT.
TH-231	3.900E-01	8.363E-01	8.546E-01	FAIL ABUN
PA-233	1.793E-02	7.319E-02	7.364E-02	NOT IDENT.
PA-234	-2.017E-01	3.787E-01	3.894E-01	NOT IDENT.
NP-237	1.793E-02	7.319E-02	7.364E-02	NOT IDENT.
NP-238	1.404E+04	1.634E+04	1.752E+04	SHORT HLIF
NP-239	-2.916E-01	2.737E-01	3.037E-01	NOT IDENT.
PU-239	1.712E+02	3.835E+02	3.912E+02	NOT IDENT.
AM-241	-2.648E-02	1.481E-01	1.486E-01	NOT IDENT.
CM-243	5.194E-02	1.163E-01	1.186E-01	NOT IDENT.
BK-247	-6.146E-03	9.525E-02	9.529E-02	FAIL ABUN
CM-247	-1.170E-02	4.788E-02	4.817E-02	NOT IDENT.
CF-249	1.478E-02	4.499E-02	4.548E-02	NOT IDENT.
CF-251	8.614E-03	1.476E-01	1.477E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	77.9138	81.75	85.7523	123.68	64.2935
879.38	86.0818	82.47	108.2836	125.81	69.5459
46.54	86.3257	83.79	108.5757	127.23	79.7983
228.16	0.0000	265.00	108.6217	127.91	55.6137
52.39	79.7360	193.51	90.1538	129.30	67.8905
1093.63	87.6638	105.31	90.3560	131.20	59.9561
52.39	81.7060	86.79	97.9324	133.02	51.9673
125.81	75.7427	86.94	97.9618	133.52	70.3603
53.44	70.6102	87.09	97.9911	136.00	56.2891
54.07	72.4778	87.57	98.0840	136.47	41.9897
293.27	0.0000	88.03	98.1729	739.50	0.0000
482.18	81.9614	306.78	79.3422	140.51	0.0000
57.98	78.5279	88.47	79.3620	143.76	73.4766
59.27	89.7077	143.76	90.9639	144.24	73.5253
59.32	89.7189	90.64	83.4930	145.44	73.6488
59.54	92.1319	531.02	83.5688	152.43	73.3112
60.96	92.4635	92.59	83.8058	1048.07	66.0521
61.17	87.7681	93.35	83.9267	154.21	72.4365
62.93	95.5977	94.56	82.8435	158.56	78.9253
63.29	95.6822	311.90	82.8574	159.00	64.4448
290.67	95.7499	946.00	72.6625	162.33	62.6020
87.57	114.7373	94.87	72.6897	537.26	53.0754
66.73	104.5931	97.43	64.3864	163.33	70.1200
67.24	100.2050	98.43	70.2810	165.86	57.5563
67.68	112.9599	98.44	70.2821	427.87	50.7500
1221.41	104.8445	103.37	75.2453	176.60	52.9283
70.82	100.5921	116.74	75.2453	177.52	59.4756
97.43	103.4978	100.11	64.7013	181.07	0.0000
70.82	103.1623	102.03	85.2742	181.52	56.5021
279.20	103.1649	103.18	70.8830	184.41	59.9666
1063.66	114.5988	103.37	70.9070	185.72	60.0589
72.87	114.6141	911.20	83.8039	193.51	55.8264
351.06	114.6141	105.31	83.8190	197.03	56.0491
74.66	115.0693	106.12	82.9611	198.01	56.1109
351.93	115.1104	106.47	83.0111	201.83	61.1684
238.63	115.1104	109.28	83.4118	203.43	66.8472
351.93	115.1104	111.00	82.6708	205.31	47.6335
238.63	115.1104	111.76	0.0000	210.85	50.9142
74.97	115.1477	114.06	79.1364	215.65	46.2820
77.11	115.6841	116.30	0.0000	218.12	52.0609
78.74	116.0877	116.74	72.5294	222.11	38.6391
256.23	94.6655	119.76	66.8921	227.09	54.8276
80.03	94.7316	264.66	63.0348	227.38	59.4141
133.52	94.7511	121.22	63.0447	228.16	0.0000
364.49	115.2037	344.28	56.0893	228.18	50.3137
711.68	115.2954	122.06	56.1141	235.69	59.9084
356.01	115.3995	122.92	71.2411	235.96	67.6077
323.87	115.4156	1274.44	71.2578	238.63	56.6159

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	39.4201	531.02	16.0959
240.99	56.7460	338.32	39.4210	537.26	16.1492
242.00	56.8013	340.48	35.2845	1260.41	0.0000
244.70	56.9493	340.55	35.2863	552.55	18.6724
685.70	45.6591	344.28	36.2270	795.86	20.2198
388.16	46.8469	345.93	43.8634	564.24	0.0000
507.63	0.0000	351.06	38.1024	569.33	20.2822
256.23	50.5219	351.93	38.1262	569.50	19.3180
527.90	0.0000	355.39	0.0000	569.70	18.3537
264.66	37.8887	356.01	26.7678	583.19	23.3408
264.80	42.6302	364.49	27.3594	584.27	20.4335
265.00	42.6379	366.42	0.0000	595.83	26.4210
269.46	51.1334	372.51	35.2527	600.60	15.6934
270.03	46.4006	375.05	30.1472	602.52	0.0000
401.81	57.1699	377.52	23.2965	604.72	20.6385
273.65	59.6786	383.85	31.1975	607.14	23.6143
276.40	47.8589	388.16	26.9440	609.32	23.6387
583.19	44.3067	666.33	22.6051	610.33	23.6504
277.60	44.3158	391.69	33.1070	614.28	19.2524
402.40	28.7556	400.66	23.6646	618.01	12.8572
279.20	51.5743	401.81	32.4540	884.68	18.8121
279.54	43.1917	402.40	39.4867	621.93	18.8260
279.70	43.1971	404.85	28.4759	630.19	0.0000
280.46	55.2328	410.95	34.4138	631.29	14.9280
301.36	37.3262	413.71	26.5198	633.25	14.9414
284.31	48.1885	720.70	21.2290	634.78	10.4667
285.41	51.8512	423.72	19.5727	635.95	8.9762
285.90	0.0000	427.09	32.0962	636.99	19.4579
287.50	39.8643	427.87	27.6523	657.50	9.0648
290.67	54.5059	433.94	30.4438	657.76	9.0659
293.27	0.0000	439.40	30.5469	657.90	0.0000
295.22	49.8511	440.45	28.7689	661.66	17.1543
316.51	49.8824	453.88	24.4726	664.57	0.0000
298.58	40.6423	463.37	30.0815	666.33	13.1455
299.98	34.1797	468.07	27.4225	666.50	17.1916
300.09	34.1823	473.00	17.8762	667.71	0.0000
300.13	34.1840	631.29	24.7813	677.62	11.1790
311.90	34.1840	696.49	28.9404	685.70	16.3177
301.36	43.9948	477.60	28.9538	692.65	0.0000
302.85	42.8250	482.18	26.2659	695.00	13.3116
304.50	46.5583	487.02	28.6488	696.49	16.3939
304.85	47.7979	492.35	0.0000	696.51	16.3939
306.78	42.9628	497.08	11.1531	697.00	10.2486
308.46	28.2706	505.52	16.8087	697.30	10.2498
311.90	29.5818	507.63	0.0000	697.49	12.3008
316.51	29.6902	511.00	15.9228	702.65	9.2461
319.41	38.4378	514.00	15.9493	706.68	18.5237
320.08	34.7368	514.00	15.9493	711.68	19.5945
321.04	33.5209	520.40	19.7704	720.70	15.5280
323.87	37.3279	520.69	0.0000	721.93	0.0000
325.23	44.8407	667.71	0.0000	1690.97	15.5414
1596.21	47.4617	527.90	0.0000	722.91	13.9878
333.37	40.1094	528.26	15.1270	723.31	10.8815
333.97	33.8571	529.59	15.1374	756.73	17.1056
334.37	45.1571	529.87	0.0000	727.33	14.5326

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	9.3644	935.54	8.9772	1362.66	0.0000
735.93	21.8767	937.49	8.4216	1365.19	1.9050
737.46	14.5936	983.53	6.7524	1368.63	0.0000
739.50	0.0000	946.00	9.0088	1384.29	5.4684
1434.09	18.8152	949.00	5.6362	1408.01	4.8126
747.24	12.5591	954.55	0.0000	1434.09	6.7800
748.06	11.5161	962.31	3.3967	1435.80	7.7515
752.31	6.2925	964.08	12.4618	1457.56	0.0000
753.82	15.7404	966.17	12.4703	1460.82	5.8480
756.73	7.3540	968.97	12.4820	1489.16	9.8108
756.80	7.3543	983.53	14.8218	1505.03	4.7265
763.94	6.3218	984.45	0.0000	1584.12	12.0264
765.81	18.9792	996.26	6.8691	1596.21	6.4313
766.84	18.9873	1002.74	11.4722	1620.50	1.6162
772.60	0.0000	1004.73	12.0535	1621.92	4.8501
776.52	15.8838	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	8.2017
778.90	13.7786	1028.54	0.0000	1750.46	0.0000
783.70	28.6710	1037.84	4.6400	1764.49	1.0406
1435.80	25.5352	1038.76	0.0000	1770.23	1.6670
903.28	15.9802	1046.59	10.4685	1771.35	1.1909
795.86	13.8702	1048.07	12.8002	1791.20	0.0000
801.95	12.8330	1049.04	9.3118	1808.65	0.0000
810.06	9.6548	1050.41	12.8101	1810.72	0.0000
810.29	9.6555	1063.66	6.1387	1836.06	4.2214
810.45	14.4844	1077.00	7.9244		
810.76	14.4860	1077.34	8.8055		
815.77	10.7507	1085.87	12.3594		
818.51	10.7617	1093.63	7.0791		
832.01	9.7350	1099.45	8.8641		
834.85	14.6179	1112.07	16.0148		
835.71	9.7482	1112.84	14.2393		
836.80	0.0000	1115.54	5.7000		
846.75	0.0000	1120.29	11.5940		
846.77	13.0508	1120.55	11.5956		
856.80	19.6479	1121.30	11.5980		
860.56	10.9306	1808.65	5.3657		
871.09	7.6805	1131.51	0.0000		
873.19	12.0782	1147.95	0.0000		
875.33	0.0000	1332.49	7.2441		
879.38	12.1051	1177.95	8.1601		
880.51	12.1100	1189.05	4.5474		
881.60	12.1145	1204.77	9.1345		
883.24	8.8158	1221.41	7.3413		
884.68	14.3330	1231.02	7.3604		
889.28	17.6693	1235.36	4.4212		
894.76	13.2778	1238.28	7.3745		
1836.06	17.7240	1260.41	0.0000		
900.72	11.0876	1271.87	5.5807		
903.28	14.4272	1274.44	8.3765		
911.20	15.5797	1274.54	8.3765		
912.08	15.5842	1291.59	7.4790		
984.45	0.0000	1298.22	0.0000		
926.50	5.5935	1312.11	13.5334		
929.11	12.0924	1332.49	6.6133		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:43:24.26

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507006.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM46.CNF;207
Background date : 6-APR-2025 11:02:44.
Sample date : 6-MAR-2025 10:30:00. Acquisition date : 10-APR-2025 20:42:58
Sample ID : G714507006 Sample quantity : 1.11210E+02 GRAM
Detector name : GAM46 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.81 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.53	61	308	0.93	21.18	19	5	1.69E-02	45.5	
2	0	31.75	18	108	1.34	63.62	63	6	5.11E-03	91.9	
3	0	46.68*	189	182	1.18	93.48	89	8	5.25E-02	14.5	
4	0	53.42	44	208	0.71	106.96	102	10	1.23E-02	63.0	
5	0	63.88*	141	341	1.08	127.86	123	11	3.90E-02	26.9	
6	3	74.95*	419	233	1.11	150.02	145	13	1.16E-01	8.1	2.90E+00
7	3	77.19*	741	226	1.14	154.49	145	13	2.06E-01	5.2	
8	4	84.33*	103	165	1.48	168.77	165	28	2.86E-02	22.6	2.67E+00
9	4	87.15*	272	195	1.49	174.40	165	28	7.56E-02	11.1	
10	4	89.98	153	178	1.50	180.06	165	28	4.25E-02	18.9	
11	4	92.82*	313	161	1.51	185.75	165	28	8.69E-02	10.1	
12	0	143.81	19	191	0.82	287.72	283	9	5.15E-03	136.5	
13	0	186.07*	285	167	1.43	372.24	366	12	7.93E-02	11.0	
14	0	208.95	50	132	1.46	418.02	414	9	1.39E-02	43.6	
15	0	229.28	39	79	1.30	458.67	456	8	1.08E-02	42.5	
16	4	238.65*	433	73	1.17	477.42	473	21	1.20E-01	5.9	1.12E+00
17	4	241.91	337	81	1.49	483.93	473	21	9.35E-02	7.6	
18	0	270.48	64	140	2.05	541.07	533	13	1.78E-02	40.0	
19	0	295.27*	511	85	1.11	590.65	585	11	1.42E-01	5.7	
20	0	328.86	25	72	2.29	657.84	653	9	6.94E-03	64.4	
21	0	338.46*	93	57	1.32	677.05	673	9	2.57E-02	18.1	
22	0	352.08	906	81	1.19	704.27	698	13	2.52E-01	3.9	
23	0	477.51	32	53	1.09	955.17	949	11	9.01E-03	47.4	
24	0	583.35*	133	49	1.54	1166.87	1158	18	3.70E-02	15.3	
25	0	609.61*	587	75	1.38	1219.40	1212	15	1.63E-01	5.3	
26	0	616.92	20	9	1.41	1234.02	1230	8	5.52E-03	35.2	
27	0	667.16	39	51	4.72	1334.53	1326	20	1.09E-02	47.1	
28	0	729.20	15	47	0.86	1458.63	1453	12	4.16E-03	95.9	
29	0	757.77*	44	29	8.34	1515.78	1505	24	1.23E-02	36.3	
30	0	768.80	44	27	1.21	1537.84	1532	11	1.21E-02	27.7	
31	0	787.38	27	26	1.58	1575.01	1567	16	7.42E-03	48.1	
32	0	807.03	7	21	1.19	1614.32	1609	9	2.03E-03	117.4	
33	0	838.07	18	36	0.63	1676.41	1669	13	5.09E-03	71.2	
34	0	851.13	24	11	0.90	1702.53	1697	11	6.69E-03	33.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	911.79*	70	15	1.64	1823.89	1819	10	1.94E-02	16.1	
36	0	934.88	27	16	1.11	1870.09	1863	13	7.42E-03	36.7	
37	0	940.10	16	8	1.24	1880.52	1876	9	4.40E-03	42.0	
38	0	965.28	12	7	0.97	1930.89	1928	6	3.19E-03	47.0	
39	0	969.28	62	9	2.47	1938.90	1934	12	1.71E-02	16.1	
40	0	1002.45	20	22	1.81	2005.25	1999	13	5.51E-03	54.3	
41	0	1071.24	13	1	1.01	2142.88	2140	7	3.51E-03	32.7	
42	0	1120.99*	125	22	1.10	2242.41	2236	13	3.48E-02	11.9	
43	0	1238.84	48	12	1.74	2478.18	2469	14	1.34E-02	20.4	
44	0	1281.57	19	5	0.73	2563.68	2558	10	5.28E-03	31.8	
45	0	1314.43	24	0	1.03	2629.42	2622	16	6.67E-03	20.4	
46	0	1363.40	9	5	2.35	2727.39	2720	10	2.42E-03	59.1	
47	0	1378.21	44	3	1.80	2757.04	2752	12	1.21E-02	17.2	
48	0	1409.10	23	4	2.07	2818.85	2814	11	6.28E-03	28.7	
49	0	1461.24*	75	12	1.85	2923.16	2915	16	2.09E-02	15.9	
50	0	1510.99	22	13	3.44	3022.71	3015	18	6.21E-03	43.8	
51	0	1632.58	7	7	0.50	3266.00	3255	13	1.81E-03	89.9	
52	0	1661.63	13	2	1.72	3324.14	3319	9	3.53E-03	35.3	
53	0	1730.14	36	0	2.05	3461.22	3455	12	1.00E-02	16.7	
54	0	1764.76*	104	3	1.80	3530.51	3521	16	2.88E-02	10.8	
55	0	1849.76	7	8	1.02	3700.59	3695	9	1.86E-03	88.6	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:43:25

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507006.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 10:30:00	Acquisition date	: 10-APR-2025 20:42:58
Sample ID	: G714507006	Sample quantity	: 111.21 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA46	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.81 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	32	10.44*	3.456E+00	5.952E-01	9.444E-01	94.76
K-40	1460.82	71	10.66*	1.258E+00	3.567E+00	3.567E+00	31.78
AS-73	53.44	47	10.30*	9.728E+00	3.155E-01	4.284E-01	125.98
CD-109	88.03	283	3.70*	9.716E+00	5.322E+00	5.613E+00	22.12
SN-126	64.28	148	9.60	1.005E+01	1.034E+00	1.034E+00	53.86
	86.94	283	8.90	9.716E+00	2.212E+00	2.212E+00	22.12
	87.57	283	37.00*	9.716E+00	5.322E-01	5.322E-01	22.12
TL-208	277.37	------	6.60	5.267E+00	------ Line Not Found		------
	583.19	130	85.00*	2.907E+00	3.545E-01	3.545E-01	30.55
	860.56	------	12.50	2.036E+00	------ Line Not Found		------
BI-210	46.54	201	4.25*	9.175E+00	3.476E+00	3.487E+00	28.96
PB-210	46.54	201	4.25*	9.175E+00	3.476E+00	3.487E+00	28.96
BI-211	72.87	------	1.23	1.003E+01	------ Line Not Found		------
	351.06	898	12.92*	4.416E+00	1.063E+01	1.063E+01	7.81
PB-212	74.82	438	10.28	9.996E+00	2.879E+00	2.879E+00	16.25
	77.11	774	17.10	9.957E+00	3.070E+00	3.070E+00	10.39
	238.63	435	43.60*	5.843E+00	1.153E+00	1.153E+00	11.77
	300.09	------	3.30	4.977E+00	------ Line Not Found		------
BI-214	609.32	571	45.49*	2.795E+00	3.029E+00	3.029E+00	10.53
	1120.29	119	14.92	1.590E+00	3.392E+00	3.392E+00	23.87
	1764.49	97	15.30	1.088E+00	3.928E+00	3.929E+00	21.62
PB-214	74.82	438	5.80	9.996E+00	5.102E+00	5.103E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.774E+00	5.775E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
RN-222	609.32	571	45.49*	2.795E+00	3.029E+00	3.029E+00	10.53
	1120.29	119	14.92	1.590E+00	3.392E+00	3.392E+00	23.87
	1764.49	97	15.30	1.088E+00	3.928E+00	3.929E+00	21.62
RA-224	240.99	338	4.10*	5.790E+00	9.618E+00	9.618E+00	15.26
RA-226	74.82	438	5.80	9.996E+00	5.102E+00	5.103E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.774E+00	5.775E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
AC-228	105.21	------	1.10	9.150E+00	------ Line Not Found		------
	338.32	92	11.27	4.551E+00	1.210E+00	1.210E+00	36.17
	835.71	------	1.61	2.092E+00	------ Line Not Found		------
	911.20	67	25.80*	1.928E+00	9.068E-01	9.068E-01	32.26
	968.97	59	15.80	1.821E+00	1.380E+00	1.380E+00	32.17
RA-228	105.21	------	1.10	9.150E+00	------ Line Not Found		------
	338.32	92	11.27	4.551E+00	1.210E+00	1.210E+00	36.17
	835.71	------	1.61	2.092E+00	------ Line Not Found		------
	911.20	67	25.80*	1.928E+00	9.068E-01	9.068E-01	32.26
	968.97	59	15.80	1.821E+00	1.380E+00	1.380E+00	32.17
TH-228	74.82	438	10.28	9.996E+00	2.879E+00	2.879E+00	16.25
	77.11	774	17.10	9.957E+00	3.070E+00	3.070E+00	10.39

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	238.63	435	43.60*	5.843E+00	1.153E+00	1.153E+00	11.77
	300.09	------	3.30	4.977E+00	------ Line Not Found		------
TH-229	85.43	107	14.70	9.793E+00	5.027E-01	5.027E-01	45.24
	88.47	283	24.00	9.716E+00	8.205E-01	8.205E-01	22.12
	193.51	------	4.41*	6.690E+00	------ Line Not Found		------
	210.85	------	2.80	6.338E+00	------ Line Not Found		------
TH-230	74.82	438	5.80	9.996E+00	5.102E+00	5.102E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.775E+00	5.775E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
TH-232	105.21	------	1.10	9.150E+00	------ Line Not Found		------
	338.32	92	11.27	4.551E+00	1.210E+00	1.210E+00	36.17
	835.71	------	1.61	2.092E+00	------ Line Not Found		------
	911.20	67	25.80*	1.928E+00	9.068E-01	9.068E-01	32.26
	968.97	59	15.80	1.821E+00	1.380E+00	1.380E+00	32.17
PA-234M	63.29	148	3.70*	1.005E+01	2.684E+00	2.684E+00	53.86
	92.59	325	4.23	9.549E+00	5.429E+00	5.429E+00	20.15
TH-234	63.29	148	3.70*	1.005E+01	2.684E+00	2.684E+00	53.86
	92.59	325	4.23	9.549E+00	5.429E+00	5.429E+00	20.15
U-234	74.82	438	5.80	9.996E+00	5.102E+00	5.102E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.774E+00	5.774E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
U-235	89.96	159	3.47	9.635E+00	3.215E+00	3.215E+00	37.87
	93.35	325	5.60	9.549E+00	4.101E+00	4.101E+00	20.15
	143.76	19	10.96*	7.932E+00	1.473E-01	1.473E-01	272.96
	163.33	------	5.08	7.399E+00	------ Line Not Found		------
	185.72	289	57.20	6.853E+00	4.985E-01	4.985E-01	21.98
	205.31	------	5.01	6.447E+00	------ Line Not Found		------
U-238	63.29	148	3.70*	1.005E+01	2.684E+00	2.684E+00	53.86
	92.59	325	4.23	9.549E+00	5.429E+00	5.429E+00	20.15
AM-243	43.53	------	5.90	8.780E+00	------ Line Not Found		------
	74.66	438	67.20*	9.996E+00	4.404E-01	4.404E-01	16.25

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:43:26.56

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507006.CNF;1    *
* Acquisition date : 10-APR-2025 20:42:58 Sensitivity     : 3.000          *
* Detector ID      : GAM46                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.81     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 10:30:00 Analyst initials: MXR1           *
* Sample ID        : G714507006           Sample Quantity : 1.1121E+02 GRAM   *
* Batch Number     : 2767515              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;18                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 30-SEP-2024 07:51:25 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM46_CAN.CNF;6           *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	9.444E-01	8.770E-01	7.793E-01
K-40	3.567E+00	1.111E+00	6.950E-01
AS-73	4.284E-01	5.289E-01	4.210E-01
CD-109	5.613E+00	1.217E+00	1.076E+00
SN-126	5.322E-01	1.154E-01	1.018E-01
TL-208	3.545E-01	1.061E-01	6.542E-02
BI-210	3.487E+00	9.896E-01	8.081E-01
PB-210	3.487E+00	9.896E-01	8.081E-01
BI-211	1.063E+01	8.131E-01	3.379E-01
PB-212	1.153E+00	1.330E-01	1.068E-01
BI-214	3.029E+00	3.125E-01	1.429E-01
PB-214	3.858E+00	2.951E-01	1.229E-01
RN-222	3.029E+00	3.125E-01	1.429E-01
RA-224	9.618E+00	1.438E+00	1.144E+00
RA-226	3.858E+00	2.951E-01	1.229E-01
AC-228	9.068E-01	2.867E-01	3.028E-01
RA-228	9.068E-01	2.867E-01	3.028E-01
TH-228	1.153E+00	1.330E-01	1.068E-01
TH-229	1.334E-01	5.612E-01	9.974E-01
TH-230	3.858E+00	2.951E-01	1.229E-01
TH-232	9.068E-01	2.867E-01	3.028E-01
PA-234M	2.684E+00	1.416E+00	1.027E+00
TH-234	2.684E+00	1.416E+00	1.027E+00
U-234	3.858E+00	2.951E-01	1.229E-01
U-235	1.473E-01	3.940E-01	3.752E-01
U-238	2.684E+00	1.416E+00	1.027E+00
AM-243	4.404E-01	7.012E-02	5.994E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	8.860E-03	4.434E-02	9.166E-02	NOT IDENT.
NA-24	0.000E+00	4.403E+15	0.000E+00	SHORT HLIF
AL-26	1.258E-02	4.811E-02	1.047E-01	NOT IDENT.

SC-46	-9.666E-03	5.337E-02	9.659E-02	FAIL ABUN
V-48	8.382E-02	1.415E-01	3.105E-01	NOT IDENT.
CR-51	-2.125E-01	6.109E-01	1.130E+00	NOT IDENT.
MN-52	-2.086E+00	3.329E+00	5.866E+00	FAIL ABUN
MN-54	-5.829E-03	5.229E-02	8.405E-02	NOT IDENT.
CO-56	-1.262E-02	6.170E-02	9.787E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.278E-02	2.528E-02	4.323E-02	NOT IDENT.
CO-58	-2.394E-02	6.674E-02	1.023E-01	NOT IDENT.
FE-59	-5.512E-02	1.095E-01	2.034E-01	NOT IDENT.
CO-60	1.261E-03	3.541E-02	7.421E-02	NOT IDENT.
ZN-65	4.950E-02	9.816E-02	1.924E-01	NOT IDENT.
GE-68	9.713E-01	1.495E+00	3.209E+00	NOT IDENT.
AS-74	1.051E-02	2.038E-01	3.890E-01	NOT IDENT.
SE-75	1.098E-03	5.407E-02	8.679E-02	NOT IDENT.
BR-77	0.000E+00	7.752E+03	0.000E+00	SHORT HLIF
SR-82	-1.392E-01	6.093E-01	1.106E+00	NOT IDENT.
RB-83	1.405E-02	8.050E-02	1.570E-01	NOT IDENT.
RB-84	2.519E-02	9.356E-02	1.904E-01	NOT IDENT.
KR-85	-2.657E+01	9.480E+00	1.243E+01	NOT IDENT.
SR-85	-1.744E-01	6.220E-02	8.151E-02	NOT IDENT.
RB-86	1.618E+00	1.865E+00	4.118E+00	NOT IDENT.
Y-88	-9.234E-03	4.281E-02	8.647E-02	NOT IDENT.
Y-91	-6.820E+00	2.111E+01	4.065E+01	NOT IDENT.
NB-94	1.973E-02	3.713E-02	7.387E-02	NOT IDENT.
NB-95	1.591E-02	6.475E-02	9.418E-02	NOT IDENT.
NB-95M	7.674E-02	1.716E-01	2.864E-01	NOT IDENT.
ZR-95	0.000E+00	2.404E-01	2.064E-01	FAIL ABUN
NB-97	0.000E+00	1.148E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	9.709E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.454E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	9.967E+40	0.000E+00	SHORT HLIF
RH-101	4.908E-03	3.306E-02	5.907E-02	NOT IDENT.
RH-102	5.845E-02	4.957E-02	1.112E-01	NOT IDENT.
RU-103	5.199E-02	5.731E-02	1.201E-01	FAIL ABUN
RH-106	9.227E-02	3.011E-01	6.027E-01	NOT IDENT.
RU-106	9.227E-02	3.011E-01	6.027E-01	NOT IDENT.
AG-108M	5.045E-03	2.817E-02	5.495E-02	NOT IDENT.
AG-110	-2.727E-01	6.410E-01	1.151E+00	NOT IDENT.
AG-110M	-3.491E-02	5.593E-02	9.333E-02	NOT IDENT.
SN-113	-1.675E-02	5.182E-02	9.521E-02	NOT IDENT.
CD-115	0.000E+00	6.094E+03	0.000E+00	SHORT HLIF
SN-117M	-7.607E-02	1.704E-01	2.880E-01	NOT IDENT.
SB-122	0.000E+00	3.570E+02	0.000E+00	SHORT HLIF
TE-123M	-4.192E-04	3.497E-02	6.119E-02	NOT IDENT.
SB-124	-1.923E-01	1.501E-01	2.035E-01	NOT IDENT.
SB-125	-1.993E-02	9.711E-02	1.800E-01	NOT IDENT.
TE-125M	-4.167E-01	1.199E+01	2.127E+01	NOT IDENT.
I-126	0.000E+00	1.864E+00	1.710E+00	FAIL ABUN
SB-126	-1.633E-01	4.381E-01	7.815E-01	FAIL ABUN
SB-127	-2.687E+01	5.873E+01	1.028E+02	NOT IDENT.
I-131	8.127E-01	7.480E-01	1.538E+00	NOT IDENT.
I-132	0.000E+00	9.235E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	9.018E+01	0.000E+00	SHORT HLIF
BA-133	-1.029E-03	4.096E-02	7.077E-02	NOT IDENT.
I-133	0.000E+00	5.843E+10	0.000E+00	SHORT HLIF
CS-134	2.071E-02	5.054E-02	9.835E-02	NOT IDENT.
I-135	0.000E+00	1.182E+38	0.000E+00	SHORT HLIF
CS-136	-9.715E-02	2.797E-01	4.952E-01	NOT IDENT.
BA-137M	-3.733E-03	3.657E-02	6.111E-02	NOT IDENT.
CS-137	-3.943E-03	3.863E-02	6.456E-02	NOT IDENT.
LA-138	-2.333E-02	5.915E-02	1.111E-01	FAIL ABUN
CE-139	-1.465E-02	3.537E-02	5.989E-02	NOT IDENT.
BA-140	-1.246E-01	8.546E-01	1.586E+00	NOT IDENT.
LA-140	-2.624E-01	3.477E-01	5.959E-01	FAIL ABUN
CE-141	-3.143E-02	1.109E-01	1.751E-01	NOT IDENT.
CE-143	0.000E+00	4.343E+06	0.000E+00	SHORT HLIF
CE-144	-1.609E-01	2.104E-01	3.502E-01	NOT IDENT.
PM-144	-4.363E-03	3.758E-02	6.933E-02	FAIL ABUN
PR-144	-3.478E-01	2.840E+00	5.235E+00	NOT IDENT.
PM-146	-3.753E-02	4.769E-02	8.235E-02	NOT IDENT.
ND-147	-3.567E-02	1.698E+00	3.286E+00	FAIL ABUN
PM-147	1.224E+02	6.730E+02	1.220E+03	NOT IDENT.
PM-149	0.000E+00	5.414E+04	0.000E+00	SHORT HLIF
EU-150	1.353E-03	3.074E-02	5.255E-02	FAIL ABUN
EU-152	1.287E-03	9.966E-02	1.896E-01	FAIL ABUN
GD-153	2.679E-02	7.791E-02	1.331E-01	NOT IDENT.
EU-154	2.760E-02	1.249E-01	2.589E-01	FAIL ABUN

EU-155	9.216E-02	9.983E-02	1.886E-01	FAIL ABUN
TB-160	-5.430E-02	1.602E-01	2.851E-01	FAIL ABUN
HO-166M	3.325E-02	7.050E-02	1.388E-01	NOT IDENT.
TM-171	7.161E+00	8.841E+00	7.862E+00	FAIL ABUN
HF-172	-1.086E-01	1.908E-01	3.239E-01	FAIL ABUN
LU-172	3.135E-02	6.846E-02	1.453E-01	FAIL ABUN
LU-176	-7.558E-03	2.224E-02	4.162E-02	FAIL ABUN
HF-181	-3.515E-03	6.737E-02	1.209E-01	NOT IDENT.
TA-182	-4.761E-02	1.535E-01	3.035E-01	FAIL ABUN
RE-183	2.723E-02	7.674E-02	1.434E-01	NOT IDENT.
RE-184	-3.303E-03	2.384E-01	4.370E-01	NOT IDENT.
W-188	-5.542E+00	1.073E+01	1.738E+01	FAIL ABUN
IR-192	1.293E-02	4.131E-02	8.105E-02	FAIL ABUN
HG-203	-2.412E-02	5.477E-02	8.999E-02	NOT IDENT.
TL-204	6.572E-01	3.038E+00	5.134E+00	NOT IDENT.
BI-207	-3.574E-02	5.187E-02	8.328E-02	FAIL ABUN
PB-211	-4.775E-01	7.503E-01	1.331E+00	NOT IDENT.
BI-212	4.100E-01	7.131E-01	1.313E+00	NOT IDENT.
BI-213	1.608E-01	1.086E-01	2.351E-01	NOT IDENT.
RN-219	3.271E-02	4.415E-01	8.387E-01	FAIL ABUN
RA-223	7.214E-01	6.340E-01	1.288E+00	FAIL ABUN
AC-225	-1.553E-01	2.552E+00	4.412E+00	NOT IDENT.
AC-227	-1.903E-01	2.942E-01	4.741E-01	NOT IDENT.
TH-227	-1.903E-01	2.942E-01	4.741E-01	NOT IDENT.
PA-231	2.841E-01	5.295E-01	1.039E+00	NOT IDENT.
TH-231	7.214E-01	6.340E-01	1.288E+00	FAIL ABUN
PA-233	2.155E-02	6.301E-02	1.240E-01	NOT IDENT.
PA-234	-3.171E-02	3.376E-01	6.199E-01	NOT IDENT.
NP-237	2.155E-02	6.301E-02	1.240E-01	NOT IDENT.
NP-238	0.000E+00	1.522E+04	0.000E+00	SHORT HLIF
NP-239	-1.173E-01	2.280E-01	3.911E-01	FAIL ABUN
PU-239	6.575E+01	3.786E+02	6.738E+02	NOT IDENT.
AM-241	1.064E-02	5.887E-02	1.007E-01	NOT IDENT.
CM-243	-4.966E-02	9.571E-02	1.647E-01	FAIL ABUN
BK-247	-4.274E-02	9.380E-02	1.401E-01	FAIL ABUN
CM-247	1.239E-02	3.976E-02	7.730E-02	NOT IDENT.
CF-249	2.796E-02	4.496E-02	8.919E-02	NOT IDENT.
CF-251	9.037E-02	1.397E-01	2.567E-01	NOT IDENT.
ANH-511	-2.177E-03	4.959E-02	1.070E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:43:25.07

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	32	10.44*	3.456E+00	5.952E-01	9.444E-01	94.76
K-40	1460.82	71	10.66*	1.258E+00	3.567E+00	3.567E+00	31.78
AS-73	53.44	47	10.30*	9.728E+00	3.155E-01	4.284E-01	125.98
CD-109	88.03	283	3.70*	9.716E+00	5.322E+00	5.613E+00	22.12
SN-126	64.28	148	9.60	1.005E+01	1.034E+00	1.034E+00	53.86
	86.94	283	8.90	9.716E+00	2.212E+00	2.212E+00	22.12
	87.57	283	37.00*	9.716E+00	5.322E-01	5.322E-01	22.12
TL-208	277.37	------	6.60	5.267E+00	------ Line Not Found		------
	583.19	130	85.00*	2.907E+00	3.545E-01	3.545E-01	30.55
	860.56	------	12.50	2.036E+00	------ Line Not Found		------
BI-210	46.54	201	4.25*	9.175E+00	3.476E+00	3.487E+00	28.96
PB-210	46.54	201	4.25*	9.175E+00	3.476E+00	3.487E+00	28.96
BI-211	72.87	------	1.23	1.003E+01	------ Line Not Found		------
	351.06	898	12.92*	4.416E+00	1.063E+01	1.063E+01	7.81
PB-212	74.82	438	10.28	9.996E+00	2.879E+00	2.879E+00	16.25
	77.11	774	17.10	9.957E+00	3.070E+00	3.070E+00	10.39
	238.63	435	43.60*	5.843E+00	1.153E+00	1.153E+00	11.77
	300.09	------	3.30	4.977E+00	------ Line Not Found		------
BI-214	609.32	571	45.49*	2.795E+00	3.029E+00	3.029E+00	10.53
	1120.29	119	14.92	1.590E+00	3.392E+00	3.392E+00	23.87
	1764.49	97	15.30	1.088E+00	3.928E+00	3.929E+00	21.62
PB-214	74.82	438	5.80	9.996E+00	5.102E+00	5.103E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.774E+00	5.775E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
RN-222	609.32	571	45.49*	2.795E+00	3.029E+00	3.029E+00	10.53
	1120.29	119	14.92	1.590E+00	3.392E+00	3.392E+00	23.87
	1764.49	97	15.30	1.088E+00	3.928E+00	3.929E+00	21.62
RA-224	240.99	338	4.10*	5.790E+00	9.618E+00	9.618E+00	15.26
RA-226	74.82	438	5.80	9.996E+00	5.102E+00	5.103E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.774E+00	5.775E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
AC-228	105.21	------	1.10	9.150E+00	------ Line Not Found		------
	338.32	92	11.27	4.551E+00	1.210E+00	1.210E+00	36.17
	835.71	------	1.61	2.092E+00	------ Line Not Found		------
	911.20	67	25.80*	1.928E+00	9.068E-01	9.068E-01	32.26
	968.97	59	15.80	1.821E+00	1.380E+00	1.380E+00	32.17
RA-228	105.21	------	1.10	9.150E+00	------ Line Not Found		------
	338.32	92	11.27	4.551E+00	1.210E+00	1.210E+00	36.17
	835.71	------	1.61	2.092E+00	------ Line Not Found		------
	911.20	67	25.80*	1.928E+00	9.068E-01	9.068E-01	32.26
	968.97	59	15.80	1.821E+00	1.380E+00	1.380E+00	32.17

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	438	10.28	9.996E+00	2.879E+00	2.879E+00	16.25
	77.11	774	17.10	9.957E+00	3.070E+00	3.070E+00	10.39
	238.63	435	43.60*	5.843E+00	1.153E+00	1.153E+00	11.77
	300.09	------	3.30	4.977E+00	------ Line Not Found		------
TH-229	85.43	107	14.70	9.793E+00	5.027E-01	5.027E-01	45.24
	88.47	283	24.00	9.716E+00	8.205E-01	8.205E-01	22.12
	193.51	------	4.41*	6.690E+00	------ Line Not Found		------
	210.85	------	2.80	6.338E+00	------ Line Not Found		------
TH-230	74.82	438	5.80	9.996E+00	5.102E+00	5.102E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.775E+00	5.775E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
TH-232	105.21	------	1.10	9.150E+00	------ Line Not Found		------
	338.32	92	11.27	4.551E+00	1.210E+00	1.210E+00	36.17
	835.71	------	1.61	2.092E+00	------ Line Not Found		------
	911.20	67	25.80*	1.928E+00	9.068E-01	9.068E-01	32.26
	968.97	59	15.80	1.821E+00	1.380E+00	1.380E+00	32.17
PA-234M	63.29	148	3.70*	1.005E+01	2.684E+00	2.684E+00	53.86
	92.59	325	4.23	9.549E+00	5.429E+00	5.429E+00	20.15
TH-234	63.29	148	3.70*	1.005E+01	2.684E+00	2.684E+00	53.86
	92.59	325	4.23	9.549E+00	5.429E+00	5.429E+00	20.15
U-234	74.82	438	5.80	9.996E+00	5.102E+00	5.102E+00	16.25
	77.11	774	9.70	9.957E+00	5.413E+00	5.413E+00	10.39
	87.09	283	3.41	9.716E+00	5.774E+00	5.774E+00	22.12
	242.00	338	7.25	5.790E+00	5.439E+00	5.439E+00	15.26
	295.22	509	18.42	5.036E+00	3.707E+00	3.707E+00	11.34
	351.93	898	35.60*	4.416E+00	3.858E+00	3.858E+00	7.81
U-235	89.96	159	3.47	9.635E+00	3.215E+00	3.215E+00	37.87
	93.35	325	5.60	9.549E+00	4.101E+00	4.101E+00	20.15
	143.76	19	10.96*	7.932E+00	1.473E-01	1.473E-01	272.96
	163.33	------	5.08	7.399E+00	------ Line Not Found		------
	185.72	289	57.20	6.853E+00	4.985E-01	4.985E-01	21.98
	205.31	------	5.01	6.447E+00	------ Line Not Found		------
U-238	63.29	148	3.70*	1.005E+01	2.684E+00	2.684E+00	53.86
	92.59	325	4.23	9.549E+00	5.429E+00	5.429E+00	20.15
AM-243	43.53	------	5.90	8.780E+00	------ Line Not Found		------
	74.66	438	67.20*	9.996E+00	4.404E-01	4.404E-01	16.25

Flag: "*" = Keyline

Sample ID : G714507006 Acquisition date : 10-APR-2025 20:42:58

Total number of lines in spectrum 55
Number of unidentified lines 17
Number of lines tentatively identified by NID 38 69.09%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	5.952E-01	9.444E-01	8.949E-01	94.76	
K-40	1.25E+09Y	1.00	3.567E+00	3.567E+00	1.134E+00	31.78	
AS-73	80.30D	1.36	3.155E-01	4.284E-01	5.397E-01	125.98	
CD-109	461.40D	1.05	5.322E+00	5.613E+00	1.242E+00	22.12	
SN-126	2.30E+05Y	1.00	5.322E-01	5.322E-01	1.177E-01	22.12	
TL-208	1.41E+10Y	1.00	3.545E-01	3.545E-01	1.083E-01	30.55	
BI-210	22.20Y	1.00	3.476E+00	3.487E+00	1.010E+00	28.96	
PB-210	22.20Y	1.00	3.476E+00	3.487E+00	1.010E+00	28.96	
BI-211	7.04E+08Y	1.00	1.063E+01	1.063E+01	0.083E+01	7.81	
PB-212	1.41E+10Y	1.00	1.153E+00	1.153E+00	0.136E+00	11.77	
BI-214	1600.00Y	1.00	3.029E+00	3.029E+00	0.319E+00	10.53	
PB-214	1600.00Y	1.00	3.858E+00	3.858E+00	0.301E+00	7.81	
RN-222	1600.00Y	1.00	3.029E+00	3.029E+00	0.319E+00	10.53	
RA-224	1.41E+10Y	1.00	9.618E+00	9.618E+00	1.467E+00	15.26	
RA-226	1600.00Y	1.00	3.858E+00	3.858E+00	0.301E+00	7.81	
AC-228	1.41E+10Y	1.00	9.068E-01	9.068E-01	2.925E-01	32.26	
RA-228	1.41E+10Y	1.00	9.068E-01	9.068E-01	2.925E-01	32.26	
TH-228	1.41E+10Y	1.00	1.153E+00	1.153E+00	0.136E+00	11.77	
TH-229	7340.00Y	1.00	8.205E-01	8.205E-01	1.815E-01	22.12	K
TH-230	7.54E+04Y	1.00	3.858E+00	3.858E+00	0.301E+00	7.81	
TH-232	1.41E+10Y	1.00	9.068E-01	9.068E-01	2.925E-01	32.26	
PA-234M	4.47E+09Y	1.00	2.684E+00	2.684E+00	1.445E+00	53.86	
TH-234	4.47E+09Y	1.00	2.684E+00	2.684E+00	1.445E+00	53.86	
U-234	2.45E+05Y	1.00	3.858E+00	3.858E+00	0.301E+00	7.81	
U-235	7.04E+08Y	1.00	1.473E-01	1.473E-01	4.021E-01	272.96	
U-238	4.47E+09Y	1.00	2.684E+00	2.684E+00	1.445E+00	53.86	
AM-243	7370.00Y	1.00	4.404E-01	4.404E-01	0.716E-01	16.25	
	Total Activity :		7.386E+01	7.463E+01			

Grand Total Activity : 7.386E+01 7.463E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	10.53	68	344	0.93	21.18	19	5	1.69E-02	91.0	5.48E-02	
0	31.75	20	116	1.34	63.62	63	6	5.11E-03	****	6.22E+00	
0	208.95	51	133	1.46	418.02	414	9	1.39E-02	87.1	6.38E+00	
0	229.28	39	80	1.30	458.67	456	8	1.08E-02	85.0	6.00E+00	T
0	270.48	64	140	2.05	541.07	533	13	1.78E-02	79.9	5.36E+00	T
0	328.86	25	72	2.29	657.84	653	9	6.94E-03	****	4.65E+00	T
0	616.92	19	9	1.41	1234.02	1230	8	5.52E-03	70.4	2.77E+00	T
0	667.16	38	49	4.72	1334.53	1326	20	1.09E-02	94.2	2.58E+00	T
0	729.20	14	45	0.86	1458.63	1453	12	4.16E-03	****	2.38E+00	
0	757.77	43	28	8.34	1515.78	1505	24	1.23E-02	72.5	2.29E+00	T
0	768.80	42	26	1.21	1537.84	1532	11	1.21E-02	55.4	2.26E+00	
0	787.38	26	25	1.58	1575.01	1567	16	7.42E-03	96.2	2.21E+00	T
0	807.03	7	20	1.19	1614.32	1609	9	2.03E-03	****	2.16E+00	
0	838.07	18	34	0.63	1676.41	1669	13	5.09E-03	****	2.09E+00	T
0	851.13	23	10	0.90	1702.53	1697	11	6.69E-03	67.1	2.06E+00	
0	934.88	26	16	1.11	1870.09	1863	13	7.42E-03	73.3	1.88E+00	T
0	940.10	15	8	1.24	1880.52	1876	9	4.40E-03	84.0	1.87E+00	
0	965.28	11	6	0.97	1930.89	1928	6	3.19E-03	94.1	1.83E+00	T
0	1002.45	19	21	1.81	2005.25	1999	13	5.51E-03	****	1.76E+00	T
0	1071.24	12	1	1.01	2142.88	2140	7	3.51E-03	65.3	1.66E+00	
0	1238.84	46	11	1.74	2478.18	2469	14	1.34E-02	40.9	1.45E+00	T
0	1281.57	18	5	0.73	2563.68	2558	10	5.28E-03	63.6	1.41E+00	
0	1314.43	23	0	1.03	2629.42	2622	16	6.67E-03	40.8	1.38E+00	
0	1363.40	8	5	2.35	2727.39	2720	10	2.42E-03	****	1.33E+00	T
0	1378.21	41	3	1.80	2757.04	2752	12	1.21E-02	34.4	1.32E+00	
0	1409.10	21	4	2.07	2818.85	2814	11	6.28E-03	57.5	1.30E+00	T
0	1510.99	21	12	3.44	3022.71	3015	18	6.21E-03	87.6	1.22E+00	
0	1632.58	6	6	0.50	3266.00	3255	13	1.81E-03	****	1.15E+00	
0	1661.63	12	2	1.72	3324.14	3319	9	3.53E-03	70.5	1.14E+00	
0	1730.14	34	0	2.05	3461.22	3455	12	1.00E-02	33.3	1.10E+00	
0	1849.76	6	8	1.02	3700.59	3695	9	1.86E-03	****	1.05E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:43:36.46

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507006.CNF;1    *
* Acquisition date : 10-APR-2025 20:42:58 Sensitivity     : 3.000          *
* Detector ID      : GAM46                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.81     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 10:30:00 Nuclide Library : SOLID          *
* Sample ID        : G714507006           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 1.1121E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 30-SEP-2024 07:51:25 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM46_CAN.CNF;6           *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	3.495E-01
K-40	2.799E-01
AS-73	1.980E-01
CD-109	5.109E-01
SN-126	4.836E-02
TL-208	2.902E-02
BI-210	3.802E-01
PB-210	3.802E-01
BI-211	1.530E-01
PB-212	4.982E-02
BI-214	6.427E-02
PB-214	5.564E-02
RN-222	6.427E-02
RA-224	5.338E-01
RA-226	5.564E-02
AC-228	1.331E-01
RA-228	1.331E-01
TH-228	4.982E-02
TH-229	4.676E-01
TH-230	5.564E-02
TH-232	1.331E-01
PA-234M	4.887E-01
TH-234	4.887E-01
U-234	5.564E-02
U-235	1.771E-01
U-238	4.887E-01
AM-243	2.860E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	3.924E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.384E-02	NOT IDENT.
SC-46	4.211E-02	FAIL ABUN

V-48	1.317E-01	NOT IDENT.
CR-51	5.177E-01	NOT IDENT.
MN-52	2.357E+00	FAIL ABUN
MN-54	3.732E-02	NOT IDENT.
CO-56	4.288E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.025E-02	NOT IDENT.
CO-58	4.512E-02	NOT IDENT.
FE-59	8.445E-02	NOT IDENT.
CO-60	3.035E-02	NOT IDENT.
ZN-65	8.378E-02	NOT IDENT.
GE-68	1.417E+00	NOT IDENT.
AS-74	1.729E-01	NOT IDENT.
SE-75	3.989E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.821E-01	NOT IDENT.
RB-83	7.011E-02	NOT IDENT.
RB-84	8.116E-02	NOT IDENT.
KR-85	5.561E+00	NOT IDENT.
SR-85	3.647E-02	NOT IDENT.
RB-86	1.821E+00	NOT IDENT.
Y-88	3.237E-02	NOT IDENT.
Y-91	1.675E+01	NOT IDENT.
NB-94	3.322E-02	NOT IDENT.
NB-95	4.119E-02	NOT IDENT.
NB-95M	1.340E-01	NOT IDENT.
ZR-95	9.247E-02	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.790E-02	NOT IDENT.
RH-102	4.949E-02	NOT IDENT.
RU-103	5.442E-02	FAIL ABUN
RH-106	2.656E-01	NOT IDENT.
RU-106	2.656E-01	NOT IDENT.
AG-108M	2.478E-02	NOT IDENT.
AG-110	4.897E-01	NOT IDENT.
AG-110M	3.970E-02	NOT IDENT.
SN-113	4.332E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.354E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.881E-02	NOT IDENT.
SB-124	7.617E-02	NOT IDENT.
SB-125	8.170E-02	NOT IDENT.
TE-125M	1.006E+01	NOT IDENT.
I-126	7.833E-01	FAIL ABUN
SB-126	3.392E-01	FAIL ABUN
SB-127	4.557E+01	NOT IDENT.
I-131	7.135E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.200E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.416E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.041E-01	NOT IDENT.
BA-137M	2.664E-02	NOT IDENT.
CS-137	2.814E-02	NOT IDENT.
LA-138	4.471E-02	FAIL ABUN
CE-139	2.808E-02	NOT IDENT.
BA-140	7.108E-01	NOT IDENT.
LA-140	2.422E-01	FAIL ABUN
CE-141	8.243E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.641E-01	NOT IDENT.
PM-144	3.071E-02	FAIL ABUN
PR-144	2.318E+00	NOT IDENT.
PM-146	3.723E-02	NOT IDENT.
ND-147	1.436E+00	FAIL ABUN
PM-147	5.718E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.420E-02	FAIL ABUN
EU-152	8.710E-02	FAIL ABUN
GD-153	6.282E-02	NOT IDENT.
EU-154	1.110E-01	FAIL ABUN
EU-155	8.947E-02	FAIL ABUN

TB-160	1.213E-01	FAIL ABUN
HO-166M	6.249E-02	NOT IDENT.
TM-171	3.720E+00	FAIL ABUN
HF-172	1.520E-01	FAIL ABUN
LU-172	6.347E-02	FAIL ABUN
LU-176	1.881E-02	FAIL ABUN
HF-181	5.456E-02	NOT IDENT.
TA-182	1.234E-01	FAIL ABUN
RE-183	6.787E-02	NOT IDENT.
RE-184	1.939E-01	NOT IDENT.
W-188	8.056E+00	FAIL ABUN
IR-192	3.730E-02	FAIL ABUN
HG-203	4.136E-02	NOT IDENT.
TL-204	2.449E+00	NOT IDENT.
BI-207	3.432E-02	FAIL ABUN
PB-211	6.042E-01	NOT IDENT.
BI-212	5.992E-01	NOT IDENT.
BI-213	1.081E-01	NOT IDENT.
RN-219	3.846E-01	FAIL ABUN
RA-223	5.955E-01	FAIL ABUN
AC-225	2.055E+00	NOT IDENT.
AC-227	2.198E-01	NOT IDENT.
TH-227	2.198E-01	NOT IDENT.
PA-231	4.849E-01	NOT IDENT.
TH-231	5.955E-01	FAIL ABUN
PA-233	5.708E-02	NOT IDENT.
PA-234	2.692E-01	NOT IDENT.
NP-237	5.708E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	1.823E-01	FAIL ABUN
PU-239	3.195E+02	NOT IDENT.
AM-241	4.776E-02	NOT IDENT.
CM-243	7.754E-02	FAIL ABUN
BK-247	6.443E-02	FAIL ABUN
CM-247	3.546E-02	NOT IDENT.
CF-249	4.122E-02	NOT IDENT.
CF-251	1.208E-01	NOT IDENT.
ANH-511	5.069E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:43:40.66

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507006.CNF;1		
Acquisition date	: 10-APR-2025 20:42:58	Sensitivity	: 3.000
Detector ID	: GAM46	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.81	Half life ratio	: *****
Sample date	: 6-MAR-2025 10:30:00	Nuclide Library	: SOLID
Sample ID	: G714507006	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.1121E+02 GRAM
		Quantity Err(%)	: 1.7984E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 30-SEP-2024 07:51:25	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM46_CAN.CNF;6		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	9.444E-01	8.813E-01	8.813E-01
K-40	3.567E+00	1.160E+00	1.160E+00
AS-73	4.284E-01	5.365E-01	5.365E-01
CD-109	5.613E+00	1.342E+00	1.342E+00
SN-126	5.322E-01	1.241E-01	1.241E-01
TL-208	3.545E-01	1.117E-01	1.117E-01
BI-210	3.487E+00	1.045E+00	1.045E+00
PB-210	3.487E+00	1.045E+00	1.045E+00
BI-211	1.063E+01	1.238E+00	1.238E+00
PB-212	1.153E+00	1.969E-01	1.969E-01
BI-214	3.029E+00	4.329E-01	4.329E-01
PB-214	3.858E+00	4.448E-01	4.448E-01
RN-222	3.029E+00	4.329E-01	4.329E-01
RA-224	9.618E+00	1.866E+00	1.866E+00
RA-226	3.858E+00	4.448E-01	4.448E-01
AC-228	9.068E-01	3.102E-01	3.102E-01
RA-228	9.068E-01	3.102E-01	3.102E-01
TH-228	1.153E+00	1.969E-01	1.969E-01
TH-229	1.334E-01	5.615E-01	5.615E-01
TH-230	3.858E+00	4.448E-01	4.448E-01
TH-232	9.068E-01	3.102E-01	3.102E-01
PA-234M	2.684E+00	1.543E+00	1.543E+00
TH-234	2.684E+00	1.543E+00	1.543E+00
U-234	3.858E+00	4.448E-01	4.448E-01
U-235	1.473E-01	3.946E-01	3.946E-01
U-238	2.684E+00	1.543E+00	1.543E+00
AM-243	4.404E-01	7.946E-02	7.946E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	8.860E-03	4.434E-02	4.452E-02	NOT IDENT.
NA-24	-1.495E+15	4.405E+15	4.456E+15	SHORT HLIF
AL-26	1.258E-02	4.812E-02	4.845E-02	NOT IDENT.

SC-46	-9.666E-03	5.339E-02	5.356E-02	FAIL ABUN
V-48	8.382E-02	1.418E-01	1.468E-01	NOT IDENT.
CR-51	-2.125E-01	6.111E-01	6.186E-01	NOT IDENT.
MN-52	-2.086E+00	3.334E+00	3.464E+00	FAIL ABUN
MN-54	-5.829E-03	5.230E-02	5.236E-02	NOT IDENT.
CO-56	-1.262E-02	6.172E-02	6.198E-02	FAIL ABUN
MN-56	1.000E+41	2.050E+42	0.000E+00	SHORT HLIF
CO-57	-1.278E-02	2.534E-02	2.598E-02	NOT IDENT.
CO-58	-2.394E-02	6.680E-02	6.766E-02	NOT IDENT.
FE-59	-5.512E-02	1.097E-01	1.125E-01	NOT IDENT.
CO-60	1.261E-03	3.541E-02	3.542E-02	NOT IDENT.
ZN-65	4.950E-02	9.828E-02	1.008E-01	NOT IDENT.
GE-68	9.713E-01	1.499E+00	1.562E+00	NOT IDENT.
AS-74	1.051E-02	2.038E-01	2.038E-01	NOT IDENT.
SE-75	1.098E-03	5.407E-02	5.407E-02	NOT IDENT.
BR-77	6.720E+04	6.968E+04	7.598E+04	SHORT HLIF
SR-82	-1.392E-01	6.095E-01	6.127E-01	NOT IDENT.
RB-83	1.405E-02	8.053E-02	8.078E-02	NOT IDENT.
RB-84	2.519E-02	9.361E-02	9.430E-02	NOT IDENT.
KR-85	-2.657E+01	9.805E+00	1.548E+01	NOT IDENT.
SR-85	-1.744E-01	6.434E-02	1.016E-01	NOT IDENT.
RB-86	1.618E+00	1.873E+00	2.010E+00	NOT IDENT.
Y-88	-9.234E-03	4.281E-02	4.301E-02	NOT IDENT.
Y-91	-6.820E+00	2.112E+01	2.134E+01	NOT IDENT.
NB-94	1.973E-02	3.719E-02	3.824E-02	NOT IDENT.
NB-95	1.591E-02	6.478E-02	6.517E-02	NOT IDENT.
NB-95M	7.674E-02	1.720E-01	1.754E-01	NOT IDENT.
ZR-95	3.383E-01	2.434E-01	2.872E-01	FAIL ABUN
NB-97	-1.000E+41	1.152E+41	0.000E+00	SHORT HLIF
ZR-97	-1.544E+15	9.816E+14	1.203E+15	SHORT HLIF
MO-99	-1.685E+00	2.454E+03	2.454E+03	SHORT HLIF
TC-99M	-4.012E+40	9.991E+40	0.000E+00	SHORT HLIF
RH-101	4.908E-03	3.308E-02	3.315E-02	NOT IDENT.
RH-102	5.845E-02	5.007E-02	5.658E-02	NOT IDENT.
RU-103	5.199E-02	5.753E-02	6.212E-02	FAIL ABUN
RH-106	9.227E-02	3.013E-01	3.042E-01	NOT IDENT.
RU-106	9.227E-02	3.013E-01	3.042E-01	NOT IDENT.
AG-108M	5.045E-03	2.817E-02	2.827E-02	NOT IDENT.
AG-110	-2.727E-01	6.415E-01	6.532E-01	NOT IDENT.
AG-110M	-3.491E-02	5.611E-02	5.828E-02	NOT IDENT.
SN-113	-1.675E-02	5.184E-02	5.238E-02	NOT IDENT.
CD-115	3.416E+02	6.094E+03	6.096E+03	SHORT HLIF
SN-117M	-7.607E-02	1.708E-01	1.742E-01	NOT IDENT.
SB-122	4.744E+01	3.570E+02	3.576E+02	SHORT HLIF
TE-123M	-4.192E-04	3.497E-02	3.497E-02	NOT IDENT.
SB-124	-1.923E-01	1.510E-01	1.741E-01	NOT IDENT.
SB-125	-1.993E-02	9.712E-02	9.754E-02	NOT IDENT.
TE-125M	-4.167E-01	1.199E+01	1.199E+01	NOT IDENT.
I-126	2.019E+00	1.877E+00	2.086E+00	FAIL ABUN
SB-126	-1.633E-01	4.387E-01	4.448E-01	FAIL ABUN
SB-127	-2.687E+01	5.896E+01	6.019E+01	NOT IDENT.
I-131	8.127E-01	7.514E-01	8.359E-01	NOT IDENT.
I-132	1.000E+41	2.374E+41	0.000E+00	SHORT HLIF
TE-132	1.082E+02	9.172E+01	1.039E+02	SHORT HLIF
BA-133	-1.029E-03	4.096E-02	4.096E-02	NOT IDENT.
I-133	2.377E+10	5.871E+10	5.968E+10	SHORT HLIF
CS-134	2.071E-02	5.060E-02	5.145E-02	NOT IDENT.
I-135	4.861E+37	1.245E+38	0.000E+00	SHORT HLIF
CS-136	-9.715E-02	2.800E-01	2.834E-01	NOT IDENT.
BA-137M	-3.733E-03	3.657E-02	3.661E-02	NOT IDENT.
CS-137	-3.943E-03	3.863E-02	3.867E-02	NOT IDENT.
LA-138	-2.333E-02	5.919E-02	6.011E-02	FAIL ABUN
CE-139	-1.465E-02	3.557E-02	3.618E-02	NOT IDENT.
BA-140	-1.246E-01	8.547E-01	8.566E-01	NOT IDENT.
LA-140	-2.624E-01	3.484E-01	3.679E-01	FAIL ABUN
CE-141	-3.143E-02	1.110E-01	1.119E-01	NOT IDENT.
CE-143	4.855E+06	4.364E+06	4.882E+06	SHORT HLIF
CE-144	-1.609E-01	2.117E-01	2.238E-01	NOT IDENT.
PM-144	-4.363E-03	3.758E-02	3.763E-02	FAIL ABUN
PR-144	-3.478E-01	2.840E+00	2.844E+00	NOT IDENT.
PM-146	-3.753E-02	4.786E-02	5.076E-02	NOT IDENT.
ND-147	-3.567E-02	1.698E+00	1.698E+00	FAIL ABUN
PM-147	1.224E+02	6.732E+02	6.755E+02	NOT IDENT.
PM-149	-7.401E+03	5.415E+04	5.426E+04	SHORT HLIF
EU-150	1.353E-03	3.074E-02	3.075E-02	FAIL ABUN
EU-152	1.287E-03	9.966E-02	9.966E-02	FAIL ABUN
GD-153	2.679E-02	7.795E-02	7.888E-02	NOT IDENT.
EU-154	2.760E-02	1.249E-01	1.256E-01	FAIL ABUN

EU-155	9.216E-02	1.004E-01	1.087E-01	FAIL ABUN
TB-160	-5.430E-02	1.603E-01	1.622E-01	FAIL ABUN
HO-166M	3.325E-02	7.060E-02	7.217E-02	NOT IDENT.
TM-171	7.161E+00	8.869E+00	9.438E+00	FAIL ABUN
HF-172	-1.086E-01	1.921E-01	1.983E-01	FAIL ABUN
LU-172	3.135E-02	6.860E-02	7.004E-02	FAIL ABUN
LU-176	-7.558E-03	2.225E-02	2.251E-02	FAIL ABUN
HF-181	-3.515E-03	6.737E-02	6.739E-02	NOT IDENT.
TA-182	-4.761E-02	1.536E-01	1.551E-01	FAIL ABUN
RE-183	2.723E-02	7.680E-02	7.778E-02	NOT IDENT.
RE-184	-3.303E-03	2.384E-01	2.384E-01	NOT IDENT.
W-188	-5.542E+00	1.076E+01	1.104E+01	FAIL ABUN
IR-192	1.293E-02	4.133E-02	4.174E-02	FAIL ABUN
HG-203	-2.412E-02	5.481E-02	5.588E-02	NOT IDENT.
TL-204	6.572E-01	3.039E+00	3.053E+00	NOT IDENT.
BI-207	-3.574E-02	5.202E-02	5.445E-02	FAIL ABUN
PB-211	-4.775E-01	7.516E-01	7.818E-01	NOT IDENT.
BI-212	4.100E-01	7.146E-01	7.381E-01	NOT IDENT.
BI-213	1.608E-01	1.095E-01	1.313E-01	NOT IDENT.
RN-219	3.271E-02	4.415E-01	4.418E-01	FAIL ABUN
RA-223	7.214E-01	6.379E-01	7.160E-01	FAIL ABUN
AC-225	-1.553E-01	2.552E+00	2.553E+00	NOT IDENT.
AC-227	-1.903E-01	2.959E-01	3.081E-01	NOT IDENT.
TH-227	-1.903E-01	2.959E-01	3.081E-01	NOT IDENT.
PA-231	2.841E-01	5.334E-01	5.485E-01	NOT IDENT.
TH-231	7.214E-01	6.379E-01	7.160E-01	FAIL ABUN
PA-233	2.155E-02	6.304E-02	6.378E-02	NOT IDENT.
PA-234	-3.171E-02	3.396E-01	3.399E-01	NOT IDENT.
NP-237	2.155E-02	6.304E-02	6.378E-02	NOT IDENT.
NP-238	-1.947E+03	1.522E+04	1.525E+04	SHORT HLIF
NP-239	-1.173E-01	2.286E-01	2.346E-01	FAIL ABUN
PU-239	6.575E+01	3.787E+02	3.798E+02	NOT IDENT.
AM-241	1.064E-02	5.888E-02	5.907E-02	NOT IDENT.
CM-243	-4.966E-02	9.593E-02	9.850E-02	FAIL ABUN
BK-247	-4.274E-02	9.427E-02	9.622E-02	FAIL ABUN
CM-247	1.239E-02	3.983E-02	4.022E-02	NOT IDENT.
CF-249	2.796E-02	4.507E-02	4.680E-02	NOT IDENT.
CF-251	9.037E-02	1.408E-01	1.466E-01	NOT IDENT.
ANH-511	-2.177E-03	4.959E-02	4.960E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	95.7287	81.75	107.6432	123.68	76.2863
879.38	84.3561	82.47	115.8599	125.81	92.6604
46.54	84.5518	83.79	117.4709	127.23	92.8303
228.16	0.0000	265.00	117.5125	127.91	100.4746
52.39	83.6232	193.51	117.7948	129.30	107.1468
1093.63	82.7719	105.31	118.0152	131.20	99.8122
52.39	82.8701	86.79	118.0621	133.02	94.6040
125.81	82.9793	86.94	118.0913	133.52	94.6624
53.44	83.0672	87.09	118.1205	136.00	64.3944
54.07	83.1847	87.57	118.2143	136.47	74.2598
293.27	0.0000	88.03	118.3037	739.50	0.0000
482.18	97.6266	306.78	118.3639	140.51	0.0000
57.98	93.5417	88.47	118.3886	143.76	93.6471
59.27	108.3030	143.76	118.6763	144.24	93.7003
59.32	108.3146	90.64	118.8064	145.44	94.2018
59.54	108.3646	531.02	118.8966	152.43	105.7269
60.96	108.6863	92.59	119.1772	1048.07	81.3197
61.17	108.7337	93.35	119.3214	154.21	80.2925
62.93	128.6132	94.56	119.5484	158.56	106.1589
63.29	128.7074	311.90	119.5657	159.00	84.0889
290.67	128.7829	946.00	119.5692	162.33	90.0244
87.57	128.9644	94.87	119.6064	537.26	79.9259
66.73	143.9901	97.43	84.1952	163.33	82.2375
67.24	134.9622	98.43	96.4200	165.86	85.8525
67.68	142.9461	98.44	96.4214	427.87	92.5167
1221.41	146.8997	103.37	86.1966	176.60	84.5463
70.82	133.0925	116.74	86.1966	177.52	69.7606
97.43	143.1658	100.11	92.5085	181.07	0.0000
70.82	134.5712	102.03	88.6057	181.52	68.8980
279.20	134.5743	103.18	112.7741	184.41	63.3411
1063.66	143.0189	103.37	101.3160	185.72	63.4242
72.87	143.0343	911.20	90.0700	193.51	69.7229
351.06	143.0343	105.31	87.9881	197.03	67.6280
74.66	144.5022	106.12	106.9688	198.01	82.8640
351.93	144.5442	106.47	113.3188	201.83	70.2805
238.63	144.5442	109.28	101.1357	203.43	82.1167
351.93	144.5442	111.00	91.8780	205.31	62.6758
238.63	144.5442	111.76	0.0000	210.85	80.3215
74.97	144.5840	114.06	86.9692	215.65	71.1813
77.11	145.1427	116.30	0.0000	218.12	63.0159
78.74	131.1741	116.74	75.5805	222.11	52.5011
256.23	136.7554	119.76	75.8898	227.09	55.9265
80.03	127.4446	264.66	71.7447	227.38	55.9408
133.52	127.4659	121.22	69.6125	228.16	0.0000
364.49	102.6560	344.28	85.7410	228.18	68.7745
711.68	116.8239	122.06	85.7727	235.69	59.5604
356.01	133.0363	122.92	65.4762	235.96	67.6245
323.87	133.0524	1274.44	65.4892	238.63	64.1457

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	44.2940	531.02	16.4196
240.99	64.2727	338.32	44.2950	537.26	27.1239
242.00	64.3269	340.48	41.7480	1260.41	0.0000
244.70	64.4708	340.55	41.7500	552.55	29.2664
685.70	64.8768	344.28	42.7235	795.86	27.4486
388.16	50.2040	345.93	43.9913	564.24	0.0000
507.63	0.0000	351.06	30.6499	569.33	23.5908
256.23	68.7610	351.93	30.6670	569.50	23.5928
527.90	0.0000	355.39	0.0000	569.70	16.7129
264.66	42.8499	356.01	30.3068	583.19	20.7693
264.80	42.8551	364.49	35.3255	584.27	20.7787
265.00	54.4011	366.42	0.0000	595.83	20.8838
269.46	55.8311	372.51	33.7255	600.60	23.9160
270.03	55.8545	375.05	40.8892	602.52	0.0000
401.81	55.9067	377.52	27.5968	604.72	34.4396
273.65	56.4246	383.85	42.8936	607.14	28.4803
276.40	46.1495	388.16	38.5243	609.32	27.0055
583.19	53.6726	666.33	43.9118	610.33	27.0176
277.60	54.9302	391.69	39.5026	614.28	21.0487
402.40	41.2097	400.66	37.0028	618.01	21.0812
279.20	52.4962	401.81	39.7362	884.68	13.5659
279.54	47.5093	402.40	36.1361	621.93	15.0830
279.70	47.5151	404.85	40.7108	630.19	0.0000
280.46	40.0352	410.95	36.3143	631.29	9.0850
301.36	47.6566	413.71	42.7362	633.25	11.1128
284.31	44.3327	720.70	45.4895	634.78	22.2399
285.41	44.3683	423.72	36.5755	635.95	23.2620
285.90	0.0000	427.09	36.6439	636.99	23.2714
287.50	50.3064	427.87	35.7437	657.50	15.3040
290.67	65.5507	433.94	25.7476	657.76	21.4272
293.27	0.0000	439.40	26.7462	657.90	0.0000
295.22	53.9622	440.45	20.3018	661.66	16.8619
316.51	53.9922	453.88	42.7553	664.57	0.0000
298.58	62.1233	463.37	32.6936	666.33	15.3577
299.98	52.7935	468.07	29.0278	666.50	15.3589
300.09	52.7985	473.00	28.1628	667.71	0.0000
300.13	52.7998	631.29	35.2409	677.62	18.5112
311.90	52.7998	696.49	25.3954	685.70	26.8231
301.36	55.0474	477.60	25.4059	692.65	0.0000
302.85	58.4967	482.18	29.4265	695.00	14.4950
304.50	40.7412	487.02	17.9636	696.49	21.7545
304.85	40.7510	492.35	0.0000	696.51	21.7545
306.78	34.8557	497.08	19.0039	697.00	22.7949
308.46	38.3020	505.52	26.7160	697.30	21.7614
311.90	39.2467	507.63	0.0000	697.49	21.7631
316.51	39.3722	511.00	27.7439	702.65	19.7290
319.41	46.3107	514.00	79.5214	706.68	27.0389
320.08	46.3326	514.00	79.5214	711.68	20.8382
321.04	42.9281	520.40	21.1424	720.70	18.8181
323.87	29.9353	520.69	0.0000	721.93	0.0000
325.23	42.6196	667.71	0.0000	1690.97	17.7865
1596.21	44.0159	527.90	0.0000	722.91	17.7872
333.37	38.4372	528.26	21.2212	723.31	16.3249
333.97	42.8694	529.59	19.3042	756.73	23.5538
334.37	40.2816	529.87	0.0000	727.33	22.0092

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	15.7538	935.54	10.1140	1362.66	0.0000
735.93	19.9757	937.49	10.1199	1365.19	3.0166
737.46	19.9873	983.53	11.8304	1368.63	0.0000
739.50	0.0000	946.00	15.7825	1384.29	12.1180
1434.09	13.7094	949.00	12.4117	1408.01	10.6593
747.24	17.9470	954.55	0.0000	1434.09	10.5287
748.06	22.1766	962.31	13.5942	1435.80	8.6177
752.31	19.0378	964.08	5.1006	1457.56	0.0000
753.82	20.1063	966.17	3.4025	1460.82	5.7759
756.73	20.1272	968.97	8.5132	1489.16	9.6844
756.80	20.1280	983.53	5.6999	1505.03	10.8828
763.94	12.7446	984.45	0.0000	1584.12	6.9124
765.81	12.7534	996.26	13.7305	1596.21	10.8885
766.84	14.8841	1002.74	17.1954	1620.50	6.9624
772.60	0.0000	1004.73	15.4847	1621.92	6.9641
776.52	18.1358	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	13.1071
778.90	16.0156	1028.54	0.0000	1750.46	0.0000
783.70	8.0212	1037.84	13.8945	1764.49	4.0884
1435.80	10.7137	1038.76	0.0000	1770.23	6.5484
903.28	27.3521	1046.59	11.6073	1771.35	3.5087
795.86	20.4063	1048.07	10.4509	1791.20	0.0000
801.95	17.7589	1049.04	11.6146	1808.65	5.1514
810.06	22.6646	1050.41	11.6195	1810.72	0.0000
810.29	14.5712	1063.66	13.9941	1836.06	4.1414
810.45	14.5723	1077.00	10.5344		
810.76	24.2899	1077.34	12.2910		
815.77	15.1393	1085.87	9.6794		
818.51	14.0712	1093.63	11.4639		
832.01	1.6309	1099.45	12.3645		
834.85	22.8551	1112.07	14.1787		
835.71	22.8611	1112.84	9.7499		
836.80	0.0000	1115.54	9.9340		
846.75	0.0000	1120.29	11.5456		
846.77	19.6670	1120.55	11.5464		
856.80	10.9623	1121.30	11.5488		
860.56	14.2685	1808.65	5.3419		
871.09	11.0132	1131.51	0.0000		
873.19	16.5308	1147.95	0.0000		
875.33	0.0000	1332.49	10.8047		
879.38	14.3552	1177.95	14.4229		
880.51	15.4652	1189.05	11.7519		
881.60	8.8402	1204.77	9.9828		
883.24	11.0559	1221.41	7.2905		
884.68	17.6979	1231.02	23.1408		
889.28	17.7240	1235.36	13.1678		
894.76	14.4256	1238.28	9.1510		
1836.06	21.1052	1260.41	0.0000		
900.72	21.1230	1271.87	8.3029		
903.28	21.1400	1274.44	10.1541		
911.20	17.8464	1274.54	10.1541		
912.08	17.8509	1291.59	12.0486		
984.45	0.0000	1298.22	0.0000		
926.50	7.8445	1312.11	4.4704		
929.11	11.7762	1332.49	6.5501		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:44:08.12

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507007.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM47.CNF;223
                                        Background date  : 6-APR-2025 11:02:50.
Sample date      : 6-MAR-2025 11:00:00. Acquisition date : 10-APR-2025 20:43:33
Sample ID        : G714507007           Sample quantity  : 1.46080E+02 GRAM
Detector name    : GAM47                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.64  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.76*	68	209	0.75	94.27	91	7	1.90E-02	37.8	
2	0	53.50*	41	236	1.40	107.74	104	8	1.13E-02	67.3	
3	0	63.32*	263	426	1.06	127.35	121	12	7.30E-02	17.0	
4	0	68.20	63	379	0.57	137.11	134	9	1.76E-02	56.7	
5	2	74.94*	543	329	1.10	150.58	144	22	1.51E-01	7.0	2.65E+00
6	2	77.22*	823	236	1.04	155.14	144	22	2.29E-01	4.7	
7	3	84.19	143	251	1.37	169.07	165	29	3.97E-02	20.6	2.24E+00
8	3	87.32*	342	241	1.38	175.32	165	29	9.51E-02	9.5	
9	3	89.90	192	201	1.10	180.47	165	29	5.35E-02	14.5	
10	3	92.79*	328	191	1.16	186.24	165	29	9.12E-02	9.4	
11	0	128.54	37	200	1.03	257.71	255	8	1.03E-02	67.8	
12	0	185.97*	325	266	1.14	372.49	365	13	9.04E-02	11.8	
13	0	209.92	71	214	3.19	420.35	415	12	1.97E-02	43.0	
14	2	238.76*	463	115	1.09	478.01	473	21	1.29E-01	6.0	2.55E+00
15	2	242.05	307	116	1.27	484.58	473	21	8.52E-02	8.3	
16	0	258.85	29	83	1.13	518.16	515	7	7.95E-03	56.9	
17	0	262.55	31	80	1.42	525.55	522	8	8.49E-03	53.9	
18	0	270.13*	112	126	1.93	540.70	535	12	3.12E-02	22.2	
19	0	295.26	597	114	1.07	590.93	585	12	1.66E-01	5.4	
20	0	299.90*	29	65	1.01	600.20	598	7	7.97E-03	50.4	
21	0	338.82*	97	140	1.14	678.00	671	14	2.68E-02	28.3	
22	0	352.08*	992	126	1.22	704.51	698	12	2.75E-01	3.9	
23	0	377.16	20	41	0.68	754.65	752	7	5.51E-03	57.1	
24	0	432.54	37	70	4.02	865.35	859	14	1.03E-02	50.7	
25	0	462.87	48	44	1.18	925.98	921	11	1.33E-02	30.4	
26	0	511.33*	58	72	2.11	1022.85	1015	17	1.61E-02	38.0	
27	0	526.26	26	30	2.34	1052.70	1044	14	7.19E-03	49.8	
28	0	583.45*	147	62	1.15	1167.04	1160	14	4.10E-02	14.3	
29	0	609.43*	681	39	1.49	1218.97	1213	12	1.89E-01	4.3	
30	0	727.67*	37	26	0.71	1455.39	1451	10	1.02E-02	31.8	
31	0	768.28	60	51	1.68	1536.59	1530	15	1.68E-02	28.4	
32	0	795.86	14	27	1.27	1591.74	1585	10	3.90E-03	74.6	
33	0	799.49	14	16	1.16	1599.00	1595	8	3.89E-03	56.2	
34	0	840.06	17	33	0.69	1680.11	1676	10	4.67E-03	68.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	1	872.18	16	28	1.91	1744.35	1738	20	4.58E-03	61.0	1.96E+00
36	1	877.68	16	8	1.91	1755.35	1738	20	4.43E-03	33.8	
37	0	899.61	15	24	0.88	1799.20	1792	12	4.17E-03	70.2	
38	0	905.82	21	20	0.86	1811.61	1804	14	5.80E-03	51.3	
39	0	911.34*	119	18	1.22	1822.64	1817	13	3.30E-02	12.0	
40	0	920.21	27	7	4.85	1840.39	1833	14	7.50E-03	28.3	
41	0	934.30	49	15	1.48	1868.55	1864	9	1.36E-02	20.4	
42	0	964.52	22	33	3.44	1929.00	1922	13	6.13E-03	57.5	
43	0	969.38	68	25	1.66	1938.71	1934	14	1.88E-02	19.8	
44	0	1001.33*	13	16	1.19	2002.60	1997	9	3.58E-03	63.8	
45	0	1052.59	11	17	3.20	2105.12	2100	11	3.08E-03	77.4	
46	0	1120.48	152	3	2.11	2240.89	2235	14	4.22E-02	8.5	
47	0	1136.86	6	19	3.22	2273.65	2264	13	1.71E-03	152.6	
48	0	1150.68	14	2	1.09	2301.29	2298	8	3.79E-03	32.7	
49	0	1155.67	23	12	1.14	2311.26	2305	12	6.39E-03	36.6	
50	0	1232.72	4	13	0.69	2465.37	2461	8	1.06E-03	167.5	
51	0	1238.20	55	29	1.95	2476.34	2470	14	1.53E-02	24.5	
52	0	1247.08	8	18	0.74	2494.10	2484	14	2.18E-03	127.1	
53	0	1357.49	9	5	2.81	2714.94	2710	10	2.50E-03	57.2	
54	0	1365.44	7	10	1.37	2730.83	2723	11	1.82E-03	104.8	
55	0	1377.74	49	9	0.80	2755.44	2749	13	1.37E-02	19.3	
56	0	1383.15	5	5	1.46	2766.26	2761	7	1.44E-03	84.2	
57	0	1460.52*	113	5	1.93	2921.03	2911	16	3.13E-02	10.6	
58	0	1509.09	17	10	1.99	3018.19	3009	13	4.67E-03	45.6	
59	0	1702.71	9	0	0.73	3405.56	3401	10	2.50E-03	33.3	
60	0	1729.69	26	3	1.82	3459.53	3453	13	7.15E-03	24.5	
61	0	1764.28*	117	7	2.26	3528.73	3522	14	3.25E-02	10.6	
62	0	1848.76	10	10	1.45	3697.77	3691	10	2.89E-03	64.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:44:09

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507007.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 11:00:00	Acquisition date	: 10-APR-2025 20:43:33
Sample ID	: G714507007	Sample quantity	: 146.08 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA47	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.64 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	109	10.66*	1.266E+00	4.132E+00	4.132E+00	21.11
AS-73	53.44	53	10.30*	9.997E+00	2.622E-01	3.560E-01	134.51
CD-109	88.03	424	3.70*	9.864E+00	5.967E+00	6.293E+00	19.00
SN-126	64.28	334	9.60	1.026E+01	1.740E+00	1.740E+00	33.92
	86.94	424	8.90	9.864E+00	2.481E+00	2.481E+00	19.00
	87.57	424	37.00*	9.864E+00	5.967E-01	5.967E-01	19.00
TL-208	277.37	------	6.60	5.267E+00	------ Line Not Found		------
	583.19	155	85.00*	2.901E+00	3.233E-01	3.233E-01	28.51
	860.56	------	12.50	2.040E+00	------ Line Not Found		------
BI-210	46.54	89	4.25*	9.488E+00	1.130E+00	1.134E+00	75.67
PB-210	46.54	89	4.25*	9.488E+00	1.130E+00	1.134E+00	75.67
BI-211	72.87	------	1.23	1.021E+01	------ Line Not Found		------
	351.06	1092	12.92*	4.407E+00	9.858E+00	9.858E+00	7.82
BI-212	727.33	38	6.67*	2.380E+00	1.221E+00	1.221E+00	63.66
	1620.50	------	1.47	1.164E+00	------ Line Not Found		------
PB-212	74.82	681	10.28	1.018E+01	3.343E+00	3.343E+00	13.96
	77.11	1029	17.10	1.013E+01	3.051E+00	3.051E+00	9.45
	238.63	527	43.60*	5.853E+00	1.062E+00	1.062E+00	12.04
	300.09	32	3.30	4.976E+00	1.003E+00	1.003E+00	100.80
BI-214	609.32	713	45.49*	2.792E+00	2.886E+00	2.886E+00	8.55
	1120.29	150	14.92	1.599E+00	3.237E+00	3.237E+00	17.01
	1764.49	110	15.30	1.091E+00	3.395E+00	3.395E+00	21.21
PB-214	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
RN-222	609.32	713	45.49*	2.792E+00	2.886E+00	2.886E+00	8.55
	1120.29	150	14.92	1.599E+00	3.237E+00	3.237E+00	17.01
	1764.49	110	15.30	1.091E+00	3.395E+00	3.395E+00	21.21
RA-224	240.99	349	4.10*	5.798E+00	7.550E+00	7.550E+00	16.62
RA-226	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
AC-228	105.21	------	1.10	9.270E+00	------ Line Not Found		------
	338.32	107	11.27	4.540E+00	1.072E+00	1.072E+00	56.57
	835.71	------	1.61	2.096E+00	------ Line Not Found		------
	911.20	120	25.80*	1.935E+00	1.235E+00	1.235E+00	24.07
	968.97	68	15.80	1.827E+00	1.206E+00	1.206E+00	39.56
RA-228	105.21	------	1.10	9.270E+00	------ Line Not Found		------
	338.32	107	11.27	4.540E+00	1.072E+00	1.072E+00	56.57
	835.71	------	1.61	2.096E+00	------ Line Not Found		------
	911.20	120	25.80*	1.935E+00	1.235E+00	1.235E+00	24.07
	968.97	68	15.80	1.827E+00	1.206E+00	1.206E+00	39.56
TH-228	74.82	681	10.28	1.018E+01	3.343E+00	3.343E+00	13.96

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	1029	17.10	1.013E+01	3.051E+00	3.051E+00	9.45
	238.63	527	43.60*	5.853E+00	1.062E+00	1.062E+00	12.04
	300.09	32	3.30	4.976E+00	1.003E+00	1.003E+00	100.80
TH-229	85.43	177	14.70	9.956E+00	6.232E-01	6.232E-01	41.20
	88.47	424	24.00	9.864E+00	9.199E-01	9.199E-01	19.00
	193.51	------	4.41*	6.722E+00	------ Line Not Found		------
	210.85	82	2.80	6.379E+00	2.354E+00	2.354E+00	86.03
TH-230	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
PA-231	283.69	------	1.70	5.182E+00	------ Line Not Found		------
	301.36	32	5.35*	4.976E+00	6.188E-01	6.188E-01	100.80
TH-232	105.21	------	1.10	9.270E+00	------ Line Not Found		------
	338.32	107	11.27	4.540E+00	1.072E+00	1.072E+00	56.57
	835.71	------	1.61	2.096E+00	------ Line Not Found		------
	911.20	120	25.80*	1.935E+00	1.235E+00	1.235E+00	24.07
	968.97	68	15.80	1.827E+00	1.206E+00	1.206E+00	39.56
PA-234M	63.29	334	3.70*	1.026E+01	4.513E+00	4.513E+00	33.92
	92.59	405	4.23	9.691E+00	5.073E+00	5.073E+00	18.74
TH-234	63.29	334	3.70*	1.026E+01	4.513E+00	4.513E+00	33.92
	92.59	405	4.23	9.691E+00	5.073E+00	5.073E+00	18.74
U-234	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
U-235	89.96	238	3.47	9.784E+00	3.598E+00	3.598E+00	29.01
	93.35	405	5.60	9.691E+00	3.832E+00	3.832E+00	18.74
	143.76	------	10.96*	8.004E+00	------ Line Not Found		------
	163.33	------	5.08	7.451E+00	------ Line Not Found		------
	185.72	379	57.20	6.891E+00	4.939E-01	4.939E-01	23.70
	205.31	------	5.01	6.472E+00	------ Line Not Found		------
U-238	63.29	334	3.70*	1.026E+01	4.513E+00	4.513E+00	33.92
	92.59	405	4.23	9.691E+00	5.073E+00	5.073E+00	18.74
AM-243	43.53	------	5.90	9.107E+00	------ Line Not Found		------
	74.66	681	67.20*	1.018E+01	5.114E-01	5.114E-01	13.96
ANH-511	511.00	62	100.00*	3.252E+00	9.735E-02	9.735E-02	75.97

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:44:10.43

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
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*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507007.CNF;1    *
* Acquisition date : 10-APR-2025 20:43:33 Sensitivity     : 3.000          *
* Detector ID      : GAM47                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.64     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 11:00:00 Analyst initials: MXR1           *
* Sample ID        : G714507007           Sample Quantity : 1.4608E+02 GRAM   *
* Batch Number     : 2767515              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;18                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 15-NOV-2024 09:21:14 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM47_CAN.CNF;7           *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	4.132E+00	8.547E-01	6.118E-01
AS-73	3.560E-01	4.692E-01	4.102E-01
CD-109	6.293E+00	1.172E+00	8.917E-01
SN-126	5.967E-01	1.111E-01	8.440E-02
TL-208	3.233E-01	9.035E-02	4.747E-02
BI-210	1.134E+00	8.407E-01	7.323E-01
PB-210	1.134E+00	8.407E-01	7.323E-01
BI-211	9.858E+00	7.554E-01	3.644E-01
BI-212	1.221E+00	7.620E-01	8.620E-01
PB-212	1.062E+00	1.253E-01	9.667E-02
BI-214	2.886E+00	2.417E-01	1.156E-01
PB-214	3.578E+00	2.742E-01	1.325E-01
RN-222	2.886E+00	2.417E-01	1.156E-01
RA-224	7.550E+00	1.230E+00	1.036E+00
RA-226	3.578E+00	2.742E-01	1.325E-01
AC-228	1.235E+00	2.913E-01	2.108E-01
RA-228	1.235E+00	2.913E-01	2.108E-01
TH-228	1.062E+00	1.253E-01	9.667E-02
TH-229	-3.904E-01	4.950E-01	8.308E-01
TH-230	3.578E+00	2.741E-01	1.325E-01
PA-231	6.188E-01	6.113E-01	7.602E-01
TH-232	1.235E+00	2.913E-01	2.108E-01
PA-234M	4.513E+00	1.500E+00	8.626E-01
TH-234	4.513E+00	1.500E+00	8.626E-01
U-234	3.578E+00	2.741E-01	1.325E-01
U-235	1.178E-01	2.019E-01	3.798E-01
U-238	4.513E+00	1.500E+00	8.626E-01
AM-243	5.114E-01	6.998E-02	5.248E-02
ANH-511	9.735E-02	7.247E-02	4.291E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-1.277E-01	4.053E-01	7.456E-01	NOT IDENT.

NA-22	-1.720E-02	3.426E-02	6.225E-02	NOT IDENT.
NA-24	0.000E+00	3.926E+15	0.000E+00	SHORT HLIF
AL-26	-2.530E-02	3.086E-02	4.754E-02	NOT IDENT.
SC-46	-9.437E-03	3.734E-02	6.760E-02	FAIL ABUN
V-48	5.461E-02	1.496E-01	3.123E-01	NOT IDENT.
CR-51	-1.836E-01	5.246E-01	9.903E-01	NOT IDENT.
MN-52	-2.314E-01	2.657E+00	5.260E+00	FAIL ABUN
MN-54	-9.515E-03	3.610E-02	6.106E-02	NOT IDENT.
CO-56	-9.928E-03	4.783E-02	8.575E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.439E-02	2.312E-02	4.077E-02	NOT IDENT.
CO-58	-2.462E-02	4.251E-02	7.237E-02	NOT IDENT.
FE-59	-5.674E-02	8.729E-02	1.567E-01	NOT IDENT.
CO-60	-9.676E-03	3.720E-02	7.022E-02	NOT IDENT.
ZN-65	-6.115E-02	8.637E-02	1.268E-01	NOT IDENT.
GE-68	7.189E-02	1.044E+00	2.121E+00	NOT IDENT.
AS-74	3.164E-02	1.969E-01	3.767E-01	NOT IDENT.
SE-75	-1.778E-03	4.721E-02	7.657E-02	NOT IDENT.
BR-77	0.000E+00	7.258E+03	0.000E+00	SHORT HLIF
SR-82	-1.434E-01	4.747E-01	8.565E-01	NOT IDENT.
RB-83	-8.056E-02	7.516E-02	1.040E-01	NOT IDENT.
RB-84	4.387E-02	1.118E-01	2.088E-01	NOT IDENT.
KR-85	4.309E+00	5.745E+00	1.185E+01	NOT IDENT.
SR-85	2.799E-02	3.766E-02	7.760E-02	NOT IDENT.
RB-86	4.428E-02	1.221E+00	2.499E+00	NOT IDENT.
Y-88	-7.149E-04	3.635E-02	7.581E-02	NOT IDENT.
Y-91	-5.509E-01	2.075E+01	4.089E+01	NOT IDENT.
NB-94	-7.871E-03	2.854E-02	5.172E-02	FAIL ABUN
NB-95	6.217E-02	5.363E-02	1.053E-01	NOT IDENT.
NB-95M	3.331E-03	1.513E-01	2.462E-01	NOT IDENT.
ZR-95	-4.398E-02	8.268E-02	1.428E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	7.270E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.949E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	7.798E+40	0.000E+00	SHORT HLIF
RH-101	4.039E-02	5.366E-02	4.617E-02	FAIL ABUN
RH-102	2.484E-03	4.808E-02	9.187E-02	FAIL ABUN
RU-103	-1.470E-02	5.121E-02	9.469E-02	FAIL ABUN
RH-106	-6.044E-02	2.815E-01	5.198E-01	NOT IDENT.
RU-106	-6.044E-02	2.815E-01	5.198E-01	NOT IDENT.
AG-108M	0.000E+00	6.037E-02	5.427E-02	FAIL ABUN
AG-110	2.659E-01	6.510E-01	1.302E+00	NOT IDENT.
AG-110M	-6.799E-03	4.761E-02	8.696E-02	FAIL ABUN
SN-113	8.503E-03	4.661E-02	9.072E-02	NOT IDENT.
CD-115	0.000E+00	5.342E+03	0.000E+00	SHORT HLIF
SN-117M	4.006E-03	1.519E-01	2.745E-01	NOT IDENT.
SB-122	0.000E+00	3.029E+02	0.000E+00	SHORT HLIF
TE-123M	1.770E-02	2.979E-02	5.607E-02	NOT IDENT.
SB-124	9.562E-03	9.672E-02	2.039E-01	NOT IDENT.
SB-125	4.497E-02	8.321E-02	1.548E-01	FAIL ABUN
TE-125M	6.359E+00	9.885E+00	1.903E+01	NOT IDENT.
I-126	1.055E-01	6.374E-01	1.212E+00	NOT IDENT.
SB-126	3.242E-01	3.742E-01	7.912E-01	NOT IDENT.
SB-127	-4.722E+01	4.353E+01	6.877E+01	NOT IDENT.
I-131	-2.365E-01	5.714E-01	1.065E+00	NOT IDENT.
I-132	0.000E+00	1.770E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.129E+01	0.000E+00	SHORT HLIF
BA-133	1.972E-03	4.364E-02	7.574E-02	NOT IDENT.
I-133	0.000E+00	5.660E+10	0.000E+00	SHORT HLIF
CS-134	4.066E-02	5.943E-02	8.546E-02	FAIL ABUN
I-135	0.000E+00	1.036E+38	0.000E+00	SHORT HLIF
CS-136	4.303E-02	2.945E-01	5.334E-01	NOT IDENT.
BA-137M	-6.683E-03	3.190E-02	5.845E-02	NOT IDENT.
CS-137	-7.060E-03	3.370E-02	6.175E-02	NOT IDENT.
LA-138	2.344E-02	5.370E-02	1.154E-01	NOT IDENT.
CE-139	-1.120E-03	3.256E-02	5.847E-02	NOT IDENT.
BA-140	6.100E-02	6.923E-01	1.336E+00	NOT IDENT.
LA-140	5.458E-02	2.962E-01	5.972E-01	NOT IDENT.
CE-141	-1.584E-02	9.529E-02	1.707E-01	NOT IDENT.
CE-143	0.000E+00	3.221E+06	0.000E+00	SHORT HLIF
CE-144	-4.605E-02	1.907E-01	3.428E-01	NOT IDENT.
PM-144	3.443E-02	3.273E-02	6.894E-02	NOT IDENT.
PR-144	2.557E+00	2.470E+00	5.196E+00	NOT IDENT.
PM-146	-2.585E-02	3.547E-02	6.279E-02	NOT IDENT.
ND-147	-4.463E-02	2.031E+00	3.448E+00	FAIL ABUN
PM-147	-4.422E+00	6.146E+02	1.134E+03	NOT IDENT.
PM-149	0.000E+00	4.511E+04	0.000E+00	SHORT HLIF
EU-150	1.339E-02	2.557E-02	4.702E-02	FAIL ABUN

EU-152	2.765E-02	8.694E-02	1.577E-01	FAIL ABUN
GD-153	1.904E-02	7.162E-02	1.256E-01	FAIL ABUN
EU-154	-5.032E-02	9.565E-02	1.729E-01	FAIL ABUN
EU-155	8.969E-02	7.871E-02	1.570E-01	FAIL ABUN
TB-160	1.673E-02	1.869E-01	3.110E-01	FAIL ABUN
HO-166M	-5.855E-02	5.944E-02	9.605E-02	NOT IDENT.
TM-171	5.950E+00	7.844E+00	6.871E+00	FAIL ABUN
HF-172	-2.121E-01	1.728E-01	2.613E-01	FAIL ABUN
LU-172	5.384E-03	5.521E-02	1.113E-01	FAIL ABUN
LU-176	-2.213E-03	2.219E-02	4.289E-02	FAIL ABUN
HF-181	-1.253E-02	5.760E-02	1.072E-01	NOT IDENT.
TA-182	1.911E-02	1.584E-01	3.207E-01	FAIL ABUN
RE-183	-1.403E-02	7.375E-02	1.293E-01	FAIL ABUN
RE-184	7.568E-02	2.245E-01	3.270E-01	NOT IDENT.
W-188	-5.322E+00	8.115E+00	1.327E+01	FAIL ABUN
IR-192	-2.036E-03	3.733E-02	7.205E-02	FAIL ABUN
HG-203	3.957E-02	4.457E-02	9.206E-02	NOT IDENT.
TL-204	-2.174E+00	3.159E+00	4.592E+00	FAIL ABUN
BI-207	-3.029E-02	3.688E-02	6.391E-02	FAIL ABUN
PB-211	-1.032E-01	6.949E-01	1.308E+00	NOT IDENT.
BI-213	-2.097E-02	8.881E-02	1.667E-01	NOT IDENT.
RN-219	2.347E-02	4.094E-01	7.822E-01	FAIL ABUN
RA-223	1.510E-01	4.836E-01	9.728E-01	FAIL ABUN
AC-225	3.357E-01	2.221E+00	4.006E+00	NOT IDENT.
AC-227	2.269E-01	2.475E-01	4.704E-01	FAIL ABUN
TH-227	2.269E-01	2.475E-01	4.704E-01	FAIL ABUN
TH-231	1.510E-01	4.836E-01	9.728E-01	FAIL ABUN
PA-233	-1.083E-02	5.469E-02	1.047E-01	FAIL ABUN
PA-234	2.412E-01	2.417E-01	5.508E-01	NOT IDENT.
NP-237	-1.083E-02	5.469E-02	1.047E-01	FAIL ABUN
NP-238	0.000E+00	1.356E+04	0.000E+00	SHORT HLIF
NP-239	-2.548E-01	2.174E-01	3.692E-01	NOT IDENT.
PU-239	4.265E+02	5.666E+02	6.121E+02	FAIL ABUN
AM-241	7.581E-03	4.821E-02	8.649E-02	NOT IDENT.
CM-243	-1.021E-01	7.587E-02	1.281E-01	NOT IDENT.
BK-247	4.541E-03	8.527E-02	1.224E-01	FAIL ABUN
CM-247	8.997E-03	3.761E-02	7.287E-02	NOT IDENT.
CF-249	3.493E-03	3.709E-02	7.166E-02	NOT IDENT.
CF-251	-8.465E-02	1.200E-01	2.043E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:44:08.93

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	109	10.66*	1.266E+00	4.132E+00	4.132E+00	21.11
AS-73	53.44	53	10.30*	9.997E+00	2.622E-01	3.560E-01	134.51
CD-109	88.03	424	3.70*	9.864E+00	5.967E+00	6.293E+00	19.00
SN-126	64.28	334	9.60	1.026E+01	1.740E+00	1.740E+00	33.92
	86.94	424	8.90	9.864E+00	2.481E+00	2.481E+00	19.00
	87.57	424	37.00*	9.864E+00	5.967E-01	5.967E-01	19.00
TL-208	277.37	------	6.60	5.267E+00	------ Line Not Found		------
	583.19	155	85.00*	2.901E+00	3.233E-01	3.233E-01	28.51
	860.56	------	12.50	2.040E+00	------ Line Not Found		------
BI-210	46.54	89	4.25*	9.488E+00	1.130E+00	1.134E+00	75.67
PB-210	46.54	89	4.25*	9.488E+00	1.130E+00	1.134E+00	75.67
BI-211	72.87	------	1.23	1.021E+01	------ Line Not Found		------
	351.06	1092	12.92*	4.407E+00	9.858E+00	9.858E+00	7.82
BI-212	727.33	38	6.67*	2.380E+00	1.221E+00	1.221E+00	63.66
	1620.50	------	1.47	1.164E+00	------ Line Not Found		------
PB-212	74.82	681	10.28	1.018E+01	3.343E+00	3.343E+00	13.96
	77.11	1029	17.10	1.013E+01	3.051E+00	3.051E+00	9.45
	238.63	527	43.60*	5.853E+00	1.062E+00	1.062E+00	12.04
	300.09	32	3.30	4.976E+00	1.003E+00	1.003E+00	100.80
BI-214	609.32	713	45.49*	2.792E+00	2.886E+00	2.886E+00	8.55
	1120.29	150	14.92	1.599E+00	3.237E+00	3.237E+00	17.01
	1764.49	110	15.30	1.091E+00	3.395E+00	3.395E+00	21.21
PB-214	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
RN-222	609.32	713	45.49*	2.792E+00	2.886E+00	2.886E+00	8.55
	1120.29	150	14.92	1.599E+00	3.237E+00	3.237E+00	17.01
	1764.49	110	15.30	1.091E+00	3.395E+00	3.395E+00	21.21
RA-224	240.99	349	4.10*	5.798E+00	7.550E+00	7.550E+00	16.62
RA-226	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
AC-228	105.21	------	1.10	9.270E+00	------ Line Not Found		------
	338.32	107	11.27	4.540E+00	1.072E+00	1.072E+00	56.57
	835.71	------	1.61	2.096E+00	------ Line Not Found		------
	911.20	120	25.80*	1.935E+00	1.235E+00	1.235E+00	24.07
	968.97	68	15.80	1.827E+00	1.206E+00	1.206E+00	39.56
RA-228	105.21	------	1.10	9.270E+00	------ Line Not Found		------
	338.32	107	11.27	4.540E+00	1.072E+00	1.072E+00	56.57
	835.71	------	1.61	2.096E+00	------ Line Not Found		------
	911.20	120	25.80*	1.935E+00	1.235E+00	1.235E+00	24.07

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	68	15.80	1.827E+00	1.206E+00	1.206E+00	39.56
TH-228	74.82	681	10.28	1.018E+01	3.343E+00	3.343E+00	13.96
	77.11	1029	17.10	1.013E+01	3.051E+00	3.051E+00	9.45
	238.63	527	43.60*	5.853E+00	1.062E+00	1.062E+00	12.04
	300.09	32	3.30	4.976E+00	1.003E+00	1.003E+00	100.80
TH-229	85.43	177	14.70	9.956E+00	6.232E-01	6.232E-01	41.20
	88.47	424	24.00	9.864E+00	9.199E-01	9.199E-01	19.00
	193.51	------	4.41*	6.722E+00	------ Line Not Found		------
	210.85	82	2.80	6.379E+00	2.354E+00	2.354E+00	86.03
TH-230	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
PA-231	283.69	------	1.70	5.182E+00	------ Line Not Found		------
	301.36	32	5.35*	4.976E+00	6.188E-01	6.188E-01	100.80
TH-232	105.21	------	1.10	9.270E+00	------ Line Not Found		------
	338.32	107	11.27	4.540E+00	1.072E+00	1.072E+00	56.57
	835.71	------	1.61	2.096E+00	------ Line Not Found		------
	911.20	120	25.80*	1.935E+00	1.235E+00	1.235E+00	24.07
	968.97	68	15.80	1.827E+00	1.206E+00	1.206E+00	39.56
PA-234M	63.29	334	3.70*	1.026E+01	4.513E+00	4.513E+00	33.92
	92.59	405	4.23	9.691E+00	5.073E+00	5.073E+00	18.74
TH-234	63.29	334	3.70*	1.026E+01	4.513E+00	4.513E+00	33.92
	92.59	405	4.23	9.691E+00	5.073E+00	5.073E+00	18.74
U-234	74.82	681	5.80	1.018E+01	5.925E+00	5.925E+00	13.96
	77.11	1029	9.70	1.013E+01	5.379E+00	5.379E+00	9.45
	87.09	424	3.41	9.864E+00	6.474E+00	6.474E+00	19.00
	242.00	349	7.25	5.798E+00	4.270E+00	4.270E+00	16.62
	295.22	668	18.42	5.033E+00	3.701E+00	3.701E+00	10.87
	351.93	1092	35.60*	4.407E+00	3.578E+00	3.578E+00	7.82
U-235	89.96	238	3.47	9.784E+00	3.598E+00	3.598E+00	29.01
	93.35	405	5.60	9.691E+00	3.832E+00	3.832E+00	18.74
	143.76	------	10.96*	8.004E+00	------ Line Not Found		------
	163.33	------	5.08	7.451E+00	------ Line Not Found		------
	185.72	379	57.20	6.891E+00	4.939E-01	4.939E-01	23.70
	205.31	------	5.01	6.472E+00	------ Line Not Found		------
U-238	63.29	334	3.70*	1.026E+01	4.513E+00	4.513E+00	33.92
	92.59	405	4.23	9.691E+00	5.073E+00	5.073E+00	18.74
AM-243	43.53	------	5.90	9.107E+00	------ Line Not Found		------
	74.66	681	67.20*	1.018E+01	5.114E-01	5.114E-01	13.96
ANH-511	511.00	62	100.00*	3.252E+00	9.735E-02	9.735E-02	75.97

Flag: "*" = Keyline

Sample ID : G714507007 Acquisition date : 10-APR-2025 20:43:33

Total number of lines in spectrum 62
Number of unidentified lines 20
Number of lines tentatively identified by NID 42 67.74%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	4.132E+00	4.132E+00	0.872E+00	21.11	
AS-73	80.30D	1.36	2.622E-01	3.560E-01	4.788E-01	134.51	
CD-109	461.40D	1.05	5.967E+00	6.293E+00	1.196E+00	19.00	
SN-126	2.30E+05Y	1.00	5.967E-01	5.967E-01	1.134E-01	19.00	
TL-208	1.41E+10Y	1.00	3.233E-01	3.233E-01	0.922E-01	28.51	
BI-210	22.20Y	1.00	1.130E+00	1.134E+00	0.858E+00	75.67	
PB-210	22.20Y	1.00	1.130E+00	1.134E+00	0.858E+00	75.67	
BI-211	7.04E+08Y	1.00	9.858E+00	9.858E+00	0.771E+00	7.82	
BI-212	1.41E+10Y	1.00	1.221E+00	1.221E+00	0.778E+00	63.66	
PB-212	1.41E+10Y	1.00	1.062E+00	1.062E+00	0.128E+00	12.04	
BI-214	1600.00Y	1.00	2.886E+00	2.886E+00	0.247E+00	8.55	
PB-214	1600.00Y	1.00	3.578E+00	3.578E+00	0.280E+00	7.82	
RN-222	1600.00Y	1.00	2.886E+00	2.886E+00	0.247E+00	8.55	
RA-224	1.41E+10Y	1.00	7.550E+00	7.550E+00	1.255E+00	16.62	
RA-226	1600.00Y	1.00	3.578E+00	3.578E+00	0.280E+00	7.82	
AC-228	1.41E+10Y	1.00	1.235E+00	1.235E+00	0.297E+00	24.07	
RA-228	1.41E+10Y	1.00	1.235E+00	1.235E+00	0.297E+00	24.07	
TH-228	1.41E+10Y	1.00	1.062E+00	1.062E+00	0.128E+00	12.04	
TH-229	7340.00Y	1.00	9.199E-01	9.199E-01	1.748E-01	19.00	K
TH-230	7.54E+04Y	1.00	3.578E+00	3.578E+00	0.280E+00	7.82	
PA-231	7.04E+08Y	1.00	6.188E-01	6.188E-01	6.237E-01	100.80	
TH-232	1.41E+10Y	1.00	1.235E+00	1.235E+00	0.297E+00	24.07	
PA-234M	4.47E+09Y	1.00	4.513E+00	4.513E+00	1.531E+00	33.92	
TH-234	4.47E+09Y	1.00	4.513E+00	4.513E+00	1.531E+00	33.92	
U-234	2.45E+05Y	1.00	3.578E+00	3.578E+00	0.280E+00	7.82	
U-235	7.04E+08Y	1.00	4.939E-01	4.939E-01	1.170E-01	23.70	K
U-238	4.47E+09Y	1.00	4.513E+00	4.513E+00	1.531E+00	33.92	
AM-243	7370.00Y	1.00	5.114E-01	5.114E-01	0.714E-01	13.96	
ANH-511	1.00E+09Y	1.00	9.735E-02	9.735E-02	7.395E-02	75.97	
Total Activity :			7.426E+01	7.469E+01			

Grand Total Activity : 7.426E+01 7.469E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	68.20	80	478	0.57	137.11	134	9	1.76E-02	****	1.03E+01	T
0	128.54	44	240	1.03	257.71	255	8	1.03E-02	****	8.48E+00	T
0	258.85	32	94	1.13	518.16	515	7	7.95E-03	****	5.53E+00	
0	262.55	35	91	1.42	525.55	522	8	8.49E-03	****	5.48E+00	
0	270.13	127	142	1.93	540.70	535	12	3.12E-02	44.4	5.37E+00	T
0	377.16	22	45	0.68	754.65	752	7	5.51E-03	****	4.18E+00	T
0	432.54	40	76	4.02	865.35	859	14	1.03E-02	****	3.74E+00	T
0	462.87	52	47	1.18	925.98	921	11	1.33E-02	60.8	3.54E+00	T
0	526.26	27	32	2.34	1052.70	1044	14	7.19E-03	99.6	3.17E+00	
0	768.28	62	52	1.68	1536.59	1530	15	1.68E-02	56.8	2.26E+00	T
0	795.86	14	28	1.27	1591.74	1585	10	3.90E-03	****	2.19E+00	T
0	799.49	14	16	1.16	1599.00	1595	8	3.89E-03	****	2.18E+00	
0	840.06	17	34	0.69	1680.11	1676	10	4.67E-03	****	2.09E+00	
1	872.18	17	28	1.91	1744.35	1738	20	4.58E-03	****	2.01E+00	T
1	877.68	16	8	1.91	1755.35	1738	20	4.43E-03	67.6	2.00E+00	
0	899.61	15	24	0.88	1799.20	1792	12	4.17E-03	****	1.96E+00	T
0	905.82	21	20	0.86	1811.61	1804	14	5.80E-03	****	1.95E+00	
0	920.21	27	7	4.85	1840.39	1833	14	7.50E-03	56.7	1.92E+00	
0	934.30	49	15	1.48	1868.55	1864	9	1.36E-02	40.8	1.89E+00	T
0	964.52	22	33	3.44	1929.00	1922	13	6.13E-03	****	1.84E+00	T
0	1001.33	13	16	1.19	2002.60	1997	9	3.58E-03	****	1.77E+00	T
0	1052.59	11	17	3.20	2105.12	2100	11	3.08E-03	****	1.69E+00	
0	1136.86	6	19	3.22	2273.65	2264	13	1.71E-03	****	1.58E+00	
0	1150.68	13	2	1.09	2301.29	2298	8	3.79E-03	65.5	1.56E+00	
0	1155.67	23	12	1.14	2311.26	2305	12	6.39E-03	73.3	1.55E+00	
0	1232.72	4	13	0.69	2465.37	2461	8	1.06E-03	****	1.47E+00	
0	1238.20	54	28	1.95	2476.34	2470	14	1.53E-02	49.0	1.46E+00	T
0	1247.08	8	18	0.74	2494.10	2484	14	2.18E-03	****	1.45E+00	
0	1357.49	9	5	2.81	2714.94	2710	10	2.50E-03	****	1.35E+00	
0	1365.44	6	10	1.37	2730.83	2723	11	1.82E-03	****	1.34E+00	T
0	1377.74	48	9	0.80	2755.44	2749	13	1.37E-02	38.5	1.33E+00	
0	1383.15	5	5	1.46	2766.26	2761	7	1.44E-03	****	1.33E+00	T
0	1509.09	16	10	1.99	3018.19	3009	13	4.67E-03	91.2	1.23E+00	
0	1702.71	9	0	0.73	3405.56	3401	10	2.50E-03	66.7	1.12E+00	
0	1729.69	24	3	1.82	3459.53	3453	13	7.15E-03	48.9	1.11E+00	
0	1848.76	10	9	1.45	3697.77	3691	10	2.89E-03	****	1.06E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:44:20.01

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507007.CNF;1   *
* Acquisition date : 10-APR-2025 20:43:33 Sensitivity     : 3.000           *
* Detector ID      : GAM47                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.64     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 11:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507007           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.4608E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 15-NOV-2024 09:21:14 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM47_CAN.CNF;7             *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.542E-01
AS-73	1.953E-01
CD-109	4.245E-01
SN-126	4.018E-02
TL-208	2.085E-02
BI-210	3.475E-01
PB-210	3.475E-01
BI-211	1.696E-01
BI-212	3.864E-01
PB-212	4.550E-02
BI-214	5.222E-02
PB-214	6.169E-02
RN-222	5.222E-02
RA-224	4.875E-01
RA-226	6.169E-02
AC-228	9.128E-02
RA-228	9.128E-02
TH-228	4.550E-02
TH-229	3.909E-01
TH-230	6.169E-02
PA-231	3.529E-01
TH-232	9.128E-02
PA-234M	4.117E-01
TH-234	4.117E-01
U-234	6.169E-02
U-235	1.816E-01
U-238	4.117E-01
AM-243	2.516E-02
ANH-511	1.926E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.413E-01	NOT IDENT.
NA-22	2.607E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	1.726E-02	NOT IDENT.
SC-46	2.902E-02	FAIL ABUN
V-48	1.380E-01	NOT IDENT.
CR-51	4.579E-01	NOT IDENT.
MN-52	2.191E+00	FAIL ABUN
MN-54	2.689E-02	NOT IDENT.
CO-56	3.818E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.931E-02	NOT IDENT.
CO-58	3.152E-02	NOT IDENT.
FE-59	6.505E-02	NOT IDENT.
CO-60	2.994E-02	NOT IDENT.
ZN-65	5.382E-02	NOT IDENT.
GE-68	9.166E-01	NOT IDENT.
AS-74	1.715E-01	NOT IDENT.
SE-75	3.552E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	3.731E-01	NOT IDENT.
RB-83	4.543E-02	NOT IDENT.
RB-84	9.358E-02	NOT IDENT.
KR-85	5.412E+00	NOT IDENT.
SR-85	3.545E-02	NOT IDENT.
RB-86	1.066E+00	NOT IDENT.
Y-88	2.959E-02	NOT IDENT.
Y-91	1.771E+01	NOT IDENT.
NB-94	2.297E-02	FAIL ABUN
NB-95	4.809E-02	NOT IDENT.
NB-95M	1.159E-01	NOT IDENT.
ZR-95	6.307E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.180E-02	FAIL ABUN
RH-102	4.116E-02	FAIL ABUN
RU-103	4.294E-02	FAIL ABUN
RH-106	2.320E-01	NOT IDENT.
RU-106	2.320E-01	NOT IDENT.
AG-108M	2.501E-02	FAIL ABUN
AG-110	5.842E-01	NOT IDENT.
AG-110M	3.809E-02	FAIL ABUN
SN-113	4.199E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.305E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.663E-02	NOT IDENT.
SB-124	8.239E-02	NOT IDENT.
SB-125	7.089E-02	FAIL ABUN
TE-125M	9.060E+00	NOT IDENT.
I-126	5.504E-01	NOT IDENT.
SB-126	3.556E-01	NOT IDENT.
SB-127	2.986E+01	NOT IDENT.
I-131	4.886E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.520E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.884E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.333E-01	NOT IDENT.
BA-137M	2.617E-02	NOT IDENT.
CS-137	2.765E-02	NOT IDENT.
LA-138	4.938E-02	NOT IDENT.
CE-139	2.776E-02	NOT IDENT.
BA-140	6.038E-01	NOT IDENT.
LA-140	2.561E-01	NOT IDENT.
CE-141	8.133E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.628E-01	NOT IDENT.
PM-144	3.140E-02	NOT IDENT.
PR-144	2.365E+00	NOT IDENT.
PM-146	2.829E-02	NOT IDENT.
ND-147	1.562E+00	FAIL ABUN
PM-147	5.367E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.187E-02	FAIL ABUN
EU-152	7.280E-02	FAIL ABUN

GD-153	5.985E-02	FAIL ABUN
EU-154	7.230E-02	FAIL ABUN
EU-155	7.469E-02	FAIL ABUN
TB-160	1.390E-01	FAIL ABUN
HO-166M	4.263E-02	NOT IDENT.
TM-171	3.270E+00	FAIL ABUN
HF-172	1.228E-01	FAIL ABUN
LU-172	4.856E-02	FAIL ABUN
LU-176	1.987E-02	FAIL ABUN
HF-181	4.895E-02	NOT IDENT.
TA-182	1.386E-01	FAIL ABUN
RE-183	6.160E-02	FAIL ABUN
RE-184	1.445E-01	NOT IDENT.
W-188	6.135E+00	FAIL ABUN
IR-192	3.349E-02	FAIL ABUN
HG-203	4.317E-02	NOT IDENT.
TL-204	2.203E+00	FAIL ABUN
BI-207	2.632E-02	FAIL ABUN
PB-211	6.059E-01	NOT IDENT.
BI-213	7.585E-02	NOT IDENT.
RN-219	3.638E-01	FAIL ABUN
RA-223	4.480E-01	FAIL ABUN
AC-225	1.884E+00	NOT IDENT.
AC-227	2.215E-01	FAIL ABUN
TH-227	2.215E-01	FAIL ABUN
TH-231	4.480E-01	FAIL ABUN
PA-233	4.850E-02	FAIL ABUN
PA-234	2.440E-01	NOT IDENT.
NP-237	4.850E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.742E-01	NOT IDENT.
PU-239	2.923E+02	FAIL ABUN
AM-241	4.122E-02	NOT IDENT.
CM-243	6.026E-02	NOT IDENT.
BK-247	5.677E-02	FAIL ABUN
CM-247	3.393E-02	NOT IDENT.
CF-249	3.317E-02	NOT IDENT.
CF-251	9.620E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:44:23.98

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507007.CNF;1   *
* Acquisition date : 10-APR-2025 20:43:33 Sensitivity     : 3.000           *
* Detector ID      : GAM47                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.64     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 11:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507007           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.4608E+02 GRAM *
*                                         Quantity Err(%) : 1.3691E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 15-NOV-2024 09:21:14 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM47_CAN.CNF;7             *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	4.132E+00	9.509E-01	9.509E-01
AS-73	3.560E-01	4.750E-01	4.750E-01
CD-109	6.293E+00	1.338E+00	1.338E+00
SN-126	5.967E-01	1.229E-01	1.229E-01
TL-208	3.233E-01	9.514E-02	9.514E-02
BI-210	1.134E+00	8.472E-01	8.472E-01
PB-210	1.134E+00	8.472E-01	8.472E-01
BI-211	9.858E+00	1.228E+00	1.228E+00
BI-212	1.221E+00	7.730E-01	7.730E-01
PB-212	1.062E+00	1.986E-01	1.986E-01
BI-214	2.886E+00	3.608E-01	3.608E-01
PB-214	3.578E+00	4.420E-01	4.420E-01
RN-222	2.886E+00	3.608E-01	3.608E-01
RA-224	7.550E+00	1.638E+00	1.638E+00
RA-226	3.578E+00	4.420E-01	4.420E-01
AC-228	1.235E+00	3.340E-01	3.340E-01
RA-228	1.235E+00	3.340E-01	3.340E-01
TH-228	1.062E+00	1.986E-01	1.986E-01
TH-229	-3.904E-01	4.991E-01	4.991E-01
TH-230	3.578E+00	4.420E-01	4.420E-01
PA-231	6.188E-01	6.286E-01	6.286E-01
TH-232	1.235E+00	3.340E-01	3.340E-01
PA-234M	4.513E+00	1.815E+00	1.815E+00
TH-234	4.513E+00	1.815E+00	1.815E+00
U-234	3.578E+00	4.420E-01	4.420E-01
U-235	1.178E-01	2.026E-01	2.026E-01
U-238	4.513E+00	1.815E+00	1.815E+00
AM-243	5.114E-01	8.170E-02	8.170E-02
ANH-511	9.735E-02	7.299E-02	7.299E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.277E-01	4.055E-01	4.096E-01	NOT IDENT.

NA-22	-1.720E-02	3.430E-02	3.517E-02	NOT IDENT.
NA-24	-1.321E+14	3.926E+15	3.927E+15	SHORT HLIF
AL-26	-2.530E-02	3.092E-02	3.296E-02	NOT IDENT.
SC-46	-9.437E-03	3.736E-02	3.760E-02	FAIL ABUN
V-48	5.461E-02	1.498E-01	1.518E-01	NOT IDENT.
CR-51	-1.836E-01	5.250E-01	5.315E-01	NOT IDENT.
MN-52	-2.314E-01	2.657E+00	2.659E+00	FAIL ABUN
MN-54	-9.515E-03	3.611E-02	3.637E-02	NOT IDENT.
CO-56	-9.928E-03	4.785E-02	4.806E-02	FAIL ABUN
MN-56	-1.000E+41	4.687E+41	0.000E+00	SHORT HLIF
CO-57	-1.439E-02	2.317E-02	2.406E-02	NOT IDENT.
CO-58	-2.462E-02	4.261E-02	4.403E-02	NOT IDENT.
FE-59	-5.674E-02	8.755E-02	9.121E-02	NOT IDENT.
CO-60	-9.676E-03	3.721E-02	3.747E-02	NOT IDENT.
ZN-65	-6.115E-02	8.657E-02	9.086E-02	NOT IDENT.
GE-68	7.189E-02	1.044E+00	1.045E+00	NOT IDENT.
AS-74	3.164E-02	1.970E-01	1.975E-01	NOT IDENT.
SE-75	-1.778E-03	4.721E-02	4.722E-02	NOT IDENT.
BR-77	6.154E+04	6.395E+04	6.970E+04	SHORT HLIF
SR-82	-1.434E-01	4.749E-01	4.793E-01	NOT IDENT.
RB-83	-8.056E-02	7.623E-02	8.444E-02	NOT IDENT.
RB-84	4.387E-02	1.119E-01	1.136E-01	NOT IDENT.
KR-85	4.309E+00	5.758E+00	6.077E+00	NOT IDENT.
SR-85	2.799E-02	3.774E-02	3.979E-02	NOT IDENT.
RB-86	4.428E-02	1.221E+00	1.221E+00	NOT IDENT.
Y-88	-7.149E-04	3.635E-02	3.635E-02	NOT IDENT.
Y-91	-5.509E-01	2.075E+01	2.075E+01	NOT IDENT.
NB-94	-7.871E-03	2.855E-02	2.877E-02	FAIL ABUN
NB-95	6.217E-02	5.405E-02	6.089E-02	NOT IDENT.
NB-95M	3.331E-03	1.513E-01	1.513E-01	NOT IDENT.
ZR-95	-4.398E-02	8.282E-02	8.516E-02	NOT IDENT.
NB-97	1.000E+41	4.849E+41	0.000E+00	SHORT HLIF
ZR-97	-4.388E+13	7.270E+14	7.273E+14	SHORT HLIF
MO-99	-4.417E+02	1.950E+03	1.960E+03	SHORT HLIF
TC-99M	4.068E+40	7.825E+40	0.000E+00	SHORT HLIF
RH-101	4.039E-02	5.433E-02	5.730E-02	FAIL ABUN
RH-102	2.484E-03	4.808E-02	4.809E-02	FAIL ABUN
RU-103	-1.470E-02	5.123E-02	5.166E-02	FAIL ABUN
RH-106	-6.044E-02	2.816E-01	2.829E-01	NOT IDENT.
RU-106	-6.044E-02	2.816E-01	2.829E-01	NOT IDENT.
AG-108M	6.074E-02	6.058E-02	6.648E-02	FAIL ABUN
AG-110	2.659E-01	6.515E-01	6.625E-01	NOT IDENT.
AG-110M	-6.799E-03	4.762E-02	4.772E-02	FAIL ABUN
SN-113	8.503E-03	4.661E-02	4.677E-02	NOT IDENT.
CD-115	-2.697E+03	5.349E+03	5.485E+03	SHORT HLIF
SN-117M	4.006E-03	1.519E-01	1.519E-01	NOT IDENT.
SB-122	-1.207E+02	3.031E+02	3.079E+02	SHORT HLIF
TE-123M	1.770E-02	2.992E-02	3.097E-02	NOT IDENT.
SB-124	9.562E-03	9.672E-02	9.681E-02	NOT IDENT.
SB-125	4.497E-02	8.330E-02	8.573E-02	FAIL ABUN
TE-125M	6.359E+00	9.908E+00	1.031E+01	NOT IDENT.
I-126	1.055E-01	6.375E-01	6.393E-01	NOT IDENT.
SB-126	3.242E-01	3.768E-01	4.042E-01	NOT IDENT.
SB-127	-4.722E+01	4.443E+01	4.927E+01	NOT IDENT.
I-131	-2.365E-01	5.718E-01	5.817E-01	NOT IDENT.
I-132	-1.000E+41	2.812E+41	0.000E+00	SHORT HLIF
TE-132	1.438E+01	5.135E+01	5.176E+01	SHORT HLIF
BA-133	1.972E-03	4.364E-02	4.365E-02	NOT IDENT.
I-133	-7.725E+09	5.663E+10	5.673E+10	SHORT HLIF
CS-134	4.066E-02	5.961E-02	6.237E-02	FAIL ABUN
I-135	2.141E+37	1.050E+38	0.000E+00	SHORT HLIF
CS-136	4.303E-02	2.946E-01	2.952E-01	NOT IDENT.
BA-137M	-6.683E-03	3.191E-02	3.205E-02	NOT IDENT.
CS-137	-7.060E-03	3.371E-02	3.386E-02	NOT IDENT.
LA-138	2.344E-02	5.375E-02	5.478E-02	NOT IDENT.
CE-139	-1.120E-03	3.256E-02	3.256E-02	NOT IDENT.
BA-140	6.100E-02	6.924E-01	6.929E-01	NOT IDENT.
LA-140	5.458E-02	2.962E-01	2.973E-01	NOT IDENT.
CE-141	-1.584E-02	9.531E-02	9.558E-02	NOT IDENT.
CE-143	6.504E+06	3.307E+06	4.420E+06	SHORT HLIF
CE-144	-4.605E-02	1.907E-01	1.919E-01	NOT IDENT.
PM-144	3.443E-02	3.291E-02	3.639E-02	NOT IDENT.
PR-144	2.557E+00	2.483E+00	2.737E+00	NOT IDENT.
PM-146	-2.585E-02	3.558E-02	3.744E-02	NOT IDENT.
ND-147	-4.463E-02	2.032E+00	2.032E+00	FAIL ABUN
PM-147	-4.422E+00	6.146E+02	6.146E+02	NOT IDENT.
PM-149	-9.253E+03	4.514E+04	4.533E+04	SHORT HLIF
EU-150	1.339E-02	2.560E-02	2.630E-02	FAIL ABUN

EU-152	2.765E-02	8.698E-02	8.787E-02	FAIL ABUN
GD-153	1.904E-02	7.164E-02	7.215E-02	FAIL ABUN
EU-154	-5.032E-02	9.577E-02	9.842E-02	FAIL ABUN
EU-155	8.969E-02	7.932E-02	8.903E-02	FAIL ABUN
TB-160	1.673E-02	1.869E-01	1.870E-01	FAIL ABUN
HO-166M	-5.855E-02	5.976E-02	6.533E-02	NOT IDENT.
TM-171	5.950E+00	7.863E+00	8.308E+00	FAIL ABUN
HF-172	-2.121E-01	1.777E-01	2.018E-01	FAIL ABUN
LU-172	5.384E-03	5.521E-02	5.527E-02	FAIL ABUN
LU-176	-2.213E-03	2.219E-02	2.221E-02	FAIL ABUN
HF-181	-1.253E-02	5.761E-02	5.789E-02	NOT IDENT.
TA-182	1.911E-02	1.584E-01	1.586E-01	FAIL ABUN
RE-183	-1.403E-02	7.377E-02	7.404E-02	FAIL ABUN
RE-184	7.568E-02	2.248E-01	2.274E-01	NOT IDENT.
W-188	-5.322E+00	8.156E+00	8.501E+00	FAIL ABUN
IR-192	-2.036E-03	3.733E-02	3.734E-02	FAIL ABUN
HG-203	3.957E-02	4.480E-02	4.822E-02	NOT IDENT.
TL-204	-2.174E+00	3.167E+00	3.315E+00	FAIL ABUN
BI-207	-3.029E-02	3.702E-02	3.946E-02	FAIL ABUN
PB-211	-1.032E-01	6.950E-01	6.966E-01	NOT IDENT.
BI-213	-2.097E-02	8.883E-02	8.933E-02	NOT IDENT.
RN-219	2.347E-02	4.094E-01	4.095E-01	FAIL ABUN
RA-223	1.510E-01	4.839E-01	4.886E-01	FAIL ABUN
AC-225	3.357E-01	2.222E+00	2.227E+00	NOT IDENT.
AC-227	2.269E-01	2.509E-01	2.709E-01	FAIL ABUN
TH-227	2.269E-01	2.509E-01	2.709E-01	FAIL ABUN
TH-231	1.510E-01	4.839E-01	4.886E-01	FAIL ABUN
PA-233	-1.083E-02	5.470E-02	5.492E-02	FAIL ABUN
PA-234	2.412E-01	3.679E-01	3.837E-01	NOT IDENT.
NP-237	-1.083E-02	5.470E-02	5.492E-02	FAIL ABUN
NP-238	-4.096E+03	1.357E+04	1.369E+04	SHORT HLIF
NP-239	-2.548E-01	2.198E-01	2.480E-01	NOT IDENT.
PU-239	4.265E+02	5.690E+02	6.006E+02	FAIL ABUN
AM-241	7.581E-03	4.821E-02	4.833E-02	NOT IDENT.
CM-243	-1.021E-01	7.691E-02	8.963E-02	NOT IDENT.
BK-247	4.541E-03	8.527E-02	8.530E-02	FAIL ABUN
CM-247	8.997E-03	3.765E-02	3.786E-02	NOT IDENT.
CF-249	3.493E-03	3.709E-02	3.712E-02	NOT IDENT.
CF-251	-8.465E-02	1.211E-01	1.270E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	113.6607	85.43	130.2848	131.20	131.1642
45.60	113.0576	86.55	130.5496	133.02	116.7159
46.54	115.2350	86.79	130.6066	133.52	125.2956
49.72	0.0000	86.94	130.6424	136.00	121.2645
51.35	130.0815	87.09	130.6772	136.47	120.2278
51.87	120.0364	87.57	130.7903	140.51	0.0000
52.39	130.4224	88.03	130.8985	143.76	129.2487
52.97	130.6112	88.34	130.9710	144.24	129.3294
53.44	130.7632	88.47	131.0009	145.44	139.6646
54.07	130.9661	89.96	131.3479	152.43	113.6261
57.36	0.0000	1093.63	131.5054	153.25	121.7040
57.53	145.6541	91.11	131.6136	323.87	132.0966
57.98	143.8634	92.59	131.9528	156.02	133.5299
59.27	139.0963	93.35	132.1258	158.56	122.4942
59.32	139.1123	94.56	132.4003	159.00	100.7953
59.54	131.3784	94.65	132.4205	162.33	125.3460
60.96	146.1609	94.67	132.4254	162.66	106.9877
61.17	146.2304	94.87	132.4708	163.33	107.0729
62.93	146.8094	97.43	127.4430	165.86	118.9382
63.29	146.9268	98.43	106.6129	176.31	102.8376
63.58	147.0214	98.44	106.6152	176.60	102.8712
64.28	147.2484	99.53	134.9150	177.52	107.6567
66.73	150.6757	100.11	136.0990	181.07	0.0000
67.24	152.8251	102.03	97.3675	181.52	117.5369
125.81	182.7675	103.18	119.8151	184.41	110.8333
67.75	182.7941	103.37	123.0341	143.76	110.9896
68.89	183.2349	105.21	93.6115	193.51	107.1510
69.67	183.5353	105.31	93.6262	197.03	109.9337
70.82	215.9670	106.12	107.5953	198.01	99.2793
70.83	215.9720	106.47	118.3135	201.83	94.8661
72.81	178.6980	109.28	105.9881	203.43	129.9012
72.87	178.7198	111.00	142.7666	205.31	107.6523
74.66	179.3635	111.76	0.0000	210.85	78.7625
74.82	179.4205	114.06	100.2947	215.65	77.9160
74.97	179.4748	116.30	0.0000	218.12	79.3219
77.11	180.2326	116.74	127.7661	222.11	68.6003
78.74	180.8030	119.76	105.4958	227.09	73.8464
79.69	181.1330	121.12	104.6147	227.38	65.2488
80.03	181.2484	121.22	104.6294	228.16	0.0000
80.12	181.2810	121.78	114.5313	228.18	67.7614
80.19	181.3055	122.06	125.4891	116.74	67.7614
80.57	181.4358	122.92	89.5899	235.69	84.3598
81.00	181.5838	123.07	93.9805	235.96	77.7625
81.07	181.6083	265.00	88.5938	238.63	85.8289
81.75	114.4165	125.81	119.9454	238.98	0.0000
82.47	114.5720	127.23	77.6796	240.99	86.0110
83.79	129.8925	127.91	85.0896	242.00	86.0889
84.00	129.9427	129.30	108.0369	244.70	78.3754

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	62.9578	344.28	41.9041	563.25	27.5658
252.80	72.2161	345.93	53.0482	564.24	0.0000
254.15	0.0000	351.06	60.6588	569.33	29.6938
256.23	64.4290	351.93	60.6956	946.00	29.6962
260.90	0.0000	355.39	0.0000	569.70	29.6986
264.66	55.9843	356.01	57.2296	583.19	17.5202
264.80	53.4459	364.49	49.3330	584.27	17.5292
265.00	53.4549	366.42	0.0000	595.83	32.1353
269.46	68.9832	372.51	29.3893	427.87	34.2823
270.03	69.0161	375.05	37.2568	602.52	0.0000
271.23	69.0853	377.52	46.9918	604.72	29.6631
273.65	58.9670	356.01	50.8833	607.14	17.1922
276.40	77.9421	388.16	50.0955	609.32	29.2031
277.37	74.5745	388.63	60.3186	610.33	29.2168
277.60	74.5886	391.69	48.3480	614.28	28.2228
278.00	61.7490	264.66	43.9439	618.01	25.1289
279.20	56.6583	401.81	58.0089	620.36	27.2515
279.54	67.8360	402.40	56.1584	621.93	26.2217
279.70	67.8456	404.85	56.2439	630.19	0.0000
280.46	69.6061	410.95	45.1621	631.29	24.2232
283.69	56.0009	413.71	47.1232	633.25	28.4601
284.31	49.9948	414.70	44.3216	634.78	20.0406
285.41	56.0776	423.72	35.0804	635.95	26.3835
285.90	0.0000	427.09	32.7754	636.99	19.0042
287.50	58.7626	427.87	29.9388	657.50	20.2370
290.67	64.9734	433.94	34.3374	657.76	20.2393
293.27	0.0000	439.40	27.7486	657.90	0.0000
351.93	41.7305	440.45	38.2967	661.66	27.7414
295.96	41.7549	453.88	39.5553	664.57	0.0000
879.38	36.6090	463.37	29.0967	666.33	29.9346
299.98	57.5902	468.07	35.0068	666.50	29.9368
300.09	57.5956	473.00	39.0023	667.71	0.0000
300.13	57.5969	475.06	45.8784	677.62	25.7793
301.36	56.3410	476.78	35.1738	685.70	29.0984
302.85	56.4047	477.60	44.9640	692.65	0.0000
256.23	61.9918	482.18	41.1558	695.00	23.7993
304.85	59.9057	487.02	32.4206	696.49	19.4846
306.78	55.2570	492.35	0.0000	696.51	19.4846
308.46	53.5711	497.08	36.5446	697.00	21.6536
311.90	56.3503	505.52	29.7620	697.30	19.4905
316.51	59.1934	507.63	0.0000	697.49	23.8235
319.41	56.6628	511.00	25.8667	702.65	24.9588
320.08	57.5759	514.00	25.9069	706.68	20.6514
321.04	54.0712	514.00	25.9069	711.68	35.9393
323.87	39.9710	520.40	32.9893	720.70	15.3017
325.23	51.5677	520.69	0.0000	721.93	0.0000
328.76	45.4592	522.65	0.0000	722.78	29.5345
333.37	48.2926	527.90	0.0000	722.91	29.5356
333.97	48.3124	528.26	24.0869	723.31	31.1823
334.37	48.3267	529.59	28.6229	724.19	22.9841
338.28	52.9466	529.87	0.0000	727.33	25.2040
338.32	52.9478	531.02	31.6577	733.00	17.1330
311.90	53.0282	537.26	28.2279	735.93	19.7915
340.48	53.0282	546.56	0.0000	333.97	23.1038
340.55	53.0306	552.55	29.4555	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	27.5757	667.71	0.0000	1434.09	9.0994
747.24	28.7126	962.31	19.9849	1435.80	8.0913
748.06	19.8838	964.08	21.4241	1457.56	0.0000
752.31	33.1934	966.17	7.1460	1460.82	8.1367
753.82	19.9277	911.20	22.8875	1489.16	8.1880
756.73	26.5996	983.53	15.2677	1505.03	16.4336
756.80	26.6006	984.45	0.0000	1584.12	11.4901
884.68	28.3389	1274.44	10.0980	1596.21	10.4718
765.81	18.3503	1002.74	17.3449	1620.50	11.5767
766.84	26.7012	1004.73	15.9092	1621.92	7.3691
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	18.9818	1025.87	0.0000	1690.97	5.3372
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	15.6458	1037.84	13.6935	1764.49	5.4141
783.70	26.8691	1038.76	0.0000	1063.66	0.0000
788.74	30.2838	631.29	9.7630	1771.35	6.1956
792.07	25.2676	1048.07	14.6504	1791.20	0.0000
795.86	10.1210	1049.04	10.2580	1808.65	7.6430
810.06	19.2163	1050.41	17.5922	1810.72	0.0000
810.29	19.2177	1063.66	14.7168	1836.06	4.3896
344.28	18.0885	1077.00	11.0801		
810.76	22.6131	1077.34	12.9285		
815.77	16.9904	1085.87	13.8858		
1048.07	14.7393	1093.63	14.8438		
832.01	21.6456	1099.45	13.9389		
834.85	21.8953	1112.07	13.9883		
835.71	13.6885	1112.84	14.9238		
836.80	0.0000	1115.54	19.4162		
846.75	0.0000	1120.29	4.6735		
846.77	25.1922	1120.55	4.6738		
856.80	28.7272	1221.41	4.6747		
860.56	21.8613	1129.67	8.9965		
871.09	21.9394	1131.51	0.0000		
873.19	21.9556	1147.95	0.0000		
875.33	0.0000	1173.23	12.3271		
879.38	22.5802	1177.95	11.3936		
880.51	19.1137	1189.05	12.3795		
881.60	19.4681	1204.77	14.3427		
883.24	23.1893	1221.41	12.4843		
884.68	18.5605	1231.02	6.1613		
889.28	15.1037	1235.36	23.1313		
894.76	10.4755	1238.28	23.1489		
898.04	15.7302	1260.41	0.0000		
900.72	13.9946	1271.87	6.8090		
903.28	14.0068	1274.44	13.6274		
911.20	14.0430	1274.54	13.6274		
912.08	14.0474	1291.59	11.7305		
923.98	0.0000	1298.22	0.0000		
926.50	21.1699	1312.11	7.8594		
929.11	24.0125	1332.49	13.8223		
935.54	16.9852	1362.66	0.0000		
937.49	14.1631	1365.19	6.3684		
944.13	16.8546	1368.63	0.0000		
946.00	9.7636	1384.29	6.3969		
949.00	15.1038	1408.01	13.0651		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:29:44.97

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507008.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;901
                                     Background date  : 7-APR-2025 07:38:46.
Sample date      : 6-MAR-2025 11:30:00. Acquisition date : 10-APR-2025 22:29:17
Sample ID        : G714507008           Sample quantity  : 1.12610E+02 GRAM
Detector name    : GAM01                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.41  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	51.46	61	119	2.32	103.02	98	11	1.69E-02	36.9	
2	0	64.01*	30	238	1.18	128.13	121	11	8.44E-03	101.9	
3	3	74.71	112	223	1.41	149.52	144	17	3.12E-02	24.1	3.09E+00
4	3	77.26*	204	173	1.15	154.63	144	17	5.66E-02	13.0	
5	3	83.86*	35	129	1.60	167.81	165	27	9.76E-03	52.1	4.81E+00
6	3	87.21*	60	201	1.59	174.52	165	27	1.66E-02	46.6	
7	3	89.65	61	134	1.17	179.40	165	27	1.70E-02	34.4	
8	3	91.86*	41	181	1.65	183.82	165	27	1.13E-02	73.0	
9	0	153.45	21	142	3.27	306.98	302	9	5.85E-03	104.2	
10	0	185.93*	120	142	1.12	371.92	366	11	3.33E-02	22.2	
11	0	209.03	21	107	1.34	418.13	415	9	5.95E-03	89.4	
12	1	238.52*	277	85	1.37	477.11	469	22	7.71E-02	8.6	6.68E-01
13	1	241.83	164	92	1.54	483.72	469	22	4.56E-02	13.5	
14	0	248.33	23	48	1.70	496.71	494	7	6.28E-03	54.3	
15	0	277.94	19	68	0.92	555.93	550	8	5.35E-03	78.2	
16	0	295.05*	327	52	1.23	590.15	584	11	9.08E-02	7.0	
17	0	338.68	47	82	1.44	677.41	671	11	1.30E-02	40.3	
18	0	351.87*	500	84	1.42	703.77	697	14	1.39E-01	6.0	
19	0	442.00*	14	42	0.62	884.04	877	13	3.89E-03	100.7	
20	3	460.99	21	21	2.08	922.01	919	42	5.76E-03	39.4	1.46E+00
21	3	463.21	17	43	2.08	926.45	919	42	4.80E-03	84.2	
22	3	477.98	30	35	1.57	956.00	919	42	8.37E-03	39.1	
23	0	493.23	23	40	4.41	986.50	974	16	6.29E-03	68.3	
24	0	511.05*	2	68	1.15	1022.14	1017	12	4.42E-04	*****	
25	0	519.56	13	11	1.42	1039.15	1034	8	3.72E-03	51.8	
26	0	532.54	19	28	1.35	1065.10	1057	14	5.40E-03	61.9	
27	0	583.71*	86	48	2.03	1167.46	1162	17	2.38E-02	22.6	
28	0	609.33*	292	60	1.53	1218.70	1210	17	8.11E-02	8.5	
29	0	640.39	5	13	1.70	1280.82	1276	8	1.45E-03	124.1	
30	0	649.03	9	4	0.67	1298.11	1295	6	2.37E-03	54.9	
31	0	666.45	21	23	1.94	1332.95	1326	15	5.69E-03	55.1	
32	0	729.71	55	20	5.74	1459.47	1451	20	1.53E-02	24.1	
33	0	743.15	11	9	0.96	1486.35	1482	7	2.93E-03	61.0	
34	0	768.17	36	22	1.55	1536.40	1528	15	1.00E-02	33.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	786.02	18	27	2.50	1572.09	1564	16	4.88E-03	71.4	
36	0	808.33	11	22	0.94	1616.73	1609	11	3.06E-03	87.9	
37	0	884.30	6	7	0.59	1768.69	1764	6	1.62E-03	84.2	
38	0	893.12	9	12	0.66	1786.33	1777	12	2.50E-03	83.9	
39	0	911.33*	61	12	1.39	1822.75	1817	12	1.68E-02	17.6	
40	0	964.59	19	11	2.23	1929.28	1923	11	5.36E-03	40.2	
41	0	968.91	29	5	0.93	1937.93	1934	9	7.92E-03	23.0	
42	0	1000.68*	9	7	3.38	2001.49	1996	10	2.47E-03	71.2	
43	0	1120.54	65	32	2.04	2241.25	2234	16	1.81E-02	23.1	
44	0	1154.71	20	9	1.92	2309.61	2305	12	5.44E-03	38.2	
45	0	1238.37	35	7	1.29	2476.97	2471	13	9.58E-03	22.8	
46	0	1377.51	29	2	2.30	2755.33	2750	10	7.96E-03	21.3	
47	0	1401.55	12	2	1.95	2803.43	2798	10	3.24E-03	38.5	
48	0	1407.67	11	2	1.36	2815.67	2810	9	2.93E-03	40.3	
49	0	1460.88*	40	17	1.91	2922.12	2916	12	1.10E-02	27.6	
50	0	1661.26	7	2	1.13	3323.05	3318	9	1.91E-03	54.4	
51	0	1764.45	62	6	2.06	3529.52	3523	12	1.72E-02	15.0	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:29:46

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507008.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 11:30:00	Acquisition date	: 10-APR-2025 22:29:17
Sample ID	: G714507008	Sample quantity	: 112.61 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA1	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.41 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
TL-208	277.37	HG-203	279.20

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	2.612E+00	7.247E-01	1.150E+00	78.26	OK
K-40	1460.82	10.66*	9.678E-01	2.406E+00	2.406E+00	55.29	OK
CD-109	88.03	3.70*	4.799E+00	2.352E+00	2.481E+00	93.21	OK
SN-126	64.28	9.60	2.495E+00	8.972E-01	8.972E-01	203.90	OK
	86.94	8.90	4.799E+00	9.777E-01	9.777E-01	93.21	OK
	87.57	37.00*	4.799E+00	2.352E-01	2.352E-01	93.21	OK
TM-171	51.35	0.27	1.051E+00	1.529E+02	1.584E+02	73.81	OK
	52.39	0.47*	1.051E+00	8.784E+01	9.097E+01	73.81	OK
	66.73	0.14	2.820E+00	----- Line Not Found		-----	Absent
HG-203	70.83	3.69	3.291E+00	----- Line Not Found		-----	Absent
	72.87	6.19	3.515E+00	----- Line Not Found		-----	Absent
	279.20	81.56*	4.063E+00	1.479E-02	2.508E-02	418.26	OK
TL-208	277.37	6.60	4.070E+00	----- Line Not Found		-----	<<INT Reject
	583.19	85.00*	2.202E+00	2.987E-01	2.987E-01	45.19	OK
	860.56	12.50	1.559E+00	----- Line Not Found		-----	Absent
BI-211	72.87	1.23	3.515E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.369E+00	7.623E+00	7.623E+00	11.95	OK
PB-212	74.82	10.28	3.709E+00	2.072E+00	2.072E+00	48.13	OK
	77.11	17.10	3.965E+00	2.111E+00	2.111E+00	26.06	OK
	238.63	43.60*	4.554E+00	9.413E-01	9.413E-01	17.16	OK
	300.09	3.30	3.827E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	2.121E+00	1.966E+00	1.967E+00	16.93	OK
	1120.29	14.92	1.224E+00	2.258E+00	2.258E+00	46.15	OK
	1764.49	15.30	8.350E-01	3.024E+00	3.024E+00	29.91	OK
PB-214	74.82	5.80	3.709E+00	3.672E+00	3.672E+00	48.13	OK
	77.11	9.70	3.965E+00	3.722E+00	3.722E+00	26.06	OK
	87.09	3.41	4.799E+00	2.552E+00	2.552E+00	93.21	OK
	242.00	7.25	4.509E+00	3.378E+00	3.378E+00	27.07	OK
	295.22	18.42	3.879E+00	3.059E+00	3.059E+00	14.07	OK
	351.93	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95	OK
RN-222	609.32	45.49*	2.121E+00	1.966E+00	1.967E+00	16.93	OK
	1120.29	14.92	1.224E+00	2.258E+00	2.258E+00	46.15	OK
	1764.49	15.30	8.350E-01	3.024E+00	3.024E+00	29.91	OK
RA-224	240.99	4.10*	4.509E+00	5.973E+00	5.973E+00	27.07	OK
RA-226	74.82	5.80	3.709E+00	3.672E+00	3.672E+00	48.13	OK
	77.11	9.70	3.965E+00	3.722E+00	3.722E+00	26.06	OK
	87.09	3.41	4.799E+00	2.552E+00	2.552E+00	93.21	OK
	242.00	7.25	4.509E+00	3.378E+00	3.378E+00	27.07	OK
	295.22	18.42	3.879E+00	3.059E+00	3.059E+00	14.07	OK
	351.93	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95	OK
AC-228	105.21	1.10	5.682E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.475E+00	7.940E-01	7.940E-01	80.67	OK
	835.71	1.61	1.601E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.480E+00	1.014E+00	1.014E+00	35.22	OK
	968.97	15.80	1.399E+00	8.229E-01	8.229E-01	46.08	OK
RA-228	105.21	1.10	5.682E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.475E+00	7.940E-01	7.940E-01	80.67	OK
	835.71	1.61	1.601E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.480E+00	1.014E+00	1.014E+00	35.22	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	968.97	15.80	1.399E+00	8.229E-01	8.229E-01	46.08	OK
TH-228	74.82	10.28	3.709E+00	2.072E+00	2.072E+00	48.13	OK
	77.11	17.10	3.965E+00	2.111E+00	2.111E+00	26.06	OK
	238.63	43.60*	4.554E+00	9.413E-01	9.413E-01	17.16	OK
	300.09	3.30	3.827E+00	----- Line Not Found		-----	Absent
TH-230	74.82	5.80	3.709E+00	3.672E+00	3.672E+00	48.13	OK
	77.11	9.70	3.965E+00	3.722E+00	3.722E+00	26.06	OK
	87.09	3.41	4.799E+00	2.552E+00	2.552E+00	93.21	OK
	242.00	7.25	4.509E+00	3.378E+00	3.378E+00	27.07	OK
	295.22	18.42	3.879E+00	3.059E+00	3.059E+00	14.07	OK
	351.93	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95	OK
TH-232	105.21	1.10	5.682E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.475E+00	7.940E-01	7.940E-01	80.67	OK
	835.71	1.61	1.601E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.480E+00	1.014E+00	1.014E+00	35.22	OK
	968.97	15.80	1.399E+00	8.229E-01	8.229E-01	46.08	OK
PA-234M	63.29	3.70*	2.495E+00	2.328E+00	2.328E+00	203.90	OK
	92.59	4.23	5.100E+00	1.311E+00	1.311E+00	146.01	OK
TH-234	63.29	3.70*	2.495E+00	2.328E+00	2.328E+00	203.90	OK
	92.59	4.23	5.100E+00	1.311E+00	1.311E+00	146.01	OK
U-234	74.82	5.80	3.709E+00	3.672E+00	3.672E+00	48.13	OK
	77.11	9.70	3.965E+00	3.722E+00	3.722E+00	26.06	OK
	87.09	3.41	4.799E+00	2.552E+00	2.552E+00	93.21	OK
	242.00	7.25	4.509E+00	3.378E+00	3.378E+00	27.07	OK
	295.22	18.42	3.879E+00	3.059E+00	3.059E+00	14.07	OK
	351.93	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95	OK
U-235	89.96	3.47	4.964E+00	2.476E+00	2.476E+00	68.78	OK
	93.35	5.60	5.100E+00	9.901E-01	9.901E-01	146.01	OK
	143.76	10.96*	5.921E+00	----- Line Not Found		-----	Absent
	163.33	5.08	5.689E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.345E+00	2.667E-01	2.667E-01	44.35	OK
	205.31	5.01	5.040E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	2.495E+00	2.328E+00	2.328E+00	203.90	OK
	92.59	4.23	5.100E+00	1.311E+00	1.311E+00	146.01	OK
AM-243	43.53	5.90	3.984E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	3.709E+00	3.169E-01	3.169E-01	48.13	OK
ANH-511	511.00	100.00*	2.468E+00	4.215E-03	4.215E-032	334.98	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:29:47.35

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507008.CNF;1		
Acquisition date	: 10-APR-2025 22:29:17	Sensitivity	: 3.000
Detector ID	: GAM01	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.41	Half life ratio	: *****
Sample date	: 6-MAR-2025 11:30:00	Analyst initials	: MXR1
Sample ID	: G714507008	Sample Quantity	: 1.1261E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 5-JUN-2024 05:42:50	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.150E+00	8.823E-01	1.104E+00
K-40	2.406E+00	1.304E+00	1.121E+00
CD-109	2.481E+00	2.266E+00	2.021E+00
SN-126	2.352E-01	2.148E-01	1.928E-01
TM-171	9.097E+01	6.580E+01	5.039E+01
HG-203	2.508E-02	1.028E-01	1.369E-01
TL-208	2.987E-01	1.323E-01	9.449E-02
BI-211	7.623E+00	8.926E-01	5.038E-01
PB-212	9.413E-01	1.583E-01	1.263E-01
BI-214	1.967E+00	3.262E-01	1.579E-01
PB-214	2.767E+00	3.240E-01	1.833E-01
RN-222	1.967E+00	3.262E-01	1.579E-01
RA-224	5.973E+00	1.585E+00	1.353E+00
RA-226	2.767E+00	3.240E-01	1.833E-01
AC-228	1.014E+00	3.501E-01	3.731E-01
RA-228	1.014E+00	3.501E-01	3.731E-01
TH-228	9.413E-01	1.583E-01	1.263E-01
TH-230	2.767E+00	3.240E-01	1.833E-01
TH-232	1.014E+00	3.501E-01	3.731E-01
PA-234M	2.328E+00	4.651E+00	3.753E+00
TH-234	2.328E+00	4.651E+00	3.753E+00
U-234	2.767E+00	3.240E-01	1.833E-01
U-235	1.036E-01	2.812E-01	5.376E-01
U-238	2.328E+00	4.651E+00	3.753E+00
AM-243	3.169E-01	1.495E-01	1.538E-01
ANH-511	4.215E-03	9.646E-02	8.194E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	-2.048E-02	4.594E-02	8.501E-02	NOT IDENT.
NA-24	0.000E+00	5.141E+15	0.000E+00	SHORT HLIF
AL-26	-1.288E-02	5.418E-02	1.042E-01	NOT IDENT.
SC-46	1.690E-03	5.312E-02	9.766E-02	FAIL ABUN

V-48	-1.986E-02	2.061E-01	4.076E-01	NOT IDENT.
CR-51	7.440E-01	7.600E-01	1.550E+00	NOT IDENT.
MN-52	-2.202E+00	3.056E+00	5.102E+00	FAIL ABUN
MN-54	-1.023E-02	5.148E-02	9.865E-02	NOT IDENT.
CO-56	-9.155E-03	6.870E-02	1.322E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-7.269E-03	3.430E-02	6.379E-02	NOT IDENT.
CO-58	2.008E-02	7.713E-02	1.331E-01	NOT IDENT.
FE-59	5.975E-02	1.303E-01	2.881E-01	NOT IDENT.
CO-60	5.209E-02	5.029E-02	1.208E-01	NOT IDENT.
ZN-65	6.513E-02	1.385E-01	2.621E-01	NOT IDENT.
GE-68	-4.416E-01	1.379E+00	2.650E+00	NOT IDENT.
AS-73	-2.988E-01	1.872E+00	2.973E+00	NOT IDENT.
AS-74	-1.533E-01	2.604E-01	4.403E-01	NOT IDENT.
SE-75	2.705E-03	6.472E-02	1.206E-01	NOT IDENT.
BR-77	0.000E+00	9.313E+03	0.000E+00	SHORT HLIF
SR-82	3.994E-01	7.977E-01	1.592E+00	NOT IDENT.
RB-83	1.062E-01	1.079E-01	1.762E-01	FAIL ABUN
RB-84	-7.614E-03	1.367E-01	2.415E-01	NOT IDENT.
KR-85	-4.242E+00	1.270E+01	1.763E+01	NOT IDENT.
SR-85	-2.792E-02	8.332E-02	1.157E-01	NOT IDENT.
RB-86	5.648E-01	1.623E+00	3.612E+00	NOT IDENT.
Y-88	-3.580E-02	6.376E-02	1.107E-01	NOT IDENT.
Y-91	0.000E+00	2.582E+01	5.286E+01	NOT IDENT.
NB-94	-5.329E-03	4.775E-02	8.602E-02	NOT IDENT.
NB-95	1.569E-02	7.003E-02	1.332E-01	NOT IDENT.
NB-95M	1.636E-01	1.884E-01	3.709E-01	NOT IDENT.
ZR-95	-4.768E-02	1.005E-01	1.723E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.299E+15	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.675E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.177E+41	0.000E+00	SHORT HLIF
RH-101	-2.745E-02	4.025E-02	7.235E-02	NOT IDENT.
RH-102	7.999E-03	6.248E-02	1.210E-01	FAIL ABUN
RU-103	-3.413E-02	8.446E-02	1.297E-01	FAIL ABUN
RH-106	-1.234E-01	4.527E-01	8.029E-01	NOT IDENT.
RU-106	-1.234E-01	4.527E-01	8.029E-01	NOT IDENT.
AG-108M	-3.902E-03	3.983E-02	7.296E-02	NOT IDENT.
AG-110	-3.508E-01	1.085E+00	1.903E+00	NOT IDENT.
AG-110M	3.737E-02	6.169E-02	1.363E-01	FAIL ABUN
SN-113	-3.361E-02	6.902E-02	1.207E-01	NOT IDENT.
CD-115	0.000E+00	8.723E+03	0.000E+00	SHORT HLIF
SN-117M	1.649E-01	2.087E-01	4.073E-01	NOT IDENT.
SB-122	0.000E+00	6.162E+02	0.000E+00	SHORT HLIF
TE-123M	4.370E-03	4.298E-02	8.055E-02	NOT IDENT.
SB-124	2.927E-02	1.688E-01	3.688E-01	NOT IDENT.
SB-125	7.015E-02	1.302E-01	2.539E-01	FAIL ABUN
TE-125M	1.064E+01	1.604E+01	3.154E+01	NOT IDENT.
I-126	1.379E+00	1.488E+00	1.902E+00	FAIL ABUN
SB-126	1.655E-01	6.489E-01	1.234E+00	FAIL ABUN
SB-127	-2.410E-01	7.025E+01	1.298E+02	NOT IDENT.
I-131	2.935E-01	8.199E-01	1.592E+00	NOT IDENT.
I-132	0.000E+00	1.079E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.937E+01	0.000E+00	SHORT HLIF
BA-133	1.397E-02	6.259E-02	1.067E-01	NOT IDENT.
I-133	0.000E+00	8.264E+10	0.000E+00	SHORT HLIF
CS-134	1.538E-02	5.441E-02	1.057E-01	NOT IDENT.
I-135	0.000E+00	1.670E+38	0.000E+00	SHORT HLIF
CS-136	-1.563E-01	3.047E-01	5.630E-01	FAIL ABUN
BA-137M	-8.244E-03	5.523E-02	9.318E-02	NOT IDENT.
CS-137	-8.709E-03	5.835E-02	9.844E-02	NOT IDENT.
LA-138	7.255E-02	5.375E-02	1.549E-01	NOT IDENT.
CE-139	-1.196E-02	4.513E-02	8.245E-02	NOT IDENT.
BA-140	4.982E-01	1.081E+00	1.970E+00	NOT IDENT.
LA-140	2.409E-02	4.825E-01	9.525E-01	NOT IDENT.
CE-141	6.339E-02	1.313E-01	2.518E-01	NOT IDENT.
CE-143	0.000E+00	5.406E+06	0.000E+00	SHORT HLIF
CE-144	-1.352E-01	2.754E-01	5.002E-01	NOT IDENT.
PM-144	-3.925E-02	4.853E-02	7.768E-02	FAIL ABUN
PR-144	-2.992E+00	3.668E+00	5.862E+00	NOT IDENT.
PM-146	-1.630E-02	5.306E-02	9.505E-02	NOT IDENT.
ND-147	1.562E+00	2.640E+00	5.303E+00	FAIL ABUN
PM-147	4.168E+02	9.800E+02	1.895E+03	NOT IDENT.
PM-149	0.000E+00	7.001E+04	0.000E+00	SHORT HLIF
EU-150	3.828E-03	3.959E-02	6.640E-02	FAIL ABUN
EU-152	4.521E-02	1.213E-01	2.343E-01	FAIL ABUN
GD-153	-1.373E-03	1.289E-01	2.205E-01	NOT IDENT.
EU-154	-6.096E-02	1.279E-01	2.348E-01	NOT IDENT.

EU-155	8.098E-02	1.390E-01	2.721E-01	FAIL ABUN
TB-160	-9.976E-02	2.292E-01	3.653E-01	FAIL ABUN
HO-166M	-3.029E-03	8.065E-02	1.484E-01	NOT IDENT.
HF-172	-3.132E-02	2.358E-01	4.412E-01	FAIL ABUN
LU-172	4.497E-02	8.274E-02	1.784E-01	FAIL ABUN
LU-176	1.419E-02	3.281E-02	6.366E-02	FAIL ABUN
HF-181	-5.461E-02	9.709E-02	1.446E-01	NOT IDENT.
TA-182	-1.346E-02	2.381E-01	4.705E-01	FAIL ABUN
RE-183	-2.063E-01	4.183E-01	6.995E-01	NOT IDENT.
RE-184	1.634E-02	2.111E-01	4.327E-01	NOT IDENT.
W-188	-2.555E+00	1.246E+01	2.021E+01	FAIL ABUN
IR-192	-2.970E-02	5.134E-02	8.994E-02	FAIL ABUN
TL-204	7.880E+00	8.946E+00	1.515E+01	FAIL ABUN
BI-207	-7.035E-03	4.639E-02	9.468E-02	FAIL ABUN
BI-210	-1.528E+00	6.654E+00	1.068E+01	NOT IDENT.
PB-210	-1.528E+00	6.654E+00	1.068E+01	NOT IDENT.
PB-211	-1.008E+00	1.011E+00	1.655E+00	NOT IDENT.
BI-212	6.615E-01	8.573E-01	1.686E+00	NOT IDENT.
BI-213	7.311E-02	1.357E-01	2.685E-01	NOT IDENT.
RN-219	3.499E-01	6.008E-01	1.164E+00	NOT IDENT.
RA-223	3.190E-01	7.749E-01	1.504E+00	FAIL ABUN
AC-225	1.055E+00	3.105E+00	5.908E+00	NOT IDENT.
AC-227	3.055E-02	3.337E-01	6.228E-01	NOT IDENT.
TH-227	3.055E-02	3.337E-01	6.228E-01	NOT IDENT.
TH-229	5.805E-01	7.130E-01	1.389E+00	FAIL ABUN
PA-231	4.211E-01	6.652E-01	1.288E+00	NOT IDENT.
TH-231	3.190E-01	7.749E-01	1.504E+00	FAIL ABUN
PA-233	1.429E-02	8.066E-02	1.528E-01	NOT IDENT.
PA-234	-1.599E-02	3.704E-01	7.365E-01	FAIL ABUN
NP-237	1.429E-02	8.066E-02	1.528E-01	NOT IDENT.
NP-238	0.000E+00	1.915E+04	0.000E+00	SHORT HLIF
NP-239	2.624E-01	3.686E-01	7.212E-01	FAIL ABUN
PU-239	4.732E+02	4.496E+02	8.955E+02	NOT IDENT.
AM-241	-6.531E-02	2.859E-01	4.470E-01	NOT IDENT.
CM-243	-3.875E-02	1.442E-01	2.680E-01	FAIL ABUN
BK-247	-4.418E-02	1.046E-01	1.868E-01	FAIL ABUN
CM-247	1.918E-02	5.164E-02	9.889E-02	FAIL ABUN
CF-249	1.470E-02	5.226E-02	9.987E-02	NOT IDENT.
CF-251	1.494E-01	1.699E-01	3.341E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:29:45.80

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	30	10.44*	2.612E+00	7.247E-01	1.150E+00	78.26
K-40	1460.82	37	10.66*	9.678E-01	2.406E+00	2.406E+00	55.29
CD-109	88.03	63	3.70*	4.799E+00	2.352E+00	2.481E+00	93.21
SN-126	64.28	32	9.60	2.495E+00	8.972E-01	8.972E-01	203.90
	86.94	63	8.90	4.799E+00	9.777E-01	9.777E-01	93.21
	87.57	63	37.00*	4.799E+00	2.352E-01	2.352E-01	93.21
TM-171	51.35	65	0.27	1.051E+00	1.529E+02	1.584E+02	73.81
	52.39	65	0.47*	1.051E+00	8.784E+01	9.097E+01	73.81
	66.73	------	0.14	2.820E+00	------ Line Not Found		------
HG-203	70.83	------	3.69	3.291E+00	------ Line Not Found		------
	72.87	------	6.19	3.515E+00	------ Line Not Found		------
	279.20	19	81.56*	4.063E+00	3.896E-02	6.605E-02	156.33
TL-208	277.37	19	6.60	4.063E+00	4.815E-01	4.815E-01	156.33
	583.19	84	85.00*	2.202E+00	2.987E-01	2.987E-01	45.19
	860.56	------	12.50	1.559E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.515E+00	------ Line Not Found		------
	351.06	498	12.92*	3.369E+00	7.623E+00	7.623E+00	11.95
PB-212	74.82	118	10.28	3.709E+00	2.072E+00	2.072E+00	48.13
	77.11	215	17.10	3.965E+00	2.111E+00	2.111E+00	26.06
	238.63	280	43.60*	4.554E+00	9.413E-01	9.413E-01	17.16
	300.09	------	3.30	3.827E+00	------ Line Not Found		------
BI-214	609.32	285	45.49*	2.121E+00	1.966E+00	1.967E+00	16.93
	1120.29	62	14.92	1.224E+00	2.258E+00	2.258E+00	46.15
	1764.49	58	15.30	8.350E-01	3.024E+00	3.024E+00	29.91
PB-214	74.82	118	5.80	3.709E+00	3.672E+00	3.672E+00	48.13
	77.11	215	9.70	3.965E+00	3.722E+00	3.722E+00	26.06
	87.09	63	3.41	4.799E+00	2.552E+00	2.552E+00	93.21
	242.00	166	7.25	4.509E+00	3.378E+00	3.378E+00	27.07
	295.22	328	18.42	3.879E+00	3.059E+00	3.059E+00	14.07
	351.93	498	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95
RN-222	609.32	285	45.49*	2.121E+00	1.966E+00	1.967E+00	16.93
	1120.29	62	14.92	1.224E+00	2.258E+00	2.258E+00	46.15
	1764.49	58	15.30	8.350E-01	3.024E+00	3.024E+00	29.91
RA-224	240.99	166	4.10*	4.509E+00	5.973E+00	5.973E+00	27.07
RA-226	74.82	118	5.80	3.709E+00	3.672E+00	3.672E+00	48.13
	77.11	215	9.70	3.965E+00	3.722E+00	3.722E+00	26.06
	87.09	63	3.41	4.799E+00	2.552E+00	2.552E+00	93.21
	242.00	166	7.25	4.509E+00	3.378E+00	3.378E+00	27.07
	295.22	328	18.42	3.879E+00	3.059E+00	3.059E+00	14.07
	351.93	498	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95
AC-228	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	47	11.27	3.475E+00	7.940E-01	7.940E-01	80.67
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	58	25.80*	1.480E+00	1.014E+00	1.014E+00	35.22
	968.97	27	15.80	1.399E+00	8.229E-01	8.229E-01	46.08
RA-228	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	47	11.27	3.475E+00	7.940E-01	7.940E-01	80.67

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	58	25.80*	1.480E+00	1.014E+00	1.014E+00	35.22
	968.97	27	15.80	1.399E+00	8.229E-01	8.229E-01	46.08
TH-228	74.82	118	10.28	3.709E+00	2.072E+00	2.072E+00	48.13
	77.11	215	17.10	3.965E+00	2.111E+00	2.111E+00	26.06
	238.63	280	43.60*	4.554E+00	9.413E-01	9.413E-01	17.16
	300.09	------	3.30	3.827E+00	------ Line Not Found		------
TH-230	74.82	118	5.80	3.709E+00	3.672E+00	3.672E+00	48.13
	77.11	215	9.70	3.965E+00	3.722E+00	3.722E+00	26.06
	87.09	63	3.41	4.799E+00	2.552E+00	2.552E+00	93.21
	242.00	166	7.25	4.509E+00	3.378E+00	3.378E+00	27.07
	295.22	328	18.42	3.879E+00	3.059E+00	3.059E+00	14.07
	351.93	498	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95
TH-232	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	47	11.27	3.475E+00	7.940E-01	7.940E-01	80.67
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	58	25.80*	1.480E+00	1.014E+00	1.014E+00	35.22
	968.97	27	15.80	1.399E+00	8.229E-01	8.229E-01	46.08
PA-234M	63.29	32	3.70*	2.495E+00	2.328E+00	2.328E+00	203.90
	92.59	42	4.23	5.100E+00	1.311E+00	1.311E+00	146.01
TH-234	63.29	32	3.70*	2.495E+00	2.328E+00	2.328E+00	203.90
	92.59	42	4.23	5.100E+00	1.311E+00	1.311E+00	146.01
U-234	74.82	118	5.80	3.709E+00	3.672E+00	3.672E+00	48.13
	77.11	215	9.70	3.965E+00	3.722E+00	3.722E+00	26.06
	87.09	63	3.41	4.799E+00	2.552E+00	2.552E+00	93.21
	242.00	166	7.25	4.509E+00	3.378E+00	3.378E+00	27.07
	295.22	328	18.42	3.879E+00	3.059E+00	3.059E+00	14.07
	351.93	498	35.60*	3.369E+00	2.767E+00	2.767E+00	11.95
U-235	89.96	64	3.47	4.964E+00	2.476E+00	2.476E+00	68.78
	93.35	42	5.60	5.100E+00	9.901E-01	9.901E-01	146.01
	143.76	------	10.96*	5.921E+00	------ Line Not Found		------
	163.33	------	5.08	5.689E+00	------ Line Not Found		------
	185.72	122	57.20	5.345E+00	2.667E-01	2.667E-01	44.35
	205.31	------	5.01	5.040E+00	------ Line Not Found		------
U-238	63.29	32	3.70*	2.495E+00	2.328E+00	2.328E+00	203.90
	92.59	42	4.23	5.100E+00	1.311E+00	1.311E+00	146.01
AM-243	43.53	------	5.90	3.984E-01	------ Line Not Found		------
	74.66	118	67.20*	3.709E+00	3.169E-01	3.169E-01	48.13
ANH-511	511.00	2	100.00*	2.468E+00	4.215E-03	4.215E-03	2334.98

Flag: "*" = Keyline

Sample ID : G714507008 Acquisition date : 10-APR-2025 22:29:17

Total number of lines in spectrum	51	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	35	68.63%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	7.247E-01	1.150E+00	0.900E+00	78.26	
K-40	1.25E+09Y	1.00	2.406E+00	2.406E+00	1.330E+00	55.29	
CD-109	461.40D	1.05	2.352E+00	2.481E+00	2.312E+00	93.21	
SN-126	2.30E+05Y	1.00	2.352E-01	2.352E-01	2.192E-01	93.21	
TM-171	1.92Y	1.04	8.784E+01	9.097E+01	6.715E+01	73.81	
HG-203	46.59D	1.70	3.896E-02	6.605E-02	10.33E-02	156.33	
TL-208	1.41E+10Y	1.00	2.987E-01	2.987E-01	1.350E-01	45.19	
BI-211	7.04E+08Y	1.00	7.623E+00	7.623E+00	0.911E+00	11.95	
PB-212	1.41E+10Y	1.00	9.413E-01	9.413E-01	1.615E-01	17.16	
BI-214	1600.00Y	1.00	1.966E+00	1.967E+00	0.333E+00	16.93	
PB-214	1600.00Y	1.00	2.767E+00	2.767E+00	0.331E+00	11.95	
RN-222	1600.00Y	1.00	1.966E+00	1.967E+00	0.333E+00	16.93	
RA-224	1.41E+10Y	1.00	5.973E+00	5.973E+00	1.617E+00	27.07	
RA-226	1600.00Y	1.00	2.767E+00	2.767E+00	0.331E+00	11.95	
AC-228	1.41E+10Y	1.00	1.014E+00	1.014E+00	0.357E+00	35.22	
RA-228	1.41E+10Y	1.00	1.014E+00	1.014E+00	0.357E+00	35.22	
TH-228	1.41E+10Y	1.00	9.413E-01	9.413E-01	1.615E-01	17.16	
TH-230	7.54E+04Y	1.00	2.767E+00	2.767E+00	0.331E+00	11.95	
TH-232	1.41E+10Y	1.00	1.014E+00	1.014E+00	0.357E+00	35.22	
PA-234M	4.47E+09Y	1.00	2.328E+00	2.328E+00	4.746E+00	203.90	
TH-234	4.47E+09Y	1.00	2.328E+00	2.328E+00	4.746E+00	203.90	
U-234	2.45E+05Y	1.00	2.767E+00	2.767E+00	0.331E+00	11.95	
U-235	7.04E+08Y	1.00	2.667E-01	2.667E-01	1.183E-01	44.35	K
U-238	4.47E+09Y	1.00	2.328E+00	2.328E+00	4.746E+00	203.90	
AM-243	7370.00Y	1.00	3.169E-01	3.169E-01	1.526E-01	48.13	
ANH-511	1.00E+09Y	1.00	4.215E-03	4.215E-03	98.42E-03	2334.98	
Total Activity :			1.350E+02	1.387E+02			

Grand Total Activity : 1.350E+02 1.387E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	83.86	37	135	1.60	167.81	165	27	9.76E-03	****	4.55E+00	T
0	153.45	22	146	3.27	306.98	302	9	5.85E-03	****	5.82E+00	T
0	209.03	22	108	1.34	418.13	415	9	5.95E-03	****	4.98E+00	
0	248.33	23	49	1.70	496.71	494	7	6.28E-03	****	4.42E+00	
0	442.00	14	42	0.62	884.04	877	13	3.89E-03	****	2.79E+00	
3	460.99	20	21	2.08	922.01	919	42	5.76E-03	78.8	2.69E+00	
3	463.21	17	43	2.08	926.45	919	42	4.80E-03	****	2.68E+00	T
0	493.23	22	40	4.41	986.50	974	16	6.29E-03	****	2.54E+00	T
0	519.56	13	10	1.42	1039.15	1034	8	3.72E-03	****	2.43E+00	T
0	532.54	19	27	1.35	1065.10	1057	14	5.40E-03	****	2.38E+00	
0	640.39	5	12	1.70	1280.82	1276	8	1.45E-03	****	2.03E+00	
0	649.03	8	4	0.67	1298.11	1295	6	2.37E-03	****	2.01E+00	
0	666.45	20	22	1.94	1332.95	1326	15	5.69E-03	****	1.96E+00	T
0	729.71	53	19	5.74	1459.47	1451	20	1.53E-02	48.1	1.81E+00	
0	743.15	10	9	0.96	1486.35	1482	7	2.93E-03	****	1.78E+00	T
0	768.17	35	21	1.55	1536.40	1528	15	1.00E-02	66.3	1.73E+00	T
0	786.02	17	26	2.50	1572.09	1564	16	4.88E-03	****	1.69E+00	
0	808.33	11	21	0.94	1616.73	1609	11	3.06E-03	****	1.65E+00	
0	884.30	6	7	0.59	1768.69	1764	6	1.62E-03	****	1.52E+00	T
0	893.12	9	12	0.66	1786.33	1777	12	2.50E-03	****	1.51E+00	
0	964.59	18	10	2.23	1929.28	1923	11	5.36E-03	80.4	1.40E+00	T
0	1000.68	8	7	3.38	2001.49	1996	10	2.47E-03	****	1.36E+00	
0	1154.71	19	9	1.92	2309.61	2305	12	5.44E-03	76.5	1.19E+00	
0	1238.37	33	6	1.29	2476.97	2471	13	9.58E-03	45.7	1.12E+00	T
0	1377.51	27	2	2.30	2755.33	2750	10	7.96E-03	42.6	1.02E+00	
0	1401.55	11	2	1.95	2803.43	2798	10	3.24E-03	77.1	1.00E+00	
0	1407.67	10	2	1.36	2815.67	2810	9	2.93E-03	80.7	9.99E-01	T
0	1661.26	6	2	1.13	3323.05	3318	9	1.91E-03	****	8.73E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:29:56.96

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507008.CNF;1   *
* Acquisition date : 10-APR-2025 22:29:17 Sensitivity     : 3.000           *
* Detector ID      : GAM01                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 11:30:00 Nuclide Library : SOLID           *
* Sample ID        : G714507008           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.1261E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19            *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	4.994E-01
K-40	4.738E-01
CD-109	9.571E-01
SN-126	9.132E-02
TM-171	2.343E+01
HG-203	6.380E-02
TL-208	4.243E-02
BI-211	2.312E-01
PB-212	5.859E-02
BI-214	6.959E-02
PB-214	8.409E-02
RN-222	6.959E-02
RA-224	6.278E-01
RA-226	8.409E-02
AC-228	1.630E-01
RA-228	1.630E-01
TH-228	5.859E-02
TH-230	8.409E-02
TH-232	1.630E-01
PA-234M	1.774E+00
TH-234	1.774E+00
U-234	8.409E-02
U-235	2.548E-01
U-238	1.774E+00
AM-243	7.326E-02
ANH-511	3.732E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	3.404E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.114E-02	NOT IDENT.
SC-46	4.085E-02	FAIL ABUN
V-48	1.734E-01	NOT IDENT.

CR-51	7.138E-01	NOT IDENT.
MN-52	1.808E+00	FAIL ABUN
MN-54	4.325E-02	NOT IDENT.
CO-56	5.830E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.994E-02	NOT IDENT.
CO-58	5.876E-02	NOT IDENT.
FE-59	1.219E-01	NOT IDENT.
CO-60	5.175E-02	NOT IDENT.
ZN-65	1.151E-01	NOT IDENT.
GE-68	1.084E+00	NOT IDENT.
AS-73	1.390E+00	NOT IDENT.
AS-74	1.919E-01	NOT IDENT.
SE-75	5.581E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	7.042E-01	NOT IDENT.
RB-83	7.711E-02	FAIL ABUN
RB-84	1.026E-01	NOT IDENT.
KR-85	7.964E+00	NOT IDENT.
SR-85	5.226E-02	NOT IDENT.
RB-86	1.499E+00	NOT IDENT.
Y-88	4.135E-02	NOT IDENT.
Y-91	2.184E+01	NOT IDENT.
NB-94	3.819E-02	NOT IDENT.
NB-95	5.896E-02	NOT IDENT.
NB-95M	1.738E-01	NOT IDENT.
ZR-95	7.228E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.390E-02	NOT IDENT.
RH-102	5.254E-02	FAIL ABUN
RU-103	5.752E-02	FAIL ABUN
RH-106	3.549E-01	NOT IDENT.
RU-106	3.549E-01	NOT IDENT.
AG-108M	3.296E-02	NOT IDENT.
AG-110	8.399E-01	NOT IDENT.
AG-110M	5.916E-02	FAIL ABUN
SN-113	5.478E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.925E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.796E-02	NOT IDENT.
SB-124	1.515E-01	NOT IDENT.
SB-125	1.161E-01	FAIL ABUN
TE-125M	1.487E+01	NOT IDENT.
I-126	8.574E-01	FAIL ABUN
SB-126	5.498E-01	FAIL ABUN
SB-127	5.728E+01	NOT IDENT.
I-131	7.237E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.896E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.635E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.255E-01	FAIL ABUN
BA-137M	4.150E-02	NOT IDENT.
CS-137	4.384E-02	NOT IDENT.
LA-138	6.350E-02	NOT IDENT.
CE-139	3.883E-02	NOT IDENT.
BA-140	8.773E-01	NOT IDENT.
LA-140	4.045E-01	NOT IDENT.
CE-141	1.191E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.352E-01	NOT IDENT.
PM-144	3.370E-02	FAIL ABUN
PR-144	2.542E+00	NOT IDENT.
PM-146	4.237E-02	NOT IDENT.
ND-147	2.381E+00	FAIL ABUN
PM-147	8.928E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.051E-02	FAIL ABUN
EU-152	1.072E-01	FAIL ABUN
GD-153	1.038E-01	NOT IDENT.
EU-154	9.369E-02	NOT IDENT.
EU-155	1.284E-01	FAIL ABUN

TB-160	1.552E-01	FAIL ABUN
HO-166M	6.521E-02	NOT IDENT.
HF-172	2.067E-01	FAIL ABUN
LU-172	7.738E-02	FAIL ABUN
LU-176	2.926E-02	FAIL ABUN
HF-181	6.458E-02	NOT IDENT.
TA-182	1.988E-01	FAIL ABUN
RE-183	3.283E-01	NOT IDENT.
RE-184	1.846E-01	NOT IDENT.
W-188	9.288E+00	FAIL ABUN
IR-192	4.080E-02	FAIL ABUN
TL-204	7.218E+00	FAIL ABUN
BI-207	3.793E-02	FAIL ABUN
BI-210	4.983E+00	NOT IDENT.
PB-210	4.983E+00	NOT IDENT.
PB-211	7.479E-01	NOT IDENT.
BI-212	7.686E-01	NOT IDENT.
BI-213	1.218E-01	NOT IDENT.
RN-219	5.366E-01	NOT IDENT.
RA-223	6.891E-01	FAIL ABUN
AC-225	2.762E+00	NOT IDENT.
AC-227	2.893E-01	NOT IDENT.
TH-227	2.893E-01	NOT IDENT.
TH-229	6.554E-01	FAIL ABUN
PA-231	5.998E-01	NOT IDENT.
TH-231	6.891E-01	FAIL ABUN
PA-233	7.005E-02	NOT IDENT.
PA-234	3.158E-01	FAIL ABUN
NP-237	7.005E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	3.413E-01	FAIL ABUN
PU-239	4.237E+02	NOT IDENT.
AM-241	2.105E-01	NOT IDENT.
CM-243	1.263E-01	FAIL ABUN
BK-247	8.626E-02	FAIL ABUN
CM-247	4.529E-02	FAIL ABUN
CF-249	4.553E-02	NOT IDENT.
CF-251	1.575E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:30:01.05

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507008.CNF;1   *
* Acquisition date : 10-APR-2025 22:29:17 Sensitivity     : 3.000           *
* Detector ID      : GAM01                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 11:30:00 Nuclide Library : SOLID           *
* Sample ID        : G714507008           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.1261E+02 GRAM *
*                                         Quantity Err(%) : 1.7760E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.150E+00	8.880E-01	8.880E-01
K-40	2.406E+00	1.321E+00	1.321E+00
CD-109	2.481E+00	2.280E+00	2.280E+00
SN-126	2.352E-01	2.158E-01	2.158E-01
TM-171	9.097E+01	6.641E+01	6.641E+01
HG-203	2.508E-02	1.030E-01	1.030E-01
TL-208	2.987E-01	1.350E-01	1.350E-01
BI-211	7.623E+00	1.088E+00	1.088E+00
PB-212	9.413E-01	1.751E-01	1.751E-01
BI-214	1.967E+00	3.714E-01	3.714E-01
PB-214	2.767E+00	3.922E-01	3.922E-01
RN-222	1.967E+00	3.714E-01	3.714E-01
RA-224	5.973E+00	1.655E+00	1.655E+00
RA-226	2.767E+00	3.922E-01	3.922E-01
AC-228	1.014E+00	3.660E-01	3.660E-01
RA-228	1.014E+00	3.660E-01	3.660E-01
TH-228	9.413E-01	1.751E-01	1.751E-01
TH-230	2.767E+00	3.922E-01	3.922E-01
TH-232	1.014E+00	3.660E-01	3.660E-01
PA-234M	2.328E+00	4.681E+00	4.681E+00
TH-234	2.328E+00	4.681E+00	4.681E+00
U-234	2.767E+00	3.922E-01	3.922E-01
U-235	1.036E-01	2.813E-01	2.813E-01
U-238	2.328E+00	4.681E+00	4.681E+00
AM-243	3.169E-01	1.516E-01	1.516E-01
ANH-511	4.215E-03	9.646E-02	9.646E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	-2.048E-02	4.597E-02	4.689E-02	NOT IDENT.
NA-24	-3.893E+15	5.156E+15	5.446E+15	SHORT HLIF
AL-26	-1.288E-02	5.419E-02	5.450E-02	NOT IDENT.
SC-46	1.690E-03	5.312E-02	5.313E-02	FAIL ABUN

V-48	-1.986E-02	2.061E-01	2.063E-01	NOT IDENT.
CR-51	7.440E-01	7.623E-01	8.328E-01	NOT IDENT.
MN-52	-2.202E+00	3.062E+00	3.219E+00	FAIL ABUN
MN-54	-1.023E-02	5.149E-02	5.169E-02	NOT IDENT.
CO-56	-9.155E-03	6.870E-02	6.883E-02	FAIL ABUN
MN-56	-1.000E+41	7.314E+41	0.000E+00	SHORT HLIF
CO-57	-7.269E-03	3.431E-02	3.446E-02	NOT IDENT.
CO-58	2.008E-02	7.716E-02	7.769E-02	NOT IDENT.
FE-59	5.975E-02	1.304E-01	1.332E-01	NOT IDENT.
CO-60	5.209E-02	5.048E-02	5.568E-02	NOT IDENT.
ZN-65	6.513E-02	1.387E-01	1.417E-01	NOT IDENT.
GE-68	-4.416E-01	1.379E+00	1.394E+00	NOT IDENT.
AS-73	-2.988E-01	1.873E+00	1.878E+00	NOT IDENT.
AS-74	-1.533E-01	2.609E-01	2.699E-01	NOT IDENT.
SE-75	2.705E-03	6.472E-02	6.474E-02	NOT IDENT.
BR-77	5.538E+04	5.762E+04	6.280E+04	SHORT HLIF
SR-82	3.994E-01	7.986E-01	8.186E-01	NOT IDENT.
RB-83	1.062E-01	1.092E-01	1.192E-01	FAIL ABUN
RB-84	-7.614E-03	1.367E-01	1.368E-01	NOT IDENT.
KR-85	-4.242E+00	1.270E+01	1.284E+01	NOT IDENT.
SR-85	-2.792E-02	8.336E-02	8.431E-02	NOT IDENT.
RB-86	5.648E-01	1.624E+00	1.644E+00	NOT IDENT.
Y-88	-3.580E-02	6.381E-02	6.582E-02	NOT IDENT.
Y-91	0.000E+00	2.582E+01	0.000E+00	NOT IDENT.
NB-94	-5.329E-03	4.775E-02	4.781E-02	NOT IDENT.
NB-95	1.569E-02	7.004E-02	7.040E-02	NOT IDENT.
NB-95M	1.636E-01	1.891E-01	2.030E-01	NOT IDENT.
ZR-95	-4.768E-02	1.006E-01	1.029E-01	NOT IDENT.
NB-97	-1.000E+41	5.043E+41	0.000E+00	SHORT HLIF
ZR-97	1.009E+15	1.302E+15	1.380E+15	SHORT HLIF
MO-99	-5.801E+02	3.676E+03	3.685E+03	SHORT HLIF
TC-99M	-1.109E+40	1.177E+41	0.000E+00	SHORT HLIF
RH-101	-2.745E-02	4.057E-02	4.242E-02	NOT IDENT.
RH-102	7.999E-03	6.249E-02	6.259E-02	FAIL ABUN
RU-103	-3.413E-02	8.451E-02	8.590E-02	FAIL ABUN
RH-106	-1.234E-01	4.528E-01	4.562E-01	NOT IDENT.
RU-106	-1.234E-01	4.528E-01	4.562E-01	NOT IDENT.
AG-108M	-3.902E-03	3.983E-02	3.987E-02	NOT IDENT.
AG-110	-3.508E-01	1.086E+00	1.097E+00	NOT IDENT.
AG-110M	3.737E-02	6.182E-02	6.407E-02	FAIL ABUN
SN-113	-3.361E-02	6.907E-02	7.071E-02	NOT IDENT.
CD-115	-2.558E+03	8.726E+03	8.802E+03	SHORT HLIF
SN-117M	1.649E-01	2.091E-01	2.219E-01	NOT IDENT.
SB-122	-1.076E+02	6.163E+02	6.182E+02	SHORT HLIF
TE-123M	4.370E-03	4.298E-02	4.303E-02	NOT IDENT.
SB-124	2.927E-02	1.688E-01	1.693E-01	NOT IDENT.
SB-125	7.015E-02	1.304E-01	1.341E-01	FAIL ABUN
TE-125M	1.064E+01	1.606E+01	1.676E+01	NOT IDENT.
I-126	1.379E+00	1.494E+00	1.618E+00	FAIL ABUN
SB-126	1.655E-01	6.493E-01	6.535E-01	FAIL ABUN
SB-127	-2.410E-01	7.025E+01	7.025E+01	NOT IDENT.
I-131	2.935E-01	8.202E-01	8.308E-01	NOT IDENT.
I-132	1.000E+41	2.440E+41	0.000E+00	SHORT HLIF
TE-132	-2.085E+01	7.941E+01	7.996E+01	SHORT HLIF
BA-133	1.397E-02	6.260E-02	6.291E-02	NOT IDENT.
I-133	1.101E+10	8.268E+10	8.283E+10	SHORT HLIF
CS-134	1.538E-02	5.443E-02	5.487E-02	NOT IDENT.
I-135	9.265E+37	1.831E+38	0.000E+00	SHORT HLIF
CS-136	-1.563E-01	3.052E-01	3.133E-01	FAIL ABUN
BA-137M	-8.244E-03	5.524E-02	5.536E-02	NOT IDENT.
CS-137	-8.709E-03	5.836E-02	5.849E-02	NOT IDENT.
LA-138	7.255E-02	5.409E-02	6.321E-02	NOT IDENT.
CE-139	-1.196E-02	4.520E-02	4.552E-02	NOT IDENT.
BA-140	4.982E-01	1.082E+00	1.105E+00	NOT IDENT.
LA-140	2.409E-02	4.825E-01	4.826E-01	NOT IDENT.
CE-141	6.339E-02	1.314E-01	1.345E-01	NOT IDENT.
CE-143	1.396E+07	5.516E+06	8.370E+06	SHORT HLIF
CE-144	-1.352E-01	2.756E-01	2.823E-01	NOT IDENT.
PM-144	-3.925E-02	4.867E-02	5.178E-02	FAIL ABUN
PR-144	-2.992E+00	3.678E+00	3.917E+00	NOT IDENT.
PM-146	-1.630E-02	5.309E-02	5.359E-02	NOT IDENT.
ND-147	1.562E+00	2.644E+00	2.736E+00	FAIL ABUN
PM-147	4.168E+02	9.804E+02	9.983E+02	NOT IDENT.
PM-149	-6.695E+03	7.001E+04	7.008E+04	SHORT HLIF
EU-150	3.828E-03	3.959E-02	3.963E-02	FAIL ABUN
EU-152	4.521E-02	1.214E-01	1.231E-01	FAIL ABUN
GD-153	-1.373E-03	1.289E-01	1.289E-01	NOT IDENT.
EU-154	-6.096E-02	1.280E-01	1.309E-01	NOT IDENT.

EU-155	8.098E-02	1.392E-01	1.439E-01	FAIL ABUN
TB-160	-9.976E-02	2.294E-01	2.338E-01	FAIL ABUN
HO-166M	-3.029E-03	8.065E-02	8.067E-02	NOT IDENT.
HF-172	-3.132E-02	2.359E-01	2.363E-01	FAIL ABUN
LU-172	4.497E-02	8.295E-02	8.539E-02	FAIL ABUN
LU-176	1.419E-02	3.283E-02	3.345E-02	FAIL ABUN
HF-181	-5.461E-02	9.721E-02	1.003E-01	NOT IDENT.
TA-182	-1.346E-02	2.381E-01	2.381E-01	FAIL ABUN
RE-183	-2.063E-01	4.189E-01	4.291E-01	NOT IDENT.
RE-184	1.634E-02	2.111E-01	2.113E-01	NOT IDENT.
W-188	-2.555E+00	1.247E+01	1.252E+01	FAIL ABUN
IR-192	-2.970E-02	5.139E-02	5.311E-02	FAIL ABUN
TL-204	7.880E+00	8.980E+00	9.657E+00	FAIL ABUN
BI-207	-7.035E-03	4.640E-02	4.650E-02	FAIL ABUN
BI-210	-1.528E+00	6.656E+00	6.692E+00	NOT IDENT.
PB-210	-1.528E+00	6.656E+00	6.692E+00	NOT IDENT.
PB-211	-1.008E+00	1.015E+00	1.112E+00	NOT IDENT.
BI-212	6.615E-01	8.597E-01	9.099E-01	NOT IDENT.
BI-213	7.311E-02	1.358E-01	1.398E-01	NOT IDENT.
RN-219	3.499E-01	6.029E-01	6.232E-01	NOT IDENT.
RA-223	3.190E-01	7.754E-01	7.887E-01	FAIL ABUN
AC-225	1.055E+00	3.107E+00	3.143E+00	NOT IDENT.
AC-227	3.055E-02	3.337E-01	3.340E-01	NOT IDENT.
TH-227	3.055E-02	3.337E-01	3.340E-01	NOT IDENT.
TH-229	5.805E-01	7.144E-01	7.608E-01	FAIL ABUN
PA-231	4.211E-01	6.718E-01	6.981E-01	NOT IDENT.
TH-231	3.190E-01	7.754E-01	7.887E-01	FAIL ABUN
PA-233	1.429E-02	8.066E-02	8.092E-02	NOT IDENT.
PA-234	-1.599E-02	3.709E-01	3.709E-01	FAIL ABUN
NP-237	1.429E-02	8.066E-02	8.092E-02	NOT IDENT.
NP-238	1.275E+04	1.920E+04	2.004E+04	SHORT HLIF
NP-239	2.624E-01	3.694E-01	3.879E-01	FAIL ABUN
PU-239	4.732E+02	4.509E+02	4.988E+02	NOT IDENT.
AM-241	-6.531E-02	2.860E-01	2.875E-01	NOT IDENT.
CM-243	-3.875E-02	1.443E-01	1.453E-01	FAIL ABUN
BK-247	-4.418E-02	1.050E-01	1.069E-01	FAIL ABUN
CM-247	1.918E-02	5.176E-02	5.248E-02	FAIL ABUN
CF-249	1.470E-02	5.229E-02	5.271E-02	NOT IDENT.
CF-251	1.494E-01	1.710E-01	1.838E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	55.8367	81.75	115.4676	123.68	78.7387
879.38	66.5416	82.47	124.5831	125.81	76.3219
46.54	60.8004	83.79	105.8971	127.23	90.1604
228.16	0.0000	265.00	105.9240	127.91	91.0760
52.39	58.9201	193.51	106.1018	129.30	76.5659
1093.63	58.9684	105.31	106.2402	131.20	100.8278
52.39	59.0162	86.79	106.2691	133.02	96.6761
125.81	59.0694	86.94	106.2881	133.52	94.9923
53.44	74.0875	87.09	106.3065	136.00	77.0258
54.07	80.4708	87.57	106.3656	136.47	79.6558
293.27	0.0000	88.03	106.4213	739.50	0.0000
482.18	88.0280	306.78	106.4594	140.51	0.0000
57.98	91.6572	88.47	106.4751	143.76	88.8713
59.27	93.8176	143.76	106.6562	144.24	83.6777
59.32	93.8245	90.64	106.7382	145.44	89.8704
59.54	93.8545	531.02	106.7947	152.43	86.0062
60.96	81.2942	92.59	106.9712	1048.07	86.0640
61.17	81.3186	93.35	107.0617	154.21	87.0107
62.93	99.5033	94.56	79.7803	158.56	97.7009
63.29	99.5535	311.90	79.7881	159.00	87.3471
290.67	99.5939	946.00	79.7900	162.33	85.8094
87.57	99.6908	94.87	79.8074	537.26	89.3706
66.73	83.5553	97.43	86.2821	163.33	85.8765
67.24	91.6526	98.43	86.1249	165.86	94.0299
67.68	101.3599	98.44	86.1260	427.87	76.8991
1221.41	101.3695	103.37	87.7302	176.60	66.1833
70.82	136.5739	116.74	87.7302	177.52	68.9134
97.43	112.9211	100.11	88.6202	181.07	0.0000
70.82	105.0134	102.03	95.5021	181.52	70.0154
279.20	105.0147	103.18	94.7782	184.41	76.4597
1063.66	150.6378	103.37	94.7972	185.72	76.5323
72.87	150.6501	911.20	78.1674	193.51	72.4324
351.06	150.6501	105.31	78.1755	197.03	74.4268
74.66	132.7290	106.12	90.8602	198.01	63.5785
351.93	132.7556	106.47	99.3086	201.83	71.9425
238.63	132.7556	109.28	75.9604	203.43	67.4630
351.93	132.7556	111.00	87.9277	205.31	75.3086
238.63	132.7556	111.76	0.0000	210.85	65.9692
74.97	132.7805	114.06	90.7379	215.65	71.6944
77.11	133.1373	116.30	0.0000	218.12	61.6838
78.74	133.4051	116.74	85.0235	222.11	51.6905
256.23	125.8002	119.76	94.6499	227.09	53.7077
80.03	129.9372	264.66	77.6958	227.38	62.0526
133.52	129.9525	121.22	77.7032	228.16	0.0000
364.49	129.9631	344.28	74.3271	228.18	72.2776
711.68	100.5838	122.06	83.7467	235.69	54.9296
356.01	130.0908	122.92	82.9593	235.96	54.9392
323.87	130.1013	1274.44	92.3802	238.63	55.0298

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	43.3403	531.02	18.1497
240.99	55.1096	338.32	43.3411	537.26	16.0504
242.00	55.1438	340.48	36.9781	1260.41	0.0000
244.70	36.5109	340.55	36.9789	552.55	13.9860
685.70	55.0199	344.28	32.6005	795.86	33.4761
388.16	54.1863	345.93	41.5249	564.24	0.0000
507.63	0.0000	351.06	41.6274	569.33	38.9575
256.23	55.6162	351.93	41.6445	569.50	38.9590
527.90	0.0000	355.39	0.0000	569.70	42.2087
264.66	51.1534	356.01	37.2551	583.19	26.0947
264.80	51.1578	364.49	27.9282	584.27	26.1045
265.00	56.8481	366.42	0.0000	595.83	22.9294
269.46	46.5446	372.51	32.0365	600.60	16.4044
270.03	50.3604	375.05	29.0673	602.52	0.0000
401.81	66.5592	377.52	30.1031	604.72	26.2832
273.65	64.2700	383.85	31.1961	607.14	18.6318
276.40	61.0326	388.16	31.2567	609.32	18.6449
583.19	45.7988	666.33	37.3139	610.33	18.6512
277.60	45.8047	391.69	40.3947	614.28	24.7174
402.40	47.2472	400.66	34.4711	618.01	20.8980
279.20	63.0378	401.81	36.5171	884.68	22.0150
279.54	57.3181	402.40	33.4827	621.93	23.1268
279.70	57.3230	404.85	46.7234	630.19	0.0000
280.46	40.1432	410.95	36.6621	631.29	13.2554
301.36	59.3649	413.71	34.6668	633.25	16.5796
284.31	51.7225	720.70	29.5812	634.78	10.6160
285.41	46.0029	423.72	34.8142	635.95	19.9124
285.90	0.0000	427.09	25.6353	636.99	9.9595
287.50	49.8936	427.87	29.7464	657.50	23.3892
290.67	47.5775	433.94	30.8502	657.76	23.3917
293.27	0.0000	439.40	20.0979	657.90	0.0000
295.22	39.5044	440.45	21.6533	661.66	18.4014
316.51	43.3749	453.88	26.9553	664.57	0.0000
298.58	55.0193	463.37	30.1794	666.33	14.5187
299.98	42.8887	468.07	30.2355	666.50	14.5197
300.09	42.8915	473.00	30.2945	667.71	0.0000
300.13	42.8924	631.29	30.3187	677.62	21.2931
311.90	42.8924	696.49	30.3387	685.70	19.0987
301.36	48.3337	477.60	30.3488	692.65	0.0000
302.85	63.8502	482.18	33.0233	695.00	5.6329
304.50	41.6361	487.02	37.8113	696.49	24.7957
304.85	39.7062	492.35	0.0000	696.51	24.7966
306.78	35.8693	497.08	26.8857	697.00	25.9274
308.46	43.6624	505.52	27.9232	697.30	22.5472
311.90	37.9090	507.63	0.0000	697.49	25.9312
316.51	41.8960	511.00	34.9752	702.65	22.5830
319.41	25.3700	514.00	36.0752	706.68	22.6099
320.08	29.2828	514.00	36.0752	711.68	18.1146
321.04	46.8760	520.40	20.7386	720.70	19.2979
323.87	33.2515	520.69	0.0000	721.93	0.0000
325.23	45.0183	667.71	0.0000	1690.97	18.7418
1596.21	36.2743	527.90	0.0000	722.91	18.7424
333.37	48.6400	528.26	20.7981	723.31	22.1525
333.97	41.2831	529.59	17.6071	756.73	15.3402
334.37	39.8161	529.87	0.0000	727.33	23.8848

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	23.9241	935.54	18.0243	1362.66	0.0000
735.93	18.8129	937.49	18.9345	1365.19	6.9017
737.46	18.8210	983.53	9.9338	1368.63	0.0000
739.50	0.0000	946.00	12.6486	1384.29	1.9788
1434.09	6.8574	949.00	11.7539	1408.01	3.1797
747.24	12.3539	954.55	0.0000	1434.09	5.9894
748.06	16.0177	962.31	8.7073	1435.80	0.0000
752.31	17.1826	964.08	10.1626	1457.56	0.0000
753.82	12.6060	966.17	3.6313	1460.82	10.0293
756.73	13.7632	968.97	5.8139	1489.16	13.1016
756.80	13.7637	983.53	11.8499	1505.03	10.1056
763.94	17.2388	984.45	0.0000	1584.12	12.2878
765.81	17.2479	996.26	16.0902	1596.21	10.2600
766.84	17.2528	1002.74	8.7896	1620.50	4.1201
772.60	0.0000	1004.73	5.8625	1621.92	3.0908
776.52	13.8394	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	4.1663
778.90	12.4638	1028.54	0.0000	1750.46	0.0000
783.70	11.5556	1037.84	10.1520	1764.49	6.3201
1435.80	10.4147	1038.76	0.0000	1770.23	4.2170
903.28	19.1110	1046.59	7.3979	1771.35	3.1633
795.86	13.9131	1048.07	9.2505	1791.20	0.0000
801.95	15.6780	1049.04	7.4019	1808.65	6.3618
810.06	10.4747	1050.41	5.5529	1810.72	0.0000
810.29	10.4755	1063.66	6.4976	1836.06	6.3875
810.45	10.4758	1077.00	5.5854		
810.76	15.7154	1077.34	9.3103		
815.77	9.3252	1085.87	5.5964		
818.51	12.8315	1093.63	9.3433		
832.01	13.1703	1099.45	6.5484		
834.85	19.3306	1112.07	15.9458		
835.71	24.6077	1112.84	12.8664		
836.80	0.0000	1115.54	12.0148		
846.75	0.0000	1120.29	15.0342		
846.77	20.2724	1120.55	15.0352		
856.80	24.7435	1121.30	15.0371		
860.56	11.4992	1808.65	11.2983		
871.09	10.6432	1131.51	0.0000		
873.19	10.6487	1147.95	0.0000		
875.33	0.0000	1332.49	10.4508		
879.38	15.6428	1177.95	4.7549		
880.51	17.0695	1189.05	11.4375		
881.60	11.3828	1204.77	7.6489		
883.24	9.7861	1221.41	10.5529		
884.68	7.1199	1231.02	13.4565		
889.28	8.5538	1235.36	6.1566		
894.76	9.9931	1238.28	9.6252		
1836.06	8.0368	1260.41	0.0000		
900.72	13.4033	1271.87	7.7510		
903.28	10.7296	1274.44	8.7237		
911.20	16.1257	1274.54	8.7242		
912.08	16.1290	1291.59	8.7528		
984.45	0.0000	1298.22	0.0000		
926.50	5.3954	1312.11	6.8342		
929.11	16.1966	1332.49	3.9202		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:30:31.48

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507009.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;814
                                       Background date  : 6-APR-2025 11:01:07.
Sample date      : 6-MAR-2025 12:00:00. Acquisition date : 10-APR-2025 22:29:57
Sample ID        : G714507009           Sample quantity  : 1.24780E+02 GRAM
Detector name    : GAM04                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.42  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	63.17*	28	82	0.94	127.17	124	19	7.76E-03	57.4	1.14E+00
2	1	64.50*	12	80	0.94	129.83	124	19	3.45E-03	131.6	
3	1	69.55	24	76	0.96	139.93	124	19	6.78E-03	60.0	
4	0	76.51	214	222	1.16	153.85	147	14	5.94E-02	16.3	
5	2	87.40	73	76	1.10	175.62	166	26	2.02E-02	23.9	2.16E+00
6	2	89.78	35	75	1.10	180.38	166	26	9.60E-03	47.4	
7	2	92.65*	60	74	1.11	186.13	166	26	1.68E-02	30.2	
8	2	93.90*	6	74	1.11	188.61	166	26	1.79E-03	281.8	
9	0	174.63	24	76	1.43	350.04	346	8	6.67E-03	66.1	
10	0	185.99*	88	118	1.07	372.77	368	10	2.45E-02	26.4	
11	0	207.40	4	52	0.67	415.57	412	5	1.22E-03	255.3	
12	0	209.63	50	60	1.76	420.04	416	8	1.39E-02	30.3	
13	0	233.14	25	37	1.50	467.05	465	6	6.93E-03	43.6	
14	0	238.63*	181	113	0.92	478.03	472	10	5.03E-02	13.5	
15	0	242.03	75	73	1.48	484.84	482	7	2.09E-02	22.1	
16	2	269.86	35	37	1.41	540.49	535	17	9.66E-03	35.9	4.23E+00
17	2	271.62	23	27	1.16	544.00	535	17	6.40E-03	46.5	
18	0	295.47*	200	70	1.11	591.68	587	10	5.56E-02	10.6	
19	0	300.29	36	30	1.29	601.34	598	7	9.92E-03	30.8	
20	0	338.22	70	38	1.33	677.19	672	10	1.96E-02	20.2	
21	0	352.07*	359	70	1.00	704.88	700	11	9.97E-02	7.0	
22	0	378.96	11	38	0.49	758.65	753	9	3.08E-03	106.6	
23	0	489.92	47	25	5.71	980.56	970	18	1.29E-02	29.9	
24	0	583.56*	100	11	1.52	1167.83	1163	13	2.78E-02	12.7	
25	0	609.61*	229	18	1.23	1219.93	1215	12	6.36E-02	7.7	
26	0	728.42	28	21	1.32	1457.55	1449	15	7.83E-03	41.0	
27	0	768.79	27	30	1.37	1538.30	1530	15	7.50E-03	48.2	
28	0	835.31	10	7	0.83	1671.35	1668	7	2.67E-03	59.1	
29	0	912.08*	58	15	1.54	1824.90	1819	15	1.62E-02	20.1	
30	0	928.65	15	5	0.58	1858.05	1852	13	4.11E-03	43.3	
31	0	934.39	15	0	1.25	1869.53	1865	9	4.17E-03	25.8	
32	0	969.30*	26	17	1.39	1939.36	1936	9	7.18E-03	35.8	
33	0	1045.21	7	2	1.00	2091.20	2087	7	1.99E-03	48.5	
34	0	1112.02	10	6	2.84	2224.85	2217	12	2.78E-03	58.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1120.80*	41	11	1.13	2242.41	2237	12	1.15E-02	23.4	
36	0	1155.16	12	5	1.96	2311.14	2306	10	3.35E-03	45.0	
37	0	1198.29	8	2	1.05	2397.43	2394	7	2.08E-03	46.3	
38	0	1208.19	9	3	2.78	2417.23	2411	10	2.60E-03	45.6	
39	0	1238.12	30	7	2.07	2477.10	2469	14	8.27E-03	26.3	
40	0	1402.43	11	5	3.77	2805.82	2800	10	3.06E-03	48.5	
41	0	1429.58	7	0	1.35	2860.14	2856	7	1.94E-03	37.8	
42	0	1461.07*	77	3	2.06	2923.14	2918	10	2.13E-02	12.7	
43	0	1729.61	18	0	0.72	3460.44	3454	11	5.00E-03	23.6	
44	0	1765.01*	34	7	2.59	3531.28	3524	13	9.45E-03	24.2	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:30:32

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507009.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 12:00:00	Acquisition date	: 10-APR-2025 22:29:57
Sample ID	: G714507009	Sample quantity	: 124.78 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA4	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.42 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	73	10.66*	8.746E-01	4.705E+00	4.705E+00	25.46
MN-54	834.85	9	99.98*	1.483E+00	3.835E-02	4.149E-02	118.21
CD-109	88.03	81	3.70*	3.830E+00	3.456E+00	3.645E+00	47.85
SN-126	64.28	14	9.60	1.562E+00	5.662E-01	5.662E-01	263.23
	86.94	81	8.90	3.830E+00	1.437E+00	1.437E+00	47.85
	87.57	81	37.00*	3.830E+00	3.456E-01	3.456E-01	47.85
TL-204	68.89	28	0.47	2.109E+00	1.679E+01	1.709E+01	119.97
	70.82	28	0.79*	2.109E+00	9.979E+00	1.016E+01	119.97
	80.03	------	0.28	3.196E+00	------ Line Not Found		------
	82.47	------	0.07	3.421E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	3.532E+00	------ Line Not Found		------
	583.19	100	85.00*	2.039E+00	3.488E-01	3.488E-01	25.39
	860.56	------	12.50	1.441E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	2.469E+00	------ Line Not Found		------
	351.06	371	12.92*	2.983E+00	5.798E+00	5.798E+00	13.99
BI-212	727.33	28	6.67*	1.684E+00	1.496E+00	1.496E+00	81.92
	1620.50	------	1.47	8.135E-01	------ Line Not Found		------
PB-212	74.82	------	10.28	2.675E+00	------ Line Not Found		------
	77.11	241	17.10	2.849E+00	2.974E+00	2.974E+00	32.64
	238.63	192	43.60*	3.921E+00	6.741E-01	6.741E-01	26.91
	300.09	37	3.30	3.340E+00	2.035E+00	2.035E+00	61.64
BI-214	609.32	229	45.49*	1.967E+00	1.542E+00	1.542E+00	15.44
	1120.29	40	14.92	1.112E+00	1.447E+00	1.447E+00	46.74
	1764.49	32	15.30	7.787E-01	1.611E+00	1.611E+00	48.49
PB-214	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
RN-222	609.32	229	45.49*	1.967E+00	1.542E+00	1.542E+00	15.44
	1120.29	40	14.92	1.112E+00	1.447E+00	1.447E+00	46.74
	1764.49	32	15.30	7.787E-01	1.611E+00	1.611E+00	48.49
RA-224	240.99	79	4.10*	3.883E+00	2.999E+00	2.999E+00	44.28
RA-226	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
AC-228	105.21	------	1.10	4.799E+00	------ Line Not Found		------
	338.32	73	11.27	3.070E+00	1.270E+00	1.270E+00	40.33
	835.71	9	1.61	1.483E+00	2.381E+00	2.381E+00	118.21
	911.20	57	25.80*	1.362E+00	9.764E-01	9.764E-01	40.16
	968.97	25	15.80	1.283E+00	7.468E-01	7.468E-01	71.69
RA-228	105.21	------	1.10	4.799E+00	------ Line Not Found		------
	338.32	73	11.27	3.070E+00	1.270E+00	1.270E+00	40.33
	835.71	9	1.61	1.483E+00	2.381E+00	2.381E+00	118.21
	911.20	57	25.80*	1.362E+00	9.764E-01	9.764E-01	40.16

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	25	15.80	1.283E+00	7.468E-01	7.468E-01	71.69
TH-228	74.82	------	10.28	2.675E+00	------ Line Not Found		------
	77.11	241	17.10	2.849E+00	2.974E+00	2.974E+00	32.64
	238.63	192	43.60*	3.921E+00	6.741E-01	6.741E-01	26.91
	300.09	37	3.30	3.340E+00	2.035E+00	2.035E+00	61.64
TH-230	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
PA-231	283.69	------	1.70	3.477E+00	------ Line Not Found		------
	301.36	37	5.35*	3.340E+00	1.255E+00	1.255E+00	61.64
TH-232	105.21	------	1.10	4.799E+00	------ Line Not Found		------
	338.32	73	11.27	3.070E+00	1.270E+00	1.270E+00	40.33
	835.71	9	1.61	1.483E+00	2.381E+00	2.381E+00	118.21
	911.20	57	25.80*	1.362E+00	9.764E-01	9.764E-01	40.16
	968.97	25	15.80	1.283E+00	7.468E-01	7.468E-01	71.69
PA-234M	63.29	32	3.70*	1.422E+00	3.632E+00	3.632E+00	114.86
	92.59	67	4.23	4.197E+00	2.283E+00	2.283E+00	60.44
TH-234	63.29	32	3.70*	1.422E+00	3.632E+00	3.632E+00	114.86
	92.59	67	4.23	4.197E+00	2.283E+00	2.283E+00	60.44
U-234	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
U-235	89.96	39	3.47	4.005E+00	1.670E+00	1.670E+00	94.84
	93.35	7	5.60	4.273E+00	1.798E-01	1.798E-01	563.68
	143.76	------	10.96*	5.110E+00	------ Line Not Found		------
	163.33	------	5.08	4.900E+00	------ Line Not Found		------
	185.72	95	57.20	4.592E+00	2.167E-01	2.167E-01	52.84
	205.31	------	5.01	4.329E+00	------ Line Not Found		------
U-238	63.29	32	3.70*	1.422E+00	3.632E+00	3.632E+00	114.86
	92.59	67	4.23	4.197E+00	2.283E+00	2.283E+00	60.44

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:30:33.73

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507009.CNF;1		
Acquisition date	: 10-APR-2025 22:29:57	Sensitivity	: 3.000
Detector ID	: GAM04	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.42	Half life ratio	: *****
Sample date	: 6-MAR-2025 12:00:00	Analyst initials	: MXR1
Sample ID	: G714507009	Sample Quantity	: 1.2478E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 5-NOV-2024 09:52:52	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	4.705E+00	1.174E+00	8.994E-01
MN-54	4.149E-02	4.807E-02	8.576E-02
CD-109	3.645E+00	1.709E+00	1.633E+00
SN-126	3.456E-01	1.621E-01	1.562E-01
TL-204	1.016E+01	1.194E+01	1.483E+01
TL-208	3.488E-01	8.678E-02	6.012E-02
BI-211	5.798E+00	7.949E-01	4.021E-01
BI-212	1.496E+00	1.201E+00	1.098E+00
PB-212	6.741E-01	1.778E-01	1.223E-01
BI-214	1.542E+00	2.333E-01	1.392E-01
PB-214	2.104E+00	2.885E-01	1.463E-01
RN-222	1.542E+00	2.333E-01	1.392E-01
RA-224	2.999E+00	1.302E+00	1.370E+00
RA-226	2.104E+00	2.885E-01	1.463E-01
AC-228	9.764E-01	3.843E-01	3.256E-01
RA-228	9.764E-01	3.843E-01	3.256E-01
TH-228	6.741E-01	1.778E-01	1.223E-01
TH-230	2.104E+00	2.885E-01	1.462E-01
PA-231	1.255E+00	7.581E-01	1.043E+00
TH-232	9.764E-01	3.843E-01	3.256E-01
PA-234M	3.632E+00	4.088E+00	4.293E+00
TH-234	3.632E+00	4.088E+00	4.293E+00
U-234	2.104E+00	2.885E-01	1.462E-01
U-235	7.759E-02	2.348E-01	4.433E-01
U-238	3.632E+00	4.088E+00	4.293E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-3.248E-01	4.634E-01	8.278E-01	NOT IDENT.
NA-22	8.735E-03	2.746E-02	6.975E-02	NOT IDENT.
NA-24	0.000E+00	3.968E+15	0.000E+00	SHORT HLIF
AL-26	-1.726E-02	3.884E-02	7.230E-02	NOT IDENT.
SC-46	-2.028E-02	5.560E-02	9.976E-02	FAIL ABUN

V-48	-3.107E-02	1.962E-01	3.677E-01	NOT IDENT.
CR-51	5.565E-01	7.639E-01	1.492E+00	NOT IDENT.
MN-52	1.445E+00	3.152E+00	7.326E+00	FAIL ABUN
CO-56	1.031E-02	6.390E-02	1.244E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.714E-02	3.139E-02	5.636E-02	NOT IDENT.
CO-58	-1.850E-02	4.751E-02	8.654E-02	NOT IDENT.
FE-59	-4.667E-02	1.323E-01	2.563E-01	NOT IDENT.
CO-60	-9.191E-03	3.518E-02	7.195E-02	NOT IDENT.
ZN-65	-3.186E-02	1.561E-01	1.868E-01	NOT IDENT.
GE-68	2.492E-01	1.247E+00	2.750E+00	NOT IDENT.
AS-73	1.448E-01	2.384E+00	4.801E+00	NOT IDENT.
AS-74	-5.263E-02	2.302E-01	4.346E-01	NOT IDENT.
SE-75	-2.349E-02	5.750E-02	9.928E-02	NOT IDENT.
BR-77	0.000E+00	1.040E+04	0.000E+00	SHORT HLIF
SR-82	7.354E-02	6.736E-01	1.330E+00	NOT IDENT.
RB-83	-6.608E-03	7.677E-02	1.527E-01	NOT IDENT.
RB-84	7.908E-02	1.207E-01	2.628E-01	NOT IDENT.
KR-85	-1.437E+01	8.849E+00	1.355E+01	NOT IDENT.
SR-85	-9.447E-02	5.805E-02	8.884E-02	NOT IDENT.
RB-86	2.252E-01	1.661E+00	3.586E+00	NOT IDENT.
Y-88	3.807E-02	6.274E-02	1.487E-01	NOT IDENT.
Y-91	-1.101E+01	2.845E+01	4.636E+01	NOT IDENT.
NB-94	1.869E-02	4.198E-02	8.518E-02	NOT IDENT.
NB-95	2.541E-02	6.541E-02	1.218E-01	NOT IDENT.
NB-95M	1.458E-01	2.034E-01	3.349E-01	NOT IDENT.
ZR-95	6.052E-02	9.820E-02	2.112E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.028E+15	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.365E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	9.505E+40	0.000E+00	SHORT HLIF
RH-101	-2.117E-02	3.457E-02	6.158E-02	NOT IDENT.
RH-102	-4.796E-02	6.411E-02	1.101E-01	FAIL ABUN
RU-103	-6.877E-03	5.926E-02	1.158E-01	FAIL ABUN
RH-106	-6.138E-02	3.300E-01	6.341E-01	NOT IDENT.
RU-106	-6.138E-02	3.300E-01	6.341E-01	NOT IDENT.
AG-108M	8.599E-03	3.068E-02	6.320E-02	NOT IDENT.
AG-110	1.420E-01	7.625E-01	1.560E+00	NOT IDENT.
AG-110M	-3.535E-02	5.996E-02	1.023E-01	NOT IDENT.
SN-113	4.640E-02	5.711E-02	1.221E-01	NOT IDENT.
CD-115	0.000E+00	7.323E+03	0.000E+00	SHORT HLIF
SN-117M	-8.848E-02	1.869E-01	3.311E-01	NOT IDENT.
SB-122	0.000E+00	3.407E+02	0.000E+00	SHORT HLIF
TE-123M	-2.772E-02	3.800E-02	6.572E-02	NOT IDENT.
SB-124	-5.235E-02	1.652E-01	3.130E-01	NOT IDENT.
SB-125	4.948E-02	9.581E-02	2.025E-01	NOT IDENT.
TE-125M	2.159E-01	1.547E+01	2.923E+01	NOT IDENT.
I-126	1.208E+00	7.673E-01	1.792E+00	NOT IDENT.
SB-126	6.791E-02	5.205E-01	1.028E+00	NOT IDENT.
SB-127	-3.478E+00	5.196E+01	1.015E+02	NOT IDENT.
I-131	2.112E-01	6.658E-01	1.385E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.911E+01	0.000E+00	SHORT HLIF
BA-133	1.228E-02	4.881E-02	8.521E-02	NOT IDENT.
I-133	0.000E+00	7.537E+10	0.000E+00	SHORT HLIF
CS-134	1.541E-02	3.953E-02	8.459E-02	NOT IDENT.
I-135	0.000E+00	1.276E+38	0.000E+00	SHORT HLIF
CS-136	5.843E-02	2.657E-01	5.351E-01	NOT IDENT.
BA-137M	1.868E-02	3.679E-02	7.980E-02	NOT IDENT.
CS-137	1.973E-02	3.886E-02	8.430E-02	NOT IDENT.
LA-138	9.041E-03	5.918E-02	1.329E-01	NOT IDENT.
CE-139	4.038E-03	3.823E-02	7.130E-02	NOT IDENT.
BA-140	2.146E-01	8.350E-01	1.717E+00	NOT IDENT.
LA-140	-1.071E-01	2.936E-01	5.668E-01	NOT IDENT.
CE-141	-4.734E-02	1.206E-01	2.162E-01	NOT IDENT.
CE-143	0.000E+00	4.858E+06	0.000E+00	SHORT HLIF
CE-144	4.622E-02	2.454E-01	4.658E-01	NOT IDENT.
PM-144	2.280E-02	3.731E-02	8.008E-02	NOT IDENT.
PR-144	1.736E+00	2.824E+00	6.064E+00	NOT IDENT.
PM-146	-1.958E-02	4.185E-02	7.820E-02	NOT IDENT.
ND-147	-1.993E-01	2.274E+00	4.416E+00	FAIL ABUN
PM-147	1.485E+01	8.322E+02	1.577E+03	NOT IDENT.
PM-149	0.000E+00	6.776E+04	0.000E+00	SHORT HLIF
EU-150	1.454E-02	3.268E-02	5.835E-02	FAIL ABUN
EU-152	2.200E-03	1.041E-01	1.897E-01	FAIL ABUN
GD-153	3.986E-02	1.000E-01	1.982E-01	FAIL ABUN
EU-154	2.802E-02	7.854E-02	2.001E-01	NOT IDENT.
EU-155	-1.625E-02	1.165E-01	2.199E-01	FAIL ABUN

TB-160	2.509E-02	2.004E-01	3.936E-01	FAIL ABUN
HO-166M	2.957E-02	6.097E-02	1.303E-01	NOT IDENT.
TM-171	3.124E+01	4.839E+01	1.016E+02	NOT IDENT.
HF-172	-2.330E-01	2.170E-01	3.691E-01	FAIL ABUN
LU-172	1.456E-02	5.809E-02	1.307E-01	FAIL ABUN
LU-176	7.574E-03	2.675E-02	5.113E-02	FAIL ABUN
HF-181	-4.667E-02	7.773E-02	1.225E-01	NOT IDENT.
TA-182	-1.841E-01	1.995E-01	3.298E-01	FAIL ABUN
RE-183	1.660E-01	4.607E-01	9.461E-01	NOT IDENT.
RE-184	-4.148E-02	2.084E-01	3.893E-01	NOT IDENT.
W-188	6.795E+00	1.079E+01	2.083E+01	FAIL ABUN
IR-192	1.713E-02	4.638E-02	8.854E-02	FAIL ABUN
HG-203	-1.861E-02	6.184E-02	1.076E-01	FAIL ABUN
BI-207	-5.207E-02	5.609E-02	8.567E-02	NOT IDENT.
BI-210	2.485E+00	1.390E+01	2.822E+01	NOT IDENT.
PB-210	2.485E+00	1.390E+01	2.822E+01	NOT IDENT.
PB-211	-5.132E-01	8.113E-01	1.483E+00	NOT IDENT.
BI-213	-3.447E-02	1.127E-01	2.146E-01	NOT IDENT.
RN-219	2.308E-02	4.525E-01	8.982E-01	FAIL ABUN
RA-223	-7.571E-02	7.887E-01	1.396E+00	FAIL ABUN
AC-225	-2.439E+00	2.958E+00	4.923E+00	NOT IDENT.
AC-227	1.503E-01	3.198E-01	6.056E-01	FAIL ABUN
TH-227	1.503E-01	3.198E-01	6.056E-01	FAIL ABUN
TH-229	2.432E-01	5.859E-01	1.120E+00	FAIL ABUN
TH-231	-7.571E-02	7.887E-01	1.396E+00	FAIL ABUN
PA-233	-4.376E-03	7.330E-02	1.291E-01	FAIL ABUN
PA-234	-8.025E-02	3.663E-01	6.738E-01	FAIL ABUN
NP-237	-4.376E-03	7.330E-02	1.291E-01	FAIL ABUN
NP-238	0.000E+00	1.766E+04	0.000E+00	SHORT HLIF
NP-239	-1.256E-01	2.879E-01	5.253E-01	NOT IDENT.
PU-239	2.718E+02	4.048E+02	7.964E+02	NOT IDENT.
AM-241	-1.696E-01	2.827E-01	4.882E-01	NOT IDENT.
AM-243	0.000E+00	8.724E-02	1.889E-01	NOT IDENT.
CM-243	-3.355E-02	1.172E-01	2.154E-01	NOT IDENT.
BK-247	-5.534E-02	1.011E-01	1.549E-01	NOT IDENT.
CM-247	1.996E-02	4.266E-02	8.807E-02	NOT IDENT.
CF-249	4.958E-03	3.872E-02	7.893E-02	NOT IDENT.
CF-251	-2.552E-02	1.634E-01	2.732E-01	NOT IDENT.
ANH-511	-7.287E-02	5.124E-02	1.049E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:30:32.28

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	73	10.66*	8.746E-01	4.705E+00	4.705E+00	25.46
MN-54	834.85	9	99.98*	1.483E+00	3.835E-02	4.149E-02	118.21
CD-109	88.03	81	3.70*	3.830E+00	3.456E+00	3.645E+00	47.85
SN-126	64.28	14	9.60	1.562E+00	5.662E-01	5.662E-01	263.23
	86.94	81	8.90	3.830E+00	1.437E+00	1.437E+00	47.85
	87.57	81	37.00*	3.830E+00	3.456E-01	3.456E-01	47.85
TL-204	68.89	28	0.47	2.109E+00	1.679E+01	1.709E+01	119.97
	70.82	28	0.79*	2.109E+00	9.979E+00	1.016E+01	119.97
	80.03	------	0.28	3.196E+00	------ Line Not Found		------
	82.47	------	0.07	3.421E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	3.532E+00	------ Line Not Found		------
	583.19	100	85.00*	2.039E+00	3.488E-01	3.488E-01	25.39
	860.56	------	12.50	1.441E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	2.469E+00	------ Line Not Found		------
	351.06	371	12.92*	2.983E+00	5.798E+00	5.798E+00	13.99
BI-212	727.33	28	6.67*	1.684E+00	1.496E+00	1.496E+00	81.92
	1620.50	------	1.47	8.135E-01	------ Line Not Found		------
PB-212	74.82	------	10.28	2.675E+00	------ Line Not Found		------
	77.11	241	17.10	2.849E+00	2.974E+00	2.974E+00	32.64
	238.63	192	43.60*	3.921E+00	6.741E-01	6.741E-01	26.91
	300.09	37	3.30	3.340E+00	2.035E+00	2.035E+00	61.64
BI-214	609.32	229	45.49*	1.967E+00	1.542E+00	1.542E+00	15.44
	1120.29	40	14.92	1.112E+00	1.447E+00	1.447E+00	46.74
	1764.49	32	15.30	7.787E-01	1.611E+00	1.611E+00	48.49
PB-214	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
RN-222	609.32	229	45.49*	1.967E+00	1.542E+00	1.542E+00	15.44
	1120.29	40	14.92	1.112E+00	1.447E+00	1.447E+00	46.74
	1764.49	32	15.30	7.787E-01	1.611E+00	1.611E+00	48.49
RA-224	240.99	79	4.10*	3.883E+00	2.999E+00	2.999E+00	44.28
RA-226	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
AC-228	105.21	------	1.10	4.799E+00	------ Line Not Found		------
	338.32	73	11.27	3.070E+00	1.270E+00	1.270E+00	40.33
	835.71	9	1.61	1.483E+00	2.381E+00	2.381E+00	118.21
	911.20	57	25.80*	1.362E+00	9.764E-01	9.764E-01	40.16
	968.97	25	15.80	1.283E+00	7.468E-01	7.468E-01	71.69
RA-228	105.21	------	1.10	4.799E+00	------ Line Not Found		------
	338.32	73	11.27	3.070E+00	1.270E+00	1.270E+00	40.33

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	835.71	9	1.61	1.483E+00	2.381E+00	2.381E+00	118.21
	911.20	57	25.80*	1.362E+00	9.764E-01	9.764E-01	40.16
	968.97	25	15.80	1.283E+00	7.468E-01	7.468E-01	71.69
TH-228	74.82	------	10.28	2.675E+00	------ Line Not Found		------
	77.11	241	17.10	2.849E+00	2.974E+00	2.974E+00	32.64
	238.63	192	43.60*	3.921E+00	6.741E-01	6.741E-01	26.91
	300.09	37	3.30	3.340E+00	2.035E+00	2.035E+00	61.64
TH-230	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
PA-231	283.69	------	1.70	3.477E+00	------ Line Not Found		------
	301.36	37	5.35*	3.340E+00	1.255E+00	1.255E+00	61.64
TH-232	105.21	------	1.10	4.799E+00	------ Line Not Found		------
	338.32	73	11.27	3.070E+00	1.270E+00	1.270E+00	40.33
	835.71	9	1.61	1.483E+00	2.381E+00	2.381E+00	118.21
	911.20	57	25.80*	1.362E+00	9.764E-01	9.764E-01	40.16
	968.97	25	15.80	1.283E+00	7.468E-01	7.468E-01	71.69
PA-234M	63.29	32	3.70*	1.422E+00	3.632E+00	3.632E+00	114.86
	92.59	67	4.23	4.197E+00	2.283E+00	2.283E+00	60.44
TH-234	63.29	32	3.70*	1.422E+00	3.632E+00	3.632E+00	114.86
	92.59	67	4.23	4.197E+00	2.283E+00	2.283E+00	60.44
U-234	74.82	------	5.80	2.675E+00	------ Line Not Found		------
	77.11	241	9.70	2.849E+00	5.242E+00	5.242E+00	32.64
	87.09	81	3.41	3.830E+00	3.750E+00	3.750E+00	47.85
	242.00	79	7.25	3.883E+00	1.696E+00	1.696E+00	44.28
	295.22	209	18.42	3.378E+00	2.021E+00	2.021E+00	21.26
	351.93	371	35.60*	2.983E+00	2.104E+00	2.104E+00	13.99
U-235	89.96	39	3.47	4.005E+00	1.670E+00	1.670E+00	94.84
	93.35	7	5.60	4.273E+00	1.798E-01	1.798E-01	563.68
	143.76	------	10.96*	5.110E+00	------ Line Not Found		------
	163.33	------	5.08	4.900E+00	------ Line Not Found		------
	185.72	95	57.20	4.592E+00	2.167E-01	2.167E-01	52.84
	205.31	------	5.01	4.329E+00	------ Line Not Found		------
U-238	63.29	32	3.70*	1.422E+00	3.632E+00	3.632E+00	114.86
	92.59	67	4.23	4.197E+00	2.283E+00	2.283E+00	60.44

Flag: "*" = Keyline

Sample ID : G714507009 Acquisition date : 10-APR-2025 22:29:57

Total number of lines in spectrum 44
Number of unidentified lines 11
Number of lines tentatively identified by NID 33 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	4.705E+00	4.705E+00	1.198E+00	25.46	
MN-54	312.05D	1.08	3.835E-02	4.149E-02	4.905E-02	118.21	
CD-109	461.40D	1.05	3.456E+00	3.645E+00	1.744E+00	47.85	
SN-126	2.30E+05Y	1.00	3.456E-01	3.456E-01	1.654E-01	47.85	
TL-204	3.78Y	1.02	9.979E+00	1.016E+01	1.219E+01	119.97	
TL-208	1.41E+10Y	1.00	3.488E-01	3.488E-01	0.886E-01	25.39	
BI-211	7.04E+08Y	1.00	5.798E+00	5.798E+00	0.811E+00	13.99	
BI-212	1.41E+10Y	1.00	1.496E+00	1.496E+00	1.225E+00	81.92	
PB-212	1.41E+10Y	1.00	6.741E-01	6.741E-01	1.814E-01	26.91	
BI-214	1600.00Y	1.00	1.542E+00	1.542E+00	0.238E+00	15.44	
PB-214	1600.00Y	1.00	2.104E+00	2.104E+00	0.294E+00	13.99	
RN-222	1600.00Y	1.00	1.542E+00	1.542E+00	0.238E+00	15.44	
RA-224	1.41E+10Y	1.00	2.999E+00	2.999E+00	1.328E+00	44.28	
RA-226	1600.00Y	1.00	2.104E+00	2.104E+00	0.294E+00	13.99	
AC-228	1.41E+10Y	1.00	9.764E-01	9.764E-01	3.921E-01	40.16	
RA-228	1.41E+10Y	1.00	9.764E-01	9.764E-01	3.921E-01	40.16	
TH-228	1.41E+10Y	1.00	6.741E-01	6.741E-01	1.814E-01	26.91	
TH-230	7.54E+04Y	1.00	2.104E+00	2.104E+00	0.294E+00	13.99	
PA-231	7.04E+08Y	1.00	1.255E+00	1.255E+00	0.774E+00	61.64	
TH-232	1.41E+10Y	1.00	9.764E-01	9.764E-01	3.921E-01	40.16	
PA-234M	4.47E+09Y	1.00	3.632E+00	3.632E+00	4.172E+00	114.86	
TH-234	4.47E+09Y	1.00	3.632E+00	3.632E+00	4.172E+00	114.86	
U-234	2.45E+05Y	1.00	2.104E+00	2.104E+00	0.294E+00	13.99	
U-235	7.04E+08Y	1.00	2.167E-01	2.167E-01	1.145E-01	52.84	K
U-238	4.47E+09Y	1.00	3.632E+00	3.632E+00	4.172E+00	114.86	
			---	---			
	Total Activity :		5.731E+01	5.768E+01			
	Grand Total Activity :		5.731E+01	5.768E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	174.63	26	82	1.43	350.04	346	8	6.67E-03	****	4.75E+00	
0	207.40	5	55	0.67	415.57	412	5	1.22E-03	****	4.30E+00	
0	209.63	53	64	1.76	420.04	416	8	1.39E-02	60.7	4.27E+00	T
0	233.14	26	39	1.50	467.05	465	6	6.93E-03	87.2	3.98E+00	
2	269.86	37	39	1.41	540.49	535	17	9.66E-03	71.8	3.60E+00	T
2	271.62	24	28	1.16	544.00	535	17	6.40E-03	93.1	3.58E+00	T
0	378.96	11	39	0.49	758.65	753	9	3.08E-03	****	2.83E+00	T
0	489.92	47	26	5.71	980.56	970	18	1.29E-02	59.7	2.34E+00	
0	768.79	27	30	1.37	1538.30	1530	15	7.50E-03	96.4	1.60E+00	
0	928.65	14	5	0.58	1858.05	1852	13	4.11E-03	86.7	1.34E+00	T
0	934.39	15	0	1.25	1869.53	1865	9	4.17E-03	51.6	1.33E+00	T
0	1045.21	7	2	1.00	2091.20	2087	7	1.99E-03	96.9	1.19E+00	T
0	1112.02	10	6	2.84	2224.85	2217	12	2.78E-03	****	1.12E+00	T
0	1155.16	12	5	1.96	2311.14	2306	10	3.35E-03	90.1	1.08E+00	
0	1198.29	7	1	1.05	2397.43	2394	7	2.08E-03	92.6	1.04E+00	
0	1208.19	9	3	2.78	2417.23	2411	10	2.60E-03	91.1	1.03E+00	
0	1238.12	29	7	2.07	2477.10	2469	14	8.27E-03	52.7	1.01E+00	T
0	1402.43	10	5	3.77	2805.82	2800	10	3.06E-03	97.1	9.04E-01	
0	1429.58	7	0	1.35	2860.14	2856	7	1.94E-03	75.6	8.90E-01	
0	1729.61	17	0	0.72	3460.44	3454	11	5.00E-03	47.1	7.86E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:30:43.37

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507009.CNF;1    *
* Acquisition date : 10-APR-2025 22:29:57 Sensitivity     : 3.000          *
* Detector ID      : GAM04                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.42     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 12:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507009           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 1.2478E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.626E-01
MN-54	3.691E-02
CD-109	7.548E-01
SN-126	7.218E-02
TL-204	6.933E+00
TL-208	2.532E-02
BI-211	1.797E-01
BI-212	4.762E-01
PB-212	5.631E-02
BI-214	6.044E-02
PB-214	6.534E-02
RN-222	6.044E-02
RA-224	6.329E-01
RA-226	6.534E-02
AC-228	1.396E-01
RA-228	1.396E-01
TH-228	5.631E-02
TH-230	6.534E-02
PA-231	4.749E-01
TH-232	1.396E-01
PA-234M	1.987E+00
TH-234	1.987E+00
U-234	6.534E-02
U-235	2.067E-01
U-238	1.987E+00

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.614E-01	NOT IDENT.
NA-22	2.637E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.562E-02	NOT IDENT.
SC-46	4.203E-02	FAIL ABUN
V-48	1.538E-01	NOT IDENT.

CR-51	6.827E-01	NOT IDENT.
MN-52	2.920E+00	FAIL ABUN
CO-56	5.450E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.610E-02	NOT IDENT.
CO-58	3.563E-02	NOT IDENT.
FE-59	1.060E-01	NOT IDENT.
CO-60	2.724E-02	NOT IDENT.
ZN-65	7.742E-02	NOT IDENT.
GE-68	1.135E+00	NOT IDENT.
AS-73	2.198E+00	NOT IDENT.
AS-74	1.896E-01	NOT IDENT.
SE-75	4.491E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.750E-01	NOT IDENT.
RB-83	6.545E-02	NOT IDENT.
RB-84	1.136E-01	NOT IDENT.
KR-85	5.931E+00	NOT IDENT.
SR-85	3.887E-02	NOT IDENT.
RB-86	1.488E+00	NOT IDENT.
Y-88	6.097E-02	NOT IDENT.
Y-91	1.858E+01	NOT IDENT.
NB-94	3.787E-02	NOT IDENT.
NB-95	5.344E-02	NOT IDENT.
NB-95M	1.550E-01	NOT IDENT.
ZR-95	9.200E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.836E-02	NOT IDENT.
RH-102	4.722E-02	FAIL ABUN
RU-103	5.059E-02	FAIL ABUN
RH-106	2.713E-01	NOT IDENT.
RU-106	2.713E-01	NOT IDENT.
AG-108M	2.805E-02	NOT IDENT.
AG-110	6.710E-01	NOT IDENT.
AG-110M	4.229E-02	NOT IDENT.
SN-113	5.535E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.537E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.040E-02	NOT IDENT.
SB-124	1.242E-01	NOT IDENT.
SB-125	9.028E-02	NOT IDENT.
TE-125M	1.365E+01	NOT IDENT.
I-126	8.045E-01	NOT IDENT.
SB-126	4.484E-01	NOT IDENT.
SB-127	4.333E+01	NOT IDENT.
I-131	6.179E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.807E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.592E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.119E-01	NOT IDENT.
BA-137M	3.492E-02	NOT IDENT.
CS-137	3.688E-02	NOT IDENT.
LA-138	5.246E-02	NOT IDENT.
CE-139	3.309E-02	NOT IDENT.
BA-140	7.521E-01	NOT IDENT.
LA-140	2.122E-01	NOT IDENT.
CE-141	1.009E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.170E-01	NOT IDENT.
PM-144	3.501E-02	NOT IDENT.
PR-144	2.652E+00	NOT IDENT.
PM-146	3.392E-02	NOT IDENT.
ND-147	1.940E+00	FAIL ABUN
PM-147	7.297E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.639E-02	FAIL ABUN
EU-152	8.453E-02	FAIL ABUN
GD-153	9.192E-02	FAIL ABUN
EU-154	7.618E-02	NOT IDENT.
EU-155	1.015E-01	FAIL ABUN
TB-160	1.697E-01	FAIL ABUN

HO-166M	5.632E-02	NOT IDENT.
TM-171	4.693E+01	NOT IDENT.
HF-172	1.696E-01	FAIL ABUN
LU-172	5.354E-02	FAIL ABUN
LU-176	2.288E-02	FAIL ABUN
HF-181	5.355E-02	NOT IDENT.
TA-182	1.283E-01	FAIL ABUN
RE-183	4.348E-01	NOT IDENT.
RE-184	1.634E-01	NOT IDENT.
W-188	9.560E+00	FAIL ABUN
IR-192	3.993E-02	FAIL ABUN
HG-203	4.890E-02	FAIL ABUN
BI-207	3.346E-02	NOT IDENT.
BI-210	1.302E+01	NOT IDENT.
PB-210	1.302E+01	NOT IDENT.
PB-211	6.606E-01	NOT IDENT.
BI-213	9.478E-02	NOT IDENT.
RN-219	4.030E-01	FAIL ABUN
RA-223	6.326E-01	FAIL ABUN
AC-225	2.257E+00	NOT IDENT.
AC-227	2.794E-01	FAIL ABUN
TH-227	2.794E-01	FAIL ABUN
TH-229	5.181E-01	FAIL ABUN
TH-231	6.326E-01	FAIL ABUN
PA-233	5.795E-02	FAIL ABUN
PA-234	2.851E-01	FAIL ABUN
NP-237	5.795E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.419E-01	NOT IDENT.
PU-239	3.726E+02	NOT IDENT.
AM-241	2.218E-01	NOT IDENT.
AM-243	8.975E-02	NOT IDENT.
CM-243	9.918E-02	NOT IDENT.
BK-247	6.986E-02	NOT IDENT.
CM-247	3.981E-02	NOT IDENT.
CF-249	3.496E-02	NOT IDENT.
CF-251	1.264E-01	NOT IDENT.
ANH-511	4.883E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:30:47.43

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507009.CNF;1		
Acquisition date	: 10-APR-2025 22:29:57	Sensitivity	: 3.000
Detector ID	: GAM04	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.42	Half life ratio	: *****
Sample date	: 6-MAR-2025 12:00:00	Nuclide Library	: SOLID
Sample ID	: G714507009	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.2478E+02 GRAM
		Quantity Err(%)	: 1.6028E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 5-NOV-2024 09:52:52	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	4.705E+00	1.295E+00	1.295E+00
MN-54	4.149E-02	4.829E-02	4.829E-02
CD-109	3.645E+00	1.754E+00	1.754E+00
SN-126	3.456E-01	1.653E-01	1.653E-01
TL-204	1.016E+01	1.201E+01	1.201E+01
TL-208	3.488E-01	9.162E-02	9.162E-02
BI-211	5.798E+00	9.815E-01	9.815E-01
BI-212	1.496E+00	1.210E+00	1.210E+00
PB-212	6.741E-01	1.909E-01	1.909E-01
BI-214	1.542E+00	2.667E-01	2.667E-01
PB-214	2.104E+00	3.546E-01	3.546E-01
RN-222	1.542E+00	2.667E-01	2.667E-01
RA-224	2.999E+00	1.339E+00	1.339E+00
RA-226	2.104E+00	3.546E-01	3.546E-01
AC-228	9.764E-01	4.039E-01	4.039E-01
RA-228	9.764E-01	4.039E-01	4.039E-01
TH-228	6.741E-01	1.909E-01	1.909E-01
TH-230	2.104E+00	3.546E-01	3.546E-01
PA-231	1.255E+00	8.147E-01	8.147E-01
TH-232	9.764E-01	4.039E-01	4.039E-01
PA-234M	3.632E+00	4.183E+00	4.183E+00
TH-234	3.632E+00	4.183E+00	4.183E+00
U-234	2.104E+00	3.546E-01	3.546E-01
U-235	7.759E-02	2.349E-01	2.349E-01
U-238	3.632E+00	4.183E+00	4.183E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-3.248E-01	4.642E-01	4.868E-01	NOT IDENT.
NA-22	8.735E-03	2.748E-02	2.776E-02	NOT IDENT.
NA-24	8.934E+14	3.969E+15	3.990E+15	SHORT HLIF
AL-26	-1.726E-02	3.887E-02	3.964E-02	NOT IDENT.
SC-46	-2.028E-02	5.565E-02	5.640E-02	FAIL ABUN

V-48	-3.107E-02	1.962E-01	1.967E-01	NOT IDENT.
CR-51	5.565E-01	7.663E-01	8.063E-01	NOT IDENT.
MN-52	1.445E+00	3.156E+00	3.223E+00	FAIL ABUN
CO-56	1.031E-02	6.391E-02	6.408E-02	FAIL ABUN
MN-56	1.000E+41	2.810E+41	0.000E+00	SHORT HLIF
CO-57	-1.714E-02	3.142E-02	3.236E-02	NOT IDENT.
CO-58	-1.850E-02	4.756E-02	4.828E-02	NOT IDENT.
FE-59	-4.667E-02	1.324E-01	1.341E-01	NOT IDENT.
CO-60	-9.191E-03	3.520E-02	3.544E-02	NOT IDENT.
ZN-65	-3.186E-02	1.561E-01	1.568E-01	NOT IDENT.
GE-68	2.492E-01	1.248E+00	1.253E+00	NOT IDENT.
AS-73	1.448E-01	2.384E+00	2.385E+00	NOT IDENT.
AS-74	-5.263E-02	2.303E-01	2.315E-01	NOT IDENT.
SE-75	-2.349E-02	5.756E-02	5.852E-02	NOT IDENT.
BR-77	3.942E+04	4.185E+04	4.547E+04	SHORT HLIF
SR-82	7.354E-02	6.736E-01	6.745E-01	NOT IDENT.
RB-83	-6.608E-03	7.678E-02	7.683E-02	NOT IDENT.
RB-84	7.908E-02	1.211E-01	1.263E-01	NOT IDENT.
KR-85	-1.437E+01	8.932E+00	1.103E+01	NOT IDENT.
SR-85	-9.447E-02	5.859E-02	7.243E-02	NOT IDENT.
RB-86	2.252E-01	1.661E+00	1.664E+00	NOT IDENT.
Y-88	3.807E-02	6.281E-02	6.512E-02	NOT IDENT.
Y-91	-1.101E+01	2.847E+01	2.890E+01	NOT IDENT.
NB-94	1.869E-02	4.201E-02	4.285E-02	NOT IDENT.
NB-95	2.541E-02	6.545E-02	6.645E-02	NOT IDENT.
NB-95M	1.458E-01	2.042E-01	2.145E-01	NOT IDENT.
ZR-95	6.052E-02	9.838E-02	1.021E-01	NOT IDENT.
NB-97	-1.000E+41	2.305E+43	0.000E+00	SHORT HLIF
ZR-97	-1.626E+15	1.037E+15	1.270E+15	SHORT HLIF
MO-99	-2.311E+03	2.376E+03	2.595E+03	SHORT HLIF
TC-99M	6.338E+40	9.534E+40	0.000E+00	SHORT HLIF
RH-101	-2.117E-02	3.481E-02	3.609E-02	NOT IDENT.
RH-102	-4.796E-02	6.432E-02	6.786E-02	FAIL ABUN
RU-103	-6.877E-03	5.926E-02	5.934E-02	FAIL ABUN
RH-106	-6.138E-02	3.300E-01	3.312E-01	NOT IDENT.
RU-106	-6.138E-02	3.300E-01	3.312E-01	NOT IDENT.
AG-108M	8.599E-03	3.069E-02	3.093E-02	NOT IDENT.
AG-110	1.420E-01	7.625E-01	7.652E-01	NOT IDENT.
AG-110M	-3.535E-02	6.012E-02	6.220E-02	NOT IDENT.
SN-113	4.640E-02	5.724E-02	6.094E-02	NOT IDENT.
CD-115	3.986E+03	7.333E+03	7.550E+03	SHORT HLIF
SN-117M	-8.848E-02	1.870E-01	1.912E-01	NOT IDENT.
SB-122	-1.908E+02	3.410E+02	3.517E+02	SHORT HLIF
TE-123M	-2.772E-02	3.806E-02	4.006E-02	NOT IDENT.
SB-124	-5.235E-02	1.652E-01	1.669E-01	NOT IDENT.
SB-125	4.948E-02	9.589E-02	9.845E-02	NOT IDENT.
TE-125M	2.159E-01	1.547E+01	1.547E+01	NOT IDENT.
I-126	1.208E+00	7.755E-01	9.477E-01	NOT IDENT.
SB-126	6.791E-02	5.206E-01	5.215E-01	NOT IDENT.
SB-127	-3.478E+00	5.196E+01	5.199E+01	NOT IDENT.
I-131	2.112E-01	6.661E-01	6.729E-01	NOT IDENT.
I-132	-1.000E+41	3.340E+41	0.000E+00	SHORT HLIF
TE-132	1.150E+01	6.913E+01	6.932E+01	SHORT HLIF
BA-133	1.228E-02	4.883E-02	4.914E-02	NOT IDENT.
I-133	5.160E+10	7.635E+10	7.981E+10	SHORT HLIF
CS-134	1.541E-02	3.956E-02	4.017E-02	NOT IDENT.
I-135	9.475E+36	1.278E+38	0.000E+00	SHORT HLIF
CS-136	5.843E-02	2.658E-01	2.671E-01	NOT IDENT.
BA-137M	1.868E-02	3.682E-02	3.777E-02	NOT IDENT.
CS-137	1.973E-02	3.890E-02	3.990E-02	NOT IDENT.
LA-138	9.041E-03	5.919E-02	5.933E-02	NOT IDENT.
CE-139	4.038E-03	3.824E-02	3.828E-02	NOT IDENT.
BA-140	2.146E-01	8.352E-01	8.408E-01	NOT IDENT.
LA-140	-1.071E-01	2.938E-01	2.978E-01	NOT IDENT.
CE-141	-4.734E-02	1.207E-01	1.226E-01	NOT IDENT.
CE-143	-2.582E+06	4.868E+06	5.005E+06	SHORT HLIF
CE-144	4.622E-02	2.455E-01	2.463E-01	NOT IDENT.
PM-144	2.280E-02	3.736E-02	3.875E-02	NOT IDENT.
PR-144	1.736E+00	2.828E+00	2.934E+00	NOT IDENT.
PM-146	-1.958E-02	4.190E-02	4.282E-02	NOT IDENT.
ND-147	-1.993E-01	2.274E+00	2.276E+00	FAIL ABUN
PM-147	1.485E+01	8.322E+02	8.323E+02	NOT IDENT.
PM-149	-3.025E+04	6.796E+04	6.931E+04	SHORT HLIF
EU-150	1.454E-02	3.271E-02	3.336E-02	FAIL ABUN
EU-152	2.200E-03	1.041E-01	1.041E-01	FAIL ABUN
GD-153	3.986E-02	1.001E-01	1.017E-01	FAIL ABUN
EU-154	2.802E-02	7.860E-02	7.961E-02	NOT IDENT.
EU-155	-1.625E-02	1.165E-01	1.167E-01	FAIL ABUN

TB-160	2.509E-02	2.005E-01	2.008E-01	FAIL ABUN
HO-166M	2.957E-02	6.104E-02	6.248E-02	NOT IDENT.
TM-171	3.124E+01	4.867E+01	5.066E+01	NOT IDENT.
HF-172	-2.330E-01	2.208E-01	2.445E-01	FAIL ABUN
LU-172	1.456E-02	5.813E-02	5.850E-02	FAIL ABUN
LU-176	7.574E-03	2.677E-02	2.698E-02	FAIL ABUN
HF-181	-4.667E-02	7.783E-02	8.062E-02	NOT IDENT.
TA-182	-1.841E-01	2.003E-01	2.169E-01	FAIL ABUN
RE-183	1.660E-01	4.614E-01	4.675E-01	NOT IDENT.
RE-184	-4.148E-02	2.084E-01	2.093E-01	NOT IDENT.
W-188	6.795E+00	1.084E+01	1.127E+01	FAIL ABUN
IR-192	1.713E-02	4.641E-02	4.705E-02	FAIL ABUN
HG-203	-1.861E-02	6.188E-02	6.245E-02	FAIL ABUN
BI-207	-5.207E-02	5.638E-02	6.107E-02	NOT IDENT.
BI-210	2.485E+00	1.390E+01	1.395E+01	NOT IDENT.
PB-210	2.485E+00	1.390E+01	1.395E+01	NOT IDENT.
PB-211	-5.132E-01	8.126E-01	8.449E-01	NOT IDENT.
BI-213	-3.447E-02	1.128E-01	1.138E-01	NOT IDENT.
RN-219	2.308E-02	4.526E-01	4.527E-01	FAIL ABUN
RA-223	-7.571E-02	7.888E-01	7.895E-01	FAIL ABUN
AC-225	-2.439E+00	2.972E+00	3.168E+00	NOT IDENT.
AC-227	1.503E-01	3.208E-01	3.279E-01	FAIL ABUN
TH-227	1.503E-01	3.208E-01	3.279E-01	FAIL ABUN
TH-229	2.432E-01	5.863E-01	5.964E-01	FAIL ABUN
TH-231	-7.571E-02	7.888E-01	7.895E-01	FAIL ABUN
PA-233	-4.376E-03	7.330E-02	7.333E-02	FAIL ABUN
PA-234	-8.025E-02	3.777E-01	3.794E-01	FAIL ABUN
NP-237	-4.376E-03	7.330E-02	7.333E-02	FAIL ABUN
NP-238	-6.227E+01	1.766E+04	1.766E+04	SHORT HLIF
NP-239	-1.256E-01	2.882E-01	2.937E-01	NOT IDENT.
PU-239	2.718E+02	4.054E+02	4.235E+02	NOT IDENT.
AM-241	-1.696E-01	2.836E-01	2.938E-01	NOT IDENT.
AM-243	2.034E-01	8.950E-02	1.281E-01	NOT IDENT.
CM-243	-3.355E-02	1.172E-01	1.182E-01	NOT IDENT.
BK-247	-5.534E-02	1.018E-01	1.048E-01	NOT IDENT.
CM-247	1.996E-02	4.281E-02	4.375E-02	NOT IDENT.
CF-249	4.958E-03	3.872E-02	3.878E-02	NOT IDENT.
CF-251	-2.552E-02	1.635E-01	1.639E-01	NOT IDENT.
ANH-511	-7.287E-02	5.161E-02	6.118E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	35.4966	85.43	49.6222	131.20	65.7977
45.60	38.9921	86.55	49.7422	133.02	51.2153
46.54	44.8159	86.79	49.7674	133.52	58.1555
49.72	0.0000	86.94	49.7837	136.00	59.3729
51.35	47.9804	87.09	49.7997	136.47	46.5432
51.87	42.2564	87.57	49.8509	140.51	0.0000
52.39	37.3434	88.03	49.8996	143.76	51.0708
52.97	35.7458	88.34	49.9323	144.24	52.1103
53.44	38.2931	88.47	49.9461	145.44	74.2902
54.07	49.2067	89.96	50.1027	152.43	54.7696
57.36	0.0000	1093.63	50.1736	153.25	59.9120
57.53	34.5374	91.11	50.2227	323.87	57.9602
57.98	37.1114	92.59	50.3758	156.02	60.1487
59.27	48.2494	93.35	50.4543	158.56	66.5036
59.32	48.2562	94.56	53.9500	159.00	66.5443
59.54	44.0500	94.65	53.9598	162.33	63.7672
60.96	31.7489	94.67	53.9620	162.66	54.5349
61.17	31.7670	94.87	53.9835	163.33	50.4655
62.93	52.1509	97.43	47.1693	165.86	53.7408
63.29	52.2008	98.43	63.9431	176.31	55.8879
63.58	52.2411	98.44	63.9442	176.60	55.9090
64.28	52.3373	99.53	55.7224	177.52	54.5756
66.73	52.6709	100.11	61.3639	181.07	0.0000
67.24	52.7393	102.03	61.5915	181.52	61.8893
125.81	52.7984	103.18	49.5682	184.41	63.5266
67.75	52.8077	103.37	49.5860	143.76	57.2679
68.89	52.9594	105.21	45.0645	193.51	42.8290
69.67	53.0632	105.31	51.6460	197.03	50.5378
70.82	68.6251	106.12	49.8432	198.01	58.1331
70.83	68.6269	106.47	48.9347	201.83	48.6633
72.81	57.2708	109.28	66.2157	203.43	56.3386
72.87	57.2793	111.00	55.9846	205.31	76.7310
74.66	60.7535	111.76	0.0000	210.85	40.7957
74.82	60.7767	114.06	47.7051	215.65	32.9604
74.97	60.7982	116.30	0.0000	218.12	57.2892
77.11	61.1036	116.74	53.6818	222.11	52.0087
78.74	61.3336	119.76	56.8533	227.09	52.2905
79.69	58.2005	121.12	51.1901	227.38	57.8708
80.03	43.9804	121.22	51.1990	228.16	0.0000
80.12	43.9898	121.78	53.1814	228.18	42.3267
80.19	43.9970	122.06	63.8479	116.74	42.3267
80.57	37.4889	122.92	45.5334	235.69	35.9287
81.00	51.8204	123.07	45.5449	235.96	35.9385
81.07	51.8288	265.00	42.6814	238.63	45.0482
81.75	40.5714	125.81	65.2227	238.98	0.0000
82.47	58.5648	127.23	57.5690	240.99	49.6746
83.79	49.4451	127.91	56.6566	242.00	31.6436
84.00	49.4682	129.30	55.8058	244.70	39.2862

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	38.8305	344.28	22.2907	563.25	16.1533
252.80	36.5610	345.93	28.5198	564.24	0.0000
254.15	0.0000	351.06	23.6537	569.33	12.3927
256.23	38.9781	351.93	23.6700	946.00	15.2539
260.90	0.0000	355.39	0.0000	569.70	15.2552
264.66	36.9863	356.01	19.9951	583.19	9.6021
264.80	38.5335	364.49	19.2855	584.27	9.6077
265.00	38.5406	366.42	0.0000	595.83	18.3630
269.46	26.7061	372.51	27.8364	427.87	24.2208
270.03	26.7208	375.05	22.8181	602.52	0.0000
271.23	26.7510	377.52	26.2458	604.72	11.6504
273.65	26.8120	356.01	25.5164	607.14	11.6646
276.40	26.4913	388.16	18.7702	609.32	14.5966
277.37	29.6342	388.63	23.8973	610.33	14.6039
277.60	26.9103	391.69	20.5283	614.28	19.0223
278.00	31.6027	264.66	28.4050	618.01	15.6374
279.20	38.6678	401.81	24.9821	620.36	16.6341
279.54	35.1636	402.40	23.2685	621.93	13.7089
279.70	38.6860	404.85	31.0781	630.19	0.0000
280.46	35.1938	410.95	22.5395	631.29	20.6582
283.69	34.1207	413.71	16.5025	633.25	14.7699
284.31	41.2036	414.70	19.1206	634.78	10.8393
285.41	24.7472	423.72	14.8653	635.95	12.8170
285.90	0.0000	427.09	19.2809	636.99	11.8374
287.50	33.0586	427.87	16.6602	657.50	10.9575
290.67	30.7845	433.94	17.6074	657.76	10.9588
293.27	0.0000	439.40	23.8546	657.90	0.0000
351.93	34.8718	440.45	22.9870	661.66	7.9847
295.96	34.8951	453.88	19.6188	664.57	0.0000
879.38	42.9236	463.37	17.0448	666.33	8.0023
299.98	33.4260	468.07	15.2952	666.50	9.0033
300.09	33.4294	473.00	17.1465	667.71	0.0000
300.13	33.4303	475.06	22.5896	677.62	14.0769
301.36	35.0598	476.78	26.2317	685.70	12.1108
302.85	25.5313	477.60	24.4347	692.65	0.0000
256.23	25.1682	482.18	24.5023	695.00	15.2026
304.85	33.5679	487.02	14.5622	696.49	10.1416
306.78	20.4142	492.35	0.0000	696.51	10.1416
308.46	31.2670	497.08	17.3966	697.00	8.1152
311.90	24.1217	505.52	14.7223	697.30	8.1162
316.51	23.0049	507.63	0.0000	697.49	8.1169
319.41	40.0526	511.00	26.7686	702.65	16.2715
320.08	26.7165	514.00	39.7596	706.68	15.2820
321.04	23.0919	514.00	39.7596	711.68	9.1897
323.87	32.8922	520.40	12.9928	720.70	14.3515
325.23	25.6111	520.69	0.0000	721.93	0.0000
328.76	18.3467	522.65	0.0000	722.78	20.0078
333.37	19.6426	527.90	0.0000	722.91	20.0094
333.97	22.9277	528.26	18.6434	723.31	18.4731
334.37	16.3822	529.59	14.9258	724.19	15.4004
338.28	29.5803	529.87	0.0000	727.33	14.3931
338.32	29.5811	531.02	18.6727	733.00	10.8213
311.90	24.6936	537.26	14.0527	735.93	11.3509
340.48	24.6936	546.56	0.0000	333.97	7.2281
340.55	24.6948	552.55	16.0606	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	19.6757	667.71	0.0000	1434.09	2.5809
747.24	7.2583	962.31	20.2610	1435.80	3.8728
748.06	10.3727	964.08	6.7578	1457.56	0.0000
752.31	10.3914	966.17	21.9780	1460.82	5.8447
753.82	11.4377	911.20	16.9226	1489.16	1.9617
756.73	9.3695	983.53	10.2041	1505.03	3.9380
756.80	9.3699	984.45	0.0000	1584.12	4.0107
884.68	9.3981	1274.44	7.9704	1596.21	5.0272
765.81	12.5405	1002.74	7.9878	1620.50	4.0435
766.84	14.6369	1004.73	9.1351	1621.92	3.0335
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	12.5962	1025.87	0.0000	1690.97	7.1854
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	13.6591	1037.84	5.7719	1764.49	4.1699
783.70	16.8444	1038.76	0.0000	1063.66	7.3059
788.74	21.0986	631.29	6.9458	1771.35	3.5792
792.07	11.6199	1048.07	3.4744	1791.20	0.0000
795.86	7.4059	1049.04	8.6890	1808.65	4.2075
810.06	8.5120	1050.41	6.9541	1810.72	0.0000
810.29	8.5127	1063.66	9.3112	1836.06	3.1730
344.28	10.6417	1077.00	7.0132		
810.76	10.6429	1077.34	6.1370		
815.77	11.7305	1085.87	2.6371		
1048.07	9.6079	1093.63	5.2870		
832.01	11.2686	1099.45	10.5930		
834.85	12.8926	1112.07	4.4308		
835.71	9.6727	1112.84	9.9278		
836.80	0.0000	1115.54	10.6458		
846.75	0.0000	1120.29	8.8843		
846.77	15.1108	1120.55	8.8849		
856.80	11.9185	1221.41	8.8867		
860.56	5.4252	1129.67	7.1274		
871.09	11.9825	1131.51	0.0000		
873.19	13.0820	1147.95	0.0000		
875.33	0.0000	1173.23	9.0253		
879.38	12.0196	1177.95	10.8450		
880.51	13.1182	1189.05	8.1601		
881.60	7.6551	1204.77	8.7434		
883.24	10.9428	1221.41	10.9812		
884.68	13.1382	1231.02	7.3403		
889.28	13.1606	1235.36	7.3496		
894.76	14.2859	1238.28	7.3555		
898.04	13.2026	1260.41	0.0000		
900.72	11.0132	1271.87	8.3518		
903.28	11.0234	1274.44	1.8573		
911.20	12.1606	1274.54	1.8573		
912.08	12.1642	1291.59	2.7990		
923.98	0.0000	1298.22	0.0000		
926.50	11.6715	1312.11	6.5668		
929.11	5.0067	1332.49	4.7159		
935.54	8.3636	1362.66	0.0000		
937.49	3.3478	1365.19	2.8535		
944.13	11.1853	1368.63	0.0000		
946.00	12.3119	1384.29	3.8232		
949.00	8.9632	1408.01	5.4946		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:14.36

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507010.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;991
                                       Background date  : 6-APR-2025 11:01:17.
Sample date      : 6-MAR-2025 12:30:00. Acquisition date : 10-APR-2025 22:30:35
Sample ID        : G714507010           Sample quantity  : 1.42050E+02 GRAM
Detector name    : GAM06                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.43  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	77.73	23	104	1.21	155.99	151	7	6.25E-03	79.0	
2	0	84.06*	11	61	0.55	168.63	166	7	2.98E-03	126.8	
3	0	92.92*	21	74	1.68	186.35	181	9	5.86E-03	82.2	
4	0	154.36	18	29	1.06	309.12	306	6	5.04E-03	54.1	
5	0	172.86	20	64	1.03	346.10	340	12	5.62E-03	83.0	
6	0	185.93*	56	34	1.21	372.21	368	10	1.57E-02	25.5	
7	0	196.42	20	34	0.98	393.17	390	8	5.47E-03	56.1	
8	0	211.37	39	60	5.11	423.07	415	17	1.08E-02	48.3	
9	5	238.67*	94	13	1.14	477.62	474	22	2.61E-02	12.9	1.91E+00
10	5	241.63	52	18	1.87	483.53	474	22	1.45E-02	26.9	
11	5	244.61	22	14	1.48	489.49	474	22	5.97E-03	43.2	
12	0	266.17	12	15	1.25	532.58	530	6	3.33E-03	58.6	
13	0	268.91	17	20	1.79	538.06	535	7	4.83E-03	48.4	
14	0	287.74	16	25	0.77	575.69	572	9	4.42E-03	63.3	
15	0	295.54*	65	21	0.97	591.28	587	10	1.82E-02	18.3	
16	0	352.27*	100	40	1.26	704.67	698	14	2.78E-02	17.3	
17	0	488.31	13	14	1.64	976.60	971	12	3.49E-03	67.5	
18	0	583.21*	26	8	1.86	1166.30	1162	8	7.29E-03	28.9	
19	0	609.27*	94	16	1.71	1218.40	1211	16	2.61E-02	14.3	
20	0	661.30	24	6	1.83	1322.42	1317	12	6.59E-03	29.2	
21	0	728.65	7	11	0.90	1457.08	1449	11	2.02E-03	95.4	
22	0	759.05	15	5	0.80	1517.86	1514	9	4.03E-03	37.2	
23	0	767.18	12	11	0.69	1534.12	1524	15	3.33E-03	67.4	
24	0	790.70	10	6	1.63	1581.16	1577	8	2.73E-03	53.8	
25	0	892.34	7	2	0.70	1784.38	1780	7	1.99E-03	48.5	
26	0	911.63*	17	9	1.48	1822.97	1815	14	4.69E-03	48.5	
27	0	968.46*	20	3	4.17	1936.60	1930	14	5.52E-03	31.1	
28	0	1119.89	20	4	2.12	2239.44	2231	13	5.62E-03	29.1	
29	0	1324.23	6	0	1.37	2648.17	2644	8	1.67E-03	40.8	
30	0	1460.46*	22	3	0.79	2920.70	2915	11	5.98E-03	28.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:31:15

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507010.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 12:30:00	Acquisition date	: 10-APR-2025 22:30:35
Sample ID	: G714507010	Sample quantity	: 142.05 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA6	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.43 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	21	10.66*	9.778E-01	1.047E+00	1.047E+00	56.92
NB-95	765.81	12	99.81*	1.780E+00	3.627E-02	5.323E-02	134.81
BA-137M	661.66	24	89.90*	2.040E+00	7.055E-02	7.071E-02	58.38
CS-137	661.66	24	85.10*	2.040E+00	7.453E-02	7.470E-02	58.38
TL-208	277.37	------	6.60	4.083E+00	------	Line Not Found	------
	583.19	27	85.00*	2.278E+00	7.467E-02	7.467E-02	57.77
	860.56	------	12.50	1.596E+00	------	Line Not Found	------
BI-211	72.87	------	1.23	3.894E+00	------	Line Not Found	------
	351.06	109	12.92*	3.414E+00	1.305E+00	1.305E+00	34.51
BI-212	727.33	7	6.67*	1.868E+00	3.158E-01	3.158E-01	190.89
	1620.50	------	1.47	9.084E-01	------	Line Not Found	------
PB-212	74.82	------	10.28	4.120E+00	------	Line Not Found	------
	77.11	28	17.10	4.433E+00	1.923E-01	1.923E-01	157.98
	238.63	106	43.60*	4.552E+00	2.810E-01	2.810E-01	25.80
	300.09	------	3.30	3.852E+00	------	Line Not Found	------
BI-214	609.32	97	45.49*	2.193E+00	5.163E-01	5.164E-01	28.62
	1120.29	20	14.92	1.237E+00	5.699E-01	5.699E-01	58.12
	1764.49	------	15.30	8.665E-01	------	Line Not Found	------
PB-214	74.82	------	5.80	4.120E+00	------	Line Not Found	------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------	Line Not Found	------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.737E-01	34.51
RN-222	609.32	97	45.49*	2.193E+00	5.163E-01	5.164E-01	28.62
	1120.29	20	14.92	1.237E+00	5.699E-01	5.699E-01	58.12
	1764.49	------	15.30	8.665E-01	------	Line Not Found	------
RA-224	240.99	58	4.10*	4.512E+00	1.670E+00	1.670E+00	53.76
RA-226	74.82	------	5.80	4.120E+00	------	Line Not Found	------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------	Line Not Found	------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.737E-01	34.51
TH-228	74.82	------	10.28	4.120E+00	------	Line Not Found	------
	77.11	28	17.10	4.433E+00	1.923E-01	1.923E-01	157.98
	238.63	106	43.60*	4.552E+00	2.810E-01	2.810E-01	25.80
	300.09	------	3.30	3.852E+00	------	Line Not Found	------
TH-230	74.82	------	5.80	4.120E+00	------	Line Not Found	------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------	Line Not Found	------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.736E-01	34.51
U-234	74.82	------	5.80	4.120E+00	------	Line Not Found	------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------	Line Not Found	------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	351.93	109	35.60*	3.414E+00	4.736E-01	4.736E-01	34.51
BK-247	84.00	13	40.00	5.016E+00	3.441E-02	3.441E-02	253.53
	102.03	------	7.00	5.989E+00	------	Line Not Found	------
	106.47	------	11.00	6.104E+00	------	Line Not Found	------
	119.76	------	4.00	6.250E+00	------	Line Not Found	------
	123.68	------	1.00	6.250E+00	------	Line Not Found	------
	265.00	13	30.00*	4.208E+00	5.597E-02	5.597E-02	117.26

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:16.49

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507010.CNF;1   *
* Acquisition date : 10-APR-2025 22:30:35 Sensitivity     : 3.000           *
* Detector ID      : GAM06                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 12:30:00 Analyst initials: MXR1            *
* Sample ID        : G714507010           Sample Quantity : 1.4205E+02 GRAM *
* Batch Number     : 2767515              Wet Weight      :    0.00000      *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000      *
* Nuclide Library  : SOLID.NLB;18                                           *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 23-SEP-2024 11:03:33 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;23            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.047E+00	5.843E-01	4.308E-01
NB-95	5.323E-02	7.033E-02	7.260E-02
BA-137M	7.071E-02	4.046E-02	4.936E-02
CS-137	7.470E-02	4.274E-02	5.215E-02
TL-208	7.467E-02	4.228E-02	5.147E-02
BI-211	1.305E+00	4.414E-01	3.031E-01
BI-212	3.158E-01	5.907E-01	6.823E-01
PB-212	2.810E-01	7.106E-02	6.799E-02
BI-214	5.164E-01	1.448E-01	1.025E-01
PB-214	4.737E-01	1.602E-01	1.103E-01
RN-222	5.164E-01	1.448E-01	1.025E-01
RA-224	1.670E+00	8.800E-01	7.289E-01
RA-226	4.737E-01	1.602E-01	1.103E-01
TH-228	2.810E-01	7.106E-02	6.799E-02
TH-230	4.736E-01	1.602E-01	1.102E-01
U-234	4.736E-01	1.602E-01	1.102E-01
BK-247	5.597E-02	6.432E-02	1.204E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-2.295E-01	2.798E-01	4.743E-01	NOT IDENT.
NA-22	-1.160E-03	3.128E-02	6.534E-02	NOT IDENT.
NA-24	0.000E+00	3.521E+15	0.000E+00	SHORT HLIF
AL-26	-6.171E-03	1.210E-02	1.675E-02	NOT IDENT.
SC-46	-1.123E-02	2.693E-02	4.394E-02	FAIL ABUN
V-48	3.916E-03	8.479E-02	1.955E-01	NOT IDENT.
CR-51	1.797E-01	3.903E-01	8.467E-01	NOT IDENT.
MN-52	9.272E-01	2.006E+00	5.191E+00	NOT IDENT.
MN-54	1.288E-02	2.743E-02	6.209E-02	NOT IDENT.
CO-56	1.869E-02	2.716E-02	6.826E-02	NOT IDENT.
MN-56	0.000E+00	1.443E+41	0.000E+00	SHORT HLIF
CO-57	-4.312E-04	1.777E-02	3.450E-02	NOT IDENT.
CO-58	1.263E-02	3.581E-02	7.935E-02	NOT IDENT.

FE-59	2.074E-02	1.006E-01	2.173E-01	NOT IDENT.
CO-60	-2.141E-03	2.967E-02	6.137E-02	NOT IDENT.
ZN-65	-1.468E-02	6.198E-02	1.058E-01	NOT IDENT.
GE-68	-4.265E-02	1.102E+00	2.227E+00	NOT IDENT.
AS-73	1.724E-01	7.714E-01	1.643E+00	NOT IDENT.
AS-74	-3.992E-02	1.243E-01	2.342E-01	NOT IDENT.
SE-75	-1.679E-02	3.716E-02	6.368E-02	NOT IDENT.
BR-77	0.000E+00	4.131E+03	0.000E+00	SHORT HLIF
SR-82	3.569E-01	4.250E-01	1.013E+00	NOT IDENT.
RB-83	4.021E-02	6.429E-02	1.396E-01	NOT IDENT.
RB-84	-2.570E-02	8.579E-02	1.668E-01	NOT IDENT.
KR-85	-1.377E+01	7.743E+00	1.122E+01	NOT IDENT.
SR-85	-9.042E-02	5.080E-02	7.355E-02	NOT IDENT.
RB-86	-2.961E-01	1.340E+00	2.617E+00	NOT IDENT.
Y-88	-1.384E-04	4.375E-02	9.450E-02	NOT IDENT.
Y-91	-9.138E+00	1.639E+01	2.896E+01	NOT IDENT.
NB-94	-9.677E-04	2.530E-02	4.889E-02	NOT IDENT.
NB-95M	-1.983E-02	1.037E-01	1.719E-01	NOT IDENT.
ZR-95	2.843E-02	7.094E-02	1.446E-01	NOT IDENT.
NB-97	0.000E+00	1.647E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	7.213E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.343E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	5.446E+40	0.000E+00	SHORT HLIF
RH-101	4.734E-03	2.046E-02	4.078E-02	NOT IDENT.
RH-102	-2.918E-03	3.782E-02	7.438E-02	FAIL ABUN
RU-103	1.772E-03	3.764E-02	7.678E-02	FAIL ABUN
RH-106	-1.228E-01	1.940E-01	3.312E-01	NOT IDENT.
RU-106	-1.228E-01	1.940E-01	3.312E-01	NOT IDENT.
AG-108M	9.607E-03	1.689E-02	3.851E-02	NOT IDENT.
CD-109	3.120E-01	5.050E-01	1.056E+00	NOT IDENT.
AG-110	-2.522E-01	6.001E-01	9.224E-01	NOT IDENT.
AG-110M	2.810E-03	4.402E-02	9.127E-02	NOT IDENT.
SN-113	7.749E-03	3.545E-02	7.346E-02	NOT IDENT.
CD-115	0.000E+00	4.161E+03	0.000E+00	SHORT HLIF
SN-117M	6.712E-03	9.064E-02	1.768E-01	NOT IDENT.
SB-122	0.000E+00	2.781E+02	0.000E+00	SHORT HLIF
TE-123M	7.419E-03	1.718E-02	3.552E-02	NOT IDENT.
SB-124	2.835E-02	6.837E-02	1.893E-01	NOT IDENT.
SB-125	1.315E-02	5.856E-02	1.237E-01	NOT IDENT.
TE-125M	3.829E+00	7.170E+00	1.508E+01	NOT IDENT.
I-126	-1.277E-01	5.221E-01	8.509E-01	NOT IDENT.
SB-126	1.211E-01	2.910E-01	6.525E-01	NOT IDENT.
SN-126	3.756E-02	5.064E-02	1.011E-01	NOT IDENT.
SB-127	-2.722E+01	4.085E+01	7.008E+01	NOT IDENT.
I-131	-3.279E-01	4.681E-01	8.478E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.190E+01	0.000E+00	SHORT HLIF
BA-133	9.451E-03	3.375E-02	6.379E-02	NOT IDENT.
I-133	0.000E+00	3.686E+10	0.000E+00	SHORT HLIF
CS-134	-1.396E-02	3.219E-02	5.895E-02	NOT IDENT.
I-135	0.000E+00	8.786E+37	0.000E+00	SHORT HLIF
CS-136	7.432E-02	2.412E-01	5.290E-01	FAIL ABUN
LA-138	1.601E-02	4.278E-02	1.046E-01	NOT IDENT.
CE-139	-1.201E-02	2.135E-02	3.783E-02	NOT IDENT.
BA-140	-2.878E-01	5.217E-01	9.316E-01	NOT IDENT.
LA-140	2.821E-02	2.029E-01	4.758E-01	FAIL ABUN
CE-141	-4.519E-02	7.270E-02	1.284E-01	NOT IDENT.
CE-143	0.000E+00	2.345E+06	0.000E+00	SHORT HLIF
CE-144	7.640E-02	1.198E-01	2.525E-01	NOT IDENT.
PM-144	1.761E-02	3.052E-02	6.426E-02	NOT IDENT.
PR-144	1.350E+00	2.312E+00	4.871E+00	NOT IDENT.
PM-146	-2.200E-03	2.643E-02	5.311E-02	NOT IDENT.
ND-147	2.034E-01	1.133E+00	2.447E+00	NOT IDENT.
PM-147	4.271E+02	4.787E+02	1.025E+03	NOT IDENT.
PM-149	0.000E+00	3.763E+04	0.000E+00	SHORT HLIF
EU-150	-2.303E-03	1.783E-02	3.556E-02	FAIL ABUN
EU-152	4.848E-02	6.935E-02	1.515E-01	FAIL ABUN
GD-153	-3.017E-02	4.924E-02	9.159E-02	NOT IDENT.
EU-154	-3.250E-03	8.771E-02	1.832E-01	NOT IDENT.
EU-155	-5.267E-02	6.445E-02	1.156E-01	NOT IDENT.
TB-160	9.822E-02	1.139E-01	2.790E-01	FAIL ABUN
HO-166M	1.211E-02	4.761E-02	9.715E-02	NOT IDENT.
TM-171	-1.323E+00	1.361E+01	2.825E+01	NOT IDENT.
HF-172	-4.763E-02	1.269E-01	2.363E-01	NOT IDENT.
LU-172	-1.786E-03	5.970E-02	1.203E-01	FAIL ABUN
LU-176	-5.665E-04	1.577E-02	3.242E-02	NOT IDENT.
HF-181	-1.576E-02	4.128E-02	7.735E-02	NOT IDENT.
TA-182	-3.151E-02	1.560E-01	3.026E-01	FAIL ABUN

RE-183	2.832E-02	1.640E-01	3.469E-01	NOT IDENT.
RE-184	-4.781E-02	1.251E-01	2.425E-01	FAIL ABUN
W-188	1.466E+00	5.916E+00	1.075E+01	NOT IDENT.
IR-192	-2.849E-03	2.743E-02	5.522E-02	FAIL ABUN
HG-203	-1.342E-02	3.375E-02	6.562E-02	NOT IDENT.
TL-204	-3.664E+00	2.843E+00	4.983E+00	NOT IDENT.
BI-207	-1.432E-02	3.880E-02	7.557E-02	NOT IDENT.
BI-210	9.674E-01	3.034E+00	6.574E+00	NOT IDENT.
PB-210	9.674E-01	3.034E+00	6.574E+00	NOT IDENT.
PB-211	-1.945E-03	5.040E-01	1.010E+00	NOT IDENT.
BI-213	-7.573E-02	6.887E-02	1.102E-01	NOT IDENT.
RN-219	8.864E-02	3.248E-01	6.642E-01	NOT IDENT.
RA-223	-4.583E-02	4.367E-01	8.725E-01	FAIL ABUN
AC-225	7.223E-01	1.512E+00	3.051E+00	NOT IDENT.
AC-227	-2.794E-02	1.891E-01	3.411E-01	NOT IDENT.
TH-227	-2.794E-02	1.891E-01	3.411E-01	NOT IDENT.
AC-228	2.297E-01	2.185E-01	3.550E-01	FAIL ABUN
RA-228	2.297E-01	2.185E-01	3.550E-01	FAIL ABUN
TH-229	1.458E-01	3.477E-01	6.518E-01	FAIL ABUN
PA-231	1.995E-01	2.860E-01	6.395E-01	NOT IDENT.
TH-231	-4.583E-02	4.367E-01	8.725E-01	FAIL ABUN
TH-232	2.297E-01	2.185E-01	3.550E-01	FAIL ABUN
PA-233	-5.416E-03	4.248E-02	8.521E-02	NOT IDENT.
PA-234	-8.459E-02	2.337E-01	4.603E-01	NOT IDENT.
PA-234M	-5.016E-01	9.745E-01	1.868E+00	FAIL ABUN
TH-234	-5.016E-01	9.745E-01	1.868E+00	FAIL ABUN
U-235	6.099E-02	1.424E-01	2.819E-01	FAIL ABUN
NP-237	-5.416E-03	4.248E-02	8.521E-02	NOT IDENT.
NP-238	0.000E+00	7.020E+03	0.000E+00	SHORT HLIF
U-238	-5.016E-01	9.745E-01	1.868E+00	FAIL ABUN
NP-239	-5.278E-02	1.429E-01	2.711E-01	NOT IDENT.
PU-239	-9.834E+01	2.092E+02	3.850E+02	NOT IDENT.
AM-241	-1.595E-03	1.016E-01	2.099E-01	NOT IDENT.
AM-243	9.710E-03	4.203E-02	7.927E-02	NOT IDENT.
CM-243	8.712E-02	5.889E-02	1.370E-01	NOT IDENT.
CM-247	1.521E-02	2.739E-02	5.874E-02	FAIL ABUN
CF-249	2.412E-02	3.016E-02	6.622E-02	NOT IDENT.
CF-251	1.520E-03	9.111E-02	1.602E-01	NOT IDENT.
ANH-511	-2.462E-02	3.959E-02	8.669E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:15.12

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	21	10.66*	9.778E-01	1.047E+00	1.047E+00	56.92
NB-95	765.81	12	99.81*	1.780E+00	3.627E-02	5.323E-02	134.81
BA-137M	661.66	24	89.90*	2.040E+00	7.055E-02	7.071E-02	58.38
CS-137	661.66	24	85.10*	2.040E+00	7.453E-02	7.470E-02	58.38
TL-208	277.37	------	6.60	4.083E+00	------ Line Not Found		------
	583.19	27	85.00*	2.278E+00	7.467E-02	7.467E-02	57.77
	860.56	------	12.50	1.596E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.894E+00	------ Line Not Found		------
	351.06	109	12.92*	3.414E+00	1.305E+00	1.305E+00	34.51
BI-212	727.33	7	6.67*	1.868E+00	3.158E-01	3.158E-01	190.89
	1620.50	------	1.47	9.084E-01	------ Line Not Found		------
PB-212	74.82	------	10.28	4.120E+00	------ Line Not Found		------
	77.11	28	17.10	4.433E+00	1.923E-01	1.923E-01	157.98
	238.63	106	43.60*	4.552E+00	2.810E-01	2.810E-01	25.80
	300.09	------	3.30	3.852E+00	------ Line Not Found		------
BI-214	609.32	97	45.49*	2.193E+00	5.163E-01	5.164E-01	28.62
	1120.29	20	14.92	1.237E+00	5.699E-01	5.699E-01	58.12
	1764.49	------	15.30	8.665E-01	------ Line Not Found		------
PB-214	74.82	------	5.80	4.120E+00	------ Line Not Found		------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------ Line Not Found		------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.737E-01	34.51
RN-222	609.32	97	45.49*	2.193E+00	5.163E-01	5.164E-01	28.62
	1120.29	20	14.92	1.237E+00	5.699E-01	5.699E-01	58.12
	1764.49	------	15.30	8.665E-01	------ Line Not Found		------
RA-224	240.99	58	4.10*	4.512E+00	1.670E+00	1.670E+00	53.76
RA-226	74.82	------	5.80	4.120E+00	------ Line Not Found		------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------ Line Not Found		------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.737E-01	34.51
TH-228	74.82	------	10.28	4.120E+00	------ Line Not Found		------
	77.11	28	17.10	4.433E+00	1.923E-01	1.923E-01	157.98
	238.63	106	43.60*	4.552E+00	2.810E-01	2.810E-01	25.80
	300.09	------	3.30	3.852E+00	------ Line Not Found		------
TH-230	74.82	------	5.80	4.120E+00	------ Line Not Found		------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------ Line Not Found		------
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.736E-01	34.51
U-234	74.82	------	5.80	4.120E+00	------ Line Not Found		------
	77.11	28	9.70	4.433E+00	3.389E-01	3.389E-01	157.98
	87.09	------	3.41	5.248E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	242.00	58	7.25	4.512E+00	9.447E-01	9.447E-01	53.76
	295.22	72	18.42	3.896E+00	5.319E-01	5.319E-01	36.62
	351.93	109	35.60*	3.414E+00	4.736E-01	4.736E-01	34.51
BK-247	84.00	13	40.00	5.016E+00	3.441E-02	3.441E-02	253.53
	102.03	------	7.00	5.989E+00	------	Line Not Found	------
	106.47	------	11.00	6.104E+00	------	Line Not Found	------
	119.76	------	4.00	6.250E+00	------	Line Not Found	------
	123.68	------	1.00	6.250E+00	------	Line Not Found	------
	265.00	13	30.00*	4.208E+00	5.597E-02	5.597E-02	117.26

Flag: "*" = Keyline

Sample ID : G714507010 Acquisition date : 10-APR-2025 22:30:35

Total number of lines in spectrum	30	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	26	86.67%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.047E+00	1.047E+00	0.596E+00	56.92	
NB-95	64.03D	1.47	3.627E-02	5.323E-02	7.176E-02	134.81	
BA-137M	30.08Y	1.00	7.055E-02	7.071E-02	4.128E-02	58.38	
CS-137	30.08Y	1.00	7.453E-02	7.470E-02	4.361E-02	58.38	
TL-208	1.41E+10Y	1.00	7.467E-02	7.467E-02	4.314E-02	57.77	
BI-211	7.04E+08Y	1.00	1.305E+00	1.305E+00	0.450E+00	34.51	
BI-212	1.41E+10Y	1.00	3.158E-01	3.158E-01	6.028E-01	190.89	
PB-212	1.41E+10Y	1.00	2.810E-01	2.810E-01	0.725E-01	25.80	
BI-214	1600.00Y	1.00	5.163E-01	5.164E-01	1.478E-01	28.62	
PB-214	1600.00Y	1.00	4.736E-01	4.737E-01	1.635E-01	34.51	
RN-222	1600.00Y	1.00	5.163E-01	5.164E-01	1.478E-01	28.62	
RA-224	1.41E+10Y	1.00	1.670E+00	1.670E+00	0.898E+00	53.76	
RA-226	1600.00Y	1.00	4.736E-01	4.737E-01	1.635E-01	34.51	
TH-228	1.41E+10Y	1.00	2.810E-01	2.810E-01	0.725E-01	25.80	
TH-230	7.54E+04Y	1.00	4.736E-01	4.736E-01	1.635E-01	34.51	
U-234	2.45E+05Y	1.00	4.736E-01	4.736E-01	1.635E-01	34.51	
BK-247	1380.00Y	1.00	5.597E-02	5.597E-02	6.563E-02	117.26	
	Total Activity :		8.140E+00	8.157E+00			
	Grand Total Activity :		8.140E+00	8.157E+00			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	92.92	26	90	1.68	186.35	181	9	5.86E-03	****	5.61E+00	T
0	154.36	21	34	1.06	309.12	306	6	5.04E-03	****	5.92E+00	T
0	172.86	23	74	1.03	346.10	340	12	5.62E-03	****	5.60E+00	
0	185.93	65	39	1.21	372.21	368	10	1.57E-02	51.1	5.37E+00	T
0	196.42	22	39	0.98	393.17	390	8	5.47E-03	****	5.19E+00	T
0	211.37	44	68	5.11	423.07	415	17	1.08E-02	96.6	4.95E+00	T
5	244.61	24	16	1.48	489.49	474	22	5.97E-03	86.5	4.47E+00	T
0	268.91	19	22	1.79	538.06	535	7	4.83E-03	96.8	4.18E+00	T
0	287.74	18	28	0.77	575.69	572	9	4.42E-03	****	3.97E+00	T
0	488.31	13	15	1.64	976.60	971	12	3.49E-03	****	2.64E+00	T
0	759.05	15	5	0.80	1517.86	1514	9	4.03E-03	74.4	1.80E+00	
0	790.70	10	6	1.63	1581.16	1577	8	2.73E-03	****	1.73E+00	T
0	892.34	7	2	0.70	1784.38	1780	7	1.99E-03	96.9	1.54E+00	
0	911.63	17	9	1.48	1822.97	1815	14	4.69E-03	97.1	1.51E+00	T
0	968.46	20	3	4.17	1936.60	1930	14	5.52E-03	62.2	1.42E+00	T
0	1324.23	6	0	1.37	2648.17	2644	8	1.67E-03	81.6	1.06E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:25.87

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507010.CNF;1		
Acquisition date	: 10-APR-2025 22:30:35	Sensitivity	: 3.000
Detector ID	: GAM06	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.43	Half life ratio	: *****
Sample date	: 6-MAR-2025 12:30:00	Nuclide Library	: SOLID
Sample ID	: G714507010	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.4205E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 23-SEP-2024 11:03:33	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;23		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.465E-01
NB-95	3.030E-02
BA-137M	2.069E-02
CS-137	2.186E-02
TL-208	2.196E-02
BI-211	1.349E-01
BI-212	2.828E-01
PB-212	3.025E-02
BI-214	4.392E-02
PB-214	4.906E-02
RN-222	4.392E-02
RA-224	3.243E-01
RA-226	4.906E-02
TH-228	3.025E-02
TH-230	4.905E-02
U-234	4.905E-02
BK-247	5.433E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.956E-01	NOT IDENT.
NA-22	2.593E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	0.000E+00	NOT IDENT.
SC-46	1.567E-02	FAIL ABUN
V-48	7.370E-02	NOT IDENT.
CR-51	3.740E-01	NOT IDENT.
MN-52	2.009E+00	NOT IDENT.
MN-54	2.626E-02	NOT IDENT.
CO-56	2.797E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.571E-02	NOT IDENT.
CO-58	3.357E-02	NOT IDENT.
FE-59	9.102E-02	NOT IDENT.

CO-60	2.377E-02	NOT IDENT.
ZN-65	4.017E-02	NOT IDENT.
GE-68	9.221E-01	NOT IDENT.
AS-73	7.455E-01	NOT IDENT.
AS-74	9.500E-02	NOT IDENT.
SE-75	2.818E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.344E-01	NOT IDENT.
RB-83	6.114E-02	NOT IDENT.
RB-84	6.911E-02	NOT IDENT.
KR-85	4.937E+00	NOT IDENT.
SR-85	3.238E-02	NOT IDENT.
RB-86	1.065E+00	NOT IDENT.
Y-88	3.661E-02	NOT IDENT.
Y-91	1.083E+01	NOT IDENT.
NB-94	2.067E-02	NOT IDENT.
NB-95M	7.636E-02	NOT IDENT.
ZR-95	6.144E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.858E-02	NOT IDENT.
RH-102	3.094E-02	FAIL ABUN
RU-103	3.260E-02	FAIL ABUN
RH-106	1.291E-01	NOT IDENT.
RU-106	1.291E-01	NOT IDENT.
AG-108M	1.646E-02	NOT IDENT.
CD-109	4.875E-01	NOT IDENT.
AG-110	3.739E-01	NOT IDENT.
AG-110M	3.855E-02	NOT IDENT.
SN-113	3.227E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	7.938E-02	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	1.588E-02	NOT IDENT.
SB-124	6.912E-02	NOT IDENT.
SB-125	5.323E-02	NOT IDENT.
TE-125M	6.842E+00	NOT IDENT.
I-126	3.523E-01	NOT IDENT.
SB-126	2.738E-01	NOT IDENT.
SN-126	4.668E-02	NOT IDENT.
SB-127	2.912E+01	NOT IDENT.
I-131	3.659E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.836E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.436E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.202E-01	FAIL ABUN
LA-138	4.125E-02	NOT IDENT.
CE-139	1.696E-02	NOT IDENT.
BA-140	3.813E-01	NOT IDENT.
LA-140	1.817E-01	FAIL ABUN
CE-141	5.876E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.143E-01	NOT IDENT.
PM-144	2.811E-02	NOT IDENT.
PR-144	2.131E+00	NOT IDENT.
PM-146	2.247E-02	NOT IDENT.
ND-147	1.011E+00	NOT IDENT.
PM-147	4.690E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.561E-02	FAIL ABUN
EU-152	6.770E-02	FAIL ABUN
GD-153	4.082E-02	NOT IDENT.
EU-154	7.271E-02	NOT IDENT.
EU-155	5.183E-02	NOT IDENT.
TB-160	1.179E-01	FAIL ABUN
HO-166M	4.152E-02	NOT IDENT.
TM-171	1.272E+01	NOT IDENT.
HF-172	1.071E-01	NOT IDENT.
LU-172	5.075E-02	FAIL ABUN
LU-176	1.412E-02	NOT IDENT.
HF-181	3.258E-02	NOT IDENT.
TA-182	1.223E-01	FAIL ABUN
RE-183	1.569E-01	NOT IDENT.

RE-184	9.624E-02	FAIL ABUN
W-188	4.708E+00	NOT IDENT.
IR-192	2.424E-02	FAIL ABUN
HG-203	2.902E-02	NOT IDENT.
TL-204	2.222E+00	NOT IDENT.
BI-207	3.032E-02	NOT IDENT.
BI-210	2.986E+00	NOT IDENT.
PB-210	2.986E+00	NOT IDENT.
PB-211	4.413E-01	NOT IDENT.
BI-213	4.521E-02	NOT IDENT.
RN-219	2.959E-01	NOT IDENT.
RA-223	3.853E-01	FAIL ABUN
AC-225	1.368E+00	NOT IDENT.
AC-227	1.525E-01	NOT IDENT.
TH-227	1.525E-01	NOT IDENT.
AC-228	1.590E-01	FAIL ABUN
RA-228	1.590E-01	FAIL ABUN
TH-229	2.936E-01	FAIL ABUN
PA-231	2.837E-01	NOT IDENT.
TH-231	3.853E-01	FAIL ABUN
TH-232	1.590E-01	FAIL ABUN
PA-233	3.747E-02	NOT IDENT.
PA-234	1.887E-01	NOT IDENT.
PA-234M	8.564E-01	FAIL ABUN
TH-234	8.564E-01	FAIL ABUN
U-235	1.297E-01	FAIL ABUN
NP-237	3.747E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	8.564E-01	FAIL ABUN
NP-239	1.203E-01	NOT IDENT.
PU-239	1.733E+02	NOT IDENT.
AM-241	9.499E-02	NOT IDENT.
AM-243	3.688E-02	NOT IDENT.
CM-243	6.246E-02	NOT IDENT.
CM-247	2.605E-02	FAIL ABUN
CF-249	2.959E-02	NOT IDENT.
CF-251	7.226E-02	NOT IDENT.
ANH-511	4.048E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:30.34

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507010.CNF;1		
Acquisition date	: 10-APR-2025 22:30:35	Sensitivity	: 3.000
Detector ID	: GAM06	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.43	Half life ratio	: *****
Sample date	: 6-MAR-2025 12:30:00	Nuclide Library	: SOLID
Sample ID	: G714507010	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.4205E+02 GRAM
		Quantity Err(%)	: 1.4080E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 23-SEP-2024 11:03:33	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;23		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.047E+00	5.970E-01	5.970E-01
NB-95	5.323E-02	7.052E-02	7.052E-02
BA-137M	7.071E-02	4.088E-02	4.088E-02
CS-137	7.470E-02	4.318E-02	4.318E-02
TL-208	7.467E-02	4.276E-02	4.276E-02
BI-211	1.305E+00	4.563E-01	4.563E-01
BI-212	3.158E-01	5.915E-01	5.915E-01
PB-212	2.810E-01	7.535E-02	7.535E-02
BI-214	5.164E-01	1.513E-01	1.513E-01
PB-214	4.737E-01	1.654E-01	1.654E-01
RN-222	5.164E-01	1.513E-01	1.513E-01
RA-224	1.670E+00	8.928E-01	8.928E-01
RA-226	4.737E-01	1.654E-01	1.654E-01
TH-228	2.810E-01	7.535E-02	7.535E-02
TH-230	4.736E-01	1.654E-01	1.654E-01
U-234	4.736E-01	1.654E-01	1.654E-01
BK-247	5.597E-02	6.544E-02	6.544E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-2.295E-01	2.804E-01	2.989E-01	NOT IDENT.
NA-22	-1.160E-03	3.128E-02	3.128E-02	NOT IDENT.
NA-24	-2.016E+15	3.530E+15	3.645E+15	SHORT HLIF
AL-26	-6.171E-03	1.211E-02	1.242E-02	NOT IDENT.
SC-46	-1.123E-02	2.696E-02	2.743E-02	FAIL ABUN
V-48	3.916E-03	8.480E-02	8.481E-02	NOT IDENT.
CR-51	1.797E-01	3.906E-01	3.989E-01	NOT IDENT.
MN-52	9.272E-01	2.009E+00	2.052E+00	NOT IDENT.
MN-54	1.288E-02	2.747E-02	2.807E-02	NOT IDENT.
CO-56	1.869E-02	2.724E-02	2.852E-02	NOT IDENT.
MN-56	1.000E+41	1.447E+41	0.000E+00	SHORT HLIF
CO-57	-4.312E-04	1.777E-02	1.777E-02	NOT IDENT.
CO-58	1.263E-02	3.583E-02	3.628E-02	NOT IDENT.

FE-59	2.074E-02	1.007E-01	1.011E-01	NOT IDENT.
CO-60	-2.141E-03	2.967E-02	2.968E-02	NOT IDENT.
ZN-65	-1.468E-02	6.199E-02	6.234E-02	NOT IDENT.
GE-68	-4.265E-02	1.102E+00	1.102E+00	NOT IDENT.
AS-73	1.724E-01	7.724E-01	7.763E-01	NOT IDENT.
AS-74	-3.992E-02	1.244E-01	1.257E-01	NOT IDENT.
SE-75	-1.679E-02	3.719E-02	3.795E-02	NOT IDENT.
BR-77	1.634E+04	1.727E+04	1.878E+04	SHORT HLIF
SR-82	3.569E-01	4.265E-01	4.559E-01	NOT IDENT.
RB-83	4.021E-02	6.460E-02	6.709E-02	NOT IDENT.
RB-84	-2.570E-02	8.584E-02	8.662E-02	NOT IDENT.
KR-85	-1.377E+01	7.832E+00	9.995E+00	NOT IDENT.
SR-85	-9.042E-02	5.138E-02	6.559E-02	NOT IDENT.
RB-86	-2.961E-01	1.341E+00	1.347E+00	NOT IDENT.
Y-88	-1.384E-04	4.375E-02	4.375E-02	NOT IDENT.
Y-91	-9.138E+00	1.641E+01	1.692E+01	NOT IDENT.
NB-94	-9.677E-04	2.530E-02	2.530E-02	NOT IDENT.
NB-95M	-1.983E-02	1.037E-01	1.041E-01	NOT IDENT.
ZR-95	2.843E-02	7.099E-02	7.214E-02	NOT IDENT.
NB-97	-1.000E+41	1.649E+41	0.000E+00	SHORT HLIF
ZR-97	-8.869E+14	7.253E+14	8.282E+14	SHORT HLIF
MO-99	-1.120E+02	1.343E+03	1.344E+03	SHORT HLIF
TC-99M	-5.376E+40	5.480E+40	0.000E+00	SHORT HLIF
RH-101	4.734E-03	2.048E-02	2.059E-02	NOT IDENT.
RH-102	-2.918E-03	3.782E-02	3.784E-02	FAIL ABUN
RU-103	1.772E-03	3.764E-02	3.764E-02	FAIL ABUN
RH-106	-1.228E-01	1.944E-01	2.021E-01	NOT IDENT.
RU-106	-1.228E-01	1.944E-01	2.021E-01	NOT IDENT.
AG-108M	9.607E-03	1.691E-02	1.745E-02	NOT IDENT.
CD-109	3.120E-01	5.061E-01	5.252E-01	NOT IDENT.
AG-110	-2.522E-01	6.005E-01	6.111E-01	NOT IDENT.
AG-110M	2.810E-03	4.402E-02	4.404E-02	NOT IDENT.
SN-113	7.749E-03	3.546E-02	3.563E-02	NOT IDENT.
CD-115	-1.819E+03	4.164E+03	4.244E+03	SHORT HLIF
SN-117M	6.712E-03	9.064E-02	9.069E-02	NOT IDENT.
SB-122	2.218E+02	2.788E+02	2.962E+02	SHORT HLIF
TE-123M	7.419E-03	1.719E-02	1.751E-02	NOT IDENT.
SB-124	2.835E-02	6.842E-02	6.960E-02	NOT IDENT.
SB-125	1.315E-02	5.857E-02	5.887E-02	NOT IDENT.
TE-125M	3.829E+00	7.176E+00	7.381E+00	NOT IDENT.
I-126	-1.277E-01	5.223E-01	5.254E-01	NOT IDENT.
SB-126	1.211E-01	2.914E-01	2.965E-01	NOT IDENT.
SN-126	3.756E-02	5.075E-02	5.350E-02	NOT IDENT.
SB-127	-2.722E+01	4.115E+01	4.294E+01	NOT IDENT.
I-131	-3.279E-01	4.690E-01	4.918E-01	NOT IDENT.
I-132	1.000E+41	3.752E+41	0.000E+00	SHORT HLIF
TE-132	1.323E+01	4.193E+01	4.235E+01	SHORT HLIF
BA-133	9.451E-03	3.376E-02	3.403E-02	NOT IDENT.
I-133	-1.552E+10	3.704E+10	3.770E+10	SHORT HLIF
CS-134	-1.396E-02	3.223E-02	3.283E-02	NOT IDENT.
I-135	-3.382E+37	9.202E+37	0.000E+00	SHORT HLIF
CS-136	7.432E-02	2.414E-01	2.437E-01	FAIL ABUN
LA-138	1.601E-02	4.282E-02	4.342E-02	NOT IDENT.
CE-139	-1.201E-02	2.150E-02	2.217E-02	NOT IDENT.
BA-140	-2.878E-01	5.222E-01	5.381E-01	NOT IDENT.
LA-140	2.821E-02	2.030E-01	2.034E-01	FAIL ABUN
CE-141	-4.519E-02	7.277E-02	7.557E-02	NOT IDENT.
CE-143	-5.629E+05	2.346E+06	2.359E+06	SHORT HLIF
CE-144	7.640E-02	1.199E-01	1.248E-01	NOT IDENT.
PM-144	1.761E-02	3.056E-02	3.157E-02	NOT IDENT.
PR-144	1.350E+00	2.315E+00	2.393E+00	NOT IDENT.
PM-146	-2.200E-03	2.643E-02	2.644E-02	NOT IDENT.
ND-147	2.034E-01	1.133E+00	1.137E+00	NOT IDENT.
PM-147	4.271E+02	4.797E+02	5.169E+02	NOT IDENT.
PM-149	2.118E+04	3.777E+04	3.896E+04	SHORT HLIF
EU-150	-2.303E-03	1.783E-02	1.786E-02	FAIL ABUN
EU-152	4.848E-02	6.950E-02	7.286E-02	FAIL ABUN
GD-153	-3.017E-02	4.929E-02	5.114E-02	NOT IDENT.
EU-154	-3.250E-03	8.771E-02	8.772E-02	NOT IDENT.
EU-155	-5.267E-02	6.462E-02	6.884E-02	NOT IDENT.
TB-160	9.822E-02	1.145E-01	1.228E-01	FAIL ABUN
HO-166M	1.211E-02	4.762E-02	4.793E-02	NOT IDENT.
TM-171	-1.323E+00	1.361E+01	1.362E+01	NOT IDENT.
HF-172	-4.763E-02	1.272E-01	1.290E-01	NOT IDENT.
LU-172	-1.786E-03	5.970E-02	5.971E-02	FAIL ABUN
LU-176	-5.665E-04	1.577E-02	1.577E-02	NOT IDENT.
HF-181	-1.576E-02	4.130E-02	4.191E-02	NOT IDENT.
TA-182	-3.151E-02	1.561E-01	1.567E-01	FAIL ABUN

RE-183	2.832E-02	1.641E-01	1.646E-01	NOT IDENT.
RE-184	-4.781E-02	1.253E-01	1.271E-01	FAIL ABUN
W-188	1.466E+00	5.919E+00	5.956E+00	NOT IDENT.
IR-192	-2.849E-03	2.743E-02	2.746E-02	FAIL ABUN
HG-203	-1.342E-02	3.377E-02	3.431E-02	NOT IDENT.
TL-204	-3.664E+00	2.870E+00	3.311E+00	NOT IDENT.
BI-207	-1.432E-02	3.883E-02	3.936E-02	NOT IDENT.
BI-210	9.674E-01	3.036E+00	3.067E+00	NOT IDENT.
PB-210	9.674E-01	3.036E+00	3.067E+00	NOT IDENT.
PB-211	-1.945E-03	5.040E-01	5.040E-01	NOT IDENT.
BI-213	-7.573E-02	6.917E-02	7.714E-02	NOT IDENT.
RN-219	8.864E-02	3.250E-01	3.275E-01	NOT IDENT.
RA-223	-4.583E-02	4.368E-01	4.372E-01	FAIL ABUN
AC-225	7.223E-01	1.514E+00	1.548E+00	NOT IDENT.
AC-227	-2.794E-02	1.891E-01	1.895E-01	NOT IDENT.
TH-227	-2.794E-02	1.891E-01	1.895E-01	NOT IDENT.
AC-228	2.297E-01	2.204E-01	2.435E-01	FAIL ABUN
RA-228	2.297E-01	2.204E-01	2.435E-01	FAIL ABUN
TH-229	1.458E-01	3.479E-01	3.540E-01	FAIL ABUN
PA-231	1.995E-01	2.896E-01	3.032E-01	NOT IDENT.
TH-231	-4.583E-02	4.368E-01	4.372E-01	FAIL ABUN
TH-232	2.297E-01	2.204E-01	2.435E-01	FAIL ABUN
PA-233	-5.416E-03	4.248E-02	4.255E-02	NOT IDENT.
PA-234	-8.459E-02	2.531E-01	2.560E-01	NOT IDENT.
PA-234M	-5.016E-01	9.815E-01	1.007E+00	FAIL ABUN
TH-234	-5.016E-01	9.815E-01	1.007E+00	FAIL ABUN
U-235	6.099E-02	1.425E-01	1.451E-01	FAIL ABUN
NP-237	-5.416E-03	4.248E-02	4.255E-02	NOT IDENT.
NP-238	1.663E+03	7.022E+03	7.062E+03	SHORT HLIF
U-238	-5.016E-01	9.815E-01	1.007E+00	FAIL ABUN
NP-239	-5.278E-02	1.430E-01	1.450E-01	NOT IDENT.
PU-239	-9.834E+01	2.093E+02	2.140E+02	NOT IDENT.
AM-241	-1.595E-03	1.016E-01	1.016E-01	NOT IDENT.
AM-243	9.710E-03	4.204E-02	4.227E-02	NOT IDENT.
CM-243	8.712E-02	5.963E-02	7.140E-02	NOT IDENT.
CM-247	1.521E-02	2.753E-02	2.837E-02	FAIL ABUN
CF-249	2.412E-02	3.028E-02	3.217E-02	NOT IDENT.
CF-251	1.520E-03	9.111E-02	9.112E-02	NOT IDENT.
ANH-511	-2.462E-02	3.964E-02	4.117E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	22.2998	85.43	44.2328	131.20	31.8093
45.60	24.9163	86.55	44.3701	133.02	26.7760
46.54	28.2459	86.79	46.8657	133.52	21.6486
49.72	0.0000	86.94	46.8854	136.00	31.0780
51.35	18.9357	87.09	34.5611	136.47	29.0327
51.87	25.5750	87.57	34.6066	140.51	0.0000
52.39	28.9347	88.03	37.1249	143.76	28.3892
52.97	27.3436	88.34	42.1102	144.24	44.2007
53.44	29.0542	88.47	47.0810	145.44	42.1899
54.07	27.4609	89.96	49.7579	152.43	32.7611
57.36	0.0000	1093.63	37.3862	153.25	41.3683
57.53	26.1365	91.11	31.8179	323.87	34.2939
57.98	27.8687	92.59	31.9419	156.02	34.4043
59.27	30.5457	93.35	32.0052	158.56	24.8383
59.32	30.5512	94.56	30.2170	159.00	18.3727
59.54	30.5755	94.65	30.2241	162.33	32.6088
60.96	29.0239	94.67	30.2256	162.66	28.2768
61.17	41.8596	94.87	30.2412	163.33	22.8649
62.93	33.5230	97.43	31.3899	165.86	33.8977
63.29	39.5892	98.43	29.5618	176.31	34.1125
63.58	38.7674	98.44	29.5625	176.60	35.6123
64.28	20.7256	99.53	15.2994	177.52	28.2344
66.73	40.0535	100.11	29.6852	181.07	0.0000
67.24	34.8880	102.03	29.8252	181.52	25.4225
125.81	22.7101	103.18	15.4366	184.41	28.5414
67.75	22.7153	103.37	15.4437	143.76	21.4492
68.89	17.5386	105.21	37.8101	193.51	21.3227
69.67	21.9788	105.31	37.8193	197.03	22.9648
70.82	42.3545	106.12	26.2329	198.01	32.1973
70.83	42.3560	106.47	26.2545	201.83	41.6261
72.81	43.5090	109.28	24.4698	203.43	23.1787
72.87	43.5173	111.00	31.4453	205.31	35.6361
74.66	54.7729	111.76	0.0000	210.85	15.2247
74.82	54.8000	114.06	29.6846	215.65	25.1501
74.97	53.6330	116.30	0.0000	218.12	18.9260
77.11	52.1819	116.74	25.8800	222.11	14.2709
78.74	42.1891	119.76	34.0664	227.09	19.1536
79.69	36.2631	121.12	25.1221	227.38	22.7533
80.03	47.1881	121.22	25.1274	228.16	0.0000
80.12	43.5703	121.78	26.1638	228.18	25.1748
80.19	43.5791	122.06	35.2414	116.74	25.1748
80.57	38.1740	122.92	42.3669	235.69	24.2093
81.00	33.9746	123.07	32.2898	235.96	20.9885
81.07	33.9814	265.00	31.3209	238.63	21.8697
81.75	38.9121	125.81	37.5499	238.98	0.0000
82.47	35.3370	127.23	31.5530	240.99	21.9345
83.79	39.4441	127.91	33.6360	242.00	21.9622
84.00	39.4674	129.30	34.7533	244.70	22.0358

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	17.3007	344.28	15.4353	563.25	11.7833
252.80	17.3090	345.93	25.0979	564.24	0.0000
254.15	0.0000	351.06	21.9282	569.33	11.8276
256.23	26.0701	351.93	21.9458	946.00	9.6782
260.90	0.0000	355.39	0.0000	569.70	9.6793
264.66	26.3295	356.01	17.8976	583.19	11.3857
264.80	26.3340	364.49	21.2724	584.27	11.3929
265.00	28.8483	366.42	0.0000	595.83	8.7406
269.46	20.1719	372.51	17.6977	427.87	5.4781
270.03	20.1851	375.05	14.0030	602.52	0.0000
271.23	21.4757	377.52	16.8398	604.72	8.2370
273.65	23.6461	356.01	22.5757	607.14	12.0979
276.40	21.1777	388.16	14.1617	609.32	12.1136
277.37	18.6569	388.63	17.9455	610.33	12.1203
277.60	22.0544	391.69	15.1510	614.28	8.2828
278.00	20.3672	264.66	17.1727	618.01	7.7471
279.20	24.6434	401.81	19.0987	620.36	6.6494
279.54	26.3524	402.40	14.3311	621.93	8.8737
279.70	26.3574	404.85	16.2747	630.19	0.0000
280.46	17.8700	410.95	18.2798	631.29	8.9209
283.69	23.0576	413.71	16.3920	633.25	11.1633
284.31	19.2274	414.70	15.4401	634.78	6.7039
285.41	14.1172	423.72	10.6914	635.95	3.3541
285.90	0.0000	427.09	14.6179	636.99	7.8309
287.50	21.4386	427.87	10.7263	657.50	10.1825
290.67	13.7676	433.94	6.8582	657.76	13.5786
293.27	0.0000	439.40	6.8869	657.90	0.0000
351.93	13.8346	440.45	17.7235	661.66	9.0716
295.96	13.8454	453.88	10.9411	664.57	0.0000
879.38	15.6193	463.37	8.0130	666.33	10.2312
299.98	13.0353	468.07	9.0456	666.50	10.2323
300.09	13.0368	473.00	12.1038	667.71	0.0000
300.13	13.0374	475.06	7.0709	677.62	11.4368
301.36	13.0542	476.78	14.1595	685.70	12.6342
302.85	20.9189	477.60	15.1797	692.65	0.0000
256.23	15.7159	482.18	13.1986	695.00	12.6955
304.85	15.7218	487.02	9.1686	696.49	10.3953
306.78	15.7529	492.35	0.0000	696.51	10.3953
308.46	16.6571	497.08	10.2588	697.00	9.2425
311.90	19.3547	505.52	16.5094	697.30	9.2441
316.51	18.5611	507.63	0.0000	697.49	9.2451
319.41	19.5015	511.00	16.5706	702.65	10.4282
320.08	14.1921	514.00	46.6992	706.68	12.7720
321.04	15.9814	514.00	46.6992	711.68	9.3125
323.87	20.4778	520.40	10.4220	720.70	6.0138
325.23	23.1801	520.69	0.0000	721.93	0.0000
328.76	22.3653	522.65	0.0000	722.78	8.4281
333.37	20.6678	527.90	0.0000	722.91	8.4287
333.97	18.8817	528.26	10.4761	723.31	9.8355
334.37	20.6879	529.59	10.4850	724.19	11.2457
338.28	21.6680	529.87	0.0000	727.33	7.9195
338.32	21.6689	531.02	6.2969	733.00	5.8828
311.90	33.4740	537.26	11.5913	735.93	10.6044
340.48	33.4740	546.56	0.0000	333.97	10.6124
340.55	30.7620	552.55	6.3845	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	7.0984	667.71	0.0000	1434.09	1.8203
747.24	10.6633	962.31	6.2449	1435.80	2.7318
748.06	9.7787	964.08	7.8115	1457.56	0.0000
752.31	8.0173	966.17	12.5086	1460.82	1.5280
753.82	7.1316	911.20	5.8698	1489.16	5.5427
756.73	7.1416	983.53	2.9514	1505.03	4.6384
756.80	7.1418	984.45	0.0000	1584.12	1.8935
884.68	8.5995	1274.44	5.9315	1596.21	2.8487
765.81	8.6074	1002.74	5.9460	1620.50	0.9553
766.84	8.6115	1004.73	3.9670	1621.92	0.9556
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	5.4069	1025.87	0.0000	1690.97	0.9717
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	7.2173	1037.84	10.0403	1764.49	4.9421
783.70	1.8084	1038.76	0.0000	1063.66	7.9176
788.74	5.8004	631.29	6.0432	1771.35	7.9195
792.07	8.7141	1048.07	6.0465	1791.20	0.0000
795.86	11.4312	1049.04	3.0244	1808.65	0.9983
810.06	7.3218	1050.41	4.0344	1810.72	0.0000
810.29	8.2378	1063.66	6.0806	1836.06	4.0176
344.28	8.2386	1077.00	8.1460		
810.76	7.3242	1077.34	8.1470		
815.77	6.4232	1085.87	7.1500		
1048.07	5.5124	1093.63	8.1938		
832.01	7.3943	1099.45	6.1578		
834.85	6.4781	1112.07	2.7487		
835.71	8.3323	1112.84	3.2994		
836.80	0.0000	1115.54	4.9535		
846.75	0.0000	1120.29	3.3078		
846.77	2.7910	1120.55	3.3080		
856.80	7.4751	1221.41	3.3090		
860.56	9.3588	1129.67	2.0740		
871.09	6.5809	1131.51	0.0000		
873.19	4.7049	1147.95	0.0000		
875.33	0.0000	1173.23	6.3131		
879.38	3.7738	1177.95	11.5915		
880.51	8.4949	1189.05	6.3457		
881.60	10.3877	1204.77	6.3779		
883.24	11.3397	1221.41	7.4807		
884.68	9.4556	1231.02	3.2157		
889.28	4.5475	1235.36	2.1467		
894.76	7.5964	1238.28	3.2230		
898.04	6.6559	1260.41	0.0000		
900.72	4.7595	1271.87	4.3420		
903.28	7.6233	1274.44	4.3455		
911.20	5.7361	1274.54	4.3457		
912.08	5.7382	1291.59	5.4602		
923.98	0.0000	1298.22	0.0000		
926.50	5.7719	1312.11	5.4938		
929.11	4.8149	1332.49	4.4216		
935.54	4.8274	1362.66	0.0000		
937.49	9.6625	1365.19	2.2318		
944.13	4.8441	1368.63	0.0000		
946.00	7.7561	1384.29	2.2440		
949.00	8.7361	1408.01	6.3253		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:57.00

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*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507011.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM07.CNF;921
                                        Background date  : 6-APR-2025 11:01:22.
Sample date      : 6-MAR-2025 13:00:00. Acquisition date : 10-APR-2025 22:31:11
Sample ID        : G714507011           Sample quantity  : 9.74900E+01 GRAM
Detector name    : GAM07                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.47  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.18*	14	114	0.96	127.22	125	6	3.98E-03	123.2	
2	3	74.97*	147	151	1.28	150.80	146	16	4.09E-02	17.0	1.29E+00
3	3	77.31*	210	105	1.05	155.47	146	16	5.85E-02	10.9	
4	0	84.17*	44	114	1.15	169.18	167	7	1.22E-02	44.0	
5	3	87.58*	74	102	1.32	176.01	173	24	2.05E-02	23.5	1.86E+00
6	3	89.91	44	108	1.22	180.66	173	24	1.21E-02	42.7	
7	3	92.91*	126	104	1.33	186.66	173	24	3.50E-02	18.1	
8	0	99.47*	17	95	1.23	199.77	197	8	4.62E-03	105.6	
9	0	106.32	12	101	1.20	213.48	210	8	3.39E-03	145.0	
10	0	115.60	15	93	0.83	232.03	228	8	4.12E-03	116.9	
11	0	157.78	10	77	1.14	316.36	313	6	2.86E-03	137.8	
12	5	186.31*	95	110	1.64	373.39	369	16	2.64E-02	21.5	2.96E+00
13	5	189.82	19	78	1.86	380.41	369	16	5.23E-03	98.5	
14	3	207.01	20	21	1.57	414.78	413	14	5.44E-03	34.7	2.65E+00
15	3	209.73	42	61	1.58	420.21	413	14	1.17E-02	37.6	
16	0	231.69	17	50	0.71	464.12	462	7	4.85E-03	70.0	
17	0	238.71*	250	130	0.91	478.16	472	10	6.95E-02	10.9	
18	0	242.19	88	73	0.96	485.11	483	7	2.44E-02	20.7	
19	0	270.17	62	59	0.91	541.06	535	11	1.71E-02	27.5	
20	0	278.09*	7	56	1.31	556.90	552	8	1.87E-03	204.1	
21	0	295.29*	226	72	1.31	591.28	584	12	6.28E-02	9.6	
22	0	338.64*	70	52	1.17	677.95	673	12	1.95E-02	23.9	
23	0	351.96*	391	56	1.28	704.58	698	14	1.09E-01	6.5	
24	0	397.97	16	39	3.30	796.58	789	11	4.52E-03	78.0	
25	0	467.54	54	61	12.80	935.67	922	30	1.50E-02	44.0	
26	0	478.27	24	37	1.17	957.13	952	12	6.57E-03	55.0	
27	0	510.86*	46	3	2.24	1022.29	1016	13	1.27E-02	26.7	
28	0	521.01	11	24	3.92	1042.59	1034	11	3.01E-03	93.8	
29	0	583.32*	116	15	1.66	1167.18	1161	15	3.23E-02	12.1	
30	0	589.15	12	6	1.24	1178.83	1176	6	3.33E-03	43.3	
31	0	609.47*	279	23	1.71	1219.45	1214	15	7.76E-02	7.1	
32	0	694.61	17	10	1.64	1389.70	1385	10	4.65E-03	43.1	
33	0	713.30	16	6	1.14	1427.08	1422	8	4.41E-03	36.8	
34	0	727.38*	23	27	2.26	1455.22	1448	13	6.31E-03	51.7	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	768.31	27	21	1.52	1537.06	1530	12	7.54E-03	38.8	
36	0	796.51	12	28	2.44	1593.46	1582	13	3.23E-03	100.0	
37	0	814.25	14	0	1.42	1628.93	1625	9	3.89E-03	26.7	
38	0	836.24	16	15	0.64	1672.89	1667	11	4.38E-03	52.6	
39	0	839.66	10	12	1.19	1679.73	1677	9	2.80E-03	68.2	
40	0	861.53	15	11	2.37	1723.47	1715	11	4.17E-03	50.0	
41	0	896.68	12	15	4.79	1793.75	1785	15	3.33E-03	76.0	
42	0	910.93*	85	0	1.50	1822.25	1815	14	2.36E-02	11.1	
43	1	964.64	20	11	2.00	1929.64	1923	22	5.43E-03	38.3	1.47E+00
44	1	969.00	32	8	2.00	1938.36	1923	22	8.85E-03	28.1	
45	0	1006.36*	9	2	0.93	2013.08	2009	7	2.63E-03	42.7	
46	0	1120.92	55	24	2.22	2242.16	2230	17	1.54E-02	23.5	
47	0	1145.36	8	5	1.28	2291.04	2285	9	2.35E-03	56.8	
48	0	1378.21	14	11	1.96	2756.68	2749	11	3.94E-03	52.3	
49	0	1460.17*	47	4	1.43	2920.60	2914	15	1.32E-02	17.8	
50	0	1522.04	9	3	1.45	3044.33	3038	11	2.56E-03	48.0	
51	0	1763.95*	48	0	1.83	3528.14	3521	14	1.32E-02	14.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:31:58

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507011.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 13:00:00 Acquisition date : 10-APR-2025 22:31:11
Sample ID : G714507011 Sample quantity : 97.490 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA7 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.47 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
TL-208	277.37	HG-203	279.20

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	2.888E+00	5.703E-01	9.045E-01	109.99	OK
K-40	1460.82	10.66*	1.051E+00	3.038E+00	3.038E+00	35.53	OK
MN-54	834.85	99.98*	1.783E+00	6.388E-02	6.911E-02	105.28	OK
CD-109	88.03	3.70*	5.844E+00	2.532E+00	2.671E+00	47.00	OK
SN-117M	156.02	2.11	6.140E+00	----- Line Not Found		-----	Absent
	158.56	86.40*	6.107E+00	1.440E-02	8.755E-02	275.53	OK
TE-123M	159.00	84.00*	6.107E+00	1.481E-02	1.820E-02	275.53	OK
SN-126	64.28	9.60	3.109E+00	3.574E-01	3.574E-01	246.35	OK
	86.94	8.90	5.844E+00	1.053E+00	1.053E+00	47.00	OK
	87.57	37.00*	5.844E+00	2.532E-01	2.532E-01	47.00	OK
EU-155	86.55	30.70	5.844E+00	3.052E-01	3.096E-01	47.00	OK
	105.31	21.10*	6.562E+00	6.523E-02	6.616E-02	289.95	OK
TL-208	277.37	6.60	4.268E+00	1.753E-01	1.753E-01	408.18	OK
	583.19	85.00*	2.465E+00	4.031E-01	4.031E-01	24.23	OK
	860.56	12.50	1.733E+00	5.004E-01	5.004E-01	100.00	OK
BI-211	72.87	1.23	4.457E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.618E+00	6.106E+00	6.106E+00	13.06	OK
BI-212	727.33	6.67*	2.033E+00	1.212E+00	1.212E+00	103.34	OK
	1620.50	1.47	9.748E-01	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	4.708E+00	2.259E+00	2.259E+00	34.05	OK
	77.11	17.10	4.966E+00	1.841E+00	1.841E+00	21.83	OK
	238.63	43.60*	4.741E+00	8.879E-01	8.879E-01	21.89	OK
	300.09	3.30	4.048E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	2.376E+00	1.875E+00	1.875E+00	14.23	OK
	1120.29	14.92	1.337E+00	2.001E+00	2.001E+00	46.97	OK
	1764.49	15.30	9.301E-01	2.398E+00	2.399E+00	29.85	OK
PB-214	74.82	5.80	4.708E+00	4.003E+00	4.003E+00	34.05	OK
	77.11	9.70	4.966E+00	3.245E+00	3.245E+00	21.83	OK
	87.09	3.41	5.844E+00	2.748E+00	2.748E+00	47.00	OK
	242.00	7.25	4.695E+00	1.893E+00	1.893E+00	41.32	OK
	295.22	18.42	4.094E+00	2.193E+00	2.193E+00	19.26	OK
	351.93	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06	OK
RN-222	609.32	45.49*	2.376E+00	1.875E+00	1.875E+00	14.23	OK
	1120.29	14.92	1.337E+00	2.001E+00	2.001E+00	46.97	OK
	1764.49	15.30	9.301E-01	2.398E+00	2.399E+00	29.85	OK
RA-224	240.99	4.10*	4.695E+00	3.347E+00	3.347E+00	41.32	OK
RA-226	74.82	5.80	4.708E+00	4.003E+00	4.003E+00	34.05	OK
	77.11	9.70	4.966E+00	3.245E+00	3.245E+00	21.83	OK
	87.09	3.41	5.844E+00	2.748E+00	2.748E+00	47.00	OK
	242.00	7.25	4.695E+00	1.893E+00	1.893E+00	41.32	OK
	295.22	18.42	4.094E+00	2.193E+00	2.193E+00	19.26	OK
	351.93	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06	OK
AC-228	105.21	1.10	6.562E+00	1.251E+00	1.251E+00	289.95	OK
	338.32	11.27	3.718E+00	1.224E+00	1.224E+00	47.84	OK
	835.71	1.61	1.783E+00	3.967E+00	3.967E+00	105.28	OK
	911.20	25.80*	1.641E+00	1.451E+00	1.451E+00	22.24	OK
	968.97	15.80	1.544E+00	9.422E-01	9.422E-01	56.16	OK
RA-228	105.21	1.10	6.562E+00	1.251E+00	1.251E+00	289.95	OK
	338.32	11.27	3.718E+00	1.224E+00	1.224E+00	47.84	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	835.71	1.61	1.783E+00	3.967E+00	3.967E+00	105.28	OK
	911.20	25.80*	1.641E+00	1.451E+00	1.451E+00	22.24	OK
	968.97	15.80	1.544E+00	9.422E-01	9.422E-01	56.16	OK
TH-228	74.82	10.28	4.708E+00	2.259E+00	2.259E+00	34.05	OK
	77.11	17.10	4.966E+00	1.841E+00	1.841E+00	21.83	OK
	238.63	43.60*	4.741E+00	8.879E-01	8.879E-01	21.89	OK
	300.09	3.30	4.048E+00	----- Line Not Found		-----	Absent
TH-229	85.43	14.70	5.597E+00	3.959E-01	3.959E-01	87.92	OK
	88.47	24.00	5.844E+00	3.904E-01	3.904E-01	47.00	OK
	193.51	4.41*	5.442E+00	----- Line Not Found		-----	Absent
	210.85	2.80	5.169E+00	2.139E+00	2.139E+00	75.12	OK
TH-230	74.82	5.80	4.708E+00	4.003E+00	4.003E+00	34.05	OK
	77.11	9.70	4.966E+00	3.245E+00	3.245E+00	21.83	OK
	87.09	3.41	5.844E+00	2.748E+00	2.748E+00	47.00	OK
	242.00	7.25	4.695E+00	1.893E+00	1.893E+00	41.32	OK
	295.22	18.42	4.094E+00	2.193E+00	2.193E+00	19.26	OK
	351.93	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06	OK
TH-232	105.21	1.10	6.562E+00	1.251E+00	1.251E+00	289.95	OK
	338.32	11.27	3.718E+00	1.224E+00	1.224E+00	47.84	OK
	835.71	1.61	1.783E+00	3.967E+00	3.967E+00	105.28	OK
	911.20	25.80*	1.641E+00	1.451E+00	1.451E+00	22.24	OK
	968.97	15.80	1.544E+00	9.422E-01	9.422E-01	56.16	OK
PA-234M	63.29	3.70*	3.109E+00	9.273E-01	9.273E-01	246.35	OK
	92.59	4.23	6.148E+00	3.590E+00	3.590E+00	36.27	OK
TH-234	63.29	3.70*	3.109E+00	9.273E-01	9.273E-01	246.35	OK
	92.59	4.23	6.148E+00	3.590E+00	3.590E+00	36.27	OK
U-234	74.82	5.80	4.708E+00	4.003E+00	4.003E+00	34.05	OK
	77.11	9.70	4.966E+00	3.245E+00	3.245E+00	21.83	OK
	87.09	3.41	5.844E+00	2.748E+00	2.748E+00	47.00	OK
	242.00	7.25	4.695E+00	1.893E+00	1.893E+00	41.32	OK
	295.22	18.42	4.094E+00	2.193E+00	2.193E+00	19.26	OK
	351.93	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06	OK
U-235	89.96	3.47	5.988E+00	1.556E+00	1.556E+00	85.36	OK
	93.35	5.60	6.148E+00	2.712E+00	2.712E+00	36.27	OK
	143.76	10.96*	6.359E+00	----- Line Not Found		-----	Absent
	163.33	5.08	6.002E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.571E+00	2.194E-01	2.194E-01	42.92	OK
	205.31	5.01	5.241E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	3.109E+00	9.273E-01	9.273E-01	246.35	OK
	92.59	4.23	6.148E+00	3.590E+00	3.590E+00	36.27	OK
AM-243	43.53	5.90	4.826E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	4.708E+00	3.455E-01	3.455E-01	34.05	OK
ANH-511	511.00	100.00*	2.744E+00	1.208E-01	1.208E-01	53.34	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:59.62

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507011.CNF;1		
Acquisition date	: 10-APR-2025 22:31:11	Sensitivity	: 3.000
Detector ID	: GAM07	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.47	Half life ratio	: *****
Sample date	: 6-MAR-2025 13:00:00	Analyst initials	: MXR1
Sample ID	: G714507011	Sample Quantity	: 9.7490E+01 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 23-JUL-2024 04:21:13	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM07_CAN.CNF;23		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	9.045E-01	9.750E-01	6.622E-01
K-40	3.038E+00	1.058E+00	1.041E+00
MN-54	6.911E-02	7.131E-02	9.261E-02
CD-109	2.671E+00	1.230E+00	1.455E+00
SN-117M	8.755E-02	2.364E-01	3.485E-01
TE-123M	1.820E-02	4.913E-02	6.924E-02
SN-126	2.532E-01	1.166E-01	1.386E-01
EU-155	6.616E-02	1.880E-01	2.036E-01
TL-208	4.031E-01	9.573E-02	6.959E-02
BI-211	6.106E+00	7.816E-01	4.038E-01
BI-212	1.212E+00	1.227E+00	1.107E+00
PB-212	8.879E-01	1.904E-01	1.506E-01
BI-214	1.875E+00	2.615E-01	1.494E-01
PB-214	2.216E+00	2.837E-01	1.469E-01
RN-222	1.875E+00	2.615E-01	1.494E-01
RA-224	3.347E+00	1.355E+00	1.836E+00
RA-226	2.216E+00	2.837E-01	1.469E-01
AC-228	1.451E+00	3.162E-01	2.728E-01
RA-228	1.451E+00	3.162E-01	2.728E-01
TH-228	8.879E-01	1.904E-01	1.506E-01
TH-229	9.487E-02	6.589E-01	1.079E+00
TH-230	2.216E+00	2.837E-01	1.469E-01
TH-232	1.451E+00	3.162E-01	2.728E-01
PA-234M	9.273E-01	2.239E+00	2.829E+00
TH-234	9.273E-01	2.239E+00	2.829E+00
U-234	2.216E+00	2.837E-01	1.469E-01
U-235	2.306E-01	2.618E-01	4.888E-01
U-238	9.273E-01	2.239E+00	2.829E+00
AM-243	3.455E-01	1.153E-01	1.122E-01
ANH-511	1.208E-01	6.315E-02	5.759E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)

NA-22	1.512E-02	4.579E-02	1.009E-01	NOT IDENT.
NA-24	0.000E+00	5.911E+15	0.000E+00	SHORT HLIF
AL-26	3.522E-02	4.540E-02	1.171E-01	NOT IDENT.
SC-46	1.838E-02	5.167E-02	1.064E-01	FAIL ABUN
V-48	-7.065E-02	1.530E-01	2.886E-01	NOT IDENT.
CR-51	8.867E-01	7.042E-01	1.508E+00	NOT IDENT.
MN-52	2.465E+00	3.324E+00	8.310E+00	NOT IDENT.
CO-56	-7.725E-04	4.917E-02	9.448E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-7.609E-03	3.013E-02	5.273E-02	NOT IDENT.
CO-58	3.480E-02	5.203E-02	1.071E-01	NOT IDENT.
FE-59	1.828E-02	1.431E-01	2.944E-01	NOT IDENT.
CO-60	1.358E-02	3.311E-02	8.174E-02	NOT IDENT.
ZN-65	2.854E-02	1.237E-01	2.288E-01	NOT IDENT.
GE-68	2.817E-01	1.396E+00	2.974E+00	NOT IDENT.
AS-73	-1.004E-01	1.262E+00	2.310E+00	NOT IDENT.
AS-74	-8.509E-02	2.611E-01	4.640E-01	NOT IDENT.
SE-75	-1.384E-02	6.176E-02	1.036E-01	FAIL ABUN
BR-77	0.000E+00	1.101E+04	0.000E+00	SHORT HLIF
SR-82	4.808E-02	7.787E-01	1.459E+00	NOT IDENT.
RB-83	8.605E-02	1.581E-01	1.885E-01	FAIL ABUN
RB-84	-1.869E-02	1.067E-01	2.131E-01	NOT IDENT.
KR-85	1.178E+00	1.005E+01	1.411E+01	NOT IDENT.
SR-85	7.653E-03	6.594E-02	9.250E-02	NOT IDENT.
RB-86	-2.252E-01	1.847E+00	3.668E+00	NOT IDENT.
Y-88	-1.734E-02	4.812E-02	9.823E-02	FAIL ABUN
Y-91	-6.415E+00	2.429E+01	4.719E+01	NOT IDENT.
NB-94	-5.355E-03	4.549E-02	8.232E-02	NOT IDENT.
NB-95	3.685E-02	7.059E-02	1.303E-01	NOT IDENT.
NB-95M	1.391E-01	2.576E-01	3.824E-01	NOT IDENT.
ZR-95	1.085E-01	1.211E-01	2.548E-01	NOT IDENT.
NB-97	0.000E+00	1.494E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.666E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.293E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.050E+41	0.000E+00	SHORT HLIF
RH-101	1.910E-02	3.776E-02	6.963E-02	NOT IDENT.
RH-102	1.935E-02	6.451E-02	1.280E-01	FAIL ABUN
RU-103	3.804E-03	5.444E-02	1.073E-01	FAIL ABUN
RH-106	1.609E-01	3.704E-01	7.525E-01	NOT IDENT.
RU-106	1.609E-01	3.704E-01	7.525E-01	NOT IDENT.
AG-108M	2.095E-02	3.279E-02	6.777E-02	NOT IDENT.
AG-110	-4.224E-01	8.858E-01	1.532E+00	NOT IDENT.
AG-110M	-1.318E-02	4.232E-02	8.455E-02	NOT IDENT.
SN-113	6.748E-03	6.713E-02	1.158E-01	NOT IDENT.
CD-115	0.000E+00	8.216E+03	0.000E+00	SHORT HLIF
SB-122	0.000E+00	3.803E+02	0.000E+00	SHORT HLIF
SB-124	7.684E-02	8.695E-02	2.730E-01	NOT IDENT.
SB-125	5.713E-02	1.137E-01	2.271E-01	NOT IDENT.
TE-125M	-3.349E+00	1.512E+01	2.432E+01	NOT IDENT.
I-126	1.674E-01	7.232E-01	1.426E+00	NOT IDENT.
SB-126	4.820E-02	5.346E-01	9.796E-01	FAIL ABUN
SB-127	-3.013E+01	5.787E+01	9.889E+01	NOT IDENT.
I-131	-7.090E-02	7.806E-01	1.469E+00	NOT IDENT.
I-132	0.000E+00	8.800E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.514E+01	0.000E+00	SHORT HLIF
BA-133	2.801E-02	4.637E-02	8.849E-02	NOT IDENT.
I-133	0.000E+00	8.784E+10	0.000E+00	SHORT HLIF
CS-134	5.440E-02	1.066E-01	1.151E-01	FAIL ABUN
I-135	0.000E+00	1.237E+38	0.000E+00	SHORT HLIF
CS-136	-2.919E-01	3.490E-01	5.840E-01	NOT IDENT.
BA-137M	2.349E-03	4.289E-02	8.119E-02	NOT IDENT.
CS-137	2.481E-03	4.531E-02	8.577E-02	NOT IDENT.
LA-138	-7.499E-03	6.805E-02	1.376E-01	NOT IDENT.
CE-139	-1.235E-02	4.233E-02	7.167E-02	NOT IDENT.
BA-140	5.584E-02	7.724E-01	1.522E+00	NOT IDENT.
LA-140	1.298E-01	3.698E-01	8.172E-01	NOT IDENT.
CE-141	-2.483E-02	1.178E-01	2.025E-01	NOT IDENT.
CE-143	0.000E+00	4.433E+06	0.000E+00	SHORT HLIF
CE-144	9.845E-02	2.324E-01	4.282E-01	NOT IDENT.
PM-144	-1.635E-02	5.300E-02	8.157E-02	FAIL ABUN
PR-144	-1.308E+00	3.999E+00	6.128E+00	NOT IDENT.
PM-146	-2.357E-02	4.671E-02	8.268E-02	NOT IDENT.
ND-147	3.031E+00	2.716E+00	5.756E+00	FAIL ABUN
PM-147	1.194E+02	8.269E+02	1.505E+03	NOT IDENT.
PM-149	0.000E+00	6.157E+04	0.000E+00	SHORT HLIF
EU-150	9.536E-03	4.005E-02	6.953E-02	FAIL ABUN
EU-152	2.868E-02	1.237E-01	2.298E-01	FAIL ABUN
GD-153	-6.891E-03	1.059E-01	1.580E-01	NOT IDENT.

EU-154	4.992E-02	1.305E-01	2.892E-01	NOT IDENT.
TB-160	1.642E-02	1.808E-01	3.723E-01	FAIL ABUN
HO-166M	-1.166E-03	8.874E-02	1.463E-01	NOT IDENT.
TM-171	-1.708E+01	2.264E+01	3.916E+01	NOT IDENT.
HF-172	-1.432E-01	2.298E-01	3.833E-01	FAIL ABUN
LU-172	-5.122E-02	6.957E-02	1.189E-01	FAIL ABUN
LU-176	2.972E-02	2.952E-02	6.209E-02	FAIL ABUN
HF-181	-9.831E-03	7.210E-02	1.205E-01	NOT IDENT.
TA-182	5.642E-02	2.080E-01	4.481E-01	FAIL ABUN
RE-183	-4.597E-02	2.819E-01	5.101E-01	NOT IDENT.
RE-184	9.515E-02	2.111E-01	4.393E-01	NOT IDENT.
W-188	2.014E+00	1.036E+01	1.841E+01	FAIL ABUN
IR-192	-2.552E-02	4.747E-02	8.528E-02	FAIL ABUN
HG-203	2.402E-02	9.608E-02	1.106E-01	FAIL ABUN
TL-204	-1.911E+00	6.609E+00	1.072E+01	NOT IDENT.
BI-207	4.133E-03	5.923E-02	1.213E-01	FAIL ABUN
BI-210	-1.430E+00	5.098E+00	9.291E+00	NOT IDENT.
PB-210	-1.430E+00	5.098E+00	9.291E+00	NOT IDENT.
PB-211	1.303E-01	8.852E-01	1.694E+00	NOT IDENT.
BI-213	-5.733E-02	1.208E-01	2.147E-01	NOT IDENT.
RN-219	-1.621E-01	5.636E-01	9.098E-01	FAIL ABUN
RA-223	7.034E-02	7.691E-01	1.470E+00	FAIL ABUN
AC-225	2.819E+00	3.052E+00	5.775E+00	NOT IDENT.
AC-227	-1.918E-01	3.433E-01	5.492E-01	NOT IDENT.
TH-227	-1.918E-01	3.433E-01	5.492E-01	NOT IDENT.
PA-231	-3.422E-01	5.537E-01	9.862E-01	NOT IDENT.
TH-231	7.034E-02	7.691E-01	1.470E+00	FAIL ABUN
PA-233	1.027E-02	7.644E-02	1.472E-01	NOT IDENT.
PA-234	-2.588E-02	3.061E-01	6.207E-01	FAIL ABUN
NP-237	1.027E-02	7.644E-02	1.472E-01	FAIL ABUN
NP-238	0.000E+00	1.280E+04	0.000E+00	SHORT HLIF
NP-239	2.078E-01	4.763E-01	4.980E-01	FAIL ABUN
PU-239	-1.203E+02	3.940E+02	6.771E+02	NOT IDENT.
AM-241	5.018E-02	1.835E-01	3.417E-01	NOT IDENT.
CM-243	-6.565E-02	1.444E-01	1.964E-01	FAIL ABUN
BK-247	-2.398E-03	1.011E-01	1.738E-01	FAIL ABUN
CM-247	3.035E-03	4.489E-02	8.546E-02	FAIL ABUN
CF-249	1.941E-02	4.877E-02	9.616E-02	NOT IDENT.
CF-251	-4.509E-02	1.497E-01	2.537E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:31:58.02

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	22	10.44*	2.888E+00	5.703E-01	9.045E-01	109.99
K-40	1460.82	44	10.66*	1.051E+00	3.038E+00	3.038E+00	35.53
MN-54	834.85	15	99.98*	1.783E+00	6.388E-02	6.911E-02	105.28
CD-109	88.03	71	3.70*	5.844E+00	2.532E+00	2.671E+00	47.00
SN-117M	156.02	------	2.11	6.140E+00	------ Line Not Found		------
	158.56	10	86.40*	6.107E+00	1.440E-02	8.755E-02	275.53
TE-123M	159.00	10	84.00*	6.107E+00	1.481E-02	1.820E-02	275.53
SN-126	64.28	14	9.60	3.109E+00	3.574E-01	3.574E-01	246.35
	86.94	71	8.90	5.844E+00	1.053E+00	1.053E+00	47.00
	87.57	71	37.00*	5.844E+00	2.532E-01	2.532E-01	47.00
EU-155	86.55	71	30.70	5.844E+00	3.052E-01	3.096E-01	47.00
	105.31	12	21.10*	6.562E+00	6.523E-02	6.616E-02	289.95
HG-203	70.83	------	3.69	4.198E+00	------ Line Not Found		------
	72.87	------	6.19	4.457E+00	------ Line Not Found		------
	279.20	6	81.56*	4.268E+00	1.418E-02	2.402E-02	408.18
TL-208	277.37	6	6.60	4.268E+00	1.753E-01	1.753E-01	408.18
	583.19	110	85.00*	2.465E+00	4.031E-01	4.031E-01	24.23
	860.56	14	12.50	1.733E+00	5.004E-01	5.004E-01	100.00
BI-211	72.87	------	1.23	4.457E+00	------ Line Not Found		------
	351.06	371	12.92*	3.618E+00	6.106E+00	6.106E+00	13.06
BI-212	727.33	21	6.67*	2.033E+00	1.212E+00	1.212E+00	103.34
	1620.50	------	1.47	9.748E-01	------ Line Not Found		------
PB-212	74.82	142	10.28	4.708E+00	2.259E+00	2.259E+00	34.05
	77.11	203	17.10	4.966E+00	1.841E+00	1.841E+00	21.83
	238.63	238	43.60*	4.741E+00	8.879E-01	8.879E-01	21.89
	300.09	------	3.30	4.048E+00	------ Line Not Found		------
BI-214	609.32	263	45.49*	2.376E+00	1.875E+00	1.875E+00	14.23
	1120.29	52	14.92	1.337E+00	2.001E+00	2.001E+00	46.97
	1764.49	44	15.30	9.301E-01	2.398E+00	2.399E+00	29.85
PB-214	74.82	142	5.80	4.708E+00	4.003E+00	4.003E+00	34.05
	77.11	203	9.70	4.966E+00	3.245E+00	3.245E+00	21.83
	87.09	71	3.41	5.844E+00	2.748E+00	2.748E+00	47.00
	242.00	84	7.25	4.695E+00	1.893E+00	1.893E+00	41.32
	295.22	215	18.42	4.094E+00	2.193E+00	2.193E+00	19.26
	351.93	371	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06
RN-222	609.32	263	45.49*	2.376E+00	1.875E+00	1.875E+00	14.23
	1120.29	52	14.92	1.337E+00	2.001E+00	2.001E+00	46.97
	1764.49	44	15.30	9.301E-01	2.398E+00	2.399E+00	29.85
RA-224	240.99	84	4.10*	4.695E+00	3.347E+00	3.347E+00	41.32
RA-226	74.82	142	5.80	4.708E+00	4.003E+00	4.003E+00	34.05
	77.11	203	9.70	4.966E+00	3.245E+00	3.245E+00	21.83
	87.09	71	3.41	5.844E+00	2.748E+00	2.748E+00	47.00
	242.00	84	7.25	4.695E+00	1.893E+00	1.893E+00	41.32
	295.22	215	18.42	4.094E+00	2.193E+00	2.193E+00	19.26
	351.93	371	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06
AC-228	105.21	12	1.10	6.562E+00	1.251E+00	1.251E+00	289.95
	338.32	67	11.27	3.718E+00	1.224E+00	1.224E+00	47.84

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	835.71	15	1.61	1.783E+00	3.967E+00	3.967E+00	105.28
	911.20	80	25.80*	1.641E+00	1.451E+00	1.451E+00	22.24
	968.97	30	15.80	1.544E+00	9.422E-01	9.422E-01	56.16
RA-228	105.21	12	1.10	6.562E+00	1.251E+00	1.251E+00	289.95
	338.32	67	11.27	3.718E+00	1.224E+00	1.224E+00	47.84
	835.71	15	1.61	1.783E+00	3.967E+00	3.967E+00	105.28
	911.20	80	25.80*	1.641E+00	1.451E+00	1.451E+00	22.24
	968.97	30	15.80	1.544E+00	9.422E-01	9.422E-01	56.16
TH-228	74.82	142	10.28	4.708E+00	2.259E+00	2.259E+00	34.05
	77.11	203	17.10	4.966E+00	1.841E+00	1.841E+00	21.83
	238.63	238	43.60*	4.741E+00	8.879E-01	8.879E-01	21.89
	300.09	------	3.30	4.048E+00	------ Line Not Found		------
TH-229	85.43	42	14.70	5.597E+00	3.959E-01	3.959E-01	87.92
	88.47	71	24.00	5.844E+00	3.904E-01	3.904E-01	47.00
	193.51	------	4.41*	5.442E+00	------ Line Not Found		------
	210.85	40	2.80	5.169E+00	2.139E+00	2.139E+00	75.12
TH-230	74.82	142	5.80	4.708E+00	4.003E+00	4.003E+00	34.05
	77.11	203	9.70	4.966E+00	3.245E+00	3.245E+00	21.83
	87.09	71	3.41	5.844E+00	2.748E+00	2.748E+00	47.00
	242.00	84	7.25	4.695E+00	1.893E+00	1.893E+00	41.32
	295.22	215	18.42	4.094E+00	2.193E+00	2.193E+00	19.26
	351.93	371	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06
TH-232	105.21	12	1.10	6.562E+00	1.251E+00	1.251E+00	289.95
	338.32	67	11.27	3.718E+00	1.224E+00	1.224E+00	47.84
	835.71	15	1.61	1.783E+00	3.967E+00	3.967E+00	105.28
	911.20	80	25.80*	1.641E+00	1.451E+00	1.451E+00	22.24
	968.97	30	15.80	1.544E+00	9.422E-01	9.422E-01	56.16
PA-234M	63.29	14	3.70*	3.109E+00	9.273E-01	9.273E-01	246.35
	92.59	121	4.23	6.148E+00	3.590E+00	3.590E+00	36.27
TH-234	63.29	14	3.70*	3.109E+00	9.273E-01	9.273E-01	246.35
	92.59	121	4.23	6.148E+00	3.590E+00	3.590E+00	36.27
U-234	74.82	142	5.80	4.708E+00	4.003E+00	4.003E+00	34.05
	77.11	203	9.70	4.966E+00	3.245E+00	3.245E+00	21.83
	87.09	71	3.41	5.844E+00	2.748E+00	2.748E+00	47.00
	242.00	84	7.25	4.695E+00	1.893E+00	1.893E+00	41.32
	295.22	215	18.42	4.094E+00	2.193E+00	2.193E+00	19.26
	351.93	371	35.60*	3.618E+00	2.216E+00	2.216E+00	13.06
U-235	89.96	42	3.47	5.988E+00	1.556E+00	1.556E+00	85.36
	93.35	121	5.60	6.148E+00	2.712E+00	2.712E+00	36.27
	143.76	------	10.96*	6.359E+00	------ Line Not Found		------
	163.33	------	5.08	6.002E+00	------ Line Not Found		------
	185.72	91	57.20	5.571E+00	2.194E-01	2.194E-01	42.92
	205.31	------	5.01	5.241E+00	------ Line Not Found		------
U-238	63.29	14	3.70*	3.109E+00	9.273E-01	9.273E-01	246.35
	92.59	121	4.23	6.148E+00	3.590E+00	3.590E+00	36.27
AM-243	43.53	------	5.90	4.826E-01	------ Line Not Found		------
	74.66	142	67.20*	4.708E+00	3.455E-01	3.455E-01	34.05
ANH-511	511.00	43	100.00*	2.744E+00	1.208E-01	1.208E-01	53.34

Flag: "*" = Keyline

Sample ID : G714507011 Acquisition date : 10-APR-2025 22:31:11

Total number of lines in spectrum 51
Number of unidentified lines 12
Number of lines tentatively identified by NID 39 76.47%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	5.703E-01	9.045E-01	9.949E-01	109.99	
K-40	1.25E+09Y	1.00	3.038E+00	3.038E+00	1.080E+00	35.53	
MN-54	312.05D	1.08	6.388E-02	6.911E-02	7.276E-02	105.28	
CD-109	461.40D	1.05	2.532E+00	2.671E+00	1.255E+00	47.00	
SN-117M	13.60D	6.08	1.440E-02	8.755E-02	24.12E-02	275.53	
TE-123M	119.20D	1.23	1.481E-02	1.820E-02	5.013E-02	275.53	
SN-126	2.30E+05Y	1.00	2.532E-01	2.532E-01	1.190E-01	47.00	
EU-155	4.75Y	1.01	6.523E-02	6.616E-02	19.18E-02	289.95	
HG-203	46.59D	1.69	1.418E-02	2.402E-02	9.804E-02	408.18	
TL-208	1.41E+10Y	1.00	4.031E-01	4.031E-01	0.977E-01	24.23	
BI-211	7.04E+08Y	1.00	6.106E+00	6.106E+00	0.798E+00	13.06	
BI-212	1.41E+10Y	1.00	1.212E+00	1.212E+00	1.253E+00	103.34	
PB-212	1.41E+10Y	1.00	8.879E-01	8.879E-01	1.943E-01	21.89	
BI-214	1600.00Y	1.00	1.875E+00	1.875E+00	0.267E+00	14.23	
PB-214	1600.00Y	1.00	2.216E+00	2.216E+00	0.289E+00	13.06	
RN-222	1600.00Y	1.00	1.875E+00	1.875E+00	0.267E+00	14.23	
RA-224	1.41E+10Y	1.00	3.347E+00	3.347E+00	1.383E+00	41.32	
RA-226	1600.00Y	1.00	2.216E+00	2.216E+00	0.289E+00	13.06	
AC-228	1.41E+10Y	1.00	1.451E+00	1.451E+00	0.323E+00	22.24	
RA-228	1.41E+10Y	1.00	1.451E+00	1.451E+00	0.323E+00	22.24	
TH-228	1.41E+10Y	1.00	8.879E-01	8.879E-01	1.943E-01	21.89	
TH-229	7340.00Y	1.00	3.904E-01	3.904E-01	1.835E-01	47.00	K
TH-230	7.54E+04Y	1.00	2.216E+00	2.216E+00	0.289E+00	13.06	
TH-232	1.41E+10Y	1.00	1.451E+00	1.451E+00	0.323E+00	22.24	
PA-234M	4.47E+09Y	1.00	9.273E-01	9.273E-01	22.84E-01	246.35	
TH-234	4.47E+09Y	1.00	9.273E-01	9.273E-01	22.84E-01	246.35	
U-234	2.45E+05Y	1.00	2.216E+00	2.216E+00	0.289E+00	13.06	
U-235	7.04E+08Y	1.00	2.194E-01	2.194E-01	0.942E-01	42.92	K
U-238	4.47E+09Y	1.00	9.273E-01	9.273E-01	22.84E-01	246.35	
AM-243	7370.00Y	1.00	3.455E-01	3.455E-01	1.177E-01	34.05	
ANH-511	1.00E+09Y	1.00	1.208E-01	1.208E-01	0.644E-01	53.34	
	Total Activity :		4.023E+01	4.080E+01			

Grand Total Activity : 4.023E+01 4.080E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	99.47	16	92	1.23	199.77	197	8	4.62E-03	****	6.41E+00	T
0	115.60	14	89	0.83	232.03	228	8	4.12E-03	****	6.64E+00	T
5	189.82	18	75	1.86	380.41	369	16	5.23E-03	****	5.51E+00	
3	207.01	19	20	1.57	414.78	413	14	5.44E-03	69.4	5.21E+00	
0	231.69	17	47	0.71	464.12	462	7	4.85E-03	****	4.84E+00	
0	270.17	59	57	0.91	541.06	535	11	1.71E-02	55.1	4.35E+00	T
0	397.97	15	37	3.30	796.58	789	11	4.52E-03	****	3.31E+00	
0	467.54	51	58	12.80	935.67	922	30	1.50E-02	88.0	2.94E+00	T
0	521.01	10	23	3.92	1042.59	1034	11	3.01E-03	****	2.70E+00	T
0	589.15	11	6	1.24	1178.83	1176	6	3.33E-03	86.6	2.45E+00	
0	694.61	16	10	1.64	1389.70	1385	10	4.65E-03	86.2	2.12E+00	T
0	713.30	15	6	1.14	1427.08	1422	8	4.41E-03	73.5	2.07E+00	
0	768.31	25	20	1.52	1537.06	1530	12	7.54E-03	77.7	1.93E+00	T
0	796.51	11	27	2.44	1593.46	1582	13	3.23E-03	****	1.87E+00	T
0	814.25	13	0	1.42	1628.93	1625	9	3.89E-03	53.5	1.83E+00	
0	839.66	9	11	1.19	1679.73	1677	9	2.80E-03	****	1.78E+00	
0	896.68	11	14	4.79	1793.75	1785	15	3.33E-03	****	1.67E+00	T
1	964.64	18	10	2.00	1929.64	1923	22	5.43E-03	76.5	1.55E+00	T
0	1006.36	9	1	0.93	2013.08	2009	7	2.63E-03	85.3	1.49E+00	
0	1145.36	8	4	1.28	2291.04	2285	9	2.35E-03	****	1.31E+00	
0	1378.21	13	10	1.96	2756.68	2749	11	3.94E-03	****	1.10E+00	
0	1522.04	9	3	1.45	3044.33	3038	11	2.56E-03	96.1	1.02E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:09.77

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507011.CNF;1		
Acquisition date	10-APR-2025 22:31:11	Sensitivity	3.000
Detector ID	GAM07	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.47	Half life ratio	*****
Sample date	6-MAR-2025 13:00:00	Nuclide Library	SOLID
Sample ID	G714507011	Analyst initials	MXR1
Batch Number	2767515	Sample Quantity	9.7490E+01 GRAM
Wet wt corr	1.00000	Wet Weight	0.00000
		Dry Weight	0.00000

CALIBRATION INFORMATION

Eff. Cal. date	23-JUL-2024 04:21:13	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM07_CAN.CNF;23		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	2.769E-01
K-40	4.284E-01
MN-54	4.006E-02
CD-109	6.776E-01
SN-117M	1.623E-01
TE-123M	3.215E-02
SN-126	6.455E-02
EU-155	9.423E-02
TL-208	2.988E-02
BI-211	1.799E-01
BI-212	4.773E-01
PB-212	7.032E-02
BI-214	6.518E-02
PB-214	6.543E-02
RN-222	6.518E-02
RA-224	8.649E-01
RA-226	6.543E-02
AC-228	1.120E-01
RA-228	1.120E-01
TH-228	7.032E-02
TH-229	4.965E-01
TH-230	6.542E-02
TH-232	1.120E-01
PA-234M	1.326E+00
TH-234	1.326E+00
U-234	6.542E-02
U-235	2.296E-01
U-238	1.326E+00
AM-243	5.283E-02
ANH-511	2.503E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	4.148E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	4.734E-02	NOT IDENT.
SC-46	4.496E-02	FAIL ABUN
V-48	1.127E-01	NOT IDENT.
CR-51	6.889E-01	NOT IDENT.
MN-52	3.374E+00	NOT IDENT.
CO-56	3.919E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.438E-02	NOT IDENT.
CO-58	4.557E-02	NOT IDENT.
FE-59	1.239E-01	NOT IDENT.
CO-60	3.167E-02	NOT IDENT.
ZN-65	9.762E-02	NOT IDENT.
GE-68	1.235E+00	NOT IDENT.
AS-73	1.072E+00	NOT IDENT.
AS-74	2.033E-01	NOT IDENT.
SE-75	4.693E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	6.355E-01	NOT IDENT.
RB-83	8.302E-02	FAIL ABUN
RB-84	8.788E-02	NOT IDENT.
KR-85	6.178E+00	NOT IDENT.
SR-85	4.051E-02	NOT IDENT.
RB-86	1.514E+00	NOT IDENT.
Y-88	3.480E-02	FAIL ABUN
Y-91	1.876E+01	NOT IDENT.
NB-94	3.624E-02	NOT IDENT.
NB-95	5.733E-02	NOT IDENT.
NB-95M	1.785E-01	NOT IDENT.
ZR-95	1.132E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.247E-02	NOT IDENT.
RH-102	5.587E-02	FAIL ABUN
RU-103	4.608E-02	FAIL ABUN
RH-106	3.288E-01	NOT IDENT.
RU-106	3.288E-01	NOT IDENT.
AG-108M	3.022E-02	NOT IDENT.
AG-110	6.524E-01	NOT IDENT.
AG-110M	3.300E-02	NOT IDENT.
SN-113	5.206E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SB-122	0.000E+00	SHORT HLIF
SB-124	1.022E-01	NOT IDENT.
SB-125	1.023E-01	NOT IDENT.
TE-125M	1.127E+01	NOT IDENT.
I-126	6.177E-01	NOT IDENT.
SB-126	4.216E-01	FAIL ABUN
SB-127	4.176E+01	NOT IDENT.
I-131	6.582E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.959E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.090E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.337E-01	NOT IDENT.
BA-137M	3.540E-02	NOT IDENT.
CS-137	3.740E-02	NOT IDENT.
LA-138	5.401E-02	NOT IDENT.
CE-139	3.325E-02	NOT IDENT.
BA-140	6.509E-01	NOT IDENT.
LA-140	3.333E-01	NOT IDENT.
CE-141	9.409E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.986E-01	NOT IDENT.
PM-144	3.554E-02	FAIL ABUN
PR-144	2.668E+00	NOT IDENT.
PM-146	3.600E-02	NOT IDENT.
ND-147	2.602E+00	FAIL ABUN
PM-147	6.965E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.190E-02	FAIL ABUN
EU-152	1.043E-01	FAIL ABUN
GD-153	7.278E-02	NOT IDENT.
EU-154	1.195E-01	NOT IDENT.

TB-160	1.578E-01	FAIL ABUN
HO-166M	6.396E-02	NOT IDENT.
TM-171	1.805E+01	NOT IDENT.
HF-172	1.773E-01	FAIL ABUN
LU-172	4.707E-02	FAIL ABUN
LU-176	2.828E-02	FAIL ABUN
HF-181	5.228E-02	NOT IDENT.
TA-182	1.856E-01	FAIL ABUN
RE-183	2.366E-01	NOT IDENT.
RE-184	1.869E-01	NOT IDENT.
W-188	8.323E+00	FAIL ABUN
IR-192	3.819E-02	FAIL ABUN
HG-203	5.026E-02	FAIL ABUN
TL-204	5.044E+00	NOT IDENT.
BI-207	5.082E-02	FAIL ABUN
BI-210	4.326E+00	NOT IDENT.
PB-210	4.326E+00	NOT IDENT.
PB-211	7.637E-01	NOT IDENT.
BI-213	9.441E-02	NOT IDENT.
RN-219	4.075E-01	FAIL ABUN
RA-223	6.677E-01	FAIL ABUN
AC-225	2.679E+00	NOT IDENT.
AC-227	2.506E-01	NOT IDENT.
TH-227	2.506E-01	NOT IDENT.
PA-231	4.454E-01	NOT IDENT.
TH-231	6.677E-01	FAIL ABUN
PA-233	6.683E-02	NOT IDENT.
PA-234	2.560E-01	FAIL ABUN
NP-237	6.683E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.295E-01	FAIL ABUN
PU-239	3.137E+02	NOT IDENT.
AM-241	1.596E-01	NOT IDENT.
CM-243	9.060E-02	FAIL ABUN
BK-247	7.912E-02	FAIL ABUN
CM-247	3.838E-02	FAIL ABUN
CF-249	4.345E-02	NOT IDENT.
CF-251	1.165E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:14.02

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507011.CNF;1		
Acquisition date	: 10-APR-2025 22:31:11	Sensitivity	: 3.000
Detector ID	: GAM07	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.47	Half life ratio	: *****
Sample date	: 6-MAR-2025 13:00:00	Nuclide Library	: SOLID
Sample ID	: G714507011	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 9.7490E+01 GRAM
		Quantity Err(%)	: 1.0257E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 23-JUL-2024 04:21:13	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM07_CAN.CNF;23		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	9.045E-01	9.779E-01	9.779E-01
K-40	3.038E+00	1.116E+00	1.116E+00
MN-54	6.911E-02	7.169E-02	7.169E-02
CD-109	2.671E+00	1.263E+00	1.263E+00
SN-117M	8.755E-02	2.365E-01	2.365E-01
TE-123M	1.820E-02	4.915E-02	4.915E-02
SN-126	2.532E-01	1.190E-01	1.190E-01
EU-155	6.616E-02	1.881E-01	1.881E-01
TL-208	4.031E-01	1.015E-01	1.015E-01
BI-211	6.106E+00	9.519E-01	9.519E-01
BI-212	1.212E+00	1.233E+00	1.233E+00
PB-212	8.879E-01	2.065E-01	2.065E-01
BI-214	1.875E+00	3.043E-01	3.043E-01
PB-214	2.216E+00	3.436E-01	3.436E-01
RN-222	1.875E+00	3.043E-01	3.043E-01
RA-224	3.347E+00	1.389E+00	1.389E+00
RA-226	2.216E+00	3.436E-01	3.436E-01
AC-228	1.451E+00	3.616E-01	3.616E-01
RA-228	1.451E+00	3.616E-01	3.616E-01
TH-228	8.879E-01	2.065E-01	2.065E-01
TH-229	9.487E-02	6.589E-01	6.589E-01
TH-230	2.216E+00	3.436E-01	3.436E-01
TH-232	1.451E+00	3.616E-01	3.616E-01
PA-234M	9.273E-01	2.250E+00	2.250E+00
TH-234	9.273E-01	2.250E+00	2.250E+00
U-234	2.216E+00	3.436E-01	3.436E-01
U-235	2.306E-01	2.624E-01	2.624E-01
U-238	9.273E-01	2.250E+00	2.250E+00
AM-243	3.455E-01	1.196E-01	1.196E-01
ANH-511	1.208E-01	6.396E-02	6.396E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)

NA-22	1.512E-02	4.582E-02	4.633E-02	NOT IDENT.
NA-24	-1.678E+15	5.914E+15	5.963E+15	SHORT HLIF
AL-26	3.522E-02	4.549E-02	4.819E-02	NOT IDENT.
SC-46	1.838E-02	5.172E-02	5.238E-02	FAIL ABUN
V-48	-7.065E-02	1.532E-01	1.565E-01	NOT IDENT.
CR-51	8.867E-01	7.089E-01	8.138E-01	NOT IDENT.
MN-52	2.465E+00	3.336E+00	3.516E+00	NOT IDENT.
CO-56	-7.725E-04	4.917E-02	4.917E-02	NOT IDENT.
MN-56	-1.000E+41	9.256E+42	0.000E+00	SHORT HLIF
CO-57	-7.609E-03	3.014E-02	3.033E-02	NOT IDENT.
CO-58	3.480E-02	5.216E-02	5.446E-02	NOT IDENT.
FE-59	1.828E-02	1.431E-01	1.433E-01	NOT IDENT.
CO-60	1.358E-02	3.315E-02	3.371E-02	NOT IDENT.
ZN-65	2.854E-02	1.237E-01	1.244E-01	NOT IDENT.
GE-68	2.817E-01	1.396E+00	1.402E+00	NOT IDENT.
AS-73	-1.004E-01	1.262E+00	1.263E+00	NOT IDENT.
AS-74	-8.509E-02	2.613E-01	2.641E-01	NOT IDENT.
SE-75	-1.384E-02	6.177E-02	6.209E-02	FAIL ABUN
BR-77	5.131E+04	5.378E+04	5.854E+04	SHORT HLIF
SR-82	4.808E-02	7.787E-01	7.790E-01	NOT IDENT.
RB-83	8.605E-02	1.587E-01	1.634E-01	FAIL ABUN
RB-84	-1.869E-02	1.067E-01	1.070E-01	NOT IDENT.
KR-85	1.178E+00	1.005E+01	1.007E+01	NOT IDENT.
SR-85	7.653E-03	6.595E-02	6.604E-02	NOT IDENT.
RB-86	-2.252E-01	1.847E+00	1.850E+00	NOT IDENT.
Y-88	-1.734E-02	4.814E-02	4.877E-02	FAIL ABUN
Y-91	-6.415E+00	2.430E+01	2.447E+01	NOT IDENT.
NB-94	-5.355E-03	4.549E-02	4.556E-02	NOT IDENT.
NB-95	3.685E-02	7.068E-02	7.260E-02	NOT IDENT.
NB-95M	1.391E-01	2.581E-01	2.656E-01	NOT IDENT.
ZR-95	1.085E-01	1.216E-01	1.311E-01	NOT IDENT.
NB-97	-1.000E+41	1.496E+41	0.000E+00	SHORT HLIF
ZR-97	2.469E+14	8.669E+14	8.740E+14	SHORT HLIF
MO-99	-1.104E+03	2.296E+03	2.349E+03	SHORT HLIF
TC-99M	-4.127E+40	1.051E+41	0.000E+00	SHORT HLIF
RH-101	1.910E-02	3.793E-02	3.890E-02	NOT IDENT.
RH-102	1.935E-02	6.455E-02	6.513E-02	FAIL ABUN
RU-103	3.804E-03	5.444E-02	5.447E-02	FAIL ABUN
RH-106	1.609E-01	3.707E-01	3.778E-01	NOT IDENT.
RU-106	1.609E-01	3.707E-01	3.778E-01	NOT IDENT.
AG-108M	2.095E-02	3.283E-02	3.417E-02	NOT IDENT.
AG-110	-4.224E-01	8.864E-01	9.067E-01	NOT IDENT.
AG-110M	-1.318E-02	4.235E-02	4.276E-02	NOT IDENT.
SN-113	6.748E-03	6.713E-02	6.720E-02	NOT IDENT.
CD-115	-6.131E+03	8.237E+03	8.689E+03	SHORT HLIF
SB-122	1.628E+02	3.806E+02	3.876E+02	SHORT HLIF
SB-124	7.684E-02	8.725E-02	9.387E-02	NOT IDENT.
SB-125	5.713E-02	1.138E-01	1.167E-01	NOT IDENT.
TE-125M	-3.349E+00	1.512E+01	1.519E+01	NOT IDENT.
I-126	1.674E-01	7.234E-01	7.273E-01	NOT IDENT.
SB-126	4.820E-02	5.346E-01	5.351E-01	FAIL ABUN
SB-127	-3.013E+01	5.814E+01	5.970E+01	NOT IDENT.
I-131	-7.090E-02	7.806E-01	7.813E-01	NOT IDENT.
I-132	-1.000E+41	2.355E+41	0.000E+00	SHORT HLIF
TE-132	4.389E+01	7.532E+01	7.787E+01	SHORT HLIF
BA-133	2.801E-02	4.643E-02	4.812E-02	NOT IDENT.
I-133	4.654E+10	8.852E+10	9.098E+10	SHORT HLIF
CS-134	5.440E-02	1.067E-01	1.095E-01	FAIL ABUN
I-135	-1.013E+37	1.240E+38	0.000E+00	SHORT HLIF
CS-136	-2.919E-01	3.510E-01	3.748E-01	NOT IDENT.
BA-137M	2.349E-03	4.289E-02	4.291E-02	NOT IDENT.
CS-137	2.481E-03	4.531E-02	4.533E-02	NOT IDENT.
LA-138	-7.499E-03	6.806E-02	6.814E-02	NOT IDENT.
CE-139	-1.235E-02	4.241E-02	4.277E-02	NOT IDENT.
BA-140	5.584E-02	7.724E-01	7.729E-01	NOT IDENT.
LA-140	1.298E-01	3.701E-01	3.747E-01	NOT IDENT.
CE-141	-2.483E-02	1.178E-01	1.183E-01	NOT IDENT.
CE-143	5.208E+06	4.461E+06	5.041E+06	SHORT HLIF
CE-144	9.845E-02	2.326E-01	2.368E-01	NOT IDENT.
PM-144	-1.635E-02	5.302E-02	5.353E-02	FAIL ABUN
PR-144	-1.308E+00	4.000E+00	4.044E+00	NOT IDENT.
PM-146	-2.357E-02	4.677E-02	4.797E-02	NOT IDENT.
ND-147	3.031E+00	2.729E+00	3.052E+00	FAIL ABUN
PM-147	1.194E+02	8.270E+02	8.287E+02	NOT IDENT.
PM-149	-2.101E+04	6.166E+04	6.238E+04	SHORT HLIF
EU-150	9.536E-03	4.006E-02	4.029E-02	FAIL ABUN
EU-152	2.868E-02	1.238E-01	1.244E-01	FAIL ABUN
GD-153	-6.891E-03	1.059E-01	1.059E-01	NOT IDENT.

EU-154	4.992E-02	1.306E-01	1.325E-01	NOT IDENT.
TB-160	1.642E-02	1.808E-01	1.809E-01	FAIL ABUN
HO-166M	-1.166E-03	8.874E-02	8.874E-02	NOT IDENT.
TM-171	-1.708E+01	2.274E+01	2.401E+01	NOT IDENT.
HF-172	-1.432E-01	2.311E-01	2.400E-01	FAIL ABUN
LU-172	-5.122E-02	6.991E-02	7.363E-02	FAIL ABUN
LU-176	2.972E-02	2.965E-02	3.253E-02	FAIL ABUN
HF-181	-9.831E-03	7.210E-02	7.224E-02	NOT IDENT.
TA-182	5.642E-02	2.080E-01	2.096E-01	FAIL ABUN
RE-183	-4.597E-02	2.819E-01	2.827E-01	NOT IDENT.
RE-184	9.515E-02	2.115E-01	2.158E-01	NOT IDENT.
W-188	2.014E+00	1.036E+01	1.040E+01	FAIL ABUN
IR-192	-2.552E-02	4.753E-02	4.890E-02	FAIL ABUN
HG-203	2.402E-02	9.611E-02	9.672E-02	FAIL ABUN
TL-204	-1.911E+00	6.612E+00	6.668E+00	NOT IDENT.
BI-207	4.133E-03	5.923E-02	5.926E-02	FAIL ABUN
BI-210	-1.430E+00	5.101E+00	5.141E+00	NOT IDENT.
PB-210	-1.430E+00	5.101E+00	5.141E+00	NOT IDENT.
PB-211	1.303E-01	8.852E-01	8.872E-01	NOT IDENT.
BI-213	-5.733E-02	1.209E-01	1.236E-01	NOT IDENT.
RN-219	-1.621E-01	5.641E-01	5.688E-01	FAIL ABUN
RA-223	7.034E-02	7.692E-01	7.698E-01	FAIL ABUN
AC-225	2.819E+00	3.068E+00	3.321E+00	NOT IDENT.
AC-227	-1.918E-01	3.445E-01	3.552E-01	NOT IDENT.
TH-227	-1.918E-01	3.445E-01	3.552E-01	NOT IDENT.
PA-231	-3.422E-01	5.592E-01	5.801E-01	NOT IDENT.
TH-231	7.034E-02	7.692E-01	7.698E-01	FAIL ABUN
PA-233	1.027E-02	7.645E-02	7.659E-02	NOT IDENT.
PA-234	-2.588E-02	3.076E-01	3.078E-01	FAIL ABUN
NP-237	1.027E-02	7.645E-02	7.659E-02	FAIL ABUN
NP-238	-2.746E+03	1.280E+04	1.286E+04	SHORT HLIF
NP-239	2.078E-01	4.767E-01	4.859E-01	FAIL ABUN
PU-239	-1.203E+02	3.941E+02	3.978E+02	NOT IDENT.
AM-241	5.018E-02	1.836E-01	1.850E-01	NOT IDENT.
CM-243	-6.565E-02	1.446E-01	1.476E-01	FAIL ABUN
BK-247	-2.398E-03	1.011E-01	1.011E-01	FAIL ABUN
CM-247	3.035E-03	4.489E-02	4.491E-02	FAIL ABUN
CF-249	1.941E-02	4.881E-02	4.959E-02	NOT IDENT.
CF-251	-4.509E-02	1.498E-01	1.512E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	50.4279	81.75	66.4851	123.68	53.9007
879.38	56.1079	82.47	69.1997	125.81	64.6906
46.54	57.1672	83.79	73.3217	127.23	53.1450
228.16	0.0000	265.00	72.0443	127.91	50.0105
52.39	54.3796	193.51	59.1229	129.30	59.7170
1093.63	49.0160	105.31	59.2607	131.20	59.8948
52.39	57.2716	86.79	59.2900	133.02	39.6851
125.81	56.4569	86.94	59.3083	133.52	46.1560
53.44	52.8855	87.09	59.3271	136.00	52.7952
54.07	52.9804	87.57	61.3652	136.47	50.6762
293.27	0.0000	88.03	61.4229	739.50	0.0000
482.18	54.4145	306.78	61.4622	140.51	0.0000
57.98	58.1743	88.47	61.4783	143.76	59.9473
59.27	69.4954	143.76	61.6642	144.24	62.1698
59.32	69.5048	90.64	61.7488	145.44	62.2785
59.54	61.2000	531.02	61.8070	152.43	72.8310
60.96	57.0863	92.59	61.9891	1048.07	50.8193
61.17	57.1177	93.35	62.0823	154.21	53.0991
62.93	73.9058	94.56	62.2294	158.56	72.4552
63.29	73.9741	311.90	62.2403	159.00	56.4186
290.67	74.0287	946.00	62.2427	162.33	63.7562
87.57	77.6023	94.87	62.2673	537.26	59.3080
66.73	84.3757	97.43	42.3896	163.33	45.9204
67.24	84.1661	98.43	42.4704	165.86	61.8070
67.68	84.2571	98.44	42.4714	427.87	42.1422
1221.41	84.2713	103.37	45.9365	176.60	47.8543
70.82	80.7069	116.74	45.9365	177.52	47.9095
97.43	83.7125	100.11	45.9867	181.07	0.0000
70.82	92.8444	102.03	50.2235	181.52	61.9052
279.20	92.8473	103.18	40.8081	184.41	65.9592
1063.66	88.1690	103.37	59.1926	185.72	59.9187
72.87	88.1809	911.20	51.8820	193.51	41.8700
351.06	88.1809	105.31	51.8917	197.03	58.3923
74.66	86.6210	106.12	59.4890	198.01	46.7670
351.93	86.6526	106.47	59.5266	201.83	45.7983
238.63	86.6526	109.28	59.1377	203.43	42.3523
351.93	86.6526	111.00	58.9717	205.31	58.1618
238.63	86.6526	111.76	0.0000	210.85	34.4017
74.97	86.6828	114.06	55.4708	215.65	51.2784
77.11	87.1030	116.30	0.0000	218.12	37.0670
78.74	87.4189	116.74	44.5791	222.11	43.2301
256.23	81.7621	119.76	47.2549	227.09	51.9076
80.03	79.2242	264.66	45.2561	227.38	47.0933
133.52	79.2409	121.22	45.2636	228.16	0.0000
364.49	79.2527	344.28	47.4125	228.18	40.2842
711.68	66.3155	122.06	51.6505	235.69	51.1529
356.01	52.7113	122.92	52.7786	235.96	51.1664
323.87	52.7195	1274.44	52.7916	238.63	66.7785

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	29.3403	531.02	15.1068
240.99	88.1609	338.32	29.3409	537.26	11.1159
242.00	73.5416	340.48	29.3900	1260.41	0.0000
244.70	36.0503	340.55	29.3913	552.55	9.1696
685.70	38.3867	344.28	28.9400	795.86	14.3446
388.16	35.9239	345.93	28.9769	564.24	0.0000
507.63	0.0000	351.06	22.4457	569.33	13.3618
256.23	47.2283	351.93	22.4604	569.50	11.3075
527.90	0.0000	355.39	0.0000	569.70	11.3084
264.66	35.0778	356.01	16.2209	583.19	12.4219
264.80	35.0829	364.49	26.2984	584.27	12.4287
265.00	35.0889	366.42	0.0000	595.83	20.8358
269.46	30.2014	372.51	26.4518	600.60	21.9297
270.03	30.2168	375.05	21.9312	602.52	0.0000
401.81	21.4274	377.52	22.8856	604.72	17.2654
273.65	25.2643	383.85	23.9079	607.14	14.1432
276.40	31.6597	388.16	23.9804	609.32	15.7312
583.19	36.3346	666.33	25.8336	610.33	15.7391
277.60	36.3425	391.69	24.9637	614.28	14.1927
402.40	36.3556	400.66	26.5135	618.01	10.5322
279.20	31.7390	401.81	29.3275	884.68	13.7072
279.54	31.7490	402.40	25.1477	621.93	11.6074
279.70	34.2938	404.85	26.1224	630.19	0.0000
280.46	34.3169	410.95	27.1669	631.29	12.7192
301.36	33.1411	413.71	30.9711	633.25	19.0968
284.31	37.4106	720.70	28.1738	634.78	11.6785
285.41	39.1494	423.72	34.9547	635.95	12.7476
285.90	0.0000	427.09	21.7763	636.99	15.9424
287.50	30.6951	427.87	20.8398	657.50	16.0956
290.67	26.9325	433.94	15.2155	657.76	18.2437
293.27	0.0000	439.40	19.0857	657.90	0.0000
295.22	35.1935	440.45	23.8734	661.66	15.0516
316.51	35.2160	453.88	21.1858	664.57	0.0000
298.58	41.3213	463.37	14.5291	666.33	11.8513
299.98	26.8906	468.07	14.5706	666.50	11.8522
300.09	26.8931	473.00	14.6140	667.71	0.0000
300.13	34.1344	631.29	14.6320	677.62	8.6634
311.90	34.1344	696.49	14.6469	685.70	15.2157
301.36	38.8303	477.60	8.7924	692.65	0.0000
302.85	35.4229	482.18	16.1633	695.00	10.9135
304.50	27.6855	487.02	15.7181	696.49	19.6567
304.85	29.4249	492.35	0.0000	696.51	19.6575
306.78	20.8037	497.08	11.8574	697.00	22.9380
308.46	33.8536	505.52	14.8938	697.30	22.9414
311.90	30.4683	507.63	0.0000	697.49	22.9431
316.51	32.3313	511.00	14.9400	702.65	19.7102
319.41	25.4010	514.00	14.9652	706.68	18.6477
320.08	19.2800	514.00	14.9652	711.68	16.4899
321.04	32.4503	520.40	18.0227	720.70	11.9188
323.87	31.6458	520.69	0.0000	721.93	0.0000
325.23	36.0802	667.71	0.0000	1690.97	8.2843
1596.21	36.1820	527.90	0.0000	722.91	8.2849
333.37	28.6967	528.26	26.1460	723.31	6.6289
333.97	37.2166	529.59	19.1206	756.73	13.2632
334.37	41.2173	529.87	0.0000	727.33	13.2808

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	17.3062	935.54	12.5845	1362.66	0.0000
735.93	8.8861	937.49	13.4926	1365.19	8.1597
737.46	11.1149	983.53	7.2124	1368.63	0.0000
739.50	0.0000	946.00	8.1192	1384.29	8.1987
1434.09	6.6877	949.00	5.4185	1408.01	5.1544
747.24	13.3926	954.55	0.0000	1434.09	2.0750
748.06	14.5134	962.31	8.7088	1435.80	5.1895
752.31	15.6571	964.08	4.5386	1457.56	0.0000
753.82	11.1906	966.17	4.5418	1460.82	7.3093
756.73	11.2040	968.97	4.5461	1489.16	2.1024
756.80	11.2044	983.53	7.3091	1505.03	10.5511
763.94	10.1136	984.45	0.0000	1584.12	15.0399
765.81	11.8082	996.26	12.8447	1596.21	4.3086
766.84	14.6261	1002.74	11.7688	1620.50	2.1658
772.60	0.0000	1004.73	7.3604	1621.92	5.4163
776.52	14.6832	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	0.0000
778.90	20.3503	1028.54	0.0000	1750.46	0.0000
783.70	20.3892	1037.84	8.3688	1764.49	0.0000
1435.80	32.3489	1038.76	0.0000	1770.23	3.3525
903.28	15.3430	1046.59	10.2574	1771.35	0.0000
795.86	11.9514	1048.07	12.1280	1791.20	0.0000
801.95	11.4099	1049.04	8.3985	1808.65	1.8019
810.06	8.5846	1050.41	4.6680	1810.72	0.0000
810.29	3.4341	1063.66	8.4375	1836.06	3.6232
810.45	3.4343	1077.00	8.4721		
810.76	5.1520	1077.34	6.5903		
815.77	1.7207	1085.87	3.7756		
818.51	8.6127	1093.63	10.4078		
832.01	15.5830	1099.45	8.5303		
834.85	13.8667	1112.07	10.6559		
835.71	13.8711	1112.84	9.1359		
836.80	0.0000	1115.54	9.1436		
846.75	0.0000	1120.29	8.5842		
846.77	8.1254	1120.55	8.5847		
856.80	6.9910	1121.30	6.1059		
860.56	10.5011	1808.65	9.5642		
871.09	11.4202	1131.51	0.0000		
873.19	9.6707	1147.95	0.0000		
875.33	0.0000	1332.49	6.7804		
879.38	9.6925	1177.95	8.7297		
880.51	9.6965	1189.05	4.8651		
881.60	8.8187	1204.77	6.8415		
883.24	7.0591	1221.41	5.8916		
884.68	6.1799	1231.02	6.8915		
889.28	7.0745	1235.36	13.8000		
894.76	11.5186	1238.28	3.9460		
1836.06	11.3551	1260.41	0.0000		
900.72	14.2075	1271.87	5.9729		
903.28	7.1101	1274.44	4.9811		
911.20	7.1301	1274.54	4.9811		
912.08	7.1323	1291.59	7.0051		
984.45	0.0000	1298.22	0.0000		
926.50	8.0645	1312.11	7.0432		
929.11	12.5563	1332.49	2.0229		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:40.63

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507012.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM19.CNF;1001
                                    Background date  : 6-APR-2025 11:01:27.
Sample date      : 6-MAR-2025 13:30:00. Acquisition date : 10-APR-2025 22:31:47
Sample ID        : G714507012           Sample quantity  : 1.51880E+02 GRAM
Detector name    : GAM19                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.66  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.37*	22	116	1.00	126.93	123	8	6.21E-03	89.0	
2	3	72.74	36	136	1.27	145.67	142	17	9.99E-03	61.8	1.52E+00
3	3	74.60	124	99	1.05	149.40	142	17	3.45E-02	15.8	
4	3	76.96	190	106	1.11	154.12	142	17	5.29E-02	11.7	
5	0	87.25*	35	129	0.74	174.70	172	6	9.81E-03	54.5	
6	0	89.78	45	92	1.30	179.76	178	5	1.25E-02	35.2	
7	0	92.64*	62	144	1.36	185.48	183	8	1.72E-02	37.6	
8	0	127.83	12	129	1.22	255.86	254	9	3.45E-03	166.9	
9	0	185.83*	79	107	1.25	371.88	368	9	2.19E-02	27.4	
10	0	209.67	54	92	1.47	419.56	414	11	1.51E-02	37.2	
11	0	238.54*	266	158	1.02	477.32	473	9	7.38E-02	10.6	
12	0	241.75	67	124	1.66	483.74	482	10	1.86E-02	34.9	
13	0	259.72	14	64	1.37	519.68	514	9	3.99E-03	103.1	
14	0	270.20*	47	91	2.35	540.64	534	11	1.31E-02	42.3	
15	0	278.16	35	81	0.93	556.57	551	12	9.82E-03	54.2	
16	0	295.21	166	94	1.11	590.67	584	11	4.62E-02	13.7	
17	0	299.96	31	35	1.01	600.16	597	6	8.50E-03	35.8	
18	0	324.60	23	34	1.02	649.47	646	7	6.31E-03	47.2	
19	0	338.91	56	92	1.28	678.09	672	13	1.55E-02	37.7	
20	0	351.96*	297	72	1.12	704.18	698	13	8.24E-02	8.4	
21	0	432.76	15	28	0.80	865.81	862	10	4.18E-03	70.2	
22	0	511.20*	29	48	1.40	1022.71	1016	13	8.05E-03	63.8	
23	1	569.69*	9	7	1.61	1139.72	1134	23	2.63E-03	132.3	1.89E+00
24	1	576.18	22	8	1.62	1152.71	1134	23	6.04E-03	31.5	
25	0	583.90*	105	47	1.57	1168.15	1159	16	2.93E-02	18.0	
26	0	609.45*	211	48	1.47	1219.26	1211	16	5.87E-02	10.2	
27	0	615.53*	4	19	2.06	1231.41	1227	8	1.19E-03	205.6	
28	0	638.54	23	19	1.75	1277.44	1272	11	6.40E-03	42.3	
29	1	662.16	20	13	1.68	1324.69	1317	27	5.67E-03	42.6	1.72E+00
30	1	665.94	30	16	1.68	1332.25	1317	27	8.32E-03	27.8	
31	0	729.55	34	40	2.02	1459.49	1451	19	9.44E-03	49.0	
32	0	737.12	16	9	1.95	1474.64	1471	7	4.57E-03	38.6	
33	0	861.07	10	13	1.96	1722.59	1718	9	2.91E-03	69.7	
34	0	911.40*	55	21	0.93	1823.27	1817	12	1.54E-02	21.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	969.15*	45	13	1.11	1938.79	1936	8	1.25E-02	20.7	
36	0	991.17	6	11	1.49	1982.83	1975	11	1.67E-03	114.6	
37	0	1039.13	8	4	2.08	2078.77	2075	7	2.34E-03	50.6	
38	0	1060.13	7	5	0.63	2120.79	2117	7	1.94E-03	65.8	
39	0	1120.54	56	0	1.70	2241.64	2236	13	1.56E-02	13.4	
40	0	1155.57	16	6	0.69	2311.71	2306	11	4.31E-03	38.8	
41	0	1378.96	12	7	1.13	2758.60	2750	12	3.46E-03	48.8	
42	0	1408.43	10	2	0.89	2817.56	2813	8	2.78E-03	40.0	
43	0	1461.07*	102	0	2.35	2922.87	2915	14	2.83E-02	10.2	
44	0	1589.17	6	2	1.47	3179.13	3175	7	1.79E-03	51.7	
45	0	1764.67*	38	7	2.53	3530.24	3525	10	1.05E-02	21.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:32:42

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507012.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 13:30:00 Acquisition date : 10-APR-2025 22:31:47
Sample ID : G714507012 Sample quantity : 151.88 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA19 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.66 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
TL-208	277.37	HG-203	279.20

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.163E+00	3.920E+00	3.920E+00	20.36	OK
CD-109	88.03	3.70*	6.035E+00	9.933E-01	1.048E+00	108.91	OK
SN-126	64.28	9.60	3.327E+00	4.519E-01	4.519E-01	177.96	OK
	86.94	8.90	6.035E+00	4.129E-01	4.129E-01	108.91	OK
	87.57	37.00*	6.035E+00	9.933E-02	9.933E-02	108.91	OK
BA-137M	661.66	89.90*	2.382E+00	4.953E-02	4.964E-02	85.15	OK
CS-137	661.66	85.10*	2.382E+00	5.232E-02	5.244E-02	85.15	OK
HG-203	70.83	3.69	4.383E+00	----- Line	Not Found	-----	Absent
	72.87	6.19	4.627E+00	8.011E-01	1.356E+00	123.58	OK
	279.20	81.56*	4.657E+00	3.290E-02	5.571E-02	175.07	OK
TL-208	277.37	6.60	4.666E+00	----- Line	Not Found	-----	<<INT Reject
	583.19	85.00*	2.652E+00	2.463E-01	2.463E-01	35.91	OK
	860.56	12.50	1.878E+00	2.257E-01	2.257E-01	139.45	OK
BI-211	72.87	1.23	4.627E+00	4.032E+00	4.032E+00	123.58	OK
	351.06	12.92*	3.933E+00	3.233E+00	3.233E+00	16.82	OK
PB-212	74.82	10.28	4.851E+00	1.585E+00	1.585E+00	31.53	OK
	77.11	17.10	5.117E+00	1.381E+00	1.381E+00	23.31	OK
	238.63	43.60*	5.175E+00	6.766E-01	6.766E-01	21.18	OK
	300.09	3.30	4.415E+00	1.181E+00	1.181E+00	71.58	OK
BI-214	609.32	45.49*	2.558E+00	9.525E-01	9.525E-01	20.38	OK
	1120.29	14.92	1.465E+00	1.259E+00	1.259E+00	26.73	OK
	1764.49	15.30	1.028E+00	1.125E+00	1.125E+00	43.53	OK
PB-214	74.82	5.80	4.851E+00	2.808E+00	2.809E+00	31.53	OK
	77.11	9.70	5.117E+00	2.435E+00	2.435E+00	23.31	OK
	87.09	3.41	6.035E+00	1.078E+00	1.078E+00	108.91	OK
	242.00	7.25	5.129E+00	1.034E+00	1.034E+00	69.83	OK
	295.22	18.42	4.465E+00	1.137E+00	1.137E+00	27.37	OK
	351.93	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82	OK
RN-222	609.32	45.49*	2.558E+00	9.525E-01	9.525E-01	20.38	OK
	1120.29	14.92	1.465E+00	1.259E+00	1.259E+00	26.73	OK
	1764.49	15.30	1.028E+00	1.125E+00	1.125E+00	43.53	OK
RA-224	240.99	4.10*	5.129E+00	1.828E+00	1.828E+00	69.83	OK
RA-226	74.82	5.80	4.851E+00	2.808E+00	2.809E+00	31.53	OK
	77.11	9.70	5.117E+00	2.435E+00	2.435E+00	23.31	OK
	87.09	3.41	6.035E+00	1.078E+00	1.078E+00	108.91	OK
	242.00	7.25	5.129E+00	1.034E+00	1.034E+00	69.83	OK
	295.22	18.42	4.465E+00	1.137E+00	1.137E+00	27.37	OK
	351.93	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82	OK
AC-228	105.21	1.10	6.834E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.043E+00	6.808E-01	6.808E-01	75.45	OK
	835.71	1.61	1.931E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.780E+00	6.072E-01	6.072E-01	43.66	OK
	968.97	15.80	1.680E+00	8.488E-01	8.488E-01	41.44	OK
RA-228	105.21	1.10	6.834E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.043E+00	6.808E-01	6.808E-01	75.45	OK
	835.71	1.61	1.931E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.780E+00	6.072E-01	6.072E-01	43.66	OK
	968.97	15.80	1.680E+00	8.488E-01	8.488E-01	41.44	OK
TH-228	74.82	10.28	4.851E+00	1.585E+00	1.585E+00	31.53	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	77.11	17.10	5.117E+00	1.381E+00	1.381E+00	23.31	OK
	238.63	43.60*	5.175E+00	6.766E-01	6.766E-01	21.18	OK
	300.09	3.30	4.415E+00	1.181E+00	1.181E+00	71.58	OK
TH-230	74.82	5.80	4.851E+00	2.808E+00	2.808E+00	31.53	OK
	77.11	9.70	5.117E+00	2.435E+00	2.435E+00	23.31	OK
	87.09	3.41	6.035E+00	1.078E+00	1.078E+00	108.91	OK
	242.00	7.25	5.129E+00	1.034E+00	1.034E+00	69.83	OK
	295.22	18.42	4.465E+00	1.137E+00	1.137E+00	27.37	OK
	351.93	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82	OK
PA-231	283.69	1.70	4.593E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.415E+00	7.283E-01	7.283E-01	71.58	OK
TH-232	105.21	1.10	6.834E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.043E+00	6.808E-01	6.808E-01	75.45	OK
	835.71	1.61	1.931E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.780E+00	6.072E-01	6.072E-01	43.66	OK
	968.97	15.80	1.680E+00	8.488E-01	8.488E-01	41.44	OK
PA-234M	63.29	3.70*	3.327E+00	1.172E+00	1.172E+00	177.96	OK
	92.59	4.23	6.368E+00	1.433E+00	1.433E+00	75.25	OK
TH-234	63.29	3.70*	3.327E+00	1.172E+00	1.172E+00	177.96	OK
	92.59	4.23	6.368E+00	1.433E+00	1.433E+00	75.25	OK
U-234	74.82	5.80	4.851E+00	2.808E+00	2.808E+00	31.53	OK
	77.11	9.70	5.117E+00	2.435E+00	2.435E+00	23.31	OK
	87.09	3.41	6.035E+00	1.078E+00	1.078E+00	108.91	OK
	242.00	7.25	5.129E+00	1.034E+00	1.034E+00	69.83	OK
	295.22	18.42	4.465E+00	1.137E+00	1.137E+00	27.37	OK
	351.93	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82	OK
U-235	89.96	3.47	6.203E+00	1.313E+00	1.313E+00	70.49	OK
	93.35	5.60	6.368E+00	1.082E+00	1.082E+00	75.25	OK
	143.76	10.96*	6.791E+00	----- Line Not Found		-----	Absent
	163.33	5.08	6.462E+00	----- Line Not Found		-----	Absent
	185.72	57.20	6.047E+00	1.337E-01	1.337E-01	54.73	OK
	205.31	5.01	5.701E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	3.327E+00	1.172E+00	1.172E+00	177.96	OK
	92.59	4.23	6.368E+00	1.433E+00	1.433E+00	75.25	OK
AM-243	43.53	5.90	5.979E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	4.851E+00	2.424E-01	2.424E-01	31.53	OK
ANH-511	511.00	100.00*	2.957E+00	5.229E-02	5.229E-02	127.57	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:42.93

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507012.CNF;1		
Acquisition date	: 10-APR-2025 22:31:47	Sensitivity	: 3.000
Detector ID	: GAM19	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.66	Half life ratio	: *****
Sample date	: 6-MAR-2025 13:30:00	Analyst initials	: MXR1
Sample ID	: G714507012	Sample Quantity	: 1.5188E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 10-DEC-2024 05:06:30	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;26		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	3.920E+00	7.820E-01	2.930E-01
CD-109	1.048E+00	1.118E+00	1.074E+00
SN-126	9.933E-02	1.060E-01	1.112E-01
BA-137M	4.964E-02	4.142E-02	4.822E-02
CS-137	5.244E-02	4.376E-02	5.094E-02
HG-203	5.571E-02	9.558E-02	6.371E-02
TL-208	2.463E-01	8.667E-02	5.037E-02
BI-211	3.233E+00	5.329E-01	2.596E-01
PB-212	6.766E-01	1.405E-01	1.019E-01
BI-214	9.525E-01	1.902E-01	1.145E-01
PB-214	1.173E+00	1.934E-01	9.442E-02
RN-222	9.525E-01	1.902E-01	1.145E-01
RA-224	1.828E+00	1.251E+00	1.161E+00
RA-226	1.173E+00	1.934E-01	9.442E-02
AC-228	6.072E-01	2.598E-01	2.087E-01
RA-228	6.072E-01	2.598E-01	2.087E-01
TH-228	6.766E-01	1.405E-01	1.019E-01
TH-230	1.173E+00	1.934E-01	9.442E-02
PA-231	7.283E-01	5.109E-01	6.975E-01
TH-232	6.072E-01	2.598E-01	2.087E-01
PA-234M	1.172E+00	2.045E+00	1.807E+00
TH-234	1.172E+00	2.045E+00	1.807E+00
U-234	1.173E+00	1.934E-01	9.442E-02
U-235	-8.383E-03	1.619E-01	3.008E-01
U-238	1.172E+00	2.045E+00	1.807E+00
AM-243	2.424E-01	7.490E-02	7.013E-02
ANH-511	5.229E-02	6.537E-02	4.692E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	2.875E-01	3.448E-01	7.383E-01	NOT IDENT.
NA-22	-1.999E-03	2.650E-02	5.551E-02	NOT IDENT.
NA-24	0.000E+00	3.234E+15	0.000E+00	SHORT HLIF

AL-26	-4.294E-04	1.955E-02	4.538E-02	NOT IDENT.
SC-46	-5.111E-03	3.994E-02	7.496E-02	FAIL ABUN
V-48	-1.278E-02	1.251E-01	2.393E-01	NOT IDENT.
CR-51	1.685E-01	4.885E-01	9.698E-01	NOT IDENT.
MN-52	-5.251E-01	2.267E+00	4.532E+00	NOT IDENT.
MN-54	-6.031E-03	2.956E-02	5.524E-02	NOT IDENT.
CO-56	-1.118E-02	4.043E-02	7.405E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.872E-03	1.907E-02	3.574E-02	NOT IDENT.
CO-58	1.833E-02	3.172E-02	6.991E-02	NOT IDENT.
FE-59	-6.804E-03	8.006E-02	1.657E-01	NOT IDENT.
CO-60	-1.862E-02	1.971E-02	2.968E-02	NOT IDENT.
ZN-65	9.527E-03	6.209E-02	1.208E-01	NOT IDENT.
GE-68	-5.059E-02	8.709E-01	1.814E+00	NOT IDENT.
AS-73	-5.457E-01	7.010E-01	1.323E+00	NOT IDENT.
AS-74	-3.736E-02	1.472E-01	2.801E-01	NOT IDENT.
SE-75	2.023E-02	4.418E-02	7.878E-02	FAIL ABUN
BR-77	0.000E+00	8.070E+03	0.000E+00	SHORT HLIF
SR-82	5.499E-02	4.139E-01	8.346E-01	NOT IDENT.
RB-83	4.267E-03	5.442E-02	1.109E-01	NOT IDENT.
RB-84	-3.477E-02	7.488E-02	1.333E-01	NOT IDENT.
KR-85	4.957E+00	5.624E+00	1.133E+01	NOT IDENT.
SR-85	3.240E-02	3.687E-02	7.428E-02	NOT IDENT.
RB-86	-3.465E-01	1.149E+00	2.274E+00	NOT IDENT.
Y-88	-6.830E-03	2.180E-02	4.581E-02	NOT IDENT.
Y-91	-6.117E-01	1.625E+01	3.377E+01	NOT IDENT.
NB-94	-3.338E-03	2.810E-02	5.317E-02	NOT IDENT.
NB-95	-2.108E-02	4.182E-02	7.410E-02	NOT IDENT.
NB-95M	1.157E-01	1.331E-01	2.455E-01	NOT IDENT.
ZR-95	-6.392E-02	6.912E-02	1.124E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.716E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.593E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	5.892E+40	0.000E+00	SHORT HLIF
RH-101	1.626E-02	5.318E-02	4.423E-02	FAIL ABUN
RH-102	3.732E-03	3.706E-02	7.522E-02	NOT IDENT.
RU-103	-4.403E-02	4.162E-02	7.042E-02	FAIL ABUN
RH-106	8.784E-02	2.820E-01	5.676E-01	NOT IDENT.
RU-106	8.784E-02	2.820E-01	5.676E-01	NOT IDENT.
AG-108M	2.679E-02	3.687E-02	4.008E-02	FAIL ABUN
AG-110	7.718E-02	5.293E-01	9.862E-01	NOT IDENT.
AG-110M	1.423E-02	3.576E-02	7.651E-02	NOT IDENT.
SN-113	1.184E-02	3.647E-02	7.549E-02	NOT IDENT.
CD-115	0.000E+00	4.233E+03	0.000E+00	SHORT HLIF
SN-117M	8.494E-03	1.120E-01	2.125E-01	NOT IDENT.
SB-122	0.000E+00	2.747E+02	0.000E+00	SHORT HLIF
TE-123M	-4.900E-03	2.519E-02	4.640E-02	NOT IDENT.
SB-124	1.607E-02	8.889E-02	1.978E-01	NOT IDENT.
SB-125	6.099E-02	7.298E-02	1.528E-01	NOT IDENT.
TE-125M	-3.599E+00	9.953E+00	1.851E+01	NOT IDENT.
I-126	0.000E+00	7.259E-01	1.175E+00	FAIL ABUN
SB-126	-6.940E-02	3.875E-01	7.253E-01	FAIL ABUN
SB-127	-3.911E+00	3.914E+01	7.530E+01	NOT IDENT.
I-131	-1.377E-01	4.870E-01	9.473E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.406E+01	0.000E+00	SHORT HLIF
BA-133	1.309E-02	3.049E-02	5.912E-02	NOT IDENT.
I-133	0.000E+00	4.690E+10	0.000E+00	SHORT HLIF
CS-134	5.222E-03	3.651E-02	7.122E-02	FAIL ABUN
I-135	0.000E+00	7.021E+37	0.000E+00	SHORT HLIF
CS-136	5.334E-02	1.730E-01	3.975E-01	NOT IDENT.
LA-138	-4.757E-03	4.097E-02	8.494E-02	NOT IDENT.
CE-139	-2.272E-03	2.771E-02	5.124E-02	NOT IDENT.
BA-140	-2.475E-01	6.223E-01	1.162E+00	NOT IDENT.
LA-140	-1.629E-01	1.689E-01	2.407E-01	NOT IDENT.
CE-141	5.435E-02	7.391E-02	1.476E-01	NOT IDENT.
CE-143	0.000E+00	3.070E+06	0.000E+00	SHORT HLIF
CE-144	-5.855E-02	1.549E-01	2.846E-01	NOT IDENT.
PM-144	5.145E-03	2.895E-02	5.734E-02	NOT IDENT.
PR-144	-1.602E-01	2.275E+00	4.336E+00	NOT IDENT.
PM-146	-1.058E-02	3.356E-02	6.392E-02	FAIL ABUN
ND-147	-4.938E-01	1.545E+00	2.923E+00	FAIL ABUN
PM-147	1.846E+02	5.740E+02	1.125E+03	NOT IDENT.
PM-149	0.000E+00	4.569E+04	0.000E+00	SHORT HLIF
EU-150	-1.180E-02	2.348E-02	3.951E-02	FAIL ABUN
EU-152	2.533E-02	9.159E-02	1.685E-01	FAIL ABUN
GD-153	-3.571E-02	6.640E-02	1.229E-01	NOT IDENT.
EU-154	-5.601E-03	7.433E-02	1.557E-01	NOT IDENT.

EU-155	-3.707E-02	8.311E-02	1.540E-01	FAIL ABUN
TB-160	-8.130E-02	1.255E-01	2.130E-01	FAIL ABUN
HO-166M	4.358E-02	4.673E-02	1.031E-01	FAIL ABUN
TM-171	1.706E+00	1.278E+01	2.620E+01	NOT IDENT.
HF-172	-4.319E-02	1.527E-01	2.614E-01	FAIL ABUN
LU-172	-1.452E-02	4.644E-02	9.112E-02	FAIL ABUN
LU-176	-3.236E-03	1.899E-02	3.768E-02	FAIL ABUN
HF-181	2.947E-02	4.627E-02	9.861E-02	NOT IDENT.
TA-182	3.790E-02	1.254E-01	2.784E-01	FAIL ABUN
RE-183	-1.883E-02	1.615E-01	3.221E-01	NOT IDENT.
RE-184	-5.565E-02	1.467E-01	2.637E-01	NOT IDENT.
W-188	-3.729E+00	8.384E+00	1.305E+01	FAIL ABUN
IR-192	-8.471E-03	3.188E-02	6.236E-02	FAIL ABUN
TL-204	-5.331E-01	3.553E+00	6.410E+00	NOT IDENT.
BI-207	-5.619E-02	8.820E-02	2.055E-01	FAIL ABUN
BI-210	-2.421E+00	2.505E+00	4.813E+00	NOT IDENT.
PB-210	-2.421E+00	2.505E+00	4.813E+00	NOT IDENT.
PB-211	1.843E-02	5.905E-01	1.167E+00	NOT IDENT.
BI-212	7.493E-01	5.406E-01	1.107E+00	NOT IDENT.
BI-213	-1.397E-02	7.069E-02	1.385E-01	NOT IDENT.
RN-219	8.479E-02	3.048E-01	6.245E-01	FAIL ABUN
RA-223	7.614E-01	7.050E-01	1.050E+00	FAIL ABUN
AC-225	-2.167E+00	2.047E+00	3.321E+00	NOT IDENT.
AC-227	-8.404E-02	1.992E-01	3.162E-01	FAIL ABUN
TH-227	-8.404E-02	1.992E-01	3.162E-01	FAIL ABUN
TH-229	5.643E-02	4.187E-01	7.847E-01	FAIL ABUN
TH-231	7.614E-01	7.050E-01	1.050E+00	FAIL ABUN
PA-233	-2.953E-03	4.632E-02	9.283E-02	FAIL ABUN
PA-234	1.266E-01	2.211E-01	4.788E-01	FAIL ABUN
NP-237	-2.953E-03	4.632E-02	9.283E-02	FAIL ABUN
NP-238	0.000E+00	1.318E+04	0.000E+00	SHORT HLIF
NP-239	-3.331E-02	1.847E-01	3.501E-01	FAIL ABUN
PU-239	1.717E+02	5.616E+02	5.257E+02	FAIL ABUN
AM-241	-3.729E-02	1.141E-01	2.052E-01	NOT IDENT.
CM-243	3.138E-02	8.076E-02	1.603E-01	FAIL ABUN
BK-247	5.921E-02	6.778E-02	1.278E-01	NOT IDENT.
CM-247	-1.508E-03	2.805E-02	5.548E-02	FAIL ABUN
CF-249	-2.481E-02	3.014E-02	5.463E-02	NOT IDENT.
CF-251	-2.825E-02	1.070E-01	1.942E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:41.39

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	98	10.66*	1.163E+00	3.920E+00	3.920E+00	20.36
CD-109	88.03	45	3.70*	6.035E+00	9.933E-01	1.048E+00	108.91
SN-126	64.28	29	9.60	3.327E+00	4.519E-01	4.519E-01	177.96
	86.94	45	8.90	6.035E+00	4.129E-01	4.129E-01	108.91
	87.57	45	37.00*	6.035E+00	9.933E-02	9.933E-02	108.91
BA-137M	661.66	21	89.90*	2.382E+00	4.953E-02	4.964E-02	85.15
CS-137	661.66	21	85.10*	2.382E+00	5.232E-02	5.244E-02	85.15
HG-203	70.83	------	3.69	4.383E+00	------ Line Not Found		------
	72.87	46	6.19	4.627E+00	8.011E-01	1.356E+00	123.58
	279.20	40	81.56*	4.657E+00	5.271E-02	8.925E-02	108.50
TL-208	277.37	40	6.60	4.657E+00	6.513E-01	6.513E-01	108.50
	583.19	112	85.00*	2.652E+00	2.463E-01	2.463E-01	35.91
	860.56	11	12.50	1.878E+00	2.257E-01	2.257E-01	139.45
BI-211	72.87	46	1.23	4.627E+00	4.032E+00	4.032E+00	123.58
	351.06	332	12.92*	3.933E+00	3.233E+00	3.233E+00	16.82
PB-212	74.82	160	10.28	4.851E+00	1.585E+00	1.585E+00	31.53
	77.11	244	17.10	5.117E+00	1.381E+00	1.381E+00	23.31
	238.63	309	43.60*	5.175E+00	6.766E-01	6.766E-01	21.18
	300.09	35	3.30	4.415E+00	1.181E+00	1.181E+00	71.58
BI-214	609.32	224	45.49*	2.558E+00	9.525E-01	9.525E-01	20.38
	1120.29	56	14.92	1.465E+00	1.259E+00	1.259E+00	26.73
	1764.49	36	15.30	1.028E+00	1.125E+00	1.125E+00	43.53
PB-214	74.82	160	5.80	4.851E+00	2.808E+00	2.809E+00	31.53
	77.11	244	9.70	5.117E+00	2.435E+00	2.435E+00	23.31
	87.09	45	3.41	6.035E+00	1.078E+00	1.078E+00	108.91
	242.00	78	7.25	5.129E+00	1.034E+00	1.034E+00	69.83
	295.22	189	18.42	4.465E+00	1.137E+00	1.137E+00	27.37
	351.93	332	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82
RN-222	609.32	224	45.49*	2.558E+00	9.525E-01	9.525E-01	20.38
	1120.29	56	14.92	1.465E+00	1.259E+00	1.259E+00	26.73
	1764.49	36	15.30	1.028E+00	1.125E+00	1.125E+00	43.53
RA-224	240.99	78	4.10*	5.129E+00	1.828E+00	1.828E+00	69.83
RA-226	74.82	160	5.80	4.851E+00	2.808E+00	2.809E+00	31.53
	77.11	244	9.70	5.117E+00	2.435E+00	2.435E+00	23.31
	87.09	45	3.41	6.035E+00	1.078E+00	1.078E+00	108.91
	242.00	78	7.25	5.129E+00	1.034E+00	1.034E+00	69.83
	295.22	189	18.42	4.465E+00	1.137E+00	1.137E+00	27.37
	351.93	332	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82
AC-228	105.21	------	1.10	6.834E+00	------ Line Not Found		------
	338.32	63	11.27	4.043E+00	6.808E-01	6.808E-01	75.45
	835.71	------	1.61	1.931E+00	------ Line Not Found		------
	911.20	56	25.80*	1.780E+00	6.072E-01	6.072E-01	43.66
	968.97	46	15.80	1.680E+00	8.488E-01	8.488E-01	41.44
RA-228	105.21	------	1.10	6.834E+00	------ Line Not Found		------
	338.32	63	11.27	4.043E+00	6.808E-01	6.808E-01	75.45
	835.71	------	1.61	1.931E+00	------ Line Not Found		------
	911.20	56	25.80*	1.780E+00	6.072E-01	6.072E-01	43.66

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	46	15.80	1.680E+00	8.488E-01	8.488E-01	41.44
TH-228	74.82	160	10.28	4.851E+00	1.585E+00	1.585E+00	31.53
	77.11	244	17.10	5.117E+00	1.381E+00	1.381E+00	23.31
	238.63	309	43.60*	5.175E+00	6.766E-01	6.766E-01	21.18
	300.09	35	3.30	4.415E+00	1.181E+00	1.181E+00	71.58
TH-230	74.82	160	5.80	4.851E+00	2.808E+00	2.808E+00	31.53
	77.11	244	9.70	5.117E+00	2.435E+00	2.435E+00	23.31
	87.09	45	3.41	6.035E+00	1.078E+00	1.078E+00	108.91
	242.00	78	7.25	5.129E+00	1.034E+00	1.034E+00	69.83
	295.22	189	18.42	4.465E+00	1.137E+00	1.137E+00	27.37
	351.93	332	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82
PA-231	283.69	------	1.70	4.593E+00	------ Line Not Found		------
	301.36	35	5.35*	4.415E+00	7.283E-01	7.283E-01	71.58
TH-232	105.21	------	1.10	6.834E+00	------ Line Not Found		------
	338.32	63	11.27	4.043E+00	6.808E-01	6.808E-01	75.45
	835.71	------	1.61	1.931E+00	------ Line Not Found		------
	911.20	56	25.80*	1.780E+00	6.072E-01	6.072E-01	43.66
	968.97	46	15.80	1.680E+00	8.488E-01	8.488E-01	41.44
PA-234M	63.29	29	3.70*	3.327E+00	1.172E+00	1.172E+00	177.96
	92.59	78	4.23	6.368E+00	1.433E+00	1.433E+00	75.25
TH-234	63.29	29	3.70*	3.327E+00	1.172E+00	1.172E+00	177.96
	92.59	78	4.23	6.368E+00	1.433E+00	1.433E+00	75.25
U-234	74.82	160	5.80	4.851E+00	2.808E+00	2.808E+00	31.53
	77.11	244	9.70	5.117E+00	2.435E+00	2.435E+00	23.31
	87.09	45	3.41	6.035E+00	1.078E+00	1.078E+00	108.91
	242.00	78	7.25	5.129E+00	1.034E+00	1.034E+00	69.83
	295.22	189	18.42	4.465E+00	1.137E+00	1.137E+00	27.37
	351.93	332	35.60*	3.933E+00	1.173E+00	1.173E+00	16.82
U-235	89.96	57	3.47	6.203E+00	1.313E+00	1.313E+00	70.49
	93.35	78	5.60	6.368E+00	1.082E+00	1.082E+00	75.25
	143.76	------	10.96*	6.791E+00	------ Line Not Found		------
	163.33	------	5.08	6.462E+00	------ Line Not Found		------
	185.72	94	57.20	6.047E+00	1.337E-01	1.337E-01	54.73
	205.31	------	5.01	5.701E+00	------ Line Not Found		------
U-238	63.29	29	3.70*	3.327E+00	1.172E+00	1.172E+00	177.96
	92.59	78	4.23	6.368E+00	1.433E+00	1.433E+00	75.25
AM-243	43.53	------	5.90	5.979E-01	------ Line Not Found		------
	74.66	160	67.20*	4.851E+00	2.424E-01	2.424E-01	31.53
ANH-511	511.00	31	100.00*	2.957E+00	5.229E-02	5.229E-02	127.57

Flag: "*" = Keyline

Sample ID : G714507012 Acquisition date : 10-APR-2025 22:31:47

Total number of lines in spectrum 45
Number of unidentified lines 8
Number of lines tentatively identified by NID 37 82.22%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	3.920E+00	3.920E+00	0.798E+00	20.36	
CD-109	461.40D	1.05	9.933E-01	1.048E+00	1.141E+00	108.91	
SN-126	2.30E+05Y	1.00	9.933E-02	9.933E-02	10.82E-02	108.91	
BA-137M	30.08Y	1.00	4.953E-02	4.964E-02	4.227E-02	85.15	
CS-137	30.08Y	1.00	5.232E-02	5.244E-02	4.465E-02	85.15	
HG-203	46.59D	1.69	5.271E-02	8.925E-02	9.683E-02	108.50	
TL-208	1.41E+10Y	1.00	2.463E-01	2.463E-01	0.884E-01	35.91	
BI-211	7.04E+08Y	1.00	3.233E+00	3.233E+00	0.544E+00	16.82	
PB-212	1.41E+10Y	1.00	6.766E-01	6.766E-01	1.433E-01	21.18	
BI-214	1600.00Y	1.00	9.525E-01	9.525E-01	1.941E-01	20.38	
PB-214	1600.00Y	1.00	1.173E+00	1.173E+00	0.197E+00	16.82	
RN-222	1600.00Y	1.00	9.525E-01	9.525E-01	1.941E-01	20.38	
RA-224	1.41E+10Y	1.00	1.828E+00	1.828E+00	1.276E+00	69.83	
RA-226	1600.00Y	1.00	1.173E+00	1.173E+00	0.197E+00	16.82	
AC-228	1.41E+10Y	1.00	6.072E-01	6.072E-01	2.651E-01	43.66	
RA-228	1.41E+10Y	1.00	6.072E-01	6.072E-01	2.651E-01	43.66	
TH-228	1.41E+10Y	1.00	6.766E-01	6.766E-01	1.433E-01	21.18	
TH-230	7.54E+04Y	1.00	1.173E+00	1.173E+00	0.197E+00	16.82	
PA-231	7.04E+08Y	1.00	7.283E-01	7.283E-01	5.214E-01	71.58	
TH-232	1.41E+10Y	1.00	6.072E-01	6.072E-01	2.651E-01	43.66	
PA-234M	4.47E+09Y	1.00	1.172E+00	1.172E+00	2.086E+00	177.96	
TH-234	4.47E+09Y	1.00	1.172E+00	1.172E+00	2.086E+00	177.96	
U-234	2.45E+05Y	1.00	1.173E+00	1.173E+00	0.197E+00	16.82	
U-235	7.04E+08Y	1.00	1.337E-01	1.337E-01	0.732E-01	54.73	K
U-238	4.47E+09Y	1.00	1.172E+00	1.172E+00	2.086E+00	177.96	
AM-243	7370.00Y	1.00	2.424E-01	2.424E-01	0.764E-01	31.53	
ANH-511	1.00E+09Y	1.00	5.229E-02	5.229E-02	6.671E-02	127.57	
Total Activity :			2.492E+01	2.501E+01			

Grand Total Activity : 2.492E+01 2.501E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	127.83	15	158	1.22	255.86	254	9	3.45E-03	****	6.97E+00	T
0	209.67	64	108	1.47	419.56	414	11	1.51E-02	74.4	5.63E+00	T
0	259.72	17	73	1.37	519.68	514	9	3.99E-03	****	4.88E+00	T
0	270.20	54	104	2.35	540.64	534	11	1.31E-02	84.7	4.75E+00	T
0	324.60	26	39	1.02	649.47	646	7	6.31E-03	94.5	4.17E+00	T
0	432.76	17	31	0.80	865.81	862	10	4.18E-03	****	3.37E+00	T
1	569.69	10	7	1.61	1139.72	1134	23	2.63E-03	****	2.71E+00	T
1	576.18	23	8	1.62	1152.71	1134	23	6.04E-03	63.1	2.68E+00	
0	615.53	5	21	2.06	1231.41	1227	8	1.19E-03	****	2.54E+00	T
0	638.54	24	20	1.75	1277.44	1272	11	6.40E-03	84.6	2.46E+00	
1	665.94	31	17	1.68	1332.25	1317	27	8.32E-03	55.7	2.37E+00	T
0	729.55	35	42	2.02	1459.49	1451	19	9.44E-03	98.0	2.19E+00	
0	737.12	17	9	1.95	1474.64	1471	7	4.57E-03	77.1	2.17E+00	T
0	991.17	6	11	1.49	1982.83	1975	11	1.67E-03	****	1.64E+00	
0	1039.13	8	4	2.08	2078.77	2075	7	2.34E-03	****	1.57E+00	T
0	1060.13	7	5	0.63	2120.79	2117	7	1.94E-03	****	1.54E+00	
0	1155.57	15	5	0.69	2311.71	2306	11	4.31E-03	77.6	1.42E+00	
0	1378.96	12	6	1.13	2758.60	2750	12	3.46E-03	97.5	1.22E+00	
0	1408.43	10	2	0.89	2817.56	2813	8	2.78E-03	80.0	1.20E+00	T
0	1589.17	6	1	1.47	3179.13	3175	7	1.79E-03	****	1.09E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:53.01

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507012.CNF;1    *
* Acquisition date : 10-APR-2025 22:31:47 Sensitivity     : 3.000          *
* Detector ID      : GAM19                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.66     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 13:30:00 Nuclide Library : SOLID          *
* Sample ID        : G714507012           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 1.5188E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 10-DEC-2024 05:06:30 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;26          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	9.212E-02
CD-109	5.034E-01
SN-126	5.239E-02
BA-137M	2.090E-02
CS-137	2.208E-02
HG-203	2.873E-02
TL-208	2.214E-02
BI-211	1.161E-01
PB-212	4.785E-02
BI-214	5.133E-02
PB-214	4.224E-02
RN-222	5.133E-02
RA-224	5.474E-01
RA-226	4.224E-02
AC-228	8.955E-02
RA-228	8.955E-02
TH-228	4.785E-02
TH-230	4.224E-02
PA-231	3.191E-01
TH-232	8.955E-02
PA-234M	8.448E-01
TH-234	8.448E-01
U-234	4.224E-02
U-235	1.409E-01
U-238	8.448E-01
AM-243	3.286E-02
ANH-511	2.113E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.355E-01	NOT IDENT.
NA-22	2.244E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.608E-02	NOT IDENT.

SC-46	3.247E-02	FAIL ABUN
V-48	1.006E-01	NOT IDENT.
CR-51	4.444E-01	NOT IDENT.
MN-52	1.806E+00	NOT IDENT.
MN-54	2.380E-02	NOT IDENT.
CO-56	3.211E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.656E-02	NOT IDENT.
CO-58	3.007E-02	NOT IDENT.
FE-59	6.889E-02	NOT IDENT.
CO-60	9.381E-03	NOT IDENT.
ZN-65	5.032E-02	NOT IDENT.
GE-68	7.555E-01	NOT IDENT.
AS-73	6.089E-01	NOT IDENT.
AS-74	1.222E-01	NOT IDENT.
SE-75	3.637E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	3.595E-01	NOT IDENT.
RB-83	4.843E-02	NOT IDENT.
RB-84	5.529E-02	NOT IDENT.
KR-85	5.123E+00	NOT IDENT.
SR-85	3.358E-02	NOT IDENT.
RB-86	9.446E-01	NOT IDENT.
Y-88	1.448E-02	NOT IDENT.
Y-91	1.400E+01	NOT IDENT.
NB-94	2.355E-02	NOT IDENT.
NB-95	3.225E-02	NOT IDENT.
NB-95M	1.148E-01	NOT IDENT.
ZR-95	4.749E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.058E-02	FAIL ABUN
RH-102	3.258E-02	NOT IDENT.
RU-103	3.052E-02	FAIL ABUN
RH-106	2.544E-01	NOT IDENT.
RU-106	2.544E-01	NOT IDENT.
AG-108M	1.776E-02	FAIL ABUN
AG-110	4.228E-01	NOT IDENT.
AG-110M	3.261E-02	NOT IDENT.
SN-113	3.410E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	9.865E-02	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.162E-02	NOT IDENT.
SB-124	7.877E-02	NOT IDENT.
SB-125	6.939E-02	NOT IDENT.
TE-125M	8.669E+00	NOT IDENT.
I-126	5.289E-01	FAIL ABUN
SB-126	3.207E-01	FAIL ABUN
SB-127	3.293E+01	NOT IDENT.
I-131	4.264E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.667E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.153E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	1.636E-01	NOT IDENT.
LA-138	3.375E-02	NOT IDENT.
CE-139	2.397E-02	NOT IDENT.
BA-140	5.126E-01	NOT IDENT.
LA-140	7.609E-02	NOT IDENT.
CE-141	6.919E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.322E-01	NOT IDENT.
PM-144	2.544E-02	NOT IDENT.
PR-144	1.924E+00	NOT IDENT.
PM-146	2.864E-02	FAIL ABUN
ND-147	1.290E+00	FAIL ABUN
PM-147	5.259E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.797E-02	FAIL ABUN
EU-152	7.769E-02	FAIL ABUN
GD-153	5.729E-02	NOT IDENT.
EU-154	6.292E-02	NOT IDENT.
EU-155	7.199E-02	FAIL ABUN

TB-160	8.923E-02	FAIL ABUN
HO-166M	4.590E-02	FAIL ABUN
TM-171	1.213E+01	NOT IDENT.
HF-172	1.214E-01	FAIL ABUN
LU-172	3.812E-02	FAIL ABUN
LU-176	1.712E-02	FAIL ABUN
HF-181	4.436E-02	NOT IDENT.
TA-182	1.163E-01	FAIL ABUN
RE-183	1.490E-01	NOT IDENT.
RE-184	1.119E-01	NOT IDENT.
W-188	5.980E+00	FAIL ABUN
IR-192	2.841E-02	FAIL ABUN
TL-204	2.993E+00	NOT IDENT.
BI-207	9.687E-02	FAIL ABUN
BI-210	2.216E+00	NOT IDENT.
PB-210	2.216E+00	NOT IDENT.
PB-211	5.319E-01	NOT IDENT.
BI-212	5.068E-01	NOT IDENT.
BI-213	6.122E-02	NOT IDENT.
RN-219	2.827E-01	FAIL ABUN
RA-223	4.831E-01	FAIL ABUN
AC-225	1.530E+00	NOT IDENT.
AC-227	1.431E-01	FAIL ABUN
TH-227	1.431E-01	FAIL ABUN
TH-229	3.653E-01	FAIL ABUN
TH-231	4.831E-01	FAIL ABUN
PA-233	4.219E-02	FAIL ABUN
PA-234	2.064E-01	FAIL ABUN
NP-237	4.219E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.622E-01	FAIL ABUN
PU-239	2.467E+02	FAIL ABUN
AM-241	9.523E-02	NOT IDENT.
CM-243	7.508E-02	FAIL ABUN
BK-247	5.905E-02	NOT IDENT.
CM-247	2.504E-02	FAIL ABUN
CF-249	2.443E-02	NOT IDENT.
CF-251	9.050E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:32:57.32

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507012.CNF;1       *
* Acquisition date : 10-APR-2025 22:31:47 Sensitivity     : 3.000               *
* Detector ID      : GAM19                Energy tolerance: 1.500               *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000              *
* Elapsed real time:    0 01:00:00.66     Half life ratio : *****               *
* Sample date      :  6-MAR-2025 13:30:00 Nuclide Library : SOLID               *
* Sample ID        : G714507012           Analyst initials: MXR1                *
* Batch Number     : 2767515              Sample Quantity : 1.5188E+02 GRAM     *
*                                         Quantity Err(%) : 1.3168E-03 %        *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000          *
*                                         Dry Weight      :    0.00000          *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 10-DEC-2024 05:06:30 Eff. Geometry   : CAN                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;26                 *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	3.920E+00	8.836E-01	8.836E-01
CD-109	1.048E+00	1.123E+00	1.123E+00
SN-126	9.933E-02	1.063E-01	1.063E-01
BA-137M	4.964E-02	4.163E-02	4.163E-02
CS-137	5.244E-02	4.398E-02	4.398E-02
HG-203	5.572E-02	9.585E-02	9.585E-02
TL-208	2.463E-01	8.919E-02	8.919E-02
BI-211	3.233E+00	6.050E-01	6.050E-01
PB-212	6.766E-01	1.528E-01	1.528E-01
BI-214	9.525E-01	2.067E-01	2.067E-01
PB-214	1.173E+00	2.187E-01	2.187E-01
RN-222	9.525E-01	2.067E-01	2.067E-01
RA-224	1.828E+00	1.262E+00	1.262E+00
RA-226	1.173E+00	2.187E-01	2.187E-01
AC-228	6.072E-01	2.695E-01	2.695E-01
RA-228	6.072E-01	2.695E-01	2.695E-01
TH-228	6.766E-01	1.528E-01	1.528E-01
TH-230	1.173E+00	2.187E-01	2.187E-01
PA-231	7.283E-01	5.373E-01	5.373E-01
TH-232	6.072E-01	2.695E-01	2.695E-01
PA-234M	1.172E+00	2.062E+00	2.062E+00
TH-234	1.172E+00	2.062E+00	2.062E+00
U-234	1.173E+00	2.187E-01	2.187E-01
U-235	-8.383E-03	1.619E-01	1.619E-01
U-238	1.172E+00	2.062E+00	2.062E+00
AM-243	2.424E-01	7.731E-02	7.731E-02
ANH-511	5.229E-02	6.553E-02	6.553E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	2.875E-01	3.456E-01	3.691E-01	NOT IDENT.
NA-22	-1.999E-03	2.651E-02	2.652E-02	NOT IDENT.
NA-24	-1.513E+15	3.238E+15	3.310E+15	SHORT HLIF

AL-26	-4.294E-04	1.955E-02	1.955E-02	NOT IDENT.
SC-46	-5.111E-03	3.994E-02	4.001E-02	FAIL ABUN
V-48	-1.278E-02	1.251E-01	1.252E-01	NOT IDENT.
CR-51	1.685E-01	4.887E-01	4.946E-01	NOT IDENT.
MN-52	-5.251E-01	2.268E+00	2.280E+00	NOT IDENT.
MN-54	-6.031E-03	2.957E-02	2.969E-02	NOT IDENT.
CO-56	-1.118E-02	4.045E-02	4.077E-02	FAIL ABUN
MN-56	-1.000E+41	3.667E+41	0.000E+00	SHORT HLIF
CO-57	-4.872E-03	1.907E-02	1.919E-02	NOT IDENT.
CO-58	1.833E-02	3.177E-02	3.283E-02	NOT IDENT.
FE-59	-6.804E-03	8.006E-02	8.012E-02	NOT IDENT.
CO-60	-1.862E-02	1.981E-02	2.151E-02	NOT IDENT.
ZN-65	9.527E-03	6.210E-02	6.224E-02	NOT IDENT.
GE-68	-5.059E-02	8.709E-01	8.712E-01	NOT IDENT.
AS-73	-5.457E-01	7.105E-01	7.519E-01	NOT IDENT.
AS-74	-3.736E-02	1.473E-01	1.482E-01	NOT IDENT.
SE-75	2.023E-02	4.421E-02	4.514E-02	FAIL ABUN
BR-77	3.887E+04	4.066E+04	4.428E+04	SHORT HLIF
SR-82	5.499E-02	4.140E-01	4.147E-01	NOT IDENT.
RB-83	4.267E-03	5.442E-02	5.445E-02	NOT IDENT.
RB-84	-3.477E-02	7.499E-02	7.661E-02	NOT IDENT.
KR-85	4.957E+00	5.640E+00	6.066E+00	NOT IDENT.
SR-85	3.240E-02	3.697E-02	3.975E-02	NOT IDENT.
RB-86	-3.465E-01	1.150E+00	1.160E+00	NOT IDENT.
Y-88	-6.830E-03	2.181E-02	2.203E-02	NOT IDENT.
Y-91	-6.117E-01	1.625E+01	1.626E+01	NOT IDENT.
NB-94	-3.338E-03	2.810E-02	2.814E-02	NOT IDENT.
NB-95	-2.108E-02	4.187E-02	4.294E-02	NOT IDENT.
NB-95M	1.157E-01	1.337E-01	1.435E-01	NOT IDENT.
ZR-95	-6.392E-02	6.939E-02	7.513E-02	NOT IDENT.
NB-97	1.000E+41	3.287E+41	0.000E+00	SHORT HLIF
ZR-97	-1.703E+14	6.718E+14	6.761E+14	SHORT HLIF
MO-99	-1.165E+03	1.598E+03	1.682E+03	SHORT HLIF
TC-99M	-4.977E+40	5.919E+40	0.000E+00	SHORT HLIF
RH-101	1.626E-02	5.327E-02	5.377E-02	FAIL ABUN
RH-102	3.732E-03	3.706E-02	3.710E-02	NOT IDENT.
RU-103	-4.403E-02	4.181E-02	4.628E-02	FAIL ABUN
RH-106	8.784E-02	2.821E-01	2.849E-01	NOT IDENT.
RU-106	8.784E-02	2.821E-01	2.849E-01	NOT IDENT.
AG-108M	2.679E-02	3.693E-02	3.886E-02	FAIL ABUN
AG-110	7.718E-02	5.293E-01	5.305E-01	NOT IDENT.
AG-110M	1.423E-02	3.580E-02	3.637E-02	NOT IDENT.
SN-113	1.184E-02	3.648E-02	3.687E-02	NOT IDENT.
CD-115	9.192E+02	4.234E+03	4.254E+03	SHORT HLIF
SN-117M	8.494E-03	1.120E-01	1.121E-01	NOT IDENT.
SB-122	2.384E+02	2.754E+02	2.956E+02	SHORT HLIF
TE-123M	-4.900E-03	2.519E-02	2.528E-02	NOT IDENT.
SB-124	1.607E-02	8.890E-02	8.920E-02	NOT IDENT.
SB-125	6.099E-02	7.315E-02	7.815E-02	NOT IDENT.
TE-125M	-3.599E+00	9.957E+00	1.009E+01	NOT IDENT.
I-126	1.331E+00	7.367E-01	9.501E-01	FAIL ABUN
SB-126	-6.940E-02	3.876E-01	3.888E-01	FAIL ABUN
SB-127	-3.911E+00	3.915E+01	3.918E+01	NOT IDENT.
I-131	-1.377E-01	4.871E-01	4.911E-01	NOT IDENT.
I-132	1.000E+41	8.141E+41	0.000E+00	SHORT HLIF
TE-132	3.993E+01	4.431E+01	4.783E+01	SHORT HLIF
BA-133	1.309E-02	3.051E-02	3.108E-02	NOT IDENT.
I-133	-1.448E+10	4.702E+10	4.748E+10	SHORT HLIF
CS-134	5.222E-03	3.651E-02	3.659E-02	FAIL ABUN
I-135	4.810E+37	8.024E+37	0.000E+00	SHORT HLIF
CS-136	5.334E-02	1.731E-01	1.748E-01	NOT IDENT.
LA-138	-4.757E-03	4.097E-02	4.103E-02	NOT IDENT.
CE-139	-2.272E-03	2.772E-02	2.774E-02	NOT IDENT.
BA-140	-2.475E-01	6.226E-01	6.326E-01	NOT IDENT.
LA-140	-1.629E-01	1.696E-01	1.848E-01	NOT IDENT.
CE-141	5.435E-02	7.401E-02	7.796E-02	NOT IDENT.
CE-143	2.740E+06	3.081E+06	3.320E+06	SHORT HLIF
CE-144	-5.855E-02	1.549E-01	1.572E-01	NOT IDENT.
PM-144	5.145E-03	2.895E-02	2.904E-02	NOT IDENT.
PR-144	-1.602E-01	2.275E+00	2.276E+00	NOT IDENT.
PM-146	-1.058E-02	3.358E-02	3.392E-02	FAIL ABUN
ND-147	-4.938E-01	1.546E+00	1.562E+00	FAIL ABUN
PM-147	1.846E+02	5.742E+02	5.802E+02	NOT IDENT.
PM-149	-3.597E+04	4.605E+04	4.882E+04	SHORT HLIF
EU-150	-1.180E-02	2.350E-02	2.410E-02	FAIL ABUN
EU-152	2.533E-02	9.163E-02	9.233E-02	FAIL ABUN
GD-153	-3.571E-02	6.645E-02	6.838E-02	NOT IDENT.
EU-154	-5.601E-03	7.433E-02	7.437E-02	NOT IDENT.

EU-155	-3.707E-02	8.317E-02	8.483E-02	FAIL ABUN
TB-160	-8.130E-02	1.259E-01	1.311E-01	FAIL ABUN
HO-166M	4.358E-02	4.692E-02	5.086E-02	FAIL ABUN
TM-171	1.706E+00	1.279E+01	1.281E+01	NOT IDENT.
HF-172	-4.319E-02	1.529E-01	1.541E-01	FAIL ABUN
LU-172	-1.452E-02	4.648E-02	4.694E-02	FAIL ABUN
LU-176	-3.236E-03	1.899E-02	1.904E-02	FAIL ABUN
HF-181	2.947E-02	4.634E-02	4.821E-02	NOT IDENT.
TA-182	3.790E-02	1.255E-01	1.266E-01	FAIL ABUN
RE-183	-1.883E-02	1.615E-01	1.617E-01	NOT IDENT.
RE-184	-5.565E-02	1.469E-01	1.490E-01	NOT IDENT.
W-188	-3.729E+00	8.399E+00	8.566E+00	FAIL ABUN
IR-192	-8.471E-03	3.189E-02	3.212E-02	FAIL ABUN
TL-204	-5.331E-01	3.554E+00	3.562E+00	NOT IDENT.
BI-207	-5.619E-02	8.838E-02	9.194E-02	FAIL ABUN
BI-210	-2.421E+00	2.516E+00	2.743E+00	NOT IDENT.
PB-210	-2.421E+00	2.516E+00	2.743E+00	NOT IDENT.
PB-211	1.843E-02	5.905E-01	5.905E-01	NOT IDENT.
BI-212	7.493E-01	5.453E-01	6.415E-01	NOT IDENT.
BI-213	-1.397E-02	7.070E-02	7.098E-02	NOT IDENT.
RN-219	8.479E-02	3.051E-01	3.075E-01	FAIL ABUN
RA-223	7.614E-01	7.091E-01	7.878E-01	FAIL ABUN
AC-225	-2.167E+00	2.060E+00	2.280E+00	NOT IDENT.
AC-227	-8.404E-02	1.996E-01	2.031E-01	FAIL ABUN
TH-227	-8.404E-02	1.996E-01	2.031E-01	FAIL ABUN
TH-229	5.643E-02	4.187E-01	4.195E-01	FAIL ABUN
TH-231	7.614E-01	7.091E-01	7.878E-01	FAIL ABUN
PA-233	-2.953E-03	4.632E-02	4.634E-02	FAIL ABUN
PA-234	1.266E-01	2.646E-01	2.707E-01	FAIL ABUN
NP-237	-2.953E-03	4.632E-02	4.634E-02	FAIL ABUN
NP-238	-5.227E+03	1.319E+04	1.340E+04	SHORT HLIF
NP-239	-3.331E-02	1.848E-01	1.854E-01	FAIL ABUN
PU-239	1.717E+02	5.617E+02	5.670E+02	FAIL ABUN
AM-241	-3.729E-02	1.142E-01	1.154E-01	NOT IDENT.
CM-243	3.138E-02	8.083E-02	8.206E-02	FAIL ABUN
BK-247	5.921E-02	6.898E-02	7.396E-02	NOT IDENT.
CM-247	-1.508E-03	2.805E-02	2.806E-02	FAIL ABUN
CF-249	-2.481E-02	3.026E-02	3.226E-02	NOT IDENT.
CF-251	-2.825E-02	1.071E-01	1.079E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	41.9745	85.43	117.7240	131.20	64.6809
45.60	40.4202	86.55	96.9940	133.02	60.6131
46.54	48.6287	86.79	89.1677	133.52	65.5921
49.72	0.0000	86.94	89.1926	136.00	58.3813
51.35	45.5984	87.09	89.2168	136.47	67.9775
51.87	35.6136	87.57	89.2943	140.51	0.0000
52.39	50.2902	88.03	74.9117	143.76	69.7052
52.97	61.3516	88.34	74.9534	144.24	74.0411
53.44	59.5899	88.47	74.9708	145.44	58.0350
54.07	58.7646	89.96	73.1921	152.43	80.2340
57.36	0.0000	1093.63	71.2996	153.25	71.6326
57.53	59.2578	91.11	71.3584	323.87	54.3312
57.98	53.7593	92.59	67.5689	156.02	81.6788
59.27	63.2188	93.35	67.6581	158.56	54.6211
59.32	63.2260	94.56	66.4698	159.00	66.6731
59.54	63.2582	94.65	66.4800	162.33	55.9657
60.96	60.9764	94.67	70.4710	162.66	59.2809
61.17	56.0255	94.87	70.4952	163.33	70.3145
62.93	68.4356	97.43	76.1455	165.86	72.7283
63.29	68.4904	98.43	74.2659	176.31	64.6836
63.58	68.5347	98.44	74.2670	176.60	54.6644
64.28	71.4618	99.53	53.2879	177.52	69.2382
66.73	73.1048	100.11	59.3777	181.07	0.0000
67.24	63.4060	102.03	76.7277	181.52	71.7891
125.81	73.8855	103.18	64.7334	184.41	43.5100
67.75	64.4224	103.37	64.7534	143.76	60.8505
68.89	72.1760	105.21	79.1521	193.51	57.9501
69.67	67.2215	105.31	79.1646	197.03	68.4274
70.82	69.9249	106.12	77.2345	198.01	58.2225
70.83	69.9266	106.47	75.2438	201.83	72.2054
72.81	73.7220	109.28	81.7041	203.43	58.5470
72.87	73.7308	111.00	77.8265	205.31	69.0097
74.66	73.9975	111.76	0.0000	210.85	56.6712
74.82	74.0216	114.06	58.6430	215.65	41.8326
74.97	74.0439	116.30	0.0000	218.12	65.2294
77.11	74.3576	116.74	56.8136	222.11	54.9562
78.74	77.5006	119.76	52.9171	227.09	55.2158
79.69	71.1720	121.12	62.3790	227.38	59.9314
80.03	71.2179	121.22	61.3484	228.16	0.0000
80.12	71.2308	121.78	59.3170	228.18	37.6323
80.19	66.0592	122.06	59.3409	116.74	37.6323
80.57	66.1074	122.92	75.0504	235.69	48.9471
81.00	79.1342	123.07	75.0663	235.96	48.9591
81.07	79.1447	265.00	49.0446	238.63	79.1585
81.75	110.1007	125.81	62.8001	238.98	0.0000
82.47	103.4210	127.23	53.1375	240.99	90.4332
83.79	89.9827	127.91	60.8869	242.00	52.4037
84.00	90.0178	129.30	61.0046	244.70	46.1633

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	37.2619	344.28	41.3027	563.25	12.6784
252.80	37.2746	345.93	36.1809	564.24	0.0000
254.15	0.0000	351.06	24.2061	569.33	18.7797
256.23	38.5918	351.93	24.2203	946.00	18.7813
260.90	0.0000	355.39	0.0000	569.70	18.7828
264.66	38.8691	356.01	22.1195	583.19	17.7209
264.80	38.8740	364.49	31.4055	584.27	17.7297
265.00	32.4007	366.42	0.0000	595.83	18.8152
269.46	43.9036	372.51	35.0806	427.87	14.8865
270.03	43.9244	375.05	30.7461	602.52	0.0000
271.23	45.5968	377.52	31.6758	604.72	23.8633
273.65	39.1611	356.01	34.4551	607.14	25.3828
276.40	28.2102	388.16	36.3221	609.32	25.4077
277.37	28.2327	388.63	36.3329	610.33	25.4191
277.60	28.2383	391.69	24.8606	614.28	17.9744
278.00	28.2474	264.66	31.2509	618.01	15.0037
279.20	28.2748	401.81	26.8054	620.36	20.0260
279.54	28.2825	402.40	29.4967	621.93	21.0419
279.70	28.2860	404.85	34.9129	630.19	0.0000
280.46	34.4565	410.95	28.7533	631.29	13.0799
283.69	25.9097	413.71	24.3012	633.25	16.6155
284.31	32.0945	414.70	22.5149	634.78	13.6038
285.41	45.7125	423.72	34.4081	635.95	21.1718
285.90	0.0000	427.09	26.3113	636.99	21.1820
287.50	35.8889	427.87	20.6954	657.50	10.6846
290.67	49.6252	433.94	14.5752	657.76	9.1593
293.27	0.0000	439.40	18.2768	657.90	0.0000
351.93	46.0671	440.45	21.9453	661.66	14.2712
295.96	39.8643	453.88	29.4857	664.57	0.0000
879.38	24.9658	463.37	25.0115	666.33	14.2996
299.98	39.9883	468.07	23.2188	666.50	14.3008
300.09	39.9922	473.00	18.6255	667.71	0.0000
300.13	39.9932	475.06	26.1053	677.62	18.4724
301.36	38.7803	476.78	23.3302	685.70	17.5043
302.85	31.3095	477.60	21.4731	692.65	0.0000
256.23	38.4550	482.18	18.7187	695.00	19.6378
304.85	38.4653	487.02	17.8291	696.49	18.6160
306.78	36.0092	492.35	0.0000	696.51	21.7186
308.46	32.7007	497.08	27.3586	697.00	21.7229
311.90	34.4670	505.52	27.0058	697.30	21.7255
316.51	39.6457	507.63	0.0000	697.49	21.7272
319.41	37.1948	511.00	27.5580	702.65	21.7725
320.08	34.5063	514.00	17.1313	706.68	19.7306
321.04	31.7383	514.00	17.1313	711.68	11.4462
323.87	41.9801	520.40	15.2780	720.70	21.9297
325.23	34.3820	520.69	0.0000	721.93	0.0000
328.76	38.8099	522.65	0.0000	722.78	20.3807
333.37	43.5490	527.90	0.0000	722.91	20.3815
333.97	43.5677	528.26	19.1732	723.31	17.2486
334.37	53.8343	529.59	20.1455	724.19	20.3918
338.28	37.7024	529.87	0.0000	727.33	17.2761
338.32	37.7033	531.02	23.0400	733.00	9.4442
311.90	37.7606	537.26	24.0743	735.93	12.6064
340.48	37.7606	546.56	0.0000	333.97	7.8839
340.55	37.7624	552.55	23.2861	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	13.7009	667.71	0.0000	1434.09	6.7654
747.24	25.3232	962.31	25.0105	1435.80	5.8011
748.06	16.8874	964.08	11.3749	1457.56	0.0000
752.31	23.2586	966.17	13.6587	1460.82	0.9724
753.82	12.6938	911.20	15.3798	1489.16	2.9355
756.73	20.1210	983.53	10.2997	1505.03	3.9275
756.80	20.1210	984.45	0.0000	1584.12	0.0000
884.68	18.0521	1274.44	3.4467	1596.21	6.0070
765.81	21.2524	1002.74	12.6628	1620.50	6.0370
766.84	18.0715	1004.73	8.0630	1621.92	7.0453
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	11.7358	1025.87	0.0000	1690.97	4.0823
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	13.8823	1037.84	6.9800	1764.49	8.2822
783.70	24.6041	1038.76	0.0000	1063.66	10.3644
788.74	27.8652	631.29	5.8317	1771.35	6.2197
792.07	17.1693	1048.07	5.2507	1791.20	0.0000
795.86	18.2673	1049.04	6.1276	1808.65	2.0880
810.06	14.0415	1050.41	10.5088	1810.72	0.0000
810.29	10.8020	1063.66	7.0332	1836.06	2.0986
344.28	10.8024	1077.00	10.5901		
810.76	7.5625	1077.34	8.8263		
815.77	15.1524	1085.87	7.9629		
1048.07	14.0839	1093.63	11.5273		
832.01	17.4173	1099.45	8.8818		
834.85	15.2555	1112.07	10.6956		
835.71	17.4401	1112.84	9.8069		
836.80	0.0000	1115.54	7.1377		
846.75	0.0000	1120.29	4.4669		
846.77	17.5078	1120.55	4.4672		
856.80	14.8239	1221.41	4.4681		
860.56	13.1938	1129.67	8.0612		
871.09	8.8275	1131.51	0.0000		
873.19	11.0425	1147.95	0.0000		
875.33	0.0000	1173.23	10.8765		
879.38	15.4919	1177.95	11.7979		
880.51	18.8186	1189.05	9.1022		
881.60	12.1812	1204.77	8.2260		
883.24	9.9719	1221.41	6.4258		
884.68	7.7596	1231.02	9.2023		
889.28	15.5432	1235.36	14.7402		
894.76	14.4594	1238.28	8.2974		
898.04	15.5888	1260.41	0.0000		
900.72	12.2595	1271.87	5.5789		
903.28	14.5007	1274.44	6.5129		
911.20	12.3016	1274.54	6.5134		
912.08	12.3052	1291.59	4.6719		
923.98	0.0000	1298.22	0.0000		
926.50	14.6112	1312.11	2.8174		
929.11	12.3737	1332.49	5.6627		
935.54	11.2724	1362.66	0.0000		
937.49	18.0469	1365.19	4.7559		
944.13	10.1730	1368.63	0.0000		
946.00	7.9169	1384.29	4.3680		
949.00	19.2454	1408.01	1.9215		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:33:24.41

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507013.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM21.CNF;898
Background date : 6-APR-2025 11:01:37.
Sample date : 6-MAR-2025 14:00:00. Acquisition date : 10-APR-2025 22:32:26
Sample ID : G714507013 Sample quantity : 1.62480E+02 GRAM
Detector name : GAM21 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.56 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.38	48	143	0.98	92.98	89	8	1.33E-02	45.8	
2	0	52.90	36	128	0.81	106.01	102	7	9.92E-03	55.1	
3	0	63.07	131	238	0.87	126.34	121	10	3.65E-02	23.6	
4	2	74.79	293	166	1.04	149.75	144	18	8.14E-02	9.2	1.31E+00
5	2	77.12	528	195	1.09	154.39	144	18	1.47E-01	6.4	
6	6	84.08	65	219	1.51	168.31	165	28	1.81E-02	37.4	1.57E+00
7	6	87.20	182	229	1.26	174.55	165	28	5.05E-02	15.9	
8	6	89.99	84	159	0.95	180.11	165	28	2.34E-02	26.1	
9	6	92.89*	179	219	1.48	185.91	165	28	4.96E-02	17.6	
10	0	105.61	65	152	1.69	211.33	208	9	1.81E-02	36.1	
11	0	129.42	37	142	0.82	258.91	255	8	1.03E-02	57.8	
12	0	161.08	22	78	0.74	322.17	321	6	6.22E-03	65.5	
13	4	168.93	38	47	1.07	337.87	336	15	1.04E-02	30.6	1.37E+00
14	4	173.47	34	101	1.67	346.94	336	15	9.31E-03	54.7	
15	0	185.84*	185	170	1.05	371.65	366	11	5.13E-02	15.6	
16	0	209.65	44	122	1.44	419.24	415	8	1.22E-02	46.4	
17	2	238.68*	519	71	1.19	477.26	474	20	1.44E-01	5.2	1.39E+00
18	2	241.79	152	81	1.52	483.47	474	20	4.22E-02	14.5	
19	0	270.35	83	124	3.62	540.55	534	14	2.30E-02	31.0	
20	0	277.68	26	76	2.27	555.19	550	9	7.31E-03	62.9	
21	0	295.24	289	92	1.35	590.28	585	10	8.03E-02	8.6	
22	0	299.55	28	104	1.64	598.89	597	11	7.74E-03	72.8	
23	0	338.62	97	62	1.09	676.99	672	10	2.70E-02	18.2	
24	0	351.95*	497	80	1.46	703.62	697	15	1.38E-01	6.0	
25	0	423.51	31	39	1.71	846.66	841	11	8.47E-03	43.4	
26	0	510.86*	26	46	1.70	1021.24	1015	13	7.23E-03	63.8	
27	0	583.40	120	50	1.30	1166.26	1160	12	3.33E-02	15.0	
28	0	609.24*	261	30	1.35	1217.90	1210	15	7.24E-02	7.8	
29	0	615.05	16	13	1.37	1229.53	1225	8	4.37E-03	48.0	
30	0	647.15	20	13	3.27	1293.68	1286	14	5.45E-03	46.1	
31	1	661.98	20	4	1.89	1323.34	1320	20	5.42E-03	29.1	8.91E-01
32	1	665.99	18	9	1.90	1331.34	1320	20	5.14E-03	44.2	
33	0	727.11	49	21	1.38	1453.55	1447	11	1.37E-02	23.2	
34	0	794.74	24	10	2.08	1588.75	1585	10	6.67E-03	32.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	800.74	12	10	1.39	1600.75	1595	10	3.33E-03	57.1	
36	0	911.23	75	10	1.37	1821.67	1816	14	2.09E-02	14.7	
37	0	934.45	26	8	3.30	1868.09	1862	14	7.24E-03	32.3	
38	0	940.40	6	0	1.44	1880.00	1877	6	1.67E-03	40.8	
39	0	964.80	27	8	1.88	1928.78	1923	10	7.60E-03	26.8	
40	0	969.06	66	11	1.84	1937.31	1933	12	1.83E-02	15.5	
41	0	979.42	13	13	0.72	1958.02	1949	18	3.66E-03	70.6	
42	0	1051.28	12	10	1.02	2101.72	2094	14	3.31E-03	64.4	
43	0	1120.34	58	15	1.83	2239.83	2235	15	1.61E-02	19.6	
44	0	1222.89	23	0	2.00	2444.91	2438	13	6.39E-03	20.9	
45	0	1238.28	41	0	1.16	2475.71	2469	16	1.14E-02	15.6	
46	0	1352.58	9	9	0.94	2704.32	2695	14	2.43E-03	84.6	
47	0	1377.66	29	6	2.11	2754.49	2745	21	8.18E-03	26.9	
48	0	1408.54	15	2	1.80	2816.25	2811	10	4.05E-03	33.1	
49	0	1460.69*	87	0	2.44	2920.57	2914	15	2.42E-02	10.9	
50	0	1729.60	17	3	2.83	3458.56	3452	13	4.64E-03	33.1	
51	0	1764.36	43	4	1.56	3528.11	3520	16	1.20E-02	18.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:33:25

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507013.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 14:00:00	Acquisition date	: 10-APR-2025 22:32:26
Sample ID	: G714507013	Sample quantity	: 162.48 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA21	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.56 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	85	10.66*	9.376E-01	3.918E+00	3.918E+00	21.88
AS-73	53.44	50	10.30*	1.152E+01	1.939E-01	2.631E-01	110.24
CD-109	88.03	242	3.70*	1.131E+01	2.670E+00	2.816E+00	31.72
SN-126	64.28	180	9.60	1.177E+01	7.372E-01	7.372E-01	47.23
	86.94	242	8.90	1.131E+01	1.110E+00	1.110E+00	31.72
	87.57	242	37.00*	1.131E+01	2.670E-01	2.670E-01	31.72
BA-137M	661.66	21	89.90*	2.163E+00	4.977E-02	4.988E-02	58.11
CS-137	661.66	21	85.10*	2.163E+00	5.258E-02	5.270E-02	58.11
EU-155	86.55	242	30.70	1.131E+01	3.218E-01	3.263E-01	31.72
	105.31	85	21.10*	1.059E+01	1.763E-01	1.788E-01	72.26
TL-208	277.37	31	6.60	5.332E+00	4.090E-01	4.090E-01	125.79
	583.19	130	85.00*	2.482E+00	2.854E-01	2.854E-01	30.03
	860.56	------	12.50	1.626E+00	------ Line Not Found		------
BI-210	46.54	68	4.25*	1.110E+01	6.639E-01	6.659E-01	91.53
PB-210	46.54	68	4.25*	1.110E+01	6.639E-01	6.659E-01	91.53
BI-211	72.87	------	1.23	1.170E+01	------ Line Not Found		------
	351.06	573	12.92*	4.232E+00	4.843E+00	4.843E+00	11.97
BI-212	727.33	52	6.67*	1.953E+00	1.856E+00	1.856E+00	46.33
	1620.50	------	1.47	8.483E-01	------ Line Not Found		------
PB-212	74.82	395	10.28	1.167E+01	1.524E+00	1.524E+00	18.50
	77.11	711	17.10	1.162E+01	1.655E+00	1.655E+00	12.71
	238.63	624	43.60*	6.120E+00	1.080E+00	1.080E+00	10.32
	300.09	33	3.30	4.961E+00	9.230E-01	9.230E-01	145.66
BI-214	609.32	282	45.49*	2.368E+00	1.212E+00	1.212E+00	15.53
	1120.29	58	14.92	1.227E+00	1.472E+00	1.472E+00	39.20
	1764.49	41	15.30	7.836E-01	1.575E+00	1.575E+00	36.83
PB-214	74.82	395	5.80	1.167E+01	2.700E+00	2.701E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
RN-222	609.32	282	45.49*	2.368E+00	1.212E+00	1.212E+00	15.53
	1120.29	58	14.92	1.227E+00	1.472E+00	1.472E+00	39.20
	1764.49	41	15.30	7.836E-01	1.575E+00	1.575E+00	36.83
RA-224	240.99	182	4.10*	6.050E+00	3.397E+00	3.397E+00	28.90
RA-226	74.82	395	5.80	1.167E+01	2.700E+00	2.701E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
AC-228	105.21	85	1.10	1.059E+01	3.381E+00	3.381E+00	72.26
	338.32	113	11.27	4.399E+00	1.051E+00	1.051E+00	36.48
	835.71	------	1.61	1.678E+00	------ Line Not Found		------
	911.20	78	25.80*	1.528E+00	9.092E-01	9.092E-01	29.36
	968.97	67	15.80	1.431E+00	1.376E+00	1.376E+00	31.03
RA-228	105.21	85	1.10	1.059E+01	3.381E+00	3.381E+00	72.26
	338.32	113	11.27	4.399E+00	1.051E+00	1.051E+00	36.48

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	835.71	------	1.61	1.678E+00	------ Line Not Found		------
	911.20	78	25.80*	1.528E+00	9.092E-01	9.092E-01	29.36
	968.97	67	15.80	1.431E+00	1.376E+00	1.376E+00	31.03
TH-228	74.82	395	10.28	1.167E+01	1.524E+00	1.524E+00	18.50
	77.11	711	17.10	1.162E+01	1.655E+00	1.655E+00	12.71
	238.63	624	43.60*	6.120E+00	1.080E+00	1.080E+00	10.32
	300.09	33	3.30	4.961E+00	9.230E-01	9.230E-01	145.66
TH-229	85.43	87	14.70	1.142E+01	2.395E-01	2.395E-01	74.75
	88.47	242	24.00	1.131E+01	4.116E-01	4.116E-01	31.72
	193.51	------	4.41*	7.294E+00	------ Line Not Found		------
	210.85	53	2.80	6.837E+00	1.289E+00	1.289E+00	92.89
TH-230	74.82	395	5.80	1.167E+01	2.700E+00	2.700E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
TH-232	105.21	85	1.10	1.059E+01	3.381E+00	3.381E+00	72.26
	338.32	113	11.27	4.399E+00	1.051E+00	1.051E+00	36.48
	835.71	------	1.61	1.678E+00	------ Line Not Found		------
	911.20	78	25.80*	1.528E+00	9.092E-01	9.092E-01	29.36
	968.97	67	15.80	1.431E+00	1.376E+00	1.376E+00	31.03
PA-234M	63.29	180	3.70*	1.177E+01	1.913E+00	1.913E+00	47.23
	92.59	236	4.23	1.111E+01	2.323E+00	2.323E+00	35.22
TH-234	63.29	180	3.70*	1.177E+01	1.913E+00	1.913E+00	47.23
	92.59	236	4.23	1.111E+01	2.323E+00	2.323E+00	35.22
U-234	74.82	395	5.80	1.167E+01	2.700E+00	2.700E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
U-235	89.96	112	3.47	1.122E+01	1.329E+00	1.329E+00	52.12
	93.35	236	5.60	1.111E+01	1.755E+00	1.755E+00	35.22
	143.76	------	10.96*	9.009E+00	------ Line Not Found		------
	163.33	------	5.08	8.277E+00	------ Line Not Found		------
	185.72	228	57.20	7.528E+00	2.447E-01	2.447E-01	31.22
	205.31	------	5.01	6.956E+00	------ Line Not Found		------
U-238	63.29	180	3.70*	1.177E+01	1.913E+00	1.913E+00	47.23
	92.59	236	4.23	1.111E+01	2.323E+00	2.323E+00	35.22
AM-243	43.53	------	5.90	1.082E+01	------ Line Not Found		------
	74.66	395	67.20*	1.167E+01	2.331E-01	2.331E-01	18.50
ANH-511	511.00	29	100.00*	2.866E+00	4.638E-02	4.638E-02	127.66

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:33:26.69

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507013.CNF;1    *
* Acquisition date : 10-APR-2025 22:32:26 Sensitivity     : 3.000          *
* Detector ID      : GAM21                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.56     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 14:00:00 Analyst initials: MXR1           *
* Sample ID        : G714507013           Sample Quantity : 1.6248E+02 GRAM   *
* Batch Number     : 2767515              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;18                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  8-JUL-2024 06:28:17 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;26          *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	3.918E+00	8.402E-01	6.366E-01
AS-73	2.631E-01	2.842E-01	2.562E-01
CD-109	2.816E+00	8.752E-01	6.400E-01
SN-126	2.670E-01	8.299E-02	6.057E-02
BA-137M	4.988E-02	2.841E-02	4.645E-02
CS-137	5.270E-02	3.001E-02	4.907E-02
EU-155	1.788E-01	1.266E-01	9.917E-02
TL-208	2.854E-01	8.400E-02	6.049E-02
BI-210	6.659E-01	5.973E-01	4.543E-01
PB-210	6.659E-01	5.973E-01	4.543E-01
BI-211	4.843E+00	5.683E-01	2.766E-01
BI-212	1.856E+00	8.428E-01	9.371E-01
PB-212	1.080E+00	1.093E-01	7.213E-02
BI-214	1.212E+00	1.844E-01	9.675E-02
PB-214	1.758E+00	2.063E-01	1.007E-01
RN-222	1.212E+00	1.844E-01	9.675E-02
RA-224	3.397E+00	9.621E-01	7.819E-01
RA-226	1.758E+00	2.063E-01	1.007E-01
AC-228	9.092E-01	2.616E-01	2.059E-01
RA-228	9.092E-01	2.616E-01	2.059E-01
TH-228	1.080E+00	1.093E-01	7.213E-02
TH-229	-1.981E-01	3.758E-01	6.600E-01
TH-230	1.758E+00	2.063E-01	1.007E-01
TH-232	9.092E-01	2.616E-01	2.059E-01
PA-234M	1.913E+00	8.852E-01	5.701E-01
TH-234	1.913E+00	8.852E-01	5.701E-01
U-234	1.758E+00	2.063E-01	1.007E-01
U-235	-1.707E-03	1.280E-01	2.409E-01
U-238	1.913E+00	8.852E-01	5.701E-01
AM-243	2.331E-01	4.225E-02	3.447E-02
ANH-511	4.638E-02	5.802E-02	4.625E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)

BE-7	1.971E-01	3.296E-01	6.838E-01	NOT IDENT.
NA-22	-2.162E-02	4.302E-02	7.559E-02	NOT IDENT.
NA-24	0.000E+00	3.652E+15	0.000E+00	SHORT HLIF
AL-26	-6.017E-03	2.049E-02	4.467E-02	NOT IDENT.
SC-46	1.061E-02	4.015E-02	8.416E-02	FAIL ABUN
V-48	-3.384E-02	1.858E-01	3.098E-01	NOT IDENT.
CR-51	2.449E-01	4.418E-01	9.143E-01	NOT IDENT.
MN-52	9.496E-01	2.546E+00	5.905E+00	FAIL ABUN
MN-54	-2.779E-02	3.659E-02	6.494E-02	NOT IDENT.
CO-56	-9.470E-03	3.746E-02	7.318E-02	FAIL ABUN
MN-56	0.000E+00	1.903E+41	0.000E+00	SHORT HLIF
CO-57	-5.263E-03	1.611E-02	3.010E-02	NOT IDENT.
CO-58	-3.119E-02	3.877E-02	6.853E-02	NOT IDENT.
FE-59	1.861E-02	1.006E-01	2.089E-01	NOT IDENT.
CO-60	-1.633E-02	2.885E-02	5.013E-02	NOT IDENT.
ZN-65	3.711E-02	7.558E-02	1.523E-01	NOT IDENT.
GE-68	8.249E-01	1.261E+00	2.739E+00	NOT IDENT.
AS-74	-1.679E-01	1.601E-01	2.540E-01	NOT IDENT.
SE-75	-1.497E-02	3.481E-02	5.994E-02	NOT IDENT.
BR-77	0.000E+00	6.239E+03	0.000E+00	SHORT HLIF
SR-82	1.623E-01	4.597E-01	9.843E-01	NOT IDENT.
RB-83	1.804E-02	5.199E-02	1.091E-01	NOT IDENT.
RB-84	-1.052E-01	9.139E-02	1.471E-01	NOT IDENT.
KR-85	1.547E+00	6.141E+00	1.096E+01	NOT IDENT.
SR-85	1.010E-02	4.026E-02	7.185E-02	NOT IDENT.
RB-86	1.044E+00	1.599E+00	3.473E+00	NOT IDENT.
Y-88	1.701E-02	4.864E-02	1.113E-01	NOT IDENT.
Y-91	-9.873E+00	2.304E+01	4.152E+01	NOT IDENT.
NB-94	-1.052E-02	2.831E-02	5.500E-02	NOT IDENT.
NB-95	1.945E-02	5.192E-02	1.064E-01	NOT IDENT.
NB-95M	1.110E-01	1.022E-01	1.937E-01	NOT IDENT.
ZR-95	-1.810E-02	7.535E-02	1.473E-01	NOT IDENT.
NB-97	0.000E+00	1.382E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	5.995E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.564E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	4.477E+40	0.000E+00	SHORT HLIF
RH-101	-1.259E-02	2.014E-02	3.347E-02	NOT IDENT.
RH-102	-2.726E-02	4.469E-02	7.700E-02	NOT IDENT.
RU-103	1.169E-02	3.972E-02	8.118E-02	FAIL ABUN
RH-106	-3.349E-03	2.673E-01	5.109E-01	FAIL ABUN
RU-106	-3.349E-03	2.673E-01	5.109E-01	FAIL ABUN
AG-108M	1.638E-02	2.287E-02	4.798E-02	FAIL ABUN
AG-110	1.986E-02	6.253E-01	1.086E+00	NOT IDENT.
AG-110M	5.002E-02	4.759E-02	1.090E-01	NOT IDENT.
SN-113	-1.074E-02	3.938E-02	7.460E-02	NOT IDENT.
CD-115	0.000E+00	4.784E+03	0.000E+00	SHORT HLIF
SN-117M	1.100E-01	1.021E-01	1.952E-01	NOT IDENT.
SB-122	0.000E+00	2.945E+02	0.000E+00	SHORT HLIF
TE-123M	2.554E-03	2.218E-02	3.876E-02	NOT IDENT.
SB-124	2.145E-02	1.045E-01	2.378E-01	NOT IDENT.
SB-125	1.249E-02	8.072E-02	1.436E-01	NOT IDENT.
TE-125M	-1.471E+00	7.321E+00	1.285E+01	NOT IDENT.
I-126	8.634E-01	7.471E-01	1.320E+00	FAIL ABUN
SB-126	1.931E-01	3.783E-01	7.747E-01	FAIL ABUN
SB-127	-5.408E-01	4.362E+01	8.254E+01	NOT IDENT.
I-131	1.232E-01	4.636E-01	9.407E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.072E+01	0.000E+00	SHORT HLIF
BA-133	2.852E-03	3.126E-02	5.627E-02	FAIL ABUN
I-133	0.000E+00	4.968E+10	0.000E+00	SHORT HLIF
CS-134	7.938E-02	4.979E-02	8.740E-02	FAIL ABUN
I-135	0.000E+00	8.790E+37	0.000E+00	SHORT HLIF
CS-136	1.518E-01	2.621E-01	5.405E-01	NOT IDENT.
LA-138	2.752E-03	4.773E-02	1.044E-01	NOT IDENT.
CE-139	1.564E-02	2.289E-02	4.203E-02	NOT IDENT.
BA-140	-5.409E-01	6.833E-01	1.216E+00	FAIL ABUN
LA-140	-2.416E-01	3.016E-01	5.140E-01	NOT IDENT.
CE-141	-2.098E-02	6.421E-02	1.178E-01	NOT IDENT.
CE-143	0.000E+00	2.500E+06	0.000E+00	SHORT HLIF
CE-144	-3.510E-02	1.205E-01	2.245E-01	NOT IDENT.
PM-144	-3.773E-03	2.798E-02	5.592E-02	NOT IDENT.
PR-144	-3.147E-01	2.111E+00	4.213E+00	NOT IDENT.
PM-146	-2.516E-03	3.468E-02	6.648E-02	NOT IDENT.
ND-147	4.308E-01	1.542E+00	3.107E+00	FAIL ABUN
PM-147	-1.803E+02	4.466E+02	8.302E+02	NOT IDENT.
PM-149	0.000E+00	3.744E+04	0.000E+00	SHORT HLIF
EU-150	-1.369E-05	2.134E-02	3.779E-02	FAIL ABUN

EU-152	-5.168E-02	6.915E-02	1.262E-01	FAIL ABUN
GD-153	-3.797E-02	4.610E-02	7.732E-02	NOT IDENT.
EU-154	-2.869E-02	1.157E-01	2.158E-01	NOT IDENT.
TB-160	2.305E-03	1.310E-01	2.670E-01	FAIL ABUN
HO-166M	-3.386E-02	4.449E-02	8.210E-02	FAIL ABUN
TM-171	4.400E+00	4.753E+00	4.530E+00	FAIL ABUN
HF-172	-5.353E-02	1.313E-01	2.230E-01	FAIL ABUN
LU-172	8.390E-03	5.036E-02	1.055E-01	FAIL ABUN
LU-176	7.359E-03	1.878E-02	3.844E-02	FAIL ABUN
HF-181	2.954E-02	4.685E-02	9.803E-02	NOT IDENT.
TA-182	0.000E+00	1.769E-01	3.831E-01	FAIL ABUN
RE-183	-3.209E-02	3.779E-02	7.259E-02	FAIL ABUN
RE-184	1.068E-01	1.615E-01	3.559E-01	NOT IDENT.
W-188	-5.299E+00	6.361E+00	1.025E+01	FAIL ABUN
IR-192	-8.606E-03	2.978E-02	5.740E-02	FAIL ABUN
HG-203	-1.651E-02	4.028E-02	6.889E-02	NOT IDENT.
TL-204	3.879E-01	1.589E+00	2.986E+00	NOT IDENT.
BI-207	4.955E-02	4.859E-02	1.110E-01	FAIL ABUN
PB-211	-3.499E-01	5.172E-01	9.342E-01	NOT IDENT.
BI-213	-3.167E-02	7.065E-02	1.309E-01	NOT IDENT.
RN-219	5.581E-02	2.978E-01	5.943E-01	FAIL ABUN
RA-223	-2.728E-01	4.589E-01	8.564E-01	FAIL ABUN
AC-225	-8.494E-01	1.706E+00	2.970E+00	NOT IDENT.
AC-227	-2.262E-03	1.798E-01	3.581E-01	FAIL ABUN
TH-227	-2.262E-03	1.798E-01	3.581E-01	FAIL ABUN
PA-231	3.507E-01	3.853E-01	7.787E-01	NOT IDENT.
TH-231	-2.728E-01	4.589E-01	8.564E-01	FAIL ABUN
PA-233	-1.364E-02	4.216E-02	8.145E-02	FAIL ABUN
PA-234	1.943E-02	1.804E-01	3.937E-01	NOT IDENT.
NP-237	-1.364E-02	4.216E-02	8.145E-02	FAIL ABUN
NP-238	0.000E+00	1.618E+04	0.000E+00	SHORT HLIF
NP-239	-1.229E-02	1.523E-01	2.910E-01	FAIL ABUN
PU-239	3.639E+02	4.124E+02	4.211E+02	FAIL ABUN
AM-241	1.742E-03	2.808E-02	5.346E-02	NOT IDENT.
CM-243	-2.594E-03	5.456E-02	9.810E-02	FAIL ABUN
BK-247	-7.076E-03	5.736E-02	1.023E-01	FAIL ABUN
CM-247	-1.333E-03	2.738E-02	5.327E-02	FAIL ABUN
CF-249	1.736E-02	3.192E-02	6.527E-02	NOT IDENT.
CF-251	-1.867E-03	8.881E-02	1.643E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:33:25.18

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	85	10.66*	9.376E-01	3.918E+00	3.918E+00	21.88
AS-73	53.44	50	10.30*	1.152E+01	1.939E-01	2.631E-01	110.24
CD-109	88.03	242	3.70*	1.131E+01	2.670E+00	2.816E+00	31.72
SN-126	64.28	180	9.60	1.177E+01	7.372E-01	7.372E-01	47.23
	86.94	242	8.90	1.131E+01	1.110E+00	1.110E+00	31.72
	87.57	242	37.00*	1.131E+01	2.670E-01	2.670E-01	31.72
BA-137M	661.66	21	89.90*	2.163E+00	4.977E-02	4.988E-02	58.11
CS-137	661.66	21	85.10*	2.163E+00	5.258E-02	5.270E-02	58.11
EU-155	86.55	242	30.70	1.131E+01	3.218E-01	3.263E-01	31.72
	105.31	85	21.10*	1.059E+01	1.763E-01	1.788E-01	72.26
TL-208	277.37	31	6.60	5.332E+00	4.090E-01	4.090E-01	125.79
	583.19	130	85.00*	2.482E+00	2.854E-01	2.854E-01	30.03
	860.56	------	12.50	1.626E+00	------ Line Not Found		------
BI-210	46.54	68	4.25*	1.110E+01	6.639E-01	6.659E-01	91.53
PB-210	46.54	68	4.25*	1.110E+01	6.639E-01	6.659E-01	91.53
BI-211	72.87	------	1.23	1.170E+01	------ Line Not Found		------
	351.06	573	12.92*	4.232E+00	4.843E+00	4.843E+00	11.97
BI-212	727.33	52	6.67*	1.953E+00	1.856E+00	1.856E+00	46.33
	1620.50	------	1.47	8.483E-01	------ Line Not Found		------
PB-212	74.82	395	10.28	1.167E+01	1.524E+00	1.524E+00	18.50
	77.11	711	17.10	1.162E+01	1.655E+00	1.655E+00	12.71
	238.63	624	43.60*	6.120E+00	1.080E+00	1.080E+00	10.32
	300.09	33	3.30	4.961E+00	9.230E-01	9.230E-01	145.66
BI-214	609.32	282	45.49*	2.368E+00	1.212E+00	1.212E+00	15.53
	1120.29	58	14.92	1.227E+00	1.472E+00	1.472E+00	39.20
	1764.49	41	15.30	7.836E-01	1.575E+00	1.575E+00	36.83
PB-214	74.82	395	5.80	1.167E+01	2.700E+00	2.701E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
RN-222	609.32	282	45.49*	2.368E+00	1.212E+00	1.212E+00	15.53
	1120.29	58	14.92	1.227E+00	1.472E+00	1.472E+00	39.20
	1764.49	41	15.30	7.836E-01	1.575E+00	1.575E+00	36.83
RA-224	240.99	182	4.10*	6.050E+00	3.397E+00	3.397E+00	28.90
RA-226	74.82	395	5.80	1.167E+01	2.700E+00	2.701E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
AC-228	105.21	85	1.10	1.059E+01	3.381E+00	3.381E+00	72.26
	338.32	113	11.27	4.399E+00	1.051E+00	1.051E+00	36.48
	835.71	------	1.61	1.678E+00	------ Line Not Found		------
	911.20	78	25.80*	1.528E+00	9.092E-01	9.092E-01	29.36
	968.97	67	15.80	1.431E+00	1.376E+00	1.376E+00	31.03

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
RA-228	105.21	85	1.10	1.059E+01	3.381E+00	3.381E+00	72.26
	338.32	113	11.27	4.399E+00	1.051E+00	1.051E+00	36.48
	835.71	------	1.61	1.678E+00	------ Line Not Found		------
	911.20	78	25.80*	1.528E+00	9.092E-01	9.092E-01	29.36
	968.97	67	15.80	1.431E+00	1.376E+00	1.376E+00	31.03
TH-228	74.82	395	10.28	1.167E+01	1.524E+00	1.524E+00	18.50
	77.11	711	17.10	1.162E+01	1.655E+00	1.655E+00	12.71
	238.63	624	43.60*	6.120E+00	1.080E+00	1.080E+00	10.32
	300.09	33	3.30	4.961E+00	9.230E-01	9.230E-01	145.66
TH-229	85.43	87	14.70	1.142E+01	2.395E-01	2.395E-01	74.75
	88.47	242	24.00	1.131E+01	4.116E-01	4.116E-01	31.72
	193.51	------	4.41*	7.294E+00	------ Line Not Found		------
	210.85	53	2.80	6.837E+00	1.289E+00	1.289E+00	92.89
TH-230	74.82	395	5.80	1.167E+01	2.700E+00	2.700E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
TH-232	105.21	85	1.10	1.059E+01	3.381E+00	3.381E+00	72.26
	338.32	113	11.27	4.399E+00	1.051E+00	1.051E+00	36.48
	835.71	------	1.61	1.678E+00	------ Line Not Found		------
	911.20	78	25.80*	1.528E+00	9.092E-01	9.092E-01	29.36
	968.97	67	15.80	1.431E+00	1.376E+00	1.376E+00	31.03
PA-234M	63.29	180	3.70*	1.177E+01	1.913E+00	1.913E+00	47.23
	92.59	236	4.23	1.111E+01	2.323E+00	2.323E+00	35.22
TH-234	63.29	180	3.70*	1.177E+01	1.913E+00	1.913E+00	47.23
	92.59	236	4.23	1.111E+01	2.323E+00	2.323E+00	35.22
U-234	74.82	395	5.80	1.167E+01	2.700E+00	2.700E+00	18.50
	77.11	711	9.70	1.162E+01	2.917E+00	2.917E+00	12.71
	87.09	242	3.41	1.131E+01	2.897E+00	2.897E+00	31.72
	242.00	182	7.25	6.050E+00	1.921E+00	1.921E+00	28.90
	295.22	340	18.42	5.031E+00	1.695E+00	1.695E+00	17.12
	351.93	573	35.60*	4.232E+00	1.758E+00	1.758E+00	11.97
U-235	89.96	112	3.47	1.122E+01	1.329E+00	1.329E+00	52.12
	93.35	236	5.60	1.111E+01	1.755E+00	1.755E+00	35.22
	143.76	------	10.96*	9.009E+00	------ Line Not Found		------
	163.33	------	5.08	8.277E+00	------ Line Not Found		------
	185.72	228	57.20	7.528E+00	2.447E-01	2.447E-01	31.22
	205.31	------	5.01	6.956E+00	------ Line Not Found		------
U-238	63.29	180	3.70*	1.177E+01	1.913E+00	1.913E+00	47.23
	92.59	236	4.23	1.111E+01	2.323E+00	2.323E+00	35.22
AM-243	43.53	------	5.90	1.082E+01	------ Line Not Found		------
	74.66	395	67.20*	1.167E+01	2.331E-01	2.331E-01	18.50
ANH-511	511.00	29	100.00*	2.866E+00	4.638E-02	4.638E-02	127.66

Flag: "*" = Keyline

Sample ID : G714507013 Acquisition date : 10-APR-2025 22:32:26

Total number of lines in spectrum 51
Number of unidentified lines 8
Number of lines tentatively identified by NID 43 84.31%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	3.918E+00	3.918E+00	0.857E+00	21.88	
AS-73	80.30D	1.36	1.939E-01	2.631E-01	2.900E-01	110.24	
CD-109	461.40D	1.05	2.670E+00	2.816E+00	0.893E+00	31.72	
SN-126	2.30E+05Y	1.00	2.670E-01	2.670E-01	0.847E-01	31.72	
BA-137M	30.08Y	1.00	4.977E-02	4.988E-02	2.899E-02	58.11	
CS-137	30.08Y	1.00	5.258E-02	5.270E-02	3.062E-02	58.11	
EU-155	4.75Y	1.01	1.763E-01	1.788E-01	1.292E-01	72.26	
TL-208	1.41E+10Y	1.00	2.854E-01	2.854E-01	0.857E-01	30.03	
BI-210	22.20Y	1.00	6.639E-01	6.659E-01	6.094E-01	91.53	
PB-210	22.20Y	1.00	6.639E-01	6.659E-01	6.094E-01	91.53	
BI-211	7.04E+08Y	1.00	4.843E+00	4.843E+00	0.580E+00	11.97	
BI-212	1.41E+10Y	1.00	1.856E+00	1.856E+00	0.860E+00	46.33	
PB-212	1.41E+10Y	1.00	1.080E+00	1.080E+00	0.111E+00	10.32	
BI-214	1600.00Y	1.00	1.212E+00	1.212E+00	0.188E+00	15.53	
PB-214	1600.00Y	1.00	1.758E+00	1.758E+00	0.210E+00	11.97	
RN-222	1600.00Y	1.00	1.212E+00	1.212E+00	0.188E+00	15.53	
RA-224	1.41E+10Y	1.00	3.397E+00	3.397E+00	0.982E+00	28.90	
RA-226	1600.00Y	1.00	1.758E+00	1.758E+00	0.210E+00	11.97	
AC-228	1.41E+10Y	1.00	9.092E-01	9.092E-01	2.669E-01	29.36	
RA-228	1.41E+10Y	1.00	9.092E-01	9.092E-01	2.669E-01	29.36	
TH-228	1.41E+10Y	1.00	1.080E+00	1.080E+00	0.111E+00	10.32	
TH-229	7340.00Y	1.00	4.116E-01	4.116E-01	1.306E-01	31.72	K
TH-230	7.54E+04Y	1.00	1.758E+00	1.758E+00	0.210E+00	11.97	
TH-232	1.41E+10Y	1.00	9.092E-01	9.092E-01	2.669E-01	29.36	
PA-234M	4.47E+09Y	1.00	1.913E+00	1.913E+00	0.903E+00	47.23	
TH-234	4.47E+09Y	1.00	1.913E+00	1.913E+00	0.903E+00	47.23	
U-234	2.45E+05Y	1.00	1.758E+00	1.758E+00	0.210E+00	11.97	
U-235	7.04E+08Y	1.00	2.447E-01	2.447E-01	0.764E-01	31.22	K
U-238	4.47E+09Y	1.00	1.913E+00	1.913E+00	0.903E+00	47.23	
AM-243	7370.00Y	1.00	2.331E-01	2.331E-01	0.431E-01	18.50	
ANH-511	1.00E+09Y	1.00	4.638E-02	4.638E-02	5.920E-02	127.66	
			---------	---------			
	Total Activity :		4.005E+01	4.027E+01			
	Grand Total Activity :		4.005E+01	4.027E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	129.42	48	182	0.82	258.91	255	8	1.03E-02	****	9.59E+00	T
0	161.08	28	97	0.74	322.17	321	6	6.22E-03	****	8.36E+00	T
4	168.93	47	59	1.07	337.87	336	15	1.04E-02	61.1	8.08E+00	
4	173.47	42	126	1.67	346.94	336	15	9.31E-03	****	7.93E+00	
0	270.35	98	147	3.62	540.55	534	14	2.30E-02	62.0	5.47E+00	T
0	423.51	34	43	1.71	846.66	841	11	8.47E-03	86.7	3.50E+00	T
0	615.05	17	14	1.37	1229.53	1225	8	4.37E-03	96.0	2.34E+00	T
0	647.15	21	14	3.27	1293.68	1286	14	5.45E-03	92.2	2.22E+00	
1	665.99	20	10	1.90	1331.34	1320	20	5.14E-03	88.3	2.15E+00	T
0	794.74	25	10	2.08	1588.75	1585	10	6.67E-03	64.0	1.77E+00	T
0	800.74	13	10	1.39	1600.75	1595	10	3.33E-03	****	1.76E+00	T
0	934.45	27	8	3.30	1868.09	1862	14	7.24E-03	64.6	1.49E+00	T
0	940.40	6	0	1.44	1880.00	1877	6	1.67E-03	81.6	1.48E+00	
0	964.80	28	8	1.88	1928.78	1923	10	7.60E-03	53.6	1.44E+00	T
0	979.42	13	13	0.72	1958.02	1949	18	3.66E-03	****	1.41E+00	
0	1051.28	12	10	1.02	2101.72	2094	14	3.31E-03	****	1.31E+00	T
0	1222.89	23	0	2.00	2444.91	2438	13	6.39E-03	41.7	1.12E+00	T
0	1238.28	41	0	1.16	2475.71	2469	16	1.14E-02	31.2	1.11E+00	T
0	1352.58	9	9	0.94	2704.32	2695	14	2.43E-03	****	1.01E+00	
0	1377.66	29	5	2.11	2754.49	2745	21	8.18E-03	53.7	9.93E-01	
0	1408.54	14	2	1.80	2816.25	2811	10	4.05E-03	66.1	9.72E-01	T
0	1729.60	16	3	2.83	3458.56	3452	13	4.64E-03	66.2	7.98E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:33:37.02

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507013.CNF;1		
Acquisition date	: 10-APR-2025 22:32:26	Sensitivity	: 3.000
Detector ID	: GAM21	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.56	Half life ratio	: *****
Sample date	: 6-MAR-2025 14:00:00	Nuclide Library	: SOLID
Sample ID	: G714507013	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.6248E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 8-JUL-2024 06:28:17	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;26		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.552E-01
AS-73	1.202E-01
CD-109	3.028E-01
SN-126	2.866E-02
BA-137M	1.990E-02
CS-137	2.102E-02
EU-155	4.652E-02
TL-208	2.718E-02
BI-210	2.124E-01
PB-210	2.124E-01
BI-211	1.263E-01
BI-212	4.192E-01
PB-212	3.358E-02
BI-214	4.237E-02
PB-214	4.598E-02
RN-222	4.237E-02
RA-224	3.643E-01
RA-226	4.598E-02
AC-228	8.674E-02
RA-228	8.674E-02
TH-228	3.358E-02
TH-229	3.093E-01
TH-230	4.598E-02
TH-232	8.674E-02
PA-234M	2.693E-01
TH-234	2.693E-01
U-234	4.598E-02
U-235	1.137E-01
U-238	2.693E-01
AM-243	1.637E-02
ANH-511	2.086E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

BE-7	3.098E-01	NOT IDENT.
NA-22	3.174E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.412E-02	NOT IDENT.
SC-46	3.661E-02	FAIL ABUN
V-48	1.338E-01	NOT IDENT.
CR-51	4.226E-01	NOT IDENT.
MN-52	2.421E+00	FAIL ABUN
MN-54	2.834E-02	NOT IDENT.
CO-56	3.126E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.418E-02	NOT IDENT.
CO-58	2.900E-02	NOT IDENT.
FE-59	8.886E-02	NOT IDENT.
CO-60	1.882E-02	NOT IDENT.
ZN-65	6.489E-02	NOT IDENT.
GE-68	1.200E+00	NOT IDENT.
AS-74	1.090E-01	NOT IDENT.
SE-75	2.750E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.305E-01	NOT IDENT.
RB-83	4.773E-02	NOT IDENT.
RB-84	6.116E-02	NOT IDENT.
KR-85	4.952E+00	NOT IDENT.
SR-85	3.246E-02	NOT IDENT.
RB-86	1.522E+00	NOT IDENT.
Y-88	4.511E-02	NOT IDENT.
Y-91	1.750E+01	NOT IDENT.
NB-94	2.431E-02	NOT IDENT.
NB-95	4.811E-02	NOT IDENT.
NB-95M	9.054E-02	NOT IDENT.
ZR-95	6.440E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.569E-02	NOT IDENT.
RH-102	3.334E-02	NOT IDENT.
RU-103	3.606E-02	FAIL ABUN
RH-106	2.254E-01	FAIL ABUN
RU-106	2.254E-01	FAIL ABUN
AG-108M	2.187E-02	FAIL ABUN
AG-110	4.705E-01	NOT IDENT.
AG-110M	4.837E-02	NOT IDENT.
SN-113	3.401E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	9.202E-02	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	1.822E-02	NOT IDENT.
SB-124	9.452E-02	NOT IDENT.
SB-125	6.530E-02	NOT IDENT.
TE-125M	6.059E+00	NOT IDENT.
I-126	5.990E-01	FAIL ABUN
SB-126	3.431E-01	FAIL ABUN
SB-127	3.636E+01	NOT IDENT.
I-131	4.286E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.559E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	3.932E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.313E-01	NOT IDENT.
LA-138	4.207E-02	NOT IDENT.
CE-139	1.980E-02	NOT IDENT.
BA-140	5.409E-01	FAIL ABUN
LA-140	2.045E-01	NOT IDENT.
CE-141	5.560E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.052E-01	NOT IDENT.
PM-144	2.457E-02	NOT IDENT.
PR-144	1.850E+00	NOT IDENT.
PM-146	3.012E-02	NOT IDENT.
ND-147	1.385E+00	FAIL ABUN
PM-147	3.907E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.736E-02	FAIL ABUN
EU-152	5.737E-02	FAIL ABUN

GD-153	3.629E-02	NOT IDENT.
EU-154	9.092E-02	NOT IDENT.
TB-160	1.147E-01	FAIL ABUN
HO-166M	3.509E-02	FAIL ABUN
TM-171	2.133E+00	FAIL ABUN
HF-172	1.051E-01	FAIL ABUN
LU-172	4.445E-02	FAIL ABUN
LU-176	1.777E-02	FAIL ABUN
HF-181	4.428E-02	NOT IDENT.
TA-182	1.656E-01	FAIL ABUN
RE-183	3.386E-02	FAIL ABUN
RE-184	1.562E-01	NOT IDENT.
W-188	4.666E+00	FAIL ABUN
IR-192	2.634E-02	FAIL ABUN
HG-203	3.186E-02	NOT IDENT.
TL-204	1.418E+00	NOT IDENT.
BI-207	4.890E-02	FAIL ABUN
PB-211	4.199E-01	NOT IDENT.
BI-213	5.796E-02	NOT IDENT.
RN-219	2.703E-01	FAIL ABUN
RA-223	3.924E-01	FAIL ABUN
AC-225	1.383E+00	NOT IDENT.
AC-227	1.670E-01	FAIL ABUN
TH-227	1.670E-01	FAIL ABUN
PA-231	3.644E-01	NOT IDENT.
TH-231	3.924E-01	FAIL ABUN
PA-233	3.714E-02	FAIL ABUN
PA-234	1.605E-01	NOT IDENT.
NP-237	3.714E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.371E-01	FAIL ABUN
PU-239	1.995E+02	FAIL ABUN
AM-241	2.510E-02	NOT IDENT.
CM-243	4.601E-02	FAIL ABUN
BK-247	4.719E-02	FAIL ABUN
CM-247	2.417E-02	FAIL ABUN
CF-249	3.004E-02	NOT IDENT.
CF-251	7.720E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:33:41.21

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507013.CNF;1   *
* Acquisition date : 10-APR-2025 22:32:26 Sensitivity     : 3.000           *
* Detector ID      : GAM21                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.56     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 14:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507013           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.6248E+02 GRAM *
*                                         Quantity Err(%) : 1.2309E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  8-JUL-2024 06:28:17 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;26            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	3.918E+00	9.231E-01	9.231E-01
AS-73	2.631E-01	2.895E-01	2.895E-01
CD-109	2.816E+00	9.191E-01	9.191E-01
SN-126	2.670E-01	8.600E-02	8.600E-02
BA-137M	4.988E-02	2.896E-02	2.896E-02
CS-137	5.270E-02	3.059E-02	3.059E-02
EU-155	1.788E-01	1.284E-01	1.284E-01
TL-208	2.854E-01	8.925E-02	8.925E-02
BI-210	6.659E-01	6.007E-01	6.007E-01
PB-210	6.659E-01	6.007E-01	6.007E-01
BI-211	4.843E+00	7.109E-01	7.109E-01
BI-212	1.856E+00	8.729E-01	8.729E-01
PB-212	1.080E+00	1.819E-01	1.819E-01
BI-214	1.212E+00	2.263E-01	2.263E-01
PB-214	1.758E+00	2.564E-01	2.564E-01
RN-222	1.212E+00	2.263E-01	2.263E-01
RA-224	3.397E+00	1.062E+00	1.062E+00
RA-226	1.758E+00	2.564E-01	2.564E-01
AC-228	9.092E-01	2.890E-01	2.890E-01
RA-228	9.092E-01	2.890E-01	2.890E-01
TH-228	1.080E+00	1.819E-01	1.819E-01
TH-229	-1.981E-01	3.771E-01	3.771E-01
TH-230	1.758E+00	2.564E-01	2.564E-01
TH-232	9.092E-01	2.890E-01	2.890E-01
PA-234M	1.913E+00	9.868E-01	9.868E-01
TH-234	1.913E+00	9.868E-01	9.868E-01
U-234	1.758E+00	2.564E-01	2.564E-01
U-235	-1.707E-03	1.280E-01	1.280E-01
U-238	1.913E+00	9.868E-01	9.868E-01
AM-243	2.331E-01	4.652E-02	4.652E-02
ANH-511	4.638E-02	5.819E-02	5.819E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)

BE-7	1.971E-01	3.301E-01	3.419E-01	NOT IDENT.
NA-22	-2.162E-02	4.306E-02	4.415E-02	NOT IDENT.
NA-24	-5.039E+14	3.653E+15	3.660E+15	SHORT HLIF
AL-26	-6.017E-03	2.050E-02	2.068E-02	NOT IDENT.
SC-46	1.061E-02	4.017E-02	4.045E-02	FAIL ABUN
V-48	-3.384E-02	1.858E-01	1.864E-01	NOT IDENT.
CR-51	2.449E-01	4.423E-01	4.559E-01	NOT IDENT.
MN-52	9.496E-01	2.548E+00	2.584E+00	FAIL ABUN
MN-54	-2.779E-02	3.676E-02	3.884E-02	NOT IDENT.
CO-56	-9.470E-03	3.748E-02	3.773E-02	FAIL ABUN
MN-56	-1.000E+41	1.907E+41	0.000E+00	SHORT HLIF
CO-57	-5.263E-03	1.613E-02	1.630E-02	NOT IDENT.
CO-58	-3.119E-02	3.897E-02	4.143E-02	NOT IDENT.
FE-59	1.861E-02	1.006E-01	1.009E-01	NOT IDENT.
CO-60	-1.633E-02	2.889E-02	2.981E-02	NOT IDENT.
ZN-65	3.711E-02	7.567E-02	7.750E-02	NOT IDENT.
GE-68	8.249E-01	1.264E+00	1.318E+00	NOT IDENT.
AS-74	-1.679E-01	1.614E-01	1.783E-01	NOT IDENT.
SE-75	-1.497E-02	3.485E-02	3.549E-02	NOT IDENT.
BR-77	6.169E+04	6.383E+04	6.962E+04	SHORT HLIF
SR-82	1.623E-01	4.601E-01	4.659E-01	NOT IDENT.
RB-83	1.804E-02	5.207E-02	5.270E-02	NOT IDENT.
RB-84	-1.052E-01	9.244E-02	1.039E-01	NOT IDENT.
KR-85	1.547E+00	6.142E+00	6.182E+00	NOT IDENT.
SR-85	1.010E-02	4.027E-02	4.053E-02	NOT IDENT.
RB-86	1.044E+00	1.602E+00	1.670E+00	NOT IDENT.
Y-88	1.701E-02	4.866E-02	4.926E-02	NOT IDENT.
Y-91	-9.873E+00	2.305E+01	2.348E+01	NOT IDENT.
NB-94	-1.052E-02	2.834E-02	2.873E-02	NOT IDENT.
NB-95	1.945E-02	5.197E-02	5.271E-02	NOT IDENT.
NB-95M	1.110E-01	1.036E-01	1.150E-01	NOT IDENT.
ZR-95	-1.810E-02	7.539E-02	7.583E-02	NOT IDENT.
NB-97	1.000E+41	1.387E+41	0.000E+00	SHORT HLIF
ZR-97	2.181E+14	5.999E+14	6.079E+14	SHORT HLIF
MO-99	-2.876E+02	1.565E+03	1.570E+03	SHORT HLIF
TC-99M	1.847E+40	4.489E+40	0.000E+00	SHORT HLIF
RH-101	-1.259E-02	2.034E-02	2.112E-02	NOT IDENT.
RH-102	-2.726E-02	4.483E-02	4.649E-02	NOT IDENT.
RU-103	1.169E-02	3.974E-02	4.009E-02	FAIL ABUN
RH-106	-3.349E-03	2.673E-01	2.673E-01	FAIL ABUN
RU-106	-3.349E-03	2.673E-01	2.673E-01	FAIL ABUN
AG-108M	1.638E-02	2.291E-02	2.407E-02	FAIL ABUN
AG-110	1.986E-02	6.253E-01	6.254E-01	NOT IDENT.
AG-110M	5.002E-02	4.807E-02	5.309E-02	NOT IDENT.
SN-113	-1.074E-02	3.939E-02	3.969E-02	NOT IDENT.
CD-115	1.731E+02	4.784E+03	4.785E+03	SHORT HLIF
SN-117M	1.100E-01	1.038E-01	1.150E-01	NOT IDENT.
SB-122	1.808E+02	2.951E+02	3.062E+02	SHORT HLIF
TE-123M	2.554E-03	2.218E-02	2.221E-02	NOT IDENT.
SB-124	2.145E-02	1.045E-01	1.050E-01	NOT IDENT.
SB-125	1.249E-02	8.073E-02	8.092E-02	NOT IDENT.
TE-125M	-1.471E+00	7.323E+00	7.353E+00	NOT IDENT.
I-126	8.634E-01	7.545E-01	8.489E-01	FAIL ABUN
SB-126	1.931E-01	3.793E-01	3.892E-01	FAIL ABUN
SB-127	-5.408E-01	4.362E+01	4.363E+01	NOT IDENT.
I-131	1.232E-01	4.638E-01	4.671E-01	NOT IDENT.
I-132	1.000E+41	4.399E+41	0.000E+00	SHORT HLIF
TE-132	-9.608E+00	4.075E+01	4.098E+01	SHORT HLIF
BA-133	2.852E-03	3.126E-02	3.129E-02	FAIL ABUN
I-133	2.403E+10	5.001E+10	5.117E+10	SHORT HLIF
CS-134	7.938E-02	5.078E-02	6.213E-02	FAIL ABUN
I-135	8.285E+36	8.815E+37	0.000E+00	SHORT HLIF
CS-136	1.518E-01	2.629E-01	2.716E-01	NOT IDENT.
LA-138	2.752E-03	4.773E-02	4.775E-02	NOT IDENT.
CE-139	1.564E-02	2.325E-02	2.429E-02	NOT IDENT.
BA-140	-5.409E-01	6.855E-01	7.276E-01	FAIL ABUN
LA-140	-2.416E-01	3.023E-01	3.213E-01	NOT IDENT.
CE-141	-2.098E-02	6.429E-02	6.498E-02	NOT IDENT.
CE-143	4.746E+06	2.538E+06	3.320E+06	SHORT HLIF
CE-144	-3.510E-02	1.206E-01	1.217E-01	NOT IDENT.
PM-144	-3.773E-03	2.798E-02	2.803E-02	NOT IDENT.
PR-144	-3.147E-01	2.112E+00	2.116E+00	NOT IDENT.
PM-146	-2.516E-03	3.468E-02	3.470E-02	NOT IDENT.
ND-147	4.308E-01	1.542E+00	1.554E+00	FAIL ABUN
PM-147	-1.803E+02	4.472E+02	4.546E+02	NOT IDENT.
PM-149	-6.731E+03	3.746E+04	3.758E+04	SHORT HLIF
EU-150	-1.369E-05	2.134E-02	2.134E-02	FAIL ABUN

EU-152	-5.168E-02	6.932E-02	7.313E-02	FAIL ABUN
GD-153	-3.797E-02	4.625E-02	4.931E-02	NOT IDENT.
EU-154	-2.869E-02	1.157E-01	1.165E-01	NOT IDENT.
TB-160	2.305E-03	1.310E-01	1.310E-01	FAIL ABUN
HO-166M	-3.386E-02	4.469E-02	4.722E-02	FAIL ABUN
TM-171	4.400E+00	4.772E+00	5.168E+00	FAIL ABUN
HF-172	-5.353E-02	1.318E-01	1.340E-01	FAIL ABUN
LU-172	8.390E-03	5.037E-02	5.051E-02	FAIL ABUN
LU-176	7.359E-03	1.880E-02	1.909E-02	FAIL ABUN
HF-181	2.954E-02	4.693E-02	4.878E-02	NOT IDENT.
TA-182	4.328E-01	1.809E-01	2.661E-01	FAIL ABUN
RE-183	-3.209E-02	3.796E-02	4.063E-02	FAIL ABUN
RE-184	1.068E-01	1.622E-01	1.692E-01	NOT IDENT.
W-188	-5.299E+00	6.402E+00	6.833E+00	FAIL ABUN
IR-192	-8.606E-03	2.979E-02	3.004E-02	FAIL ABUN
HG-203	-1.651E-02	4.030E-02	4.099E-02	NOT IDENT.
TL-204	3.879E-01	1.589E+00	1.599E+00	NOT IDENT.
BI-207	4.955E-02	4.889E-02	5.375E-02	FAIL ABUN
PB-211	-3.499E-01	5.181E-01	5.416E-01	NOT IDENT.
BI-213	-3.167E-02	7.070E-02	7.213E-02	NOT IDENT.
RN-219	5.581E-02	2.979E-01	2.990E-01	FAIL ABUN
RA-223	-2.728E-01	4.597E-01	4.759E-01	FAIL ABUN
AC-225	-8.494E-01	1.712E+00	1.754E+00	NOT IDENT.
AC-227	-2.262E-03	1.798E-01	1.798E-01	FAIL ABUN
TH-227	-2.262E-03	1.798E-01	1.798E-01	FAIL ABUN
PA-231	3.507E-01	3.934E-01	4.240E-01	NOT IDENT.
TH-231	-2.728E-01	4.597E-01	4.759E-01	FAIL ABUN
PA-233	-1.364E-02	4.218E-02	4.263E-02	FAIL ABUN
PA-234	1.943E-02	1.817E-01	1.819E-01	NOT IDENT.
NP-237	-1.364E-02	4.218E-02	4.263E-02	FAIL ABUN
NP-238	4.467E+03	1.619E+04	1.631E+04	SHORT HLIF
NP-239	-1.229E-02	1.523E-01	1.524E-01	FAIL ABUN
PU-239	3.639E+02	4.157E+02	4.469E+02	FAIL ABUN
AM-241	1.742E-03	2.808E-02	2.809E-02	NOT IDENT.
CM-243	-2.594E-03	5.456E-02	5.457E-02	FAIL ABUN
BK-247	-7.076E-03	5.739E-02	5.747E-02	FAIL ABUN
CM-247	-1.333E-03	2.738E-02	2.738E-02	FAIL ABUN
CF-249	1.736E-02	3.197E-02	3.292E-02	NOT IDENT.
CF-251	-1.867E-03	8.881E-02	8.881E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	69.3782	85.43	102.8334	131.20	69.4426
45.60	69.4043	86.55	103.1313	133.02	76.7911
46.54	69.6658	86.79	103.1942	133.52	82.2002
49.72	0.0000	86.94	103.2342	136.00	81.5073
51.35	72.6951	87.09	103.2742	136.47	91.2386
51.87	71.1009	87.57	103.4007	140.51	0.0000
52.39	71.2367	88.03	103.5216	143.76	93.5310
52.97	71.3878	88.34	103.6024	144.24	92.5213
53.44	77.9046	88.47	103.6367	145.44	103.6250
54.07	75.7504	89.96	104.0252	152.43	85.0060
57.36	0.0000	1093.63	104.2016	153.25	67.4355
57.53	75.2009	91.11	104.3232	323.87	97.4410
57.98	84.1770	92.59	104.7036	156.02	92.1820
59.27	77.1293	93.35	104.8979	158.56	62.4565
59.32	77.1422	94.56	105.2057	159.00	78.8714
59.54	77.1991	94.65	105.2285	162.33	80.7946
60.96	79.9507	94.67	105.2334	162.66	77.8434
61.17	96.7239	94.87	105.2840	163.33	79.4256
62.93	97.2793	97.43	101.6374	165.86	69.2143
63.29	97.3919	98.43	89.3072	176.31	82.5765
63.58	97.4826	98.44	89.3092	176.60	73.4336
64.28	102.5250	99.53	71.6287	177.52	81.5781
66.73	98.4534	100.11	78.6986	181.07	0.0000
67.24	109.5648	102.03	89.3851	181.52	77.0569
125.81	109.7122	103.18	66.8793	184.41	87.0586
67.75	117.9662	103.37	77.6136	143.76	87.2246
68.89	115.6227	105.21	76.5909	193.51	88.2019
69.67	111.2967	105.31	76.6077	197.03	81.5458
70.82	110.7550	106.12	76.7457	198.01	67.4553
70.83	110.7587	106.47	76.8048	201.83	91.6032
72.81	116.9743	109.28	96.2592	203.43	81.0727
72.87	116.9945	111.00	96.9569	205.31	113.1519
74.66	117.5992	111.76	0.0000	210.85	77.0635
74.82	117.6530	114.06	94.5058	215.65	63.0076
74.97	117.7030	116.30	0.0000	218.12	72.9327
77.11	118.4153	116.74	90.9024	222.11	76.9687
78.74	118.9508	119.76	80.0319	227.09	63.9280
79.69	119.2603	121.12	84.4205	227.38	63.9510
80.03	127.5805	121.22	95.9047	228.16	0.0000
80.12	127.6134	121.78	97.0557	228.18	65.2456
80.19	127.6370	122.06	97.1103	116.74	65.2456
80.57	134.7262	122.92	106.6902	235.69	43.0699
81.00	117.7845	123.07	106.7221	235.96	43.0842
81.07	117.8072	265.00	83.8049	238.63	61.0930
81.75	112.3112	125.81	103.7923	238.98	0.0000
82.47	135.4153	127.23	92.8269	240.99	62.5153
83.79	102.3942	127.91	77.4579	242.00	62.5900
84.00	102.4505	129.30	73.0746	244.70	62.7892

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	52.3705	344.28	46.3298	563.25	26.0537
252.80	49.0142	345.93	37.8607	564.24	0.0000
254.15	0.0000	351.06	37.2868	569.33	14.1632
256.23	63.6280	351.93	37.3153	946.00	14.1648
260.90	0.0000	355.39	0.0000	569.70	16.3458
264.66	50.0997	356.01	32.2995	583.19	26.3604
264.80	50.1068	364.49	31.1215	584.27	26.3770
265.00	50.1175	366.42	0.0000	595.83	25.4454
269.46	58.8856	372.51	40.8278	427.87	13.3120
270.03	58.9218	375.05	39.9629	602.52	0.0000
271.23	58.9983	377.52	38.1380	604.72	10.0071
273.65	57.0773	356.01	29.7115	607.14	16.7010
276.40	55.1635	388.16	35.5863	609.32	16.7218
277.37	55.2204	388.63	31.7519	610.33	16.7310
277.60	55.2334	391.69	40.5106	614.28	18.4443
278.00	55.2579	264.66	41.7726	618.01	25.2036
279.20	60.0255	401.81	31.1152	620.36	16.8243
279.54	53.5197	402.40	33.0752	621.93	19.0835
279.70	53.5285	404.85	37.0375	630.19	0.0000
280.46	48.3457	410.95	38.1931	631.29	21.4376
283.69	61.1831	413.71	30.4229	633.25	15.8132
284.31	58.5991	414.70	31.4284	634.78	15.8263
285.41	49.9098	423.72	32.6334	635.95	18.0983
285.90	0.0000	427.09	31.2296	636.99	16.9769
287.50	42.1201	427.87	31.2475	657.50	13.7300
290.67	51.5017	433.94	24.9120	657.76	13.7319
293.27	0.0000	439.40	23.0112	657.90	0.0000
351.93	44.5758	440.45	26.0328	661.66	12.0398
295.96	44.6096	453.88	32.3522	664.57	0.0000
879.38	58.5704	463.37	19.3382	666.33	21.8389
299.98	51.1875	468.07	23.4867	666.50	21.8412
300.09	51.1934	473.00	26.6406	667.71	0.0000
300.13	51.1957	475.06	31.8086	677.62	25.4348
301.36	51.2578	476.78	15.4095	685.70	18.5736
302.85	44.1151	477.60	22.6132	692.65	0.0000
256.23	61.5935	482.18	20.6217	695.00	11.6630
304.85	58.9370	487.02	24.8271	696.49	19.2581
306.78	42.9443	492.35	0.0000	696.51	19.2587
308.46	37.6378	497.08	17.7042	697.00	25.3927
311.90	41.3604	505.52	20.4204	697.30	25.3962
316.51	46.9631	507.63	0.0000	697.49	27.1505
319.41	40.7529	511.00	28.3755	702.65	21.9513
320.08	39.8732	514.00	25.2715	706.68	10.5575
321.04	47.1652	514.00	25.2715	711.68	17.6392
323.87	50.9289	520.40	12.6875	720.70	14.1733
325.23	59.1892	520.69	0.0000	721.93	0.0000
328.76	49.3341	522.65	0.0000	722.78	24.1196
333.37	46.2410	527.90	0.0000	722.91	22.7016
333.97	42.6865	528.26	19.1265	723.31	22.7063
334.37	33.0601	529.59	17.0150	724.19	14.1973
338.28	44.2373	529.87	0.0000	727.33	24.1719
338.32	44.2383	531.02	19.1594	733.00	20.4956
311.90	41.5549	537.26	27.7826	735.93	23.2007
340.48	41.5549	546.56	0.0000	333.97	19.6461
340.55	41.5576	552.55	20.4937	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	19.7086	667.71	0.0000	1434.09	4.5586
747.24	20.6339	962.31	9.4271	1435.80	5.4729
748.06	22.4365	964.08	11.0055	1457.56	0.0000
752.31	15.2874	966.17	0.0000	1460.82	5.5093
753.82	16.1982	911.20	7.8755	1489.16	4.6250
756.73	18.9236	983.53	15.8369	1505.03	10.2164
756.80	15.3191	984.45	0.0000	1584.12	6.6312
884.68	18.9864	1274.44	5.9669	1596.21	11.4012
765.81	24.4325	1002.74	7.9746	1620.50	7.6453
766.84	21.7280	1004.73	10.9731	1621.92	5.7360
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	12.7307	1025.87	0.0000	1690.97	3.8865
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	15.4753	1037.84	14.1324	1764.49	1.9759
783.70	14.5967	1038.76	0.0000	1063.66	4.9460
788.74	24.6879	631.29	11.3415	1771.35	7.9156
792.07	21.9778	1048.07	6.4840	1791.20	0.0000
795.86	7.3381	1049.04	8.1079	1808.65	1.9951
810.06	16.6146	1050.41	7.0978	1810.72	0.0000
810.29	19.3857	1063.66	8.1494	1836.06	4.0139
344.28	19.3876	1077.00	10.2338		
810.76	18.4668	1077.34	10.2350		
815.77	17.5817	1085.87	9.2379		
1048.07	14.8232	1093.63	8.2334		
832.01	13.9778	1099.45	9.2807		
834.85	25.1914	1112.07	14.4982		
835.71	26.1338	1112.84	13.4658		
836.80	0.0000	1115.54	6.6352		
846.75	0.0000	1120.29	14.5375		
846.77	14.0662	1120.55	14.5383		
856.80	16.9503	1221.41	14.5426		
860.56	12.2613	1129.67	15.6244		
871.09	12.3148	1131.51	0.0000		
873.19	16.1180	1147.95	0.0000		
875.33	0.0000	1173.23	11.6204		
879.38	12.3565	1177.95	13.7538		
880.51	19.9701	1189.05	11.6788		
881.60	19.9791	1204.77	13.8696		
883.24	9.5200	1221.41	8.5791		
884.68	9.5258	1231.02	8.6045		
889.28	12.4065	1235.36	6.8930		
894.76	13.3903	1238.28	6.4677		
898.04	17.2392	1260.41	0.0000		
900.72	21.0923	1271.87	15.2441		
903.28	10.5569	1274.44	11.9869		
911.20	9.6277	1274.54	14.1664		
912.08	9.6310	1291.59	9.8569		
923.98	0.0000	1298.22	0.0000		
926.50	11.6228	1312.11	6.6105		
929.11	9.3076	1332.49	6.6493		
935.54	10.8862	1362.66	0.0000		
937.49	0.0000	1365.19	4.4739		
944.13	4.6809	1368.63	0.0000		
946.00	5.8553	1384.29	8.9951		
949.00	8.7932	1408.01	3.6215		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:08.03

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GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507014.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM23.CNF;951
Background date : 6-APR-2025 11:01:43.
Sample date : 6-MAR-2025 14:30:00. Acquisition date : 10-APR-2025 22:33:02
Sample ID : G714507014 Sample quantity : 1.30380E+02 GRAM
Detector name : GAM23 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.05 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.06*	40	171	4.77	126.22	122	14	1.12E-02	71.2	
2	0	74.66*	41	161	0.77	149.40	146	7	1.15E-02	53.7	
3	0	77.09	129	135	0.88	154.26	152	7	3.58E-02	17.4	
4	0	87.81	98	184	1.00	175.70	171	11	2.72E-02	28.6	
5	0	92.88*	81	175	1.46	185.84	182	11	2.24E-02	34.7	
6	0	130.12	18	78	0.91	260.29	255	8	5.04E-03	88.1	
7	0	144.17*	20	90	1.64	288.39	285	8	5.66E-03	85.0	
8	0	185.76*	89	127	1.20	371.54	365	13	2.48E-02	28.7	
9	4	208.98	38	79	1.65	417.95	413	17	1.05E-02	46.6	1.82E+00
10	4	212.24	21	50	1.37	424.48	413	17	5.86E-03	65.5	
11	2	238.56*	276	53	1.24	477.10	471	16	7.68E-02	7.5	8.51E-01
12	2	241.56	113	27	1.43	483.10	471	16	3.13E-02	13.3	
13	0	269.91	29	39	1.27	539.77	536	7	8.09E-03	39.9	
14	0	295.11	144	66	1.00	590.17	586	8	4.01E-02	12.0	
15	0	301.43	11	83	1.85	602.80	596	12	3.05E-03	165.0	
16	0	328.62	25	43	1.44	657.17	650	11	6.90E-03	56.5	
17	0	338.28*	54	63	1.20	676.47	670	13	1.51E-02	33.0	
18	0	351.89*	322	58	1.31	703.68	699	13	8.96E-02	7.4	
19	0	477.81	50	28	1.39	955.46	947	16	1.40E-02	27.4	
20	0	511.04*	11	30	2.74	1021.91	1016	11	3.00E-03	135.0	
21	0	561.80	14	9	1.66	1123.40	1119	8	3.85E-03	47.4	
22	0	583.15	100	14	1.51	1166.10	1160	11	2.78E-02	12.3	
23	0	588.17*	3	18	0.73	1176.13	1172	9	8.52E-04	270.3	
24	0	609.05*	228	14	1.55	1217.88	1209	14	6.32E-02	7.6	
25	1	714.96	18	13	1.96	1429.64	1425	16	4.97E-03	34.9	1.62E+00
26	1	717.96	16	8	1.96	1435.64	1425	16	4.45E-03	41.8	
27	0	727.77	13	17	2.18	1455.26	1448	10	3.50E-03	68.2	
28	0	768.04	29	8	1.82	1535.78	1531	10	8.14E-03	25.5	
29	0	785.52	30	3	1.10	1570.75	1565	12	8.30E-03	21.7	
30	0	814.73	6	7	3.01	1629.15	1622	9	1.74E-03	84.7	
31	0	861.34	7	10	1.72	1722.36	1717	8	1.89E-03	89.5	
32	0	911.16*	64	4	1.65	1821.97	1814	16	1.77E-02	14.7	
33	0	926.46	12	2	1.46	1852.57	1848	9	3.31E-03	36.6	
34	0	933.28	24	3	3.96	1866.21	1861	11	6.70E-03	24.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	967.98	48	21	3.39	1935.59	1926	17	1.33E-02	26.3	
36	0	1064.55	4	7	0.90	2128.70	2120	10	1.09E-03	139.5	
37	0	1120.16	47	20	1.29	2239.91	2231	16	1.30E-02	25.9	
38	0	1154.57	20	3	3.76	2308.73	2302	13	5.52E-03	29.2	
39	0	1238.14	19	13	2.03	2475.83	2467	13	5.23E-03	45.8	
40	0	1379.33	4	8	0.73	2758.19	2752	8	1.08E-03	146.0	
41	0	1460.35*	77	4	2.07	2920.23	2912	14	2.13E-02	12.9	
42	0	1763.80	42	0	1.51	3527.12	3517	17	1.17E-02	15.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:34:09

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507014.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 14:30:00 Acquisition date : 10-APR-2025 22:33:02
Sample ID : G714507014 Sample quantity : 130.38 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA23 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.05 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	2.657E+00	1.075E+00	1.703E+00	54.89	OK
K-40	1460.82	10.66*	9.503E-01	4.156E+00	4.156E+00	25.77	OK
CD-109	88.03	3.70*	5.042E+00	3.477E+00	3.666E+00	57.28	OK
SN-126	64.28	9.60	2.281E+00	1.237E+00	1.237E+00	142.50	OK
	86.94	8.90	5.042E+00	1.445E+00	1.445E+00	57.28	OK
	87.57	37.00*	5.042E+00	3.477E-01	3.477E-01	57.28	OK
CE-141	145.44	48.29*	6.052E+00	3.083E-03	6.552E-032	86.83	OK
TL-208	277.37	6.60	4.066E+00	----- Line	Not Found	-----	Absent
	583.19	85.00*	2.247E+00	3.068E-01	3.068E-01	24.62	OK
	860.56	12.50	1.568E+00	1.974E-01	1.974E-01	179.06	OK
BI-211	72.87	1.23	3.553E+00	----- Line	Not Found	-----	Absent
	351.06	12.92*	3.389E+00	4.461E+00	4.461E+00	14.74	OK
BI-212	727.33	6.67*	1.841E+00	5.906E-01	5.906E-01	136.49	OK
	1620.50	1.47	8.787E-01	----- Line	Not Found	-----	Absent
PB-212	74.82	10.28	3.767E+00	7.113E-01	7.113E-01	107.37	OK
	77.11	17.10	4.043E+00	1.244E+00	1.244E+00	34.88	OK
	238.63	43.60*	4.546E+00	8.664E-01	8.664E-01	14.92	OK
	300.09	3.30	3.818E+00	5.333E-01	5.333E-01	329.92	OK
BI-214	609.32	45.49*	2.163E+00	1.350E+00	1.350E+00	15.17	OK
	1120.29	14.92	1.212E+00	1.450E+00	1.450E+00	51.72	OK
	1764.49	15.30	8.345E-01	1.779E+00	1.780E+00	30.86	OK
PB-214	74.82	5.80	3.767E+00	1.261E+00	1.261E+00	107.37	OK
	77.11	9.70	4.043E+00	2.193E+00	2.193E+00	34.88	OK
	87.09	3.41	5.042E+00	3.772E+00	3.773E+00	57.28	OK
	242.00	7.25	4.505E+00	2.140E+00	2.140E+00	26.51	OK
	295.22	18.42	3.880E+00	1.237E+00	1.237E+00	23.92	OK
	351.93	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74	OK
RN-222	609.32	45.49*	2.163E+00	1.350E+00	1.350E+00	15.17	OK
	1120.29	14.92	1.212E+00	1.450E+00	1.450E+00	51.72	OK
	1764.49	15.30	8.345E-01	1.779E+00	1.780E+00	30.86	OK
RA-224	240.99	4.10*	4.505E+00	3.784E+00	3.784E+00	26.51	OK
RA-226	74.82	5.80	3.767E+00	1.261E+00	1.261E+00	107.37	OK
	77.11	9.70	4.043E+00	2.193E+00	2.193E+00	34.88	OK
	87.09	3.41	5.042E+00	3.772E+00	3.773E+00	57.28	OK
	242.00	7.25	4.505E+00	2.140E+00	2.140E+00	26.51	OK
	295.22	18.42	3.880E+00	1.237E+00	1.237E+00	23.92	OK
	351.93	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74	OK
AC-228	105.21	1.10	5.934E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.494E+00	8.405E-01	8.405E-01	66.08	OK
	835.71	1.61	1.615E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.485E+00	9.438E-01	9.438E-01	29.31	OK
	968.97	15.80	1.399E+00	1.226E+00	1.226E+00	52.65	OK
RA-228	105.21	1.10	5.934E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.494E+00	8.405E-01	8.405E-01	66.08	OK
	835.71	1.61	1.615E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.485E+00	9.438E-01	9.438E-01	29.31	OK
	968.97	15.80	1.399E+00	1.226E+00	1.226E+00	52.65	OK
TH-228	74.82	10.28	3.767E+00	7.113E-01	7.113E-01	107.37	OK
	77.11	17.10	4.043E+00	1.244E+00	1.244E+00	34.88	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	238.63	43.60*	4.546E+00	8.664E-01	8.664E-01	14.92	OK
	300.09	3.30	3.818E+00	5.333E-01	5.333E-01	329.92	OK
TH-230	74.82	5.80	3.767E+00	1.261E+00	1.261E+00	107.37	OK
	77.11	9.70	4.043E+00	2.193E+00	2.193E+00	34.88	OK
	87.09	3.41	5.042E+00	3.772E+00	3.772E+00	57.28	OK
	242.00	7.25	4.505E+00	2.140E+00	2.140E+00	26.51	OK
	295.22	18.42	3.880E+00	1.237E+00	1.237E+00	23.92	OK
	351.93	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74	OK
PA-231	283.69	1.70	3.998E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	3.818E+00	3.289E-01	3.289E-01	329.92	OK
TH-232	105.21	1.10	5.934E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.494E+00	8.405E-01	8.405E-01	66.08	OK
	835.71	1.61	1.615E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.485E+00	9.438E-01	9.438E-01	29.31	OK
	968.97	15.80	1.399E+00	1.226E+00	1.226E+00	52.65	OK
PA-234M	63.29	3.70*	2.281E+00	3.210E+00	3.210E+00	142.50	OK
	92.59	4.23	5.388E+00	2.335E+00	2.335E+00	69.40	OK
TH-234	63.29	3.70*	2.281E+00	3.210E+00	3.210E+00	142.50	OK
	92.59	4.23	5.388E+00	2.335E+00	2.335E+00	69.40	OK
U-234	74.82	5.80	3.767E+00	1.261E+00	1.261E+00	107.37	OK
	77.11	9.70	4.043E+00	2.193E+00	2.193E+00	34.88	OK
	87.09	3.41	5.042E+00	3.772E+00	3.772E+00	57.28	OK
	242.00	7.25	4.505E+00	2.140E+00	2.140E+00	26.51	OK
	295.22	18.42	3.880E+00	1.237E+00	1.237E+00	23.92	OK
	351.93	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74	OK
U-235	89.96	3.47	5.199E+00	----- Line Not Found		-----	Absent
	93.35	5.60	5.388E+00	1.764E+00	1.764E+00	69.40	OK
	143.76	10.96*	6.057E+00	----- Line Not Found		-----	<<INT Reject
	163.33	5.08	5.764E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.377E+00	1.836E-01	1.836E-01	57.48	OK
	205.31	5.01	5.046E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	2.281E+00	3.210E+00	3.210E+00	142.50	OK
	92.59	4.23	5.388E+00	2.335E+00	2.335E+00	69.40	OK
AM-243	43.53	5.90	2.688E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	3.767E+00	1.088E-01	1.088E-01	107.37	OK
ANH-511	511.00	100.00*	2.513E+00	2.534E-02	2.534E-02	269.96	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:10.32

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507014.CNF;1		
Acquisition date	: 10-APR-2025 22:33:02	Sensitivity	: 3.000
Detector ID	: GAM23	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.05	Half life ratio	: *****
Sample date	: 6-MAR-2025 14:30:00	Analyst initials	: MXR1
Sample ID	: G714507014	Sample Quantity	: 1.3038E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 4-SEP-2024 11:58:10	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM23_CAN.CNF;22		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.703E+00	9.160E-01	6.782E-01
K-40	4.156E+00	1.050E+00	7.329E-01
CD-109	3.666E+00	2.058E+00	1.399E+00
SN-126	3.477E-01	1.952E-01	1.335E-01
CE-141	6.552E-03	1.661E-01	1.561E-01
TL-208	3.068E-01	7.403E-02	6.308E-02
BI-211	4.461E+00	6.445E-01	3.673E-01
BI-212	5.906E-01	7.900E-01	1.117E+00
PB-212	8.664E-01	1.267E-01	8.671E-02
BI-214	1.350E+00	2.006E-01	1.172E-01
PB-214	1.619E+00	2.339E-01	1.336E-01
RN-222	1.350E+00	2.006E-01	1.172E-01
RA-224	3.784E+00	9.830E-01	9.300E-01
RA-226	1.619E+00	2.339E-01	1.336E-01
AC-228	9.438E-01	2.711E-01	2.930E-01
RA-228	9.438E-01	2.711E-01	2.930E-01
TH-228	8.664E-01	1.267E-01	8.671E-02
TH-230	1.619E+00	2.339E-01	1.336E-01
PA-231	3.289E-01	1.063E+00	9.294E-01
TH-232	9.438E-01	2.711E-01	2.930E-01
PA-234M	3.210E+00	4.482E+00	2.166E+00
TH-234	3.210E+00	4.482E+00	2.166E+00
U-234	1.619E+00	2.339E-01	1.336E-01
U-235	1.971E-01	3.285E-01	3.770E-01
U-238	3.210E+00	4.482E+00	2.166E+00
AM-243	1.088E-01	1.145E-01	1.176E-01
ANH-511	2.534E-02	6.705E-02	5.822E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	2.064E-02	4.297E-02	9.668E-02	NOT IDENT.
NA-24	0.000E+00	3.672E+15	0.000E+00	SHORT HLIF
AL-26	-6.505E-03	3.209E-02	7.086E-02	NOT IDENT.

SC-46	1.760E-02	4.783E-02	1.023E-01	FAIL ABUN
V-48	1.496E-01	2.006E-01	4.342E-01	NOT IDENT.
CR-51	4.028E-01	5.671E-01	1.195E+00	NOT IDENT.
MN-52	-1.310E+00	2.712E+00	5.128E+00	NOT IDENT.
MN-54	-6.406E-03	4.365E-02	8.372E-02	NOT IDENT.
CO-56	8.707E-03	5.129E-02	1.041E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.424E-03	2.048E-02	3.883E-02	NOT IDENT.
CO-58	-4.574E-02	6.050E-02	8.726E-02	NOT IDENT.
FE-59	-1.533E-02	1.211E-01	2.341E-01	NOT IDENT.
CO-60	2.019E-02	4.437E-02	9.902E-02	NOT IDENT.
ZN-65	7.168E-02	6.891E-02	1.703E-01	NOT IDENT.
GE-68	-5.681E-02	1.171E+00	2.349E+00	NOT IDENT.
AS-73	-4.400E-02	1.426E+00	2.454E+00	NOT IDENT.
AS-74	-4.145E-02	2.227E-01	4.067E-01	NOT IDENT.
SE-75	6.233E-03	5.506E-02	9.936E-02	NOT IDENT.
BR-77	0.000E+00	7.192E+03	0.000E+00	SHORT HLIF
SR-82	2.741E-01	5.977E-01	1.272E+00	NOT IDENT.
RB-83	2.598E-02	7.314E-02	1.504E-01	NOT IDENT.
RB-84	-4.716E-02	1.025E-01	1.887E-01	NOT IDENT.
KR-85	5.334E+00	7.101E+00	1.387E+01	NOT IDENT.
SR-85	3.478E-02	4.653E-02	9.085E-02	NOT IDENT.
RB-86	-5.082E-02	1.489E+00	2.995E+00	NOT IDENT.
Y-88	-2.471E-03	5.688E-02	1.166E-01	NOT IDENT.
Y-91	1.819E+00	1.837E+01	3.930E+01	NOT IDENT.
NB-94	4.393E-02	4.037E-02	8.823E-02	NOT IDENT.
NB-95	8.580E-03	5.811E-02	1.051E-01	NOT IDENT.
NB-95M	1.830E-02	1.532E-01	2.588E-01	NOT IDENT.
ZR-95	6.111E-02	9.048E-02	1.981E-01	NOT IDENT.
NB-97	0.000E+00	1.065E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.073E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.898E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	6.308E+40	0.000E+00	SHORT HLIF
RH-101	-1.182E-02	2.990E-02	5.063E-02	NOT IDENT.
RH-102	2.787E-02	5.330E-02	1.106E-01	FAIL ABUN
RU-103	-4.593E-03	5.445E-02	1.038E-01	FAIL ABUN
RH-106	-6.473E-02	3.646E-01	6.642E-01	NOT IDENT.
RU-106	-6.473E-02	3.646E-01	6.642E-01	NOT IDENT.
AG-108M	3.568E-04	3.022E-02	5.829E-02	NOT IDENT.
AG-110	7.418E-01	8.681E-01	1.819E+00	NOT IDENT.
AG-110M	-2.562E-03	5.535E-02	1.092E-01	NOT IDENT.
SN-113	-2.529E-02	4.665E-02	8.480E-02	NOT IDENT.
CD-115	0.000E+00	5.269E+03	0.000E+00	SHORT HLIF
SN-117M	-3.032E-02	1.422E-01	2.602E-01	NOT IDENT.
SB-122	0.000E+00	3.474E+02	0.000E+00	SHORT HLIF
TE-123M	1.290E-02	2.866E-02	5.577E-02	NOT IDENT.
SB-124	-2.325E-02	1.264E-01	2.551E-01	NOT IDENT.
SB-125	1.895E-02	1.020E-01	1.990E-01	NOT IDENT.
TE-125M	-6.433E+00	1.049E+01	1.912E+01	NOT IDENT.
I-126	-3.583E-01	7.966E-01	1.367E+00	NOT IDENT.
SB-126	7.610E-02	4.790E-01	7.794E-01	NOT IDENT.
SB-127	-2.280E+01	4.399E+01	8.256E+01	NOT IDENT.
I-131	4.168E-01	6.141E-01	1.295E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.116E+01	0.000E+00	SHORT HLIF
BA-133	-5.850E-03	4.407E-02	7.589E-02	FAIL ABUN
I-133	0.000E+00	5.634E+10	0.000E+00	SHORT HLIF
CS-134	3.314E-03	4.508E-02	9.004E-02	FAIL ABUN
I-135	0.000E+00	9.598E+37	0.000E+00	SHORT HLIF
CS-136	5.839E-02	2.851E-01	5.983E-01	NOT IDENT.
BA-137M	-2.291E-02	5.043E-02	8.210E-02	NOT IDENT.
CS-137	-2.421E-02	5.327E-02	8.674E-02	NOT IDENT.
LA-138	2.750E-03	6.040E-02	1.288E-01	NOT IDENT.
CE-139	-2.594E-02	3.154E-02	5.409E-02	NOT IDENT.
BA-140	-3.363E-01	6.042E-01	1.064E+00	NOT IDENT.
LA-140	-1.367E-01	3.514E-01	6.547E-01	FAIL ABUN
CE-143	0.000E+00	2.990E+06	0.000E+00	SHORT HLIF
CE-144	3.403E-02	1.779E-01	3.443E-01	NOT IDENT.
PM-144	-2.313E-02	3.120E-02	5.593E-02	FAIL ABUN
PR-144	-1.730E+00	2.364E+00	4.245E+00	NOT IDENT.
PM-146	4.495E-02	4.189E-02	9.136E-02	NOT IDENT.
ND-147	4.421E-01	1.766E+00	3.579E+00	NOT IDENT.
PM-147	-3.957E+01	6.246E+02	1.196E+03	NOT IDENT.
PM-149	0.000E+00	4.347E+04	0.000E+00	SHORT HLIF
EU-150	3.902E-03	2.609E-02	4.735E-02	FAIL ABUN
EU-152	5.475E-02	8.848E-02	1.852E-01	NOT IDENT.
GD-153	-5.343E-02	7.783E-02	1.346E-01	NOT IDENT.
EU-154	5.789E-02	1.205E-01	2.711E-01	NOT IDENT.

EU-155	7.496E-02	8.828E-02	1.837E-01	FAIL ABUN
TB-160	1.859E-02	1.535E-01	3.165E-01	FAIL ABUN
HO-166M	1.925E-02	5.442E-02	1.076E-01	FAIL ABUN
TM-171	1.019E+01	2.425E+01	4.473E+01	NOT IDENT.
HF-172	1.150E-01	1.649E-01	3.173E-01	FAIL ABUN
LU-172	-1.033E-02	5.126E-02	1.007E-01	FAIL ABUN
LU-176	-2.123E-03	2.659E-02	5.166E-02	FAIL ABUN
HF-181	-4.014E-02	6.403E-02	9.618E-02	NOT IDENT.
TA-182	7.935E-02	1.937E-01	4.144E-01	FAIL ABUN
RE-183	-2.116E-02	2.568E-01	5.225E-01	NOT IDENT.
RE-184	8.240E-02	1.797E-01	3.817E-01	NOT IDENT.
W-188	4.284E+00	7.271E+00	1.437E+01	FAIL ABUN
IR-192	-7.923E-03	3.737E-02	7.221E-02	FAIL ABUN
HG-203	5.176E-03	5.697E-02	1.020E-01	NOT IDENT.
TL-204	-1.157E+00	4.617E+00	9.047E+00	NOT IDENT.
BI-207	2.314E-02	6.328E-02	9.684E-02	FAIL ABUN
BI-210	1.230E+00	5.810E+00	1.057E+01	NOT IDENT.
PB-210	1.230E+00	5.810E+00	1.057E+01	NOT IDENT.
PB-211	3.027E-01	8.181E-01	1.617E+00	NOT IDENT.
BI-213	-5.697E-05	1.210E-01	2.298E-01	NOT IDENT.
RN-219	2.997E-01	4.286E-01	8.846E-01	FAIL ABUN
RA-223	-2.307E-01	6.563E-01	1.103E+00	FAIL ABUN
AC-225	-8.786E-01	2.376E+00	4.146E+00	NOT IDENT.
AC-227	-8.370E-02	2.575E-01	4.448E-01	FAIL ABUN
TH-227	-8.370E-02	2.575E-01	4.448E-01	FAIL ABUN
TH-229	5.516E-02	4.500E-01	8.433E-01	FAIL ABUN
TH-231	-2.307E-01	6.563E-01	1.103E+00	FAIL ABUN
PA-233	-1.012E-02	5.429E-02	1.058E-01	FAIL ABUN
PA-234	-1.957E-01	3.214E-01	5.551E-01	FAIL ABUN
NP-237	-1.012E-02	5.429E-02	1.058E-01	FAIL ABUN
NP-238	0.000E+00	1.759E+04	0.000E+00	SHORT HLIF
NP-239	7.598E-02	2.247E-01	4.458E-01	NOT IDENT.
PU-239	3.007E+02	5.194E+02	6.023E+02	FAIL ABUN
AM-241	1.217E-02	1.568E-01	3.031E-01	NOT IDENT.
CM-243	-9.328E-02	8.358E-02	1.464E-01	NOT IDENT.
BK-247	-2.564E-02	8.714E-02	1.502E-01	NOT IDENT.
CM-247	1.750E-03	4.216E-02	8.085E-02	NOT IDENT.
CF-249	-5.906E-04	3.735E-02	7.270E-02	NOT IDENT.
CF-251	8.521E-02	1.317E-01	2.554E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:08.80

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	52	10.44*	2.657E+00	1.075E+00	1.703E+00	54.89
K-40	1460.82	73	10.66*	9.503E-01	4.156E+00	4.156E+00	25.77
CD-109	88.03	113	3.70*	5.042E+00	3.477E+00	3.666E+00	57.28
SN-126	64.28	47	9.60	2.281E+00	1.237E+00	1.237E+00	142.50
	86.94	113	8.90	5.042E+00	1.445E+00	1.445E+00	57.28
	87.57	113	37.00*	5.042E+00	3.477E-01	3.477E-01	57.28
CE-141	145.44	23	48.29*	6.052E+00	4.475E-02	9.509E-02	170.02
TL-208	277.37	------	6.60	4.066E+00	------ Line Not Found		------
	583.19	102	85.00*	2.247E+00	3.068E-01	3.068E-01	24.62
	860.56	7	12.50	1.568E+00	1.974E-01	1.974E-01	179.06
BI-211	72.87	------	1.23	3.553E+00	------ Line Not Found		------
	351.06	339	12.92*	3.389E+00	4.461E+00	4.461E+00	14.74
BI-212	727.33	13	6.67*	1.841E+00	5.906E-01	5.906E-01	136.49
	1620.50	------	1.47	8.787E-01	------ Line Not Found		------
PB-212	74.82	48	10.28	3.767E+00	7.113E-01	7.113E-01	107.37
	77.11	149	17.10	4.043E+00	1.244E+00	1.244E+00	34.88
	238.63	298	43.60*	4.546E+00	8.664E-01	8.664E-01	14.92
	300.09	12	3.30	3.818E+00	5.333E-01	5.333E-01	329.92
BI-214	609.32	231	45.49*	2.163E+00	1.350E+00	1.350E+00	15.17
	1120.29	46	14.92	1.212E+00	1.450E+00	1.450E+00	51.72
	1764.49	39	15.30	8.345E-01	1.779E+00	1.780E+00	30.86
PB-214	74.82	48	5.80	3.767E+00	1.261E+00	1.261E+00	107.37
	77.11	149	9.70	4.043E+00	2.193E+00	2.193E+00	34.88
	87.09	113	3.41	5.042E+00	3.772E+00	3.773E+00	57.28
	242.00	121	7.25	4.505E+00	2.140E+00	2.140E+00	26.51
	295.22	154	18.42	3.880E+00	1.237E+00	1.237E+00	23.92
	351.93	339	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74
RN-222	609.32	231	45.49*	2.163E+00	1.350E+00	1.350E+00	15.17
	1120.29	46	14.92	1.212E+00	1.450E+00	1.450E+00	51.72
	1764.49	39	15.30	8.345E-01	1.779E+00	1.780E+00	30.86
RA-224	240.99	121	4.10*	4.505E+00	3.784E+00	3.784E+00	26.51
RA-226	74.82	48	5.80	3.767E+00	1.261E+00	1.261E+00	107.37
	77.11	149	9.70	4.043E+00	2.193E+00	2.193E+00	34.88
	87.09	113	3.41	5.042E+00	3.772E+00	3.773E+00	57.28
	242.00	121	7.25	4.505E+00	2.140E+00	2.140E+00	26.51
	295.22	154	18.42	3.880E+00	1.237E+00	1.237E+00	23.92
	351.93	339	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74
AC-228	105.21	------	1.10	5.934E+00	------ Line Not Found		------
	338.32	57	11.27	3.494E+00	8.405E-01	8.405E-01	66.08
	835.71	------	1.61	1.615E+00	------ Line Not Found		------
	911.20	63	25.80*	1.485E+00	9.438E-01	9.438E-01	29.31
	968.97	47	15.80	1.399E+00	1.226E+00	1.226E+00	52.65
RA-228	105.21	------	1.10	5.934E+00	------ Line Not Found		------
	338.32	57	11.27	3.494E+00	8.405E-01	8.405E-01	66.08
	835.71	------	1.61	1.615E+00	------ Line Not Found		------
	911.20	63	25.80*	1.485E+00	9.438E-01	9.438E-01	29.31
	968.97	47	15.80	1.399E+00	1.226E+00	1.226E+00	52.65

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	48	10.28	3.767E+00	7.113E-01	7.113E-01	107.37
	77.11	149	17.10	4.043E+00	1.244E+00	1.244E+00	34.88
	238.63	298	43.60*	4.546E+00	8.664E-01	8.664E-01	14.92
	300.09	12	3.30	3.818E+00	5.333E-01	5.333E-01	329.92
TH-230	74.82	48	5.80	3.767E+00	1.261E+00	1.261E+00	107.37
	77.11	149	9.70	4.043E+00	2.193E+00	2.193E+00	34.88
	87.09	113	3.41	5.042E+00	3.772E+00	3.772E+00	57.28
	242.00	121	7.25	4.505E+00	2.140E+00	2.140E+00	26.51
	295.22	154	18.42	3.880E+00	1.237E+00	1.237E+00	23.92
	351.93	339	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74
PA-231	283.69	------	1.70	3.998E+00	------ Line Not Found		------
	301.36	12	5.35*	3.818E+00	3.289E-01	3.289E-01	329.92
TH-232	105.21	------	1.10	5.934E+00	------ Line Not Found		------
	338.32	57	11.27	3.494E+00	8.405E-01	8.405E-01	66.08
	835.71	------	1.61	1.615E+00	------ Line Not Found		------
	911.20	63	25.80*	1.485E+00	9.438E-01	9.438E-01	29.31
	968.97	47	15.80	1.399E+00	1.226E+00	1.226E+00	52.65
PA-234M	63.29	47	3.70*	2.281E+00	3.210E+00	3.210E+00	142.50
	92.59	92	4.23	5.388E+00	2.335E+00	2.335E+00	69.40
TH-234	63.29	47	3.70*	2.281E+00	3.210E+00	3.210E+00	142.50
	92.59	92	4.23	5.388E+00	2.335E+00	2.335E+00	69.40
U-234	74.82	48	5.80	3.767E+00	1.261E+00	1.261E+00	107.37
	77.11	149	9.70	4.043E+00	2.193E+00	2.193E+00	34.88
	87.09	113	3.41	5.042E+00	3.772E+00	3.772E+00	57.28
	242.00	121	7.25	4.505E+00	2.140E+00	2.140E+00	26.51
	295.22	154	18.42	3.880E+00	1.237E+00	1.237E+00	23.92
	351.93	339	35.60*	3.389E+00	1.619E+00	1.619E+00	14.74
U-235	89.96	------	3.47	5.199E+00	------ Line Not Found		------
	93.35	92	5.60	5.388E+00	1.764E+00	1.764E+00	69.40
	143.76	23	10.96*	6.052E+00	1.971E-01	1.971E-01	170.02
	163.33	------	5.08	5.764E+00	------ Line Not Found		------
	185.72	98	57.20	5.377E+00	1.836E-01	1.836E-01	57.48
	205.31	------	5.01	5.046E+00	------ Line Not Found		------
U-238	63.29	47	3.70*	2.281E+00	3.210E+00	3.210E+00	142.50
	92.59	92	4.23	5.388E+00	2.335E+00	2.335E+00	69.40
AM-243	43.53	------	5.90	2.688E-01	------ Line Not Found		------
	74.66	48	67.20*	3.767E+00	1.088E-01	1.088E-01	107.37
ANH-511	511.00	11	100.00*	2.513E+00	2.534E-02	2.534E-02	269.96

Flag: "*" = Keyline

Sample ID : G714507014 Acquisition date : 10-APR-2025 22:33:02

Total number of lines in spectrum 42
Number of unidentified lines 8
Number of lines tentatively identified by NID 34 80.95%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.58	1.075E+00	1.703E+00	0.935E+00	54.89	
K-40	1.25E+09Y	1.00	4.156E+00	4.156E+00	1.071E+00	25.77	
CD-109	461.40D	1.05	3.477E+00	3.666E+00	2.100E+00	57.28	
SN-126	2.30E+05Y	1.00	3.477E-01	3.477E-01	1.991E-01	57.28	
CE-141	32.51D	2.13	4.475E-02	9.509E-02	16.17E-02	170.02	
TL-208	1.41E+10Y	1.00	3.068E-01	3.068E-01	0.755E-01	24.62	
BI-211	7.04E+08Y	1.00	4.461E+00	4.461E+00	0.658E+00	14.74	
BI-212	1.41E+10Y	1.00	5.906E-01	5.906E-01	8.062E-01	136.49	
PB-212	1.41E+10Y	1.00	8.664E-01	8.664E-01	1.293E-01	14.92	
BI-214	1600.00Y	1.00	1.350E+00	1.350E+00	0.205E+00	15.17	
PB-214	1600.00Y	1.00	1.619E+00	1.619E+00	0.239E+00	14.74	
RN-222	1600.00Y	1.00	1.350E+00	1.350E+00	0.205E+00	15.17	
RA-224	1.41E+10Y	1.00	3.784E+00	3.784E+00	1.003E+00	26.51	
RA-226	1600.00Y	1.00	1.619E+00	1.619E+00	0.239E+00	14.74	
AC-228	1.41E+10Y	1.00	9.438E-01	9.438E-01	2.766E-01	29.31	
RA-228	1.41E+10Y	1.00	9.438E-01	9.438E-01	2.766E-01	29.31	
TH-228	1.41E+10Y	1.00	8.664E-01	8.664E-01	1.293E-01	14.92	
TH-230	7.54E+04Y	1.00	1.619E+00	1.619E+00	0.239E+00	14.74	
PA-231	7.04E+08Y	1.00	3.289E-01	3.289E-01	10.85E-01	329.92	
TH-232	1.41E+10Y	1.00	9.438E-01	9.438E-01	2.766E-01	29.31	
PA-234M	4.47E+09Y	1.00	3.210E+00	3.210E+00	4.574E+00	142.50	
TH-234	4.47E+09Y	1.00	3.210E+00	3.210E+00	4.574E+00	142.50	
U-234	2.45E+05Y	1.00	1.619E+00	1.619E+00	0.239E+00	14.74	
U-235	7.04E+08Y	1.00	1.971E-01	1.971E-01	3.352E-01	170.02	
U-238	4.47E+09Y	1.00	3.210E+00	3.210E+00	4.574E+00	142.50	
AM-243	7370.00Y	1.00	1.088E-01	1.088E-01	1.168E-01	107.37	
ANH-511	1.00E+09Y	1.00	2.534E-02	2.534E-02	6.842E-02	269.96	
	Total Activity :		4.227E+01	4.314E+01			

Grand Total Activity : 4.227E+01 4.314E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	130.12	20	87	0.91	260.29	255	8	5.04E-03	****	6.18E+00	T
4	208.98	41	86	1.65	417.95	413	17	1.05E-02	93.2	4.99E+00	
4	212.24	23	54	1.37	424.48	413	17	5.86E-03	****	4.94E+00	T
0	269.91	31	42	1.27	539.77	536	7	8.09E-03	79.9	4.15E+00	T
0	328.62	26	46	1.44	657.17	650	11	6.90E-03	****	3.57E+00	T
0	561.80	14	9	1.66	1123.40	1119	8	3.85E-03	94.7	2.32E+00	T
0	588.17	3	18	0.73	1176.13	1172	9	8.52E-04	****	2.23E+00	
1	714.96	18	13	1.96	1429.64	1425	16	4.97E-03	69.9	1.87E+00	
1	717.96	16	8	1.96	1435.64	1425	16	4.45E-03	83.7	1.86E+00	
0	768.04	29	8	1.82	1535.78	1531	10	8.14E-03	50.9	1.75E+00	T
0	785.52	30	3	1.10	1570.75	1565	12	8.30E-03	43.4	1.71E+00	
0	814.73	6	7	3.01	1629.15	1622	9	1.74E-03	****	1.66E+00	T
0	926.46	12	2	1.46	1852.57	1848	9	3.31E-03	73.2	1.46E+00	T
0	933.28	24	3	3.96	1866.21	1861	11	6.70E-03	48.8	1.45E+00	
0	1064.55	4	7	0.90	2128.70	2120	10	1.09E-03	****	1.27E+00	T
0	1154.57	19	3	3.76	2308.73	2302	13	5.52E-03	58.3	1.18E+00	
0	1238.14	18	13	2.03	2475.83	2467	13	5.23E-03	91.6	1.10E+00	T
0	1379.33	4	8	0.73	2758.19	2752	8	1.08E-03	****	9.97E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:19.98

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507014.CNF;1   *
* Acquisition date : 10-APR-2025 22:33:02 Sensitivity     : 3.000           *
* Detector ID      : GAM23                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:01.05     Half life ratio : *****           *
* Sample date      :  6-MAR-2025 14:30:00 Nuclide Library : SOLID            *
* Sample ID        : G714507014           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.3038E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  4-SEP-2024 11:58:10 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM23_CAN.CNF;22            *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	2.938E-01
K-40	2.895E-01
CD-109	6.539E-01
SN-126	6.239E-02
CE-141	7.217E-02
TL-208	2.741E-02
BI-211	1.655E-01
BI-212	4.945E-01
PB-212	3.932E-02
BI-214	5.056E-02
PB-214	6.022E-02
RN-222	5.056E-02
RA-224	4.218E-01
RA-226	6.022E-02
AC-228	1.260E-01
RA-228	1.260E-01
TH-228	3.932E-02
TH-230	6.022E-02
PA-231	4.257E-01
TH-232	1.260E-01
PA-234M	9.873E-01
TH-234	9.873E-01
U-234	6.022E-02
U-235	1.764E-01
U-238	9.873E-01
AM-243	5.559E-02
ANH-511	2.596E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	4.086E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.598E-02	NOT IDENT.
SC-46	4.421E-02	FAIL ABUN

V-48	1.907E-01	NOT IDENT.
CR-51	5.441E-01	NOT IDENT.
MN-52	1.916E+00	NOT IDENT.
MN-54	3.661E-02	NOT IDENT.
CO-56	4.530E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.775E-02	NOT IDENT.
CO-58	3.691E-02	NOT IDENT.
FE-59	9.760E-02	NOT IDENT.
CO-60	4.183E-02	NOT IDENT.
ZN-65	7.110E-02	NOT IDENT.
GE-68	9.629E-01	NOT IDENT.
AS-73	1.127E+00	NOT IDENT.
AS-74	1.792E-01	NOT IDENT.
SE-75	4.574E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.571E-01	NOT IDENT.
RB-83	6.579E-02	NOT IDENT.
RB-84	7.869E-02	NOT IDENT.
KR-85	6.204E+00	NOT IDENT.
SR-85	4.062E-02	NOT IDENT.
RB-86	1.230E+00	NOT IDENT.
Y-88	4.629E-02	NOT IDENT.
Y-91	1.560E+01	NOT IDENT.
NB-94	3.998E-02	NOT IDENT.
NB-95	4.595E-02	NOT IDENT.
NB-95M	1.191E-01	NOT IDENT.
ZR-95	8.713E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.336E-02	NOT IDENT.
RH-102	4.845E-02	FAIL ABUN
RU-103	4.557E-02	FAIL ABUN
RH-106	2.922E-01	NOT IDENT.
RU-106	2.922E-01	NOT IDENT.
AG-108M	2.610E-02	NOT IDENT.
AG-110	8.140E-01	NOT IDENT.
AG-110M	4.682E-02	NOT IDENT.
SN-113	3.754E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.204E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.587E-02	NOT IDENT.
SB-124	9.882E-02	NOT IDENT.
SB-125	9.011E-02	NOT IDENT.
TE-125M	8.799E+00	NOT IDENT.
I-126	6.037E-01	NOT IDENT.
SB-126	3.324E-01	NOT IDENT.
SB-127	3.488E+01	NOT IDENT.
I-131	5.849E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.410E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	3.941E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.504E-01	NOT IDENT.
BA-137M	3.668E-02	NOT IDENT.
CS-137	3.875E-02	NOT IDENT.
LA-138	5.204E-02	NOT IDENT.
CE-139	2.495E-02	NOT IDENT.
BA-140	4.399E-01	NOT IDENT.
LA-140	2.646E-01	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	1.593E-01	NOT IDENT.
PM-144	2.355E-02	FAIL ABUN
PR-144	1.788E+00	NOT IDENT.
PM-146	4.123E-02	NOT IDENT.
ND-147	1.558E+00	NOT IDENT.
PM-147	5.509E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.132E-02	FAIL ABUN
EU-152	8.390E-02	NOT IDENT.
GD-153	6.179E-02	NOT IDENT.
EU-154	1.146E-01	NOT IDENT.
EU-155	8.528E-02	FAIL ABUN

TB-160	1.344E-01	FAIL ABUN
HO-166M	4.608E-02	FAIL ABUN
TM-171	2.050E+01	NOT IDENT.
HF-172	1.467E-01	FAIL ABUN
LU-172	3.996E-02	FAIL ABUN
LU-176	2.357E-02	FAIL ABUN
HF-181	4.144E-02	NOT IDENT.
TA-182	1.750E-01	FAIL ABUN
RE-183	2.403E-01	NOT IDENT.
RE-184	1.634E-01	NOT IDENT.
W-188	6.469E+00	FAIL ABUN
IR-192	3.245E-02	FAIL ABUN
HG-203	4.692E-02	NOT IDENT.
TL-204	4.205E+00	NOT IDENT.
BI-207	4.017E-02	FAIL ABUN
BI-210	4.856E+00	NOT IDENT.
PB-210	4.856E+00	NOT IDENT.
PB-211	7.394E-01	NOT IDENT.
BI-213	1.041E-01	NOT IDENT.
RN-219	4.029E-01	FAIL ABUN
RA-223	4.961E-01	FAIL ABUN
AC-225	1.905E+00	NOT IDENT.
AC-227	2.029E-01	FAIL ABUN
TH-227	2.029E-01	FAIL ABUN
TH-229	3.870E-01	FAIL ABUN
TH-231	4.961E-01	FAIL ABUN
PA-233	4.732E-02	FAIL ABUN
PA-234	2.319E-01	FAIL ABUN
NP-237	4.732E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.064E-01	NOT IDENT.
PU-239	2.805E+02	FAIL ABUN
AM-241	1.390E-01	NOT IDENT.
CM-243	6.660E-02	NOT IDENT.
BK-247	6.876E-02	NOT IDENT.
CM-247	3.681E-02	NOT IDENT.
CF-249	3.252E-02	NOT IDENT.
CF-251	1.193E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:24.05

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507014.CNF;1		
Acquisition date	: 10-APR-2025 22:33:02	Sensitivity	: 3.000
Detector ID	: GAM23	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.05	Half life ratio	: *****
Sample date	: 6-MAR-2025 14:30:00	Nuclide Library	: SOLID
Sample ID	: G714507014	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.3038E+02 GRAM
		Quantity Err(%)	: 1.5340E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 4-SEP-2024 11:58:10	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM23_CAN.CNF;22		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.703E+00	9.274E-01	9.274E-01
K-40	4.156E+00	1.143E+00	1.143E+00
CD-109	3.666E+00	2.094E+00	2.094E+00
SN-126	3.477E-01	1.977E-01	1.977E-01
CE-141	6.552E-03	1.664E-01	1.664E-01
TL-208	3.068E-01	7.848E-02	7.848E-02
BI-211	4.461E+00	7.622E-01	7.622E-01
BI-212	5.906E-01	7.919E-01	7.919E-01
PB-212	8.664E-01	1.499E-01	1.499E-01
BI-214	1.350E+00	2.306E-01	2.306E-01
PB-214	1.619E+00	2.754E-01	2.754E-01
RN-222	1.350E+00	2.306E-01	2.306E-01
RA-224	3.784E+00	1.045E+00	1.045E+00
RA-226	1.619E+00	2.754E-01	2.754E-01
AC-228	9.438E-01	2.907E-01	2.907E-01
RA-228	9.438E-01	2.907E-01	2.907E-01
TH-228	8.664E-01	1.499E-01	1.499E-01
TH-230	1.619E+00	2.754E-01	2.754E-01
PA-231	3.289E-01	1.066E+00	1.066E+00
TH-232	9.438E-01	2.907E-01	2.907E-01
PA-234M	3.210E+00	4.546E+00	4.546E+00
TH-234	3.210E+00	4.546E+00	4.546E+00
U-234	1.619E+00	2.754E-01	2.754E-01
U-235	1.971E-01	3.288E-01	3.288E-01
U-238	3.210E+00	4.546E+00	4.546E+00
AM-243	1.088E-01	1.149E-01	1.149E-01
ANH-511	2.534E-02	6.708E-02	6.708E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	2.064E-02	4.302E-02	4.401E-02	NOT IDENT.
NA-24	2.128E+14	3.672E+15	3.674E+15	SHORT HLIF
AL-26	-6.505E-03	3.210E-02	3.223E-02	NOT IDENT.

SC-46	1.760E-02	4.786E-02	4.852E-02	FAIL ABUN
V-48	1.496E-01	2.012E-01	2.122E-01	NOT IDENT.
CR-51	4.028E-01	5.684E-01	5.967E-01	NOT IDENT.
MN-52	-1.310E+00	2.716E+00	2.779E+00	NOT IDENT.
MN-54	-6.406E-03	4.365E-02	4.375E-02	NOT IDENT.
CO-56	8.707E-03	5.130E-02	5.145E-02	FAIL ABUN
MN-56	1.000E+41	5.765E+41	0.000E+00	SHORT HLIF
CO-57	-4.424E-03	2.048E-02	2.058E-02	NOT IDENT.
CO-58	-4.574E-02	6.067E-02	6.408E-02	NOT IDENT.
FE-59	-1.533E-02	1.212E-01	1.214E-01	NOT IDENT.
CO-60	2.019E-02	4.442E-02	4.535E-02	NOT IDENT.
ZN-65	7.168E-02	6.923E-02	7.640E-02	NOT IDENT.
GE-68	-5.681E-02	1.171E+00	1.171E+00	NOT IDENT.
AS-73	-4.400E-02	1.426E+00	1.426E+00	NOT IDENT.
AS-74	-4.145E-02	2.227E-01	2.235E-01	NOT IDENT.
SE-75	6.233E-03	5.506E-02	5.513E-02	NOT IDENT.
BR-77	4.918E+04	5.089E+04	5.551E+04	SHORT HLIF
SR-82	2.741E-01	5.983E-01	6.109E-01	NOT IDENT.
RB-83	2.598E-02	7.325E-02	7.418E-02	NOT IDENT.
RB-84	-4.716E-02	1.027E-01	1.048E-01	NOT IDENT.
KR-85	5.334E+00	7.116E+00	7.511E+00	NOT IDENT.
SR-85	3.478E-02	4.662E-02	4.919E-02	NOT IDENT.
RB-86	-5.082E-02	1.489E+00	1.489E+00	NOT IDENT.
Y-88	-2.471E-03	5.688E-02	5.689E-02	NOT IDENT.
Y-91	1.819E+00	1.837E+01	1.839E+01	NOT IDENT.
NB-94	4.393E-02	4.055E-02	4.512E-02	NOT IDENT.
NB-95	8.580E-03	5.811E-02	5.824E-02	NOT IDENT.
NB-95M	1.830E-02	1.532E-01	1.534E-01	NOT IDENT.
ZR-95	6.111E-02	9.066E-02	9.475E-02	NOT IDENT.
NB-97	1.000E+41	1.068E+41	0.000E+00	SHORT HLIF
ZR-97	3.580E+14	8.078E+14	8.238E+14	SHORT HLIF
MO-99	-9.167E+02	1.900E+03	1.945E+03	SHORT HLIF
TC-99M	1.203E+40	6.309E+40	0.000E+00	SHORT HLIF
RH-101	-1.182E-02	2.998E-02	3.045E-02	NOT IDENT.
RH-102	2.787E-02	5.338E-02	5.484E-02	FAIL ABUN
RU-103	-4.593E-03	5.445E-02	5.449E-02	FAIL ABUN
RH-106	-6.473E-02	3.647E-01	3.659E-01	NOT IDENT.
RU-106	-6.473E-02	3.647E-01	3.659E-01	NOT IDENT.
AG-108M	3.568E-04	3.022E-02	3.022E-02	NOT IDENT.
AG-110	7.418E-01	8.702E-01	9.322E-01	NOT IDENT.
AG-110M	-2.562E-03	5.535E-02	5.536E-02	NOT IDENT.
SN-113	-2.529E-02	4.670E-02	4.807E-02	NOT IDENT.
CD-115	1.850E+03	5.272E+03	5.337E+03	SHORT HLIF
SN-117M	-3.032E-02	1.422E-01	1.428E-01	NOT IDENT.
SB-122	-2.075E+02	3.479E+02	3.603E+02	SHORT HLIF
TE-123M	1.290E-02	2.867E-02	2.926E-02	NOT IDENT.
SB-124	-2.325E-02	1.264E-01	1.268E-01	NOT IDENT.
SB-125	1.895E-02	1.020E-01	1.024E-01	NOT IDENT.
TE-125M	-6.433E+00	1.050E+01	1.090E+01	NOT IDENT.
I-126	-3.583E-01	7.973E-01	8.135E-01	NOT IDENT.
SB-126	7.610E-02	4.791E-01	4.803E-01	NOT IDENT.
SB-127	-2.280E+01	4.419E+01	4.537E+01	NOT IDENT.
I-131	4.168E-01	6.152E-01	6.432E-01	NOT IDENT.
I-132	1.000E+41	5.170E+41	0.000E+00	SHORT HLIF
TE-132	3.343E+01	6.129E+01	6.312E+01	SHORT HLIF
BA-133	-5.850E-03	4.408E-02	4.415E-02	FAIL ABUN
I-133	3.598E+10	5.697E+10	5.924E+10	SHORT HLIF
CS-134	3.314E-03	4.508E-02	4.511E-02	FAIL ABUN
I-135	-2.826E+36	9.601E+37	0.000E+00	SHORT HLIF
CS-136	5.839E-02	2.852E-01	2.864E-01	NOT IDENT.
BA-137M	-2.291E-02	5.046E-02	5.151E-02	NOT IDENT.
CS-137	-2.421E-02	5.331E-02	5.442E-02	NOT IDENT.
LA-138	2.750E-03	6.040E-02	6.041E-02	NOT IDENT.
CE-139	-2.594E-02	3.201E-02	3.408E-02	NOT IDENT.
BA-140	-3.363E-01	6.049E-01	6.236E-01	NOT IDENT.
LA-140	-1.367E-01	3.516E-01	3.570E-01	FAIL ABUN
CE-143	2.900E+06	3.004E+06	3.276E+06	SHORT HLIF
CE-144	3.403E-02	1.779E-01	1.785E-01	NOT IDENT.
PM-144	-2.313E-02	3.127E-02	3.296E-02	FAIL ABUN
PR-144	-1.730E+00	2.369E+00	2.494E+00	NOT IDENT.
PM-146	4.495E-02	4.215E-02	4.677E-02	NOT IDENT.
ND-147	4.421E-01	1.766E+00	1.778E+00	NOT IDENT.
PM-147	-3.957E+01	6.246E+02	6.248E+02	NOT IDENT.
PM-149	1.264E+04	4.351E+04	4.388E+04	SHORT HLIF
EU-150	3.902E-03	2.610E-02	2.616E-02	FAIL ABUN
EU-152	5.475E-02	8.865E-02	9.202E-02	NOT IDENT.
GD-153	-5.343E-02	7.795E-02	8.158E-02	NOT IDENT.
EU-154	5.789E-02	1.206E-01	1.234E-01	NOT IDENT.

EU-155	7.496E-02	8.854E-02	9.477E-02	FAIL ABUN
TB-160	1.859E-02	1.535E-01	1.538E-01	FAIL ABUN
HO-166M	1.925E-02	5.445E-02	5.514E-02	FAIL ABUN
TM-171	1.019E+01	2.429E+01	2.472E+01	NOT IDENT.
HF-172	1.150E-01	1.661E-01	1.740E-01	FAIL ABUN
LU-172	-1.033E-02	5.128E-02	5.149E-02	FAIL ABUN
LU-176	-2.123E-03	2.659E-02	2.661E-02	FAIL ABUN
HF-181	-4.014E-02	6.412E-02	6.662E-02	NOT IDENT.
TA-182	7.935E-02	1.938E-01	1.971E-01	FAIL ABUN
RE-183	-2.116E-02	2.568E-01	2.570E-01	NOT IDENT.
RE-184	8.240E-02	1.800E-01	1.838E-01	NOT IDENT.
W-188	4.284E+00	7.297E+00	7.548E+00	FAIL ABUN
IR-192	-7.923E-03	3.738E-02	3.755E-02	FAIL ABUN
HG-203	5.176E-03	5.697E-02	5.702E-02	NOT IDENT.
TL-204	-1.157E+00	4.619E+00	4.648E+00	NOT IDENT.
BI-207	2.314E-02	6.332E-02	6.417E-02	FAIL ABUN
BI-210	1.230E+00	5.812E+00	5.838E+00	NOT IDENT.
PB-210	1.230E+00	5.812E+00	5.838E+00	NOT IDENT.
PB-211	3.027E-01	8.185E-01	8.298E-01	NOT IDENT.
BI-213	-5.697E-05	1.210E-01	1.210E-01	NOT IDENT.
RN-219	2.997E-01	4.308E-01	4.515E-01	FAIL ABUN
RA-223	-2.307E-01	6.567E-01	6.649E-01	FAIL ABUN
AC-225	-8.786E-01	2.378E+00	2.410E+00	NOT IDENT.
AC-227	-8.370E-02	2.579E-01	2.606E-01	FAIL ABUN
TH-227	-8.370E-02	2.579E-01	2.606E-01	FAIL ABUN
TH-229	5.516E-02	4.500E-01	4.507E-01	FAIL ABUN
TH-231	-2.307E-01	6.567E-01	6.649E-01	FAIL ABUN
PA-233	-1.012E-02	5.430E-02	5.449E-02	FAIL ABUN
PA-234	-1.957E-01	3.921E-01	4.019E-01	FAIL ABUN
NP-237	-1.012E-02	5.430E-02	5.449E-02	FAIL ABUN
NP-238	5.550E+02	1.759E+04	1.760E+04	SHORT HLIF
NP-239	7.598E-02	2.248E-01	2.274E-01	NOT IDENT.
PU-239	3.007E+02	5.199E+02	5.373E+02	FAIL ABUN
AM-241	1.217E-02	1.568E-01	1.569E-01	NOT IDENT.
CM-243	-9.328E-02	8.418E-02	9.410E-02	NOT IDENT.
BK-247	-2.564E-02	8.731E-02	8.808E-02	NOT IDENT.
CM-247	1.750E-03	4.216E-02	4.217E-02	NOT IDENT.
CF-249	-5.906E-04	3.735E-02	3.735E-02	NOT IDENT.
CF-251	8.521E-02	1.322E-01	1.376E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	45.2632	81.75	62.8069	123.68	39.8249
879.38	27.1889	82.47	79.7576	125.81	36.8607
46.54	33.0825	83.79	62.9738	127.23	56.1230
228.16	0.0000	265.00	60.7687	127.91	53.6625
52.39	39.8252	193.51	76.8984	129.30	54.8065
1093.63	45.8447	105.31	68.1091	131.20	34.7745
52.39	32.6193	86.79	68.1635	133.02	43.9810
125.81	43.1217	86.94	68.1982	133.52	47.5951
53.44	43.2212	87.09	68.2324	136.00	47.8740
54.07	43.3540	87.57	68.3423	136.47	43.0359
293.27	0.0000	88.03	68.4467	739.50	0.0000
482.18	47.8693	306.78	68.5168	140.51	0.0000
57.98	45.6839	88.47	68.5468	143.76	47.7356
59.27	37.7838	143.76	56.8280	144.24	47.7869
59.32	37.7923	90.64	56.9539	145.44	50.5762
59.54	39.8746	531.02	57.0405	152.43	56.7545
60.96	41.1570	92.59	48.6283	1048.07	49.7469
61.17	40.1652	93.35	48.7462	154.21	53.9171
62.93	35.8047	94.56	48.9321	158.56	56.1649
63.29	35.8601	311.90	48.9462	159.00	46.2373
290.67	35.9048	946.00	48.9492	162.33	43.4490
87.57	36.0120	94.87	48.9799	537.26	43.4778
66.73	36.3829	97.43	47.0182	163.33	48.7198
67.24	47.5557	98.43	53.9414	165.86	64.5941
67.68	46.5826	98.44	53.9430	427.87	65.9138
1221.41	46.5956	103.37	46.1360	176.60	65.9497
70.82	55.3225	116.74	46.1360	177.52	53.2768
97.43	50.4266	100.11	48.8828	181.07	0.0000
70.82	63.5209	102.03	44.6930	181.52	35.7834
279.20	63.5239	103.18	43.0503	184.41	44.2469
1063.66	60.5043	103.37	53.8431	185.72	44.3520
72.87	60.5186	911.20	40.5983	193.51	39.4854
351.06	60.5186	105.31	40.6099	197.03	43.0377
74.66	100.1037	106.12	38.8953	198.01	42.0049
351.93	100.1646	106.47	42.5561	201.83	41.1654
238.63	100.1646	109.28	52.0211	203.43	44.6234
351.93	100.1646	111.00	49.5188	205.31	50.7316
238.63	100.1646	111.76	0.0000	210.85	41.7845
74.97	100.2207	114.06	39.7623	215.65	40.9702
77.11	77.9632	116.30	0.0000	218.12	50.2714
78.74	65.1734	116.74	45.6362	222.11	45.9882
256.23	65.3973	119.76	51.6309	227.09	53.2935
80.03	61.0363	264.66	43.3342	227.38	48.6804
133.52	54.3963	121.22	47.1146	228.16	0.0000
364.49	54.4102	344.28	41.5202	228.18	46.4191
711.68	65.6032	122.06	41.5498	235.69	42.2501
356.01	67.9306	122.92	52.9977	235.96	37.5703
323.87	65.9981	1274.44	53.0178	238.63	31.8248

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	28.4922	531.02	12.6670
240.99	31.9344	338.32	28.4935	537.26	12.7246
242.00	31.9809	340.48	26.7749	1260.41	0.0000
244.70	26.9526	340.55	26.7767	552.55	19.2957
685.70	34.8610	344.28	22.4035	795.86	12.9604
388.16	34.8804	345.93	37.7045	564.24	0.0000
507.63	0.0000	351.06	27.9809	569.33	15.1843
256.23	42.2974	351.93	28.0061	569.50	15.1860
527.90	0.0000	355.39	0.0000	569.70	15.1877
264.66	42.7844	356.01	28.5789	583.19	14.7805
264.80	42.7930	364.49	20.1344	584.27	13.1475
265.00	45.2496	366.42	0.0000	595.83	20.9776
269.46	33.2161	372.51	23.0657	600.60	23.2584
270.03	33.2416	375.05	24.0492	602.52	0.0000
401.81	42.7472	377.52	24.1079	604.72	19.9893
273.65	37.1100	383.85	28.9225	607.14	13.3472
276.40	44.6913	388.16	24.3591	609.32	13.3662
583.19	38.5324	666.33	27.1819	610.33	15.0469
277.60	46.0038	391.69	27.2618	614.28	16.0904
402.40	46.0276	400.66	30.3379	618.01	19.0413
279.20	42.3610	401.81	24.6760	884.68	14.5827
279.54	42.3796	402.40	34.1858	621.93	20.2112
279.70	42.3879	404.85	32.3599	630.19	0.0000
280.46	34.9410	410.95	31.5854	631.29	11.2952
301.36	27.5665	413.71	21.1102	633.25	14.7017
284.31	33.4399	720.70	18.2478	634.78	14.7155
285.41	32.6492	423.72	29.0466	635.95	19.2571
285.90	0.0000	427.09	22.3360	636.99	12.4685
287.50	25.1807	427.87	28.1823	657.50	13.7739
290.67	18.9601	433.94	24.4247	657.76	12.6283
293.27	0.0000	439.40	27.4856	657.90	0.0000
295.22	32.5398	440.45	31.4408	661.66	25.3158
316.51	33.0776	453.88	14.9069	664.57	0.0000
298.58	33.1832	463.37	25.0417	666.33	25.3865
299.98	39.8874	468.07	28.1549	666.50	25.3892
300.09	39.8922	473.00	19.6865	667.71	0.0000
300.13	39.8941	631.29	14.1575	677.62	17.4249
311.90	39.8941	696.49	14.1772	685.70	14.8812
301.36	39.9531	477.60	14.1866	692.65	0.0000
302.85	41.0508	482.18	21.3576	695.00	14.9616
304.50	43.7026	487.02	21.4396	696.49	16.7357
304.85	43.7202	492.35	0.0000	696.51	16.7363
306.78	37.8053	497.08	18.5219	697.00	14.0977
308.46	24.9667	505.52	20.1959	697.30	14.9814
311.90	26.7964	507.63	0.0000	697.49	14.9829
316.51	29.5466	511.00	22.8800	702.65	16.7949
319.41	27.9010	514.00	14.0718	706.68	20.3770
320.08	24.4316	514.00	14.0718	711.68	8.5292
321.04	25.3319	520.40	12.5684	720.70	9.5247
323.87	32.8621	520.69	0.0000	721.93	0.0000
325.23	26.3293	667.71	0.0000	1690.97	14.3037
1596.21	27.3148	527.90	0.0000	722.91	14.3047
333.37	25.2402	528.26	13.6945	723.31	11.9234
333.97	25.2570	529.59	12.6538	756.73	15.7464
334.37	23.9381	529.87	0.0000	727.33	20.0758

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	19.7784	935.54	7.9407	1362.66	0.0000
735.93	11.7063	937.49	6.3580	1365.19	8.3667
737.46	17.1231	983.53	3.9854	1368.63	0.0000
739.50	0.0000	946.00	13.9598	1384.29	10.5200
1434.09	15.3772	949.00	8.9860	1408.01	5.6514
747.24	8.1541	954.55	0.0000	1434.09	5.6956
748.06	10.8768	962.31	9.6398	1435.80	5.6985
752.31	13.6272	964.08	17.6865	1457.56	0.0000
753.82	11.8197	966.17	15.0874	1460.82	4.7837
756.73	10.9274	968.97	15.1053	1489.16	1.9292
756.80	10.9277	983.53	8.1057	1505.03	4.8450
763.94	10.2378	984.45	0.0000	1584.12	11.8852
765.81	14.6396	996.26	15.2792	1596.21	8.9429
766.84	16.1127	1002.74	14.2986	1620.50	7.0007
772.60	0.0000	1004.73	8.1775	1621.92	6.0029
776.52	11.9618	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	5.0928
778.90	10.5287	1028.54	0.0000	1750.46	0.0000
783.70	8.8661	1037.84	10.3595	1764.49	5.1870
1435.80	5.9260	1038.76	0.0000	1770.23	10.3887
903.28	18.0204	1046.59	10.3961	1771.35	5.1958
795.86	15.7985	1048.07	7.2816	1791.20	0.0000
801.95	16.7794	1049.04	9.3653	1808.65	2.0971
810.06	29.9512	1050.41	8.3291	1810.72	0.0000
810.29	19.4708	1063.66	11.7216	1836.06	5.2769
810.45	19.4721	1077.00	7.3640		
810.76	19.4752	1077.34	7.3653		
815.77	13.5167	1085.87	8.4448		
818.51	12.5326	1093.63	6.3523		
832.01	17.0316	1099.45	9.5499		
834.85	18.0027	1112.07	2.8431		
835.71	21.8018	1112.84	13.6508		
836.80	0.0000	1115.54	1.7080		
846.75	0.0000	1120.29	1.0694		
846.77	13.3416	1120.55	1.0695		
856.80	7.6604	1121.30	1.0698		
860.56	10.5518	1808.65	7.5118		
871.09	10.6042	1131.51	0.0000		
873.19	13.5095	1147.95	0.0000		
875.33	0.0000	1332.49	6.5413		
879.38	9.6777	1177.95	4.3682		
880.51	9.6826	1189.05	8.7710		
881.60	12.5938	1204.77	4.4097		
883.24	11.6338	1221.41	6.6526		
884.68	12.6116	1231.02	3.5598		
889.28	8.7498	1235.36	8.9126		
894.76	12.6703	1238.28	5.3528		
1836.06	9.7610	1260.41	0.0000		
900.72	10.7502	1271.87	10.8270		
903.28	7.8274	1274.44	6.3212		
911.20	12.7651	1274.54	6.3212		
912.08	12.7699	1291.59	8.1729		
984.45	0.0000	1298.22	0.0000		
926.50	1.9773	1312.11	8.2274		
929.11	0.0000	1332.49	6.4412		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:50.48

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507015.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM24.CNF;788
                                     Background date  : 6-APR-2025 11:01:48.
Sample date      : 6-MAR-2025 15:00:00. Acquisition date : 10-APR-2025 22:33:41
Sample ID        : G714507015           Sample quantity  : 1.20010E+02 GRAM
Detector name    : GAM24                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.48  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.84*	22	211	1.19	93.90	90	10	5.98E-03	129.7	
2	0	62.87*	88	224	1.39	125.97	121	10	2.45E-02	34.1	
3	2	74.89*	222	225	1.18	150.01	145	15	6.17E-02	13.2	3.10E+00
4	2	77.20	381	194	0.98	154.61	145	15	1.06E-01	7.8	
5	4	83.78*	47	81	0.94	167.77	166	12	1.32E-02	32.7	6.20E+00
6	4	85.14*	46	185	1.47	170.48	166	12	1.27E-02	60.4	
7	4	87.44	157	147	1.24	175.10	166	12	4.37E-02	15.2	
8	0	93.04*	131	213	1.50	186.30	183	9	3.63E-02	23.1	
9	0	128.65	54	172	1.94	257.50	254	10	1.49E-02	47.5	
10	0	144.05*	20	113	0.97	288.30	285	7	5.66E-03	90.2	
11	0	186.21*	140	136	1.52	372.58	368	10	3.90E-02	18.5	
12	3	209.20*	84	114	1.63	418.56	414	31	2.32E-02	26.7	1.64E+00
13	3	212.66	26	97	1.48	425.49	414	31	7.29E-03	72.0	
14	4	238.79*	525	88	1.10	477.74	470	19	1.46E-01	5.4	9.07E-01
15	4	241.82	218	102	1.59	483.78	470	19	6.05E-02	12.3	
16	0	270.58	56	78	1.29	541.31	538	9	1.55E-02	31.3	
17	0	295.43	289	126	1.14	591.00	585	10	8.02E-02	9.3	
18	0	328.46	32	65	0.67	657.06	653	9	8.90E-03	48.7	
19	0	338.57	109	61	1.23	677.26	673	9	3.03E-02	16.1	
20	0	352.09*	548	69	1.20	704.31	699	12	1.52E-01	5.3	
21	0	463.24	49	32	1.38	926.59	922	11	1.36E-02	26.8	
22	0	478.58	24	66	1.03	957.26	953	12	6.60E-03	70.2	
23	0	510.93*	76	58	2.48	1021.96	1015	18	2.11E-02	29.5	
24	0	535.97	31	21	2.67	1072.03	1067	11	8.63E-03	34.1	
25	0	554.28	30	18	3.24	1108.65	1102	12	8.41E-03	33.3	
26	0	563.58	19	33	2.83	1127.25	1119	12	5.37E-03	63.6	
27	0	583.41*	166	31	1.57	1166.89	1162	14	4.62E-02	10.7	
28	0	609.53*	369	39	1.62	1219.15	1213	15	1.03E-01	6.6	
29	0	645.64	24	17	2.92	1291.36	1286	10	6.76E-03	37.8	
30	0	727.77	43	20	1.74	1455.62	1450	13	1.18E-02	26.4	
31	0	768.44*	45	18	1.45	1536.97	1531	12	1.24E-02	24.8	
32	0	795.20	27	14	0.61	1590.49	1584	11	7.61E-03	32.4	
33	0	806.93	17	34	3.86	1613.94	1605	15	4.71E-03	78.7	
34	0	860.77	32	9	0.92	1721.64	1717	10	8.82E-03	25.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	911.47*	88	31	1.24	1823.04	1817	12	2.44E-02	17.3	
36	0	934.49	22	17	0.73	1869.07	1863	11	5.97E-03	42.5	
37	0	969.30	52	26	1.31	1938.70	1934	10	1.43E-02	23.5	
38	0	1039.00	14	6	1.63	2078.11	2070	13	3.79E-03	47.0	
39	0	1047.84	15	5	1.02	2095.79	2092	9	4.03E-03	37.2	
40	0	1120.42*	82	23	2.24	2240.98	2233	13	2.26E-02	16.6	
41	0	1155.58	10	11	1.36	2311.31	2304	11	2.88E-03	69.1	
42	0	1166.00	9	9	0.66	2332.15	2325	10	2.44E-03	74.7	
43	0	1171.94	26	10	7.75	2344.04	2334	19	7.08E-03	35.1	
44	0	1222.66	9	13	3.36	2445.49	2434	14	2.63E-03	89.1	
45	0	1237.82	38	9	2.33	2475.82	2469	13	1.06E-02	23.3	
46	0	1307.98	6	4	1.38	2616.17	2611	8	1.67E-03	70.7	
47	0	1378.49	11	15	1.12	2757.21	2751	12	2.93E-03	79.8	
48	0	1407.38	26	0	1.97	2815.00	2808	15	7.22E-03	19.6	
49	0	1460.76*	132	8	2.22	2921.80	2913	15	3.66E-02	10.1	
50	0	1621.15	12	0	0.96	3242.67	3236	12	3.33E-03	28.9	
51	0	1729.79	19	6	2.17	3460.03	3455	11	5.14E-03	33.8	
52	0	1764.80*	79	3	2.84	3530.06	3523	14	2.20E-02	12.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:34:51

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507015.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 15:00:00 Acquisition date : 10-APR-2025 22:33:41
Sample ID : G714507015 Sample quantity : 120.01 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA24 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.48 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	3.500E+00	4.084E-01	6.471E-01	140.49	OK
K-40	1460.82	10.66*	1.314E+00	5.561E+00	5.561E+00	20.20	OK
CD-109	88.03	3.70*	7.925E+00	3.661E+00	3.861E+00	30.42	OK
SN-126	64.28	9.60	5.472E+00	1.163E+00	1.163E+00	68.21	OK
	86.94	8.90	7.925E+00	1.522E+00	1.522E+00	30.42	OK
	87.57	37.00*	7.925E+00	3.661E-01	3.661E-01	30.42	OK
TL-208	277.37	6.60	5.118E+00	----- Line	Not Found	-----	Absent
	583.19	85.00*	2.999E+00	4.056E-01	4.056E-01	21.49	OK
	860.56	12.50	2.132E+00	7.257E-01	7.257E-01	51.17	OK
BI-210	46.54	4.25*	2.300E+00	1.545E+00	1.550E+00	259.42	OK
PB-210	46.54	4.25*	2.300E+00	1.545E+00	1.550E+00	259.42	OK
BI-211	72.87	1.23	6.856E+00	----- Line	Not Found	-----	Absent
	351.06	12.92*	4.358E+00	6.205E+00	6.205E+00	10.54	OK
BI-212	727.33	6.67*	2.485E+00	1.579E+00	1.579E+00	52.77	OK
	1620.50	1.47	1.219E+00	3.941E+00	3.941E+00	57.74	OK
PB-212	74.82	10.28	7.066E+00	2.100E+00	2.100E+00	26.44	OK
	77.11	17.10	7.279E+00	2.098E+00	2.098E+00	15.50	OK
	238.63	43.60*	5.647E+00	1.386E+00	1.386E+00	10.73	OK
	300.09	3.30	4.857E+00	----- Line	Not Found	-----	Absent
BI-214	609.32	45.49*	2.893E+00	1.740E+00	1.740E+00	13.16	OK
	1120.29	14.92	1.660E+00	1.976E+00	1.976E+00	33.17	OK
	1764.49	15.30	1.160E+00	2.611E+00	2.611E+00	25.61	OK
PB-214	74.82	5.80	7.066E+00	3.722E+00	3.722E+00	26.44	OK
	77.11	9.70	7.279E+00	3.698E+00	3.698E+00	15.50	OK
	87.09	3.41	7.925E+00	3.973E+00	3.973E+00	30.42	OK
	242.00	7.25	5.601E+00	3.484E+00	3.485E+00	24.59	OK
	295.22	18.42	4.908E+00	2.053E+00	2.053E+00	18.69	OK
	351.93	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54	OK
RN-222	609.32	45.49*	2.893E+00	1.740E+00	1.740E+00	13.16	OK
	1120.29	14.92	1.660E+00	1.976E+00	1.976E+00	33.17	OK
	1764.49	15.30	1.160E+00	2.611E+00	2.611E+00	25.61	OK
RA-224	240.99	4.10*	5.601E+00	6.162E+00	6.162E+00	24.59	OK
RA-226	74.82	5.80	7.066E+00	3.722E+00	3.722E+00	26.44	OK
	77.11	9.70	7.279E+00	3.698E+00	3.698E+00	15.50	OK
	87.09	3.41	7.925E+00	3.973E+00	3.973E+00	30.42	OK
	242.00	7.25	5.601E+00	3.484E+00	3.485E+00	24.59	OK
	295.22	18.42	4.908E+00	2.053E+00	2.053E+00	18.69	OK
	351.93	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54	OK
AC-228	105.21	1.10	8.242E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.477E+00	1.381E+00	1.381E+00	32.11	OK
	835.71	1.61	2.191E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	2.020E+00	1.023E+00	1.023E+00	34.64	OK
	968.97	15.80	1.905E+00	1.037E+00	1.037E+00	46.97	OK
RA-228	105.21	1.10	8.242E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.477E+00	1.381E+00	1.381E+00	32.11	OK
	835.71	1.61	2.191E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	2.020E+00	1.023E+00	1.023E+00	34.64	OK
	968.97	15.80	1.905E+00	1.037E+00	1.037E+00	46.97	OK
TH-228	74.82	10.28	7.066E+00	2.100E+00	2.100E+00	26.44	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	77.11	17.10	7.279E+00	2.098E+00	2.098E+00	15.50	OK
	238.63	43.60*	5.647E+00	1.386E+00	1.386E+00	10.73	OK
	300.09	3.30	4.857E+00	----- Line Not Found		-----	Absent
TH-229	85.43	14.70	7.817E+00	2.722E-01	2.722E-01	120.73	OK
	88.47	24.00	7.925E+00	5.645E-01	5.645E-01	30.42	OK
	193.51	4.41*	6.452E+00	----- Line Not Found		-----	Absent
	210.85	2.80	6.116E+00	----- Line Not Found		-----	Absent
TH-230	74.82	5.80	7.066E+00	3.722E+00	3.722E+00	26.44	OK
	77.11	9.70	7.279E+00	3.698E+00	3.698E+00	15.50	OK
	87.09	3.41	7.925E+00	3.973E+00	3.973E+00	30.42	OK
	242.00	7.25	5.601E+00	3.484E+00	3.484E+00	24.59	OK
	295.22	18.42	4.908E+00	2.053E+00	2.053E+00	18.69	OK
	351.93	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54	OK
TH-232	105.21	1.10	8.242E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.477E+00	1.381E+00	1.381E+00	32.11	OK
	835.71	1.61	2.191E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	2.020E+00	1.023E+00	1.023E+00	34.64	OK
	968.97	15.80	1.905E+00	1.037E+00	1.037E+00	46.97	OK
PA-234M	63.29	3.70*	5.472E+00	3.019E+00	3.019E+00	68.21	OK
	92.59	4.23	8.111E+00	2.588E+00	2.588E+00	46.13	OK
TH-234	63.29	3.70*	5.472E+00	3.019E+00	3.019E+00	68.21	OK
	92.59	4.23	8.111E+00	2.588E+00	2.588E+00	46.13	OK
U-234	74.82	5.80	7.066E+00	3.722E+00	3.722E+00	26.44	OK
	77.11	9.70	7.279E+00	3.698E+00	3.698E+00	15.50	OK
	87.09	3.41	7.925E+00	3.973E+00	3.973E+00	30.42	OK
	242.00	7.25	5.601E+00	3.484E+00	3.484E+00	24.59	OK
	295.22	18.42	4.908E+00	2.053E+00	2.053E+00	18.69	OK
	351.93	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54	OK
U-235	89.96	3.47	8.021E+00	----- Line Not Found		-----	Absent
	93.35	5.60	8.111E+00	1.955E+00	1.955E+00	46.13	OK
	143.76	10.96*	7.584E+00	1.633E-01	1.633E-01	180.33	OK
	163.33	5.08	7.120E+00	----- Line Not Found		-----	Absent
	185.72	57.20	6.604E+00	2.443E-01	2.443E-01	36.94	OK
	205.31	5.01	6.219E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	5.472E+00	3.019E+00	3.019E+00	68.21	OK
	92.59	4.23	8.111E+00	2.588E+00	2.588E+00	46.13	OK
AM-243	43.53	5.90	1.656E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	7.066E+00	3.213E-01	3.213E-01	26.44	OK
ANH-511	511.00	100.00*	3.331E+00	1.426E-01	1.426E-01	59.03	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:52.81

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507015.CNF;1		
Acquisition date	: 10-APR-2025 22:33:41	Sensitivity	: 3.000
Detector ID	: GAM24	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.48	Half life ratio	: *****
Sample date	: 6-MAR-2025 15:00:00	Analyst initials	: MXR1
Sample ID	: G714507015	Sample Quantity	: 1.2001E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 24-JUN-2024 07:06:44	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM24_CAN.CNF;16		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	6.471E-01	8.910E-01	6.416E-01
K-40	5.561E+00	1.101E+00	8.092E-01
CD-109	3.861E+00	1.151E+00	1.388E+00
SN-126	3.661E-01	1.092E-01	1.165E-01
TL-208	4.056E-01	8.540E-02	5.749E-02
BI-210	1.550E+00	3.941E+00	3.132E+00
PB-210	1.550E+00	3.941E+00	3.132E+00
BI-211	6.205E+00	6.409E-01	3.459E-01
BI-212	1.579E+00	8.166E-01	8.142E-01
PB-212	1.386E+00	1.457E-01	1.057E-01
BI-214	1.740E+00	2.245E-01	1.249E-01
PB-214	2.252E+00	2.326E-01	1.258E-01
RN-222	1.740E+00	2.245E-01	1.249E-01
RA-224	6.162E+00	1.485E+00	1.133E+00
RA-226	2.252E+00	2.326E-01	1.258E-01
AC-228	1.023E+00	3.472E-01	2.810E-01
RA-228	1.023E+00	3.472E-01	2.810E-01
TH-228	1.386E+00	1.457E-01	1.057E-01
TH-229	-2.223E-01	5.643E-01	9.503E-01
TH-230	2.252E+00	2.326E-01	1.258E-01
TH-232	1.023E+00	3.472E-01	2.810E-01
PA-234M	3.019E+00	2.018E+00	1.530E+00
TH-234	3.019E+00	2.018E+00	1.530E+00
U-234	2.252E+00	2.326E-01	1.258E-01
U-235	1.633E-01	2.886E-01	3.379E-01
U-238	3.019E+00	2.018E+00	1.530E+00
AM-243	3.213E-01	8.325E-02	8.007E-02
ANH-511	1.426E-01	8.252E-02	5.012E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	-3.401E-02	4.234E-02	6.896E-02	NOT IDENT.
NA-24	0.000E+00	4.317E+15	0.000E+00	SHORT HLIF

AL-26	1.637E-03	3.328E-02	7.175E-02	NOT IDENT.
SC-46	-2.707E-02	4.674E-02	8.358E-02	FAIL ABUN
V-48	-8.224E-02	1.509E-01	2.701E-01	NOT IDENT.
CR-51	-5.337E-01	5.604E-01	9.674E-01	NOT IDENT.
MN-52	2.419E-01	2.796E+00	5.694E+00	FAIL ABUN
MN-54	1.079E-02	3.743E-02	7.554E-02	NOT IDENT.
CO-56	3.006E-02	4.644E-02	9.818E-02	FAIL ABUN
MN-56	0.000E+00	1.560E+41	0.000E+00	SHORT HLIF
CO-57	1.111E-02	2.603E-02	4.822E-02	NOT IDENT.
CO-58	2.865E-02	4.827E-02	9.365E-02	NOT IDENT.
FE-59	-6.141E-02	1.010E-01	1.764E-01	NOT IDENT.
CO-60	4.513E-02	3.073E-02	8.145E-02	FAIL ABUN
ZN-65	-1.172E-02	9.680E-02	1.600E-01	NOT IDENT.
GE-68	1.134E-02	1.229E+00	2.406E+00	NOT IDENT.
AS-73	-3.066E-02	5.595E-01	1.038E+00	NOT IDENT.
AS-74	-1.110E-01	2.050E-01	3.503E-01	NOT IDENT.
SE-75	-4.080E-02	5.235E-02	9.358E-02	NOT IDENT.
BR-77	0.000E+00	8.224E+03	0.000E+00	SHORT HLIF
SR-82	-2.806E-01	6.072E-01	1.114E+00	NOT IDENT.
RB-83	1.037E-02	8.198E-02	1.551E-01	NOT IDENT.
RB-84	-7.401E-02	9.776E-02	1.699E-01	NOT IDENT.
KR-85	4.770E+00	6.864E+00	1.369E+01	NOT IDENT.
SR-85	3.118E-02	4.498E-02	8.968E-02	NOT IDENT.
RB-86	3.079E-01	1.553E+00	3.135E+00	NOT IDENT.
Y-88	5.714E-03	3.947E-02	8.836E-02	NOT IDENT.
Y-91	-2.898E+00	2.539E+01	4.774E+01	NOT IDENT.
NB-94	9.173E-03	2.907E-02	5.741E-02	NOT IDENT.
NB-95	4.425E-02	5.315E-02	1.046E-01	NOT IDENT.
NB-95M	9.560E-02	1.663E-01	2.998E-01	NOT IDENT.
ZR-95	4.145E-02	8.427E-02	1.755E-01	NOT IDENT.
NB-97	0.000E+00	1.893E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.367E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.838E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	6.798E+40	0.000E+00	SHORT HLIF
RH-101	0.000E+00	6.336E-02	5.603E-02	FAIL ABUN
RH-102	-3.781E-02	6.093E-02	1.042E-01	FAIL ABUN
RU-103	1.730E-02	5.261E-02	1.029E-01	FAIL ABUN
RH-106	-3.685E-01	3.104E-01	4.662E-01	NOT IDENT.
RU-106	-3.685E-01	3.104E-01	4.662E-01	NOT IDENT.
AG-108M	2.720E-02	2.971E-02	6.078E-02	NOT IDENT.
AG-110	-6.489E-01	7.493E-01	1.195E+00	NOT IDENT.
AG-110M	5.124E-04	5.231E-02	1.023E-01	NOT IDENT.
SN-113	-5.870E-02	5.102E-02	8.416E-02	NOT IDENT.
CD-115	0.000E+00	6.140E+03	0.000E+00	SHORT HLIF
SN-117M	-1.587E-01	1.602E-01	2.599E-01	NOT IDENT.
SB-122	0.000E+00	5.600E+02	0.000E+00	SHORT HLIF
TE-123M	-4.184E-02	3.353E-02	5.307E-02	NOT IDENT.
SB-124	-4.151E-02	1.037E-01	1.995E-01	NOT IDENT.
SB-125	-9.572E-02	8.833E-02	1.447E-01	FAIL ABUN
TE-125M	-6.002E+00	1.015E+01	1.758E+01	NOT IDENT.
I-126	7.135E-02	7.384E-01	1.354E+00	NOT IDENT.
SB-126	-1.522E-01	4.574E-01	7.934E-01	NOT IDENT.
SB-127	-2.361E+01	4.803E+01	8.178E+01	NOT IDENT.
I-131	-2.609E-02	6.195E-01	1.169E+00	NOT IDENT.
I-132	0.000E+00	1.941E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.255E+01	0.000E+00	SHORT HLIF
BA-133	-8.835E-03	4.617E-02	7.622E-02	NOT IDENT.
I-133	0.000E+00	5.910E+10	0.000E+00	SHORT HLIF
CS-134	8.824E-02	5.606E-02	1.005E-01	FAIL ABUN
I-135	0.000E+00	7.740E+37	0.000E+00	SHORT HLIF
CS-136	3.970E-01	2.896E-01	6.544E-01	FAIL ABUN
BA-137M	1.529E-02	3.954E-02	7.528E-02	NOT IDENT.
CS-137	1.615E-02	4.177E-02	7.952E-02	NOT IDENT.
LA-138	-7.301E-03	5.028E-02	9.788E-02	NOT IDENT.
CE-139	7.124E-04	3.476E-02	6.127E-02	NOT IDENT.
BA-140	0.000E+00	1.132E+00	1.390E+00	FAIL ABUN
LA-140	-4.509E-02	3.020E-01	5.979E-01	FAIL ABUN
CE-141	7.873E-02	1.391E-01	1.673E-01	FAIL ABUN
CE-143	0.000E+00	3.604E+06	0.000E+00	SHORT HLIF
CE-144	-1.319E-01	2.137E-01	3.312E-01	NOT IDENT.
PM-144	5.660E-03	3.287E-02	6.227E-02	NOT IDENT.
PR-144	1.114E+00	2.367E+00	4.715E+00	NOT IDENT.
PM-146	1.754E-02	4.158E-02	8.143E-02	NOT IDENT.
ND-147	-1.252E-01	2.017E+00	3.347E+00	NOT IDENT.
PM-147	4.388E+01	7.202E+02	1.301E+03	NOT IDENT.
PM-149	0.000E+00	5.411E+04	0.000E+00	SHORT HLIF
EU-150	5.196E-04	2.907E-02	4.947E-02	FAIL ABUN
EU-152	1.369E-02	9.837E-02	1.876E-01	FAIL ABUN

GD-153	3.582E-02	8.359E-02	1.458E-01	NOT IDENT.
EU-154	-9.782E-02	1.183E-01	1.914E-01	NOT IDENT.
EU-155	1.384E-01	9.683E-02	1.924E-01	FAIL ABUN
TB-160	9.041E-02	1.445E-01	3.112E-01	FAIL ABUN
HO-166M	2.604E-03	6.336E-02	1.162E-01	NOT IDENT.
TM-171	4.489E-01	9.939E+00	1.882E+01	NOT IDENT.
HF-172	-3.040E-02	2.013E-01	3.287E-01	FAIL ABUN
LU-172	4.747E-03	5.405E-02	1.090E-01	FAIL ABUN
LU-176	-1.339E-02	2.408E-02	4.357E-02	FAIL ABUN
HF-181	-1.423E-02	6.885E-02	1.109E-01	NOT IDENT.
TA-182	1.693E-01	2.958E-01	3.520E-01	FAIL ABUN
RE-183	-1.241E-01	1.425E-01	2.515E-01	NOT IDENT.
RE-184	4.863E-02	1.882E-01	3.784E-01	NOT IDENT.
W-188	-9.571E+00	9.958E+00	1.514E+01	FAIL ABUN
IR-192	-1.546E-02	3.930E-02	7.205E-02	FAIL ABUN
HG-203	-2.836E-02	5.361E-02	9.741E-02	NOT IDENT.
TL-204	1.660E+00	4.170E+00	7.284E+00	FAIL ABUN
BI-207	-5.333E-02	4.839E-02	7.535E-02	FAIL ABUN
PB-211	-8.103E-01	6.983E-01	1.144E+00	NOT IDENT.
BI-213	1.610E-02	9.340E-02	1.801E-01	NOT IDENT.
RN-219	2.297E-01	4.283E-01	8.388E-01	FAIL ABUN
RA-223	3.363E-01	6.994E-01	1.254E+00	FAIL ABUN
AC-225	-5.812E-01	2.805E+00	4.752E+00	NOT IDENT.
AC-227	8.465E-02	2.266E-01	4.485E-01	NOT IDENT.
TH-227	8.465E-02	2.266E-01	4.485E-01	NOT IDENT.
PA-231	3.987E-01	5.216E-01	1.034E+00	NOT IDENT.
TH-231	3.363E-01	6.994E-01	1.254E+00	FAIL ABUN
PA-233	-3.320E-02	6.320E-02	1.143E-01	NOT IDENT.
PA-234	4.559E-02	3.101E-01	6.131E-01	NOT IDENT.
NP-237	-3.320E-02	6.320E-02	1.143E-01	NOT IDENT.
NP-238	0.000E+00	1.214E+04	0.000E+00	SHORT HLIF
NP-239	2.204E-02	2.504E-01	4.544E-01	NOT IDENT.
PU-239	0.000E+00	6.690E+02	6.843E+02	FAIL ABUN
AM-241	2.860E-02	9.677E-02	1.725E-01	NOT IDENT.
CM-243	2.657E-03	9.384E-02	1.708E-01	NOT IDENT.
BK-247	-2.862E-02	8.080E-02	1.497E-01	FAIL ABUN
CM-247	3.173E-02	3.728E-02	7.553E-02	NOT IDENT.
CF-249	4.407E-03	4.195E-02	7.922E-02	NOT IDENT.
CF-251	-9.909E-02	1.391E-01	2.291E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:34:51.28

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	24	10.44*	3.500E+00	4.084E-01	6.471E-01	140.49
K-40	1460.82	125	10.66*	1.314E+00	5.561E+00	5.561E+00	20.20
CD-109	88.03	172	3.70*	7.925E+00	3.661E+00	3.861E+00	30.42
SN-126	64.28	98	9.60	5.472E+00	1.163E+00	1.163E+00	68.21
	86.94	172	8.90	7.925E+00	1.522E+00	1.522E+00	30.42
	87.57	172	37.00*	7.925E+00	3.661E-01	3.661E-01	30.42
CE-141	145.44	22	48.29*	7.584E+00	3.706E-02	7.873E-02	180.33
TL-208	277.37	------	6.60	5.118E+00	------ Line Not Found		------
	583.19	165	85.00*	2.999E+00	4.056E-01	4.056E-01	21.49
	860.56	31	12.50	2.132E+00	7.257E-01	7.257E-01	51.17
BI-210	46.54	24	4.25*	2.300E+00	1.545E+00	1.550E+00	259.42
PB-210	46.54	24	4.25*	2.300E+00	1.545E+00	1.550E+00	259.42
BI-211	72.87	------	1.23	6.856E+00	------ Line Not Found		------
	351.06	559	12.92*	4.358E+00	6.205E+00	6.205E+00	10.54
BI-212	727.33	42	6.67*	2.485E+00	1.579E+00	1.579E+00	52.77
	1620.50	11	1.47	1.219E+00	3.941E+00	3.941E+00	57.74
PB-212	74.82	244	10.28	7.066E+00	2.100E+00	2.100E+00	26.44
	77.11	417	17.10	7.279E+00	2.098E+00	2.098E+00	15.50
	238.63	545	43.60*	5.647E+00	1.386E+00	1.386E+00	10.73
	300.09	------	3.30	4.857E+00	------ Line Not Found		------
BI-214	609.32	366	45.49*	2.893E+00	1.740E+00	1.740E+00	13.16
	1120.29	78	14.92	1.660E+00	1.976E+00	1.976E+00	33.17
	1764.49	74	15.30	1.160E+00	2.611E+00	2.611E+00	25.61
PB-214	74.82	244	5.80	7.066E+00	3.722E+00	3.722E+00	26.44
	77.11	417	9.70	7.279E+00	3.698E+00	3.698E+00	15.50
	87.09	172	3.41	7.925E+00	3.973E+00	3.973E+00	30.42
	242.00	226	7.25	5.601E+00	3.484E+00	3.485E+00	24.59
	295.22	297	18.42	4.908E+00	2.053E+00	2.053E+00	18.69
	351.93	559	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54
RN-222	609.32	366	45.49*	2.893E+00	1.740E+00	1.740E+00	13.16
	1120.29	78	14.92	1.660E+00	1.976E+00	1.976E+00	33.17
	1764.49	74	15.30	1.160E+00	2.611E+00	2.611E+00	25.61
RA-224	240.99	226	4.10*	5.601E+00	6.162E+00	6.162E+00	24.59
RA-226	74.82	244	5.80	7.066E+00	3.722E+00	3.722E+00	26.44
	77.11	417	9.70	7.279E+00	3.698E+00	3.698E+00	15.50
	87.09	172	3.41	7.925E+00	3.973E+00	3.973E+00	30.42
	242.00	226	7.25	5.601E+00	3.484E+00	3.485E+00	24.59
	295.22	297	18.42	4.908E+00	2.053E+00	2.053E+00	18.69
	351.93	559	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54
AC-228	105.21	------	1.10	8.242E+00	------ Line Not Found		------
	338.32	111	11.27	4.477E+00	1.381E+00	1.381E+00	32.11
	835.71	------	1.61	2.191E+00	------ Line Not Found		------
	911.20	85	25.80*	2.020E+00	1.023E+00	1.023E+00	34.64
	968.97	50	15.80	1.905E+00	1.037E+00	1.037E+00	46.97
RA-228	105.21	------	1.10	8.242E+00	------ Line Not Found		------
	338.32	111	11.27	4.477E+00	1.381E+00	1.381E+00	32.11
	835.71	------	1.61	2.191E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	85	25.80*	2.020E+00	1.023E+00	1.023E+00	34.64
	968.97	50	15.80	1.905E+00	1.037E+00	1.037E+00	46.97
TH-228	74.82	244	10.28	7.066E+00	2.100E+00	2.100E+00	26.44
	77.11	417	17.10	7.279E+00	2.098E+00	2.098E+00	15.50
	238.63	545	43.60*	5.647E+00	1.386E+00	1.386E+00	10.73
	300.09	------	3.30	4.857E+00	------	Line Not Found	------
TH-229	85.43	50	14.70	7.817E+00	2.722E-01	2.722E-01	120.73
	88.47	172	24.00	7.925E+00	5.645E-01	5.645E-01	30.42
	193.51	------	4.41*	6.452E+00	------	Line Not Found	------
	210.85	------	2.80	6.116E+00	------	Line Not Found	------
TH-230	74.82	244	5.80	7.066E+00	3.722E+00	3.722E+00	26.44
	77.11	417	9.70	7.279E+00	3.698E+00	3.698E+00	15.50
	87.09	172	3.41	7.925E+00	3.973E+00	3.973E+00	30.42
	242.00	226	7.25	5.601E+00	3.484E+00	3.484E+00	24.59
	295.22	297	18.42	4.908E+00	2.053E+00	2.053E+00	18.69
	351.93	559	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54
TH-232	105.21	------	1.10	8.242E+00	------	Line Not Found	------
	338.32	111	11.27	4.477E+00	1.381E+00	1.381E+00	32.11
	835.71	------	1.61	2.191E+00	------	Line Not Found	------
	911.20	85	25.80*	2.020E+00	1.023E+00	1.023E+00	34.64
	968.97	50	15.80	1.905E+00	1.037E+00	1.037E+00	46.97
PA-234M	63.29	98	3.70*	5.472E+00	3.019E+00	3.019E+00	68.21
	92.59	142	4.23	8.111E+00	2.588E+00	2.588E+00	46.13
TH-234	63.29	98	3.70*	5.472E+00	3.019E+00	3.019E+00	68.21
	92.59	142	4.23	8.111E+00	2.588E+00	2.588E+00	46.13
U-234	74.82	244	5.80	7.066E+00	3.722E+00	3.722E+00	26.44
	77.11	417	9.70	7.279E+00	3.698E+00	3.698E+00	15.50
	87.09	172	3.41	7.925E+00	3.973E+00	3.973E+00	30.42
	242.00	226	7.25	5.601E+00	3.484E+00	3.484E+00	24.59
	295.22	297	18.42	4.908E+00	2.053E+00	2.053E+00	18.69
	351.93	559	35.60*	4.358E+00	2.252E+00	2.252E+00	10.54
U-235	89.96	------	3.47	8.021E+00	------	Line Not Found	------
	93.35	142	5.60	8.111E+00	1.955E+00	1.955E+00	46.13
	143.76	22	10.96*	7.584E+00	1.633E-01	1.633E-01	180.33
	163.33	------	5.08	7.120E+00	------	Line Not Found	------
	185.72	148	57.20	6.604E+00	2.443E-01	2.443E-01	36.94
	205.31	------	5.01	6.219E+00	------	Line Not Found	------
U-238	63.29	98	3.70*	5.472E+00	3.019E+00	3.019E+00	68.21
	92.59	142	4.23	8.111E+00	2.588E+00	2.588E+00	46.13
AM-243	43.53	------	5.90	1.656E+00	------	Line Not Found	------
	74.66	244	67.20*	7.066E+00	3.213E-01	3.213E-01	26.44
ANH-511	511.00	76	100.00*	3.331E+00	1.426E-01	1.426E-01	59.03

Flag: "*" = Keyline

Sample ID : G714507015 Acquisition date : 10-APR-2025 22:33:41

Total number of lines in spectrum 52
Number of unidentified lines 11
Number of lines tentatively identified by NID 41 78.85%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.58	4.084E-01	6.471E-01	9.092E-01	140.49	
K-40	1.25E+09Y	1.00	5.561E+00	5.561E+00	1.123E+00	20.20	
CD-109	461.40D	1.05	3.661E+00	3.861E+00	1.175E+00	30.42	
SN-126	2.30E+05Y	1.00	3.661E-01	3.661E-01	1.114E-01	30.42	
CE-141	32.51D	2.12	3.706E-02	7.873E-02	14.20E-02	180.33	
TL-208	1.41E+10Y	1.00	4.056E-01	4.056E-01	0.871E-01	21.49	
BI-210	22.20Y	1.00	1.545E+00	1.550E+00	4.021E+00	259.42	
PB-210	22.20Y	1.00	1.545E+00	1.550E+00	4.021E+00	259.42	
BI-211	7.04E+08Y	1.00	6.205E+00	6.205E+00	0.654E+00	10.54	
BI-212	1.41E+10Y	1.00	1.579E+00	1.579E+00	0.833E+00	52.77	
PB-212	1.41E+10Y	1.00	1.386E+00	1.386E+00	0.149E+00	10.73	
BI-214	1600.00Y	1.00	1.740E+00	1.740E+00	0.229E+00	13.16	
PB-214	1600.00Y	1.00	2.252E+00	2.252E+00	0.237E+00	10.54	
RN-222	1600.00Y	1.00	1.740E+00	1.740E+00	0.229E+00	13.16	
RA-224	1.41E+10Y	1.00	6.162E+00	6.162E+00	1.515E+00	24.59	
RA-226	1600.00Y	1.00	2.252E+00	2.252E+00	0.237E+00	10.54	
AC-228	1.41E+10Y	1.00	1.023E+00	1.023E+00	0.354E+00	34.64	
RA-228	1.41E+10Y	1.00	1.023E+00	1.023E+00	0.354E+00	34.64	
TH-228	1.41E+10Y	1.00	1.386E+00	1.386E+00	0.149E+00	10.73	
TH-229	7340.00Y	1.00	5.645E-01	5.645E-01	1.717E-01	30.42	K
TH-230	7.54E+04Y	1.00	2.252E+00	2.252E+00	0.237E+00	10.54	
TH-232	1.41E+10Y	1.00	1.023E+00	1.023E+00	0.354E+00	34.64	
PA-234M	4.47E+09Y	1.00	3.019E+00	3.019E+00	2.059E+00	68.21	
TH-234	4.47E+09Y	1.00	3.019E+00	3.019E+00	2.059E+00	68.21	
U-234	2.45E+05Y	1.00	2.252E+00	2.252E+00	0.237E+00	10.54	
U-235	7.04E+08Y	1.00	1.633E-01	1.633E-01	2.945E-01	180.33	
U-238	4.47E+09Y	1.00	3.019E+00	3.019E+00	2.059E+00	68.21	
AM-243	7370.00Y	1.00	3.213E-01	3.213E-01	0.849E-01	26.44	
ANH-511	1.00E+09Y	1.00	1.426E-01	1.426E-01	0.842E-01	59.03	
	Total Activity :		5.605E+01	5.654E+01			

Grand Total Activity : 5.605E+01 5.654E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	83.78	52	88	0.94	167.77	166	12	1.32E-02	65.4	7.74E+00	T
0	128.65	57	184	1.94	257.50	254	10	1.49E-02	95.0	7.93E+00	T
3	209.20	87	120	1.63	418.56	414	31	2.32E-02	53.4	6.15E+00	
3	212.66	27	102	1.48	425.49	414	31	7.29E-03	****	6.08E+00	
0	270.58	58	81	1.29	541.31	538	9	1.55E-02	62.6	5.20E+00	T
0	328.46	33	66	0.67	657.06	653	9	8.90E-03	97.4	4.57E+00	T
0	463.24	49	32	1.38	926.59	922	11	1.36E-02	53.6	3.59E+00	T
0	535.97	31	21	2.67	1072.03	1067	11	8.63E-03	68.3	3.21E+00	T
0	554.28	30	18	3.24	1108.65	1102	12	8.41E-03	66.7	3.13E+00	
0	563.58	19	33	2.83	1127.25	1119	12	5.37E-03	****	3.08E+00	T
0	645.64	24	16	2.92	1291.36	1286	10	6.76E-03	75.6	2.76E+00	
0	768.44	44	17	1.45	1536.97	1531	12	1.24E-02	49.6	2.37E+00	
0	795.20	27	13	0.61	1590.49	1584	11	7.61E-03	64.8	2.29E+00	T
0	806.93	17	33	3.86	1613.94	1605	15	4.71E-03	****	2.26E+00	
0	934.49	21	16	0.73	1869.07	1863	11	5.97E-03	84.9	1.97E+00	T
0	1039.00	13	6	1.63	2078.11	2070	13	3.79E-03	94.0	1.78E+00	T
0	1047.84	14	4	1.02	2095.79	2092	9	4.03E-03	74.4	1.77E+00	T
0	1155.58	10	10	1.36	2311.31	2304	11	2.88E-03	****	1.61E+00	
0	1166.00	8	9	0.66	2332.15	2325	10	2.44E-03	****	1.60E+00	
0	1171.94	24	9	7.75	2344.04	2334	19	7.08E-03	70.2	1.59E+00	T
0	1222.66	9	12	3.36	2445.49	2434	14	2.63E-03	****	1.53E+00	T
0	1237.82	36	8	2.33	2475.82	2469	13	1.06E-02	46.5	1.51E+00	T
0	1307.98	6	4	1.38	2616.17	2611	8	1.67E-03	****	1.44E+00	
0	1378.49	10	15	1.12	2757.21	2751	12	2.93E-03	****	1.38E+00	
0	1407.38	25	0	1.97	2815.00	2808	15	7.22E-03	39.2	1.35E+00	T
0	1729.79	17	5	2.17	3460.03	3455	11	5.14E-03	67.6	1.17E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:02.66

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507015.CNF;1		
Acquisition date	: 10-APR-2025 22:33:41	Sensitivity	: 3.000
Detector ID	: GAM24	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.48	Half life ratio	: *****
Sample date	: 6-MAR-2025 15:00:00	Nuclide Library	: SOLID
Sample ID	: G714507015	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.2001E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 24-JUN-2024 07:06:44	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM24_CAN.CNF;16		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	2.839E-01
K-40	3.445E-01
CD-109	6.632E-01
SN-126	5.529E-02
TL-208	2.541E-02
BI-210	1.474E+00
PB-210	1.474E+00
BI-211	1.578E-01
BI-212	3.559E-01
PB-212	4.939E-02
BI-214	5.598E-02
PB-214	5.739E-02
RN-222	5.598E-02
RA-224	5.292E-01
RA-226	5.739E-02
AC-228	1.243E-01
RA-228	1.243E-01
TH-228	4.939E-02
TH-229	4.450E-01
TH-230	5.738E-02
TH-232	1.243E-01
PA-234M	7.227E-01
TH-234	7.227E-01
U-234	5.738E-02
U-235	1.586E-01
U-238	7.227E-01
AM-243	3.821E-02
ANH-511	2.250E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	2.860E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.852E-02	NOT IDENT.

SC-46	3.630E-02	FAIL ABUN
V-48	1.142E-01	NOT IDENT.
CR-51	4.388E-01	NOT IDENT.
MN-52	2.341E+00	FAIL ABUN
MN-54	3.359E-02	NOT IDENT.
CO-56	4.372E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.274E-02	NOT IDENT.
CO-58	4.148E-02	NOT IDENT.
FE-59	7.286E-02	NOT IDENT.
CO-60	3.470E-02	FAIL ABUN
ZN-65	6.892E-02	NOT IDENT.
GE-68	1.036E+00	NOT IDENT.
AS-73	4.879E-01	NOT IDENT.
AS-74	1.558E-01	NOT IDENT.
SE-75	4.341E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.941E-01	NOT IDENT.
RB-83	6.990E-02	NOT IDENT.
RB-84	7.248E-02	NOT IDENT.
KR-85	6.249E+00	NOT IDENT.
SR-85	4.094E-02	NOT IDENT.
RB-86	1.356E+00	NOT IDENT.
Y-88	3.481E-02	NOT IDENT.
Y-91	2.069E+01	NOT IDENT.
NB-94	2.539E-02	NOT IDENT.
NB-95	4.705E-02	NOT IDENT.
NB-95M	1.410E-01	NOT IDENT.
ZR-95	7.824E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.639E-02	FAIL ABUN
RH-102	4.659E-02	FAIL ABUN
RU-103	4.630E-02	FAIL ABUN
RH-106	2.009E-01	NOT IDENT.
RU-106	2.009E-01	NOT IDENT.
AG-108M	2.789E-02	NOT IDENT.
AG-110	5.208E-01	NOT IDENT.
AG-110M	4.494E-02	NOT IDENT.
SN-113	3.806E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.216E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.479E-02	NOT IDENT.
SB-124	7.735E-02	NOT IDENT.
SB-125	6.464E-02	FAIL ABUN
TE-125M	8.194E+00	NOT IDENT.
I-126	6.129E-01	NOT IDENT.
SB-126	3.510E-01	NOT IDENT.
SB-127	3.578E+01	NOT IDENT.
I-131	5.326E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.490E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.577E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.888E-01	FAIL ABUN
BA-137M	3.413E-02	NOT IDENT.
CS-137	3.606E-02	NOT IDENT.
LA-138	3.927E-02	NOT IDENT.
CE-139	2.882E-02	NOT IDENT.
BA-140	6.205E-01	FAIL ABUN
LA-140	2.500E-01	FAIL ABUN
CE-141	7.862E-02	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	1.548E-01	NOT IDENT.
PM-144	2.760E-02	NOT IDENT.
PR-144	2.090E+00	NOT IDENT.
PM-146	3.707E-02	NOT IDENT.
ND-147	1.486E+00	NOT IDENT.
PM-147	6.123E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.276E-02	FAIL ABUN
EU-152	8.650E-02	FAIL ABUN
GD-153	6.889E-02	NOT IDENT.

EU-154	7.920E-02	NOT IDENT.
EU-155	9.117E-02	FAIL ABUN
TB-160	1.367E-01	FAIL ABUN
HO-166M	5.191E-02	NOT IDENT.
TM-171	8.857E+00	NOT IDENT.
HF-172	1.545E-01	FAIL ABUN
LU-172	4.628E-02	FAIL ABUN
LU-176	1.987E-02	FAIL ABUN
HF-181	5.005E-02	NOT IDENT.
TA-182	1.507E-01	FAIL ABUN
RE-183	1.179E-01	NOT IDENT.
RE-184	1.674E-01	NOT IDENT.
W-188	6.959E+00	FAIL ABUN
IR-192	3.295E-02	FAIL ABUN
HG-203	4.522E-02	NOT IDENT.
TL-204	3.473E+00	FAIL ABUN
BI-207	3.116E-02	FAIL ABUN
PB-211	5.147E-01	NOT IDENT.
BI-213	8.122E-02	NOT IDENT.
RN-219	3.869E-01	FAIL ABUN
RA-223	5.806E-01	FAIL ABUN
AC-225	2.231E+00	NOT IDENT.
AC-227	2.075E-01	NOT IDENT.
TH-227	2.075E-01	NOT IDENT.
PA-231	4.843E-01	NOT IDENT.
TH-231	5.806E-01	FAIL ABUN
PA-233	5.245E-02	NOT IDENT.
PA-234	2.704E-01	NOT IDENT.
NP-237	5.245E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.139E-01	NOT IDENT.
PU-239	3.249E+02	FAIL ABUN
AM-241	8.129E-02	NOT IDENT.
CM-243	8.039E-02	NOT IDENT.
BK-247	6.941E-02	FAIL ABUN
CM-247	3.478E-02	NOT IDENT.
CF-249	3.644E-02	NOT IDENT.
CF-251	1.072E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:07.17

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507015.CNF;1    *
* Acquisition date : 10-APR-2025 22:33:41 Sensitivity     : 3.000          *
* Detector ID      : GAM24                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.48     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 15:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507015           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 1.2001E+02 GRAM   *
*                                         Quantity Err(%) : 1.6665E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 24-JUN-2024 07:06:44 Eff. Geometry   : CAN            *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_CAN.CNF;16            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	6.471E-01	8.927E-01	8.927E-01
K-40	5.561E+00	1.276E+00	1.276E+00
CD-109	3.861E+00	1.211E+00	1.211E+00
SN-126	3.661E-01	1.132E-01	1.132E-01
TL-208	4.056E-01	9.193E-02	9.193E-02
BI-210	1.550E+00	3.944E+00	3.944E+00
PB-210	1.550E+00	3.944E+00	3.944E+00
BI-211	6.205E+00	8.699E-01	8.699E-01
BI-212	1.579E+00	8.305E-01	8.305E-01
PB-212	1.386E+00	2.046E-01	2.046E-01
BI-214	1.740E+00	2.672E-01	2.672E-01
PB-214	2.252E+00	3.136E-01	3.136E-01
RN-222	1.740E+00	2.672E-01	2.672E-01
RA-224	6.162E+00	1.618E+00	1.618E+00
RA-226	2.252E+00	3.136E-01	3.136E-01
AC-228	1.023E+00	3.705E-01	3.705E-01
RA-228	1.023E+00	3.705E-01	3.705E-01
TH-228	1.386E+00	2.046E-01	2.046E-01
TH-229	-2.223E-01	5.646E-01	5.646E-01
TH-230	2.252E+00	3.136E-01	3.136E-01
TH-232	1.023E+00	3.705E-01	3.705E-01
PA-234M	3.019E+00	2.132E+00	2.132E+00
TH-234	3.019E+00	2.132E+00	2.132E+00
U-234	2.252E+00	3.136E-01	3.136E-01
U-235	1.633E-01	2.889E-01	2.889E-01
U-238	3.019E+00	2.132E+00	2.132E+00
AM-243	3.213E-01	8.701E-02	8.701E-02
ANH-511	1.426E-01	8.339E-02	8.339E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	-3.401E-02	4.249E-02	4.517E-02	NOT IDENT.
NA-24	2.860E+15	4.332E+15	4.519E+15	SHORT HLIF

AL-26	1.637E-03	3.328E-02	3.329E-02	NOT IDENT.
SC-46	-2.707E-02	4.686E-02	4.842E-02	FAIL ABUN
V-48	-8.224E-02	1.512E-01	1.557E-01	NOT IDENT.
CR-51	-5.337E-01	5.630E-01	6.123E-01	NOT IDENT.
MN-52	2.419E-01	2.796E+00	2.798E+00	FAIL ABUN
MN-54	1.079E-02	3.745E-02	3.776E-02	NOT IDENT.
CO-56	3.006E-02	4.657E-02	4.850E-02	FAIL ABUN
MN-56	1.000E+41	1.564E+41	0.000E+00	SHORT HLIF
CO-57	1.111E-02	2.604E-02	2.652E-02	NOT IDENT.
CO-58	2.865E-02	4.837E-02	5.007E-02	NOT IDENT.
FE-59	-6.141E-02	1.012E-01	1.050E-01	NOT IDENT.
CO-60	4.513E-02	3.118E-02	3.723E-02	FAIL ABUN
ZN-65	-1.172E-02	9.680E-02	9.695E-02	NOT IDENT.
GE-68	1.134E-02	1.229E+00	1.229E+00	NOT IDENT.
AS-73	-3.066E-02	5.595E-01	5.597E-01	NOT IDENT.
AS-74	-1.110E-01	2.054E-01	2.114E-01	NOT IDENT.
SE-75	-4.080E-02	5.253E-02	5.565E-02	NOT IDENT.
BR-77	7.819E+04	8.056E+04	8.793E+04	SHORT HLIF
SR-82	-2.806E-01	6.078E-01	6.208E-01	NOT IDENT.
RB-83	1.037E-02	8.200E-02	8.213E-02	NOT IDENT.
RB-84	-7.401E-02	9.817E-02	1.037E-01	NOT IDENT.
KR-85	4.770E+00	6.875E+00	7.204E+00	NOT IDENT.
SR-85	3.118E-02	4.505E-02	4.719E-02	NOT IDENT.
RB-86	3.079E-01	1.553E+00	1.560E+00	NOT IDENT.
Y-88	5.714E-03	3.947E-02	3.956E-02	NOT IDENT.
Y-91	-2.898E+00	2.539E+01	2.543E+01	NOT IDENT.
NB-94	9.173E-03	2.908E-02	2.937E-02	NOT IDENT.
NB-95	4.425E-02	5.333E-02	5.694E-02	NOT IDENT.
NB-95M	9.560E-02	1.667E-01	1.722E-01	NOT IDENT.
ZR-95	4.145E-02	8.437E-02	8.641E-02	NOT IDENT.
NB-97	-1.000E+41	1.895E+41	0.000E+00	SHORT HLIF
ZR-97	-6.998E+13	8.368E+14	8.373E+14	SHORT HLIF
MO-99	-1.327E+03	1.843E+03	1.938E+03	SHORT HLIF
TC-99M	-1.829E+40	6.802E+40	0.000E+00	SHORT HLIF
RH-101	6.803E-02	6.464E-02	7.154E-02	FAIL ABUN
RH-102	-3.781E-02	6.107E-02	6.340E-02	FAIL ABUN
RU-103	1.730E-02	5.264E-02	5.321E-02	FAIL ABUN
RH-106	-3.685E-01	3.124E-01	3.538E-01	NOT IDENT.
RU-106	-3.685E-01	3.124E-01	3.538E-01	NOT IDENT.
AG-108M	2.720E-02	2.979E-02	3.222E-02	NOT IDENT.
AG-110	-6.489E-01	7.511E-01	8.061E-01	NOT IDENT.
AG-110M	5.124E-04	5.231E-02	5.231E-02	NOT IDENT.
SN-113	-5.870E-02	5.124E-02	5.767E-02	NOT IDENT.
CD-115	1.929E+03	6.143E+03	6.205E+03	SHORT HLIF
SN-117M	-1.587E-01	1.608E-01	1.760E-01	NOT IDENT.
SB-122	4.492E+02	5.613E+02	5.967E+02	SHORT HLIF
TE-123M	-4.184E-02	3.372E-02	3.863E-02	NOT IDENT.
SB-124	-4.151E-02	1.037E-01	1.054E-01	NOT IDENT.
SB-125	-9.572E-02	8.868E-02	9.862E-02	FAIL ABUN
TE-125M	-6.002E+00	1.016E+01	1.051E+01	NOT IDENT.
I-126	7.135E-02	7.384E-01	7.391E-01	NOT IDENT.
SB-126	-1.522E-01	4.578E-01	4.629E-01	NOT IDENT.
SB-127	-2.361E+01	4.822E+01	4.938E+01	NOT IDENT.
I-131	-2.609E-02	6.195E-01	6.196E-01	NOT IDENT.
I-132	1.000E+41	2.919E+41	0.000E+00	SHORT HLIF
TE-132	3.376E+01	6.270E+01	6.452E+01	SHORT HLIF
BA-133	-8.835E-03	4.618E-02	4.635E-02	NOT IDENT.
I-133	2.297E+09	5.910E+10	5.911E+10	SHORT HLIF
CS-134	8.824E-02	5.680E-02	6.935E-02	FAIL ABUN
I-135	-2.769E+37	8.057E+37	0.000E+00	SHORT HLIF
CS-136	3.970E-01	2.942E-01	3.444E-01	FAIL ABUN
BA-137M	1.529E-02	3.955E-02	4.015E-02	NOT IDENT.
CS-137	1.615E-02	4.179E-02	4.242E-02	NOT IDENT.
LA-138	-7.301E-03	5.028E-02	5.039E-02	NOT IDENT.
CE-139	7.124E-04	3.476E-02	3.476E-02	NOT IDENT.
BA-140	1.692E+00	1.141E+00	1.372E+00	FAIL ABUN
LA-140	-4.509E-02	3.020E-01	3.027E-01	FAIL ABUN
CE-141	7.873E-02	1.393E-01	1.437E-01	FAIL ABUN
CE-143	3.748E+06	3.626E+06	4.001E+06	SHORT HLIF
CE-144	-1.319E-01	2.140E-01	2.221E-01	NOT IDENT.
PM-144	5.660E-03	3.287E-02	3.297E-02	NOT IDENT.
PR-144	1.114E+00	2.368E+00	2.421E+00	NOT IDENT.
PM-146	1.754E-02	4.162E-02	4.236E-02	NOT IDENT.
ND-147	-1.252E-01	2.017E+00	2.018E+00	NOT IDENT.
PM-147	4.388E+01	7.202E+02	7.205E+02	NOT IDENT.
PM-149	1.825E+04	5.419E+04	5.482E+04	SHORT HLIF
EU-150	5.196E-04	2.907E-02	2.907E-02	FAIL ABUN
EU-152	1.369E-02	9.838E-02	9.858E-02	FAIL ABUN

GD-153	3.582E-02	8.364E-02	8.518E-02	NOT IDENT.
EU-154	-9.782E-02	1.187E-01	1.266E-01	NOT IDENT.
EU-155	1.384E-01	9.760E-02	1.158E-01	FAIL ABUN
TB-160	9.041E-02	1.449E-01	1.506E-01	FAIL ABUN
HO-166M	2.604E-03	6.336E-02	6.337E-02	NOT IDENT.
TM-171	4.489E-01	9.939E+00	9.941E+00	NOT IDENT.
HF-172	-3.040E-02	2.014E-01	2.019E-01	FAIL ABUN
LU-172	4.747E-03	5.405E-02	5.409E-02	FAIL ABUN
LU-176	-1.339E-02	2.412E-02	2.487E-02	FAIL ABUN
HF-181	-1.423E-02	6.886E-02	6.916E-02	NOT IDENT.
TA-182	1.693E-01	2.962E-01	3.059E-01	FAIL ABUN
RE-183	-1.241E-01	1.433E-01	1.538E-01	NOT IDENT.
RE-184	4.863E-02	1.883E-01	1.896E-01	NOT IDENT.
W-188	-9.571E+00	1.006E+01	1.094E+01	FAIL ABUN
IR-192	-1.546E-02	3.933E-02	3.994E-02	FAIL ABUN
HG-203	-2.836E-02	5.370E-02	5.520E-02	NOT IDENT.
TL-204	1.660E+00	4.173E+00	4.240E+00	FAIL ABUN
BI-207	-5.333E-02	4.872E-02	5.433E-02	FAIL ABUN
PB-211	-8.103E-01	7.019E-01	7.913E-01	NOT IDENT.
BI-213	1.610E-02	9.341E-02	9.369E-02	NOT IDENT.
RN-219	2.297E-01	4.296E-01	4.419E-01	FAIL ABUN
RA-223	3.363E-01	7.004E-01	7.166E-01	FAIL ABUN
AC-225	-5.812E-01	2.806E+00	2.818E+00	NOT IDENT.
AC-227	8.465E-02	2.270E-01	2.302E-01	NOT IDENT.
TH-227	8.465E-02	2.270E-01	2.302E-01	NOT IDENT.
PA-231	3.987E-01	5.299E-01	5.596E-01	NOT IDENT.
TH-231	3.363E-01	7.004E-01	7.166E-01	FAIL ABUN
PA-233	-3.320E-02	6.329E-02	6.504E-02	NOT IDENT.
PA-234	4.559E-02	3.145E-01	3.152E-01	NOT IDENT.
NP-237	-3.320E-02	6.329E-02	6.504E-02	NOT IDENT.
NP-238	-7.343E+02	1.215E+04	1.215E+04	SHORT HLIF
NP-239	2.204E-02	2.504E-01	2.506E-01	NOT IDENT.
PU-239	7.184E+02	6.711E+02	7.452E+02	FAIL ABUN
AM-241	2.860E-02	9.681E-02	9.766E-02	NOT IDENT.
CM-243	2.657E-03	9.384E-02	9.385E-02	NOT IDENT.
BK-247	-2.862E-02	8.105E-02	8.207E-02	FAIL ABUN
CM-247	3.173E-02	3.772E-02	4.035E-02	NOT IDENT.
CF-249	4.407E-03	4.195E-02	4.200E-02	NOT IDENT.
CF-251	-9.909E-02	1.397E-01	1.467E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	69.0464	81.75	131.2910	123.68	83.2553
879.38	85.4335	82.47	112.9131	125.81	85.3701
46.54	85.7074	83.79	115.9186	127.23	92.8288
228.16	0.0000	265.00	115.9734	127.91	80.5931
52.39	86.7627	193.51	116.3496	129.30	80.7817
1093.63	85.3754	105.31	116.6407	131.20	77.3876
52.39	83.6758	86.79	116.7027	133.02	74.6925
125.81	81.0636	86.94	116.7425	133.52	85.0140
53.44	78.4142	87.09	116.7806	136.00	76.1594
54.07	85.0364	87.57	116.9054	136.47	87.2633
293.27	0.0000	88.03	151.9966	739.50	0.0000
482.18	83.1224	306.78	150.7541	140.51	0.0000
57.98	97.2596	88.47	150.7962	143.76	78.2202
59.27	81.3538	143.76	81.0468	144.24	78.2779
59.32	81.3654	90.64	121.7487	145.44	76.1825
59.54	81.4170	531.02	135.4136	152.43	78.1262
60.96	89.2931	92.59	130.4082	1048.07	89.5585
61.17	96.2674	93.35	130.6191	154.21	102.1729
62.93	96.7417	94.56	130.9512	158.56	72.8506
63.29	96.8380	311.90	94.1394	159.00	100.6046
290.67	96.9156	946.00	94.1429	162.33	88.4497
87.57	100.2747	94.87	94.1822	537.26	91.9397
66.73	107.3276	97.43	85.0772	163.33	65.5688
67.24	114.1900	98.43	83.5325	165.86	83.1193
67.68	126.8115	98.44	83.5343	427.87	84.3179
1221.41	126.8347	103.37	83.7191	176.60	100.7524
70.82	120.4681	116.74	83.7191	177.52	90.3190
97.43	122.6437	100.11	79.6777	181.07	0.0000
70.82	122.6822	102.03	75.8287	181.52	92.7637
279.20	122.6861	103.18	85.3714	184.41	96.2693
1063.66	146.6653	103.37	84.3618	185.72	75.8818
72.87	146.6871	911.20	71.0775	193.51	82.6229
351.06	146.6871	105.31	71.0915	197.03	85.3894
74.66	144.7334	106.12	78.5328	198.01	85.4934
351.93	144.7898	106.47	86.9679	201.83	89.5213
238.63	144.7898	109.28	76.9014	203.43	71.5137
351.93	144.7898	111.00	78.2072	205.31	45.3536
238.63	144.7898	111.76	0.0000	210.85	83.1520
74.97	144.8440	114.06	86.0922	215.65	83.6179
77.11	145.6006	116.30	0.0000	218.12	83.8555
78.74	136.9518	116.74	83.3088	222.11	82.5846
256.23	133.3002	119.76	73.0215	227.09	72.2495
80.03	133.4050	264.66	82.8846	227.38	72.2734
133.52	133.4348	121.22	82.8993	228.16	0.0000
364.49	130.8147	344.28	80.8250	228.18	62.3596
711.68	130.9305	122.06	80.8651	235.69	69.1604
356.01	91.3465	122.92	80.9864	235.96	67.0841
323.87	91.3613	1274.44	81.0076	238.63	67.2770

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	43.3683	531.02	22.0895
240.99	67.4463	338.32	43.3692	537.26	22.1681
242.00	67.5179	340.48	51.3029	1260.41	0.0000
244.70	50.7825	340.55	51.3063	552.55	20.2300
685.70	40.0985	344.28	44.5068	795.86	18.2071
388.16	41.8218	345.93	42.7095	564.24	0.0000
507.63	0.0000	351.06	36.3586	569.33	25.7891
256.23	44.5375	351.93	36.3840	569.50	25.7920
527.90	0.0000	355.39	0.0000	569.70	25.7949
264.66	71.6912	356.01	43.5209	583.19	19.4861
264.80	71.7013	364.49	35.8013	584.27	19.4978
265.00	62.2104	366.42	0.0000	595.83	29.4247
269.46	59.8795	372.51	34.1257	600.60	24.0347
270.03	57.3082	375.05	33.2419	602.52	0.0000
401.81	57.3754	377.52	34.2554	604.72	39.4146
273.65	66.6589	383.85	42.0655	607.14	31.2415
276.40	62.0297	388.16	42.1998	609.32	25.2405
583.19	53.3427	666.33	41.2547	610.33	25.2536
277.60	55.9779	391.69	50.0015	614.28	18.1536
402.40	56.0000	400.66	49.3585	618.01	18.7390
279.20	67.4518	401.81	37.7757	884.68	12.1396
279.54	68.3492	402.40	31.0085	621.93	28.7168
279.70	68.3595	404.85	46.5947	630.19	0.0000
280.46	62.2694	410.95	28.2725	631.29	29.9608
301.36	58.0602	413.71	42.0027	633.25	17.7721
284.31	58.9740	720.70	43.0090	634.78	33.3484
285.41	59.9164	423.72	37.3761	635.95	28.9189
285.90	0.0000	427.09	34.5051	636.99	26.7080
287.50	46.7901	427.87	40.4420	657.50	26.9766
290.67	65.0781	433.94	26.7418	657.76	26.9795
293.27	0.0000	439.40	27.8337	657.90	0.0000
295.22	59.5710	440.45	25.8641	661.66	25.9040
316.51	58.7208	453.88	28.1003	664.57	0.0000
298.58	69.5624	463.37	23.2237	666.33	29.3484
299.98	60.0059	468.07	28.8636	666.50	28.2216
300.09	62.5118	473.00	26.4137	667.71	0.0000
300.13	62.5146	631.29	18.3102	677.62	19.2917
311.90	62.5146	696.49	13.7472	685.70	22.7824
301.36	55.4307	477.60	19.8674	692.65	0.0000
302.85	62.6670	482.18	32.1851	695.00	27.4570
304.50	47.5169	487.02	28.6944	696.49	18.3171
304.85	46.6352	492.35	0.0000	696.51	14.8826
306.78	45.8162	497.08	22.6839	697.00	19.4667
308.46	38.6870	505.52	45.0797	697.30	19.4695
311.90	51.4371	507.63	0.0000	697.49	19.4709
316.51	45.3013	511.00	25.9926	702.65	13.7766
319.41	43.5977	514.00	26.0386	706.68	18.4023
320.08	48.1660	514.00	26.0386	711.68	23.0550
321.04	44.5677	520.40	26.1363	720.70	24.3060
323.87	42.3951	520.69	0.0000	721.93	0.0000
325.23	43.8135	667.71	0.0000	1690.97	15.6401
1596.21	43.0279	527.90	0.0000	722.91	15.6407
333.37	37.2198	528.26	22.0544	723.31	17.3816
333.97	44.1338	529.59	26.2756	756.73	17.3889
334.37	51.0466	529.87	0.0000	727.33	16.2519

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	19.2023	935.54	10.5950	1362.66	0.0000
735.93	17.4792	937.49	10.6025	1365.19	9.7064
737.46	16.3248	983.53	13.2848	1368.63	0.0000
739.50	0.0000	946.00	17.0914	1384.29	8.6704
1434.09	17.5427	949.00	11.4067	1408.01	7.6332
747.24	22.8357	954.55	0.0000	1434.09	6.5859
748.06	18.4506	962.31	27.6955	1435.80	6.5889
752.31	25.5263	964.08	15.2900	1457.56	0.0000
753.82	20.2584	966.17	21.4218	1460.82	11.0498
756.73	16.7560	968.97	27.7610	1489.16	5.5634
756.80	16.7566	983.53	15.3940	1505.03	13.4033
763.94	15.5692	984.45	0.0000	1584.12	9.1030
765.81	15.5815	996.26	11.5961	1596.21	10.0413
766.84	25.5085	1002.74	8.7163	1620.50	1.8357
772.60	0.0000	1004.73	21.3206	1621.92	3.0605
776.52	26.6803	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	6.5259
778.90	15.1339	1028.54	0.0000	1750.46	0.0000
783.70	31.2199	1037.84	17.6385	1764.49	4.7351
1435.80	20.2615	1038.76	0.0000	1770.23	0.0000
903.28	11.4574	1046.59	18.8684	1771.35	0.0000
795.86	15.7787	1048.07	14.7482	1791.20	0.0000
801.95	14.3799	1049.04	18.8836	1808.65	4.7786
810.06	11.5422	1050.41	14.1688	1810.72	0.0000
810.29	11.5434	1063.66	18.7762	1836.06	3.8443
810.45	12.9872	1077.00	11.9092		
810.76	12.9885	1077.34	12.9032		
815.77	10.8457	1085.87	14.9286		
818.51	17.1915	1093.63	9.9768		
832.01	18.1940	1099.45	12.9937		
834.85	18.2147	1112.07	15.0522		
835.71	20.0429	1112.84	10.7064		
836.80	0.0000	1115.54	14.4659		
846.75	0.0000	1120.29	15.0906		
846.77	14.6401	1120.55	15.0916		
856.80	13.2275	1121.30	14.4914		
860.56	19.3184	1808.65	13.1166		
871.09	12.9310	1131.51	0.0000		
873.19	16.6388	1147.95	0.0000		
875.33	0.0000	1332.49	4.9072		
879.38	11.1189	1177.95	9.8279		
880.51	19.4664	1189.05	16.4336		
881.60	19.4741	1204.77	15.4779		
883.24	19.4863	1221.41	12.4417		
884.68	17.6403	1231.02	9.7036		
889.28	21.3905	1235.36	21.6519		
894.76	20.5028	1238.28	14.5853		
1836.06	20.5276	1260.41	0.0000		
900.72	27.0866	1271.87	9.4653		
903.28	16.8283	1274.44	15.7864		
911.20	19.6907	1274.54	15.7874		
912.08	19.6971	1291.59	10.5743		
984.45	0.0000	1298.22	0.0000		
926.50	16.0293	1312.11	6.8055		
929.11	19.6308	1332.49	1.0692		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:34.22

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507016.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM27.CNF;774
Background date : 6-APR-2025 11:01:53.
Sample date : 6-MAR-2025 15:30:00. Acquisition date : 10-APR-2025 22:34:23
Sample ID : G714507016 Sample quantity : 1.39600E+02 GRAM
Detector name : GAM27 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.92 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.64*	51	207	1.00	128.10	125	8	1.41E-02	52.1	
2	3	74.86*	216	205	1.19	150.53	146	15	6.01E-02	13.1	6.76E-01
3	3	77.28*	357	170	0.99	155.37	146	15	9.92E-02	8.0	
4	3	83.92*	37	229	1.29	168.64	164	29	1.04E-02	70.5	2.23E+00
5	3	87.47	122	218	1.30	175.74	164	29	3.38E-02	22.8	
6	3	90.09	90	130	0.83	180.98	164	29	2.49E-02	21.6	
7	3	92.83*	131	197	1.28	186.47	164	29	3.65E-02	22.4	
8	0	129.28	46	104	1.36	259.32	256	7	1.27E-02	39.8	
9	3	183.79	22	69	1.15	368.32	366	12	6.08E-03	60.6	1.01E+00
10	3	186.16*	183	107	1.41	373.04	366	12	5.09E-02	13.0	
11	5	209.72	49	73	1.84	420.14	417	15	1.37E-02	31.8	2.25E+00
12	5	213.21	44	105	1.88	427.13	417	15	1.21E-02	49.2	
13	0	216.56	28	61	1.39	433.83	432	6	7.70E-03	48.3	
14	4	238.82*	512	81	1.14	478.34	472	19	1.42E-01	5.4	8.96E-01
15	4	241.89	208	93	1.65	484.47	472	19	5.78E-02	12.0	
16	0	270.44	67	107	1.39	541.55	535	12	1.85E-02	33.8	
17	0	274.78	21	55	1.54	550.23	547	7	5.79E-03	62.8	
18	0	278.98	23	79	1.28	558.62	556	8	6.47E-03	69.5	
19	2	295.38*	338	48	1.40	591.41	586	20	9.38E-02	6.5	3.22E+00
20	2	299.91	29	54	1.53	600.47	586	20	8.06E-03	51.7	
21	0	321.42	16	50	2.77	643.47	638	9	4.38E-03	84.4	
22	0	338.83	108	72	1.25	678.29	674	11	2.99E-02	18.0	
23	0	352.27*	518	89	1.23	705.16	700	12	1.44E-01	5.8	
24	0	388.74	32	53	4.23	778.08	772	14	8.88E-03	51.3	
25	0	410.03	14	55	3.90	820.64	811	11	3.89E-03	106.0	
26	0	463.28	35	18	2.14	927.12	924	7	9.71E-03	26.2	
27	0	480.86	15	32	0.80	962.26	958	9	4.26E-03	72.2	
28	0	511.13*	67	41	1.28	1022.79	1016	14	1.86E-02	28.5	
29	0	583.35*	154	49	1.20	1167.19	1161	13	4.27E-02	12.5	
30	0	609.53*	423	13	1.40	1219.55	1213	13	1.17E-01	5.2	
31	0	704.12	17	44	4.47	1408.69	1397	16	4.70E-03	91.0	
32	0	727.65*	45	14	1.44	1455.73	1451	10	1.24E-02	22.8	
33	0	763.41	7	15	1.48	1527.24	1523	9	1.98E-03	101.4	
34	0	768.21	38	27	1.02	1536.83	1532	11	1.04E-02	31.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	806.53	12	22	1.00	1613.47	1607	9	3.36E-03	76.1	
36	0	861.27	37	16	0.87	1722.93	1715	14	1.02E-02	29.0	
37	0	911.33*	156	10	1.72	1823.05	1816	14	4.35E-02	9.2	
38	0	918.70	24	8	6.52	1837.77	1829	16	6.67E-03	33.3	
39	0	935.16	18	15	1.34	1870.69	1866	9	4.88E-03	47.1	
40	0	951.74	7	7	1.07	1903.86	1900	7	1.94E-03	73.2	
41	0	965.77	16	31	1.65	1931.90	1925	11	4.44E-03	71.3	
42	0	969.49*	58	12	1.59	1939.35	1935	11	1.62E-02	18.2	
43	0	983.68	11	12	2.29	1967.71	1962	11	3.09E-03	70.2	
44	0	1024.39	15	20	2.77	2049.13	2041	16	4.06E-03	73.5	
45	0	1043.21	19	18	3.94	2086.76	2076	18	5.41E-03	55.8	
46	0	1059.84	7	1	0.94	2120.04	2117	6	1.86E-03	47.9	
47	0	1066.51	17	16	4.82	2133.37	2124	17	4.66E-03	61.2	
48	0	1111.95	11	5	0.50	2224.25	2217	10	2.97E-03	50.0	
49	0	1120.80*	120	6	2.19	2241.95	2234	20	3.32E-02	10.4	
50	0	1155.30	12	13	1.86	2310.93	2306	10	3.39E-03	61.4	
51	0	1183.74	9	2	0.54	2367.82	2365	7	2.46E-03	42.3	
52	0	1239.51	17	20	1.79	2479.34	2470	11	4.79E-03	55.0	
53	0	1297.73	5	5	1.38	2595.79	2592	6	1.51E-03	75.1	
54	0	1377.96	23	13	2.18	2756.24	2750	10	6.50E-03	35.0	
55	0	1408.75	28	9	2.31	2817.84	2807	18	7.73E-03	31.7	
56	0	1461.23*	78	10	2.08	2922.80	2916	14	2.15E-02	14.8	
57	0	1510.10	26	5	4.94	3020.54	3010	20	7.27E-03	28.6	
58	0	1521.96*	9	2	1.47	3044.27	3037	12	2.45E-03	52.7	
59	0	1765.03	76	0	2.55	3530.46	3525	11	2.11E-02	11.5	
60	0	1847.58	10	2	0.78	3695.57	3691	9	2.77E-03	41.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:35:35

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507016.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 6-MAR-2025 15:30:00	Acquisition date	: 10-APR-2025 22:34:23
Sample ID	: G714507016	Sample quantity	: 139.60 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA27	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.92 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	74	10.66*	1.253E+00	2.991E+00	2.991E+00	29.54
CR-51	320.08	17	9.91*	4.431E+00	2.103E-01	5.089E-01	168.88
CD-109	88.03	146	3.70*	6.743E+00	3.146E+00	3.317E+00	45.62
SN-126	64.28	62	9.60	3.900E+00	8.975E-01	8.975E-01	104.24
	86.94	146	8.90	6.743E+00	1.308E+00	1.308E+00	45.62
	87.57	146	37.00*	6.743E+00	3.146E-01	3.146E-01	45.62
HG-203	70.83	------	3.69	5.028E+00	------ Line Not Found		------
	72.87	------	6.19	5.308E+00	------ Line Not Found		------
	279.20	26	81.56*	4.854E+00	3.482E-02	5.889E-02	139.05
TL-208	277.37	------	6.60	4.872E+00	------ Line Not Found		------
	583.19	159	85.00*	2.908E+00	3.467E-01	3.467E-01	25.07
	860.56	37	12.50	2.056E+00	7.732E-01	7.732E-01	58.06
BI-211	72.87	------	1.23	5.308E+00	------ Line Not Found		------
	351.06	560	12.92*	4.174E+00	5.583E+00	5.583E+00	11.60
BI-212	727.33	46	6.67*	2.408E+00	1.527E+00	1.527E+00	45.65
	1620.50	------	1.47	1.168E+00	------ Line Not Found		------
PB-212	74.82	263	10.28	5.562E+00	2.470E+00	2.470E+00	26.11
	77.11	433	17.10	5.845E+00	2.329E+00	2.329E+00	16.10
	238.63	571	43.60*	5.358E+00	1.314E+00	1.314E+00	10.78
	300.09	32	3.30	4.634E+00	1.118E+00	1.118E+00	103.45
BI-214	609.32	437	45.49*	2.805E+00	1.842E+00	1.842E+00	10.40
	1120.29	117	14.92	1.588E+00	2.662E+00	2.662E+00	20.75
	1764.49	72	15.30	1.120E+00	2.247E+00	2.247E+00	22.94
PB-214	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
RN-222	609.32	437	45.49*	2.805E+00	1.842E+00	1.842E+00	10.40
	1120.29	117	14.92	1.588E+00	2.662E+00	2.662E+00	20.75
	1764.49	72	15.30	1.120E+00	2.247E+00	2.247E+00	22.94
RA-224	240.99	232	4.10*	5.315E+00	5.720E+00	5.720E+00	23.98
RA-226	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
AC-228	105.21	------	1.10	7.409E+00	------ Line Not Found		------
	338.32	117	11.27	4.282E+00	1.301E+00	1.301E+00	36.06
	835.71	------	1.61	2.117E+00	------ Line Not Found		------
	911.20	156	25.80*	1.947E+00	1.674E+00	1.674E+00	18.50
	968.97	58	15.80	1.832E+00	1.074E+00	1.074E+00	36.32
RA-228	105.21	------	1.10	7.409E+00	------ Line Not Found		------
	338.32	117	11.27	4.282E+00	1.301E+00	1.301E+00	36.06
	835.71	------	1.61	2.117E+00	------ Line Not Found		------
	911.20	156	25.80*	1.947E+00	1.674E+00	1.674E+00	18.50
	968.97	58	15.80	1.832E+00	1.074E+00	1.074E+00	36.32

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	263	10.28	5.562E+00	2.470E+00	2.470E+00	26.11
	77.11	433	17.10	5.845E+00	2.329E+00	2.329E+00	16.10
	238.63	571	43.60*	5.358E+00	1.314E+00	1.314E+00	10.78
	300.09	32	3.30	4.634E+00	1.118E+00	1.118E+00	103.45
TH-230	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
PA-231	283.69	------	1.70	4.802E+00	------ Line Not Found		------
	301.36	32	5.35*	4.634E+00	6.895E-01	6.895E-01	103.45
TH-232	105.21	------	1.10	7.409E+00	------ Line Not Found		------
	338.32	117	11.27	4.282E+00	1.301E+00	1.301E+00	36.06
	835.71	------	1.61	2.117E+00	------ Line Not Found		------
	911.20	156	25.80*	1.947E+00	1.674E+00	1.674E+00	18.50
	968.97	58	15.80	1.832E+00	1.074E+00	1.074E+00	36.32
PA-234M	63.29	62	3.70*	3.900E+00	2.329E+00	2.329E+00	104.24
	92.59	157	4.23	7.045E+00	2.833E+00	2.833E+00	44.76
TH-234	63.29	62	3.70*	3.900E+00	2.329E+00	2.329E+00	104.24
	92.59	157	4.23	7.045E+00	2.833E+00	2.833E+00	44.76
U-234	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
U-235	89.96	108	3.47	6.903E+00	2.413E+00	2.413E+00	43.27
	93.35	157	5.60	7.045E+00	2.140E+00	2.140E+00	44.76
	143.76	------	10.96*	7.101E+00	------ Line Not Found		------
	163.33	------	5.08	6.701E+00	------ Line Not Found		------
	185.72	208	57.20	6.239E+00	3.138E-01	3.138E-01	26.09
	205.31	------	5.01	5.886E+00	------ Line Not Found		------
U-238	63.29	62	3.70*	3.900E+00	2.329E+00	2.329E+00	104.24
	92.59	157	4.23	7.045E+00	2.833E+00	2.833E+00	44.76
AM-243	43.53	------	5.90	6.688E-01	------ Line Not Found		------
	74.66	263	67.20*	5.562E+00	3.779E-01	3.779E-01	26.11
CF-249	252.80	------	2.50	5.169E+00	------ Line Not Found		------
	333.37	------	14.60	4.328E+00	------ Line Not Found		------
	388.16	34	66.00*	3.910E+00	7.144E-02	7.145E-02	102.57
ANH-511	511.00	70	100.00*	3.222E+00	1.171E-01	1.171E-01	56.91

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:36.75

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507016.CNF;1		
Acquisition date	: 10-APR-2025 22:34:23	Sensitivity	: 3.000
Detector ID	: GAM27	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.92	Half life ratio	: *****
Sample date	: 6-MAR-2025 15:30:00	Analyst initials	: MXR1
Sample ID	: G714507016	Sample Quantity	: 1.3960E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 9-JUL-2024 08:43:14	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM27_CAN.CNF;22		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	2.991E+00	8.658E-01	6.070E-01
CR-51	5.089E-01	8.423E-01	9.255E-01
CD-109	3.317E+00	1.483E+00	1.142E+00
SN-126	3.146E-01	1.406E-01	1.088E-01
HG-203	5.889E-02	8.024E-02	7.528E-02
TL-208	3.467E-01	8.519E-02	5.239E-02
BI-211	5.583E+00	6.347E-01	3.178E-01
BI-212	1.527E+00	6.832E-01	7.275E-01
PB-212	1.314E+00	1.389E-01	9.003E-02
BI-214	1.842E+00	1.877E-01	8.984E-02
PB-214	2.026E+00	2.304E-01	1.155E-01
RN-222	1.842E+00	1.877E-01	8.984E-02
RA-224	5.720E+00	1.344E+00	9.642E-01
RA-226	2.026E+00	2.304E-01	1.155E-01
AC-228	1.674E+00	3.034E-01	2.387E-01
RA-228	1.674E+00	3.034E-01	2.387E-01
TH-228	1.314E+00	1.389E-01	9.003E-02
TH-230	2.026E+00	2.303E-01	1.155E-01
PA-231	6.895E-01	6.990E-01	8.069E-01
TH-232	1.674E+00	3.034E-01	2.387E-01
PA-234M	2.329E+00	2.379E+00	2.079E+00
TH-234	2.329E+00	2.379E+00	2.079E+00
U-234	2.026E+00	2.303E-01	1.155E-01
U-235	8.657E-02	2.001E-01	3.755E-01
U-238	2.329E+00	2.379E+00	2.079E+00
AM-243	3.779E-01	9.668E-02	8.264E-02
CF-249	7.145E-02	7.183E-02	6.181E-02
ANH-511	1.171E-01	6.530E-02	4.135E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	3.312E-01	3.719E-01	7.347E-01	NOT IDENT.
NA-22	-4.893E-03	3.548E-02	6.953E-02	NOT IDENT.

NA-24	0.000E+00	2.543E+15	0.000E+00	SHORT HLIF
AL-26	-8.326E-03	2.132E-02	4.098E-02	NOT IDENT.
SC-46	6.105E-03	4.088E-02	7.910E-02	FAIL ABUN
V-48	1.521E-01	2.092E-01	3.270E-01	FAIL ABUN
MN-52	-1.353E+00	3.090E+00	5.627E+00	FAIL ABUN
MN-54	9.351E-03	3.646E-02	7.040E-02	NOT IDENT.
CO-56	1.251E-03	3.873E-02	7.418E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.819E-03	2.346E-02	4.401E-02	NOT IDENT.
CO-58	1.086E-02	4.238E-02	8.316E-02	NOT IDENT.
FE-59	3.889E-02	8.426E-02	1.875E-01	NOT IDENT.
CO-60	3.309E-02	3.674E-02	8.400E-02	NOT IDENT.
ZN-65	4.797E-02	3.684E-02	1.084E-01	NOT IDENT.
GE-68	1.698E-01	9.839E-01	2.067E+00	NOT IDENT.
AS-73	-3.624E-01	8.461E-01	1.604E+00	NOT IDENT.
AS-74	1.748E-01	1.828E-01	3.857E-01	NOT IDENT.
SE-75	1.453E-02	4.756E-02	8.750E-02	FAIL ABUN
BR-77	0.000E+00	7.791E+03	0.000E+00	SHORT HLIF
SR-82	3.056E-01	4.928E-01	1.021E+00	NOT IDENT.
RB-83	-2.785E-02	7.557E-02	1.387E-01	NOT IDENT.
RB-84	1.978E-02	9.235E-02	1.799E-01	NOT IDENT.
KR-85	1.756E+00	6.313E+00	1.135E+01	NOT IDENT.
SR-85	1.138E-02	4.135E-02	7.429E-02	NOT IDENT.
RB-86	-1.130E-01	1.279E+00	2.565E+00	NOT IDENT.
Y-88	-7.743E-03	2.845E-02	5.723E-02	NOT IDENT.
Y-91	6.349E-01	1.604E+01	3.359E+01	NOT IDENT.
NB-94	3.756E-02	6.696E-02	5.859E-02	FAIL ABUN
NB-95	8.600E-03	6.242E-02	8.584E-02	NOT IDENT.
NB-95M	3.081E-02	1.539E-01	2.584E-01	NOT IDENT.
ZR-95	3.019E-02	7.606E-02	1.528E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.296E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.720E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	5.629E+40	0.000E+00	SHORT HLIF
RH-101	-2.083E-02	2.701E-02	4.292E-02	NOT IDENT.
RH-102	1.041E-02	3.980E-02	8.076E-02	FAIL ABUN
RU-103	6.672E-03	4.418E-02	8.777E-02	FAIL ABUN
RH-106	2.236E-02	2.740E-01	5.308E-01	NOT IDENT.
RU-106	2.236E-02	2.740E-01	5.308E-01	NOT IDENT.
AG-108M	-2.373E-02	2.343E-02	4.023E-02	NOT IDENT.
AG-110	-3.480E-01	5.291E-01	9.161E-01	NOT IDENT.
AG-110M	-1.961E-02	4.975E-02	8.712E-02	FAIL ABUN
SN-113	-2.417E-03	4.382E-02	7.669E-02	NOT IDENT.
CD-115	0.000E+00	4.775E+03	0.000E+00	SHORT HLIF
SN-117M	-3.987E-02	1.459E-01	2.613E-01	NOT IDENT.
SB-122	0.000E+00	2.986E+02	0.000E+00	SHORT HLIF
TE-123M	2.578E-03	2.956E-02	5.451E-02	NOT IDENT.
SB-124	-4.901E-02	9.078E-02	1.608E-01	NOT IDENT.
SB-125	-1.911E-02	8.314E-02	1.569E-01	FAIL ABUN
TE-125M	3.726E+00	1.076E+01	2.065E+01	NOT IDENT.
I-126	1.090E-01	6.340E-01	1.213E+00	FAIL ABUN
SB-126	3.933E-02	3.544E-01	6.893E-01	NOT IDENT.
SB-127	2.776E+01	4.156E+01	8.657E+01	NOT IDENT.
I-131	-1.071E-01	5.391E-01	1.037E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.245E+01	0.000E+00	SHORT HLIF
BA-133	-9.401E-03	3.266E-02	5.595E-02	NOT IDENT.
I-133	0.000E+00	4.408E+10	0.000E+00	SHORT HLIF
CS-134	3.322E-02	3.993E-02	8.261E-02	NOT IDENT.
I-135	0.000E+00	6.898E+37	0.000E+00	SHORT HLIF
CS-136	-2.170E-01	3.038E-01	4.514E-01	FAIL ABUN
BA-137M	1.237E-02	3.241E-02	6.413E-02	NOT IDENT.
CS-137	1.307E-02	3.423E-02	6.775E-02	NOT IDENT.
LA-138	1.205E-02	5.034E-02	1.073E-01	NOT IDENT.
CE-139	-7.458E-03	3.049E-02	5.464E-02	NOT IDENT.
BA-140	1.911E-01	7.134E-01	1.409E+00	NOT IDENT.
LA-140	-1.026E-01	3.003E-01	5.507E-01	NOT IDENT.
CE-141	4.993E-02	9.147E-02	1.735E-01	NOT IDENT.
CE-143	0.000E+00	3.063E+06	0.000E+00	SHORT HLIF
CE-144	-1.897E-01	2.001E-01	3.440E-01	NOT IDENT.
PM-144	-1.067E-02	3.021E-02	4.792E-02	NOT IDENT.
PR-144	-8.277E-01	2.282E+00	3.611E+00	NOT IDENT.
PM-146	2.049E-02	3.864E-02	7.825E-02	NOT IDENT.
ND-147	-8.885E-01	1.457E+00	2.603E+00	FAIL ABUN
PM-147	2.429E+02	6.139E+02	1.186E+03	NOT IDENT.
PM-149	0.000E+00	4.913E+04	0.000E+00	SHORT HLIF
EU-150	-3.497E-03	2.390E-02	4.407E-02	FAIL ABUN
EU-152	7.348E-04	9.625E-02	1.786E-01	FAIL ABUN

GD-153	-3.311E-02	7.919E-02	1.335E-01	NOT IDENT.
EU-154	-1.152E-02	9.996E-02	1.966E-01	NOT IDENT.
EU-155	4.425E-02	9.520E-02	1.839E-01	FAIL ABUN
TB-160	-8.939E-02	1.369E-01	2.283E-01	FAIL ABUN
HO-166M	-3.019E-02	4.930E-02	8.513E-02	FAIL ABUN
TM-171	-3.413E-01	1.511E+01	2.949E+01	NOT IDENT.
HF-172	4.575E-02	1.805E-01	3.181E-01	FAIL ABUN
LU-172	-1.407E-02	5.171E-02	9.989E-02	FAIL ABUN
LU-176	-3.607E-03	2.117E-02	4.120E-02	FAIL ABUN
HF-181	5.714E-02	8.088E-02	8.822E-02	FAIL ABUN
TA-182	-6.696E-02	1.541E-01	2.864E-01	FAIL ABUN
RE-183	1.061E-01	1.970E-01	3.963E-01	NOT IDENT.
RE-184	3.528E-02	1.706E-01	3.302E-01	NOT IDENT.
W-188	-4.030E+00	8.822E+00	1.485E+01	FAIL ABUN
IR-192	3.282E-03	3.429E-02	6.361E-02	FAIL ABUN
TL-204	1.536E-01	4.604E+00	8.161E+00	FAIL ABUN
BI-207	-1.445E-03	4.475E-02	7.984E-02	FAIL ABUN
BI-210	-2.078E+00	3.353E+00	6.491E+00	NOT IDENT.
PB-210	-2.078E+00	3.353E+00	6.491E+00	NOT IDENT.
PB-211	-2.006E-01	6.748E-01	1.131E+00	NOT IDENT.
BI-213	5.912E-02	8.667E-02	1.803E-01	NOT IDENT.
RN-219	-5.180E-02	3.498E-01	6.692E-01	FAIL ABUN
RA-223	-1.402E-01	6.031E-01	1.036E+00	FAIL ABUN
AC-225	1.385E+00	2.374E+00	4.194E+00	NOT IDENT.
AC-227	-4.834E-02	2.394E-01	4.192E-01	FAIL ABUN
TH-227	-4.834E-02	2.394E-01	4.192E-01	FAIL ABUN
TH-229	3.495E-01	5.058E-01	9.640E-01	FAIL ABUN
TH-231	-1.402E-01	6.031E-01	1.036E+00	FAIL ABUN
PA-233	4.887E-02	5.688E-02	1.190E-01	FAIL ABUN
PA-234	1.519E-01	2.624E-01	5.422E-01	NOT IDENT.
NP-237	4.887E-02	5.688E-02	1.190E-01	FAIL ABUN
NP-238	0.000E+00	1.855E+04	0.000E+00	SHORT HLIF
NP-239	-4.767E-02	2.281E-01	4.202E-01	FAIL ABUN
PU-239	6.192E+02	4.827E+02	6.336E+02	FAIL ABUN
AM-241	-5.980E-02	1.268E-01	2.385E-01	NOT IDENT.
CM-243	-4.045E-02	8.845E-02	1.611E-01	FAIL ABUN
BK-247	2.275E-02	8.283E-02	1.405E-01	FAIL ABUN
CM-247	8.935E-03	3.319E-02	6.346E-02	FAIL ABUN
CF-251	-1.110E-01	1.264E-01	2.131E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:35.21

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	74	10.66*	1.253E+00	2.991E+00	2.991E+00	29.54
CR-51	320.08	17	9.91*	4.431E+00	2.103E-01	5.089E-01	168.88
CD-109	88.03	146	3.70*	6.743E+00	3.146E+00	3.317E+00	45.62
SN-126	64.28	62	9.60	3.900E+00	8.975E-01	8.975E-01	104.24
	86.94	146	8.90	6.743E+00	1.308E+00	1.308E+00	45.62
	87.57	146	37.00*	6.743E+00	3.146E-01	3.146E-01	45.62
HG-203	70.83	------	3.69	5.028E+00	------	Line Not Found	------
	72.87	------	6.19	5.308E+00	------	Line Not Found	------
	279.20	26	81.56*	4.854E+00	3.482E-02	5.889E-02	139.05
TL-208	277.37	------	6.60	4.872E+00	------	Line Not Found	------
	583.19	159	85.00*	2.908E+00	3.467E-01	3.467E-01	25.07
	860.56	37	12.50	2.056E+00	7.732E-01	7.732E-01	58.06
BI-211	72.87	------	1.23	5.308E+00	------	Line Not Found	------
	351.06	560	12.92*	4.174E+00	5.583E+00	5.583E+00	11.60
BI-212	727.33	46	6.67*	2.408E+00	1.527E+00	1.527E+00	45.65
	1620.50	------	1.47	1.168E+00	------	Line Not Found	------
PB-212	74.82	263	10.28	5.562E+00	2.470E+00	2.470E+00	26.11
	77.11	433	17.10	5.845E+00	2.329E+00	2.329E+00	16.10
	238.63	571	43.60*	5.358E+00	1.314E+00	1.314E+00	10.78
	300.09	32	3.30	4.634E+00	1.118E+00	1.118E+00	103.45
BI-214	609.32	437	45.49*	2.805E+00	1.842E+00	1.842E+00	10.40
	1120.29	117	14.92	1.588E+00	2.662E+00	2.662E+00	20.75
	1764.49	72	15.30	1.120E+00	2.247E+00	2.247E+00	22.94
PB-214	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
RN-222	609.32	437	45.49*	2.805E+00	1.842E+00	1.842E+00	10.40
	1120.29	117	14.92	1.588E+00	2.662E+00	2.662E+00	20.75
	1764.49	72	15.30	1.120E+00	2.247E+00	2.247E+00	22.94
RA-224	240.99	232	4.10*	5.315E+00	5.720E+00	5.720E+00	23.98
RA-226	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
AC-228	105.21	------	1.10	7.409E+00	------	Line Not Found	------
	338.32	117	11.27	4.282E+00	1.301E+00	1.301E+00	36.06
	835.71	------	1.61	2.117E+00	------	Line Not Found	------
	911.20	156	25.80*	1.947E+00	1.674E+00	1.674E+00	18.50
	968.97	58	15.80	1.832E+00	1.074E+00	1.074E+00	36.32
RA-228	105.21	------	1.10	7.409E+00	------	Line Not Found	------
	338.32	117	11.27	4.282E+00	1.301E+00	1.301E+00	36.06
	835.71	------	1.61	2.117E+00	------	Line Not Found	------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	156	25.80*	1.947E+00	1.674E+00	1.674E+00	18.50
	968.97	58	15.80	1.832E+00	1.074E+00	1.074E+00	36.32
TH-228	74.82	263	10.28	5.562E+00	2.470E+00	2.470E+00	26.11
	77.11	433	17.10	5.845E+00	2.329E+00	2.329E+00	16.10
	238.63	571	43.60*	5.358E+00	1.314E+00	1.314E+00	10.78
	300.09	32	3.30	4.634E+00	1.118E+00	1.118E+00	103.45
TH-230	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
PA-231	283.69	------	1.70	4.802E+00	------ Line Not Found		------
	301.36	32	5.35*	4.634E+00	6.895E-01	6.895E-01	103.45
TH-232	105.21	------	1.10	7.409E+00	------ Line Not Found		------
	338.32	117	11.27	4.282E+00	1.301E+00	1.301E+00	36.06
	835.71	------	1.61	2.117E+00	------ Line Not Found		------
	911.20	156	25.80*	1.947E+00	1.674E+00	1.674E+00	18.50
	968.97	58	15.80	1.832E+00	1.074E+00	1.074E+00	36.32
PA-234M	63.29	62	3.70*	3.900E+00	2.329E+00	2.329E+00	104.24
	92.59	157	4.23	7.045E+00	2.833E+00	2.833E+00	44.76
TH-234	63.29	62	3.70*	3.900E+00	2.329E+00	2.329E+00	104.24
	92.59	157	4.23	7.045E+00	2.833E+00	2.833E+00	44.76
U-234	74.82	263	5.80	5.562E+00	4.378E+00	4.378E+00	26.11
	77.11	433	9.70	5.845E+00	4.105E+00	4.105E+00	16.10
	87.09	146	3.41	6.743E+00	3.414E+00	3.414E+00	45.62
	242.00	232	7.25	5.315E+00	3.235E+00	3.235E+00	23.98
	295.22	370	18.42	4.680E+00	2.309E+00	2.309E+00	12.93
	351.93	560	35.60*	4.174E+00	2.026E+00	2.026E+00	11.60
U-235	89.96	108	3.47	6.903E+00	2.413E+00	2.413E+00	43.27
	93.35	157	5.60	7.045E+00	2.140E+00	2.140E+00	44.76
	143.76	------	10.96*	7.101E+00	------ Line Not Found		------
	163.33	------	5.08	6.701E+00	------ Line Not Found		------
	185.72	208	57.20	6.239E+00	3.138E-01	3.138E-01	26.09
	205.31	------	5.01	5.886E+00	------ Line Not Found		------
U-238	63.29	62	3.70*	3.900E+00	2.329E+00	2.329E+00	104.24
	92.59	157	4.23	7.045E+00	2.833E+00	2.833E+00	44.76
AM-243	43.53	------	5.90	6.688E-01	------ Line Not Found		------
	74.66	263	67.20*	5.562E+00	3.779E-01	3.779E-01	26.11
CF-249	252.80	------	2.50	5.169E+00	------ Line Not Found		------
	333.37	------	14.60	4.328E+00	------ Line Not Found		------
	388.16	34	66.00*	3.910E+00	7.144E-02	7.145E-02	102.57
ANH-511	511.00	70	100.00*	3.222E+00	1.171E-01	1.171E-01	56.91

Flag: "*" = Keyline

Sample ID : G714507016 Acquisition date : 10-APR-2025 22:34:23

Total number of lines in spectrum 60
Number of unidentified lines 13
Number of lines tentatively identified by NID 47 78.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	2.991E+00	2.991E+00	0.883E+00	29.54	
CR-51	27.70D	2.42	2.103E-01	5.089E-01	8.595E-01	168.88	
CD-109	461.40D	1.05	3.146E+00	3.317E+00	1.513E+00	45.62	
SN-126	2.30E+05Y	1.00	3.146E-01	3.146E-01	1.435E-01	45.62	
HG-203	46.59D	1.69	3.482E-02	5.889E-02	8.188E-02	139.05	
TL-208	1.41E+10Y	1.00	3.467E-01	3.467E-01	0.869E-01	25.07	
BI-211	7.04E+08Y	1.00	5.583E+00	5.583E+00	0.648E+00	11.60	
BI-212	1.41E+10Y	1.00	1.527E+00	1.527E+00	0.697E+00	45.65	
PB-212	1.41E+10Y	1.00	1.314E+00	1.314E+00	0.142E+00	10.78	
BI-214	1600.00Y	1.00	1.842E+00	1.842E+00	0.192E+00	10.40	
PB-214	1600.00Y	1.00	2.026E+00	2.026E+00	0.235E+00	11.60	
RN-222	1600.00Y	1.00	1.842E+00	1.842E+00	0.192E+00	10.40	
RA-224	1.41E+10Y	1.00	5.720E+00	5.720E+00	1.372E+00	23.98	
RA-226	1600.00Y	1.00	2.026E+00	2.026E+00	0.235E+00	11.60	
AC-228	1.41E+10Y	1.00	1.674E+00	1.674E+00	0.310E+00	18.50	
RA-228	1.41E+10Y	1.00	1.674E+00	1.674E+00	0.310E+00	18.50	
TH-228	1.41E+10Y	1.00	1.314E+00	1.314E+00	0.142E+00	10.78	
TH-230	7.54E+04Y	1.00	2.026E+00	2.026E+00	0.235E+00	11.60	
PA-231	7.04E+08Y	1.00	6.895E-01	6.895E-01	7.132E-01	103.45	
TH-232	1.41E+10Y	1.00	1.674E+00	1.674E+00	0.310E+00	18.50	
PA-234M	4.47E+09Y	1.00	2.329E+00	2.329E+00	2.427E+00	104.24	
TH-234	4.47E+09Y	1.00	2.329E+00	2.329E+00	2.427E+00	104.24	
U-234	2.45E+05Y	1.00	2.026E+00	2.026E+00	0.235E+00	11.60	
U-235	7.04E+08Y	1.00	3.138E-01	3.138E-01	0.819E-01	26.09	K
U-238	4.47E+09Y	1.00	2.329E+00	2.329E+00	2.427E+00	104.24	
AM-243	7370.00Y	1.00	3.779E-01	3.779E-01	0.987E-01	26.11	
CF-249	351.00Y	1.00	7.144E-02	7.145E-02	7.329E-02	102.57	
ANH-511	1.00E+09Y	1.00	1.171E-01	1.171E-01	0.666E-01	56.91	
			---------	---------			
	Total Activity :		4.786E+01	4.836E+01			
	Grand Total Activity :		4.786E+01	4.836E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	83.92	45	276	1.29	168.64	164	29	1.04E-02	****	6.48E+00	T
0	129.28	53	122	1.36	259.32	256	7	1.27E-02	79.5	7.35E+00	T
3	183.79	25	79	1.15	368.32	366	12	6.08E-03	****	6.29E+00	T
5	209.72	55	82	1.84	420.14	417	15	1.37E-02	63.6	5.81E+00	T
5	213.21	49	119	1.88	427.13	417	15	1.21E-02	98.3	5.75E+00	
0	216.56	31	69	1.39	433.83	432	6	7.70E-03	96.5	5.70E+00	T
0	270.44	74	119	1.39	541.55	535	12	1.85E-02	67.6	4.95E+00	T
0	274.78	23	61	1.54	550.23	547	7	5.79E-03	****	4.90E+00	T
0	410.03	15	59	3.90	820.64	811	11	3.89E-03	****	3.77E+00	T
0	463.28	37	19	2.14	927.12	924	7	9.71E-03	52.3	3.46E+00	T
0	480.86	16	33	0.80	962.26	958	9	4.26E-03	****	3.37E+00	T
0	704.12	17	45	4.47	1408.69	1397	16	4.70E-03	****	2.48E+00	T
0	763.41	7	15	1.48	1527.24	1523	9	1.98E-03	****	2.30E+00	T
0	768.21	38	27	1.02	1536.83	1532	11	1.04E-02	63.0	2.29E+00	T
0	806.53	12	22	1.00	1613.47	1607	9	3.36E-03	****	2.19E+00	
0	918.70	24	8	6.52	1837.77	1829	16	6.67E-03	66.7	1.93E+00	
0	935.16	18	15	1.34	1870.69	1866	9	4.88E-03	94.1	1.90E+00	T
0	951.74	7	7	1.07	1903.86	1900	7	1.94E-03	****	1.87E+00	
0	965.77	16	31	1.65	1931.90	1925	11	4.44E-03	****	1.84E+00	T
0	983.68	11	12	2.29	1967.71	1962	11	3.09E-03	****	1.81E+00	T
0	1024.39	14	20	2.77	2049.13	2041	16	4.06E-03	****	1.73E+00	T
0	1043.21	19	17	3.94	2086.76	2076	18	5.41E-03	****	1.70E+00	
0	1059.84	7	1	0.94	2120.04	2117	6	1.86E-03	95.7	1.68E+00	
0	1066.51	17	16	4.82	2133.37	2124	17	4.66E-03	****	1.67E+00	
0	1111.95	10	5	0.50	2224.25	2217	10	2.97E-03	99.9	1.60E+00	T
0	1155.30	12	13	1.86	2310.93	2306	10	3.39E-03	****	1.54E+00	
0	1183.74	9	2	0.54	2367.82	2365	7	2.46E-03	84.6	1.51E+00	
0	1239.51	17	19	1.79	2479.34	2470	11	4.79E-03	****	1.44E+00	T
0	1297.73	5	4	1.38	2595.79	2592	6	1.51E-03	****	1.38E+00	T
0	1377.96	23	12	2.18	2756.24	2750	10	6.50E-03	70.0	1.31E+00	
0	1408.75	27	9	2.31	2817.84	2807	18	7.73E-03	63.3	1.29E+00	T
0	1510.10	25	5	4.94	3020.54	3010	20	7.27E-03	57.2	1.22E+00	
0	1521.96	8	2	1.47	3044.27	3037	12	2.45E-03	****	1.22E+00	
0	1847.58	9	2	0.78	3695.57	3691	9	2.77E-03	83.0	1.10E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:46.74

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507016.CNF;1		
Acquisition date	: 10-APR-2025 22:34:23	Sensitivity	: 3.000
Detector ID	: GAM27	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.92	Half life ratio	: *****
Sample date	: 6-MAR-2025 15:30:00	Nuclide Library	: SOLID
Sample ID	: G714507016	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.3960E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 9-JUL-2024 08:43:14	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM27_CAN.CNF;22		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.489E-01
CR-51	4.215E-01
CD-109	5.389E-01
SN-126	5.131E-02
HG-203	3.443E-02
TL-208	2.319E-02
BI-211	1.450E-01
BI-212	3.178E-01
PB-212	4.179E-02
BI-214	3.911E-02
PB-214	5.274E-02
RN-222	3.911E-02
RA-224	4.476E-01
RA-226	5.274E-02
AC-228	1.047E-01
RA-228	1.047E-01
TH-228	4.179E-02
TH-230	5.273E-02
PA-231	3.731E-01
TH-232	1.047E-01
PA-234M	9.852E-01
TH-234	9.852E-01
U-234	5.273E-02
U-235	1.780E-01
U-238	9.852E-01
AM-243	3.926E-02
CF-249	2.801E-02
ANH-511	1.837E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.340E-01	NOT IDENT.
NA-22	2.943E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF

AL-26	1.393E-02	NOT IDENT.
SC-46	3.461E-02	FAIL ABUN
V-48	1.447E-01	FAIL ABUN
MN-52	2.356E+00	FAIL ABUN
MN-54	3.144E-02	NOT IDENT.
CO-56	3.225E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.070E-02	NOT IDENT.
CO-58	3.677E-02	NOT IDENT.
FE-59	7.984E-02	NOT IDENT.
CO-60	3.653E-02	NOT IDENT.
ZN-65	4.413E-02	NOT IDENT.
GE-68	8.827E-01	NOT IDENT.
AS-73	7.533E-01	NOT IDENT.
AS-74	1.754E-01	NOT IDENT.
SE-75	4.063E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	4.539E-01	NOT IDENT.
RB-83	6.244E-02	NOT IDENT.
RB-84	7.873E-02	NOT IDENT.
KR-85	5.135E+00	NOT IDENT.
SR-85	3.362E-02	NOT IDENT.
RB-86	1.091E+00	NOT IDENT.
Y-88	2.028E-02	NOT IDENT.
Y-91	1.391E+01	NOT IDENT.
NB-94	2.632E-02	FAIL ABUN
NB-95	3.821E-02	NOT IDENT.
NB-95M	1.210E-01	NOT IDENT.
ZR-95	6.781E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.991E-02	NOT IDENT.
RH-102	3.543E-02	FAIL ABUN
RU-103	3.925E-02	FAIL ABUN
RH-106	2.365E-01	NOT IDENT.
RU-106	2.365E-01	NOT IDENT.
AG-108M	1.784E-02	NOT IDENT.
AG-110	3.891E-01	NOT IDENT.
AG-110M	3.799E-02	FAIL ABUN
SN-113	3.468E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.228E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.562E-02	NOT IDENT.
SB-124	6.026E-02	NOT IDENT.
SB-125	7.145E-02	FAIL ABUN
TE-125M	9.745E+00	NOT IDENT.
I-126	5.491E-01	FAIL ABUN
SB-126	3.036E-01	NOT IDENT.
SB-127	3.872E+01	NOT IDENT.
I-131	4.710E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.504E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.729E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.909E-01	FAIL ABUN
BA-137M	2.892E-02	NOT IDENT.
CS-137	3.055E-02	NOT IDENT.
LA-138	4.488E-02	NOT IDENT.
CE-139	2.562E-02	NOT IDENT.
BA-140	6.373E-01	NOT IDENT.
LA-140	2.312E-01	NOT IDENT.
CE-141	8.205E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.618E-01	NOT IDENT.
PM-144	2.078E-02	NOT IDENT.
PR-144	1.565E+00	NOT IDENT.
PM-146	3.582E-02	NOT IDENT.
ND-147	1.133E+00	FAIL ABUN
PM-147	5.562E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.023E-02	FAIL ABUN
EU-152	8.265E-02	FAIL ABUN
GD-153	6.269E-02	NOT IDENT.

EU-154	8.333E-02	NOT IDENT.
EU-155	8.702E-02	FAIL ABUN
TB-160	9.714E-02	FAIL ABUN
HO-166M	3.700E-02	FAIL ABUN
TM-171	1.386E+01	NOT IDENT.
HF-172	1.496E-01	FAIL ABUN
LU-172	4.253E-02	FAIL ABUN
LU-176	1.884E-02	FAIL ABUN
HF-181	3.921E-02	FAIL ABUN
TA-182	1.202E-01	FAIL ABUN
RE-183	1.872E-01	NOT IDENT.
RE-184	1.455E-01	NOT IDENT.
W-188	6.865E+00	FAIL ABUN
IR-192	2.898E-02	FAIL ABUN
TL-204	3.884E+00	FAIL ABUN
BI-207	3.403E-02	FAIL ABUN
BI-210	3.068E+00	NOT IDENT.
PB-210	3.068E+00	NOT IDENT.
PB-211	5.133E-01	NOT IDENT.
BI-213	8.215E-02	NOT IDENT.
RN-219	3.050E-01	FAIL ABUN
RA-223	4.755E-01	FAIL ABUN
AC-225	1.962E+00	NOT IDENT.
AC-227	1.941E-01	FAIL ABUN
TH-227	1.941E-01	FAIL ABUN
TH-229	4.539E-01	FAIL ABUN
TH-231	4.755E-01	FAIL ABUN
PA-233	5.520E-02	FAIL ABUN
PA-234	2.385E-01	NOT IDENT.
NP-237	5.520E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.972E-01	FAIL ABUN
PU-239	3.004E+02	FAIL ABUN
AM-241	1.125E-01	NOT IDENT.
CM-243	7.560E-02	FAIL ABUN
BK-247	6.525E-02	FAIL ABUN
CM-247	2.902E-02	FAIL ABUN
CF-251	9.975E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:35:50.81

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507016.CNF;1       *
* Acquisition date : 10-APR-2025 22:34:23 Sensitivity     : 3.000                *
* Detector ID      : GAM27                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.92     Half life ratio : *****                *
* Sample date      :  6-MAR-2025 15:30:00 Nuclide Library : SOLID                *
* Sample ID        : G714507016           Analyst initials: MXR1                 *
* Batch Number     : 2767515              Sample Quantity : 1.3960E+02 GRAM      *
*                                         Quantity Err(%) : 1.4327E-03 %         *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  9-JUL-2024 08:43:14 Eff. Geometry   : CAN                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM27_CAN.CNF;22                 *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	2.991E+00	9.394E-01	9.394E-01
CR-51	5.089E-01	8.438E-01	8.438E-01
CD-109	3.317E+00	1.541E+00	1.541E+00
SN-126	3.146E-01	1.452E-01	1.452E-01
HG-203	5.889E-02	8.049E-02	8.049E-02
TL-208	3.467E-01	9.005E-02	9.005E-02
BI-211	5.583E+00	8.256E-01	8.256E-01
BI-212	1.527E+00	6.991E-01	6.991E-01
PB-212	1.314E+00	1.890E-01	1.890E-01
BI-214	1.842E+00	2.429E-01	2.429E-01
PB-214	2.026E+00	2.978E-01	2.978E-01
RN-222	1.842E+00	2.429E-01	2.429E-01
RA-224	5.720E+00	1.458E+00	1.458E+00
RA-226	2.026E+00	2.978E-01	2.978E-01
AC-228	1.674E+00	3.747E-01	3.747E-01
RA-228	1.674E+00	3.747E-01	3.747E-01
TH-228	1.314E+00	1.890E-01	1.890E-01
TH-230	2.026E+00	2.978E-01	2.978E-01
PA-231	6.895E-01	7.172E-01	7.172E-01
TH-232	1.674E+00	3.747E-01	3.747E-01
PA-234M	2.329E+00	2.449E+00	2.449E+00
TH-234	2.329E+00	2.449E+00	2.449E+00
U-234	2.026E+00	2.978E-01	2.978E-01
U-235	8.657E-02	2.002E-01	2.002E-01
U-238	2.329E+00	2.449E+00	2.449E+00
AM-243	3.779E-01	1.059E-01	1.059E-01
CF-249	7.145E-02	7.225E-02	7.225E-02
ANH-511	1.171E-01	6.605E-02	6.605E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	3.312E-01	3.730E-01	4.018E-01	NOT IDENT.
NA-22	-4.893E-03	3.548E-02	3.555E-02	NOT IDENT.

NA-24	1.619E+15	2.552E+15	2.654E+15	SHORT HLIF
AL-26	-8.326E-03	2.133E-02	2.165E-02	NOT IDENT.
SC-46	6.105E-03	4.088E-02	4.098E-02	FAIL ABUN
V-48	1.521E-01	2.100E-01	2.209E-01	FAIL ABUN
MN-52	-1.353E+00	3.094E+00	3.154E+00	FAIL ABUN
MN-54	9.351E-03	3.648E-02	3.672E-02	NOT IDENT.
CO-56	1.251E-03	3.873E-02	3.873E-02	FAIL ABUN
MN-56	1.000E+41	2.783E+42	0.000E+00	SHORT HLIF
CO-57	1.819E-03	2.346E-02	2.348E-02	NOT IDENT.
CO-58	1.086E-02	4.240E-02	4.268E-02	NOT IDENT.
FE-59	3.889E-02	8.440E-02	8.620E-02	NOT IDENT.
CO-60	3.309E-02	3.696E-02	3.986E-02	NOT IDENT.
ZN-65	4.797E-02	3.716E-02	4.300E-02	NOT IDENT.
GE-68	1.698E-01	9.841E-01	9.871E-01	NOT IDENT.
AS-73	-3.624E-01	8.505E-01	8.661E-01	NOT IDENT.
AS-74	1.748E-01	1.838E-01	1.999E-01	NOT IDENT.
SE-75	1.453E-02	4.759E-02	4.803E-02	FAIL ABUN
BR-77	7.373E+04	7.588E+04	8.284E+04	SHORT HLIF
SR-82	3.056E-01	4.938E-01	5.127E-01	NOT IDENT.
RB-83	-2.785E-02	7.569E-02	7.672E-02	NOT IDENT.
RB-84	1.978E-02	9.238E-02	9.281E-02	NOT IDENT.
KR-85	1.756E+00	6.314E+00	6.364E+00	NOT IDENT.
SR-85	1.138E-02	4.136E-02	4.168E-02	NOT IDENT.
RB-86	-1.130E-01	1.279E+00	1.280E+00	NOT IDENT.
Y-88	-7.743E-03	2.845E-02	2.867E-02	NOT IDENT.
Y-91	6.349E-01	1.604E+01	1.605E+01	NOT IDENT.
NB-94	3.756E-02	6.704E-02	6.914E-02	FAIL ABUN
NB-95	8.600E-03	6.243E-02	6.255E-02	NOT IDENT.
NB-95M	3.081E-02	1.540E-01	1.546E-01	NOT IDENT.
ZR-95	3.019E-02	7.611E-02	7.732E-02	NOT IDENT.
NB-97	-1.000E+41	1.343E+42	0.000E+00	SHORT HLIF
ZR-97	5.483E+14	6.313E+14	6.780E+14	SHORT HLIF
MO-99	-1.226E+03	1.725E+03	1.811E+03	SHORT HLIF
TC-99M	-2.942E+40	5.639E+40	0.000E+00	SHORT HLIF
RH-101	-2.083E-02	2.729E-02	2.886E-02	NOT IDENT.
RH-102	1.041E-02	3.982E-02	4.009E-02	FAIL ABUN
RU-103	6.672E-03	4.419E-02	4.429E-02	FAIL ABUN
RH-106	2.236E-02	2.741E-01	2.742E-01	NOT IDENT.
RU-106	2.236E-02	2.741E-01	2.742E-01	NOT IDENT.
AG-108M	-2.373E-02	2.351E-02	2.583E-02	NOT IDENT.
AG-110	-3.480E-01	5.298E-01	5.526E-01	NOT IDENT.
AG-110M	-1.961E-02	4.982E-02	5.060E-02	FAIL ABUN
SN-113	-2.417E-03	4.382E-02	4.384E-02	NOT IDENT.
CD-115	-2.322E+02	4.775E+03	4.776E+03	SHORT HLIF
SN-117M	-3.987E-02	1.460E-01	1.471E-01	NOT IDENT.
SB-122	2.236E+02	2.992E+02	3.157E+02	SHORT HLIF
TE-123M	2.578E-03	2.956E-02	2.958E-02	NOT IDENT.
SB-124	-4.901E-02	9.091E-02	9.355E-02	NOT IDENT.
SB-125	-1.911E-02	8.316E-02	8.360E-02	FAIL ABUN
TE-125M	3.726E+00	1.076E+01	1.089E+01	NOT IDENT.
I-126	1.090E-01	6.341E-01	6.360E-01	FAIL ABUN
SB-126	3.933E-02	3.544E-01	3.548E-01	NOT IDENT.
SB-127	2.776E+01	4.187E+01	4.370E+01	NOT IDENT.
I-131	-1.071E-01	5.392E-01	5.413E-01	NOT IDENT.
I-132	1.000E+41	1.490E+42	0.000E+00	SHORT HLIF
TE-132	-1.727E+01	5.249E+01	5.306E+01	SHORT HLIF
BA-133	-9.401E-03	3.267E-02	3.295E-02	NOT IDENT.
I-133	-5.103E+10	4.568E+10	5.115E+10	SHORT HLIF
CS-134	3.322E-02	4.009E-02	4.279E-02	NOT IDENT.
I-135	1.071E+37	6.952E+37	0.000E+00	SHORT HLIF
CS-136	-2.170E-01	3.052E-01	3.205E-01	FAIL ABUN
BA-137M	1.237E-02	3.242E-02	3.290E-02	NOT IDENT.
CS-137	1.307E-02	3.425E-02	3.475E-02	NOT IDENT.
LA-138	1.205E-02	5.036E-02	5.065E-02	NOT IDENT.
CE-139	-7.458E-03	3.053E-02	3.072E-02	NOT IDENT.
BA-140	1.911E-01	7.136E-01	7.188E-01	NOT IDENT.
LA-140	-1.026E-01	3.005E-01	3.041E-01	NOT IDENT.
CE-141	4.993E-02	9.155E-02	9.427E-02	NOT IDENT.
CE-143	9.418E+05	3.065E+06	3.094E+06	SHORT HLIF
CE-144	-1.897E-01	2.007E-01	2.182E-01	NOT IDENT.
PM-144	-1.067E-02	3.023E-02	3.061E-02	NOT IDENT.
PR-144	-8.277E-01	2.283E+00	2.314E+00	NOT IDENT.
PM-146	2.049E-02	3.870E-02	3.978E-02	NOT IDENT.
ND-147	-8.885E-01	1.459E+00	1.513E+00	FAIL ABUN
PM-147	2.429E+02	6.142E+02	6.238E+02	NOT IDENT.
PM-149	-5.636E+04	5.002E+04	5.610E+04	SHORT HLIF
EU-150	-3.497E-03	2.390E-02	2.395E-02	FAIL ABUN
EU-152	7.348E-04	9.625E-02	9.625E-02	FAIL ABUN

GD-153	-3.311E-02	7.926E-02	8.066E-02	NOT IDENT.
EU-154	-1.152E-02	9.997E-02	1.001E-01	NOT IDENT.
EU-155	4.425E-02	9.530E-02	9.737E-02	FAIL ABUN
TB-160	-8.939E-02	1.374E-01	1.432E-01	FAIL ABUN
HO-166M	-3.019E-02	4.939E-02	5.123E-02	FAIL ABUN
TM-171	-3.413E-01	1.511E+01	1.511E+01	NOT IDENT.
HF-172	4.575E-02	1.807E-01	1.819E-01	FAIL ABUN
LU-172	-1.407E-02	5.175E-02	5.214E-02	FAIL ABUN
LU-176	-3.607E-03	2.117E-02	2.124E-02	FAIL ABUN
HF-181	5.714E-02	8.103E-02	8.502E-02	FAIL ABUN
TA-182	-6.696E-02	1.543E-01	1.572E-01	FAIL ABUN
RE-183	1.061E-01	1.978E-01	2.035E-01	NOT IDENT.
RE-184	3.528E-02	1.707E-01	1.714E-01	NOT IDENT.
W-188	-4.030E+00	8.842E+00	9.027E+00	FAIL ABUN
IR-192	3.282E-03	3.429E-02	3.432E-02	FAIL ABUN
TL-204	1.536E-01	4.604E+00	4.605E+00	FAIL ABUN
BI-207	-1.445E-03	4.475E-02	4.476E-02	FAIL ABUN
BI-210	-2.078E+00	3.362E+00	3.490E+00	NOT IDENT.
PB-210	-2.078E+00	3.362E+00	3.490E+00	NOT IDENT.
PB-211	-2.006E-01	6.750E-01	6.811E-01	NOT IDENT.
BI-213	5.912E-02	8.681E-02	9.081E-02	NOT IDENT.
RN-219	-5.180E-02	3.499E-01	3.507E-01	FAIL ABUN
RA-223	-1.402E-01	6.033E-01	6.066E-01	FAIL ABUN
AC-225	1.385E+00	2.379E+00	2.460E+00	NOT IDENT.
AC-227	-4.834E-02	2.395E-01	2.405E-01	FAIL ABUN
TH-227	-4.834E-02	2.395E-01	2.405E-01	FAIL ABUN
TH-229	3.495E-01	5.066E-01	5.306E-01	FAIL ABUN
TH-231	-1.402E-01	6.033E-01	6.066E-01	FAIL ABUN
PA-233	4.887E-02	5.711E-02	6.121E-02	FAIL ABUN
PA-234	1.519E-01	3.152E-01	3.225E-01	NOT IDENT.
NP-237	4.887E-02	5.711E-02	6.121E-02	FAIL ABUN
NP-238	1.348E+04	1.862E+04	1.958E+04	SHORT HLIF
NP-239	-4.767E-02	2.281E-01	2.291E-01	FAIL ABUN
PU-239	6.192E+02	4.848E+02	5.594E+02	FAIL ABUN
AM-241	-5.980E-02	1.272E-01	1.300E-01	NOT IDENT.
CM-243	-4.045E-02	8.858E-02	9.043E-02	FAIL ABUN
BK-247	2.275E-02	8.298E-02	8.361E-02	FAIL ABUN
CM-247	8.935E-03	3.323E-02	3.347E-02	FAIL ABUN
CF-251	-1.110E-01	1.272E-01	1.367E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	89.9301	85.43	92.6872	131.20	81.5271
45.60	81.6202	86.55	92.8909	133.02	97.2488
46.54	94.3015	86.79	92.9343	133.52	108.9550
49.72	0.0000	86.94	92.9619	136.00	59.4504
51.35	77.5596	87.09	92.9887	136.47	80.7372
51.87	82.1858	87.57	93.0757	140.51	0.0000
52.39	77.7802	88.03	93.1583	143.76	93.3747
52.97	86.0550	88.34	93.2141	144.24	100.9536
53.44	87.0707	88.47	93.2373	145.44	80.6808
54.07	76.3150	89.96	93.5040	152.43	98.8189
57.36	0.0000	1093.63	93.6243	153.25	100.0143
57.53	87.0911	91.11	93.7077	323.87	88.1673
57.98	82.6014	92.59	93.9686	156.02	100.3779
59.27	102.2075	93.35	94.1013	158.56	89.7626
59.32	102.2202	94.56	94.3122	159.00	79.9551
59.54	105.0407	94.65	94.3274	162.33	78.0961
60.96	94.9317	94.67	94.3310	162.66	67.1246
61.17	94.9807	94.87	79.4659	163.33	70.4863
62.93	109.6347	97.43	91.8126	165.86	81.7584
63.29	109.7295	98.43	79.9805	176.31	78.3324
63.58	109.8058	98.44	79.9823	176.60	83.9573
64.28	109.9894	99.53	81.1397	177.52	94.1347
66.73	121.2490	100.11	78.2148	181.07	0.0000
67.24	116.3862	102.03	79.4858	181.52	91.5782
125.81	117.7572	103.18	97.7919	184.41	73.4344
67.75	117.7754	103.37	88.7479	143.76	73.5455
68.89	111.1742	105.21	90.0409	193.51	69.6330
69.67	123.6410	105.31	90.0565	197.03	72.1978
70.82	123.6435	106.12	85.1145	198.01	65.3922
70.83	123.6464	106.47	102.4009	201.83	61.0580
72.81	130.5254	109.28	84.5502	203.43	88.8609
72.87	130.5427	111.00	106.2455	205.31	67.0696
74.66	120.2360	111.76	0.0000	210.85	63.5879
74.82	120.2774	114.06	83.1642	215.65	42.0853
74.97	120.3168	116.30	0.0000	218.12	56.2566
77.11	120.8657	116.74	83.5232	222.11	70.6073
78.74	121.2790	119.76	81.8509	227.09	53.2212
79.69	109.9452	121.12	66.4502	227.38	54.4193
80.03	123.5322	121.22	66.4604	228.16	0.0000
80.12	123.5566	121.78	69.6366	228.18	63.9347
80.19	123.5742	122.06	81.1046	116.74	63.9347
80.57	110.1444	122.92	91.6241	235.69	66.7931
81.00	96.7026	123.07	91.6450	235.96	66.8110
81.07	96.7163	265.00	85.4765	238.63	56.2177
81.75	110.4097	125.81	76.6908	238.98	0.0000
82.47	92.1421	127.23	74.0600	240.99	56.3454
83.79	92.3864	127.91	81.1303	242.00	56.3999
84.00	92.4248	129.30	77.7939	244.70	35.2899

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	61.7991	344.28	51.2155	563.25	26.8297
252.80	63.0338	345.93	39.2432	564.24	0.0000
254.15	0.0000	351.06	36.7637	569.33	18.9374
256.23	57.1522	351.93	36.7867	946.00	20.9325
260.90	0.0000	355.39	0.0000	569.70	20.9351
264.66	50.2365	356.01	28.9885	583.19	20.0708
264.80	50.6512	364.49	36.2337	584.27	20.0814
265.00	50.6601	366.42	0.0000	595.83	20.1945
269.46	45.9386	372.51	28.4382	427.87	27.3252
270.03	45.9626	375.05	41.8412	602.52	0.0000
271.23	46.0104	377.52	31.2110	604.72	10.6470
273.65	32.1104	356.01	28.2111	607.14	15.2277
276.40	47.0431	388.16	31.4368	609.32	15.2435
277.37	47.0825	388.63	31.4467	610.33	15.2509
277.60	47.0918	391.69	31.0607	614.28	18.3347
278.00	42.1493	264.66	35.3199	618.01	18.3669
279.20	38.4700	401.81	38.0659	620.36	24.5156
279.54	38.4813	402.40	33.7284	621.93	21.4674
279.70	38.4861	404.85	38.1411	630.19	0.0000
280.46	34.7847	410.95	38.2915	631.29	14.3731
283.69	32.3889	413.71	32.8792	633.25	15.4138
284.31	41.1302	414.70	29.2441	634.78	19.5381
285.41	63.6239	423.72	31.2497	635.95	16.4616
285.90	0.0000	427.09	32.2364	636.99	17.4987
287.50	39.9912	427.87	38.7025	657.50	17.6613
290.67	60.1450	433.94	35.1480	657.76	14.5463
293.27	0.0000	439.40	26.9131	657.90	0.0000
351.93	46.1176	440.45	25.0730	661.66	22.8979
295.96	46.1455	453.88	30.8932	664.57	0.0000
879.38	46.2451	463.37	25.4180	666.33	28.1602
299.98	46.2977	468.07	29.2637	666.50	26.0763
300.09	46.3011	473.00	23.6669	667.71	0.0000
300.13	46.3033	475.06	31.2772	677.62	20.9627
301.36	50.5627	476.78	17.0771	685.70	15.7770
302.85	43.0302	477.60	19.9327	692.65	0.0000
256.23	36.7509	482.18	15.7024	695.00	20.2750
304.85	33.4657	487.02	14.3140	696.49	19.0195
306.78	41.4734	492.35	0.0000	696.51	19.0203
308.46	50.8521	497.08	22.0716	697.00	20.6093
311.90	39.0923	505.52	21.6920	697.30	17.4406
316.51	28.1465	507.63	0.0000	697.49	17.4420
319.41	30.7749	511.00	21.2733	702.65	16.9505
320.08	35.0667	514.00	26.1508	706.68	33.4277
321.04	35.0934	514.00	26.1508	711.68	22.3322
323.87	46.3206	520.40	33.0440	720.70	17.0788
325.23	48.4297	520.69	0.0000	721.93	0.0000
328.76	40.4671	522.65	0.0000	722.78	17.6279
333.37	37.1517	527.90	0.0000	722.91	17.6286
333.97	44.6031	528.26	15.6152	723.31	12.8228
334.37	55.7696	529.59	26.3694	724.19	16.0345
338.28	35.5539	529.87	0.0000	727.33	16.0553
338.32	35.5555	531.02	22.4797	733.00	24.4606
311.90	35.6122	537.26	26.4749	735.93	12.8892
340.48	35.6122	546.56	0.0000	333.97	20.4210
340.55	35.6139	552.55	24.7080	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	18.3212	667.71	0.0000	1434.09	12.9532
747.24	21.5804	962.31	8.7476	1435.80	6.9778
748.06	15.1114	964.08	26.6074	1457.56	0.0000
752.31	19.4619	966.17	0.0000	1460.82	7.0188
753.82	11.9006	911.20	16.8316	1489.16	7.0645
756.73	16.2469	983.53	13.2120	1505.03	6.4824
756.80	16.2476	984.45	0.0000	1584.12	14.4307
884.68	19.5520	1274.44	13.2660	1596.21	12.4014
765.81	19.5667	1002.74	12.4068	1620.50	8.3105
766.84	19.5747	1004.73	15.0747	1621.92	6.2347
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	14.1907	1025.87	0.0000	1690.97	6.3252
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	22.9448	1037.84	14.3359	1764.49	5.3494
783.70	21.8929	1038.76	0.0000	1063.66	1.7138
788.74	19.7417	631.29	14.3740	1771.35	4.8976
792.07	30.7492	1048.07	18.6951	1791.20	0.0000
795.86	17.5964	1049.04	17.2617	1808.65	3.2375
810.06	11.6100	1050.41	14.3906	1810.72	0.0000
810.29	15.9234	1063.66	11.5586	1836.06	3.2547
344.28	17.2517	1077.00	11.7868		
810.76	16.5900	1077.34	9.9741		
815.77	15.5130	1085.87	9.9996		
1048.07	15.5290	1093.63	13.6670		
832.01	26.7549	1099.45	7.3018		
834.85	20.0867	1112.07	5.8629		
835.71	15.6281	1112.84	5.4976		
836.80	0.0000	1115.54	0.0000		
846.75	0.0000	1120.29	6.4279		
846.77	14.5705	1120.55	6.4283		
856.80	10.1239	1221.41	6.4296		
860.56	10.1375	1129.67	14.7324		
871.09	13.5674	1131.51	0.0000		
873.19	13.5776	1147.95	0.0000		
875.33	0.0000	1173.23	10.2534		
879.38	18.1432	1177.95	8.4001		
880.51	11.3440	1189.05	5.3498		
881.60	13.6182	1204.77	7.5225		
883.24	13.6260	1221.41	13.2233		
884.68	20.4492	1231.02	10.8224		
889.28	14.7927	1235.36	12.1352		
894.76	12.5406	1238.28	9.1084		
898.04	11.4136	1260.41	0.0000		
900.72	17.1362	1271.87	8.6149		
903.28	16.0081	1274.44	11.4946		
911.20	17.1985	1274.54	11.4946		
912.08	17.2034	1291.59	5.7726		
923.98	0.0000	1298.22	0.0000		
926.50	14.9831	1312.11	7.7373		
929.11	10.3817	1332.49	6.8052		
935.54	15.6066	1362.66	0.0000		
937.49	20.8220	1365.19	4.9002		
944.13	22.0275	1368.63	0.0000		
946.00	11.6007	1384.29	0.9846		
949.00	12.1927	1408.01	9.9030		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:36:18.09

****

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507017.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM28.CNF;692
Background date : 6-APR-2025 11:01:58.
Sample date : 7-MAR-2025 08:00:00. Acquisition date : 10-APR-2025 22:34:56
Sample ID : G714507017 Sample quantity : 1.18530E+02 GRAM
Detector name : GAM28 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.57 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

****

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.95*	22	100	1.03	94.10	91	7	6.18E-03	81.3	
2	0	64.63*	121	293	3.25	129.43	122	16	3.35E-02	33.2	
3	0	76.37*	446	425	3.20	152.91	146	16	1.24E-01	11.5	
4	4	84.35*	54	87	1.36	168.86	166	27	1.50E-02	32.7	1.34E+00
5	4	87.46	142	125	1.37	175.08	166	27	3.94E-02	16.7	
6	4	90.04	110	135	1.38	180.23	166	27	3.06E-02	22.0	
7	4	92.77*	153	149	1.39	185.69	166	27	4.25E-02	16.8	
8	0	144.39*	14	141	1.35	288.87	285	8	3.85E-03	152.5	
9	0	153.08	47	140	2.74	306.24	301	10	1.29E-02	49.8	
10	0	186.03*	178	173	1.23	372.11	367	11	4.93E-02	16.7	
11	0	209.52*	33	88	1.32	419.08	416	7	9.07E-03	51.8	
12	3	238.72*	400	84	1.24	477.44	467	22	1.11E-01	6.3	4.36E+00
13	3	241.88	180	95	1.52	483.76	467	22	5.01E-02	12.9	
14	0	270.31	68	71	2.78	540.59	536	10	1.90E-02	26.0	
15	0	287.56	23	47	1.74	575.08	571	7	6.27E-03	54.8	
16	3	295.37	304	46	1.23	590.69	585	18	8.46E-02	6.8	1.32E+00
17	3	299.80	32	36	1.60	599.55	585	18	8.89E-03	35.0	
18	10	335.87	13	56	2.02	671.67	669	14	3.58E-03	93.3	2.25E+00
19	10	338.39	44	88	1.50	676.70	669	14	1.22E-02	42.3	
20	0	351.99*	557	86	1.25	703.88	698	13	1.55E-01	5.5	
21	0	403.14	16	26	1.08	806.14	802	7	4.45E-03	58.6	
22	0	407.00	28	47	3.50	813.87	808	11	7.81E-03	50.7	
23	0	478.07	61	41	1.01	955.96	950	12	1.70E-02	24.7	
24	0	511.20*	41	51	2.58	1022.19	1015	16	1.13E-02	49.3	
25	0	527.82	14	38	0.58	1055.42	1047	13	3.95E-03	93.9	
26	0	547.26	36	12	1.00	1094.28	1088	12	1.01E-02	25.3	
27	0	583.08*	120	28	1.21	1165.90	1159	14	3.34E-02	13.4	
28	0	609.33*	400	32	1.32	1218.40	1211	13	1.11E-01	5.8	
29	0	666.87	47	8	6.13	1333.44	1327	15	1.29E-02	19.5	
30	0	727.20	55	25	1.61	1454.08	1446	17	1.53E-02	25.0	
31	0	768.49	29	21	1.30	1536.65	1533	8	7.94E-03	34.6	
32	0	785.67	25	8	1.41	1570.99	1566	10	7.05E-03	28.3	
33	0	859.86	23	20	1.53	1719.36	1713	13	6.25E-03	45.6	
34	0	911.40*	91	10	2.01	1822.42	1817	15	2.54E-02	13.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	917.94	13	6	2.45	1835.49	1831	9	3.49E-03	46.6	
36	0	969.41*	40	25	1.54	1938.42	1929	14	1.11E-02	31.4	
37	0	1028.65	11	8	4.27	2056.89	2050	11	3.13E-03	57.3	
38	0	1042.43	6	10	0.54	2084.45	2074	13	1.75E-03	109.4	
39	0	1092.87	10	8	2.29	2185.33	2174	13	2.90E-03	59.9	
40	0	1120.53	73	26	1.55	2240.64	2233	15	2.04E-02	19.1	
41	0	1237.94	21	26	2.68	2475.47	2468	13	5.93E-03	53.7	
42	0	1377.42	42	3	1.27	2754.45	2749	11	1.18E-02	17.1	
43	0	1407.69	24	3	1.91	2814.99	2809	11	6.72E-03	24.3	
44	0	1413.34	9	2	3.26	2826.29	2821	9	2.50E-03	44.5	
45	0	1418.69	7	0	1.50	2837.00	2834	6	1.94E-03	37.8	
46	0	1425.61	12	0	0.58	2850.83	2844	13	3.33E-03	28.9	
47	0	1461.01*	46	13	0.77	2921.64	2916	11	1.28E-02	22.4	
48	0	1510.62	6	13	1.55	3020.88	3014	10	1.73E-03	114.1	
49	0	1593.66	8	9	0.52	3186.99	3180	10	2.27E-03	79.3	
50	0	1729.72	12	7	1.82	3459.17	3454	9	3.44E-03	47.3	
51	0	1764.43*	92	0	2.48	3528.62	3522	13	2.54E-02	10.6	
52	0	1950.06	6	0	1.44	3900.00	3896	8	1.67E-03	40.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:36:19

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507017.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 7-MAR-2025 08:00:00 Acquisition date : 10-APR-2025 22:34:56
Sample ID : G714507017 Sample quantity : 118.53 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA28 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.57 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	3.063E+00	1.213E+00	1.904E+00	49.30	OK
K-40	1460.82	10.66*	1.187E+00	2.173E+00	2.173E+00	44.87	OK
CD-109	88.03	3.70*	5.755E+00	4.567E+00	4.811E+00	33.35	OK
SN-126	64.28	9.60	3.050E+00	2.864E+00	2.864E+00	66.38	OK
	86.94	8.90	5.755E+00	1.899E+00	1.899E+00	33.35	OK
	87.57	37.00*	5.755E+00	4.567E-01	4.567E-01	33.35	OK
TL-208	277.37	6.60	4.426E+00	----- Line	Not Found	-----	Absent
	583.19	85.00*	2.649E+00	3.351E-01	3.351E-01	26.75	OK
	860.56	12.50	1.915E+00	5.781E-01	5.781E-01	91.25	OK
BI-210	46.54	4.25*	6.321E-01	5.833E+00	5.850E+00	162.54	OK
PB-210	46.54	4.25*	6.321E-01	5.833E+00	5.850E+00	162.54	OK
BI-211	72.87	1.23	4.235E+00	----- Line	Not Found	-----	Absent
	351.06	12.92*	3.774E+00	7.343E+00	7.343E+00	10.91	OK
BI-212	727.33	6.67*	2.218E+00	2.303E+00	2.303E+00	49.98	OK
	1620.50	1.47	1.103E+00	----- Line	Not Found	-----	Absent
PB-212	74.82	10.28	4.486E+00	----- Line	Not Found	-----	Absent
	77.11	17.10	4.675E+00	3.844E+00	3.844E+00	22.91	OK
	238.63	43.60*	4.892E+00	1.228E+00	1.228E+00	12.50	OK
	300.09	3.30	4.202E+00	1.494E+00	1.494E+00	70.03	OK
BI-214	609.32	45.49*	2.560E+00	2.150E+00	2.151E+00	11.66	OK
	1120.29	14.92	1.498E+00	1.996E+00	1.996E+00	38.24	OK
	1764.49	15.30	1.052E+00	3.375E+00	3.375E+00	21.24	OK
PB-214	74.82	5.80	4.486E+00	----- Line	Not Found	-----	Absent
	77.11	9.70	4.675E+00	6.777E+00	6.777E+00	22.91	OK
	87.09	3.41	5.755E+00	4.955E+00	4.955E+00	33.35	OK
	242.00	7.25	4.850E+00	3.357E+00	3.357E+00	25.90	OK
	295.22	18.42	4.244E+00	2.523E+00	2.524E+00	13.54	OK
	351.93	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91	OK
RN-219	271.23	10.80	4.503E+00	9.134E-01	9.134E-01	51.91	OK
	401.81	6.60*	3.445E+00	4.495E-01	4.495E-01	117.13	OK
RN-222	609.32	45.49*	2.560E+00	2.150E+00	2.151E+00	11.66	OK
	1120.29	14.92	1.498E+00	1.996E+00	1.996E+00	38.24	OK
	1764.49	15.30	1.052E+00	3.375E+00	3.375E+00	21.24	OK
RA-224	240.99	4.10*	4.850E+00	5.936E+00	5.936E+00	25.90	OK
RA-226	74.82	5.80	4.486E+00	----- Line	Not Found	-----	Absent
	77.11	9.70	4.675E+00	6.777E+00	6.777E+00	22.91	OK
	87.09	3.41	5.755E+00	4.955E+00	4.955E+00	33.35	OK
	242.00	7.25	4.850E+00	3.357E+00	3.357E+00	25.90	OK
	295.22	18.42	4.244E+00	2.523E+00	2.524E+00	13.54	OK
	351.93	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91	OK
AC-228	105.21	1.10	6.597E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.875E+00	6.448E-01	6.448E-01	84.61	OK
	835.71	1.61	1.965E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.816E+00	1.195E+00	1.195E+00	26.62	OK
	968.97	15.80	1.715E+00	9.054E-01	9.054E-01	62.71	OK
RA-228	105.21	1.10	6.597E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.875E+00	6.448E-01	6.448E-01	84.61	OK
	835.71	1.61	1.965E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.816E+00	1.195E+00	1.195E+00	26.62	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	968.97	15.80	1.715E+00	9.054E-01	9.054E-01	62.71	OK
TH-228	74.82	10.28	4.486E+00	----- Line Not Found		-----	Absent
	77.11	17.10	4.675E+00	3.844E+00	3.844E+00	22.91	OK
	238.63	43.60*	4.892E+00	1.228E+00	1.228E+00	12.50	OK
	300.09	3.30	4.202E+00	1.494E+00	1.494E+00	70.03	OK
TH-229	85.43	14.70	5.501E+00	4.592E-01	4.592E-01	65.49	OK
	88.47	24.00	5.755E+00	7.040E-01	7.041E-01	33.35	OK
	193.51	4.41*	5.601E+00	----- Line Not Found		-----	Absent
	210.85	2.80	5.328E+00	1.441E+00	1.441E+00	103.51	OK
TH-230	74.82	5.80	4.486E+00	----- Line Not Found		-----	Absent
	77.11	9.70	4.675E+00	6.777E+00	6.777E+00	22.91	OK
	87.09	3.41	5.755E+00	4.955E+00	4.955E+00	33.35	OK
	242.00	7.25	4.850E+00	3.357E+00	3.357E+00	25.90	OK
	295.22	18.42	4.244E+00	2.523E+00	2.523E+00	13.54	OK
	351.93	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91	OK
TH-232	105.21	1.10	6.597E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.875E+00	6.448E-01	6.448E-01	84.61	OK
	835.71	1.61	1.965E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.816E+00	1.195E+00	1.195E+00	26.62	OK
	968.97	15.80	1.715E+00	9.054E-01	9.054E-01	62.71	OK
PA-234M	63.29	3.70*	3.050E+00	7.430E+00	7.430E+00	66.38	OK
	92.59	4.23	6.108E+00	4.049E+00	4.049E+00	33.68	OK
TH-234	63.29	3.70*	3.050E+00	7.430E+00	7.430E+00	66.38	OK
	92.59	4.23	6.108E+00	4.049E+00	4.049E+00	33.68	OK
U-234	74.82	5.80	4.486E+00	----- Line Not Found		-----	Absent
	77.11	9.70	4.675E+00	6.777E+00	6.777E+00	22.91	OK
	87.09	3.41	5.755E+00	4.955E+00	4.955E+00	33.35	OK
	242.00	7.25	4.850E+00	3.357E+00	3.357E+00	25.90	OK
	295.22	18.42	4.244E+00	2.523E+00	2.523E+00	13.54	OK
	351.93	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91	OK
U-235	89.96	3.47	5.939E+00	3.664E+00	3.664E+00	43.92	OK
	93.35	5.60	6.108E+00	3.058E+00	3.058E+00	33.68	OK
	143.76	10.96*	6.505E+00	1.303E-01	1.303E-01	304.92	OK
	163.33	5.08	6.164E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.736E+00	3.585E-01	3.585E-01	33.30	OK
	205.31	5.01	5.397E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	3.050E+00	7.430E+00	7.430E+00	66.38	OK
	92.59	4.23	6.108E+00	4.049E+00	4.049E+00	33.68	OK
CM-247	278.00	3.40	4.419E+00	----- Line Not Found		-----	Absent
	287.50	2.00	4.320E+00	1.694E+00	1.694E+00	109.56	OK
	402.40	72.00*	3.445E+00	4.120E-02	4.120E-02	117.13	OK
ANH-511	511.00	100.00*	2.920E+00	8.828E-02	8.828E-02	98.51	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:36:20.45

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507017.CNF;1    *
* Acquisition date : 10-APR-2025 22:34:56 Sensitivity     : 3.000            *
* Detector ID      : GAM28                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.57     Half life ratio : *****            *
* Sample date      :  7-MAR-2025 08:00:00 Analyst initials: MXR1             *
* Sample ID        : G714507017           Sample Quantity : 1.1853E+02 GRAM  *
* Batch Number     : 2767515              Wet Weight      :    0.00000       *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000       *
* Nuclide Library  : SOLID.NLB;18                                           *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 10-MAR-2025 08:48:04 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_CAN.CNF;21             *
**********************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.904E+00	9.198E-01	7.643E-01
K-40	2.173E+00	9.557E-01	8.141E-01
CD-109	4.811E+00	1.572E+00	1.384E+00
SN-126	4.567E-01	1.493E-01	1.321E-01
TL-208	3.351E-01	8.786E-02	6.078E-02
BI-210	5.850E+00	9.319E+00	1.000E+01
PB-210	5.850E+00	9.319E+00	1.000E+01
BI-211	7.343E+00	7.852E-01	3.656E-01
BI-212	2.303E+00	1.128E+00	7.220E-01
PB-212	1.228E+00	1.505E-01	1.132E-01
BI-214	2.151E+00	2.457E-01	1.322E-01
PB-214	2.665E+00	2.850E-01	1.330E-01
RN-219	4.495E-01	5.160E-01	8.347E-01
RN-222	2.151E+00	2.457E-01	1.322E-01
RA-224	5.936E+00	1.506E+00	1.213E+00
RA-226	2.665E+00	2.850E-01	1.330E-01
AC-228	1.195E+00	3.119E-01	1.977E-01
RA-228	1.195E+00	3.119E-01	1.977E-01
TH-228	1.228E+00	1.505E-01	1.132E-01
TH-229	-6.515E-01	6.650E-01	1.092E+00
TH-230	2.665E+00	2.850E-01	1.329E-01
TH-232	1.195E+00	3.119E-01	1.977E-01
PA-234M	7.430E+00	4.833E+00	2.561E+00
TH-234	7.430E+00	4.833E+00	2.561E+00
U-234	2.665E+00	2.850E-01	1.329E-01
U-235	1.303E-01	3.893E-01	4.021E-01
U-238	7.430E+00	4.833E+00	2.561E+00
CM-247	4.120E-02	4.730E-02	6.491E-02
ANH-511	8.828E-02	8.523E-02	5.848E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	9.680E-04	3.590E-02	7.518E-02	NOT IDENT.

NA-24	0.000E+00	1.349E+15	0.000E+00	SHORT HLIF
AL-26	-2.157E-02	4.131E-02	6.931E-02	NOT IDENT.
SC-46	1.822E-03	5.026E-02	9.580E-02	FAIL ABUN
V-48	7.279E-04	1.603E-01	3.079E-01	NOT IDENT.
CR-51	1.870E-01	7.207E-01	1.304E+00	NOT IDENT.
MN-52	1.142E+00	2.824E+00	6.290E+00	NOT IDENT.
MN-54	-5.666E-03	4.062E-02	7.518E-02	NOT IDENT.
CO-56	-2.127E-02	5.148E-02	9.091E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	2.403E-02	3.033E-02	5.858E-02	NOT IDENT.
CO-58	-1.760E-02	4.059E-02	7.275E-02	NOT IDENT.
FE-59	-3.109E-02	1.104E-01	1.994E-01	NOT IDENT.
CO-60	4.353E-02	3.901E-02	9.537E-02	NOT IDENT.
ZN-65	2.755E-02	8.458E-02	1.597E-01	NOT IDENT.
GE-68	1.469E+00	1.227E+00	2.885E+00	NOT IDENT.
AS-73	9.179E-01	1.196E+00	2.447E+00	NOT IDENT.
AS-74	-1.397E-01	1.832E-01	3.152E-01	NOT IDENT.
SE-75	1.042E-02	5.983E-02	1.077E-01	NOT IDENT.
BR-77	0.000E+00	6.910E+03	0.000E+00	SHORT HLIF
SR-82	3.768E-01	5.396E-01	1.154E+00	NOT IDENT.
RB-83	-1.761E-02	7.815E-02	1.479E-01	NOT IDENT.
RB-84	-1.057E-02	1.014E-01	1.927E-01	NOT IDENT.
KR-85	2.712E+00	7.540E+00	1.380E+01	NOT IDENT.
SR-85	1.748E-02	4.903E-02	8.970E-02	NOT IDENT.
RB-86	1.226E+00	1.570E+00	3.446E+00	NOT IDENT.
Y-88	-7.984E-04	5.337E-02	1.089E-01	NOT IDENT.
Y-91	-7.516E+00	2.036E+01	3.921E+01	NOT IDENT.
NB-94	1.983E-02	2.952E-02	6.303E-02	NOT IDENT.
NB-95	8.803E-03	6.456E-02	1.108E-01	NOT IDENT.
NB-95M	1.535E-01	1.744E-01	3.317E-01	NOT IDENT.
ZR-95	2.039E-02	8.738E-02	1.737E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.021E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.037E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.080E+40	0.000E+00	SHORT HLIF
RH-101	-5.043E-03	3.581E-02	6.478E-02	NOT IDENT.
RH-102	1.599E-02	5.001E-02	1.021E-01	NOT IDENT.
RU-103	3.460E-02	5.184E-02	1.098E-01	FAIL ABUN
RH-106	2.887E-01	3.158E-01	6.842E-01	NOT IDENT.
RU-106	2.887E-01	3.158E-01	6.842E-01	NOT IDENT.
AG-108M	-1.611E-02	2.874E-02	5.243E-02	NOT IDENT.
AG-110	-2.685E-02	6.060E-01	1.192E+00	NOT IDENT.
AG-110M	-3.760E-02	5.384E-02	8.955E-02	NOT IDENT.
SN-113	-2.173E-03	5.118E-02	9.912E-02	NOT IDENT.
CD-115	0.000E+00	1.007E+04	0.000E+00	SHORT HLIF
SN-117M	4.324E-02	1.618E-01	2.994E-01	NOT IDENT.
SB-122	0.000E+00	3.029E+02	0.000E+00	SHORT HLIF
TE-123M	2.129E-02	3.408E-02	6.491E-02	NOT IDENT.
SB-124	3.695E-02	1.023E-01	2.408E-01	NOT IDENT.
SB-125	5.572E-03	9.723E-02	1.893E-01	NOT IDENT.
TE-125M	6.212E-01	1.279E+01	2.372E+01	NOT IDENT.
I-126	0.000E+00	9.031E-01	1.425E+00	FAIL ABUN
SB-126	1.269E-01	3.969E-01	7.458E-01	FAIL ABUN
SB-127	3.167E+01	4.331E+01	9.179E+01	NOT IDENT.
I-131	1.728E-01	6.597E-01	1.314E+00	NOT IDENT.
I-132	0.000E+00	3.820E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.910E+01	0.000E+00	SHORT HLIF
BA-133	3.591E-02	4.666E-02	8.995E-02	NOT IDENT.
I-133	0.000E+00	3.825E+10	0.000E+00	SHORT HLIF
CS-134	2.125E-02	4.361E-02	8.862E-02	NOT IDENT.
I-135	0.000E+00	1.256E+37	0.000E+00	SHORT HLIF
CS-136	1.724E-01	2.868E-01	6.109E-01	FAIL ABUN
BA-137M	2.355E-02	2.752E-02	5.944E-02	NOT IDENT.
CS-137	2.488E-02	2.907E-02	6.279E-02	NOT IDENT.
LA-138	5.897E-02	6.404E-02	1.512E-01	NOT IDENT.
CE-139	-1.017E-03	3.871E-02	6.956E-02	NOT IDENT.
BA-140	1.861E-01	6.114E-01	1.273E+00	NOT IDENT.
LA-140	9.985E-02	3.315E-01	6.446E-01	NOT IDENT.
CE-141	6.187E-02	1.849E-01	2.032E-01	FAIL ABUN
CE-143	0.000E+00	2.582E+06	0.000E+00	SHORT HLIF
CE-144	-1.021E-01	2.385E-01	4.209E-01	NOT IDENT.
PM-144	8.537E-03	3.231E-02	6.498E-02	FAIL ABUN
PR-144	6.365E-01	2.441E+00	4.908E+00	NOT IDENT.
PM-146	-2.021E-02	3.881E-02	7.113E-02	NOT IDENT.
ND-147	2.051E-01	1.987E+00	3.550E+00	FAIL ABUN
PM-147	3.521E+02	8.238E+02	1.559E+03	NOT IDENT.
PM-149	0.000E+00	4.655E+04	0.000E+00	SHORT HLIF
EU-150	2.123E-02	3.162E-02	5.642E-02	FAIL ABUN

EU-152	-3.238E-02	1.066E-01	1.808E-01	FAIL ABUN
GD-153	-4.050E-02	1.057E-01	1.756E-01	NOT IDENT.
EU-154	5.458E-03	1.014E-01	2.132E-01	NOT IDENT.
EU-155	-1.324E-02	1.091E-01	2.006E-01	FAIL ABUN
TB-160	3.021E-02	1.643E-01	3.234E-01	FAIL ABUN
HO-166M	4.158E-02	5.784E-02	1.229E-01	NOT IDENT.
TM-171	-1.371E+01	2.301E+01	4.241E+01	NOT IDENT.
HF-172	1.603E-02	2.070E-01	3.819E-01	NOT IDENT.
LU-172	6.807E-02	7.990E-02	1.192E-01	FAIL ABUN
LU-176	2.388E-03	3.126E-02	5.558E-02	FAIL ABUN
HF-181	5.538E-02	5.486E-02	1.150E-01	NOT IDENT.
TA-182	1.875E-02	1.466E-01	3.169E-01	FAIL ABUN
RE-183	-1.084E-03	2.851E-01	5.454E-01	NOT IDENT.
RE-184	-3.151E-02	2.058E-01	3.781E-01	NOT IDENT.
W-188	-1.044E+00	1.110E+01	1.565E+01	FAIL ABUN
IR-192	-1.414E-02	4.464E-02	7.608E-02	FAIL ABUN
HG-203	-1.084E-02	6.343E-02	1.097E-01	NOT IDENT.
TL-204	1.842E-01	5.622E+00	9.854E+00	NOT IDENT.
BI-207	-3.180E-02	5.142E-02	8.514E-02	FAIL ABUN
PB-211	0.000E+00	6.857E-01	1.548E+00	NOT IDENT.
BI-213	1.589E-01	9.650E-02	2.226E-01	NOT IDENT.
RA-223	4.492E-03	7.406E-01	1.304E+00	FAIL ABUN
AC-225	-1.438E+00	2.589E+00	4.382E+00	NOT IDENT.
AC-227	1.138E-02	2.883E-01	5.146E-01	FAIL ABUN
TH-227	1.138E-02	2.883E-01	5.146E-01	FAIL ABUN
PA-231	3.842E-01	5.698E-01	1.011E+00	NOT IDENT.
TH-231	4.492E-03	7.406E-01	1.304E+00	FAIL ABUN
PA-233	5.891E-02	7.364E-02	1.417E-01	FAIL ABUN
PA-234	1.334E-01	2.182E-01	4.984E-01	NOT IDENT.
NP-237	5.891E-02	7.364E-02	1.417E-01	FAIL ABUN
NP-238	0.000E+00	1.146E+04	0.000E+00	SHORT HLIF
NP-239	-1.324E-01	2.681E-01	4.762E-01	NOT IDENT.
PU-239	-1.020E+01	3.811E+02	6.943E+02	NOT IDENT.
AM-241	4.686E-03	1.748E-01	3.129E-01	NOT IDENT.
AM-243	0.000E+00	7.926E-02	1.722E-01	NOT IDENT.
CM-243	3.998E-02	1.013E-01	1.948E-01	NOT IDENT.
BK-247	4.183E-02	9.640E-02	1.778E-01	FAIL ABUN
CF-249	8.184E-04	3.863E-02	7.571E-02	NOT IDENT.
CF-251	1.018E-01	1.521E-01	2.871E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:36:18.91

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	61	10.44*	3.063E+00	1.213E+00	1.904E+00	49.30
K-40	1460.82	43	10.66*	1.187E+00	2.173E+00	2.173E+00	44.87
CD-109	88.03	154	3.70*	5.755E+00	4.567E+00	4.811E+00	33.35
SN-126	64.28	132	9.60	3.050E+00	2.864E+00	2.864E+00	66.38
	86.94	154	8.90	5.755E+00	1.899E+00	1.899E+00	33.35
	87.57	154	37.00*	5.755E+00	4.567E-01	4.567E-01	33.35
CE-141	145.44	15	48.29*	6.505E+00	2.957E-02	6.187E-02	304.92
TL-208	277.37	------	6.60	4.426E+00	------ Line Not Found		------
	583.19	119	85.00*	2.649E+00	3.351E-01	3.351E-01	26.75
	860.56	22	12.50	1.915E+00	5.781E-01	5.781E-01	91.25
BI-210	46.54	25	4.25*	6.321E-01	5.833E+00	5.850E+00	162.54
PB-210	46.54	25	4.25*	6.321E-01	5.833E+00	5.850E+00	162.54
BI-211	72.87	------	1.23	4.235E+00	------ Line Not Found		------
	351.06	565	12.92*	3.774E+00	7.343E+00	7.343E+00	10.91
BI-212	727.33	54	6.67*	2.218E+00	2.303E+00	2.303E+00	49.98
	1620.50	------	1.47	1.103E+00	------ Line Not Found		------
PB-212	74.82	------	10.28	4.486E+00	------ Line Not Found		------
	77.11	485	17.10	4.675E+00	3.844E+00	3.844E+00	22.91
	238.63	414	43.60*	4.892E+00	1.228E+00	1.228E+00	12.50
	300.09	33	3.30	4.202E+00	1.494E+00	1.494E+00	70.03
BI-214	609.32	395	45.49*	2.560E+00	2.150E+00	2.151E+00	11.66
	1120.29	70	14.92	1.498E+00	1.996E+00	1.996E+00	38.24
	1764.49	86	15.30	1.052E+00	3.375E+00	3.375E+00	21.24
PB-214	74.82	------	5.80	4.486E+00	------ Line Not Found		------
	77.11	485	9.70	4.675E+00	6.777E+00	6.777E+00	22.91
	87.09	154	3.41	5.755E+00	4.955E+00	4.955E+00	33.35
	242.00	186	7.25	4.850E+00	3.357E+00	3.357E+00	25.90
	295.22	311	18.42	4.244E+00	2.523E+00	2.524E+00	13.54
	351.93	565	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91
RN-219	271.23	70	10.80	4.503E+00	9.134E-01	9.134E-01	51.91
	401.81	16	6.60*	3.445E+00	4.495E-01	4.495E-01	117.13
RN-222	609.32	395	45.49*	2.560E+00	2.150E+00	2.151E+00	11.66
	1120.29	70	14.92	1.498E+00	1.996E+00	1.996E+00	38.24
	1764.49	86	15.30	1.052E+00	3.375E+00	3.375E+00	21.24
RA-224	240.99	186	4.10*	4.850E+00	5.936E+00	5.936E+00	25.90
RA-226	74.82	------	5.80	4.486E+00	------ Line Not Found		------
	77.11	485	9.70	4.675E+00	6.777E+00	6.777E+00	22.91
	87.09	154	3.41	5.755E+00	4.955E+00	4.955E+00	33.35
	242.00	186	7.25	4.850E+00	3.357E+00	3.357E+00	25.90
	295.22	311	18.42	4.244E+00	2.523E+00	2.524E+00	13.54
	351.93	565	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91
AC-228	105.21	------	1.10	6.597E+00	------ Line Not Found		------
	338.32	44	11.27	3.875E+00	6.448E-01	6.448E-01	84.61
	835.71	------	1.61	1.965E+00	------ Line Not Found		------
	911.20	88	25.80*	1.816E+00	1.195E+00	1.195E+00	26.62
	968.97	39	15.80	1.715E+00	9.054E-01	9.054E-01	62.71
RA-228	105.21	------	1.10	6.597E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	44	11.27	3.875E+00	6.448E-01	6.448E-01	84.61
	835.71	------	1.61	1.965E+00	------ Line Not Found		------
	911.20	88	25.80*	1.816E+00	1.195E+00	1.195E+00	26.62
	968.97	39	15.80	1.715E+00	9.054E-01	9.054E-01	62.71
TH-228	74.82	------	10.28	4.486E+00	------ Line Not Found		------
	77.11	485	17.10	4.675E+00	3.844E+00	3.844E+00	22.91
	238.63	414	43.60*	4.892E+00	1.228E+00	1.228E+00	12.50
	300.09	33	3.30	4.202E+00	1.494E+00	1.494E+00	70.03
TH-229	85.43	59	14.70	5.501E+00	4.592E-01	4.592E-01	65.49
	88.47	154	24.00	5.755E+00	7.040E-01	7.041E-01	33.35
	193.51	------	4.41*	5.601E+00	------ Line Not Found		------
	210.85	34	2.80	5.328E+00	1.441E+00	1.441E+00	103.51
TH-230	74.82	------	5.80	4.486E+00	------ Line Not Found		------
	77.11	485	9.70	4.675E+00	6.777E+00	6.777E+00	22.91
	87.09	154	3.41	5.755E+00	4.955E+00	4.955E+00	33.35
	242.00	186	7.25	4.850E+00	3.357E+00	3.357E+00	25.90
	295.22	311	18.42	4.244E+00	2.523E+00	2.523E+00	13.54
	351.93	565	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91
TH-232	105.21	------	1.10	6.597E+00	------ Line Not Found		------
	338.32	44	11.27	3.875E+00	6.448E-01	6.448E-01	84.61
	835.71	------	1.61	1.965E+00	------ Line Not Found		------
	911.20	88	25.80*	1.816E+00	1.195E+00	1.195E+00	26.62
	968.97	39	15.80	1.715E+00	9.054E-01	9.054E-01	62.71
PA-234M	63.29	132	3.70*	3.050E+00	7.430E+00	7.430E+00	66.38
	92.59	165	4.23	6.108E+00	4.049E+00	4.049E+00	33.68
TH-234	63.29	132	3.70*	3.050E+00	7.430E+00	7.430E+00	66.38
	92.59	165	4.23	6.108E+00	4.049E+00	4.049E+00	33.68
U-234	74.82	------	5.80	4.486E+00	------ Line Not Found		------
	77.11	485	9.70	4.675E+00	6.777E+00	6.777E+00	22.91
	87.09	154	3.41	5.755E+00	4.955E+00	4.955E+00	33.35
	242.00	186	7.25	4.850E+00	3.357E+00	3.357E+00	25.90
	295.22	311	18.42	4.244E+00	2.523E+00	2.523E+00	13.54
	351.93	565	35.60*	3.774E+00	2.665E+00	2.665E+00	10.91
U-235	89.96	119	3.47	5.939E+00	3.664E+00	3.664E+00	43.92
	93.35	165	5.60	6.108E+00	3.058E+00	3.058E+00	33.68
	143.76	15	10.96*	6.505E+00	1.303E-01	1.303E-01	304.92
	163.33	------	5.08	6.164E+00	------ Line Not Found		------
	185.72	186	57.20	5.736E+00	3.585E-01	3.585E-01	33.30
	205.31	------	5.01	5.397E+00	------ Line Not Found		------
U-238	63.29	132	3.70*	3.050E+00	7.430E+00	7.430E+00	66.38
	92.59	165	4.23	6.108E+00	4.049E+00	4.049E+00	33.68
CM-247	278.00	------	3.40	4.419E+00	------ Line Not Found		------
	287.50	23	2.00	4.320E+00	1.694E+00	1.694E+00	109.56
	402.40	16	72.00*	3.445E+00	4.120E-02	4.120E-02	117.13
ANH-511	511.00	41	100.00*	2.920E+00	8.828E-02	8.828E-02	98.51

Flag: "*" = Keyline

Sample ID : G714507017 Acquisition date : 10-APR-2025 22:34:56

Total number of lines in spectrum	52	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	38	73.08%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.57	1.213E+00	1.904E+00	0.939E+00	49.30	
K-40	1.25E+09Y	1.00	2.173E+00	2.173E+00	0.975E+00	44.87	
CD-109	461.40D	1.05	4.567E+00	4.811E+00	1.605E+00	33.35	
SN-126	2.30E+05Y	1.00	4.567E-01	4.567E-01	1.523E-01	33.35	
CE-141	32.51D	2.09	2.957E-02	6.187E-02	18.86E-02	304.92	
TL-208	1.41E+10Y	1.00	3.351E-01	3.351E-01	0.897E-01	26.75	
BI-210	22.20Y	1.00	5.833E+00	5.850E+00	9.509E+00	162.54	
PB-210	22.20Y	1.00	5.833E+00	5.850E+00	9.509E+00	162.54	
BI-211	7.04E+08Y	1.00	7.343E+00	7.343E+00	0.801E+00	10.91	
BI-212	1.41E+10Y	1.00	2.303E+00	2.303E+00	1.151E+00	49.98	
PB-212	1.41E+10Y	1.00	1.228E+00	1.228E+00	0.154E+00	12.50	
BI-214	1600.00Y	1.00	2.150E+00	2.151E+00	0.251E+00	11.66	
PB-214	1600.00Y	1.00	2.665E+00	2.665E+00	0.291E+00	10.91	
RN-219	7.04E+08Y	1.00	4.495E-01	4.495E-01	5.265E-01	117.13	
RN-222	1600.00Y	1.00	2.150E+00	2.151E+00	0.251E+00	11.66	
RA-224	1.41E+10Y	1.00	5.936E+00	5.936E+00	1.537E+00	25.90	
RA-226	1600.00Y	1.00	2.665E+00	2.665E+00	0.291E+00	10.91	
AC-228	1.41E+10Y	1.00	1.195E+00	1.195E+00	0.318E+00	26.62	
RA-228	1.41E+10Y	1.00	1.195E+00	1.195E+00	0.318E+00	26.62	
TH-228	1.41E+10Y	1.00	1.228E+00	1.228E+00	0.154E+00	12.50	
TH-229	7340.00Y	1.00	7.040E-01	7.041E-01	2.348E-01	33.35	K
TH-230	7.54E+04Y	1.00	2.665E+00	2.665E+00	0.291E+00	10.91	
TH-232	1.41E+10Y	1.00	1.195E+00	1.195E+00	0.318E+00	26.62	
PA-234M	4.47E+09Y	1.00	7.430E+00	7.430E+00	4.932E+00	66.38	
TH-234	4.47E+09Y	1.00	7.430E+00	7.430E+00	4.932E+00	66.38	
U-234	2.45E+05Y	1.00	2.665E+00	2.665E+00	0.291E+00	10.91	
U-235	7.04E+08Y	1.00	1.303E-01	1.303E-01	3.972E-01	304.92	
U-238	4.47E+09Y	1.00	7.430E+00	7.430E+00	4.932E+00	66.38	
CM-247	1.56E+07Y	1.00	4.120E-02	4.120E-02	4.826E-02	117.13	
ANH-511	1.00E+09Y	1.00	8.828E-02	8.828E-02	8.697E-02	98.51	
Total Activity :			8.073E+01	8.173E+01			
Grand Total Activity :			8.073E+01	8.173E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	153.08	49	148	2.74	306.24	301	10	1.29E-02	99.6	6.36E+00	T
10	335.87	13	57	2.02	671.67	669	14	3.58E-03	****	3.89E+00	
0	407.00	28	47	3.50	813.87	808	11	7.81E-03	****	3.42E+00	
0	527.82	14	38	0.58	1055.42	1047	13	3.95E-03	****	2.85E+00	T
0	547.26	36	12	1.00	1094.28	1088	12	1.01E-02	50.7	2.78E+00	T
0	666.87	46	7	6.13	1333.44	1327	15	1.29E-02	39.0	2.38E+00	T
0	768.49	28	21	1.30	1536.65	1533	8	7.94E-03	69.3	2.12E+00	
0	785.67	25	7	1.41	1570.99	1566	10	7.05E-03	56.7	2.08E+00	
0	917.94	12	6	2.45	1835.49	1831	9	3.49E-03	93.2	1.80E+00	
0	1028.65	11	7	4.27	2056.89	2050	11	3.13E-03	****	1.62E+00	T
0	1042.43	6	9	0.54	2084.45	2074	13	1.75E-03	****	1.60E+00	
0	1092.87	10	7	2.29	2185.33	2174	13	2.90E-03	****	1.53E+00	T
0	1237.94	20	24	2.68	2475.47	2468	13	5.93E-03	****	1.37E+00	T
0	1377.42	40	2	1.27	2754.45	2749	11	1.18E-02	34.2	1.24E+00	
0	1407.69	23	3	1.91	2814.99	2809	11	6.72E-03	48.6	1.22E+00	T
0	1413.34	9	2	3.26	2826.29	2821	9	2.50E-03	89.1	1.22E+00	
0	1418.69	7	0	1.50	2837.00	2834	6	1.94E-03	75.6	1.21E+00	
0	1425.61	11	0	0.58	2850.83	2844	13	3.33E-03	57.7	1.21E+00	
0	1510.62	6	12	1.55	3020.88	3014	10	1.73E-03	****	1.16E+00	
0	1593.66	8	8	0.52	3186.99	3180	10	2.27E-03	****	1.11E+00	
0	1729.72	12	6	1.82	3459.17	3454	9	3.44E-03	94.5	1.06E+00	
0	1950.06	6	0	1.44	3900.00	3896	8	1.67E-03	81.6	1.02E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:36:30.74

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507017.CNF;1    *
* Acquisition date : 10-APR-2025 22:34:56 Sensitivity     : 3.000          *
* Detector ID      : GAM28                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.57     Half life ratio : *****          *
* Sample date      :  7-MAR-2025 08:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507017           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 1.1853E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 10-MAR-2025 08:48:04 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_CAN.CNF;21          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	3.399E-01
K-40	3.396E-01
CD-109	6.489E-01
SN-126	6.195E-02
TL-208	2.656E-02
BI-210	4.650E+00
PB-210	4.650E+00
BI-211	1.651E-01
BI-212	3.029E-01
PB-212	5.255E-02
BI-214	5.874E-02
PB-214	6.004E-02
RN-219	3.795E-01
RN-222	5.874E-02
RA-224	5.630E-01
RA-226	6.004E-02
AC-228	8.056E-02
RA-228	8.056E-02
TH-228	5.255E-02
TH-229	5.109E-01
TH-230	6.004E-02
TH-232	8.056E-02
PA-234M	1.197E+00
TH-234	1.197E+00
U-234	6.004E-02
U-235	1.888E-01
U-238	1.197E+00
CM-247	2.898E-02
ANH-511	2.629E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	3.100E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF

AL-26	2.645E-02	NOT IDENT.
SC-46	4.175E-02	FAIL ABUN
V-48	1.312E-01	NOT IDENT.
CR-51	6.003E-01	NOT IDENT.
MN-52	2.626E+00	NOT IDENT.
MN-54	3.288E-02	NOT IDENT.
CO-56	3.943E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.764E-02	NOT IDENT.
CO-58	3.037E-02	NOT IDENT.
FE-59	8.265E-02	NOT IDENT.
CO-60	4.093E-02	NOT IDENT.
ZN-65	6.744E-02	NOT IDENT.
GE-68	1.256E+00	NOT IDENT.
AS-73	1.140E+00	NOT IDENT.
AS-74	1.360E-01	NOT IDENT.
SE-75	4.993E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.071E-01	NOT IDENT.
RB-83	6.518E-02	NOT IDENT.
RB-84	8.256E-02	NOT IDENT.
KR-85	6.213E+00	NOT IDENT.
SR-85	4.038E-02	NOT IDENT.
RB-86	1.492E+00	NOT IDENT.
Y-88	4.405E-02	NOT IDENT.
Y-91	1.606E+01	NOT IDENT.
NB-94	2.774E-02	NOT IDENT.
NB-95	4.950E-02	NOT IDENT.
NB-95M	1.556E-01	NOT IDENT.
ZR-95	7.613E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.044E-02	NOT IDENT.
RH-102	4.479E-02	NOT IDENT.
RU-103	4.907E-02	FAIL ABUN
RH-106	3.054E-01	NOT IDENT.
RU-106	3.054E-01	NOT IDENT.
AG-108M	2.330E-02	NOT IDENT.
AG-110	5.087E-01	NOT IDENT.
AG-110M	3.781E-02	NOT IDENT.
SN-113	4.489E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.403E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.043E-02	NOT IDENT.
SB-124	9.555E-02	NOT IDENT.
SB-125	8.570E-02	NOT IDENT.
TE-125M	1.112E+01	NOT IDENT.
I-126	6.424E-01	FAIL ABUN
SB-126	3.230E-01	FAIL ABUN
SB-127	4.078E+01	NOT IDENT.
I-131	5.998E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.123E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.926E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.639E-01	FAIL ABUN
BA-137M	2.572E-02	NOT IDENT.
CS-137	2.717E-02	NOT IDENT.
LA-138	6.476E-02	NOT IDENT.
CE-139	3.267E-02	NOT IDENT.
BA-140	5.541E-01	NOT IDENT.
LA-140	2.696E-01	NOT IDENT.
CE-141	9.578E-02	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	1.976E-01	NOT IDENT.
PM-144	2.848E-02	FAIL ABUN
PR-144	2.151E+00	NOT IDENT.
PM-146	3.133E-02	NOT IDENT.
ND-147	1.569E+00	FAIL ABUN
PM-147	7.332E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.590E-02	FAIL ABUN
EU-152	8.188E-02	FAIL ABUN

GD-153	8.257E-02	NOT IDENT.
EU-154	8.813E-02	NOT IDENT.
EU-155	9.393E-02	FAIL ABUN
TB-160	1.405E-01	FAIL ABUN
HO-166M	5.442E-02	NOT IDENT.
TM-171	1.964E+01	NOT IDENT.
HF-172	1.791E-01	NOT IDENT.
LU-172	5.039E-02	FAIL ABUN
LU-176	2.556E-02	FAIL ABUN
HF-181	5.132E-02	NOT IDENT.
TA-182	1.302E-01	FAIL ABUN
RE-183	2.549E-01	NOT IDENT.
RE-184	1.648E-01	NOT IDENT.
W-188	7.117E+00	FAIL ABUN
IR-192	3.447E-02	FAIL ABUN
HG-203	5.081E-02	NOT IDENT.
TL-204	4.641E+00	NOT IDENT.
BI-207	3.526E-02	FAIL ABUN
PB-211	7.074E-01	NOT IDENT.
BI-213	1.011E-01	NOT IDENT.
RA-223	5.979E-01	FAIL ABUN
AC-225	2.030E+00	NOT IDENT.
AC-227	2.378E-01	FAIL ABUN
TH-227	2.378E-01	FAIL ABUN
PA-231	4.670E-01	NOT IDENT.
TH-231	5.979E-01	FAIL ABUN
PA-233	6.537E-02	FAIL ABUN
PA-234	2.085E-01	NOT IDENT.
NP-237	6.537E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.218E-01	NOT IDENT.
PU-239	3.266E+02	NOT IDENT.
AM-241	1.456E-01	NOT IDENT.
AM-243	8.322E-02	NOT IDENT.
CM-243	9.099E-02	NOT IDENT.
BK-247	8.257E-02	FAIL ABUN
CF-249	3.415E-02	NOT IDENT.
CF-251	1.350E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:36:34.97

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507017.CNF;1		
Acquisition date	: 10-APR-2025 22:34:56	Sensitivity	: 3.000
Detector ID	: GAM28	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.57	Half life ratio	: *****
Sample date	: 7-MAR-2025 08:00:00	Nuclide Library	: SOLID
Sample ID	: G714507017	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.1853E+02 GRAM
		Quantity Err(%)	: 1.6873E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 10-MAR-2025 08:48:04	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM28_CAN.CNF;21		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.904E+00	9.348E-01	9.348E-01
K-40	2.173E+00	9.887E-01	9.887E-01
CD-109	4.811E+00	1.648E+00	1.648E+00
SN-126	4.567E-01	1.546E-01	1.546E-01
TL-208	3.351E-01	9.252E-02	9.252E-02
BI-210	5.850E+00	9.339E+00	9.339E+00
PB-210	5.850E+00	9.339E+00	9.339E+00
BI-211	7.343E+00	1.051E+00	1.051E+00
BI-212	2.303E+00	1.151E+00	1.151E+00
PB-212	1.228E+00	1.910E-01	1.910E-01
BI-214	2.151E+00	3.071E-01	3.071E-01
PB-214	2.665E+00	3.790E-01	3.790E-01
RN-219	4.495E-01	5.202E-01	5.202E-01
RN-222	2.151E+00	3.071E-01	3.071E-01
RA-224	5.936E+00	1.612E+00	1.612E+00
RA-226	2.665E+00	3.790E-01	3.790E-01
AC-228	1.195E+00	3.515E-01	3.515E-01
RA-228	1.195E+00	3.515E-01	3.515E-01
TH-228	1.228E+00	1.910E-01	1.910E-01
TH-229	-6.515E-01	6.671E-01	6.671E-01
TH-230	2.665E+00	3.790E-01	3.790E-01
TH-232	1.195E+00	3.515E-01	3.515E-01
PA-234M	7.430E+00	5.131E+00	5.131E+00
TH-234	7.430E+00	5.131E+00	5.131E+00
U-234	2.665E+00	3.790E-01	3.790E-01
U-235	1.303E-01	3.894E-01	3.894E-01
U-238	7.430E+00	5.131E+00	5.131E+00
CM-247	4.120E-02	4.790E-02	4.790E-02
ANH-511	8.828E-02	8.558E-02	8.558E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	9.680E-04	3.590E-02	3.591E-02	NOT IDENT.

NA-24	6.593E+14	1.351E+15	1.384E+15	SHORT HLIF
AL-26	-2.157E-02	4.135E-02	4.248E-02	NOT IDENT.
SC-46	1.822E-03	5.026E-02	5.027E-02	FAIL ABUN
V-48	7.279E-04	1.603E-01	1.603E-01	NOT IDENT.
CR-51	1.870E-01	7.210E-01	7.259E-01	NOT IDENT.
MN-52	1.142E+00	2.827E+00	2.873E+00	NOT IDENT.
MN-54	-5.666E-03	4.063E-02	4.071E-02	NOT IDENT.
CO-56	-2.127E-02	5.155E-02	5.243E-02	FAIL ABUN
MN-56	-1.000E+41	2.424E+41	0.000E+00	SHORT HLIF
CO-57	2.403E-02	3.039E-02	3.226E-02	NOT IDENT.
CO-58	-1.760E-02	4.064E-02	4.140E-02	NOT IDENT.
FE-59	-3.109E-02	1.104E-01	1.113E-01	NOT IDENT.
CO-60	4.353E-02	3.934E-02	4.397E-02	NOT IDENT.
ZN-65	2.755E-02	8.462E-02	8.553E-02	NOT IDENT.
GE-68	1.469E+00	1.237E+00	1.403E+00	NOT IDENT.
AS-73	9.179E-01	1.213E+00	1.281E+00	NOT IDENT.
AS-74	-1.397E-01	1.838E-01	1.943E-01	NOT IDENT.
SE-75	1.042E-02	5.984E-02	6.003E-02	NOT IDENT.
BR-77	5.639E+04	5.703E+04	6.244E+04	SHORT HLIF
SR-82	3.768E-01	5.411E-01	5.671E-01	NOT IDENT.
RB-83	-1.761E-02	7.819E-02	7.860E-02	NOT IDENT.
RB-84	-1.057E-02	1.014E-01	1.015E-01	NOT IDENT.
KR-85	2.712E+00	7.544E+00	7.642E+00	NOT IDENT.
SR-85	1.748E-02	4.906E-02	4.969E-02	NOT IDENT.
RB-86	1.226E+00	1.576E+00	1.670E+00	NOT IDENT.
Y-88	-7.984E-04	5.337E-02	5.337E-02	NOT IDENT.
Y-91	-7.516E+00	2.037E+01	2.065E+01	NOT IDENT.
NB-94	1.983E-02	2.958E-02	3.090E-02	NOT IDENT.
NB-95	8.803E-03	6.456E-02	6.468E-02	NOT IDENT.
NB-95M	1.535E-01	1.752E-01	1.884E-01	NOT IDENT.
ZR-95	2.039E-02	8.740E-02	8.788E-02	NOT IDENT.
NB-97	-1.000E+41	3.047E+41	0.000E+00	SHORT HLIF
ZR-97	1.316E+13	4.021E+14	4.022E+14	SHORT HLIF
MO-99	-1.644E+03	2.044E+03	2.174E+03	SHORT HLIF
TC-99M	1.157E+39	1.080E+40	0.000E+00	SHORT HLIF
RH-101	-5.043E-03	3.582E-02	3.590E-02	NOT IDENT.
RH-102	1.599E-02	5.004E-02	5.055E-02	NOT IDENT.
RU-103	3.460E-02	5.193E-02	5.422E-02	FAIL ABUN
RH-106	2.887E-01	3.170E-01	3.427E-01	NOT IDENT.
RU-106	2.887E-01	3.170E-01	3.427E-01	NOT IDENT.
AG-108M	-1.611E-02	2.877E-02	2.967E-02	NOT IDENT.
AG-110	-2.685E-02	6.060E-01	6.061E-01	NOT IDENT.
AG-110M	-3.760E-02	5.408E-02	5.667E-02	NOT IDENT.
SN-113	-2.173E-03	5.118E-02	5.119E-02	NOT IDENT.
CD-115	5.467E+03	1.008E+04	1.038E+04	SHORT HLIF
SN-117M	4.324E-02	1.618E-01	1.630E-01	NOT IDENT.
SB-122	-8.814E+00	3.029E+02	3.030E+02	SHORT HLIF
TE-123M	2.129E-02	3.411E-02	3.544E-02	NOT IDENT.
SB-124	3.695E-02	1.023E-01	1.037E-01	NOT IDENT.
SB-125	5.572E-03	9.723E-02	9.726E-02	NOT IDENT.
TE-125M	6.212E-01	1.279E+01	1.279E+01	NOT IDENT.
I-126	2.364E+00	9.305E-01	1.415E+00	FAIL ABUN
SB-126	1.269E-01	3.973E-01	4.014E-01	FAIL ABUN
SB-127	3.167E+01	4.369E+01	4.597E+01	NOT IDENT.
I-131	1.728E-01	6.599E-01	6.645E-01	NOT IDENT.
I-132	1.000E+41	2.170E+41	0.000E+00	SHORT HLIF
TE-132	-4.605E+01	5.936E+01	6.289E+01	SHORT HLIF
BA-133	3.591E-02	4.678E-02	4.951E-02	NOT IDENT.
I-133	-1.524E+10	3.841E+10	3.902E+10	SHORT HLIF
CS-134	2.125E-02	4.367E-02	4.471E-02	NOT IDENT.
I-135	8.944E+36	1.441E+37	0.000E+00	SHORT HLIF
CS-136	1.724E-01	2.878E-01	2.981E-01	FAIL ABUN
BA-137M	2.355E-02	2.759E-02	2.956E-02	NOT IDENT.
CS-137	2.488E-02	2.915E-02	3.123E-02	NOT IDENT.
LA-138	5.897E-02	6.439E-02	6.966E-02	NOT IDENT.
CE-139	-1.017E-03	3.871E-02	3.871E-02	NOT IDENT.
BA-140	1.861E-01	6.116E-01	6.174E-01	NOT IDENT.
LA-140	9.985E-02	3.317E-01	3.347E-01	NOT IDENT.
CE-141	6.187E-02	1.849E-01	1.870E-01	FAIL ABUN
CE-143	1.585E+06	2.588E+06	2.684E+06	SHORT HLIF
CE-144	-1.021E-01	2.386E-01	2.430E-01	NOT IDENT.
PM-144	8.537E-03	3.232E-02	3.255E-02	FAIL ABUN
PR-144	6.365E-01	2.442E+00	2.459E+00	NOT IDENT.
PM-146	-2.021E-02	3.887E-02	3.992E-02	NOT IDENT.
ND-147	2.051E-01	1.987E+00	1.989E+00	FAIL ABUN
PM-147	3.521E+02	8.242E+02	8.394E+02	NOT IDENT.
PM-149	2.194E+04	4.669E+04	4.773E+04	SHORT HLIF
EU-150	2.123E-02	3.169E-02	3.310E-02	FAIL ABUN

EU-152	-3.238E-02	1.067E-01	1.077E-01	FAIL ABUN
GD-153	-4.050E-02	1.057E-01	1.073E-01	NOT IDENT.
EU-154	5.458E-03	1.014E-01	1.015E-01	NOT IDENT.
EU-155	-1.324E-02	1.091E-01	1.093E-01	FAIL ABUN
TB-160	3.021E-02	1.644E-01	1.649E-01	FAIL ABUN
HO-166M	4.158E-02	5.798E-02	6.094E-02	NOT IDENT.
TM-171	-1.371E+01	2.307E+01	2.388E+01	NOT IDENT.
HF-172	1.603E-02	2.070E-01	2.071E-01	NOT IDENT.
LU-172	6.807E-02	8.046E-02	8.612E-02	FAIL ABUN
LU-176	2.388E-03	3.126E-02	3.128E-02	FAIL ABUN
HF-181	5.538E-02	5.507E-02	6.047E-02	NOT IDENT.
TA-182	1.875E-02	1.467E-01	1.469E-01	FAIL ABUN
RE-183	-1.084E-03	2.851E-01	2.851E-01	NOT IDENT.
RE-184	-3.151E-02	2.059E-01	2.064E-01	NOT IDENT.
W-188	-1.044E+00	1.110E+01	1.111E+01	FAIL ABUN
IR-192	-1.414E-02	4.466E-02	4.511E-02	FAIL ABUN
HG-203	-1.084E-02	6.344E-02	6.363E-02	NOT IDENT.
TL-204	1.842E-01	5.622E+00	5.622E+00	NOT IDENT.
BI-207	-3.180E-02	5.153E-02	5.349E-02	FAIL ABUN
PB-211	1.599E+00	7.010E-01	1.006E+00	NOT IDENT.
BI-213	1.589E-01	9.749E-02	1.210E-01	NOT IDENT.
RA-223	4.492E-03	7.406E-01	7.406E-01	FAIL ABUN
AC-225	-1.438E+00	2.594E+00	2.673E+00	NOT IDENT.
AC-227	1.138E-02	2.883E-01	2.884E-01	FAIL ABUN
TH-227	1.138E-02	2.883E-01	2.884E-01	FAIL ABUN
PA-231	3.842E-01	5.768E-01	6.022E-01	NOT IDENT.
TH-231	4.492E-03	7.406E-01	7.406E-01	FAIL ABUN
PA-233	5.891E-02	7.388E-02	7.851E-02	FAIL ABUN
PA-234	1.334E-01	2.667E-01	2.734E-01	NOT IDENT.
NP-237	5.891E-02	7.388E-02	7.851E-02	FAIL ABUN
NP-238	4.632E+03	1.147E+04	1.166E+04	SHORT HLIF
NP-239	-1.324E-01	2.685E-01	2.750E-01	NOT IDENT.
PU-239	-1.020E+01	3.811E+02	3.812E+02	NOT IDENT.
AM-241	4.686E-03	1.748E-01	1.748E-01	NOT IDENT.
AM-243	3.492E-01	8.472E-02	1.788E-01	NOT IDENT.
CM-243	3.998E-02	1.014E-01	1.030E-01	NOT IDENT.
BK-247	4.183E-02	9.684E-02	9.866E-02	FAIL ABUN
CF-249	8.184E-04	3.863E-02	3.863E-02	NOT IDENT.
CF-251	1.018E-01	1.526E-01	1.594E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	53.0036	81.75	63.0621	123.68	76.7539
879.38	68.0783	82.47	83.5840	125.81	73.9989
46.54	58.8770	83.79	75.4209	127.23	85.1770
228.16	0.0000	265.00	75.4524	127.91	85.2633
52.39	52.7509	193.51	75.6619	129.30	84.4319
1093.63	62.3504	105.31	75.8256	131.20	89.7048
52.39	65.0385	86.79	75.8603	133.02	94.9926
125.81	43.4258	86.94	75.8819	133.52	90.0049
53.44	46.9579	87.09	75.9035	136.00	76.1135
54.07	60.1007	87.57	75.9733	136.47	86.3190
293.27	0.0000	88.03	76.0395	739.50	0.0000
482.18	63.2708	306.78	76.0840	140.51	0.0000
57.98	68.6201	88.47	76.1031	143.76	80.0126
59.27	69.4278	143.76	76.3163	144.24	80.0650
59.32	60.0211	90.64	76.4127	145.44	72.6550
59.54	60.0536	531.02	76.4795	152.43	63.2990
60.96	62.6243	92.59	76.6883	1048.07	63.3670
61.17	63.8383	93.35	76.7946	154.21	70.7268
62.93	68.5587	94.56	76.9640	158.56	69.5017
63.29	68.6169	311.90	76.9763	159.00	60.6957
290.67	68.6636	946.00	76.9788	162.33	63.0524
87.57	68.7761	94.87	77.0066	537.26	63.0780
66.73	69.1650	97.43	90.4119	163.33	89.4344
67.24	69.2455	98.43	74.6258	165.86	80.2154
67.68	69.3142	98.44	74.6276	427.87	71.6097
1221.41	69.3248	103.37	76.6870	176.60	71.6343
70.82	74.6171	116.74	76.6870	177.52	67.4306
97.43	85.5974	100.11	67.1690	181.07	0.0000
70.82	87.0220	102.03	69.3177	181.52	57.3494
279.20	87.0242	103.18	58.8429	184.41	69.0479
1063.66	98.3232	103.37	58.8620	185.72	69.1504
72.87	98.3364	911.20	75.5012	193.51	95.9130
351.06	98.3364	105.31	70.6731	197.03	95.1894
74.66	101.4533	106.12	72.7077	198.01	71.1939
351.93	101.4880	106.47	71.7807	201.83	74.7859
238.63	101.4880	109.28	75.0379	203.43	67.2018
351.93	101.4880	111.00	81.1123	205.31	64.0243
238.63	101.4880	111.76	0.0000	210.85	66.6165
74.97	101.5202	114.06	76.6015	215.65	56.9042
77.11	101.9750	116.30	0.0000	218.12	64.8765
78.74	102.3171	116.74	72.9815	222.11	57.2762
256.23	102.5144	119.76	69.3607	227.09	53.0443
80.03	91.1857	264.66	86.3854	227.38	56.4461
133.52	91.2030	121.22	72.4954	228.16	0.0000
364.49	91.2165	344.28	73.5512	228.18	72.3076
711.68	82.6507	122.06	73.5828	235.69	55.7635
356.01	83.3395	122.92	73.6788	235.96	55.7785
323.87	83.3512	1274.44	73.6957	238.63	55.9198

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	52.0604	531.02	18.1321
240.99	56.0446	338.32	52.0616	537.26	12.1272
242.00	56.0977	340.48	46.3499	1260.41	0.0000
244.70	45.9094	340.55	46.3522	552.55	9.0254
685.70	52.0155	344.28	36.1031	795.86	19.8490
388.16	55.5029	345.93	34.9000	564.24	0.0000
507.63	0.0000	351.06	29.1902	569.33	25.5970
256.23	48.7160	351.93	29.2087	569.50	28.4436
527.90	0.0000	355.39	0.0000	569.70	28.4460
264.66	50.2502	356.01	27.6188	583.19	16.2260
264.80	50.2568	364.49	32.8348	584.27	16.2343
265.00	47.9280	366.42	0.0000	595.83	22.0857
269.46	43.4203	372.51	30.4761	600.60	25.0235
270.03	43.4418	375.05	33.9209	602.52	0.0000
401.81	43.4870	377.52	33.9779	604.72	23.1426
273.65	42.3995	383.85	26.4445	607.14	21.2382
276.40	62.5687	388.16	28.2311	609.32	21.2606
583.19	50.8053	666.33	30.8071	610.33	21.2704
277.60	47.2693	391.69	31.7269	614.28	26.1519
402.40	43.7388	400.66	34.9308	618.01	23.2861
279.20	56.8008	401.81	33.6624	884.68	19.4263
279.54	59.1843	402.40	23.3135	621.93	12.6366
279.70	52.0889	404.85	5.1888	630.19	0.0000
280.46	47.3840	410.95	24.7433	631.29	13.6667
301.36	34.8423	413.71	29.5695	633.25	17.5869
284.31	36.4447	720.70	26.1066	634.78	12.7107
285.41	30.1344	423.72	28.8790	635.95	16.6299
285.90	0.0000	427.09	23.6777	636.99	17.6169
287.50	38.1299	427.87	29.8302	657.50	11.8521
290.67	35.8401	433.94	29.0603	657.76	11.8535
293.27	0.0000	439.40	22.0881	657.90	0.0000
295.22	38.3721	440.45	11.4932	661.66	5.9368
316.51	38.3945	453.88	24.9523	664.57	0.0000
298.58	38.4756	463.37	20.6098	666.33	12.8894
299.98	38.5195	468.07	28.7520	666.50	12.8905
300.09	46.5480	473.00	31.0859	667.71	0.0000
300.13	46.5492	631.29	23.0035	677.62	19.9268
311.90	46.5492	696.49	21.6714	685.70	12.9974
301.36	35.3481	477.60	21.6812	692.65	0.0000
302.85	41.8247	482.18	10.8687	695.00	22.0824
304.50	49.5308	487.02	12.7143	696.49	14.0610
304.85	43.5026	492.35	0.0000	696.51	14.0610
306.78	42.3582	497.08	15.5245	697.00	16.0729
308.46	36.3551	505.52	13.7610	697.30	16.0749
311.90	32.8074	507.63	0.0000	697.49	15.0714
316.51	36.5836	511.00	26.6828	702.65	11.0765
319.41	34.2207	514.00	22.1182	706.68	13.1121
320.08	40.3517	514.00	22.1182	711.68	12.1289
321.04	41.6046	520.40	21.2686	720.70	10.6521
323.87	40.4685	520.69	0.0000	721.93	0.0000
325.23	45.4201	667.71	0.0000	1690.97	12.1841
1596.21	45.5409	527.90	0.0000	722.91	12.1846
333.37	24.7009	528.26	18.5710	723.31	9.1399
333.97	29.6543	529.59	23.6935	756.73	7.6193
334.37	32.9590	529.87	0.0000	727.33	9.1549

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	15.2930	935.54	18.6615	1362.66	0.0000
735.93	11.2283	937.49	16.4764	1365.19	6.5061
737.46	15.3204	983.53	12.1091	1368.63	0.0000
739.50	0.0000	946.00	4.4061	1384.29	6.5364
1434.09	17.4102	949.00	13.2310	1408.01	4.5076
747.24	14.3555	954.55	0.0000	1434.09	5.6689
748.06	21.5400	962.31	9.9664	1435.80	4.7260
752.31	20.5485	964.08	13.2964	1457.56	0.0000
753.82	14.3925	966.17	16.6315	1460.82	8.5562
756.73	14.4090	968.97	16.6467	1489.16	5.7411
756.80	14.4096	983.53	11.1495	1505.03	7.6821
763.94	17.0304	984.45	0.0000	1584.12	8.7940
765.81	21.6904	996.26	5.5973	1596.21	6.2695
766.84	13.9493	1002.74	24.6784	1620.50	4.9234
772.60	0.0000	1004.73	10.1019	1621.92	5.9099
776.52	10.3719	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	2.9974
778.90	18.6863	1028.54	0.0000	1750.46	0.0000
783.70	14.0405	1037.84	17.0093	1764.49	6.0831
1435.80	14.0674	1038.76	0.0000	1770.23	0.0000
903.28	19.8241	1046.59	12.2792	1771.35	0.0000
795.86	14.6278	1048.07	7.9627	1791.20	0.0000
801.95	15.7086	1049.04	11.3786	1808.65	6.1355
810.06	11.5546	1050.41	14.7974	1810.72	0.0000
810.29	11.5559	1063.66	13.7139	1836.06	6.1677
810.45	10.5058	1077.00	6.8843		
810.76	12.6084	1077.34	4.5898		
815.77	13.6845	1085.87	6.9023		
818.51	12.6445	1093.63	10.3770		
832.01	18.0023	1099.45	10.3945		
834.85	18.0210	1112.07	9.2734		
835.71	16.9661	1112.84	11.5942		
836.80	0.0000	1115.54	6.9619		
846.75	0.0000	1120.29	10.4568		
846.77	19.1631	1120.55	10.4583		
856.80	11.2186	1121.30	10.4604		
860.56	13.9082	1808.65	8.1553		
871.09	7.5170	1131.51	0.0000		
873.19	17.1940	1147.95	0.0000		
875.33	0.0000	1332.49	4.4223		
879.38	12.9238	1177.95	3.5425		
880.51	16.1609	1189.05	5.3298		
881.60	11.8558	1204.77	9.8130		
883.24	8.6273	1221.41	6.2728		
884.68	17.2630	1231.02	4.7913		
889.28	15.1296	1235.36	11.5125		
894.76	20.5717	1238.28	11.7011		
1836.06	18.4270	1260.41	0.0000		
900.72	23.8682	1271.87	9.9882		
903.28	17.3743	1274.44	7.2690		
911.20	6.5328	1274.54	7.2690		
912.08	6.5347	1291.59	5.4756		
984.45	0.0000	1298.22	0.0000		
926.50	13.1333	1312.11	7.3389		
929.11	12.0492	1332.49	3.6882		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:01.92

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507018.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM31.CNF;805
Background date : 6-APR-2025 11:02:07.
Sample date : 7-MAR-2025 08:30:00. Acquisition date : 10-APR-2025 22:35:39
Sample ID : G714507018 Sample quantity : 9.68600E+01 GRAM
Detector name : GAM31 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:08.26 0.2%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	36.14*	33	38	1.95	72.44	69	7	9.12E-03	39.7	
2	0	40.46*	2	97	1.38	81.09	78	6	4.33E-04	*****	
3	0	46.67*	119	163	1.12	93.52	89	10	3.30E-02	22.6	
4	1	53.49*	29	121	1.38	107.17	100	20	8.08E-03	67.2	1.66E+00
5	1	58.03	30	118	1.39	116.25	100	20	8.34E-03	64.4	
6	0	63.34*	59	223	1.09	126.88	123	10	1.65E-02	50.8	
7	3	74.82*	256	182	1.72	149.84	144	17	7.12E-02	12.4	3.07E+00
8	3	77.29*	364	116	1.18	154.80	144	17	1.01E-01	7.6	
9	0	86.89	114	264	1.17	174.01	167	12	3.18E-02	30.0	
10	0	93.01*	95	147	1.39	186.26	184	7	2.63E-02	25.8	
11	0	186.07*	120	96	1.56	372.48	367	9	3.33E-02	18.1	
12	0	209.83	35	92	0.67	420.02	416	10	9.70E-03	54.2	
13	0	238.68*	210	115	1.01	477.75	472	10	5.83E-02	12.1	
14	0	242.02	86	87	1.44	484.44	482	8	2.39E-02	21.7	
15	0	271.34	37	58	1.71	543.12	537	11	1.02E-02	43.9	
16	0	295.39*	208	66	1.37	591.23	584	15	5.77E-02	11.2	
17	0	304.83	35	85	7.26	610.11	598	18	9.59E-03	65.1	
18	0	327.39	24	33	1.57	655.26	652	8	6.54E-03	46.8	
19	0	338.91*	39	66	1.36	678.32	672	12	1.09E-02	45.0	
20	0	351.94*	370	41	1.29	704.38	699	12	1.03E-01	6.3	
21	0	413.84	18	6	2.01	828.22	824	8	5.02E-03	33.2	
22	0	421.48	45	32	8.25	843.51	832	21	1.24E-02	34.9	
23	0	469.05	13	15	0.82	938.68	935	10	3.65E-03	64.5	
24	0	478.16	26	18	1.19	956.91	954	10	7.17E-03	36.3	
25	0	510.57*	23	33	3.45	1021.76	1015	15	6.49E-03	69.3	
26	0	583.49*	94	24	2.31	1167.64	1159	22	2.62E-02	16.7	
27	0	609.36*	240	25	1.67	1219.37	1213	14	6.67E-02	8.0	
28	0	756.31	10	10	1.33	1513.32	1507	11	2.75E-03	71.6	
29	0	911.42*	27	12	1.08	1823.56	1816	12	7.62E-03	33.2	
30	0	934.07	16	10	2.50	1868.86	1861	13	4.50E-03	46.9	
31	0	965.51	15	7	0.86	1931.75	1927	8	4.04E-03	42.4	
32	0	969.24*	43	0	2.07	1939.20	1935	9	1.19E-02	16.1	
33	0	1049.13	12	10	4.88	2098.97	2091	13	3.42E-03	59.5	
34	0	1120.60	38	24	1.21	2241.89	2235	12	1.06E-02	30.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1161.52	11	3	1.46	2323.71	2316	11	3.00E-03	43.1	
36	0	1238.12	15	2	1.75	2476.87	2473	9	4.22E-03	30.9	
37	0	1378.16*	13	12	1.76	2756.87	2750	12	3.74E-03	59.2	
38	0	1461.28*	20	10	0.97	2923.03	2915	12	5.59E-03	39.1	
39	0	1764.14*	39	0	1.12	3528.42	3520	16	1.10E-02	16.7	
40	0	1847.04	8	4	0.74	3694.10	3689	9	2.18E-03	60.0	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:37:03

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507018.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 08:30:00	Acquisition date	: 10-APR-2025 22:35:39
Sample ID	: G714507018	Sample quantity	: 96.860 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA31	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:08.26 0.2%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	24	10.44*	1.738E+00	1.041E+00	1.633E+00	72.53
K-40	1460.82	19	10.66*	6.800E-01	2.007E+00	2.007E+00	78.25
AS-73	53.44	28	10.30*	6.003E+00	3.517E-01	4.741E-01	134.34
CD-109	88.03	110	3.70*	5.632E+00	4.087E+00	4.305E+00	59.98
SN-126	64.28	57	9.60	6.014E+00	7.678E-01	7.678E-01	101.56
	86.94	110	8.90	5.632E+00	1.699E+00	1.699E+00	59.98
	87.57	110	37.00*	5.632E+00	4.087E-01	4.087E-01	59.98
TL-208	277.37	------	6.60	2.735E+00	------ Line Not Found		------
	583.19	89	85.00*	1.467E+00	5.508E-01	5.508E-01	33.40
	860.56	------	12.50	1.056E+00	------ Line Not Found		------
BI-210	46.54	115	4.25*	5.864E+00	3.567E+00	3.577E+00	45.15
PB-210	46.54	115	4.25*	5.864E+00	3.567E+00	3.577E+00	45.15
BI-211	72.87	------	1.23	5.902E+00	------ Line Not Found		------
	351.06	350	12.92*	2.250E+00	9.344E+00	9.344E+00	12.58
PB-212	74.82	246	10.28	5.870E+00	3.166E+00	3.166E+00	24.71
	77.11	350	17.10	5.826E+00	2.719E+00	2.719E+00	15.26
	238.63	199	43.60*	3.080E+00	1.150E+00	1.150E+00	24.11
	300.09	------	3.30	2.566E+00	------ Line Not Found		------
BI-214	609.32	226	45.49*	1.414E+00	2.720E+00	2.720E+00	15.90
	1120.29	36	14.92	8.472E-01	2.182E+00	2.182E+00	60.82
	1764.49	37	15.30	5.819E-01	3.195E+00	3.195E+00	33.44
PB-214	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
RN-222	609.32	226	45.49*	1.414E+00	2.720E+00	2.720E+00	15.90
	1120.29	36	14.92	8.472E-01	2.182E+00	2.182E+00	60.82
	1764.49	37	15.30	5.819E-01	3.195E+00	3.195E+00	33.44
RA-224	240.99	82	4.10*	3.047E+00	5.071E+00	5.071E+00	43.42
RA-226	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
AC-228	105.21	------	1.10	5.220E+00	------ Line Not Found		------
	338.32	37	11.27	2.321E+00	1.104E+00	1.104E+00	89.92
	835.71	------	1.61	1.083E+00	------ Line Not Found		------
	911.20	26	25.80*	1.007E+00	7.673E-01	7.673E-01	66.44
	968.97	40	15.80	9.562E-01	2.051E+00	2.051E+00	32.17
RA-228	105.21	------	1.10	5.220E+00	------ Line Not Found		------
	338.32	37	11.27	2.321E+00	1.104E+00	1.104E+00	89.92
	835.71	------	1.61	1.083E+00	------ Line Not Found		------
	911.20	26	25.80*	1.007E+00	7.673E-01	7.673E-01	66.44
	968.97	40	15.80	9.562E-01	2.051E+00	2.051E+00	32.17
TH-228	74.82	246	10.28	5.870E+00	3.166E+00	3.166E+00	24.71
	77.11	350	17.10	5.826E+00	2.719E+00	2.719E+00	15.26

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	238.63	199	43.60*	3.080E+00	1.150E+00	1.150E+00	24.11
	300.09	------	3.30	2.566E+00	------ Line Not Found		------
TH-230	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
TH-232	105.21	------	1.10	5.220E+00	------ Line Not Found		------
	338.32	37	11.27	2.321E+00	1.104E+00	1.104E+00	89.92
	835.71	------	1.61	1.083E+00	------ Line Not Found		------
	911.20	26	25.80*	1.007E+00	7.673E-01	7.673E-01	66.44
	968.97	40	15.80	9.562E-01	2.051E+00	2.051E+00	32.17
PA-234M	63.29	57	3.70*	6.014E+00	1.992E+00	1.992E+00	101.56
	92.59	91	4.23	5.497E+00	3.021E+00	3.021E+00	51.55
TH-234	63.29	57	3.70*	6.014E+00	1.992E+00	1.992E+00	101.56
	92.59	91	4.23	5.497E+00	3.021E+00	3.021E+00	51.55
U-234	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
U-238	63.29	57	3.70*	6.014E+00	1.992E+00	1.992E+00	101.56
	92.59	91	4.23	5.497E+00	3.021E+00	3.021E+00	51.55
AM-243	43.53	------	5.90	5.746E+00	------ Line Not Found		------
	74.66	246	67.20*	5.870E+00	4.844E-01	4.844E-01	24.71
ANH-511	511.00	22	100.00*	1.644E+00	1.038E-01	1.038E-01	138.57

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:04.40

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507018.CNF;1		
Acquisition date	: 10-APR-2025 22:35:39	Sensitivity	: 3.000
Detector ID	: GAM31	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:08.26	Half life ratio	: *****
Sample date	: 7-MAR-2025 08:30:00	Analyst initials	: MXR1
Sample ID	: G714507018	Sample Quantity	: 9.6860E+01 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 22-AUG-2024 08:21:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;19		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.633E+00	1.161E+00	1.785E+00
K-40	2.007E+00	1.539E+00	1.829E+00
AS-73	4.741E-01	6.242E-01	8.221E-01
CD-109	4.305E+00	2.530E+00	2.490E+00
SN-126	4.087E-01	2.402E-01	2.304E-01
TL-208	5.508E-01	1.803E-01	1.057E-01
BI-210	3.577E+00	1.583E+00	1.420E+00
PB-210	3.577E+00	1.583E+00	1.420E+00
BI-211	9.344E+00	1.152E+00	8.094E-01
PB-212	1.150E+00	2.717E-01	2.316E-01
BI-214	2.720E+00	4.240E-01	2.416E-01
PB-214	3.391E+00	4.182E-01	2.944E-01
RN-222	2.720E+00	4.240E-01	2.416E-01
RA-224	5.071E+00	2.158E+00	2.535E+00
RA-226	3.391E+00	4.182E-01	2.944E-01
AC-228	7.673E-01	4.996E-01	5.491E-01
RA-228	7.673E-01	4.996E-01	5.491E-01
TH-228	1.150E+00	2.717E-01	2.316E-01
TH-230	3.391E+00	4.182E-01	2.944E-01
TH-232	7.673E-01	4.996E-01	5.491E-01
PA-234M	1.992E+00	1.983E+00	1.827E+00
TH-234	1.992E+00	1.983E+00	1.827E+00
U-234	3.391E+00	4.182E-01	2.944E-01
U-238	1.992E+00	1.983E+00	1.827E+00
AM-243	4.844E-01	1.173E-01	1.013E-01
ANH-511	1.038E-01	1.410E-01	1.192E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	-4.946E-03	8.918E-02	1.724E-01	NOT IDENT.
NA-24	0.000E+00	3.363E+15	0.000E+00	SHORT HLIF
AL-26	-3.573E-02	6.690E-02	1.253E-01	NOT IDENT.
SC-46	5.521E-02	8.083E-02	1.824E-01	FAIL ABUN

V-48	1.012E-01	2.560E-01	5.697E-01	NOT IDENT.
CR-51	8.571E-01	1.355E+00	2.589E+00	NOT IDENT.
MN-52	-2.134E-01	5.344E+00	1.078E+01	FAIL ABUN
MN-54	1.556E-02	8.766E-02	1.725E-01	NOT IDENT.
CO-56	-2.118E-02	9.473E-02	1.789E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	6.533E-02	4.696E-02	9.362E-02	NOT IDENT.
CO-58	-1.475E-02	9.843E-02	1.878E-01	NOT IDENT.
FE-59	-5.411E-02	2.169E-01	4.099E-01	NOT IDENT.
CO-60	-1.415E-02	6.518E-02	1.272E-01	NOT IDENT.
ZN-65	5.801E-02	1.546E-01	3.091E-01	NOT IDENT.
GE-68	3.987E-01	2.320E+00	4.816E+00	NOT IDENT.
AS-74	-2.728E-02	4.309E-01	8.265E-01	NOT IDENT.
SE-75	5.654E-02	1.026E-01	1.952E-01	NOT IDENT.
BR-77	0.000E+00	1.240E+04	0.000E+00	SHORT HLIF
SR-82	1.155E+00	1.156E+00	2.585E+00	NOT IDENT.
RB-83	3.677E-03	1.623E-01	2.996E-01	NOT IDENT.
RB-84	-1.869E-01	2.072E-01	3.380E-01	NOT IDENT.
KR-85	2.187E+01	1.337E+01	2.917E+01	NOT IDENT.
SR-85	1.418E-01	8.689E-02	1.895E-01	NOT IDENT.
RB-86	9.968E-01	2.988E+00	6.333E+00	NOT IDENT.
Y-88	-5.678E-02	9.312E-02	1.681E-01	NOT IDENT.
Y-91	2.118E+01	5.018E+01	1.052E+02	NOT IDENT.
NB-94	6.694E-02	6.849E-02	1.499E-01	NOT IDENT.
NB-95	6.434E-03	1.258E-01	2.404E-01	NOT IDENT.
NB-95M	3.965E-01	3.236E-01	5.931E-01	NOT IDENT.
ZR-95	1.636E-01	2.295E-01	3.572E-01	FAIL ABUN
NB-97	0.000E+00	1.587E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.936E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.084E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.619E+40	0.000E+00	SHORT HLIF
RH-101	-3.486E-02	5.826E-02	1.013E-01	NOT IDENT.
RH-102	3.291E-02	1.010E-01	2.097E-01	NOT IDENT.
RU-103	3.302E-02	1.119E-01	2.147E-01	FAIL ABUN
RH-106	-6.081E-01	6.977E-01	1.190E+00	FAIL ABUN
RU-106	-6.081E-01	6.977E-01	1.190E+00	FAIL ABUN
AG-108M	-4.278E-03	6.160E-02	1.110E-01	NOT IDENT.
AG-110	-1.277E+00	1.458E+00	2.468E+00	NOT IDENT.
AG-110M	3.135E-02	8.369E-02	1.836E-01	NOT IDENT.
SN-113	-6.073E-02	9.931E-02	1.655E-01	NOT IDENT.
CD-115	0.000E+00	9.627E+03	0.000E+00	SHORT HLIF
SN-117M	1.098E-01	2.874E-01	5.346E-01	NOT IDENT.
SB-122	0.000E+00	4.960E+02	0.000E+00	SHORT HLIF
TE-123M	4.307E-02	6.162E-02	1.172E-01	NOT IDENT.
SB-124	-6.081E-02	1.515E-01	3.122E-01	NOT IDENT.
SB-125	8.854E-02	2.177E-01	3.769E-01	NOT IDENT.
TE-125M	-7.365E+00	1.856E+01	3.303E+01	NOT IDENT.
I-126	-2.452E-01	1.440E+00	2.704E+00	NOT IDENT.
SB-126	1.930E-02	9.571E-01	1.849E+00	FAIL ABUN
SB-127	-3.833E+00	8.571E+01	1.672E+02	NOT IDENT.
I-131	9.275E-01	1.255E+00	2.490E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	9.859E+01	0.000E+00	SHORT HLIF
BA-133	4.283E-02	1.003E-01	1.721E-01	NOT IDENT.
I-133	0.000E+00	5.505E+10	0.000E+00	SHORT HLIF
CS-134	1.039E-01	1.003E-01	2.161E-01	NOT IDENT.
I-135	0.000E+00	2.445E+37	0.000E+00	SHORT HLIF
CS-136	7.720E-01	9.001E-01	1.363E+00	FAIL ABUN
BA-137M	-2.882E-02	7.225E-02	1.328E-01	NOT IDENT.
CS-137	-3.045E-02	7.633E-02	1.403E-01	NOT IDENT.
LA-138	-6.568E-02	1.367E-01	2.385E-01	NOT IDENT.
CE-139	-4.026E-03	6.664E-02	1.197E-01	NOT IDENT.
BA-140	-5.388E-01	1.704E+00	2.935E+00	FAIL ABUN
LA-140	7.452E-02	7.782E-01	1.511E+00	FAIL ABUN
CE-141	3.145E-02	1.747E-01	3.211E-01	NOT IDENT.
CE-143	0.000E+00	5.958E+06	0.000E+00	SHORT HLIF
CE-144	-2.880E-02	4.030E-01	7.261E-01	NOT IDENT.
PM-144	6.764E-02	7.012E-02	1.546E-01	FAIL ABUN
PR-144	5.114E+00	5.301E+00	1.169E+01	NOT IDENT.
PM-146	-8.384E-03	8.820E-02	1.583E-01	NOT IDENT.
ND-147	1.303E+00	3.318E+00	6.653E+00	NOT IDENT.
PM-147	-2.848E+02	1.357E+03	2.432E+03	NOT IDENT.
PM-149	0.000E+00	8.730E+04	0.000E+00	SHORT HLIF
EU-150	-3.731E-02	6.994E-02	1.032E-01	FAIL ABUN
EU-152	6.834E-02	2.122E-01	3.810E-01	FAIL ABUN
GD-153	-8.766E-02	1.581E-01	2.428E-01	NOT IDENT.
EU-154	-1.386E-02	2.502E-01	4.836E-01	FAIL ABUN
EU-155	1.917E-01	1.574E-01	3.132E-01	FAIL ABUN

TB-160	9.846E-02	3.422E-01	6.974E-01	FAIL ABUN
HO-166M	-6.080E-03	1.151E-01	2.247E-01	NOT IDENT.
TM-171	7.975E+00	1.050E+01	1.294E+01	FAIL ABUN
HF-172	-2.440E-01	3.486E-01	6.020E-01	FAIL ABUN
LU-172	4.559E-02	1.273E-01	2.668E-01	FAIL ABUN
LU-176	2.116E-02	6.757E-02	1.127E-01	FAIL ABUN
HF-181	-9.162E-02	1.535E-01	2.173E-01	FAIL ABUN
TA-182	-4.290E-02	3.964E-01	7.562E-01	FAIL ABUN
RE-183	1.527E-01	1.926E-01	2.589E-01	FAIL ABUN
RE-184	-1.601E-01	4.119E-01	7.468E-01	NOT IDENT.
W-188	-2.801E-01	2.082E+01	3.343E+01	FAIL ABUN
IR-192	-5.531E-02	8.430E-02	1.410E-01	FAIL ABUN
HG-203	4.786E-02	1.117E-01	2.086E-01	NOT IDENT.
TL-204	-1.107E+00	5.299E+00	8.582E+00	NOT IDENT.
BI-207	1.250E-02	7.702E-02	1.654E-01	FAIL ABUN
PB-211	-5.589E-02	1.510E+00	2.719E+00	NOT IDENT.
BI-212	1.634E+00	1.211E+00	2.667E+00	NOT IDENT.
BI-213	1.953E-01	2.050E-01	4.244E-01	NOT IDENT.
RN-219	2.045E-02	9.152E-01	1.651E+00	FAIL ABUN
RA-223	-5.079E-01	1.634E+00	2.500E+00	FAIL ABUN
AC-225	5.322E-01	4.614E+00	8.406E+00	NOT IDENT.
AC-227	-4.284E-01	4.906E-01	8.074E-01	FAIL ABUN
TH-227	-4.284E-01	4.906E-01	8.074E-01	FAIL ABUN
TH-229	-4.750E-01	9.930E-01	1.724E+00	FAIL ABUN
PA-231	1.987E-01	1.103E+00	1.822E+00	NOT IDENT.
TH-231	-5.079E-01	1.634E+00	2.500E+00	FAIL ABUN
PA-233	8.090E-02	1.344E-01	2.586E-01	NOT IDENT.
PA-234	-1.634E-01	5.910E-01	1.106E+00	NOT IDENT.
U-235	5.535E-03	3.979E-01	7.205E-01	FAIL ABUN
NP-237	8.090E-02	1.344E-01	2.586E-01	NOT IDENT.
NP-238	0.000E+00	1.878E+04	0.000E+00	SHORT HLIF
NP-239	-2.571E-01	4.451E-01	7.785E-01	NOT IDENT.
PU-239	4.917E+02	6.884E+02	1.297E+03	FAIL ABUN
AM-241	-4.853E-02	1.349E-01	1.710E-01	NOT IDENT.
CM-243	-1.735E-01	1.561E-01	2.624E-01	NOT IDENT.
BK-247	9.096E-02	1.651E-01	3.141E-01	NOT IDENT.
CM-247	4.107E-02	7.816E-02	1.509E-01	NOT IDENT.
CF-249	7.101E-02	8.594E-02	1.704E-01	NOT IDENT.
CF-251	-1.966E-02	2.656E-01	4.762E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:02.70

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	24	10.44*	1.738E+00	1.041E+00	1.633E+00	72.53
K-40	1460.82	19	10.66*	6.800E-01	2.007E+00	2.007E+00	78.25
AS-73	53.44	28	10.30*	6.003E+00	3.517E-01	4.741E-01	134.34
CD-109	88.03	110	3.70*	5.632E+00	4.087E+00	4.305E+00	59.98
SN-126	64.28	57	9.60	6.014E+00	7.678E-01	7.678E-01	101.56
	86.94	110	8.90	5.632E+00	1.699E+00	1.699E+00	59.98
	87.57	110	37.00*	5.632E+00	4.087E-01	4.087E-01	59.98
TL-208	277.37	------	6.60	2.735E+00	------ Line Not Found		------
	583.19	89	85.00*	1.467E+00	5.508E-01	5.508E-01	33.40
	860.56	------	12.50	1.056E+00	------ Line Not Found		------
BI-210	46.54	115	4.25*	5.864E+00	3.567E+00	3.577E+00	45.15
PB-210	46.54	115	4.25*	5.864E+00	3.567E+00	3.577E+00	45.15
BI-211	72.87	------	1.23	5.902E+00	------ Line Not Found		------
	351.06	350	12.92*	2.250E+00	9.344E+00	9.344E+00	12.58
PB-212	74.82	246	10.28	5.870E+00	3.166E+00	3.166E+00	24.71
	77.11	350	17.10	5.826E+00	2.719E+00	2.719E+00	15.26
	238.63	199	43.60*	3.080E+00	1.150E+00	1.150E+00	24.11
	300.09	------	3.30	2.566E+00	------ Line Not Found		------
BI-214	609.32	226	45.49*	1.414E+00	2.720E+00	2.720E+00	15.90
	1120.29	36	14.92	8.472E-01	2.182E+00	2.182E+00	60.82
	1764.49	37	15.30	5.819E-01	3.195E+00	3.195E+00	33.44
PB-214	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
RN-222	609.32	226	45.49*	1.414E+00	2.720E+00	2.720E+00	15.90
	1120.29	36	14.92	8.472E-01	2.182E+00	2.182E+00	60.82
	1764.49	37	15.30	5.819E-01	3.195E+00	3.195E+00	33.44
RA-224	240.99	82	4.10*	3.047E+00	5.071E+00	5.071E+00	43.42
RA-226	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
AC-228	105.21	------	1.10	5.220E+00	------ Line Not Found		------
	338.32	37	11.27	2.321E+00	1.104E+00	1.104E+00	89.92
	835.71	------	1.61	1.083E+00	------ Line Not Found		------
	911.20	26	25.80*	1.007E+00	7.673E-01	7.673E-01	66.44
	968.97	40	15.80	9.562E-01	2.051E+00	2.051E+00	32.17
RA-228	105.21	------	1.10	5.220E+00	------ Line Not Found		------
	338.32	37	11.27	2.321E+00	1.104E+00	1.104E+00	89.92
	835.71	------	1.61	1.083E+00	------ Line Not Found		------
	911.20	26	25.80*	1.007E+00	7.673E-01	7.673E-01	66.44
	968.97	40	15.80	9.562E-01	2.051E+00	2.051E+00	32.17

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	246	10.28	5.870E+00	3.166E+00	3.166E+00	24.71
	77.11	350	17.10	5.826E+00	2.719E+00	2.719E+00	15.26
	238.63	199	43.60*	3.080E+00	1.150E+00	1.150E+00	24.11
	300.09	------	3.30	2.566E+00	------ Line Not Found		------
TH-230	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
TH-232	105.21	------	1.10	5.220E+00	------ Line Not Found		------
	338.32	37	11.27	2.321E+00	1.104E+00	1.104E+00	89.92
	835.71	------	1.61	1.083E+00	------ Line Not Found		------
	911.20	26	25.80*	1.007E+00	7.673E-01	7.673E-01	66.44
	968.97	40	15.80	9.562E-01	2.051E+00	2.051E+00	32.17
PA-234M	63.29	57	3.70*	6.014E+00	1.992E+00	1.992E+00	101.56
	92.59	91	4.23	5.497E+00	3.021E+00	3.021E+00	51.55
TH-234	63.29	57	3.70*	6.014E+00	1.992E+00	1.992E+00	101.56
	92.59	91	4.23	5.497E+00	3.021E+00	3.021E+00	51.55
U-234	74.82	246	5.80	5.870E+00	5.612E+00	5.612E+00	24.71
	77.11	350	9.70	5.826E+00	4.794E+00	4.794E+00	15.26
	87.09	110	3.41	5.632E+00	4.434E+00	4.434E+00	59.98
	242.00	82	7.25	3.047E+00	2.868E+00	2.868E+00	43.42
	295.22	197	18.42	2.599E+00	3.186E+00	3.186E+00	22.33
	351.93	350	35.60*	2.250E+00	3.391E+00	3.391E+00	12.58
U-238	63.29	57	3.70*	6.014E+00	1.992E+00	1.992E+00	101.56
	92.59	91	4.23	5.497E+00	3.021E+00	3.021E+00	51.55
AM-243	43.53	------	5.90	5.746E+00	------ Line Not Found		------
	74.66	246	67.20*	5.870E+00	4.844E-01	4.844E-01	24.71
ANH-511	511.00	22	100.00*	1.644E+00	1.038E-01	1.038E-01	138.57

Flag: "*" = Keyline

Sample ID : G714507018 Acquisition date : 10-APR-2025 22:35:39

Total number of lines in spectrum 40
Number of unidentified lines 6
Number of lines tentatively identified by NID 34 85.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.57	1.041E+00	1.633E+00	1.185E+00	72.53	
K-40	1.25E+09Y	1.00	2.007E+00	2.007E+00	1.570E+00	78.25	
AS-73	80.30D	1.35	3.517E-01	4.741E-01	6.369E-01	134.34	
CD-109	461.40D	1.05	4.087E+00	4.305E+00	2.582E+00	59.98	
SN-126	2.30E+05Y	1.00	4.087E-01	4.087E-01	2.451E-01	59.98	
TL-208	1.41E+10Y	1.00	5.508E-01	5.508E-01	1.840E-01	33.40	
BI-210	22.20Y	1.00	3.567E+00	3.577E+00	1.615E+00	45.15	
PB-210	22.20Y	1.00	3.567E+00	3.577E+00	1.615E+00	45.15	
BI-211	7.04E+08Y	1.00	9.344E+00	9.344E+00	1.176E+00	12.58	
PB-212	1.41E+10Y	1.00	1.150E+00	1.150E+00	0.277E+00	24.11	
BI-214	1600.00Y	1.00	2.720E+00	2.720E+00	0.433E+00	15.90	
PB-214	1600.00Y	1.00	3.391E+00	3.391E+00	0.427E+00	12.58	
RN-222	1600.00Y	1.00	2.720E+00	2.720E+00	0.433E+00	15.90	
RA-224	1.41E+10Y	1.00	5.071E+00	5.071E+00	2.202E+00	43.42	
RA-226	1600.00Y	1.00	3.391E+00	3.391E+00	0.427E+00	12.58	
AC-228	1.41E+10Y	1.00	7.673E-01	7.673E-01	5.098E-01	66.44	
RA-228	1.41E+10Y	1.00	7.673E-01	7.673E-01	5.098E-01	66.44	
TH-228	1.41E+10Y	1.00	1.150E+00	1.150E+00	0.277E+00	24.11	
TH-230	7.54E+04Y	1.00	3.391E+00	3.391E+00	0.427E+00	12.58	
TH-232	1.41E+10Y	1.00	7.673E-01	7.673E-01	5.098E-01	66.44	
PA-234M	4.47E+09Y	1.00	1.992E+00	1.992E+00	2.023E+00	101.56	
TH-234	4.47E+09Y	1.00	1.992E+00	1.992E+00	2.023E+00	101.56	
U-234	2.45E+05Y	1.00	3.391E+00	3.391E+00	0.427E+00	12.58	
U-238	4.47E+09Y	1.00	1.992E+00	1.992E+00	2.023E+00	101.56	
AM-243	7370.00Y	1.00	4.844E-01	4.844E-01	1.197E-01	24.71	
ANH-511	1.00E+09Y	1.00	1.038E-01	1.038E-01	1.439E-01	138.57	
			---	---			
	Total Activity :		6.017E+01	6.112E+01			

Grand Total Activity : 6.017E+01 6.112E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	36.14	32	37	1.95	72.44	69	7	9.12E-03	79.3	5.28E+00	
0	40.46	2	94	1.38	81.09	78	6	4.33E-04	****	5.59E+00	
1	58.03	29	113	1.39	116.25	100	20	8.34E-03	****	6.03E+00	T
0	186.07	114	91	1.56	372.48	367	9	3.33E-02	36.1	3.71E+00	T
0	209.83	33	88	0.67	420.02	416	10	9.70E-03	****	3.40E+00	T
0	271.34	35	55	1.71	543.12	537	11	1.02E-02	87.7	2.78E+00	T
0	304.83	33	81	7.26	610.11	598	18	9.59E-03	****	2.53E+00	T
0	327.39	22	32	1.57	655.26	652	8	6.54E-03	93.5	2.39E+00	T
0	413.84	17	6	2.01	828.22	824	8	5.02E-03	66.4	1.96E+00	T
0	421.48	42	30	8.25	843.51	832	21	1.24E-02	69.8	1.93E+00	
0	469.05	12	14	0.82	938.68	935	10	3.65E-03	****	1.77E+00	T
0	756.31	9	9	1.33	1513.32	1507	11	2.75E-03	****	1.18E+00	T
0	934.07	15	9	2.50	1868.86	1861	13	4.50E-03	93.7	9.86E-01	T
0	965.51	14	7	0.86	1931.75	1927	8	4.04E-03	84.8	9.59E-01	T
0	1049.13	12	9	4.88	2098.97	2091	13	3.42E-03	****	8.95E-01	T
0	1161.52	10	3	1.46	2323.71	2316	11	3.00E-03	86.1	8.22E-01	
0	1238.12	14	2	1.75	2476.87	2473	9	4.22E-03	61.8	7.80E-01	T
0	1378.16	13	11	1.76	2756.87	2750	12	3.74E-03	****	7.14E-01	
0	1847.04	7	4	0.74	3694.10	3689	9	2.18E-03	****	5.60E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:14.42

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507018.CNF;1    *
* Acquisition date : 10-APR-2025 22:35:39 Sensitivity     : 3.000          *
* Detector ID      : GAM31                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:08.26     Half life ratio : *****          *
* Sample date      :  7-MAR-2025 08:30:00 Nuclide Library : SOLID          *
* Sample ID        : G714507018           Analyst initials: MXR1           *
* Batch Number     : 2767515              Sample Quantity : 9.6860E+01 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 22-AUG-2024 08:21:06 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;19          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	8.031E-01
K-40	7.716E-01
AS-73	3.885E-01
CD-109	1.193E+00
SN-126	1.102E-01
TL-208	4.454E-02
BI-210	6.684E-01
PB-210	6.684E-01
BI-211	3.692E-01
PB-212	1.081E-01
BI-214	1.047E-01
PB-214	1.343E-01
RN-222	1.047E-01
RA-224	1.185E+00
RA-226	1.343E-01
AC-228	2.346E-01
RA-228	2.346E-01
TH-228	1.081E-01
TH-230	1.343E-01
TH-232	2.346E-01
PA-234M	8.674E-01
TH-234	8.674E-01
U-234	1.343E-01
U-238	8.674E-01
AM-243	4.802E-02
ANH-511	5.328E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	7.221E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.440E-02	NOT IDENT.
SC-46	7.777E-02	FAIL ABUN
V-48	2.355E-01	NOT IDENT.

CR-51	1.192E+00	NOT IDENT.
MN-52	4.294E+00	FAIL ABUN
MN-54	7.591E-02	NOT IDENT.
CO-56	7.624E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	4.409E-02	NOT IDENT.
CO-58	8.075E-02	NOT IDENT.
FE-59	1.684E-01	NOT IDENT.
CO-60	4.929E-02	NOT IDENT.
ZN-65	1.280E-01	NOT IDENT.
GE-68	2.006E+00	NOT IDENT.
AS-74	3.662E-01	NOT IDENT.
SE-75	9.007E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.139E+00	NOT IDENT.
RB-83	1.310E-01	NOT IDENT.
RB-84	1.388E-01	NOT IDENT.
KR-85	1.312E+01	NOT IDENT.
SR-85	8.521E-02	NOT IDENT.
RB-86	2.670E+00	NOT IDENT.
Y-88	6.075E-02	NOT IDENT.
Y-91	4.507E+01	NOT IDENT.
NB-94	6.667E-02	NOT IDENT.
NB-95	1.072E-01	NOT IDENT.
NB-95M	2.771E-01	NOT IDENT.
ZR-95	1.550E-01	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	4.739E-02	NOT IDENT.
RH-102	9.112E-02	NOT IDENT.
RU-103	9.486E-02	FAIL ABUN
RH-106	5.149E-01	FAIL ABUN
RU-106	5.149E-01	FAIL ABUN
AG-108M	4.942E-02	NOT IDENT.
AG-110	1.042E+00	NOT IDENT.
AG-110M	7.658E-02	NOT IDENT.
SN-113	7.318E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.504E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	5.496E-02	NOT IDENT.
SB-124	1.021E-01	NOT IDENT.
SB-125	1.698E-01	NOT IDENT.
TE-125M	1.538E+01	NOT IDENT.
I-126	1.198E+00	NOT IDENT.
SB-126	8.151E-01	FAIL ABUN
SB-127	7.241E+01	NOT IDENT.
I-131	1.129E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	7.849E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	9.696E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	5.922E-01	FAIL ABUN
BA-137M	5.763E-02	NOT IDENT.
CS-137	6.089E-02	NOT IDENT.
LA-138	9.631E-02	NOT IDENT.
CE-139	5.602E-02	NOT IDENT.
BA-140	1.290E+00	FAIL ABUN
LA-140	6.425E-01	FAIL ABUN
CE-141	1.503E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.411E-01	NOT IDENT.
PM-144	6.848E-02	FAIL ABUN
PR-144	5.177E+00	NOT IDENT.
PM-146	7.028E-02	NOT IDENT.
ND-147	2.884E+00	NOT IDENT.
PM-147	1.140E+03	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	4.699E-02	FAIL ABUN
EU-152	1.734E-01	FAIL ABUN
GD-153	1.141E-01	NOT IDENT.
EU-154	2.026E-01	FAIL ABUN
EU-155	1.471E-01	FAIL ABUN
TB-160	3.024E-01	FAIL ABUN

HO-166M	9.690E-02	NOT IDENT.
TM-171	6.088E+00	FAIL ABUN
HF-172	2.811E-01	FAIL ABUN
LU-172	1.137E-01	FAIL ABUN
LU-176	5.196E-02	FAIL ABUN
HF-181	9.548E-02	FAIL ABUN
TA-182	3.181E-01	FAIL ABUN
RE-183	1.224E-01	FAIL ABUN
RE-184	3.206E-01	NOT IDENT.
W-188	1.534E+01	FAIL ABUN
IR-192	6.345E-02	FAIL ABUN
HG-203	9.648E-02	NOT IDENT.
TL-204	4.066E+00	NOT IDENT.
BI-207	6.694E-02	FAIL ABUN
PB-211	1.223E+00	NOT IDENT.
BI-212	1.206E+00	NOT IDENT.
BI-213	1.908E-01	NOT IDENT.
RN-219	7.475E-01	FAIL ABUN
RA-223	1.142E+00	FAIL ABUN
AC-225	3.900E+00	NOT IDENT.
AC-227	3.663E-01	FAIL ABUN
TH-227	3.663E-01	FAIL ABUN
TH-229	7.971E-01	FAIL ABUN
PA-231	8.351E-01	NOT IDENT.
TH-231	1.142E+00	FAIL ABUN
PA-233	1.185E-01	NOT IDENT.
PA-234	4.646E-01	NOT IDENT.
U-235	3.388E-01	FAIL ABUN
NP-237	1.185E-01	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	3.630E-01	NOT IDENT.
PU-239	6.136E+02	FAIL ABUN
AM-241	8.074E-02	NOT IDENT.
CM-243	1.218E-01	NOT IDENT.
BK-247	1.449E-01	NOT IDENT.
CM-247	6.827E-02	NOT IDENT.
CF-249	7.764E-02	NOT IDENT.
CF-251	2.225E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:18.61

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507018.CNF;1		
Acquisition date	: 10-APR-2025 22:35:39	Sensitivity	: 3.000
Detector ID	: GAM31	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:08.26	Half life ratio	: *****
Sample date	: 7-MAR-2025 08:30:00	Nuclide Library	: SOLID
Sample ID	: G714507018	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 9.6860E+01 GRAM
		Quantity Err(%)	: 1.0324E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 22-AUG-2024 08:21:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;19		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.633E+00	1.193E+00	1.193E+00
K-40	2.007E+00	1.552E+00	1.552E+00
AS-73	4.741E-01	6.345E-01	6.345E-01
CD-109	4.305E+00	2.567E+00	2.567E+00
SN-126	4.087E-01	2.428E-01	2.428E-01
TL-208	5.508E-01	1.971E-01	1.971E-01
BI-210	3.577E+00	1.673E+00	1.673E+00
PB-210	3.577E+00	1.673E+00	1.673E+00
BI-211	9.344E+00	1.792E+00	1.792E+00
PB-212	1.150E+00	2.930E-01	2.930E-01
BI-214	2.720E+00	5.622E-01	5.622E-01
PB-214	3.391E+00	6.481E-01	6.481E-01
RN-222	2.720E+00	5.622E-01	5.622E-01
RA-224	5.071E+00	2.212E+00	2.212E+00
RA-226	3.391E+00	6.481E-01	6.481E-01
AC-228	7.673E-01	5.049E-01	5.049E-01
RA-228	7.673E-01	5.049E-01	5.049E-01
TH-228	1.150E+00	2.930E-01	2.930E-01
TH-230	3.391E+00	6.480E-01	6.480E-01
TH-232	7.673E-01	5.049E-01	5.049E-01
PA-234M	1.992E+00	2.045E+00	2.045E+00
TH-234	1.992E+00	2.045E+00	2.045E+00
U-234	3.391E+00	6.480E-01	6.480E-01
U-238	1.992E+00	2.045E+00	2.045E+00
AM-243	4.844E-01	1.293E-01	1.293E-01
ANH-511	1.038E-01	1.420E-01	1.420E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	-4.946E-03	8.918E-02	8.921E-02	NOT IDENT.
NA-24	1.366E+15	3.366E+15	3.422E+15	SHORT HLIF
AL-26	-3.573E-02	6.697E-02	6.888E-02	NOT IDENT.
SC-46	5.521E-02	8.099E-02	8.473E-02	FAIL ABUN

V-48	1.012E-01	2.562E-01	2.602E-01	NOT IDENT.
CR-51	8.571E-01	1.359E+00	1.413E+00	NOT IDENT.
MN-52	-2.134E-01	5.344E+00	5.344E+00	FAIL ABUN
MN-54	1.556E-02	8.768E-02	8.796E-02	NOT IDENT.
CO-56	-2.118E-02	9.475E-02	9.523E-02	FAIL ABUN
MN-56	-1.000E+41	4.387E+41	0.000E+00	SHORT HLIF
CO-57	6.533E-02	4.769E-02	5.605E-02	NOT IDENT.
CO-58	-1.475E-02	9.844E-02	9.867E-02	NOT IDENT.
FE-59	-5.411E-02	2.170E-01	2.184E-01	NOT IDENT.
CO-60	-1.415E-02	6.520E-02	6.551E-02	NOT IDENT.
ZN-65	5.801E-02	1.547E-01	1.569E-01	NOT IDENT.
GE-68	3.987E-01	2.320E+00	2.327E+00	NOT IDENT.
AS-74	-2.728E-02	4.309E-01	4.311E-01	NOT IDENT.
SE-75	5.654E-02	1.028E-01	1.059E-01	NOT IDENT.
BR-77	5.249E+04	5.410E+04	5.905E+04	SHORT HLIF
SR-82	1.155E+00	1.162E+00	1.274E+00	NOT IDENT.
RB-83	3.677E-03	1.623E-01	1.623E-01	NOT IDENT.
RB-84	-1.869E-01	2.079E-01	2.243E-01	NOT IDENT.
KR-85	2.187E+01	1.383E+01	1.699E+01	NOT IDENT.
SR-85	1.418E-01	8.988E-02	1.103E-01	NOT IDENT.
RB-86	9.968E-01	2.989E+00	3.023E+00	NOT IDENT.
Y-88	-5.678E-02	9.323E-02	9.668E-02	NOT IDENT.
Y-91	2.118E+01	5.022E+01	5.112E+01	NOT IDENT.
NB-94	6.694E-02	6.890E-02	7.522E-02	NOT IDENT.
NB-95	6.434E-03	1.258E-01	1.259E-01	NOT IDENT.
NB-95M	3.965E-01	3.266E-01	3.723E-01	NOT IDENT.
ZR-95	1.636E-01	2.302E-01	2.418E-01	FAIL ABUN
NB-97	-1.000E+41	1.591E+41	0.000E+00	SHORT HLIF
ZR-97	9.537E+14	9.072E+14	1.004E+15	SHORT HLIF
MO-99	-3.048E+03	3.104E+03	3.395E+03	SHORT HLIF
TC-99M	8.903E+39	1.624E+40	0.000E+00	SHORT HLIF
RH-101	-3.486E-02	5.873E-02	6.079E-02	NOT IDENT.
RH-102	3.291E-02	1.011E-01	1.022E-01	NOT IDENT.
RU-103	3.302E-02	1.121E-01	1.130E-01	FAIL ABUN
RH-106	-6.081E-01	7.028E-01	7.543E-01	FAIL ABUN
RU-106	-6.081E-01	7.028E-01	7.543E-01	FAIL ABUN
AG-108M	-4.278E-03	6.160E-02	6.163E-02	NOT IDENT.
AG-110	-1.277E+00	1.465E+00	1.575E+00	NOT IDENT.
AG-110M	3.135E-02	8.374E-02	8.493E-02	NOT IDENT.
SN-113	-6.073E-02	9.988E-02	1.036E-01	NOT IDENT.
CD-115	-1.053E+04	9.785E+03	1.088E+04	SHORT HLIF
SN-117M	1.098E-01	2.876E-01	2.918E-01	NOT IDENT.
SB-122	6.607E+01	4.961E+02	4.970E+02	SHORT HLIF
TE-123M	4.307E-02	6.173E-02	6.471E-02	NOT IDENT.
SB-124	-6.081E-02	1.515E-01	1.540E-01	NOT IDENT.
SB-125	8.854E-02	2.182E-01	2.218E-01	NOT IDENT.
TE-125M	-7.365E+00	1.858E+01	1.887E+01	NOT IDENT.
I-126	-2.452E-01	1.440E+00	1.444E+00	NOT IDENT.
SB-126	1.930E-02	9.571E-01	9.571E-01	FAIL ABUN
SB-127	-3.833E+00	8.571E+01	8.573E+01	NOT IDENT.
I-131	9.275E-01	1.264E+00	1.331E+00	NOT IDENT.
I-132	1.000E+41	4.479E+41	0.000E+00	SHORT HLIF
TE-132	6.719E+01	9.893E+01	1.035E+02	SHORT HLIF
BA-133	4.283E-02	1.005E-01	1.024E-01	NOT IDENT.
I-133	7.644E+10	5.872E+10	6.809E+10	SHORT HLIF
CS-134	1.039E-01	1.009E-01	1.113E-01	NOT IDENT.
I-135	1.423E+37	2.691E+37	0.000E+00	SHORT HLIF
CS-136	7.720E-01	9.045E-01	9.691E-01	FAIL ABUN
BA-137M	-2.882E-02	7.233E-02	7.349E-02	NOT IDENT.
CS-137	-3.045E-02	7.641E-02	7.763E-02	NOT IDENT.
LA-138	-6.568E-02	1.369E-01	1.401E-01	NOT IDENT.
CE-139	-4.026E-03	6.664E-02	6.667E-02	NOT IDENT.
BA-140	-5.388E-01	1.706E+00	1.723E+00	FAIL ABUN
LA-140	7.452E-02	7.782E-01	7.790E-01	FAIL ABUN
CE-141	3.145E-02	1.747E-01	1.753E-01	NOT IDENT.
CE-143	9.900E+06	6.056E+06	7.523E+06	SHORT HLIF
CE-144	-2.880E-02	4.030E-01	4.032E-01	NOT IDENT.
PM-144	6.764E-02	7.054E-02	7.685E-02	FAIL ABUN
PR-144	5.114E+00	5.333E+00	5.810E+00	NOT IDENT.
PM-146	-8.384E-03	8.821E-02	8.829E-02	NOT IDENT.
ND-147	1.303E+00	3.324E+00	3.376E+00	NOT IDENT.
PM-147	-2.848E+02	1.357E+03	1.363E+03	NOT IDENT.
PM-149	2.214E+04	8.737E+04	8.794E+04	SHORT HLIF
EU-150	-3.731E-02	7.012E-02	7.211E-02	FAIL ABUN
EU-152	6.834E-02	2.124E-01	2.146E-01	FAIL ABUN
GD-153	-8.766E-02	1.583E-01	1.632E-01	NOT IDENT.
EU-154	-1.386E-02	2.502E-01	2.503E-01	FAIL ABUN
EU-155	1.917E-01	1.589E-01	1.809E-01	FAIL ABUN

TB-160	9.846E-02	3.424E-01	3.453E-01	FAIL ABUN
HO-166M	-6.080E-03	1.151E-01	1.152E-01	NOT IDENT.
TM-171	7.975E+00	1.057E+01	1.116E+01	FAIL ABUN
HF-172	-2.440E-01	3.520E-01	3.688E-01	FAIL ABUN
LU-172	4.559E-02	1.274E-01	1.290E-01	FAIL ABUN
LU-176	2.116E-02	6.761E-02	6.828E-02	FAIL ABUN
HF-181	-9.162E-02	1.543E-01	1.597E-01	FAIL ABUN
TA-182	-4.290E-02	3.964E-01	3.968E-01	FAIL ABUN
RE-183	1.527E-01	1.942E-01	2.060E-01	FAIL ABUN
RE-184	-1.601E-01	4.123E-01	4.186E-01	NOT IDENT.
W-188	-2.801E-01	2.082E+01	2.082E+01	FAIL ABUN
IR-192	-5.531E-02	8.457E-02	8.817E-02	FAIL ABUN
HG-203	4.786E-02	1.118E-01	1.139E-01	NOT IDENT.
TL-204	-1.107E+00	5.301E+00	5.324E+00	NOT IDENT.
BI-207	1.250E-02	7.703E-02	7.724E-02	FAIL ABUN
PB-211	-5.589E-02	1.510E+00	1.510E+00	NOT IDENT.
BI-212	1.634E+00	1.225E+00	1.430E+00	NOT IDENT.
BI-213	1.953E-01	2.078E-01	2.257E-01	NOT IDENT.
RN-219	2.045E-02	9.152E-01	9.153E-01	FAIL ABUN
RA-223	-5.079E-01	1.635E+00	1.651E+00	FAIL ABUN
AC-225	5.322E-01	4.614E+00	4.621E+00	NOT IDENT.
AC-227	-4.284E-01	4.952E-01	5.315E-01	FAIL ABUN
TH-227	-4.284E-01	4.952E-01	5.315E-01	FAIL ABUN
TH-229	-4.750E-01	9.938E-01	1.017E+00	FAIL ABUN
PA-231	1.987E-01	1.104E+00	1.108E+00	NOT IDENT.
TH-231	-5.079E-01	1.635E+00	1.651E+00	FAIL ABUN
PA-233	8.090E-02	1.347E-01	1.396E-01	NOT IDENT.
PA-234	-1.634E-01	6.200E-01	6.244E-01	NOT IDENT.
U-235	5.535E-03	3.979E-01	3.979E-01	FAIL ABUN
NP-237	8.090E-02	1.347E-01	1.396E-01	NOT IDENT.
NP-238	1.856E+04	1.886E+04	2.063E+04	SHORT HLIF
NP-239	-2.571E-01	4.465E-01	4.613E-01	NOT IDENT.
PU-239	4.917E+02	6.909E+02	7.256E+02	FAIL ABUN
AM-241	-4.853E-02	1.351E-01	1.369E-01	NOT IDENT.
CM-243	-1.735E-01	1.576E-01	1.760E-01	NOT IDENT.
BK-247	9.096E-02	1.663E-01	1.713E-01	NOT IDENT.
CM-247	4.107E-02	7.878E-02	8.092E-02	NOT IDENT.
CF-249	7.101E-02	8.696E-02	9.266E-02	NOT IDENT.
CF-251	-1.966E-02	2.656E-01	2.658E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	93.4452	81.75	112.0640	123.68	76.4758
879.38	85.5716	82.47	111.2975	125.81	83.0228
46.54	85.7161	83.79	139.7893	127.23	84.0514
228.16	0.0000	265.00	137.2125	127.91	84.1071
52.39	96.4065	193.51	163.2046	129.30	84.2201
1093.63	96.4906	105.31	163.4310	131.20	81.6223
52.39	96.5743	86.79	163.4785	133.02	87.2756
125.81	98.7506	86.94	163.5090	133.52	81.8024
53.44	98.8275	87.09	163.5394	136.00	66.3318
54.07	98.9293	87.57	163.6355	136.47	77.4208
293.27	0.0000	88.03	172.0454	739.50	0.0000
482.18	99.4802	306.78	140.5787	140.51	0.0000
57.98	99.5504	88.47	140.6016	143.76	76.0842
59.27	103.5385	143.76	110.5781	144.24	76.1168
59.32	103.5466	90.64	79.0489	145.44	67.8353
59.54	108.6344	531.02	118.6400	152.43	73.8648
60.96	75.9567	92.59	166.3882	1048.07	69.2395
61.17	75.9810	93.35	121.5993	154.21	69.2967
62.93	115.9669	94.56	83.3873	158.56	80.6591
63.29	116.0291	311.90	83.3960	159.00	60.1777
290.67	116.0793	946.00	83.3979	162.33	75.4329
87.57	116.1995	94.87	79.4453	537.26	67.9087
66.73	112.3593	97.43	92.9613	163.33	68.8905
67.24	109.8863	98.43	87.7494	165.86	72.8173
67.68	111.2344	98.44	87.7504	427.87	67.7123
1221.41	111.2451	103.37	63.8976	176.60	67.7275
70.82	112.7064	116.74	63.8976	177.52	69.6862
97.43	115.3956	100.11	63.9393	181.07	0.0000
70.82	115.5803	102.03	81.8767	181.52	76.1293
279.20	115.5824	103.18	78.4171	184.41	66.2219
1063.66	114.6111	103.37	80.2162	185.72	67.2493
72.87	114.6206	911.20	42.8687	193.51	59.9155
351.06	114.6206	105.31	52.6984	197.03	61.0415
74.66	111.8874	106.12	61.6848	198.01	62.0547
351.93	111.9112	106.47	73.3345	201.83	60.2839
238.63	111.9112	109.28	69.9690	203.43	73.0080
351.93	111.9112	111.00	74.5906	205.31	59.9479
238.63	111.9112	111.76	0.0000	210.85	60.6743
74.97	111.9336	114.06	68.5198	215.65	51.0595
77.11	112.2537	116.30	0.0000	218.12	53.1140
78.74	112.4944	116.74	76.8466	222.11	47.3418
256.23	106.5690	119.76	72.5488	227.09	56.4086
80.03	113.1162	264.66	79.0053	227.38	56.4196
133.52	113.1301	121.22	79.0132	228.16	0.0000
364.49	113.1401	344.28	61.7921	228.18	44.5656
711.68	107.5577	122.06	55.4466	235.69	40.3092
356.01	106.7491	122.92	62.7720	235.96	40.3167
323.87	106.7585	1274.44	65.5111	238.63	65.8160

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	35.9133	531.02	10.3462
240.99	68.9130	338.32	35.9140	537.26	21.8938
242.00	68.9579	340.48	38.0691	1260.41	0.0000
244.70	51.0576	340.55	38.0706	552.55	23.1771
685.70	39.2349	344.28	29.2430	795.86	15.1243
388.16	40.2511	345.93	34.3578	564.24	0.0000
507.63	0.0000	351.06	36.1478	569.33	16.3236
256.23	47.3961	351.93	36.1637	569.50	16.3242
527.90	0.0000	355.39	0.0000	569.70	13.9932
264.66	37.5059	356.01	28.7770	583.19	9.6670
264.80	37.5089	364.49	21.4058	584.27	9.6707
265.00	37.5134	366.42	0.0000	595.83	21.1853
269.46	39.6483	372.51	36.5324	600.60	17.6837
270.03	44.7466	375.05	31.1984	602.52	0.0000
401.81	44.7788	377.52	31.2355	604.72	22.6680
273.65	51.9774	383.85	24.8479	607.14	15.5971
276.40	49.0000	388.16	22.7333	609.32	14.1899
583.19	57.1997	666.33	21.6557	610.33	14.1948
277.60	49.0342	391.69	28.1926	614.28	12.7925
402.40	49.0459	400.66	25.0435	618.01	12.4529
279.20	42.9459	401.81	30.5042	884.68	11.5726
279.54	40.9090	402.40	22.8842	621.93	24.0485
279.70	39.8895	404.85	27.2736	630.19	0.0000
280.46	41.9543	410.95	22.9734	631.29	11.6154
301.36	36.9075	413.71	26.2881	633.25	15.1992
284.31	36.9207	720.70	9.8624	634.78	10.7344
285.41	36.9441	423.72	13.2029	635.95	9.8439
285.90	0.0000	427.09	23.1396	636.99	10.7424
287.50	47.2634	427.87	21.4940	657.50	18.9268
290.67	41.6882	433.94	23.2093	657.76	17.1254
293.27	0.0000	439.40	22.1562	657.90	0.0000
295.22	40.2481	440.45	14.4081	661.66	18.9524
316.51	40.2648	453.88	22.2937	664.57	0.0000
298.58	18.6112	463.37	19.0254	666.33	22.5960
299.98	18.6259	468.07	21.8657	666.50	22.5975
300.09	32.5972	473.00	18.5393	667.71	0.0000
300.13	32.5978	631.29	20.2419	677.62	11.7928
311.90	32.5978	696.49	21.9438	685.70	14.5513
301.36	37.2803	477.60	27.0171	692.65	0.0000
302.85	37.3110	482.18	27.0674	695.00	13.6816
304.50	37.3455	487.02	28.2501	696.49	10.0379
304.85	37.3528	492.35	0.0000	696.51	10.0379
306.78	40.5084	497.08	15.8839	697.00	10.9523
308.46	49.9023	505.52	17.0752	697.30	11.8661
311.90	30.2066	507.63	0.0000	697.49	11.8665
316.51	37.5916	511.00	23.9565	702.65	10.9713
319.41	38.6960	514.00	6.8525	706.68	16.4778
320.08	34.5247	514.00	6.8525	711.68	13.7526
321.04	36.6364	520.40	16.0291	720.70	18.3875
323.87	44.0303	520.69	0.0000	721.93	0.0000
325.23	34.6201	667.71	0.0000	1690.97	19.3190
1596.21	47.2971	527.90	0.0000	722.91	19.3196
333.37	39.5096	528.26	16.0770	723.31	23.9227
333.97	45.8453	529.59	4.5959	756.73	25.7698
334.37	49.0174	529.87	0.0000	727.33	12.8973

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	12.9195	935.54	10.9272	1362.66	0.0000
735.93	9.2361	937.49	14.0563	1365.19	7.4995
737.46	11.0885	983.53	13.6885	1368.63	0.0000
739.50	0.0000	946.00	11.7385	1384.29	6.1443
1434.09	12.9631	949.00	8.8105	1408.01	3.2401
747.24	12.9746	954.55	0.0000	1434.09	5.4260
748.06	12.0506	962.31	14.1434	1435.80	9.7701
752.31	5.9400	964.08	6.2887	1457.56	0.0000
753.82	7.4285	966.17	0.0000	1460.82	9.8146
756.73	5.9479	968.97	4.7222	1489.16	2.1921
756.80	5.9480	983.53	4.9365	1505.03	8.7930
763.94	18.6261	984.45	0.0000	1584.12	7.7998
765.81	22.3638	996.26	14.8553	1596.21	10.0492
766.84	16.7778	1002.74	8.9269	1620.50	4.4844
772.60	0.0000	1004.73	15.8779	1621.92	4.4856
776.52	8.4125	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	2.7220
778.90	14.0305	1028.54	0.0000	1750.46	0.0000
783.70	11.2401	1037.84	16.0029	1764.49	0.0000
1435.80	16.8843	1038.76	0.0000	1770.23	1.5313
903.28	23.4726	1046.59	9.6211	1771.35	2.6256
795.86	13.1588	1048.07	7.0179	1791.20	0.0000
801.95	10.3568	1049.04	7.0192	1808.65	4.6211
810.06	16.0428	1050.41	4.8149	1810.72	0.0000
810.29	15.1001	1063.66	5.0308	1836.06	5.5688
810.45	15.1006	1077.00	7.0645		
810.76	14.1582	1077.34	7.0649		
815.77	14.1779	1085.87	13.1460		
818.51	9.4592	1093.63	8.1040		
832.01	18.0392	1099.45	9.1291		
834.85	16.1533	1112.07	9.1549		
835.71	15.2065	1112.84	13.2261		
836.80	0.0000	1115.54	4.8861		
846.75	0.0000	1120.29	12.2285		
846.77	13.3459	1120.55	12.2292		
856.80	18.1616	1121.30	9.7852		
860.56	10.5250	1808.65	7.1478		
871.09	11.5144	1131.51	0.0000		
873.19	14.4008	1147.95	0.0000		
875.33	0.0000	1332.49	7.2158		
879.38	11.5397	1177.95	14.4460		
880.51	19.2383	1189.05	11.3766		
881.60	15.3950	1204.77	8.3013		
883.24	3.8505	1221.41	10.4126		
884.68	5.7779	1231.02	11.4767		
889.28	5.7849	1235.36	5.0124		
894.76	10.6207	1238.28	7.3145		
1836.06	12.5624	1260.41	0.0000		
900.72	13.5381	1271.87	8.4160		
903.28	16.4501	1274.44	9.4730		
911.20	11.6356	1274.54	9.4735		
912.08	4.6553	1291.59	4.2246		
984.45	0.0000	1298.22	0.0000		
926.50	14.2768	1312.11	4.2417		
929.11	7.7925	1332.49	5.3232		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:45.44

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507019.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM32.CNF;682
Background date : 6-APR-2025 11:02:13.
Sample date : 7-MAR-2025 09:00:00. Acquisition date : 10-APR-2025 22:36:16
Sample ID : G714507019 Sample quantity : 1.38130E+02 GRAM
Detector name : GAM32 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.85 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	36.17	45	29	1.15	72.85	68	15	1.24E-02	31.9	2.08E+00
2	3	38.06	24	51	1.06	76.65	68	15	6.78E-03	57.4	
3	3	61.53	24	80	1.23	123.58	121	10	6.68E-03	61.1	1.52E+00
4	3	63.05*	50	122	1.24	126.61	121	10	1.40E-02	40.5	
5	3	74.78	143	130	0.99	150.08	143	18	3.96E-02	15.2	1.62E+00
6	3	77.07*	256	124	1.00	154.66	143	18	7.12E-02	9.5	
7	0	83.75*	30	145	0.82	168.02	166	6	8.35E-03	66.8	
8	0	87.08	109	113	1.23	174.68	172	6	3.02E-02	18.4	
9	4	89.87	78	63	1.38	180.25	178	14	2.16E-02	18.2	1.03E+00
10	4	92.67*	159	161	1.44	185.86	178	14	4.41E-02	16.9	
11	0	128.06	92	167	3.83	256.64	252	11	2.56E-02	29.0	
12	0	143.81*	26	111	0.84	288.14	285	6	7.34E-03	67.2	
13	0	186.04*	238	164	1.22	372.60	367	11	6.62E-02	12.5	
14	0	209.82	30	87	1.53	420.14	416	7	8.35E-03	55.3	
15	3	238.52*	351	83	0.97	477.55	470	22	9.74E-02	6.9	1.01E+00
16	3	241.88*	228	102	1.37	484.27	470	22	6.32E-02	10.2	
17	0	249.63	13	63	1.27	499.77	495	7	3.61E-03	105.0	
18	1	269.62	50	75	1.33	539.76	533	14	1.40E-02	32.8	1.87E+00
19	1	271.12	22	67	1.34	542.76	533	14	6.09E-03	74.9	
20	0	278.17	18	88	0.72	556.86	550	10	5.00E-03	100.1	
21	0	295.18	358	120	1.19	590.87	584	11	9.94E-02	7.9	
22	0	338.46*	62	46	1.40	677.42	673	8	1.74E-02	23.0	
23	0	351.83*	658	90	1.23	704.16	699	12	1.83E-01	4.9	
24	0	462.94	18	29	1.02	926.38	923	8	5.12E-03	57.1	
25	0	511.13*	47	65	2.39	1022.75	1013	23	1.30E-02	52.5	
26	0	524.23	33	27	2.33	1048.97	1043	14	9.19E-03	38.0	
27	0	531.51	31	33	1.30	1063.52	1057	13	8.66E-03	41.8	
28	0	582.77*	117	29	1.31	1166.05	1159	13	3.25E-02	13.5	
29	0	609.06*	500	44	1.42	1218.63	1213	11	1.39E-01	5.2	
30	0	638.73	20	28	0.57	1277.98	1269	18	5.61E-03	64.4	
31	0	651.42	13	16	1.13	1303.34	1300	8	3.48E-03	62.4	
32	0	665.81	35	21	1.25	1332.13	1327	12	9.84E-03	30.8	
33	0	677.09	14	11	1.35	1354.68	1348	11	3.94E-03	52.4	
34	0	685.30	75	14	5.43	1371.11	1360	27	2.07E-02	18.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	726.97	33	13	1.29	1454.45	1448	10	9.23E-03	26.5	
36	0	767.78	49	17	1.06	1536.07	1530	11	1.35E-02	21.7	
37	0	848.39	11	12	0.76	1697.30	1692	8	2.92E-03	67.9	
38	0	883.28	15	10	4.00	1767.07	1761	11	4.04E-03	51.1	
39	0	910.60*	71	8	1.71	1821.72	1816	11	1.96E-02	14.6	
40	0	933.15	29	5	3.62	1866.83	1862	10	8.06E-03	23.5	
41	0	969.92	27	46	1.96	1940.36	1930	14	7.47E-03	58.1	
42	0	1000.20	23	7	1.47	2000.93	1993	14	6.39E-03	32.1	
43	0	1011.84	13	9	2.01	2024.22	2016	11	3.73E-03	49.8	
44	0	1022.17	11	6	1.47	2044.88	2038	11	3.19E-03	49.4	
45	0	1119.74	88	10	2.42	2240.02	2235	11	2.44E-02	12.9	
46	0	1154.94*	20	8	1.85	2310.43	2306	13	5.68E-03	35.3	
47	0	1168.56	8	4	1.31	2337.67	2333	7	2.08E-03	55.2	
48	0	1183.16	11	10	3.53	2366.86	2361	11	3.01E-03	66.1	
49	0	1237.86	43	11	1.51	2476.28	2470	12	1.19E-02	22.1	
50	0	1281.00	13	5	1.00	2562.57	2557	10	3.72E-03	41.2	
51	0	1296.87	7	5	1.01	2594.30	2590	7	1.92E-03	66.5	
52	0	1345.02	6	3	0.47	2690.61	2687	7	1.76E-03	61.4	
53	0	1376.98	34	5	1.77	2754.53	2749	11	9.32E-03	21.9	
54	0	1384.77	20	3	1.96	2770.12	2765	12	5.45E-03	28.8	
55	0	1396.15	9	5	0.59	2792.88	2788	9	2.36E-03	56.6	
56	0	1400.80	12	2	2.60	2802.18	2797	9	3.24E-03	37.4	
57	0	1460.36*	65	3	2.34	2921.32	2915	13	1.80E-02	14.3	
58	0	1729.37	15	9	2.78	3459.39	3451	12	4.09E-03	48.6	
59	0	1763.71*	62	10	2.06	3528.07	3520	13	1.71E-02	16.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:37:47

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507019.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 7-MAR-2025 09:00:00 Acquisition date : 10-APR-2025 22:36:16
Sample ID : G714507019 Sample quantity : 138.13 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA32 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.85 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
TL-208	277.37	HG-203	279.20

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.094E+00	2.898E+00	2.898E+00	28.52	OK
CD-109	88.03	3.70*	4.841E+00	3.938E+00	4.148E+00	36.77	OK
SN-126	64.28	9.60	1.978E+00	1.759E+00	1.759E+00	80.99	OK
	86.94	8.90	4.841E+00	1.637E+00	1.637E+00	36.77	OK
	87.57	37.00*	4.841E+00	3.938E-01	3.938E-01	36.77	OK
ND-147	91.11	27.90	5.072E+00	3.550E-01	3.151E+00	36.34	OK
	319.41	1.95	3.920E+00	----- Line Not Found		-----	Absent
	531.02	13.10*	2.724E+00	4.950E-01	4.394E+00	83.52	OK
HG-203	70.83	3.69	3.019E+00	----- Line Not Found		-----	Absent
	72.87	6.19	3.285E+00	----- Line Not Found		-----	Absent
	279.20	81.56*	4.307E+00	5.813E-03	9.725E-031	057.60	OK
TL-208	277.37	6.60	4.316E+00	----- Line Not Found		-----	<<INT Reject
	583.19	85.00*	2.533E+00	3.055E-01	3.055E-01	26.99	OK
	860.56	12.50	1.797E+00	----- Line Not Found		-----	Absent
BI-211	72.87	1.23	3.285E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.668E+00	8.117E+00	8.117E+00	9.83	OK
BI-212	727.33	6.67*	2.100E+00	1.309E+00	1.309E+00	52.92	OK
	1620.50	1.47	1.016E+00	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	3.526E+00	2.579E+00	2.579E+00	30.34	OK
	77.11	17.10	3.804E+00	2.578E+00	2.578E+00	18.92	OK
	238.63	43.60*	4.774E+00	1.016E+00	1.016E+00	13.72	OK
	300.09	3.30	4.091E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	2.444E+00	2.519E+00	2.519E+00	10.37	OK
	1120.29	14.92	1.391E+00	2.249E+00	2.249E+00	25.84	OK
	1764.49	15.30	9.714E-01	2.121E+00	2.121E+00	33.64	OK
PB-214	74.82	5.80	3.526E+00	4.571E+00	4.571E+00	30.34	OK
	77.11	9.70	3.804E+00	4.546E+00	4.546E+00	18.92	OK
	87.09	3.41	4.841E+00	4.273E+00	4.273E+00	36.77	OK
	242.00	7.25	4.730E+00	3.995E+00	3.996E+00	20.49	OK
	295.22	18.42	4.137E+00	2.784E+00	2.784E+00	15.84	OK
	351.93	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83	OK
RN-222	609.32	45.49*	2.444E+00	2.519E+00	2.519E+00	10.37	OK
	1120.29	14.92	1.391E+00	2.249E+00	2.249E+00	25.84	OK
	1764.49	15.30	9.714E-01	2.121E+00	2.121E+00	33.64	OK
RA-224	240.99	4.10*	4.730E+00	7.065E+00	7.065E+00	20.49	OK
RA-226	74.82	5.80	3.526E+00	4.571E+00	4.571E+00	30.34	OK
	77.11	9.70	3.804E+00	4.546E+00	4.546E+00	18.92	OK
	87.09	3.41	4.841E+00	4.273E+00	4.273E+00	36.77	OK
	242.00	7.25	4.730E+00	3.995E+00	3.996E+00	20.49	OK
	295.22	18.42	4.137E+00	2.784E+00	2.784E+00	15.84	OK
	351.93	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83	OK
AC-228	105.21	1.10	5.932E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.768E+00	8.634E-01	8.634E-01	46.08	OK
	835.71	1.61	1.848E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.702E+00	8.718E-01	8.718E-01	29.28	OK
	968.97	15.80	1.601E+00	5.732E-01	5.732E-01	116.24	OK
RA-228	105.21	1.10	5.932E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.768E+00	8.634E-01	8.634E-01	46.08	OK
	835.71	1.61	1.848E+00	----- Line Not Found		-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	911.20	25.80*	1.702E+00	8.718E-01	8.718E-01	29.28	OK
	968.97	15.80	1.601E+00	5.732E-01	5.732E-01	116.24	OK
TH-228	74.82	10.28	3.526E+00	2.579E+00	2.579E+00	30.34	OK
	77.11	17.10	3.804E+00	2.578E+00	2.578E+00	18.92	OK
	238.63	43.60*	4.774E+00	1.016E+00	1.016E+00	13.72	OK
	300.09	3.30	4.091E+00	----- Line Not Found		-----	Absent
TH-230	74.82	5.80	3.526E+00	4.571E+00	4.571E+00	30.34	OK
	77.11	9.70	3.804E+00	4.546E+00	4.546E+00	18.92	OK
	87.09	3.41	4.841E+00	4.273E+00	4.273E+00	36.77	OK
	242.00	7.25	4.730E+00	3.995E+00	3.995E+00	20.49	OK
	295.22	18.42	4.137E+00	2.784E+00	2.784E+00	15.84	OK
	351.93	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83	OK
TH-232	105.21	1.10	5.932E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.768E+00	8.634E-01	8.634E-01	46.08	OK
	835.71	1.61	1.848E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.702E+00	8.718E-01	8.718E-01	29.28	OK
	968.97	15.80	1.601E+00	5.732E-01	5.732E-01	116.24	OK
PA-234M	63.29	3.70*	1.978E+00	4.565E+00	4.565E+00	80.99	OK
	92.59	4.23	5.280E+00	4.591E+00	4.591E+00	33.81	OK
TH-234	63.29	3.70*	1.978E+00	4.565E+00	4.565E+00	80.99	OK
	92.59	4.23	5.280E+00	4.591E+00	4.591E+00	33.81	OK
U-234	74.82	5.80	3.526E+00	4.571E+00	4.571E+00	30.34	OK
	77.11	9.70	3.804E+00	4.546E+00	4.546E+00	18.92	OK
	87.09	3.41	4.841E+00	4.273E+00	4.273E+00	36.77	OK
	242.00	7.25	4.730E+00	3.995E+00	3.995E+00	20.49	OK
	295.22	18.42	4.137E+00	2.784E+00	2.784E+00	15.84	OK
	351.93	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83	OK
U-235	89.96	3.47	5.072E+00	2.854E+00	2.854E+00	36.34	OK
	93.35	5.60	5.280E+00	3.468E+00	3.468E+00	33.81	OK
	143.76	10.96*	6.195E+00	2.434E-01	2.434E-01	134.37	OK
	163.33	5.08	5.931E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.561E+00	4.602E-01	4.602E-01	25.03	OK
	205.31	5.01	5.251E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	1.978E+00	4.565E+00	4.565E+00	80.99	OK
	92.59	4.23	5.280E+00	4.591E+00	4.591E+00	33.81	OK
AM-243	43.53	5.90	1.705E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	3.526E+00	3.945E-01	3.945E-01	30.34	OK
ANH-511	511.00	100.00*	2.806E+00	9.443E-02	9.443E-02	105.02	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:48.11

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507019.CNF;1		
Acquisition date	: 10-APR-2025 22:36:16	Sensitivity	: 3.000
Detector ID	: GAM32	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.85	Half life ratio	: *****
Sample date	: 7-MAR-2025 09:00:00	Analyst initials	: MXR1
Sample ID	: G714507019	Sample Quantity	: 1.3813E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 17-JUL-2024 09:18:46	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;23		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	2.898E+00	8.100E-01	6.055E-01
CD-109	4.148E+00	1.495E+00	1.277E+00
SN-126	3.938E-01	1.419E-01	1.221E-01
ND-147	4.394E+00	3.597E+00	3.257E+00
HG-203	9.725E-03	1.008E-01	9.762E-02
TL-208	3.055E-01	8.080E-02	6.272E-02
BI-211	8.117E+00	7.821E-01	3.701E-01
BI-212	1.309E+00	6.788E-01	7.565E-01
PB-212	1.016E+00	1.366E-01	1.110E-01
BI-214	2.519E+00	2.561E-01	1.423E-01
PB-214	2.946E+00	2.838E-01	1.346E-01
RN-222	2.519E+00	2.561E-01	1.423E-01
RA-224	7.065E+00	1.419E+00	1.189E+00
RA-226	2.946E+00	2.838E-01	1.346E-01
AC-228	8.718E-01	2.501E-01	1.969E-01
RA-228	8.718E-01	2.501E-01	1.969E-01
TH-228	1.016E+00	1.366E-01	1.110E-01
TH-230	2.946E+00	2.838E-01	1.346E-01
TH-232	8.718E-01	2.501E-01	1.969E-01
PA-234M	4.565E+00	3.623E+00	3.563E+00
TH-234	4.565E+00	3.623E+00	3.563E+00
U-234	2.946E+00	2.838E-01	1.346E-01
U-235	2.434E-01	3.205E-01	3.835E-01
U-238	4.565E+00	3.623E+00	3.563E+00
AM-243	3.945E-01	1.173E-01	1.200E-01
ANH-511	9.443E-02	9.718E-02	4.933E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-7.568E-02	3.874E-01	7.387E-01	NOT IDENT.
NA-22	2.035E-02	2.296E-02	6.233E-02	NOT IDENT.
NA-24	0.000E+00	1.510E+15	0.000E+00	SHORT HLIF
AL-26	-1.769E-02	2.002E-02	1.534E-02	NOT IDENT.

SC-46	4.533E-02	4.063E-02	9.342E-02	FAIL ABUN
V-48	-1.881E-03	1.766E-01	3.314E-01	NOT IDENT.
CR-51	2.030E-01	5.383E-01	1.102E+00	NOT IDENT.
MN-52	8.081E-01	2.193E+00	5.090E+00	NOT IDENT.
MN-54	-8.788E-03	3.474E-02	6.377E-02	NOT IDENT.
CO-56	4.471E-02	5.111E-02	1.020E-01	FAIL ABUN
MN-56	0.000E+00	1.147E+41	0.000E+00	SHORT HLIF
CO-57	-9.347E-04	2.699E-02	5.030E-02	NOT IDENT.
CO-58	7.973E-05	4.093E-02	7.954E-02	NOT IDENT.
FE-59	7.134E-02	1.007E-01	2.304E-01	NOT IDENT.
CO-60	1.969E-02	3.766E-02	8.429E-02	NOT IDENT.
ZN-65	4.723E-02	7.945E-02	1.650E-01	NOT IDENT.
GE-68	3.641E-02	1.123E+00	2.323E+00	NOT IDENT.
AS-73	8.568E-02	1.824E+00	3.605E+00	NOT IDENT.
AS-74	8.053E-02	1.902E-01	3.830E-01	NOT IDENT.
SE-75	4.750E-02	5.330E-02	9.834E-02	FAIL ABUN
BR-77	0.000E+00	6.196E+03	0.000E+00	SHORT HLIF
SR-82	-8.899E-02	4.541E-01	8.591E-01	NOT IDENT.
RB-83	-7.179E-03	8.292E-02	1.317E-01	NOT IDENT.
RB-84	-3.086E-02	1.165E-01	1.855E-01	NOT IDENT.
KR-85	2.213E+00	6.199E+00	1.255E+01	NOT IDENT.
SR-85	1.430E-02	4.030E-02	8.155E-02	NOT IDENT.
RB-86	2.907E-01	1.382E+00	2.942E+00	NOT IDENT.
Y-88	-3.068E-02	4.115E-02	6.650E-02	NOT IDENT.
Y-91	-5.500E+00	1.743E+01	3.435E+01	NOT IDENT.
NB-94	-1.303E-02	3.314E-02	5.967E-02	NOT IDENT.
NB-95	2.261E-02	5.526E-02	1.008E-01	NOT IDENT.
NB-95M	2.724E-02	1.591E-01	2.890E-01	NOT IDENT.
ZR-95	-9.959E-03	8.624E-02	1.620E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.287E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.568E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	8.913E+39	0.000E+00	SHORT HLIF
RH-101	0.000E+00	7.879E-02	6.664E-02	FAIL ABUN
RH-102	-1.344E-02	4.746E-02	8.435E-02	FAIL ABUN
RU-103	7.124E-03	4.763E-02	9.564E-02	FAIL ABUN
RH-106	-1.211E-01	2.813E-01	5.135E-01	NOT IDENT.
RU-106	-1.211E-01	2.813E-01	5.135E-01	NOT IDENT.
AG-108M	7.051E-03	2.729E-02	5.496E-02	NOT IDENT.
AG-110	-3.523E-01	7.080E-01	1.267E+00	NOT IDENT.
AG-110M	6.821E-02	6.835E-02	9.746E-02	FAIL ABUN
SN-113	-3.633E-03	4.674E-02	9.095E-02	NOT IDENT.
CD-115	0.000E+00	4.113E+03	0.000E+00	SHORT HLIF
SN-117M	2.099E-04	1.611E-01	2.947E-01	NOT IDENT.
SB-122	0.000E+00	2.102E+02	0.000E+00	SHORT HLIF
TE-123M	-1.193E-02	3.460E-02	6.163E-02	NOT IDENT.
SB-124	5.324E-02	9.031E-02	2.274E-01	NOT IDENT.
SB-125	1.519E-02	8.558E-02	1.707E-01	FAIL ABUN
TE-125M	-3.888E+00	1.320E+01	2.420E+01	NOT IDENT.
I-126	0.000E+00	1.017E+00	1.476E+00	FAIL ABUN
SB-126	2.743E-01	3.772E-01	7.862E-01	FAIL ABUN
SB-127	0.000E+00	9.048E+01	8.471E+01	FAIL ABUN
I-131	-3.758E-01	6.016E-01	1.109E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.043E+01	0.000E+00	SHORT HLIF
BA-133	-9.259E-03	3.540E-02	6.137E-02	NOT IDENT.
I-133	0.000E+00	3.608E+10	0.000E+00	SHORT HLIF
CS-134	1.830E-02	4.365E-02	8.718E-02	NOT IDENT.
I-135	0.000E+00	1.198E+37	0.000E+00	SHORT HLIF
CS-136	-1.929E-01	2.534E-01	4.025E-01	NOT IDENT.
BA-137M	-6.703E-03	3.586E-02	5.968E-02	NOT IDENT.
CS-137	-7.081E-03	3.788E-02	6.304E-02	NOT IDENT.
LA-138	2.817E-02	4.939E-02	1.168E-01	NOT IDENT.
CE-139	-6.796E-03	3.454E-02	6.218E-02	NOT IDENT.
BA-140	2.440E-02	6.912E-01	1.301E+00	NOT IDENT.
LA-140	5.599E-02	2.622E-01	5.639E-01	NOT IDENT.
CE-141	5.880E-03	1.105E-01	1.884E-01	NOT IDENT.
CE-143	0.000E+00	2.744E+06	0.000E+00	SHORT HLIF
CE-144	7.677E-02	2.190E-01	4.158E-01	NOT IDENT.
PM-144	1.068E-04	3.476E-02	6.635E-02	NOT IDENT.
PR-144	4.049E-02	2.633E+00	5.033E+00	NOT IDENT.
PM-146	2.088E-02	3.817E-02	7.937E-02	NOT IDENT.
PM-147	-5.930E+01	7.635E+02	1.414E+03	NOT IDENT.
PM-149	0.000E+00	3.936E+04	0.000E+00	SHORT HLIF
EU-150	7.077E-03	3.054E-02	5.516E-02	FAIL ABUN
EU-152	-1.488E-02	8.964E-02	1.739E-01	NOT IDENT.
GD-153	-1.321E-02	1.068E-01	1.844E-01	NOT IDENT.
EU-154	4.945E-02	6.144E-02	1.671E-01	NOT IDENT.

EU-155	1.286E-02	1.022E-01	1.952E-01	FAIL ABUN
TB-160	1.268E-01	1.555E-01	3.181E-01	FAIL ABUN
HO-166M	-4.333E-03	5.272E-02	1.009E-01	NOT IDENT.
TM-171	-4.949E+00	3.516E+01	6.853E+01	NOT IDENT.
HF-172	9.450E-02	1.991E-01	3.601E-01	FAIL ABUN
LU-172	-8.872E-03	5.059E-02	1.021E-01	FAIL ABUN
LU-176	1.439E-02	2.940E-02	5.485E-02	FAIL ABUN
HF-181	-1.677E-02	5.190E-02	9.793E-02	NOT IDENT.
TA-182	-3.550E-02	1.506E-01	2.987E-01	NOT IDENT.
RE-183	5.547E-02	3.740E-01	7.398E-01	NOT IDENT.
RE-184	1.055E-01	1.611E-01	3.469E-01	NOT IDENT.
W-188	4.854E+00	1.094E+01	1.875E+01	FAIL ABUN
IR-192	3.517E-03	3.679E-02	7.366E-02	FAIL ABUN
TL-204	1.272E+00	6.658E+00	1.202E+01	FAIL ABUN
BI-207	3.238E-02	3.752E-02	9.092E-02	FAIL ABUN
BI-210	-3.756E+00	9.562E+00	1.835E+01	NOT IDENT.
PB-210	-3.756E+00	9.562E+00	1.835E+01	NOT IDENT.
PB-211	-9.552E-03	6.767E-01	1.320E+00	NOT IDENT.
BI-213	-3.820E-02	9.423E-02	1.762E-01	NOT IDENT.
RN-219	-8.046E-02	4.008E-01	7.657E-01	FAIL ABUN
RA-223	1.537E-01	5.991E-01	1.206E+00	FAIL ABUN
AC-225	1.551E+00	2.338E+00	4.474E+00	NOT IDENT.
AC-227	-2.932E-02	2.746E-01	4.863E-01	NOT IDENT.
TH-227	-2.932E-02	2.746E-01	4.863E-01	NOT IDENT.
TH-229	1.268E-01	5.261E-01	9.767E-01	FAIL ABUN
PA-231	-4.833E-01	5.713E-01	9.198E-01	NOT IDENT.
TH-231	1.537E-01	5.991E-01	1.206E+00	FAIL ABUN
PA-233	-2.816E-02	5.631E-02	1.066E-01	NOT IDENT.
PA-234	2.289E-01	2.957E-01	6.336E-01	FAIL ABUN
NP-237	-2.816E-02	5.631E-02	1.066E-01	NOT IDENT.
NP-238	0.000E+00	1.118E+04	0.000E+00	SHORT HLIF
NP-239	-3.615E-01	2.807E-01	4.726E-01	FAIL ABUN
PU-239	0.000E+00	8.324E+02	7.619E+02	FAIL ABUN
AM-241	-5.008E-02	2.372E-01	4.222E-01	NOT IDENT.
CM-243	-1.135E-01	1.052E-01	1.817E-01	FAIL ABUN
BK-247	2.120E-02	9.292E-02	1.573E-01	FAIL ABUN
CM-247	3.175E-04	3.590E-02	7.014E-02	FAIL ABUN
CF-249	1.037E-02	4.053E-02	8.074E-02	NOT IDENT.
CF-251	-8.434E-02	1.358E-01	2.346E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:46.48

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	62	10.66*	1.094E+00	2.898E+00	2.898E+00	28.52
CD-109	88.03	130	3.70*	4.841E+00	3.938E+00	4.148E+00	36.77
SN-126	64.28	61	9.60	1.978E+00	1.759E+00	1.759E+00	80.99
	86.94	130	8.90	4.841E+00	1.637E+00	1.637E+00	36.77
	87.57	130	37.00*	4.841E+00	3.938E-01	3.938E-01	36.77
ND-147	91.11	92	27.90	5.072E+00	3.550E-01	3.151E+00	36.34
	319.41	------	1.95	3.920E+00	------ Line Not Found		------
	531.02	32	13.10*	2.724E+00	4.950E-01	4.394E+00	83.52
HG-203	70.83	------	3.69	3.019E+00	------ Line Not Found		------
	72.87	------	6.19	3.285E+00	------ Line Not Found		------
	279.20	20	81.56*	4.307E+00	3.053E-02	5.108E-02	200.18
TL-208	277.37	20	6.60	4.307E+00	3.773E-01	3.773E-01	200.18
	583.19	121	85.00*	2.533E+00	3.055E-01	3.055E-01	26.99
	860.56	------	12.50	1.797E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.285E+00	------ Line Not Found		------
	351.06	708	12.92*	3.668E+00	8.117E+00	8.117E+00	9.83
BI-212	727.33	34	6.67*	2.100E+00	1.309E+00	1.309E+00	52.92
	1620.50	------	1.47	1.016E+00	------ Line Not Found		------
PB-212	74.82	172	10.28	3.526E+00	2.579E+00	2.579E+00	30.34
	77.11	309	17.10	3.804E+00	2.578E+00	2.578E+00	18.92
	238.63	389	43.60*	4.774E+00	1.016E+00	1.016E+00	13.72
	300.09	------	3.30	4.091E+00	------ Line Not Found		------
BI-214	609.32	515	45.49*	2.444E+00	2.519E+00	2.519E+00	10.37
	1120.29	86	14.92	1.391E+00	2.249E+00	2.249E+00	25.84
	1764.49	58	15.30	9.714E-01	2.121E+00	2.121E+00	33.64
PB-214	74.82	172	5.80	3.526E+00	4.571E+00	4.571E+00	30.34
	77.11	309	9.70	3.804E+00	4.546E+00	4.546E+00	18.92
	87.09	130	3.41	4.841E+00	4.273E+00	4.273E+00	36.77
	242.00	252	7.25	4.730E+00	3.995E+00	3.996E+00	20.49
	295.22	390	18.42	4.137E+00	2.784E+00	2.784E+00	15.84
	351.93	708	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83
RN-222	609.32	515	45.49*	2.444E+00	2.519E+00	2.519E+00	10.37
	1120.29	86	14.92	1.391E+00	2.249E+00	2.249E+00	25.84
	1764.49	58	15.30	9.714E-01	2.121E+00	2.121E+00	33.64
RA-224	240.99	252	4.10*	4.730E+00	7.065E+00	7.065E+00	20.49
RA-226	74.82	172	5.80	3.526E+00	4.571E+00	4.571E+00	30.34
	77.11	309	9.70	3.804E+00	4.546E+00	4.546E+00	18.92
	87.09	130	3.41	4.841E+00	4.273E+00	4.273E+00	36.77
	242.00	252	7.25	4.730E+00	3.995E+00	3.996E+00	20.49
	295.22	390	18.42	4.137E+00	2.784E+00	2.784E+00	15.84
	351.93	708	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83
AC-228	105.21	------	1.10	5.932E+00	------ Line Not Found		------
	338.32	67	11.27	3.768E+00	8.634E-01	8.634E-01	46.08
	835.71	------	1.61	1.848E+00	------ Line Not Found		------
	911.20	70	25.80*	1.702E+00	8.718E-01	8.718E-01	29.28
	968.97	27	15.80	1.601E+00	5.732E-01	5.732E-01	116.24
RA-228	105.21	------	1.10	5.932E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	67	11.27	3.768E+00	8.634E-01	8.634E-01	46.08
	835.71	------	1.61	1.848E+00	------ Line Not Found		------
	911.20	70	25.80*	1.702E+00	8.718E-01	8.718E-01	29.28
	968.97	27	15.80	1.601E+00	5.732E-01	5.732E-01	116.24
TH-228	74.82	172	10.28	3.526E+00	2.579E+00	2.579E+00	30.34
	77.11	309	17.10	3.804E+00	2.578E+00	2.578E+00	18.92
	238.63	389	43.60*	4.774E+00	1.016E+00	1.016E+00	13.72
	300.09	------	3.30	4.091E+00	------ Line Not Found		------
TH-230	74.82	172	5.80	3.526E+00	4.571E+00	4.571E+00	30.34
	77.11	309	9.70	3.804E+00	4.546E+00	4.546E+00	18.92
	87.09	130	3.41	4.841E+00	4.273E+00	4.273E+00	36.77
	242.00	252	7.25	4.730E+00	3.995E+00	3.995E+00	20.49
	295.22	390	18.42	4.137E+00	2.784E+00	2.784E+00	15.84
	351.93	708	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83
TH-232	105.21	------	1.10	5.932E+00	------ Line Not Found		------
	338.32	67	11.27	3.768E+00	8.634E-01	8.634E-01	46.08
	835.71	------	1.61	1.848E+00	------ Line Not Found		------
	911.20	70	25.80*	1.702E+00	8.718E-01	8.718E-01	29.28
	968.97	27	15.80	1.601E+00	5.732E-01	5.732E-01	116.24
PA-234M	63.29	61	3.70*	1.978E+00	4.565E+00	4.565E+00	80.99
	92.59	189	4.23	5.280E+00	4.591E+00	4.591E+00	33.81
TH-234	63.29	61	3.70*	1.978E+00	4.565E+00	4.565E+00	80.99
	92.59	189	4.23	5.280E+00	4.591E+00	4.591E+00	33.81
U-234	74.82	172	5.80	3.526E+00	4.571E+00	4.571E+00	30.34
	77.11	309	9.70	3.804E+00	4.546E+00	4.546E+00	18.92
	87.09	130	3.41	4.841E+00	4.273E+00	4.273E+00	36.77
	242.00	252	7.25	4.730E+00	3.995E+00	3.995E+00	20.49
	295.22	390	18.42	4.137E+00	2.784E+00	2.784E+00	15.84
	351.93	708	35.60*	3.668E+00	2.946E+00	2.946E+00	9.83
U-235	89.96	92	3.47	5.072E+00	2.854E+00	2.854E+00	36.34
	93.35	189	5.60	5.280E+00	3.468E+00	3.468E+00	33.81
	143.76	30	10.96*	6.195E+00	2.434E-01	2.434E-01	134.37
	163.33	------	5.08	5.931E+00	------ Line Not Found		------
	185.72	269	57.20	5.561E+00	4.602E-01	4.602E-01	25.03
	205.31	------	5.01	5.251E+00	------ Line Not Found		------
U-238	63.29	61	3.70*	1.978E+00	4.565E+00	4.565E+00	80.99
	92.59	189	4.23	5.280E+00	4.591E+00	4.591E+00	33.81
AM-243	43.53	------	5.90	1.705E-01	------ Line Not Found		------
	74.66	172	67.20*	3.526E+00	3.945E-01	3.945E-01	30.34
ANH-511	511.00	49	100.00*	2.806E+00	9.443E-02	9.443E-02	105.02

Flag: "*" = Keyline

Sample ID : G714507019 Acquisition date : 10-APR-2025 22:36:16

Total number of lines in spectrum	59	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	40	67.80%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	2.898E+00	2.898E+00	0.826E+00	28.52	
CD-109	461.40D	1.05	3.938E+00	4.148E+00	1.525E+00	36.77	
SN-126	2.30E+05Y	1.00	3.938E-01	3.938E-01	1.448E-01	36.77	
ND-147	10.98D	8.88	4.950E-01	4.394E+00	3.670E+00	83.52	
HG-203	46.59D	1.67	3.053E-02	5.108E-02	10.22E-02	200.18	
TL-208	1.41E+10Y	1.00	3.055E-01	3.055E-01	0.825E-01	26.99	
BI-211	7.04E+08Y	1.00	8.117E+00	8.117E+00	0.798E+00	9.83	
BI-212	1.41E+10Y	1.00	1.309E+00	1.309E+00	0.693E+00	52.92	
PB-212	1.41E+10Y	1.00	1.016E+00	1.016E+00	0.139E+00	13.72	
BI-214	1600.00Y	1.00	2.519E+00	2.519E+00	0.261E+00	10.37	
PB-214	1600.00Y	1.00	2.946E+00	2.946E+00	0.290E+00	9.83	
RN-222	1600.00Y	1.00	2.519E+00	2.519E+00	0.261E+00	10.37	
RA-224	1.41E+10Y	1.00	7.065E+00	7.065E+00	1.448E+00	20.49	
RA-226	1600.00Y	1.00	2.946E+00	2.946E+00	0.290E+00	9.83	
AC-228	1.41E+10Y	1.00	8.718E-01	8.718E-01	2.552E-01	29.28	
RA-228	1.41E+10Y	1.00	8.718E-01	8.718E-01	2.552E-01	29.28	
TH-228	1.41E+10Y	1.00	1.016E+00	1.016E+00	0.139E+00	13.72	
TH-230	7.54E+04Y	1.00	2.946E+00	2.946E+00	0.290E+00	9.83	
TH-232	1.41E+10Y	1.00	8.718E-01	8.718E-01	2.552E-01	29.28	
PA-234M	4.47E+09Y	1.00	4.565E+00	4.565E+00	3.697E+00	80.99	
TH-234	4.47E+09Y	1.00	4.565E+00	4.565E+00	3.697E+00	80.99	
U-234	2.45E+05Y	1.00	2.946E+00	2.946E+00	0.290E+00	9.83	
U-235	7.04E+08Y	1.00	2.434E-01	2.434E-01	3.270E-01	134.37	
U-238	4.47E+09Y	1.00	4.565E+00	4.565E+00	3.697E+00	80.99	
AM-243	7370.00Y	1.00	3.945E-01	3.945E-01	1.197E-01	30.34	
ANH-511	1.00E+09Y	1.00	9.443E-02	9.443E-02	9.917E-02	105.02	
			---------	---------			
	Total Activity :		6.045E+01	6.458E+01			
	Grand Total Activity :		6.045E+01	6.458E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	36.17	57	37	1.15	72.85	68	15	1.24E-02	63.8	2.09E-02	
3	38.06	31	64	1.06	76.65	68	15	6.78E-03	****	4.01E-02	
3	61.53	29	98	1.23	123.58	121	10	6.68E-03	****	1.78E+00	T
0	83.75	36	173	0.82	168.02	166	6	8.35E-03	****	4.53E+00	T
0	128.06	107	194	3.83	256.64	252	11	2.56E-02	57.9	6.29E+00	T
0	209.82	34	97	1.53	420.14	416	7	8.35E-03	****	5.18E+00	T
0	249.63	14	70	1.27	499.77	495	7	3.61E-03	****	4.63E+00	
1	269.62	55	83	1.33	539.76	533	14	1.40E-02	65.6	4.40E+00	T
1	271.12	24	74	1.34	542.76	533	14	6.09E-03	****	4.38E+00	T
0	462.94	19	30	1.02	926.38	923	8	5.12E-03	****	3.02E+00	T
0	524.23	35	28	2.33	1048.97	1043	14	9.19E-03	76.0	2.75E+00	
0	638.73	21	29	0.57	1277.98	1269	18	5.61E-03	****	2.35E+00	
0	651.42	13	17	1.13	1303.34	1300	8	3.48E-03	****	2.31E+00	
0	665.81	36	21	1.25	1332.13	1327	12	9.84E-03	61.6	2.27E+00	T
0	677.09	14	11	1.35	1354.68	1348	11	3.94E-03	****	2.24E+00	T
0	685.30	76	14	5.43	1371.11	1360	27	2.07E-02	35.9	2.21E+00	T
0	767.78	49	17	1.06	1536.07	1530	11	1.35E-02	43.3	2.00E+00	T
0	848.39	11	13	0.76	1697.30	1692	8	2.92E-03	****	1.82E+00	
0	883.28	15	10	4.00	1767.07	1761	11	4.04E-03	****	1.75E+00	T
0	933.15	29	5	3.62	1866.83	1862	10	8.06E-03	47.0	1.66E+00	
0	1000.20	23	7	1.47	2000.93	1993	14	6.39E-03	64.2	1.55E+00	
0	1011.84	13	8	2.01	2024.22	2016	11	3.73E-03	99.5	1.54E+00	
0	1022.17	11	5	1.47	2044.88	2038	11	3.19E-03	98.8	1.52E+00	T
0	1154.94	20	7	1.85	2310.43	2306	13	5.68E-03	70.7	1.35E+00	
0	1168.56	7	3	1.31	2337.67	2333	7	2.08E-03	****	1.33E+00	
0	1183.16	11	10	3.53	2366.86	2361	11	3.01E-03	****	1.32E+00	
0	1237.86	42	11	1.51	2476.28	2470	12	1.19E-02	44.2	1.26E+00	T
0	1281.00	13	4	1.00	2562.57	2557	10	3.72E-03	82.5	1.22E+00	
0	1296.87	7	5	1.01	2594.30	2590	7	1.92E-03	****	1.21E+00	T
0	1345.02	6	3	0.47	2690.61	2687	7	1.76E-03	****	1.17E+00	
0	1376.98	32	5	1.77	2754.53	2749	11	9.32E-03	43.9	1.15E+00	
0	1384.77	19	3	1.96	2770.12	2765	12	5.45E-03	57.6	1.14E+00	T
0	1396.15	8	4	0.59	2792.88	2788	9	2.36E-03	****	1.13E+00	
0	1400.80	11	2	2.60	2802.18	2797	9	3.24E-03	74.8	1.13E+00	
0	1729.37	14	9	2.78	3459.39	3451	12	4.09E-03	97.1	9.80E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:37:58.21

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507019.CNF;1   *
* Acquisition date : 10-APR-2025 22:36:16 Sensitivity     : 3.000           *
* Detector ID      : GAM32                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.85     Half life ratio : *****           *
* Sample date      :  7-MAR-2025 09:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507019           Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.3813E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 17-JUL-2024 09:18:46 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;23            *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.395E-01
CD-109	5.936E-01
SN-126	5.679E-02
ND-147	1.442E+00
HG-203	4.519E-02
TL-208	2.788E-02
BI-211	1.691E-01
BI-212	3.250E-01
PB-212	5.183E-02
BI-214	6.442E-02
PB-214	6.150E-02
RN-222	6.442E-02
RA-224	5.553E-01
RA-226	6.150E-02
AC-228	8.148E-02
RA-228	8.148E-02
TH-228	5.183E-02
TH-230	6.150E-02
TH-232	8.148E-02
PA-234M	1.677E+00
TH-234	1.677E+00
U-234	6.150E-02
U-235	1.805E-01
U-238	1.677E+00
AM-243	5.672E-02
ANH-511	2.199E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.311E-01	NOT IDENT.
NA-22	2.500E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	0.000E+00	NOT IDENT.
SC-46	4.103E-02	FAIL ABUN

V-48	1.446E-01	NOT IDENT.
CR-51	5.048E-01	NOT IDENT.
MN-52	2.061E+00	NOT IDENT.
MN-54	2.754E-02	NOT IDENT.
CO-56	4.544E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.358E-02	NOT IDENT.
CO-58	3.424E-02	NOT IDENT.
FE-59	9.934E-02	NOT IDENT.
CO-60	3.582E-02	NOT IDENT.
ZN-65	7.093E-02	NOT IDENT.
GE-68	9.872E-01	NOT IDENT.
AS-73	1.681E+00	NOT IDENT.
AS-74	1.719E-01	NOT IDENT.
SE-75	4.564E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	3.652E-01	NOT IDENT.
RB-83	5.787E-02	NOT IDENT.
RB-84	8.000E-02	NOT IDENT.
KR-85	5.651E+00	NOT IDENT.
SR-85	3.673E-02	NOT IDENT.
RB-86	1.256E+00	NOT IDENT.
Y-88	2.356E-02	NOT IDENT.
Y-91	1.387E+01	NOT IDENT.
NB-94	2.638E-02	NOT IDENT.
NB-95	4.498E-02	NOT IDENT.
NB-95M	1.353E-01	NOT IDENT.
ZR-95	7.117E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.149E-02	FAIL ABUN
RH-102	3.644E-02	FAIL ABUN
RU-103	4.252E-02	FAIL ABUN
RH-106	2.233E-01	NOT IDENT.
RU-106	2.233E-01	NOT IDENT.
AG-108M	2.485E-02	NOT IDENT.
AG-110	5.538E-01	NOT IDENT.
AG-110M	4.230E-02	FAIL ABUN
SN-113	4.127E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.388E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.896E-02	NOT IDENT.
SB-124	9.051E-02	NOT IDENT.
SB-125	7.728E-02	FAIL ABUN
TE-125M	1.139E+01	NOT IDENT.
I-126	6.742E-01	FAIL ABUN
SB-126	3.474E-01	FAIL ABUN
SB-127	3.771E+01	FAIL ABUN
I-131	5.033E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.731E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.894E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.626E-01	NOT IDENT.
BA-137M	2.618E-02	NOT IDENT.
CS-137	2.766E-02	NOT IDENT.
LA-138	4.823E-02	NOT IDENT.
CE-139	2.916E-02	NOT IDENT.
BA-140	5.761E-01	NOT IDENT.
LA-140	2.327E-01	NOT IDENT.
CE-141	8.883E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.959E-01	NOT IDENT.
PM-144	2.950E-02	NOT IDENT.
PR-144	2.239E+00	NOT IDENT.
PM-146	3.587E-02	NOT IDENT.
PM-147	6.630E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.551E-02	FAIL ABUN
EU-152	7.927E-02	NOT IDENT.
GD-153	8.692E-02	NOT IDENT.
EU-154	6.623E-02	NOT IDENT.
EU-155	9.136E-02	FAIL ABUN

TB-160	1.395E-01	FAIL ABUN
HO-166M	4.398E-02	NOT IDENT.
TM-171	3.194E+01	NOT IDENT.
HF-172	1.689E-01	FAIL ABUN
LU-172	4.248E-02	FAIL ABUN
LU-176	2.542E-02	FAIL ABUN
HF-181	4.336E-02	NOT IDENT.
TA-182	1.229E-01	NOT IDENT.
RE-183	3.460E-01	NOT IDENT.
RE-184	1.510E-01	NOT IDENT.
W-188	8.741E+00	FAIL ABUN
IR-192	3.362E-02	FAIL ABUN
TL-204	5.678E+00	FAIL ABUN
BI-207	3.865E-02	FAIL ABUN
BI-210	8.576E+00	NOT IDENT.
PB-210	8.576E+00	NOT IDENT.
PB-211	6.002E-01	NOT IDENT.
BI-213	7.886E-02	NOT IDENT.
RN-219	3.487E-01	FAIL ABUN
RA-223	5.543E-01	FAIL ABUN
AC-225	2.092E+00	NOT IDENT.
AC-227	2.256E-01	NOT IDENT.
TH-227	2.256E-01	NOT IDENT.
TH-229	4.566E-01	FAIL ABUN
PA-231	4.252E-01	NOT IDENT.
TH-231	5.543E-01	FAIL ABUN
PA-233	4.837E-02	NOT IDENT.
PA-234	2.791E-01	FAIL ABUN
NP-237	4.837E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.207E-01	FAIL ABUN
PU-239	3.616E+02	FAIL ABUN
AM-241	1.969E-01	NOT IDENT.
CM-243	8.454E-02	FAIL ABUN
BK-247	7.298E-02	FAIL ABUN
CM-247	3.194E-02	FAIL ABUN
CF-249	3.704E-02	NOT IDENT.
CF-251	1.096E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:38:02.32

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507019.CNF;1		
Acquisition date	: 10-APR-2025 22:36:16	Sensitivity	: 3.000
Detector ID	: GAM32	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.85	Half life ratio	: *****
Sample date	: 7-MAR-2025 09:00:00	Nuclide Library	: SOLID
Sample ID	: G714507019	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.3813E+02 GRAM
		Quantity Err(%)	: 1.4479E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 17-JUL-2024 09:18:46	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;23		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	2.898E+00	8.888E-01	8.888E-01
CD-109	4.148E+00	1.554E+00	1.554E+00
SN-126	3.938E-01	1.461E-01	1.461E-01
ND-147	4.394E+00	3.616E+00	3.616E+00
HG-203	9.725E-03	1.010E-01	1.010E-01
TL-208	3.055E-01	8.477E-02	8.477E-02
BI-211	8.117E+00	1.094E+00	1.094E+00
BI-212	1.309E+00	6.910E-01	6.910E-01
PB-212	1.016E+00	1.683E-01	1.683E-01
BI-214	2.519E+00	3.312E-01	3.312E-01
PB-214	2.946E+00	3.942E-01	3.942E-01
RN-222	2.519E+00	3.312E-01	3.312E-01
RA-224	7.065E+00	1.579E+00	1.579E+00
RA-226	2.946E+00	3.942E-01	3.942E-01
AC-228	8.718E-01	2.786E-01	2.786E-01
RA-228	8.718E-01	2.786E-01	2.786E-01
TH-228	1.016E+00	1.683E-01	1.683E-01
TH-230	2.946E+00	3.942E-01	3.942E-01
TH-232	8.718E-01	2.786E-01	2.786E-01
PA-234M	4.565E+00	3.786E+00	3.786E+00
TH-234	4.565E+00	3.786E+00	3.786E+00
U-234	2.946E+00	3.941E-01	3.941E-01
U-235	2.434E-01	3.211E-01	3.211E-01
U-238	4.565E+00	3.786E+00	3.786E+00
AM-243	3.945E-01	1.228E-01	1.228E-01
ANH-511	9.443E-02	9.751E-02	9.751E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-7.568E-02	3.875E-01	3.890E-01	NOT IDENT.
NA-22	2.035E-02	2.308E-02	2.484E-02	NOT IDENT.
NA-24	3.799E+14	1.511E+15	1.521E+15	SHORT HLIF
AL-26	-1.769E-02	2.008E-02	2.161E-02	NOT IDENT.

SC-46	4.533E-02	4.109E-02	4.589E-02	FAIL ABUN
V-48	-1.881E-03	1.766E-01	1.767E-01	NOT IDENT.
CR-51	2.030E-01	5.387E-01	5.464E-01	NOT IDENT.
MN-52	8.081E-01	2.196E+00	2.226E+00	NOT IDENT.
MN-54	-8.788E-03	3.475E-02	3.498E-02	NOT IDENT.
CO-56	4.471E-02	5.141E-02	5.522E-02	FAIL ABUN
MN-56	1.000E+41	1.153E+41	0.000E+00	SHORT HLIF
CO-57	-9.347E-04	2.699E-02	2.699E-02	NOT IDENT.
CO-58	7.973E-05	4.093E-02	4.093E-02	NOT IDENT.
FE-59	7.134E-02	1.011E-01	1.061E-01	NOT IDENT.
CO-60	1.969E-02	3.775E-02	3.878E-02	NOT IDENT.
ZN-65	4.723E-02	7.961E-02	8.240E-02	NOT IDENT.
GE-68	3.641E-02	1.123E+00	1.123E+00	NOT IDENT.
AS-73	8.568E-02	1.824E+00	1.825E+00	NOT IDENT.
AS-74	8.053E-02	1.904E-01	1.938E-01	NOT IDENT.
SE-75	4.750E-02	5.352E-02	5.765E-02	FAIL ABUN
BR-77	4.608E+04	4.662E+04	5.104E+04	SHORT HLIF
SR-82	-8.899E-02	4.542E-01	4.560E-01	NOT IDENT.
RB-83	-7.179E-03	8.293E-02	8.299E-02	NOT IDENT.
RB-84	-3.086E-02	1.166E-01	1.174E-01	NOT IDENT.
KR-85	2.213E+00	6.202E+00	6.282E+00	NOT IDENT.
SR-85	1.430E-02	4.032E-02	4.083E-02	NOT IDENT.
RB-86	2.907E-01	1.383E+00	1.389E+00	NOT IDENT.
Y-88	-3.068E-02	4.122E-02	4.348E-02	NOT IDENT.
Y-91	-5.500E+00	1.744E+01	1.762E+01	NOT IDENT.
NB-94	-1.303E-02	3.316E-02	3.368E-02	NOT IDENT.
NB-95	2.261E-02	5.531E-02	5.624E-02	NOT IDENT.
NB-95M	2.724E-02	1.592E-01	1.596E-01	NOT IDENT.
ZR-95	-9.959E-03	8.625E-02	8.637E-02	NOT IDENT.
NB-97	-1.000E+41	2.808E+41	0.000E+00	SHORT HLIF
ZR-97	2.869E+14	3.296E+14	3.540E+14	SHORT HLIF
MO-99	-3.596E+02	1.568E+03	1.576E+03	SHORT HLIF
TC-99M	-4.279E+39	8.928E+39	0.000E+00	SHORT HLIF
RH-101	1.388E-01	8.316E-02	1.041E-01	FAIL ABUN
RH-102	-1.344E-02	4.749E-02	4.787E-02	FAIL ABUN
RU-103	7.124E-03	4.764E-02	4.775E-02	FAIL ABUN
RH-106	-1.211E-01	2.815E-01	2.868E-01	NOT IDENT.
RU-106	-1.211E-01	2.815E-01	2.868E-01	NOT IDENT.
AG-108M	7.051E-03	2.729E-02	2.748E-02	NOT IDENT.
AG-110	-3.523E-01	7.086E-01	7.262E-01	NOT IDENT.
AG-110M	6.821E-02	6.899E-02	7.553E-02	FAIL ABUN
SN-113	-3.633E-03	4.674E-02	4.677E-02	NOT IDENT.
CD-115	1.604E+03	4.116E+03	4.179E+03	SHORT HLIF
SN-117M	2.099E-04	1.611E-01	1.611E-01	NOT IDENT.
SB-122	-1.849E+02	2.107E+02	2.266E+02	SHORT HLIF
TE-123M	-1.193E-02	3.461E-02	3.502E-02	NOT IDENT.
SB-124	5.324E-02	9.047E-02	9.360E-02	NOT IDENT.
SB-125	1.519E-02	8.559E-02	8.587E-02	FAIL ABUN
TE-125M	-3.888E+00	1.320E+01	1.332E+01	NOT IDENT.
I-126	1.686E+00	1.029E+00	1.280E+00	FAIL ABUN
SB-126	2.743E-01	3.789E-01	3.986E-01	FAIL ABUN
SB-127	2.570E+02	1.017E+02	1.541E+02	FAIL ABUN
I-131	-3.758E-01	6.026E-01	6.260E-01	NOT IDENT.
I-132	1.000E+41	3.108E+41	0.000E+00	SHORT HLIF
TE-132	-9.379E+00	5.045E+01	5.062E+01	SHORT HLIF
BA-133	-9.259E-03	3.541E-02	3.565E-02	NOT IDENT.
I-133	2.819E+10	3.666E+10	3.880E+10	SHORT HLIF
CS-134	1.830E-02	4.370E-02	4.447E-02	NOT IDENT.
I-135	2.193E+35	1.199E+37	0.000E+00	SHORT HLIF
CS-136	-1.929E-01	2.548E-01	2.692E-01	NOT IDENT.
BA-137M	-6.703E-03	3.586E-02	3.599E-02	NOT IDENT.
CS-137	-7.081E-03	3.789E-02	3.802E-02	NOT IDENT.
LA-138	2.817E-02	4.951E-02	5.111E-02	NOT IDENT.
CE-139	-6.796E-03	3.457E-02	3.470E-02	NOT IDENT.
BA-140	2.440E-02	6.912E-01	6.913E-01	NOT IDENT.
LA-140	5.599E-02	2.623E-01	2.635E-01	NOT IDENT.
CE-141	5.880E-03	1.105E-01	1.105E-01	NOT IDENT.
CE-143	8.524E+05	2.746E+06	2.772E+06	SHORT HLIF
CE-144	7.677E-02	2.191E-01	2.218E-01	NOT IDENT.
PM-144	1.068E-04	3.476E-02	3.476E-02	NOT IDENT.
PR-144	4.049E-02	2.633E+00	2.633E+00	NOT IDENT.
PM-146	2.088E-02	3.823E-02	3.937E-02	NOT IDENT.
PM-147	-5.930E+01	7.635E+02	7.640E+02	NOT IDENT.
PM-149	1.673E+04	3.946E+04	4.018E+04	SHORT HLIF
EU-150	7.077E-03	3.055E-02	3.072E-02	FAIL ABUN
EU-152	-1.488E-02	8.966E-02	8.991E-02	NOT IDENT.
GD-153	-1.321E-02	1.068E-01	1.070E-01	NOT IDENT.
EU-154	4.945E-02	6.172E-02	6.562E-02	NOT IDENT.

EU-155	1.286E-02	1.023E-01	1.024E-01	FAIL ABUN
TB-160	1.268E-01	1.565E-01	1.666E-01	FAIL ABUN
HO-166M	-4.333E-03	5.272E-02	5.276E-02	NOT IDENT.
TM-171	-4.949E+00	3.516E+01	3.524E+01	NOT IDENT.
HF-172	9.450E-02	1.998E-01	2.043E-01	FAIL ABUN
LU-172	-8.872E-03	5.060E-02	5.076E-02	FAIL ABUN
LU-176	1.439E-02	2.943E-02	3.014E-02	FAIL ABUN
HF-181	-1.677E-02	5.191E-02	5.246E-02	NOT IDENT.
TA-182	-3.550E-02	1.507E-01	1.515E-01	NOT IDENT.
RE-183	5.547E-02	3.741E-01	3.750E-01	NOT IDENT.
RE-184	1.055E-01	1.619E-01	1.687E-01	NOT IDENT.
W-188	4.854E+00	1.097E+01	1.118E+01	FAIL ABUN
IR-192	3.517E-03	3.680E-02	3.683E-02	FAIL ABUN
TL-204	1.272E+00	6.660E+00	6.684E+00	FAIL ABUN
BI-207	3.238E-02	3.771E-02	4.043E-02	FAIL ABUN
BI-210	-3.756E+00	9.575E+00	9.723E+00	NOT IDENT.
PB-210	-3.756E+00	9.575E+00	9.723E+00	NOT IDENT.
PB-211	-9.552E-03	6.767E-01	6.767E-01	NOT IDENT.
BI-213	-3.820E-02	9.428E-02	9.584E-02	NOT IDENT.
RN-219	-8.046E-02	4.010E-01	4.026E-01	FAIL ABUN
RA-223	1.537E-01	5.993E-01	6.033E-01	FAIL ABUN
AC-225	1.551E+00	2.344E+00	2.446E+00	NOT IDENT.
AC-227	-2.932E-02	2.746E-01	2.750E-01	NOT IDENT.
TH-227	-2.932E-02	2.746E-01	2.750E-01	NOT IDENT.
TH-229	1.268E-01	5.262E-01	5.292E-01	FAIL ABUN
PA-231	-4.833E-01	5.823E-01	6.217E-01	NOT IDENT.
TH-231	1.537E-01	5.993E-01	6.033E-01	FAIL ABUN
PA-233	-2.816E-02	5.638E-02	5.779E-02	NOT IDENT.
PA-234	2.289E-01	3.961E-01	4.093E-01	FAIL ABUN
NP-237	-2.816E-02	5.638E-02	5.779E-02	NOT IDENT.
NP-238	4.707E+03	1.120E+04	1.140E+04	SHORT HLIF
NP-239	-3.615E-01	2.833E-01	3.268E-01	FAIL ABUN
PU-239	1.466E+03	8.411E+02	1.070E+03	FAIL ABUN
AM-241	-5.008E-02	2.373E-01	2.384E-01	NOT IDENT.
CM-243	-1.135E-01	1.059E-01	1.176E-01	FAIL ABUN
BK-247	2.120E-02	9.303E-02	9.352E-02	FAIL ABUN
CM-247	3.175E-04	3.590E-02	3.590E-02	FAIL ABUN
CF-249	1.037E-02	4.054E-02	4.081E-02	NOT IDENT.
CF-251	-8.434E-02	1.362E-01	1.414E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	78.8589	85.43	95.4616	131.20	83.8159
45.60	74.8622	86.55	80.0412	133.02	74.2239
46.54	77.7363	86.79	80.0756	133.52	79.8802
49.72	0.0000	86.94	80.0981	136.00	89.6420
51.35	78.7322	87.09	80.1200	136.47	87.5885
51.87	79.7433	87.57	58.6757	140.51	0.0000
52.39	66.2381	88.03	58.7247	143.76	85.2429
52.97	59.9741	88.34	58.7576	144.24	95.2479
53.44	62.7745	88.47	58.7714	145.44	89.7005
54.07	72.8961	89.96	70.7146	152.43	84.0366
57.36	0.0000	1093.63	70.8003	153.25	79.8095
57.53	81.7838	91.11	70.8596	323.87	93.9416
57.98	66.2327	92.59	71.0447	156.02	104.9748
59.27	73.8162	93.35	71.1392	158.56	86.8469
59.32	73.8248	94.56	81.8499	159.00	90.1518
59.54	68.9387	94.65	81.8625	162.33	82.8803
60.96	85.2224	94.67	81.8657	162.66	84.0037
61.17	85.2635	94.87	81.8941	163.33	84.0719
62.93	85.6055	97.43	94.1929	165.86	81.0391
63.29	85.6750	98.43	83.7212	176.31	68.7216
63.58	85.7308	98.44	83.7225	176.60	73.1795
64.28	94.5756	99.53	96.8564	177.52	82.1344
66.73	88.8309	100.11	98.9486	181.07	0.0000
67.24	98.6354	102.03	60.1598	181.52	75.8131
125.81	99.6694	103.18	85.3865	184.41	91.7132
67.75	99.6847	103.37	85.4131	143.76	91.8446
68.89	101.8136	105.21	68.5344	193.51	63.2504
69.67	94.4283	105.31	68.5458	197.03	85.0250
70.82	92.1315	106.12	85.7938	198.01	54.4717
70.83	92.1337	106.47	85.8418	201.83	70.6383
72.81	98.8489	109.28	92.3108	203.43	82.1656
72.87	98.8608	111.00	81.3702	205.31	77.7503
74.66	99.2218	111.76	0.0000	210.85	41.3915
74.82	99.2535	114.06	78.6890	215.65	58.9174
74.97	99.2837	116.30	0.0000	218.12	54.4277
77.11	99.7082	116.74	99.5302	222.11	55.8003
78.74	100.0280	119.76	81.4260	227.09	53.7301
79.69	105.3520	121.12	74.3593	227.38	57.2499
80.03	105.4203	121.22	74.3703	228.16	0.0000
80.12	77.1509	121.78	78.5663	228.18	68.9849
80.19	77.1613	122.06	76.5299	116.74	68.9849
80.57	77.2174	122.92	88.0155	235.69	67.1143
81.00	81.1456	123.07	70.4280	235.96	67.1317
81.07	90.8179	265.00	60.8151	238.63	67.2961
81.75	77.3920	125.81	63.7741	238.98	0.0000
82.47	122.7054	127.23	80.2255	240.99	67.4405
83.79	89.3440	127.91	80.3027	242.00	67.5022
84.00	89.3791	129.30	80.4602	244.70	55.3989

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	60.5594	344.28	38.5217	563.25	22.3318
252.80	53.8055	345.93	42.8507	564.24	0.0000
254.15	0.0000	351.06	37.8429	569.33	19.4751
256.23	57.5640	351.93	37.8653	946.00	21.4244
260.90	0.0000	355.39	0.0000	569.70	23.3750
264.66	37.0437	356.01	25.8899	583.19	21.5640
264.80	49.9348	364.49	42.5291	584.27	25.0071
265.00	49.9423	366.42	0.0000	595.83	18.7333
269.46	50.9388	372.51	35.7757	427.87	24.7030
270.03	50.9632	375.05	28.8434	602.52	0.0000
271.23	51.0145	377.52	36.7688	604.72	28.2147
273.65	29.2097	356.01	42.1943	607.14	28.2449
276.40	51.2324	388.16	37.0226	609.32	30.7540
277.37	51.2734	388.63	42.3242	610.33	25.3091
277.60	51.2836	391.69	33.5716	614.28	25.0554
278.00	51.3003	264.66	26.6541	618.01	13.9430
279.20	52.1654	401.81	38.2313	620.36	20.9368
279.54	55.4409	402.40	34.6876	621.93	19.9536
279.70	55.4478	404.85	33.8499	630.19	0.0000
280.46	58.7461	410.95	38.4482	631.29	16.8308
283.69	39.2666	413.71	22.3913	633.25	10.5282
284.31	58.9292	414.70	36.7433	634.78	13.5456
285.41	44.2354	423.72	33.3393	635.95	13.0508
285.90	0.0000	427.09	24.3781	636.99	13.0566
287.50	45.5409	427.87	28.0023	657.50	22.2927
290.67	52.6471	433.94	26.2901	657.76	22.2945
293.27	0.0000	439.40	27.2833	657.90	0.0000
351.93	66.8705	440.45	30.0298	661.66	19.7944
295.96	51.2151	453.88	22.0093	664.57	0.0000
879.38	57.9417	463.37	23.9709	666.33	14.2393
299.98	41.0174	468.07	16.6388	666.50	14.2404
300.09	41.0204	473.00	24.0994	667.71	0.0000
300.13	41.0224	475.06	26.9108	677.62	3.0658
301.36	69.6787	476.78	27.8650	685.70	16.9183
302.85	41.1080	477.60	27.8772	692.65	0.0000
256.23	39.9131	482.18	24.2205	695.00	18.5273
304.85	51.1524	487.02	19.6140	696.49	21.6281
306.78	43.7308	492.35	0.0000	696.51	21.6289
308.46	43.3693	497.08	19.7195	697.00	24.7236
311.90	40.1377	505.52	24.0520	697.30	27.8174
316.51	35.2410	507.63	0.0000	697.49	28.8499
319.41	29.4308	511.00	22.7019	702.65	24.7803
320.08	33.6515	514.00	22.7373	706.68	13.4443
321.04	40.4111	514.00	22.7373	711.68	16.5801
323.87	38.8078	520.40	19.0104	720.70	11.2320
325.23	52.3579	520.69	0.0000	721.93	0.0000
328.76	47.4118	522.65	0.0000	722.78	23.4192
333.37	37.7154	527.90	0.0000	722.91	23.4210
333.97	45.8899	528.26	8.5887	723.31	15.6165
334.37	43.3529	529.59	20.0541	724.19	15.6219
338.28	31.5402	529.87	0.0000	727.33	12.5132
338.32	31.5409	531.02	20.0686	733.00	13.5861
311.90	37.1385	537.26	19.5566	735.93	18.8328
340.48	37.1385	546.56	0.0000	333.97	9.4222
340.55	37.1403	552.55	20.2839	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	23.0921	667.71	0.0000	1434.09	3.8538
747.24	21.0173	962.31	22.0867	1435.80	3.8555
748.06	22.0758	964.08	20.3994	1457.56	0.0000
752.31	16.8470	966.17	20.4126	1460.82	4.8465
753.82	21.0710	911.20	19.2959	1489.16	9.7546
756.73	18.9851	983.53	15.9631	1505.03	16.6410
756.80	18.9858	984.45	0.0000	1584.12	10.9517
884.68	11.1050	1274.44	6.8682	1596.21	5.9890
765.81	17.4634	1002.74	12.0432	1620.50	6.0190
766.84	16.9408	1004.73	2.2953	1621.92	7.0244
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	12.7520	1025.87	0.0000	1690.97	2.0352
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	20.2084	1037.84	10.4326	1764.49	3.3033
783.70	26.6378	1038.76	0.0000	1063.66	5.1672
788.74	23.4851	631.29	12.7841	1771.35	1.0337
792.07	23.5138	1048.07	12.7895	1791.20	0.0000
795.86	18.1953	1049.04	9.3040	1808.65	3.1230
810.06	15.0618	1050.41	8.1444	1810.72	0.0000
810.29	10.7597	1063.66	4.3799	1836.06	6.2780
344.28	12.9121	1077.00	9.6733		
810.76	12.9136	1077.34	10.5535		
815.77	16.1713	1085.87	9.6982		
1048.07	18.3454	1093.63	9.7197		
832.01	17.3496	1099.45	7.0806		
834.85	16.2817	1112.07	7.9942		
835.71	17.3724	1112.84	10.6611		
836.80	0.0000	1115.54	7.1128		
846.75	0.0000	1120.29	11.5734		
846.77	11.4451	1120.55	11.5742		
856.80	12.0321	1221.41	8.5488		
860.56	15.3336	1129.67	11.6035		
871.09	17.5879	1131.51	0.0000		
873.19	7.7001	1147.95	0.0000		
875.33	0.0000	1173.23	8.2584		
879.38	8.2675	1177.95	5.7883		
880.51	13.2329	1189.05	6.2201		
881.60	16.5472	1204.77	8.1980		
883.24	9.9338	1221.41	9.1486		
884.68	9.9390	1231.02	8.3850		
889.28	6.6362	1235.36	13.2214		
894.76	13.2969	1238.28	8.2700		
898.04	9.9836	1260.41	0.0000		
900.72	24.4259	1271.87	5.5605		
903.28	8.8896	1274.44	1.0598		
911.20	7.7989	1274.54	1.0598		
912.08	13.3735	1291.59	7.4507		
923.98	0.0000	1298.22	0.0000		
926.50	5.5988	1312.11	7.4888		
929.11	13.4482	1332.49	6.5851		
935.54	6.7380	1362.66	0.0000		
937.49	1.6856	1365.19	3.7925		
944.13	15.7660	1368.63	0.0000		
946.00	10.1411	1384.29	2.8574		
949.00	12.4068	1408.01	5.7462		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:38:29.25

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507020.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM33.CNF;630
                                       Background date  : 6-APR-2025 11:02:18.
Sample date      : 7-MAR-2025 09:30:00. Acquisition date : 10-APR-2025 22:36:52
Sample ID        : G714507020           Sample quantity  : 1.44840E+02 GRAM
Detector name    : GAM33                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.64  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	64.29*	34	298	3.33	129.01	121	13	9.43E-03	108.1	
2	4	74.29	170	282	1.90	149.00	140	21	4.73E-02	21.8	2.80E+00
3	4	77.27	241	331	2.05	154.96	140	21	6.69E-02	17.0	
4	0	93.06*	277	482	2.42	186.54	177	18	7.70E-02	20.2	
5	0	98.53	34	159	1.39	197.46	195	9	9.31E-03	69.8	
6	0	186.10*	189	239	2.56	372.55	365	14	5.25E-02	19.4	
7	0	198.44	44	327	4.05	397.21	388	17	1.23E-02	94.5	
8	0	208.90	103	245	5.75	418.12	409	16	2.87E-02	35.4	
9	2	238.55*	445	203	2.50	477.42	469	22	1.24E-01	8.9	2.88E+00
10	2	241.91*	203	176	2.51	484.13	469	22	5.64E-02	17.1	
11	0	270.70	83	162	1.14	541.70	532	18	2.32E-02	37.4	
12	0	295.29	393	133	2.38	590.85	584	14	1.09E-01	8.0	
13	0	300.88	23	112	1.54	602.04	597	12	6.31E-03	96.1	
14	0	338.76	58	94	3.05	677.77	673	11	1.60E-02	35.0	
15	0	351.94*	729	129	2.23	704.13	697	16	2.02E-01	5.1	
16	0	363.95	42	67	1.34	728.14	720	15	1.16E-02	45.4	
17	3	395.11	33	48	2.39	790.44	778	21	9.14E-03	51.7	2.74E+00
18	3	397.89	34	10	1.59	796.01	778	21	9.41E-03	25.2	
19	0	402.25	21	52	1.22	804.72	798	10	5.71E-03	69.5	
20	0	457.88	7	43	0.66	915.94	909	10	2.00E-03	170.1	
21	0	464.52	31	68	1.55	929.22	920	15	8.55E-03	62.2	
22	0	510.79*	42	52	3.06	1021.74	1013	19	1.16E-02	50.9	
23	0	583.06*	114	28	2.49	1166.24	1159	14	3.17E-02	13.9	
24	0	609.44*	508	68	2.60	1218.99	1209	21	1.41E-01	6.1	
25	0	626.83	20	25	3.18	1253.76	1245	14	5.63E-03	56.4	
26	0	704.12*	48	77	3.77	1408.31	1390	31	1.34E-02	56.0	
27	0	728.03	32	34	1.84	1456.11	1450	12	8.78E-03	41.7	
28	0	769.08	37	90	1.49	1538.20	1532	16	1.02E-02	62.5	
29	1	833.23	26	8	2.63	1666.48	1660	16	7.23E-03	32.3	1.42E+00
30	1	835.50	19	2	2.39	1671.00	1660	16	5.14E-03	36.4	
31	0	840.72	22	13	0.79	1681.45	1675	13	6.11E-03	40.0	
32	0	873.15	30	19	3.72	1746.30	1738	16	8.46E-03	37.3	
33	0	900.74	10	9	3.68	1801.46	1795	11	2.90E-03	61.8	
34	0	911.44*	103	21	2.42	1822.86	1816	14	2.87E-02	14.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	933.99	60	15	3.89	1867.96	1858	20	1.67E-02	20.4	
36	0	957.87	5	10	3.21	1915.71	1907	10	1.48E-03	118.6	
37	0	969.07*	49	34	2.15	1938.10	1930	14	1.36E-02	29.6	
38	0	1025.70	16	10	2.78	2051.33	2045	13	4.46E-03	47.4	
39	0	1053.94	6	19	6.09	2107.80	2095	18	1.61E-03	177.5	
40	0	1057.17	7	2	0.71	2114.27	2112	6	1.98E-03	51.7	
41	4	1112.54	18	2	2.50	2225.00	2223	24	5.12E-03	16.0	1.58E+00
42	4	1120.04	102	10	2.79	2239.98	2223	24	2.84E-02	11.8	
43	0	1238.45	53	12	1.87	2476.78	2468	18	1.47E-02	21.1	
44	0	1377.71	36	6	1.13	2755.27	2750	11	1.01E-02	20.8	
45	0	1408.55	15	6	1.49	2816.94	2813	8	4.06E-03	41.6	
46	0	1460.54*	76	22	1.84	2920.91	2913	17	2.11E-02	18.5	
47	0	1497.47	6	14	0.53	2994.77	2986	14	1.63E-03	142.0	
48	0	1510.11	21	16	3.79	3020.04	3010	16	5.85E-03	47.7	
49	0	1661.06	20	4	1.76	3321.92	3313	18	5.43E-03	34.0	
50	0	1729.33	24	12	1.36	3458.47	3449	16	6.77E-03	37.6	
51	0	1764.49*	82	15	2.44	3528.79	3518	20	2.29E-02	16.1	
52	0	1847.08	23	3	2.91	3693.97	3687	13	6.32E-03	26.6	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:38:30

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507020.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 09:30:00	Acquisition date	: 10-APR-2025 22:36:52
Sample ID	: G714507020	Sample quantity	: 144.84 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA33	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.64 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	73	10.66*	1.061E+00	3.345E+00	3.345E+00	36.93
MN-54	834.85	19	99.98*	1.780E+00	5.472E-02	5.908E-02	72.87
I-131	80.19	------	2.62	4.190E+00	------ Line Not Found		------
	284.31	------	6.12	4.076E+00	------ Line Not Found		------
	364.49	46	81.50*	3.431E+00	8.496E-02	1.679E+00	90.86
	636.99	------	7.16	2.259E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.146E+00	------ Line Not Found		------
	583.19	120	85.00*	2.427E+00	3.012E-01	3.012E-01	27.77
	860.56	------	12.50	1.732E+00	------ Line Not Found		------
BI-211	72.87	212	1.23	3.508E+00	2.550E+01	2.550E+01	43.58
	351.06	800	12.92*	3.513E+00	9.135E+00	9.135E+00	10.20
BI-212	727.33	32	6.67*	2.016E+00	1.253E+00	1.253E+00	83.47
	1620.50	------	1.47	9.858E-01	------ Line Not Found		------
PB-212	74.82	212	10.28	3.508E+00	3.051E+00	3.051E+00	43.58
	77.11	299	17.10	3.865E+00	2.348E+00	2.348E+00	34.07
	238.63	505	43.60*	4.598E+00	1.306E+00	1.306E+00	17.78
	300.09	25	3.30	3.918E+00	1.013E+00	1.013E+00	192.27
BI-214	609.32	531	45.49*	2.342E+00	2.585E+00	2.585E+00	12.13
	1120.29	101	14.92	1.346E+00	2.605E+00	2.605E+00	23.53
	1764.49	78	15.30	9.414E-01	2.795E+00	2.796E+00	32.18
PB-214	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
RN-219	271.23	94	10.80	4.216E+00	1.065E+00	1.065E+00	74.86
	401.81	22	6.60*	3.198E+00	5.479E-01	5.479E-01	138.97
RN-222	609.32	531	45.49*	2.342E+00	2.585E+00	2.585E+00	12.13
	1120.29	101	14.92	1.346E+00	2.605E+00	2.605E+00	23.53
	1764.49	78	15.30	9.414E-01	2.795E+00	2.796E+00	32.18
RA-224	240.99	230	4.10*	4.555E+00	6.390E+00	6.390E+00	34.27
RA-226	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
AC-228	105.21	------	1.10	5.882E+00	------ Line Not Found		------
	338.32	64	11.27	3.608E+00	8.102E-01	8.102E-01	70.09
	835.71	19	1.61	1.780E+00	3.398E+00	3.398E+00	72.87
	911.20	104	25.80*	1.640E+00	1.275E+00	1.275E+00	28.02
	968.97	49	15.80	1.547E+00	1.039E+00	1.039E+00	59.22
RA-228	105.21	------	1.10	5.882E+00	------ Line Not Found		------
	338.32	64	11.27	3.608E+00	8.102E-01	8.102E-01	70.09
	835.71	19	1.61	1.780E+00	3.398E+00	3.398E+00	72.87
	911.20	104	25.80*	1.640E+00	1.275E+00	1.275E+00	28.02
	968.97	49	15.80	1.547E+00	1.039E+00	1.039E+00	59.22
TH-228	74.82	212	10.28	3.508E+00	3.051E+00	3.051E+00	43.58

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	299	17.10	3.865E+00	2.348E+00	2.348E+00	34.07
	238.63	505	43.60*	4.598E+00	1.306E+00	1.306E+00	17.78
	300.09	25	3.30	3.918E+00	1.013E+00	1.013E+00	192.27
TH-230	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
PA-231	283.69	------	1.70	4.082E+00	------ Line Not Found		------
	301.36	25	5.35*	3.918E+00	6.250E-01	6.250E-01	192.27
TH-232	105.21	------	1.10	5.882E+00	------ Line Not Found		------
	338.32	64	11.27	3.608E+00	8.102E-01	8.102E-01	70.09
	835.71	19	1.61	1.780E+00	3.398E+00	3.398E+00	72.87
	911.20	104	25.80*	1.640E+00	1.275E+00	1.275E+00	28.02
	968.97	49	15.80	1.547E+00	1.039E+00	1.039E+00	59.22
PA-234M	63.29	43	3.70*	2.194E+00	2.730E+00	2.730E+00	216.22
	92.59	339	4.23	5.297E+00	7.852E+00	7.852E+00	40.38
TH-234	63.29	43	3.70*	2.194E+00	2.730E+00	2.730E+00	216.22
	92.59	339	4.23	5.297E+00	7.852E+00	7.852E+00	40.38
U-234	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
U-238	63.29	43	3.70*	2.194E+00	2.730E+00	2.730E+00	216.22
	92.59	339	4.23	5.297E+00	7.852E+00	7.852E+00	40.38
AM-243	43.53	------	5.90	1.821E-01	------ Line Not Found		------
	74.66	212	67.20*	3.508E+00	4.667E-01	4.667E-01	43.58
CM-247	278.00	------	3.40	4.139E+00	------ Line Not Found		------
	287.50	------	2.00	4.044E+00	------ Line Not Found		------
	402.40	22	72.00*	3.198E+00	5.022E-02	5.022E-02	138.97
ANH-511	511.00	44	100.00*	2.688E+00	8.564E-02	8.564E-02	101.86

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:38:31.66

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507020.CNF;1		
Acquisition date	: 10-APR-2025 22:36:52	Sensitivity	: 3.000
Detector ID	: GAM33	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.64	Half life ratio	: *****
Sample date	: 7-MAR-2025 09:30:00	Analyst initials	: MXR1
Sample ID	: G714507020	Sample Quantity	: 1.4484E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 25-NOV-2024 09:05:04	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	3.345E+00	1.211E+00	8.518E-01
MN-54	5.908E-02	4.219E-02	5.841E-02
I-131	1.679E+00	1.495E+00	1.428E+00
TL-208	3.012E-01	8.197E-02	7.380E-02
BI-211	9.135E+00	9.133E-01	5.327E-01
BI-212	1.253E+00	1.025E+00	1.094E+00
PB-212	1.306E+00	2.276E-01	1.423E-01
BI-214	2.585E+00	3.072E-01	1.505E-01
PB-214	3.315E+00	3.315E-01	1.937E-01
RN-219	5.479E-01	7.462E-01	1.055E+00
RN-222	2.585E+00	3.072E-01	1.505E-01
RA-224	6.390E+00	2.146E+00	1.523E+00
RA-226	3.315E+00	3.315E-01	1.937E-01
AC-228	1.275E+00	3.501E-01	2.949E-01
RA-228	1.275E+00	3.501E-01	2.949E-01
TH-228	1.306E+00	2.276E-01	1.423E-01
TH-230	3.315E+00	3.315E-01	1.937E-01
PA-231	6.250E-01	1.178E+00	1.139E+00
TH-232	1.275E+00	3.501E-01	2.949E-01
PA-234M	2.730E+00	5.786E+00	4.782E+00
TH-234	2.730E+00	5.786E+00	4.782E+00
U-234	3.315E+00	3.315E-01	1.937E-01
U-238	2.730E+00	5.786E+00	4.782E+00
AM-243	4.667E-01	1.993E-01	1.656E-01
CM-247	5.022E-02	6.840E-02	9.339E-02
ANH-511	8.564E-02	8.549E-02	6.487E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	4.879E-01	5.398E-01	1.072E+00	NOT IDENT.
NA-22	-3.754E-02	4.696E-02	7.836E-02	NOT IDENT.
NA-24	0.000E+00	2.064E+15	0.000E+00	SHORT HLIF
AL-26	4.090E-03	3.005E-02	6.699E-02	NOT IDENT.

SC-46	-3.022E-02	5.888E-02	1.057E-01	FAIL ABUN
V-48	1.860E-01	1.680E-01	3.792E-01	NOT IDENT.
CR-51	7.330E-02	7.569E-01	1.405E+00	NOT IDENT.
MN-52	-1.384E-01	2.974E+00	5.863E+00	NOT IDENT.
CO-56	4.578E-02	6.770E-02	1.244E-01	FAIL ABUN
MN-56	0.000E+00	1.498E+41	0.000E+00	SHORT HLIF
CO-57	-2.034E-02	3.812E-02	6.937E-02	NOT IDENT.
CO-58	-2.930E-02	5.453E-02	9.829E-02	NOT IDENT.
FE-59	-1.260E-01	1.329E-01	2.184E-01	NOT IDENT.
CO-60	2.868E-02	4.107E-02	9.130E-02	NOT IDENT.
ZN-65	8.359E-02	8.679E-02	1.945E-01	NOT IDENT.
GE-68	4.550E-01	1.144E+00	2.447E+00	NOT IDENT.
AS-73	2.185E-01	2.516E+00	4.885E+00	NOT IDENT.
AS-74	-8.437E-02	2.132E-01	3.968E-01	NOT IDENT.
SE-75	-5.942E-02	8.096E-02	1.206E-01	NOT IDENT.
BR-77	0.000E+00	1.026E+04	0.000E+00	SHORT HLIF
SR-82	-4.714E-01	7.238E-01	1.071E+00	NOT IDENT.
RB-83	-4.608E-02	9.614E-02	1.669E-01	NOT IDENT.
RB-84	-1.046E-02	1.094E-01	2.058E-01	NOT IDENT.
KR-85	3.575E+00	1.017E+01	1.688E+01	NOT IDENT.
SR-85	2.301E-02	6.608E-02	1.097E-01	NOT IDENT.
RB-86	6.278E-01	1.425E+00	3.062E+00	NOT IDENT.
Y-88	-2.443E-02	3.905E-02	6.555E-02	NOT IDENT.
Y-91	-2.148E+01	2.558E+01	4.253E+01	NOT IDENT.
NB-94	0.000E+00	1.367E-01	9.332E-02	FAIL ABUN
NB-95	1.436E-01	9.264E-02	1.769E-01	NOT IDENT.
NB-95M	0.000E+00	2.369E-01	4.582E-01	NOT IDENT.
ZR-95	-3.044E-02	9.935E-02	1.852E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	5.048E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.819E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.167E+40	0.000E+00	SHORT HLIF
RH-101	2.044E-02	4.693E-02	8.935E-02	FAIL ABUN
RH-102	-8.013E-03	6.695E-02	1.115E-01	FAIL ABUN
RU-103	2.047E-02	6.233E-02	1.198E-01	FAIL ABUN
RH-106	2.202E-02	3.759E-01	6.481E-01	NOT IDENT.
RU-106	2.202E-02	3.759E-01	6.481E-01	NOT IDENT.
AG-108M	4.060E-03	4.018E-02	7.397E-02	NOT IDENT.
CD-109	1.527E+00	1.664E+00	2.864E+00	NOT IDENT.
AG-110	-5.558E-01	8.343E-01	1.495E+00	NOT IDENT.
AG-110M	3.214E-02	5.842E-02	1.212E-01	NOT IDENT.
SN-113	-1.199E-03	7.289E-02	1.165E-01	NOT IDENT.
CD-115	0.000E+00	5.425E+03	0.000E+00	SHORT HLIF
SN-117M	-1.612E-01	2.266E-01	4.040E-01	NOT IDENT.
SB-122	0.000E+00	3.449E+02	0.000E+00	SHORT HLIF
TE-123M	-4.296E-02	4.964E-02	8.777E-02	NOT IDENT.
SB-124	1.724E-02	1.437E-01	2.896E-01	NOT IDENT.
SB-125	-7.314E-03	1.254E-01	2.274E-01	FAIL ABUN
TE-125M	-8.340E+00	1.797E+01	3.294E+01	NOT IDENT.
I-126	7.178E-02	7.352E-01	1.428E+00	NOT IDENT.
SB-126	5.987E-02	5.020E-01	9.315E-01	NOT IDENT.
SN-126	1.511E-01	1.563E-01	2.700E-01	FAIL ABUN
SB-127	2.955E+01	5.416E+01	1.094E+02	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.962E+01	0.000E+00	SHORT HLIF
BA-133	1.871E-02	8.138E-02	1.124E-01	NOT IDENT.
I-133	0.000E+00	3.924E+10	0.000E+00	SHORT HLIF
CS-134	1.379E-02	5.251E-02	1.030E-01	NOT IDENT.
I-135	0.000E+00	1.349E+37	0.000E+00	SHORT HLIF
CS-136	1.781E-01	3.125E-01	6.070E-01	NOT IDENT.
BA-137M	3.027E-03	3.951E-02	7.709E-02	NOT IDENT.
CS-137	3.198E-03	4.174E-02	8.144E-02	NOT IDENT.
LA-138	6.187E-03	6.791E-02	1.356E-01	NOT IDENT.
CE-139	-1.236E-02	5.007E-02	9.129E-02	NOT IDENT.
BA-140	-7.082E-01	8.881E-01	1.584E+00	NOT IDENT.
LA-140	2.142E-01	3.401E-01	7.322E-01	NOT IDENT.
CE-141	4.355E-02	1.484E-01	2.783E-01	NOT IDENT.
CE-143	0.000E+00	4.535E+06	0.000E+00	SHORT HLIF
CE-144	4.119E-02	3.098E-01	5.803E-01	NOT IDENT.
PM-144	1.714E-02	4.232E-02	7.630E-02	NOT IDENT.
PR-144	1.288E+00	3.199E+00	5.765E+00	NOT IDENT.
PM-146	-4.670E-02	6.145E-02	8.703E-02	NOT IDENT.
ND-147	1.971E-01	2.176E+00	4.265E+00	NOT IDENT.
PM-147	-1.093E+03	1.085E+03	1.925E+03	NOT IDENT.
PM-149	0.000E+00	5.315E+04	0.000E+00	SHORT HLIF
EU-150	-1.348E-02	4.340E-02	6.690E-02	FAIL ABUN
EU-152	1.107E-02	1.728E-01	2.577E-01	FAIL ABUN
GD-153	1.439E-01	1.968E-01	2.538E-01	FAIL ABUN

EU-154	-1.053E-01	1.318E-01	2.198E-01	FAIL ABUN
EU-155	9.587E-02	1.590E-01	2.982E-01	NOT IDENT.
TB-160	-8.536E-02	1.754E-01	2.671E-01	FAIL ABUN
HO-166M	-3.168E-02	8.223E-02	1.291E-01	NOT IDENT.
TM-171	-1.218E+01	4.835E+01	9.223E+01	NOT IDENT.
HF-172	-7.361E-02	2.879E-01	5.304E-01	FAIL ABUN
LU-172	4.302E-02	6.052E-02	1.332E-01	FAIL ABUN
LU-176	-1.281E-02	4.072E-02	6.308E-02	NOT IDENT.
HF-181	-4.117E-02	7.449E-02	1.283E-01	NOT IDENT.
TA-182	9.487E-02	2.034E-01	4.235E-01	FAIL ABUN
RE-183	4.320E-01	5.991E-01	1.065E+00	NOT IDENT.
RE-184	-7.187E-02	2.534E-01	3.762E-01	NOT IDENT.
W-188	2.692E+00	1.286E+01	2.114E+01	FAIL ABUN
IR-192	1.355E-03	5.077E-02	9.396E-02	FAIL ABUN
HG-203	3.344E-02	7.025E-02	1.330E-01	FAIL ABUN
TL-204	5.613E+00	9.704E+00	1.680E+01	NOT IDENT.
BI-207	2.660E-02	5.565E-02	1.136E-01	FAIL ABUN
BI-210	6.023E+00	1.284E+01	2.543E+01	NOT IDENT.
PB-210	6.023E+00	1.284E+01	2.543E+01	NOT IDENT.
PB-211	1.042E+00	9.960E-01	1.806E+00	FAIL ABUN
BI-213	-4.735E-02	1.224E-01	2.162E-01	NOT IDENT.
RA-223	-6.277E-01	8.775E-01	1.515E+00	FAIL ABUN
AC-225	-4.548E-01	3.177E+00	5.796E+00	NOT IDENT.
AC-227	-2.871E-02	3.612E-01	6.589E-01	FAIL ABUN
TH-227	-2.871E-02	3.612E-01	6.589E-01	FAIL ABUN
TH-229	7.368E-01	8.559E-01	1.471E+00	NOT IDENT.
TH-231	-6.277E-01	8.775E-01	1.515E+00	FAIL ABUN
PA-233	7.990E-02	8.505E-02	1.674E-01	FAIL ABUN
PA-234	-1.742E-01	3.121E-01	5.588E-01	FAIL ABUN
U-235	2.457E-01	3.132E-01	6.001E-01	FAIL ABUN
NP-237	7.990E-02	8.505E-02	1.674E-01	FAIL ABUN
NP-238	0.000E+00	1.236E+04	0.000E+00	SHORT HLIF
NP-239	2.627E-01	3.785E-01	7.340E-01	FAIL ABUN
PU-239	2.040E+02	5.012E+02	9.519E+02	NOT IDENT.
AM-241	2.145E-01	3.652E-01	6.417E-01	NOT IDENT.
CM-243	-2.740E-02	1.768E-01	2.890E-01	FAIL ABUN
BK-247	-8.411E-02	1.299E-01	1.953E-01	NOT IDENT.
CF-249	2.526E-02	6.328E-02	1.054E-01	NOT IDENT.
CF-251	3.504E-02	1.993E-01	3.703E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:38:30.05

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	73	10.66*	1.061E+00	3.345E+00	3.345E+00	36.93
MN-54	834.85	19	99.98*	1.780E+00	5.472E-02	5.908E-02	72.87
I-131	80.19	------	2.62	4.190E+00	------ Line Not Found		------
	284.31	------	6.12	4.076E+00	------ Line Not Found		------
	364.49	46	81.50*	3.431E+00	8.496E-02	1.679E+00	90.86
	636.99	------	7.16	2.259E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.146E+00	------ Line Not Found		------
	583.19	120	85.00*	2.427E+00	3.012E-01	3.012E-01	27.77
	860.56	------	12.50	1.732E+00	------ Line Not Found		------
BI-211	72.87	212	1.23	3.508E+00	2.550E+01	2.550E+01	43.58
	351.06	800	12.92*	3.513E+00	9.135E+00	9.135E+00	10.20
BI-212	727.33	32	6.67*	2.016E+00	1.253E+00	1.253E+00	83.47
	1620.50	------	1.47	9.858E-01	------ Line Not Found		------
PB-212	74.82	212	10.28	3.508E+00	3.051E+00	3.051E+00	43.58
	77.11	299	17.10	3.865E+00	2.348E+00	2.348E+00	34.07
	238.63	505	43.60*	4.598E+00	1.306E+00	1.306E+00	17.78
	300.09	25	3.30	3.918E+00	1.013E+00	1.013E+00	192.27
BI-214	609.32	531	45.49*	2.342E+00	2.585E+00	2.585E+00	12.13
	1120.29	101	14.92	1.346E+00	2.605E+00	2.605E+00	23.53
	1764.49	78	15.30	9.414E-01	2.795E+00	2.796E+00	32.18
PB-214	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
RN-219	271.23	94	10.80	4.216E+00	1.065E+00	1.065E+00	74.86
	401.81	22	6.60*	3.198E+00	5.479E-01	5.479E-01	138.97
RN-222	609.32	531	45.49*	2.342E+00	2.585E+00	2.585E+00	12.13
	1120.29	101	14.92	1.346E+00	2.605E+00	2.605E+00	23.53
	1764.49	78	15.30	9.414E-01	2.795E+00	2.796E+00	32.18
RA-224	240.99	230	4.10*	4.555E+00	6.390E+00	6.390E+00	34.27
RA-226	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
AC-228	105.21	------	1.10	5.882E+00	------ Line Not Found		------
	338.32	64	11.27	3.608E+00	8.102E-01	8.102E-01	70.09
	835.71	19	1.61	1.780E+00	3.398E+00	3.398E+00	72.87
	911.20	104	25.80*	1.640E+00	1.275E+00	1.275E+00	28.02
	968.97	49	15.80	1.547E+00	1.039E+00	1.039E+00	59.22
RA-228	105.21	------	1.10	5.882E+00	------ Line Not Found		------
	338.32	64	11.27	3.608E+00	8.102E-01	8.102E-01	70.09
	835.71	19	1.61	1.780E+00	3.398E+00	3.398E+00	72.87
	911.20	104	25.80*	1.640E+00	1.275E+00	1.275E+00	28.02

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	49	15.80	1.547E+00	1.039E+00	1.039E+00	59.22
TH-228	74.82	212	10.28	3.508E+00	3.051E+00	3.051E+00	43.58
	77.11	299	17.10	3.865E+00	2.348E+00	2.348E+00	34.07
	238.63	505	43.60*	4.598E+00	1.306E+00	1.306E+00	17.78
	300.09	25	3.30	3.918E+00	1.013E+00	1.013E+00	192.27
TH-230	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
PA-231	283.69	------	1.70	4.082E+00	------ Line Not Found		------
	301.36	25	5.35*	3.918E+00	6.250E-01	6.250E-01	192.27
TH-232	105.21	------	1.10	5.882E+00	------ Line Not Found		------
	338.32	64	11.27	3.608E+00	8.102E-01	8.102E-01	70.09
	835.71	19	1.61	1.780E+00	3.398E+00	3.398E+00	72.87
	911.20	104	25.80*	1.640E+00	1.275E+00	1.275E+00	28.02
	968.97	49	15.80	1.547E+00	1.039E+00	1.039E+00	59.22
PA-234M	63.29	43	3.70*	2.194E+00	2.730E+00	2.730E+00	216.22
	92.59	339	4.23	5.297E+00	7.852E+00	7.852E+00	40.38
TH-234	63.29	43	3.70*	2.194E+00	2.730E+00	2.730E+00	216.22
	92.59	339	4.23	5.297E+00	7.852E+00	7.852E+00	40.38
U-234	74.82	212	5.80	3.508E+00	5.407E+00	5.407E+00	43.58
	77.11	299	9.70	3.865E+00	4.139E+00	4.139E+00	34.07
	87.09	------	3.41	4.851E+00	------ Line Not Found		------
	242.00	230	7.25	4.555E+00	3.614E+00	3.614E+00	34.27
	295.22	438	18.42	3.970E+00	3.104E+00	3.104E+00	16.02
	351.93	800	35.60*	3.513E+00	3.315E+00	3.315E+00	10.20
U-238	63.29	43	3.70*	2.194E+00	2.730E+00	2.730E+00	216.22
	92.59	339	4.23	5.297E+00	7.852E+00	7.852E+00	40.38
AM-243	43.53	------	5.90	1.821E-01	------ Line Not Found		------
	74.66	212	67.20*	3.508E+00	4.667E-01	4.667E-01	43.58
CM-247	278.00	------	3.40	4.139E+00	------ Line Not Found		------
	287.50	------	2.00	4.044E+00	------ Line Not Found		------
	402.40	22	72.00*	3.198E+00	5.022E-02	5.022E-02	138.97
ANH-511	511.00	44	100.00*	2.688E+00	8.564E-02	8.564E-02	101.86

Flag: "*" = Keyline

Sample ID : G714507020 Acquisition date : 10-APR-2025 22:36:52

Total number of lines in spectrum 52
Number of unidentified lines 17
Number of lines tentatively identified by NID 35 67.31%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	3.345E+00	3.345E+00	1.235E+00	36.93	
MN-54	312.05D	1.08	5.472E-02	5.908E-02	4.306E-02	72.87	
I-131	8.03D	19.8	8.496E-02	1.679E+00	1.526E+00	90.86	
TL-208	1.41E+10Y	1.00	3.012E-01	3.012E-01	0.836E-01	27.77	
BI-211	7.04E+08Y	1.00	9.135E+00	9.135E+00	0.932E+00	10.20	
BI-212	1.41E+10Y	1.00	1.253E+00	1.253E+00	1.046E+00	83.47	
PB-212	1.41E+10Y	1.00	1.306E+00	1.306E+00	0.232E+00	17.78	
BI-214	1600.00Y	1.00	2.585E+00	2.585E+00	0.314E+00	12.13	
PB-214	1600.00Y	1.00	3.315E+00	3.315E+00	0.338E+00	10.20	
RN-219	7.04E+08Y	1.00	5.479E-01	5.479E-01	7.614E-01	138.97	
RN-222	1600.00Y	1.00	2.585E+00	2.585E+00	0.314E+00	12.13	
RA-224	1.41E+10Y	1.00	6.390E+00	6.390E+00	2.190E+00	34.27	
RA-226	1600.00Y	1.00	3.315E+00	3.315E+00	0.338E+00	10.20	
AC-228	1.41E+10Y	1.00	1.275E+00	1.275E+00	0.357E+00	28.02	
RA-228	1.41E+10Y	1.00	1.275E+00	1.275E+00	0.357E+00	28.02	
TH-228	1.41E+10Y	1.00	1.306E+00	1.306E+00	0.232E+00	17.78	
TH-230	7.54E+04Y	1.00	3.315E+00	3.315E+00	0.338E+00	10.20	
PA-231	7.04E+08Y	1.00	6.250E-01	6.250E-01	12.02E-01	192.27	
TH-232	1.41E+10Y	1.00	1.275E+00	1.275E+00	0.357E+00	28.02	
PA-234M	4.47E+09Y	1.00	2.730E+00	2.730E+00	5.904E+00	216.22	
TH-234	4.47E+09Y	1.00	2.730E+00	2.730E+00	5.904E+00	216.22	
U-234	2.45E+05Y	1.00	3.315E+00	3.315E+00	0.338E+00	10.20	
U-238	4.47E+09Y	1.00	2.730E+00	2.730E+00	5.904E+00	216.22	
AM-243	7370.00Y	1.00	4.667E-01	4.667E-01	2.034E-01	43.58	
CM-247	1.56E+07Y	1.00	5.022E-02	5.022E-02	6.979E-02	138.97	
ANH-511	1.00E+09Y	1.00	8.564E-02	8.564E-02	8.723E-02	101.86	
	Total Activity :		5.540E+01	5.700E+01			

Grand Total Activity : 5.540E+01 5.700E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	98.53	41	194	1.39	197.46	195	9	9.31E-03	****	5.61E+00	T
0	186.10	219	277	2.56	372.55	365	14	5.25E-02	38.8	5.39E+00	T
0	198.44	51	376	4.05	397.21	388	17	1.23E-02	****	5.19E+00	T
0	208.90	119	281	5.75	418.12	409	16	2.87E-02	70.9	5.02E+00	
3	395.11	36	52	2.39	790.44	778	21	9.14E-03	****	3.24E+00	
3	397.89	37	10	1.59	796.01	778	21	9.41E-03	50.5	3.22E+00	
0	457.88	8	46	0.66	915.94	909	10	2.00E-03	****	2.91E+00	
0	464.52	33	73	1.55	929.22	920	15	8.55E-03	****	2.88E+00	T
0	626.83	21	26	3.18	1253.76	1245	14	5.63E-03	****	2.29E+00	
0	704.12	50	79	3.77	1408.31	1390	31	1.34E-02	****	2.08E+00	T
0	769.08	38	92	1.49	1538.20	1532	16	1.02E-02	****	1.92E+00	
1	833.23	26	8	2.63	1666.48	1660	16	7.23E-03	64.5	1.78E+00	T
0	840.72	22	13	0.79	1681.45	1675	13	6.11E-03	79.9	1.77E+00	
0	873.15	31	19	3.72	1746.30	1738	16	8.46E-03	74.6	1.71E+00	T
0	900.74	11	9	3.68	1801.46	1795	11	2.90E-03	****	1.66E+00	T
0	933.99	60	15	3.89	1867.96	1858	20	1.67E-02	40.8	1.60E+00	
0	957.87	5	10	3.21	1915.71	1907	10	1.48E-03	****	1.56E+00	
0	1025.70	16	10	2.78	2051.33	2045	13	4.46E-03	94.7	1.46E+00	T
0	1053.94	6	19	6.09	2107.80	2095	18	1.61E-03	****	1.43E+00	
0	1057.17	7	2	0.71	2114.27	2112	6	1.98E-03	****	1.42E+00	
4	1112.54	18	2	2.50	2225.00	2223	24	5.12E-03	32.0	1.35E+00	T
0	1238.45	52	12	1.87	2476.78	2468	18	1.47E-02	42.3	1.22E+00	T
0	1377.71	35	6	1.13	2755.27	2750	11	1.01E-02	41.6	1.11E+00	
0	1408.55	14	6	1.49	2816.94	2813	8	4.06E-03	83.2	1.09E+00	T
0	1497.47	6	14	0.53	2994.77	2986	14	1.63E-03	****	1.04E+00	
0	1510.11	20	15	3.79	3020.04	3010	16	5.85E-03	95.5	1.03E+00	
0	1661.06	19	4	1.76	3321.92	3313	18	5.43E-03	68.0	9.71E-01	
0	1729.33	23	11	1.36	3458.47	3449	16	6.77E-03	75.2	9.50E-01	
0	1847.08	21	3	2.91	3693.97	3687	13	6.32E-03	53.1	9.25E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:38:41.24

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507020.CNF;1    *
* Acquisition date : 10-APR-2025 22:36:52 Sensitivity     : 3.000       *
* Detector ID      : GAM33                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.64     Half life ratio : *****       *
* Sample date      :  7-MAR-2025 09:30:00 Nuclide Library : SOLID        *
* Sample ID        : G714507020           Analyst initials: MXR1        *
* Batch Number     : 2767515              Sample Quantity : 1.4484E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-NOV-2024 09:05:04 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;17         *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.637E-01
MN-54	2.488E-02
I-131	6.628E-01
TL-208	3.342E-02
BI-211	2.505E-01
BI-212	4.938E-01
PB-212	6.751E-02
BI-214	6.851E-02
PB-214	9.106E-02
RN-219	4.936E-01
RN-222	6.851E-02
RA-224	7.228E-01
RA-226	9.106E-02
AC-228	1.306E-01
RA-228	1.306E-01
TH-228	6.751E-02
TH-230	9.106E-02
PA-231	5.351E-01
TH-232	1.306E-01
PA-234M	2.293E+00
TH-234	2.293E+00
U-234	9.106E-02
U-238	2.293E+00
AM-243	7.969E-02
CM-247	4.356E-02
ANH-511	2.976E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	4.975E-01	NOT IDENT.
NA-22	3.310E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.595E-02	NOT IDENT.
SC-46	4.720E-02	FAIL ABUN

V-48	1.688E-01	NOT IDENT.
CR-51	6.563E-01	NOT IDENT.
MN-52	2.456E+00	NOT IDENT.
CO-56	5.666E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	3.316E-02	NOT IDENT.
CO-58	4.366E-02	NOT IDENT.
FE-59	9.352E-02	NOT IDENT.
CO-60	3.942E-02	NOT IDENT.
ZN-65	8.582E-02	NOT IDENT.
GE-68	1.051E+00	NOT IDENT.
AS-73	2.331E+00	NOT IDENT.
AS-74	1.788E-01	NOT IDENT.
SE-75	5.678E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.715E-01	NOT IDENT.
RB-83	7.547E-02	NOT IDENT.
RB-84	9.022E-02	NOT IDENT.
KR-85	7.820E+00	NOT IDENT.
SR-85	5.081E-02	NOT IDENT.
RB-86	1.319E+00	NOT IDENT.
Y-88	2.322E-02	NOT IDENT.
Y-91	1.801E+01	NOT IDENT.
NB-94	4.323E-02	FAIL ABUN
NB-95	8.308E-02	NOT IDENT.
NB-95M	2.199E-01	NOT IDENT.
ZR-95	8.282E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	4.289E-02	FAIL ABUN
RH-102	5.003E-02	FAIL ABUN
RU-103	5.461E-02	FAIL ABUN
RH-106	2.906E-01	NOT IDENT.
RU-106	2.906E-01	NOT IDENT.
AG-108M	3.436E-02	NOT IDENT.
CD-109	1.390E+00	NOT IDENT.
AG-110	6.681E-01	NOT IDENT.
AG-110M	5.423E-02	NOT IDENT.
SN-113	5.403E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.936E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	4.206E-02	NOT IDENT.
SB-124	1.220E-01	NOT IDENT.
SB-125	1.056E-01	FAIL ABUN
TE-125M	1.578E+01	NOT IDENT.
I-126	6.504E-01	NOT IDENT.
SB-126	4.204E-01	NOT IDENT.
SN-126	1.309E-01	FAIL ABUN
SB-127	5.009E+01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	5.286E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.687E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.654E-01	NOT IDENT.
BA-137M	3.490E-02	NOT IDENT.
CS-137	3.687E-02	NOT IDENT.
LA-138	5.780E-02	NOT IDENT.
CE-139	4.375E-02	NOT IDENT.
BA-140	7.173E-01	NOT IDENT.
LA-140	3.177E-01	NOT IDENT.
CE-141	1.339E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.784E-01	NOT IDENT.
PM-144	3.449E-02	NOT IDENT.
PR-144	2.606E+00	NOT IDENT.
PM-146	3.969E-02	NOT IDENT.
ND-147	1.946E+00	NOT IDENT.
PM-147	9.194E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.138E-02	FAIL ABUN
EU-152	1.212E-01	FAIL ABUN
GD-153	1.218E-01	FAIL ABUN
EU-154	9.287E-02	FAIL ABUN

EU-155	1.431E-01	NOT IDENT.
TB-160	1.142E-01	FAIL ABUN
HO-166M	5.813E-02	NOT IDENT.
TM-171	4.398E+01	NOT IDENT.
HF-172	2.543E-01	FAIL ABUN
LU-172	5.816E-02	FAIL ABUN
LU-176	2.954E-02	NOT IDENT.
HF-181	5.857E-02	NOT IDENT.
TA-182	1.857E-01	FAIL ABUN
RE-183	5.102E-01	NOT IDENT.
RE-184	1.659E-01	NOT IDENT.
W-188	9.937E+00	FAIL ABUN
IR-192	4.378E-02	FAIL ABUN
HG-203	6.289E-02	FAIL ABUN
TL-204	8.087E+00	NOT IDENT.
BI-207	5.009E-02	FAIL ABUN
BI-210	1.217E+01	NOT IDENT.
PB-210	1.217E+01	NOT IDENT.
PB-211	8.432E-01	FAIL ABUN
BI-213	9.884E-02	NOT IDENT.
RA-223	7.087E-01	FAIL ABUN
AC-225	2.754E+00	NOT IDENT.
AC-227	3.120E-01	FAIL ABUN
TH-227	3.120E-01	FAIL ABUN
TH-229	7.043E-01	NOT IDENT.
TH-231	7.087E-01	FAIL ABUN
PA-233	7.880E-02	FAIL ABUN
PA-234	2.420E-01	FAIL ABUN
U-235	2.890E-01	FAIL ABUN
NP-237	7.880E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	3.519E-01	FAIL ABUN
PU-239	4.571E+02	NOT IDENT.
AM-241	3.076E-01	NOT IDENT.
CM-243	1.384E-01	FAIL ABUN
BK-247	9.197E-02	NOT IDENT.
CF-249	4.935E-02	NOT IDENT.
CF-251	1.775E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:38:45.34

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507020.CNF;1		
Acquisition date	: 10-APR-2025 22:36:52	Sensitivity	: 3.000
Detector ID	: GAM33	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.64	Half life ratio	: *****
Sample date	: 7-MAR-2025 09:30:00	Nuclide Library	: SOLID
Sample ID	: G714507020	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.4484E+02 GRAM
		Quantity Err(%)	: 1.3808E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 25-NOV-2024 09:05:04	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	3.345E+00	1.274E+00	1.274E+00
MN-54	5.908E-02	4.276E-02	4.276E-02
I-131	1.679E+00	1.503E+00	1.503E+00
TL-208	3.012E-01	8.598E-02	8.598E-02
BI-211	9.135E+00	1.262E+00	1.262E+00
BI-212	1.253E+00	1.032E+00	1.032E+00
PB-212	1.306E+00	2.581E-01	2.581E-01
BI-214	2.585E+00	3.774E-01	3.774E-01
PB-214	3.315E+00	4.549E-01	4.549E-01
RN-219	5.479E-01	7.505E-01	7.505E-01
RN-222	2.585E+00	3.774E-01	3.774E-01
RA-224	6.390E+00	2.230E+00	2.230E+00
RA-226	3.315E+00	4.549E-01	4.549E-01
AC-228	1.275E+00	3.900E-01	3.900E-01
RA-228	1.275E+00	3.900E-01	3.900E-01
TH-228	1.306E+00	2.581E-01	2.581E-01
TH-230	3.315E+00	4.549E-01	4.549E-01
PA-231	6.250E-01	1.186E+00	1.186E+00
TH-232	1.275E+00	3.900E-01	3.900E-01
PA-234M	2.730E+00	5.823E+00	5.823E+00
TH-234	2.730E+00	5.823E+00	5.823E+00
U-234	3.315E+00	4.549E-01	4.549E-01
U-238	2.730E+00	5.823E+00	5.823E+00
AM-243	4.667E-01	2.046E-01	2.046E-01
CM-247	5.022E-02	6.903E-02	6.903E-02
ANH-511	8.564E-02	8.582E-02	8.582E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	4.879E-01	5.416E-01	5.845E-01	NOT IDENT.
NA-22	-3.754E-02	4.714E-02	5.009E-02	NOT IDENT.
NA-24	-7.220E+14	2.066E+15	2.091E+15	SHORT HLIF
AL-26	4.090E-03	3.005E-02	3.011E-02	NOT IDENT.

SC-46	-3.022E-02	5.902E-02	6.057E-02	FAIL ABUN
V-48	1.860E-01	1.696E-01	1.892E-01	NOT IDENT.
CR-51	7.330E-02	7.570E-01	7.577E-01	NOT IDENT.
MN-52	-1.384E-01	2.974E+00	2.975E+00	NOT IDENT.
CO-56	4.578E-02	6.792E-02	7.099E-02	FAIL ABUN
MN-56	1.000E+41	1.503E+41	0.000E+00	SHORT HLIF
CO-57	-2.034E-02	3.815E-02	3.923E-02	NOT IDENT.
CO-58	-2.930E-02	5.462E-02	5.620E-02	NOT IDENT.
FE-59	-1.260E-01	1.338E-01	1.454E-01	NOT IDENT.
CO-60	2.868E-02	4.121E-02	4.319E-02	NOT IDENT.
ZN-65	8.359E-02	8.722E-02	9.501E-02	NOT IDENT.
GE-68	4.550E-01	1.145E+00	1.163E+00	NOT IDENT.
AS-73	2.185E-01	2.517E+00	2.519E+00	NOT IDENT.
AS-74	-8.437E-02	2.134E-01	2.167E-01	NOT IDENT.
SE-75	-5.942E-02	8.117E-02	8.548E-02	NOT IDENT.
BR-77	5.889E+04	5.988E+04	6.550E+04	SHORT HLIF
SR-82	-4.714E-01	7.255E-01	7.560E-01	NOT IDENT.
RB-83	-4.608E-02	9.642E-02	9.863E-02	NOT IDENT.
RB-84	-1.046E-02	1.094E-01	1.095E-01	NOT IDENT.
KR-85	3.575E+00	1.017E+01	1.030E+01	NOT IDENT.
SR-85	2.301E-02	6.611E-02	6.692E-02	NOT IDENT.
RB-86	6.278E-01	1.426E+00	1.454E+00	NOT IDENT.
Y-88	-2.443E-02	3.909E-02	4.062E-02	NOT IDENT.
Y-91	-2.148E+01	2.567E+01	2.743E+01	NOT IDENT.
NB-94	1.245E-01	1.371E-01	1.482E-01	FAIL ABUN
NB-95	1.436E-01	9.379E-02	1.140E-01	NOT IDENT.
NB-95M	6.469E-01	2.473E-01	3.824E-01	NOT IDENT.
ZR-95	-3.044E-02	9.940E-02	1.003E-01	NOT IDENT.
NB-97	-1.000E+41	2.834E+41	0.000E+00	SHORT HLIF
ZR-97	6.707E+14	5.083E+14	5.914E+14	SHORT HLIF
MO-99	-1.152E+03	1.823E+03	1.896E+03	SHORT HLIF
TC-99M	-7.136E+39	1.170E+40	0.000E+00	SHORT HLIF
RH-101	2.044E-02	4.709E-02	4.798E-02	FAIL ABUN
RH-102	-8.013E-03	6.696E-02	6.706E-02	FAIL ABUN
RU-103	2.047E-02	6.235E-02	6.303E-02	FAIL ABUN
RH-106	2.202E-02	3.759E-01	3.760E-01	NOT IDENT.
RU-106	2.202E-02	3.759E-01	3.760E-01	NOT IDENT.
AG-108M	4.060E-03	4.018E-02	4.022E-02	NOT IDENT.
CD-109	1.527E+00	1.673E+00	1.809E+00	NOT IDENT.
AG-110	-5.558E-01	8.355E-01	8.722E-01	NOT IDENT.
AG-110M	3.214E-02	5.857E-02	6.034E-02	NOT IDENT.
SN-113	-1.199E-03	7.289E-02	7.289E-02	NOT IDENT.
CD-115	-9.610E+02	5.426E+03	5.443E+03	SHORT HLIF
SN-117M	-1.612E-01	2.269E-01	2.383E-01	NOT IDENT.
SB-122	-2.731E+02	3.457E+02	3.670E+02	SHORT HLIF
TE-123M	-4.296E-02	4.974E-02	5.338E-02	NOT IDENT.
SB-124	1.724E-02	1.437E-01	1.439E-01	NOT IDENT.
SB-125	-7.314E-03	1.254E-01	1.254E-01	FAIL ABUN
TE-125M	-8.340E+00	1.798E+01	1.837E+01	NOT IDENT.
I-126	7.178E-02	7.352E-01	7.360E-01	NOT IDENT.
SB-126	5.987E-02	5.021E-01	5.028E-01	NOT IDENT.
SN-126	1.511E-01	1.570E-01	1.711E-01	FAIL ABUN
SB-127	2.955E+01	5.442E+01	5.602E+01	NOT IDENT.
I-132	1.000E+41	3.275E+41	0.000E+00	SHORT HLIF
TE-132	2.989E+01	6.972E+01	7.101E+01	SHORT HLIF
BA-133	1.871E-02	8.140E-02	8.183E-02	NOT IDENT.
I-133	-1.697E+10	3.944E+10	4.017E+10	SHORT HLIF
CS-134	1.379E-02	5.253E-02	5.290E-02	NOT IDENT.
I-135	-1.780E+37	1.949E+37	0.000E+00	SHORT HLIF
CS-136	1.781E-01	3.134E-01	3.235E-01	NOT IDENT.
BA-137M	3.027E-03	3.951E-02	3.953E-02	NOT IDENT.
CS-137	3.198E-03	4.174E-02	4.176E-02	NOT IDENT.
LA-138	6.187E-03	6.791E-02	6.797E-02	NOT IDENT.
CE-139	-1.236E-02	5.014E-02	5.045E-02	NOT IDENT.
BA-140	-7.082E-01	8.903E-01	9.458E-01	NOT IDENT.
LA-140	2.142E-01	3.408E-01	3.542E-01	NOT IDENT.
CE-141	4.355E-02	1.485E-01	1.498E-01	NOT IDENT.
CE-143	2.528E+07	5.213E+06	1.253E+07	SHORT HLIF
CE-144	4.119E-02	3.098E-01	3.104E-01	NOT IDENT.
PM-144	1.714E-02	4.235E-02	4.305E-02	NOT IDENT.
PR-144	1.288E+00	3.201E+00	3.253E+00	NOT IDENT.
PM-146	-4.670E-02	6.165E-02	6.515E-02	NOT IDENT.
ND-147	1.971E-01	2.176E+00	2.178E+00	NOT IDENT.
PM-147	-1.093E+03	1.088E+03	1.195E+03	NOT IDENT.
PM-149	-3.544E+04	5.346E+04	5.580E+04	SHORT HLIF
EU-150	-1.348E-02	4.342E-02	4.385E-02	FAIL ABUN
EU-152	1.107E-02	1.729E-01	1.729E-01	FAIL ABUN
GD-153	1.439E-01	1.972E-01	2.076E-01	FAIL ABUN

EU-154	-1.053E-01	1.323E-01	1.405E-01	FAIL ABUN
EU-155	9.587E-02	1.592E-01	1.650E-01	NOT IDENT.
TB-160	-8.536E-02	1.758E-01	1.799E-01	FAIL ABUN
HO-166M	-3.168E-02	8.228E-02	8.351E-02	NOT IDENT.
TM-171	-1.218E+01	4.839E+01	4.870E+01	NOT IDENT.
HF-172	-7.361E-02	2.882E-01	2.901E-01	FAIL ABUN
LU-172	4.302E-02	6.083E-02	6.385E-02	FAIL ABUN
LU-176	-1.281E-02	4.074E-02	4.115E-02	NOT IDENT.
HF-181	-4.117E-02	7.458E-02	7.686E-02	NOT IDENT.
TA-182	9.487E-02	2.036E-01	2.081E-01	FAIL ABUN
RE-183	4.320E-01	6.027E-01	6.334E-01	NOT IDENT.
RE-184	-7.187E-02	2.536E-01	2.556E-01	NOT IDENT.
W-188	2.692E+00	1.286E+01	1.292E+01	FAIL ABUN
IR-192	1.355E-03	5.077E-02	5.077E-02	FAIL ABUN
HG-203	3.344E-02	7.033E-02	7.193E-02	FAIL ABUN
TL-204	5.613E+00	9.727E+00	1.005E+01	NOT IDENT.
BI-207	2.660E-02	5.573E-02	5.701E-02	FAIL ABUN
BI-210	6.023E+00	1.286E+01	1.315E+01	NOT IDENT.
PB-210	6.023E+00	1.286E+01	1.315E+01	NOT IDENT.
PB-211	1.042E+00	1.001E+00	1.106E+00	FAIL ABUN
BI-213	-4.735E-02	1.225E-01	1.243E-01	NOT IDENT.
RA-223	-6.277E-01	8.801E-01	9.244E-01	FAIL ABUN
AC-225	-4.548E-01	3.178E+00	3.184E+00	NOT IDENT.
AC-227	-2.871E-02	3.612E-01	3.614E-01	FAIL ABUN
TH-227	-2.871E-02	3.612E-01	3.614E-01	FAIL ABUN
TH-229	7.368E-01	8.579E-01	9.200E-01	NOT IDENT.
TH-231	-6.277E-01	8.801E-01	9.244E-01	FAIL ABUN
PA-233	7.990E-02	8.543E-02	9.271E-02	FAIL ABUN
PA-234	-1.742E-01	3.709E-01	3.792E-01	FAIL ABUN
U-235	2.457E-01	3.138E-01	3.328E-01	FAIL ABUN
NP-237	7.990E-02	8.543E-02	9.271E-02	FAIL ABUN
NP-238	6.593E+03	1.239E+04	1.274E+04	SHORT HLIF
NP-239	2.627E-01	3.795E-01	3.975E-01	FAIL ABUN
PU-239	2.040E+02	5.015E+02	5.098E+02	NOT IDENT.
AM-241	2.145E-01	3.663E-01	3.788E-01	NOT IDENT.
CM-243	-2.740E-02	1.768E-01	1.773E-01	FAIL ABUN
BK-247	-8.411E-02	1.312E-01	1.366E-01	NOT IDENT.
CF-249	2.526E-02	6.335E-02	6.436E-02	NOT IDENT.
CF-251	3.504E-02	1.994E-01	2.000E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	155.8575	85.43	261.0181	131.20	197.2595
45.60	157.1011	86.55	265.8259	133.02	173.7562
46.54	150.7293	86.79	265.8692	133.52	181.7034
49.72	0.0000	86.94	265.8956	136.00	213.5816
51.35	160.7471	87.09	275.1458	136.47	196.8198
51.87	157.0822	87.57	284.4601	140.51	0.0000
52.39	148.7359	88.03	296.8529	143.76	194.5809
52.97	136.6455	88.34	296.9142	144.24	192.6427
53.44	140.4476	88.47	298.4787	145.44	202.6957
54.07	155.5147	89.96	346.5157	152.43	203.3992
57.36	0.0000	1093.63	311.2334	153.25	180.5402
57.53	163.8716	91.11	311.3296	323.87	161.6638
57.98	145.8857	92.59	311.6304	156.02	178.7856
59.27	143.0323	93.35	311.7845	158.56	201.0046
59.32	143.0384	94.56	312.0274	159.00	209.0494
59.54	155.1120	94.65	312.0459	162.33	180.3268
60.96	185.4478	94.67	312.0496	162.66	178.3517
61.17	185.4797	94.87	312.0903	163.33	182.4166
62.93	181.2147	97.43	123.8013	165.86	184.6401
63.29	181.2673	98.43	123.8794	176.31	185.5273
63.58	181.3094	98.44	123.8804	176.60	177.4838
64.28	181.4106	99.53	151.8569	177.52	172.5134
66.73	212.0551	100.11	164.3129	181.07	0.0000
67.24	166.6805	102.03	173.8201	181.52	187.5768
125.81	212.2114	103.18	177.0486	184.41	154.8257
67.75	212.2225	103.37	177.0695	143.76	154.9155
68.89	178.2717	105.21	163.2729	193.51	133.2900
69.67	207.4758	105.31	163.2826	197.03	166.8615
70.82	194.4875	106.12	167.2523	198.01	166.9304
70.83	194.4891	106.47	167.2870	201.83	130.4961
72.81	215.8918	109.28	189.0010	203.43	163.2275
72.87	215.9013	111.00	171.6387	205.31	166.0771
74.66	216.1862	111.76	0.0000	210.85	140.8040
74.82	216.2113	114.06	185.6223	215.65	123.0322
74.97	216.2355	116.30	0.0000	218.12	126.2319
77.11	216.5715	116.74	153.6186	222.11	129.5155
78.74	246.0527	119.76	182.3058	227.09	121.5291
79.69	244.6890	121.12	187.3490	227.38	122.5726
80.03	244.7471	121.22	187.3599	228.16	0.0000
80.12	244.7637	121.78	185.4557	228.18	119.5197
80.19	250.8948	122.06	175.6705	116.74	119.5197
80.57	250.9618	122.92	166.9177	235.69	90.9319
81.00	260.2222	123.07	150.2382	235.96	90.9407
81.07	260.2347	265.00	154.2181	238.63	114.8253
81.75	281.7994	125.81	188.8191	238.98	0.0000
82.47	283.4732	127.23	174.2016	240.99	114.9277
83.79	313.3087	127.91	176.2356	242.00	114.9709
84.00	299.1115	129.30	178.3379	244.70	91.2401

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	94.6186	344.28	81.4678	563.25	44.4685
252.80	95.6724	345.93	68.6387	564.24	0.0000
254.15	0.0000	351.06	82.7078	569.33	24.5360
256.23	108.2863	351.93	82.7301	946.00	23.6285
260.90	0.0000	355.39	0.0000	569.70	23.6292
264.66	110.2841	356.01	74.5839	583.19	30.9926
264.80	108.6195	364.49	56.0776	584.27	36.4697
265.00	108.6274	366.42	0.0000	595.83	33.8194
269.46	92.0605	372.51	62.6941	427.87	32.6782
270.03	92.0780	375.05	47.5959	602.52	0.0000
271.23	92.1169	377.52	59.5369	604.72	36.6318
273.65	107.2813	356.01	67.2364	607.14	34.8188
276.40	87.2498	388.16	62.5403	609.32	34.8346
277.37	92.3143	388.63	69.4990	610.33	34.8420
277.60	102.3924	391.69	55.6469	614.28	29.0597
278.00	103.5265	264.66	8.7166	618.01	27.5515
279.20	88.1733	401.81	69.7549	620.36	33.6911
279.54	86.0840	402.40	64.5337	621.93	24.5104
279.70	86.0890	404.85	41.8881	630.19	0.0000
280.46	98.7132	410.95	62.2811	631.29	27.6284
283.69	84.1040	413.71	73.2628	633.25	31.0952
284.31	98.8423	414.70	61.2509	634.78	21.1975
285.41	95.7238	423.72	43.8568	635.95	17.5152
285.90	0.0000	427.09	50.4810	636.99	23.0511
287.50	76.8440	427.87	58.1750	657.50	33.3334
290.67	75.8727	433.94	54.9698	657.76	29.6313
293.27	0.0000	439.40	47.3416	657.90	0.0000
351.93	87.8084	440.45	45.1522	661.66	29.6547
295.96	87.8300	453.88	53.0449	664.57	0.0000
879.38	42.2626	463.37	49.6282	666.33	33.3932
299.98	42.2821	468.07	46.1379	666.50	36.1769
300.09	42.2833	473.00	54.4125	667.71	0.0000
300.13	42.2839	475.06	52.2188	677.62	27.8906
301.36	79.5259	476.78	41.1259	685.70	30.7288
302.85	72.7935	477.60	38.9109	692.65	0.0000
256.23	76.2198	482.18	46.7456	695.00	17.1029
304.85	76.2286	487.02	43.4584	696.49	23.3295
306.78	81.3621	492.35	0.0000	696.51	23.3295
308.46	86.9185	497.08	30.1604	697.00	24.8867
311.90	62.6083	505.52	46.5639	697.30	28.9331
316.51	61.6383	507.63	0.0000	697.49	28.9338
319.41	69.1409	511.00	41.4697	702.65	28.9634
320.08	64.9000	514.00	44.8636	706.68	28.9861
321.04	62.7910	514.00	44.8636	711.68	34.3177
323.87	88.4117	520.40	38.1919	720.70	26.9545
325.23	89.5153	520.69	0.0000	721.93	0.0000
328.76	73.6115	522.65	0.0000	722.78	39.0808
333.37	94.0163	527.90	0.0000	722.91	39.0813
333.97	85.4846	528.26	39.6129	723.31	39.0839
334.37	83.7857	529.59	43.2270	724.19	28.1455
338.28	75.9684	529.87	0.0000	727.33	29.1011
338.32	75.9694	531.02	35.1343	733.00	34.4574
311.90	78.8042	537.26	44.2065	735.93	24.4474
340.48	78.8042	546.56	0.0000	333.97	25.3949
340.55	82.2316	552.55	39.8342	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	16.0097	667.71	0.0000	1434.09	9.3955
747.24	26.3840	962.31	17.1121	1435.80	10.4414
748.06	27.3305	964.08	17.9323	1457.56	0.0000
752.31	19.8064	966.17	24.4611	1460.82	11.5205
753.82	20.7555	911.20	30.3453	1489.16	12.0100
756.73	28.3184	983.53	9.8113	1505.03	12.2830
756.80	28.3191	984.45	0.0000	1584.12	17.0008
884.68	42.5347	1274.44	32.4417	1596.21	8.5121
765.81	39.3972	1002.74	24.6014	1620.50	6.4017
766.84	40.9815	1004.73	29.5313	1621.92	5.3357
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	28.4216	1025.87	0.0000	1690.97	8.6023
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	24.6429	1037.84	15.8297	1764.49	6.5030
783.70	32.2535	1038.76	0.0000	1063.66	5.4224
788.74	32.2834	631.29	9.9067	1771.35	7.2308
792.07	37.0529	1048.07	9.9092	1791.20	0.0000
795.86	30.4234	1049.04	14.8660	1808.65	3.2666
810.06	28.5945	1050.41	18.1731	1810.72	0.0000
810.29	32.4079	1063.66	13.2428	1836.06	5.4600
344.28	32.4096	1077.00	8.9565		
810.76	28.5981	1077.34	8.9569		
815.77	18.1279	1085.87	7.9719		
1048.07	21.0004	1093.63	8.9785		
832.01	12.7578	1099.45	22.9641		
834.85	11.1688	1112.07	11.6701		
835.71	0.0000	1112.84	8.3366		
836.80	0.0000	1115.54	9.0070		
846.75	0.0000	1120.29	9.0132		
846.77	23.9825	1120.55	9.0136		
856.80	31.7117	1221.41	11.6855		
860.56	24.0393	1129.67	23.0651		
871.09	30.5047	1131.51	0.0000		
873.19	18.3093	1147.95	0.0000		
875.33	0.0000	1173.23	17.1536		
879.38	17.6852	1177.95	9.0870		
880.51	24.8103	1189.05	14.1572		
881.60	18.2281	1204.77	19.2551		
883.24	18.3404	1221.41	12.1887		
884.68	17.3795	1231.02	10.1704		
889.28	30.9203	1235.36	23.7458		
894.76	20.9547	1238.28	16.2891		
898.04	29.0303	1260.41	0.0000		
900.72	16.1353	1271.87	9.2039		
903.28	23.2441	1274.44	18.4140		
911.20	20.3653	1274.54	18.4140		
912.08	20.3684	1291.59	19.4806		
923.98	0.0000	1298.22	0.0000		
926.50	22.6851	1312.11	14.3924		
929.11	16.2105	1332.49	7.2153		
935.54	13.6312	1362.66	0.0000		
937.49	19.4790	1365.19	11.3856		
944.13	17.5500	1368.63	0.0000		
946.00	20.4812	1384.29	10.3750		
949.00	13.4167	1408.01	5.2029		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:39:11.89

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041221.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM38.CNF;181
                                    Background date  : 6-APR-2025 11:02:24.
Sample date      : 19-MAR-2025 00:00:00 Acquisition date : 10-APR-2025 22:37:37
Sample ID        : G1206041221          Sample quantity  : 1.62480E+02 GRAM
Detector name    : GAM38                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.16  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	44.98	13	7	1.30	90.28	89	9	3.52E-03	33.5	6.98E+00
2	3	46.62*	1	20	0.92	93.56	89	9	2.85E-04	****	
3	0	121.71	13	18	1.03	243.86	238	9	3.66E-03	64.2	
4	0	186.10*	17	34	1.01	372.73	368	11	4.86E-03	75.1	
5	0	197.94*	10	23	2.42	396.43	392	9	2.71E-03	100.1	
6	0	406.34	12	18	2.46	813.47	803	14	3.44E-03	77.0	
7	0	435.33	4	8	0.52	871.47	866	7	1.18E-03	123.0	
8	0	557.94	13	6	0.72	1116.81	1109	12	3.61E-03	46.8	
9	0	609.78*	6	7	1.36	1220.52	1214	14	1.77E-03	107.1	
10	0	719.48	14	0	0.67	1440.00	1435	9	3.89E-03	26.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:39:13

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041221.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 19-MAR-2025 00:00:00	Acquisition date	: 10-APR-2025 22:37:37
Sample ID	: G1206041221	Sample quantity	: 162.48 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA38	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.16 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-57	122.06	17	85.60*	6.587E+00	1.391E-02	1.475E-02	128.34
	136.47	------	10.68	6.198E+00	------ Line Not Found		------
PM-147	121.22	17	0.00*	6.587E+00	4.179E+02	4.249E+02	128.34
BI-210	46.54	1	4.25*	6.795E+00	2.315E-02	2.320E-02	2036.65
PB-210	46.54	1	4.25*	6.795E+00	2.315E-02	2.320E-02	2036.65

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:39:13.88

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041221.CNF;1  *
* Acquisition date : 10-APR-2025 22:37:37 Sensitivity     : 3.000       *
* Detector ID      : GAM38                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.16     Half life ratio : *****       *
* Sample date      : 19-MAR-2025 00:00:00 Analyst initials: MXR1        *
* Sample ID        : G1206041221          Sample Quantity : 1.6248E+02 GRAM  *
* Batch Number     : 2767515              Wet Weight      :    0.00000  *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000  *
* Nuclide Library  : SOLID.NLB;18                                       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
CO-57	1.475E-02	1.855E-02	2.001E-02
PM-147	4.249E+02	5.344E+02	5.071E+02
BI-210	2.320E-02	4.630E-01	4.692E-01
PB-210	2.320E-02	4.630E-01	4.692E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-3.601E-02	2.834E-01	5.477E-01	NOT IDENT.
NA-22	1.194E-02	2.627E-02	6.819E-02	NOT IDENT.
NA-24	0.000E+00	3.632E+09	0.000E+00	SHORT HLIF
AL-26	-3.252E-02	3.813E-02	5.585E-02	NOT IDENT.
K-40	-6.695E-02	4.299E-01	9.430E-01	NOT IDENT.
SC-46	8.414E-03	2.637E-02	6.313E-02	NOT IDENT.
V-48	2.871E-02	4.947E-02	1.369E-01	NOT IDENT.
CR-51	-3.828E-01	2.956E-01	4.676E-01	NOT IDENT.
MN-52	5.639E-03	4.084E-01	9.914E-01	NOT IDENT.
MN-54	-5.415E-03	2.930E-02	5.883E-02	NOT IDENT.
CO-56	2.376E-02	3.030E-02	7.584E-02	NOT IDENT.
MN-56	0.000E+00	1.283E+41	0.000E+00	SHORT HLIF
CO-58	1.398E-02	2.947E-02	7.018E-02	NOT IDENT.
FE-59	-4.417E-02	7.652E-02	1.332E-01	NOT IDENT.
CO-60	1.906E-03	2.270E-02	5.647E-02	NOT IDENT.
ZN-65	2.651E-02	4.465E-02	1.218E-01	NOT IDENT.
GE-68	1.090E-01	8.385E-01	1.899E+00	NOT IDENT.
AS-73	6.955E-02	8.058E-02	1.947E-01	NOT IDENT.
AS-74	6.393E-02	9.169E-02	2.172E-01	NOT IDENT.
SE-75	1.097E-02	2.412E-02	5.385E-02	FAIL ABUN
BR-77	-1.250E+01	5.874E+01	1.170E+02	NOT IDENT.
SR-82	7.688E-02	2.736E-01	5.925E-01	NOT IDENT.
RB-83	2.499E-03	5.494E-02	1.113E-01	NOT IDENT.
RB-84	3.788E-02	5.789E-02	1.431E-01	NOT IDENT.
KR-85	-1.198E+01	7.672E+00	1.086E+01	NOT IDENT.
SR-85	-6.897E-02	4.415E-02	6.249E-02	NOT IDENT.

RB-86	9.001E-02	6.919E-01	1.567E+00	NOT IDENT.
Y-88	-9.538E-03	1.869E-02	2.432E-02	NOT IDENT.
Y-91	6.174E+00	1.579E+01	3.778E+01	NOT IDENT.
NB-94	3.449E-04	1.685E-02	3.857E-02	NOT IDENT.
NB-95	-1.254E-02	2.531E-02	4.846E-02	NOT IDENT.
NB-95M	-2.244E-02	7.583E-02	1.495E-01	NOT IDENT.
ZR-95	-1.684E-02	5.657E-02	1.126E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.013E+09	0.000E+00	SHORT HLIF
MO-99	3.218E+01	6.756E+01	1.558E+02	NOT IDENT.
TC-99M	0.000E+00	4.028E+25	0.000E+00	SHORT HLIF
RH-101	-1.304E-02	1.489E-02	2.500E-02	FAIL ABUN
RH-102	2.289E-02	3.639E-02	8.827E-02	NOT IDENT.
RU-103	-1.151E-02	2.680E-02	4.953E-02	FAIL ABUN
RH-106	-6.264E-02	2.241E-01	4.542E-01	NOT IDENT.
RU-106	-6.264E-02	2.241E-01	4.542E-01	NOT IDENT.
AG-108M	1.034E-02	2.493E-02	4.275E-02	FAIL ABUN
CD-109	-1.036E-01	2.417E-01	4.559E-01	NOT IDENT.
AG-110	-9.106E-02	5.554E-01	1.140E+00	NOT IDENT.
AG-110M	-6.133E-05	3.618E-02	7.779E-02	NOT IDENT.
SN-113	1.706E-02	2.786E-02	6.367E-02	NOT IDENT.
CD-115	0.000E+00	9.172E+01	0.000E+00	SHORT HLIF
SN-117M	-6.901E-03	3.273E-02	6.878E-02	NOT IDENT.
SB-122	4.479E+00	7.148E+00	1.854E+01	NOT IDENT.
TE-123M	-3.128E-03	1.216E-02	2.534E-02	NOT IDENT.
SB-124	-4.990E-02	9.217E-02	1.670E-01	NOT IDENT.
SB-125	3.671E-02	4.922E-02	1.195E-01	NOT IDENT.
TE-125M	-1.666E-01	3.881E+00	7.750E+00	NOT IDENT.
I-126	-7.513E-02	2.102E-01	4.210E-01	NOT IDENT.
SB-126	3.209E-01	1.681E-01	4.332E-01	FAIL ABUN
SN-126	-1.949E-02	2.663E-02	4.785E-02	NOT IDENT.
SB-127	2.601E+00	3.294E+00	8.435E+00	NOT IDENT.
I-131	-4.945E-02	1.305E-01	2.321E-01	NOT IDENT.
I-132	0.000E+00	1.562E+41	0.000E+00	SHORT HLIF
TE-132	-1.932E+00	2.091E+00	3.775E+00	NOT IDENT.
BA-133	6.677E-03	2.363E-02	5.142E-02	NOT IDENT.
I-133	0.000E+00	2.166E+06	0.000E+00	SHORT HLIF
CS-134	-5.504E-03	2.121E-02	4.469E-02	NOT IDENT.
I-135	0.000E+00	1.591E+24	0.000E+00	SHORT HLIF
CS-136	-2.940E-02	1.310E-01	2.571E-01	NOT IDENT.
BA-137M	1.248E-02	2.305E-02	5.523E-02	NOT IDENT.
CS-137	1.318E-02	2.435E-02	5.834E-02	NOT IDENT.
LA-138	1.896E-02	3.644E-02	1.019E-01	NOT IDENT.
CE-139	-1.307E-02	1.415E-02	2.652E-02	NOT IDENT.
BA-140	4.957E-02	2.523E-01	5.455E-01	NOT IDENT.
LA-140	-2.493E-02	4.887E-02	6.728E-02	NOT IDENT.
CE-141	-3.507E-02	3.666E-02	6.232E-02	NOT IDENT.
CE-143	0.000E+00	3.819E+03	0.000E+00	SHORT HLIF
CE-144	-1.404E-02	7.522E-02	1.455E-01	NOT IDENT.
PM-144	9.431E-03	2.386E-02	5.499E-02	NOT IDENT.
PR-144	7.087E-01	1.793E+00	4.132E+00	NOT IDENT.
PM-146	-5.105E-03	2.883E-02	5.624E-02	NOT IDENT.
ND-147	3.050E-01	6.151E-01	1.388E+00	NOT IDENT.
PM-149	0.000E+00	5.653E+02	0.000E+00	SHORT HLIF
EU-150	7.822E-05	1.656E-02	3.381E-02	NOT IDENT.
EU-152	-2.162E-02	6.246E-02	1.196E-01	FAIL ABUN
GD-153	1.033E-02	3.110E-02	6.527E-02	NOT IDENT.
EU-154	3.370E-02	7.413E-02	1.925E-01	FAIL ABUN
EU-155	2.016E-02	4.060E-02	8.693E-02	NOT IDENT.
TB-160	6.311E-02	1.004E-01	2.478E-01	FAIL ABUN
HO-166M	6.702E-03	3.714E-02	8.480E-02	NOT IDENT.
TM-171	1.133E+00	1.562E+00	3.679E+00	NOT IDENT.
HF-172	3.602E-02	7.683E-02	1.643E-01	FAIL ABUN
LU-172	-3.588E-02	4.639E-02	7.342E-02	NOT IDENT.
LU-176	-3.209E-03	1.227E-02	2.479E-02	NOT IDENT.
HF-181	6.483E-03	3.068E-02	6.619E-02	NOT IDENT.
TA-182	-1.337E-02	1.121E-01	2.487E-01	NOT IDENT.
RE-183	-1.434E-03	2.472E-02	5.212E-02	NOT IDENT.
RE-184	2.085E-02	8.718E-02	2.082E-01	NOT IDENT.
W-188	-1.781E+00	4.636E+00	8.946E+00	NOT IDENT.
IR-192	1.859E-02	2.416E-02	5.444E-02	NOT IDENT.
HG-203	-7.452E-03	2.090E-02	4.122E-02	NOT IDENT.
TL-204	2.248E-01	1.184E+00	2.446E+00	NOT IDENT.
BI-207	-1.805E-02	2.440E-02	3.573E-02	NOT IDENT.
TL-208	-5.697E-03	2.377E-02	5.053E-02	NOT IDENT.
BI-211	-6.271E-02	1.440E-01	2.666E-01	NOT IDENT.
PB-211	6.808E-01	1.028E+00	1.096E+00	FAIL ABUN
BI-212	-2.319E-02	3.136E-01	6.650E-01	NOT IDENT.

PB-212	-9.820E-03	3.873E-02	7.674E-02	NOT IDENT.
BI-213	6.730E-02	5.926E-02	1.510E-01	NOT IDENT.
BI-214	4.124E-02	8.655E-02	1.179E-01	FAIL ABUN
PB-214	1.042E-03	5.325E-02	1.059E-01	NOT IDENT.
RN-219	9.045E-02	2.400E-01	4.953E-01	NOT IDENT.
RN-222	4.124E-02	8.655E-02	1.179E-01	FAIL ABUN
RA-223	6.366E-02	3.999E-01	8.097E-01	NOT IDENT.
RA-224	-3.766E-01	3.408E-01	5.925E-01	NOT IDENT.
AC-225	-2.143E-01	5.039E-01	9.935E-01	NOT IDENT.
RA-226	1.042E-03	5.325E-02	1.059E-01	NOT IDENT.
AC-227	-1.129E-02	1.390E-01	2.846E-01	NOT IDENT.
TH-227	-1.129E-02	1.390E-01	2.846E-01	NOT IDENT.
AC-228	6.545E-02	1.201E-01	2.794E-01	NOT IDENT.
RA-228	6.545E-02	1.201E-01	2.794E-01	NOT IDENT.
TH-228	-9.820E-03	3.873E-02	7.674E-02	NOT IDENT.
TH-229	1.680E-01	2.794E-01	5.813E-01	NOT IDENT.
TH-230	1.042E-03	5.325E-02	1.059E-01	NOT IDENT.
PA-231	-4.872E-02	2.233E-01	4.530E-01	NOT IDENT.
TH-231	6.366E-02	3.999E-01	8.097E-01	NOT IDENT.
TH-232	6.545E-02	1.201E-01	2.794E-01	NOT IDENT.
PA-233	-1.117E-02	3.597E-02	7.056E-02	NOT IDENT.
PA-234	-6.228E-02	2.478E-01	4.859E-01	NOT IDENT.
PA-234M	-5.659E-03	2.732E-01	6.271E-01	NOT IDENT.
TH-234	-5.659E-03	2.732E-01	6.271E-01	NOT IDENT.
U-234	1.042E-03	5.325E-02	1.059E-01	NOT IDENT.
U-235	-6.144E-03	9.701E-02	1.920E-01	FAIL ABUN
NP-237	-1.117E-02	3.597E-02	7.056E-02	NOT IDENT.
NP-238	0.000E+00	1.367E+02	0.000E+00	SHORT HLIF
U-238	-5.659E-03	2.732E-01	6.271E-01	NOT IDENT.
NP-239	-1.156E-01	1.254E-01	1.846E-01	NOT IDENT.
PU-239	8.513E+01	1.616E+02	3.379E+02	NOT IDENT.
AM-241	-3.639E-04	1.825E-02	3.878E-02	NOT IDENT.
AM-243	-1.161E-02	1.680E-02	3.292E-02	FAIL ABUN
CM-243	2.446E-02	4.206E-02	9.050E-02	NOT IDENT.
BK-247	-5.137E-04	4.214E-02	8.776E-02	NOT IDENT.
CM-247	2.748E-03	2.309E-02	4.425E-02	NOT IDENT.
CF-249	2.802E-03	2.596E-02	5.374E-02	NOT IDENT.
CF-251	-1.482E-02	6.722E-02	1.372E-01	NOT IDENT.
ANH-511	-5.450E-02	3.738E-02	7.902E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:39:12.63

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-57	122.06	17	85.60*	6.587E+00	1.391E-02	1.475E-02	128.34
	136.47	------	10.68	6.198E+00	------	Line Not Found	------
PM-147	121.22	17	0.00*	6.587E+00	4.179E+02	4.249E+02	128.34
BI-210	46.54	1	4.25*	6.795E+00	2.315E-02	2.320E-02	2036.65
PB-210	46.54	1	4.25*	6.795E+00	2.315E-02	2.320E-02	2036.65

Flag: "*" = Keyline

Sample ID : G1206041221 Acquisition date : 10-APR-2025 22:37:37

Total number of lines in spectrum 10
Number of unidentified lines 1
Number of lines tentatively identified by NID 9 90.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	1.06	1.391E-02	1.475E-02	1.893E-02	128.34	
PM-147	2.62Y	1.02	4.179E+02	4.249E+02	5.453E+02	128.34	
BI-210	22.20Y	1.00	2.315E-02	2.320E-02	47.25E-02	2036.65	
PB-210	22.20Y	1.00	2.315E-02	2.320E-02	47.25E-02	2036.65	
	Total Activity :		4.179E+02	4.249E+02			
	Grand Total Activity :		4.179E+02	4.249E+02			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	44.98	18	10	1.30	90.28	89	9	3.52E-03	66.9	6.66E+00	T
0	186.10	22	42	1.01	372.73	368	11	4.86E-03	****	5.04E+00	T
0	197.94	12	28	2.42	396.43	392	9	2.71E-03	****	4.81E+00	T
0	406.34	14	20	2.46	813.47	803	14	3.44E-03	****	2.53E+00	T
0	435.33	5	9	0.52	871.47	866	7	1.18E-03	****	2.36E+00	T
0	557.94	14	7	0.72	1116.81	1109	12	3.61E-03	93.6	1.85E+00	
0	609.78	7	8	1.36	1220.52	1214	14	1.77E-03	****	1.70E+00	T
0	719.48	15	0	0.67	1440.00	1435	9	3.89E-03	53.5	1.44E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:39:22.99

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041221.CNF;1  *
* Acquisition date : 10-APR-2025 22:37:37 Sensitivity     : 3.000           *
* Detector ID      : GAM38                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.16     Half life ratio : *****           *
* Sample date      : 19-MAR-2025 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1206041221          Analyst initials: MXR1            *
* Batch Number     : 2767515              Sample Quantity : 1.6248E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
CO-57	8.730E-03
PM-147	2.169E+02
BI-210	2.105E-01
PB-210	2.105E-01

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	2.348E-01	NOT IDENT.
NA-22	2.642E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.765E-02	NOT IDENT.
K-40	3.918E-01	NOT IDENT.
SC-46	2.498E-02	NOT IDENT.
V-48	5.225E-02	NOT IDENT.
CR-51	1.965E-01	NOT IDENT.
MN-52	3.512E-01	NOT IDENT.
MN-54	2.401E-02	NOT IDENT.
CO-56	3.152E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-58	2.880E-02	NOT IDENT.
FE-59	4.987E-02	NOT IDENT.
CO-60	2.032E-02	NOT IDENT.
ZN-65	4.675E-02	NOT IDENT.
GE-68	7.356E-01	NOT IDENT.
AS-73	8.598E-02	NOT IDENT.
AS-74	9.310E-02	NOT IDENT.
SE-75	2.352E-02	FAIL ABUN
BR-77	5.285E+01	NOT IDENT.
SR-82	2.366E-01	NOT IDENT.
RB-83	4.687E-02	NOT IDENT.
RB-84	5.882E-02	NOT IDENT.
KR-85	4.681E+00	NOT IDENT.
SR-85	2.693E-02	NOT IDENT.
RB-86	6.071E-01	NOT IDENT.

Y-88	0.000E+00	NOT IDENT.
Y-91	1.527E+01	NOT IDENT.
NB-94	1.491E-02	NOT IDENT.
NB-95	1.814E-02	NOT IDENT.
NB-95M	6.649E-02	NOT IDENT.
ZR-95	4.527E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	6.551E+01	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.094E-02	FAIL ABUN
RH-102	3.701E-02	NOT IDENT.
RU-103	1.959E-02	FAIL ABUN
RH-106	1.862E-01	NOT IDENT.
RU-106	1.862E-01	NOT IDENT.
AG-108M	1.832E-02	FAIL ABUN
CD-109	2.021E-01	NOT IDENT.
AG-110	4.729E-01	NOT IDENT.
AG-110M	3.095E-02	NOT IDENT.
SN-113	2.741E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.995E-02	NOT IDENT.
SB-122	7.524E+00	NOT IDENT.
TE-123M	1.105E-02	NOT IDENT.
SB-124	5.703E-02	NOT IDENT.
SB-125	5.046E-02	NOT IDENT.
TE-125M	3.394E+00	NOT IDENT.
I-126	1.673E-01	NOT IDENT.
SB-126	1.865E-01	FAIL ABUN
SN-126	2.143E-02	NOT IDENT.
SB-127	3.493E+00	NOT IDENT.
I-131	9.515E-02	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	1.632E+00	NOT IDENT.
BA-133	2.200E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	1.647E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.021E-01	NOT IDENT.
BA-137M	2.302E-02	NOT IDENT.
CS-137	2.432E-02	NOT IDENT.
LA-138	3.813E-02	NOT IDENT.
CE-139	1.154E-02	NOT IDENT.
BA-140	2.244E-01	NOT IDENT.
LA-140	0.000E+00	NOT IDENT.
CE-141	2.734E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	6.250E-02	NOT IDENT.
PM-144	2.295E-02	NOT IDENT.
PR-144	1.724E+00	NOT IDENT.
PM-146	2.365E-02	NOT IDENT.
ND-147	5.852E-01	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.465E-02	NOT IDENT.
EU-152	5.141E-02	FAIL ABUN
GD-153	2.915E-02	NOT IDENT.
EU-154	7.456E-02	FAIL ABUN
EU-155	3.883E-02	NOT IDENT.
TB-160	1.016E-01	FAIL ABUN
HO-166M	3.423E-02	NOT IDENT.
TM-171	1.629E+00	NOT IDENT.
HF-172	7.270E-02	FAIL ABUN
LU-172	2.601E-02	NOT IDENT.
LU-176	1.026E-02	NOT IDENT.
HF-181	2.758E-02	NOT IDENT.
TA-182	9.339E-02	NOT IDENT.
RE-183	2.263E-02	NOT IDENT.
RE-184	8.137E-02	NOT IDENT.
W-188	3.877E+00	NOT IDENT.
IR-192	2.414E-02	NOT IDENT.
HG-203	1.743E-02	NOT IDENT.
TL-204	1.107E+00	NOT IDENT.
BI-207	9.241E-03	NOT IDENT.
TL-208	2.096E-02	NOT IDENT.
BI-211	1.158E-01	NOT IDENT.
PB-211	4.798E-01	FAIL ABUN
BI-212	2.648E-01	NOT IDENT.
PB-212	3.468E-02	NOT IDENT.

BI-213	6.471E-02	NOT IDENT.
BI-214	5.058E-02	FAIL ABUN
PB-214	4.658E-02	NOT IDENT.
RN-219	2.087E-01	NOT IDENT.
RN-222	5.058E-02	FAIL ABUN
RA-223	3.522E-01	NOT IDENT.
RA-224	2.566E-01	NOT IDENT.
AC-225	4.322E-01	NOT IDENT.
RA-226	4.658E-02	NOT IDENT.
AC-227	1.243E-01	NOT IDENT.
TH-227	1.243E-01	NOT IDENT.
AC-228	1.181E-01	NOT IDENT.
RA-228	1.181E-01	NOT IDENT.
TH-228	3.468E-02	NOT IDENT.
TH-229	2.597E-01	NOT IDENT.
TH-230	4.658E-02	NOT IDENT.
PA-231	1.897E-01	NOT IDENT.
TH-231	3.522E-01	NOT IDENT.
TH-232	1.181E-01	NOT IDENT.
PA-233	3.000E-02	NOT IDENT.
PA-234	1.949E-01	NOT IDENT.
PA-234M	2.888E-01	NOT IDENT.
TH-234	2.888E-01	NOT IDENT.
U-234	4.658E-02	NOT IDENT.
U-235	8.576E-02	FAIL ABUN
NP-237	3.000E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	2.888E-01	NOT IDENT.
NP-239	7.957E-02	NOT IDENT.
PU-239	1.522E+02	NOT IDENT.
AM-241	1.680E-02	NOT IDENT.
AM-243	1.511E-02	FAIL ABUN
CM-243	4.063E-02	NOT IDENT.
BK-247	3.801E-02	NOT IDENT.
CM-247	1.856E-02	NOT IDENT.
CF-249	2.310E-02	NOT IDENT.
CF-251	6.119E-02	NOT IDENT.
ANH-511	3.630E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:39:26.79

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041221.CNF;1  *
* Acquisition date : 10-APR-2025 22:37:37 Sensitivity     : 3.000       *
* Detector ID      : GAM38                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.16     Half life ratio : *****       *
* Sample date      : 19-MAR-2025 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1206041221          Analyst initials: MXR1        *
* Batch Number     : 2767515              Sample Quantity : 1.6248E+02 GRAM  *
*                                         Quantity Err(%) : 1.2309E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
CO-57	1.475E-02	1.861E-02	1.861E-02
PM-147	4.249E+02	5.361E+02	5.361E+02
BI-210	2.320E-02	4.630E-01	4.630E-01
PB-210	2.320E-02	4.630E-01	4.630E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-3.601E-02	2.834E-01	2.839E-01	NOT IDENT.
NA-22	1.194E-02	2.629E-02	2.683E-02	NOT IDENT.
NA-24	4.129E+07	3.632E+09	3.632E+09	SHORT HLIF
AL-26	-3.252E-02	3.820E-02	4.092E-02	NOT IDENT.
K-40	-6.695E-02	4.299E-01	4.310E-01	NOT IDENT.
SC-46	8.414E-03	2.638E-02	2.665E-02	NOT IDENT.
V-48	2.871E-02	4.954E-02	5.120E-02	NOT IDENT.
CR-51	-3.828E-01	2.972E-01	3.436E-01	NOT IDENT.
MN-52	5.639E-03	4.084E-01	4.084E-01	NOT IDENT.
MN-54	-5.415E-03	2.930E-02	2.940E-02	NOT IDENT.
CO-56	2.376E-02	3.038E-02	3.221E-02	NOT IDENT.
MN-56	1.000E+41	1.286E+41	0.000E+00	SHORT HLIF
CO-58	1.398E-02	2.950E-02	3.016E-02	NOT IDENT.
FE-59	-4.417E-02	7.666E-02	7.921E-02	NOT IDENT.
CO-60	1.906E-03	2.270E-02	2.272E-02	NOT IDENT.
ZN-65	2.651E-02	4.470E-02	4.627E-02	NOT IDENT.
GE-68	1.090E-01	8.386E-01	8.400E-01	NOT IDENT.
AS-73	6.955E-02	8.187E-02	8.767E-02	NOT IDENT.
AS-74	6.393E-02	9.197E-02	9.638E-02	NOT IDENT.
SE-75	1.097E-02	2.414E-02	2.464E-02	FAIL ABUN
BR-77	-1.250E+01	5.933E+01	5.960E+01	NOT IDENT.
SR-82	7.688E-02	2.737E-01	2.759E-01	NOT IDENT.
RB-83	2.499E-03	5.494E-02	5.495E-02	NOT IDENT.
RB-84	3.788E-02	5.800E-02	6.046E-02	NOT IDENT.
KR-85	-1.198E+01	7.748E+00	9.444E+00	NOT IDENT.
SR-85	-6.897E-02	4.459E-02	5.436E-02	NOT IDENT.

RB-86	9.001E-02	6.919E-01	6.931E-01	NOT IDENT.
Y-88	-9.538E-03	1.871E-02	1.920E-02	NOT IDENT.
Y-91	6.174E+00	1.580E+01	1.604E+01	NOT IDENT.
NB-94	3.449E-04	1.685E-02	1.685E-02	NOT IDENT.
NB-95	-1.254E-02	2.534E-02	2.596E-02	NOT IDENT.
NB-95M	-2.244E-02	7.588E-02	7.655E-02	NOT IDENT.
ZR-95	-1.684E-02	5.659E-02	5.710E-02	NOT IDENT.
NB-97	-1.000E+41	8.221E+41	0.000E+00	SHORT HLIF
ZR-97	-7.203E+09	4.065E+09	5.203E+09	SHORT HLIF
MO-99	3.218E+01	6.763E+01	6.917E+01	NOT IDENT.
TC-99M	-1.304E+25	4.033E+25	0.000E+00	SHORT HLIF
RH-101	-1.304E-02	1.512E-02	1.622E-02	FAIL ABUN
RH-102	2.289E-02	3.648E-02	3.791E-02	NOT IDENT.
RU-103	-1.151E-02	2.682E-02	2.732E-02	FAIL ABUN
RH-106	-6.264E-02	2.242E-01	2.260E-01	NOT IDENT.
RU-106	-6.264E-02	2.242E-01	2.260E-01	NOT IDENT.
AG-108M	1.034E-02	2.494E-02	2.537E-02	FAIL ABUN
CD-109	-1.036E-01	2.419E-01	2.464E-01	NOT IDENT.
AG-110	-9.106E-02	5.554E-01	5.569E-01	NOT IDENT.
AG-110M	-6.133E-05	3.618E-02	3.618E-02	NOT IDENT.
SN-113	1.706E-02	2.789E-02	2.893E-02	NOT IDENT.
CD-115	-4.435E+01	9.183E+01	9.398E+01	SHORT HLIF
SN-117M	-6.901E-03	3.274E-02	3.289E-02	NOT IDENT.
SB-122	4.479E+00	7.160E+00	7.439E+00	NOT IDENT.
TE-123M	-3.128E-03	1.217E-02	1.225E-02	NOT IDENT.
SB-124	-4.990E-02	9.225E-02	9.496E-02	NOT IDENT.
SB-125	3.671E-02	4.932E-02	5.203E-02	NOT IDENT.
TE-125M	-1.666E-01	3.882E+00	3.882E+00	NOT IDENT.
I-126	-7.513E-02	2.103E-01	2.131E-01	NOT IDENT.
SB-126	3.209E-01	1.729E-01	2.255E-01	FAIL ABUN
SN-126	-1.949E-02	2.668E-02	2.809E-02	NOT IDENT.
SB-127	2.601E+00	3.314E+00	3.515E+00	NOT IDENT.
I-131	-4.945E-02	1.306E-01	1.325E-01	NOT IDENT.
I-132	1.000E+41	2.110E+41	0.000E+00	SHORT HLIF
TE-132	-1.932E+00	2.106E+00	2.279E+00	NOT IDENT.
BA-133	6.677E-03	2.364E-02	2.383E-02	NOT IDENT.
I-133	-4.373E+05	2.167E+06	2.176E+06	SHORT HLIF
CS-134	-5.504E-03	2.122E-02	2.136E-02	NOT IDENT.
I-135	1.013E+24	1.678E+24	0.000E+00	SHORT HLIF
CS-136	-2.940E-02	1.311E-01	1.317E-01	NOT IDENT.
BA-137M	1.248E-02	2.307E-02	2.375E-02	NOT IDENT.
CS-137	1.318E-02	2.437E-02	2.509E-02	NOT IDENT.
LA-138	1.896E-02	3.648E-02	3.747E-02	NOT IDENT.
CE-139	-1.307E-02	1.447E-02	1.562E-02	NOT IDENT.
BA-140	4.957E-02	2.523E-01	2.533E-01	NOT IDENT.
LA-140	-2.493E-02	4.891E-02	5.019E-02	NOT IDENT.
CE-141	-3.507E-02	3.687E-02	4.011E-02	NOT IDENT.
CE-143	6.980E+02	3.820E+03	3.833E+03	SHORT HLIF
CE-144	-1.404E-02	7.524E-02	7.550E-02	NOT IDENT.
PM-144	9.431E-03	2.388E-02	2.425E-02	NOT IDENT.
PR-144	7.087E-01	1.794E+00	1.823E+00	NOT IDENT.
PM-146	-5.105E-03	2.884E-02	2.893E-02	NOT IDENT.
ND-147	3.050E-01	6.157E-01	6.309E-01	NOT IDENT.
PM-149	3.908E+02	5.682E+02	5.949E+02	SHORT HLIF
EU-150	7.822E-05	1.656E-02	1.656E-02	NOT IDENT.
EU-152	-2.162E-02	6.249E-02	6.325E-02	FAIL ABUN
GD-153	1.033E-02	3.112E-02	3.146E-02	NOT IDENT.
EU-154	3.370E-02	7.419E-02	7.573E-02	FAIL ABUN
EU-155	2.016E-02	4.065E-02	4.166E-02	NOT IDENT.
TB-160	6.311E-02	1.006E-01	1.045E-01	FAIL ABUN
HO-166M	6.702E-03	3.714E-02	3.727E-02	NOT IDENT.
TM-171	1.133E+00	1.566E+00	1.647E+00	NOT IDENT.
HF-172	3.602E-02	7.712E-02	7.881E-02	FAIL ABUN
LU-172	-3.588E-02	4.661E-02	4.934E-02	NOT IDENT.
LU-176	-3.209E-03	1.227E-02	1.236E-02	NOT IDENT.
HF-181	6.483E-03	3.068E-02	3.082E-02	NOT IDENT.
TA-182	-1.337E-02	1.121E-01	1.122E-01	NOT IDENT.
RE-183	-1.434E-03	2.472E-02	2.473E-02	NOT IDENT.
RE-184	2.085E-02	8.721E-02	8.771E-02	NOT IDENT.
W-188	-1.781E+00	4.642E+00	4.711E+00	NOT IDENT.
IR-192	1.859E-02	2.420E-02	2.561E-02	NOT IDENT.
HG-203	-7.452E-03	2.090E-02	2.117E-02	NOT IDENT.
TL-204	2.248E-01	1.184E+00	1.188E+00	NOT IDENT.
BI-207	-1.805E-02	2.445E-02	2.577E-02	NOT IDENT.
TL-208	-5.697E-03	2.378E-02	2.392E-02	NOT IDENT.
BI-211	-6.271E-02	1.441E-01	1.469E-01	NOT IDENT.
PB-211	6.808E-01	1.030E+00	1.075E+00	FAIL ABUN
BI-212	-2.319E-02	3.136E-01	3.137E-01	NOT IDENT.

PB-212	-9.820E-03	3.874E-02	3.899E-02	NOT IDENT.
BI-213	6.730E-02	5.956E-02	6.684E-02	NOT IDENT.
BI-214	4.124E-02	8.663E-02	8.860E-02	FAIL ABUN
PB-214	1.042E-03	5.325E-02	5.326E-02	NOT IDENT.
RN-219	9.045E-02	2.404E-01	2.438E-01	NOT IDENT.
RN-222	4.124E-02	8.663E-02	8.860E-02	FAIL ABUN
RA-223	6.366E-02	3.999E-01	4.010E-01	NOT IDENT.
RA-224	-3.766E-01	3.429E-01	3.826E-01	NOT IDENT.
AC-225	-2.143E-01	5.046E-01	5.138E-01	NOT IDENT.
RA-226	1.042E-03	5.325E-02	5.326E-02	NOT IDENT.
AC-227	-1.129E-02	1.390E-01	1.391E-01	NOT IDENT.
TH-227	-1.129E-02	1.390E-01	1.391E-01	NOT IDENT.
AC-228	6.545E-02	1.203E-01	1.238E-01	NOT IDENT.
RA-228	6.545E-02	1.203E-01	1.238E-01	NOT IDENT.
TH-228	-9.820E-03	3.874E-02	3.899E-02	NOT IDENT.
TH-229	1.680E-01	2.801E-01	2.902E-01	NOT IDENT.
TH-230	1.042E-03	5.325E-02	5.325E-02	NOT IDENT.
PA-231	-4.872E-02	2.235E-01	2.246E-01	NOT IDENT.
TH-231	6.366E-02	3.999E-01	4.010E-01	NOT IDENT.
TH-232	6.545E-02	1.203E-01	1.238E-01	NOT IDENT.
PA-233	-1.117E-02	3.598E-02	3.633E-02	NOT IDENT.
PA-234	-6.228E-02	2.579E-01	2.594E-01	NOT IDENT.
PA-234M	-5.659E-03	2.732E-01	2.732E-01	NOT IDENT.
TH-234	-5.659E-03	2.732E-01	2.732E-01	NOT IDENT.
U-234	1.042E-03	5.325E-02	5.325E-02	NOT IDENT.
U-235	-6.144E-03	9.702E-02	9.706E-02	FAIL ABUN
NP-237	-1.117E-02	3.598E-02	3.633E-02	NOT IDENT.
NP-238	1.804E+01	1.368E+02	1.370E+02	SHORT HLIF
U-238	-5.659E-03	2.732E-01	2.732E-01	NOT IDENT.
NP-239	-1.156E-01	1.261E-01	1.365E-01	NOT IDENT.
PU-239	8.513E+01	1.618E+02	1.663E+02	NOT IDENT.
AM-241	-3.639E-04	1.825E-02	1.825E-02	NOT IDENT.
AM-243	-1.161E-02	1.683E-02	1.762E-02	FAIL ABUN
CM-243	2.446E-02	4.216E-02	4.358E-02	NOT IDENT.
BK-247	-5.137E-04	4.214E-02	4.214E-02	NOT IDENT.
CM-247	2.748E-03	2.310E-02	2.313E-02	NOT IDENT.
CF-249	2.802E-03	2.596E-02	2.599E-02	NOT IDENT.
CF-251	-1.482E-02	6.726E-02	6.759E-02	NOT IDENT.
ANH-511	-5.450E-02	3.770E-02	4.500E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	14.2771	85.43	38.3921	131.20	25.2031
45.60	25.4976	86.55	23.0945	133.02	15.6499
46.54	25.5816	86.79	30.8094	133.52	14.4582
49.72	7.9569	86.94	30.8200	136.00	21.7771
51.35	22.9991	87.09	30.8305	136.47	20.5833
51.87	18.0297	87.57	36.3755	140.51	21.9383
52.39	12.0400	88.03	26.4824	143.76	18.3774
52.97	12.0624	88.34	25.3967	144.24	17.1653
53.44	10.0670	88.47	24.2995	145.44	24.5685
54.07	16.1393	89.96	32.1380	152.43	26.0776
57.36	0.0000	90.64	47.7248	153.25	17.4066
57.53	16.3124	91.11	46.6633	154.21	16.1869
57.98	15.3135	92.59	30.0951	156.02	17.4795
59.27	14.3477	93.35	25.6788	158.56	17.5457
59.32	14.3498	94.56	58.2080	159.00	18.3931
59.54	14.3592	94.65	58.2195	162.33	25.2042
60.96	24.7181	94.67	58.2219	162.66	25.2164
61.17	35.0386	94.87	57.1268	163.33	20.1926
62.93	15.5365	97.43	19.1458	165.86	26.1774
63.29	14.5155	98.43	25.9575	176.31	23.1353
63.58	11.4144	98.44	25.9580	176.60	23.1443
64.28	27.0326	99.53	16.9675	177.52	25.7483
66.73	17.7953	100.11	27.1805	181.07	23.8024
67.24	16.7717	102.03	22.7396	181.52	22.0046
67.68	20.9897	103.18	20.5133	184.41	15.5923
67.75	20.9937	103.37	18.2410	185.72	13.8840
68.89	23.1638	105.21	17.1641	193.51	15.7778
69.67	27.4326	105.31	17.1674	197.03	22.8920
70.82	27.5155	106.12	21.7803	198.01	22.9203
70.83	27.5163	106.47	22.9425	201.83	18.6008
72.81	37.2321	109.28	17.3016	203.43	26.6251
72.87	37.2380	111.00	21.9880	205.31	22.2389
74.66	38.4769	111.76	18.5432	210.85	24.1793
74.82	38.4925	114.06	24.4440	215.65	20.7148
74.97	38.5071	116.30	17.5330	218.12	19.8715
77.11	37.6380	116.74	26.5160	222.11	22.6860
78.74	18.3546	119.76	11.7631	227.09	21.9026
79.69	15.1504	121.12	11.7920	227.38	23.7355
80.03	23.8270	121.22	11.7941	228.16	24.6703
80.12	23.8324	121.78	11.8060	228.18	24.6709
80.19	29.2538	122.06	15.7492	235.69	25.7994
80.57	30.3650	122.92	17.3506	235.96	25.8071
81.00	26.0539	123.07	17.3553	238.63	22.1851
81.07	26.0583	123.68	17.3741	238.98	21.2689
81.75	29.3632	125.81	14.2686	240.99	27.8024
82.47	22.8771	127.23	28.6078	242.00	15.7718
83.79	37.1538	127.91	17.9011	244.70	15.8177
84.00	26.2390	129.30	15.5514	252.40	20.6371

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	17.8305	351.06	10.2673	569.33	1.7793
254.15	0.0000	351.93	8.2196	569.50	1.7795
256.23	16.9523	355.39	0.0000	569.70	3.5593
260.90	0.0000	356.01	9.2774	583.19	6.2747
264.66	11.3989	364.49	9.3400	584.27	6.2784
264.80	11.4006	366.42	5.1967	595.83	5.4148
265.00	14.2535	372.51	12.5313	600.60	6.3331
269.46	13.3628	375.05	11.5096	602.52	0.0000
270.03	11.4604	377.52	20.9660	604.72	8.7044
271.23	19.1231	383.85	12.6401	607.14	2.9051
273.65	14.3765	388.16	11.6244	609.32	5.4532
276.40	18.2594	388.63	14.8001	610.33	5.4562
277.37	15.3910	391.69	7.4168	614.28	11.6637
277.60	14.4321	400.66	9.5991	618.01	9.1296
278.00	13.4753	401.81	6.4048	620.36	7.3125
279.20	13.4910	402.40	8.0093	621.93	9.1479
279.54	13.4953	404.85	11.7678	630.19	0.0000
279.70	13.4976	410.95	5.1576	631.29	4.5958
280.46	11.5776	413.71	8.6130	633.25	5.5204
283.69	15.4847	414.70	15.0835	634.78	6.4454
284.31	13.5574	423.72	13.0107	635.95	4.6066
285.41	11.6326	427.09	4.3471	636.99	2.7654
285.90	0.0000	427.87	4.3494	657.50	9.3121
287.50	16.5123	433.94	6.5515	657.76	9.3134
290.67	18.5102	439.40	9.8639	657.90	0.0000
293.27	0.0000	440.45	3.2903	661.66	4.6655
295.22	17.6104	453.88	11.0665	664.57	0.0000
295.96	13.7063	463.37	14.4761	666.33	7.4817
298.58	11.7766	468.07	14.5200	666.50	7.4824
299.98	14.7397	473.00	13.4456	667.71	0.0000
300.09	14.7412	475.06	12.3412	677.62	3.7612
300.13	14.7417	476.78	10.1085	685.70	2.8317
301.36	10.8228	477.60	13.4849	692.65	5.6821
302.85	9.8521	482.18	6.7620	695.00	9.4806
304.50	7.8936	487.02	7.9130	696.49	5.6922
304.85	7.8960	492.35	0.0000	696.51	5.6924
306.78	9.8871	497.08	7.9623	697.00	8.5405
308.46	6.9315	505.52	11.4335	697.30	6.6435
311.90	13.9054	507.63	0.0000	697.49	6.6441
316.51	11.9675	511.00	14.9126	702.65	3.8057
319.41	23.9956	514.00	35.6243	706.68	5.7191
320.08	24.0098	514.00	35.6243	711.68	4.7769
321.04	13.0161	520.40	9.2285	720.70	4.6047
323.87	12.0444	520.69	8.0764	721.93	0.0000
325.23	20.0972	522.65	0.0000	722.78	0.0000
328.76	12.0950	527.90	0.0000	722.91	1.5365
333.37	12.1421	1093.63	10.4301	723.31	12.4858
333.97	14.1732	529.59	9.2783	724.19	6.7259
334.37	14.1777	529.87	0.0000	727.33	4.8109
338.28	15.2402	531.02	5.8038	733.00	5.7880
338.32	15.2408	537.26	5.8248	735.93	5.7955
340.48	9.1609	546.56	0.0000	737.46	6.7659
340.55	9.1615	552.55	12.6918	739.50	5.8046
344.28	16.3372	563.25	3.0400	744.23	12.6033
345.93	11.2471	564.24	2.6614	747.24	2.9123

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	8.7399	962.31	4.2271	1435.80	0.9737
752.31	3.8917	964.08	7.4020	1457.56	0.0000
753.82	5.8414	966.17	5.2911	1460.82	4.8992
756.73	7.7983	968.97	2.1185	1489.16	1.9735
756.80	6.8238	983.53	1.0647	1505.03	1.9812
763.94	2.9335	984.45	0.0000	1584.12	3.0281
765.81	5.8718	996.26	5.3471	1596.21	1.0122
766.84	3.9163	1002.74	6.4310	1620.50	2.0357
772.60	0.0000	1004.73	3.2177	1621.92	3.0545
776.52	2.9494	1021.30	0.0000	1678.03	0.0000
777.92	6.8861	1025.87	0.0000	1690.97	4.1361
778.90	8.8572	1028.54	0.0000	1750.46	0.0000
783.70	7.8892	1037.84	3.2540	1764.49	5.2527
788.74	4.9411	1038.76	0.0000	1770.23	1.0518
792.07	2.9689	1046.59	2.1757	1771.35	3.1562
795.86	3.9647	1048.07	6.5303	1791.20	0.0000
801.95	4.9686	1049.04	7.6208	1808.65	5.3015
810.06	3.9882	1050.41	7.6242	1810.72	0.0000
810.29	4.9857	1063.66	3.2818	1836.06	1.0663
810.45	4.9860	1077.00	3.2961		
810.76	3.9893	1077.34	3.2964		
815.77	5.9962	1085.87	3.3056		
818.51	7.0034	1093.63	6.6277		
832.01	5.0299	1099.45	6.6398		
834.85	8.0569	1112.07	2.2222		
835.71	9.0673	1112.84	1.1113		
836.80	0.0000	1115.54	1.1123		
846.75	0.0000	1120.29	1.1140		
846.77	3.0358	1120.55	1.1140		
856.80	6.0956	1121.30	1.1143		
860.56	2.0349	1129.67	2.2344		
871.09	6.1296	1131.51	0.0000		
873.19	3.0673	1147.95	0.0000		
875.33	0.0000	1173.23	2.7173		
879.38	3.0746	1177.95	3.6281		
880.51	2.0507	1189.05	0.9101		
881.60	3.0773	1204.77	3.6572		
883.24	9.2376	1221.41	3.6750		
884.68	5.1347	1231.02	6.4494		
889.28	3.0862	1235.36	6.4572		
894.76	2.0618	1238.28	4.6162		
898.04	3.0965	1260.41	0.0000		
900.72	4.1329	1271.87	4.6604		
903.28	2.0684	1274.44	1.8655		
911.20	3.1119	1274.54	1.8656		
912.08	3.1129	1291.59	4.6863		
923.98	0.0000	1298.22	0.0000		
926.50	5.2159	1312.11	1.8851		
929.11	5.2209	1332.49	1.8956		
935.54	6.2798	1362.66	0.0000		
937.49	7.3315	1365.19	1.9122		
944.13	6.2994	1368.63	0.0000		
946.00	7.3544	1384.29	1.9218		
949.00	8.4141	1408.01	3.8674		
954.55	0.0000	1434.09	1.9466		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:25:36.97

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GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041222.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;901
Background date : 7-APR-2025 07:38:46.
Sample date : 7-MAR-2025 08:00:00. Acquisition date : 10-APR-2025 19:25:04
Sample ID : G1206041222 Sample quantity : 1.27470E+02 GRAM
Detector name : GAM01 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.33 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767515 Detector SN# :
Matrix Spike ID : LCS ID :

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	6	35.69*	28	28	1.87	71.50	66	17	7.70E-03	56.7	1.56E+00
2	6	37.71*	0	49	1.68	75.53	66	17	8.59E-05	*****	
3	4	74.96	78	111	1.34	150.02	146	15	2.17E-02	25.8	2.52E+00
4	4	77.19*	145	119	1.74	154.49	146	15	4.04E-02	17.4	
5	0	85.51*	77	153	4.02	171.11	165	12	2.15E-02	34.2	
6	0	92.50*	87	210	1.60	185.09	178	15	2.42E-02	39.0	
7	2	180.22	22	80	1.63	360.52	356	27	6.21E-03	77.9	1.90E+00
8	2	185.68*	51	72	1.53	371.43	356	27	1.43E-02	37.0	
9	0	238.53*	206	110	1.22	477.13	470	11	5.72E-02	12.4	
10	0	241.80	73	64	1.18	483.67	481	8	2.04E-02	22.7	
11	0	295.28*	102	73	1.47	590.62	586	11	2.84E-02	19.2	
12	0	300.79	18	35	1.44	601.63	598	7	4.95E-03	60.7	
13	0	338.04	43	41	0.68	676.12	672	10	1.20E-02	31.4	
14	0	351.90*	149	32	1.52	703.85	697	12	4.13E-02	11.7	
15	0	385.76	19	30	1.56	771.56	767	9	5.23E-03	58.2	
16	0	400.09	23	42	4.62	800.22	789	15	6.33E-03	67.1	
17	0	510.67*	36	34	2.45	1021.38	1012	17	9.89E-03	47.9	
18	0	517.59	10	38	1.23	1035.22	1028	13	2.74E-03	134.1	
19	0	523.14	8	12	1.20	1046.31	1042	7	2.23E-03	80.2	
20	0	555.15	12	10	2.06	1110.32	1105	8	3.35E-03	53.7	
21	3	562.00	16	14	2.16	1124.03	1118	32	4.55E-03	58.5	1.08E+00
22	3	567.20*	21	16	2.16	1134.43	1118	32	5.87E-03	51.4	
23	0	584.01*	29	50	1.36	1168.06	1162	15	8.02E-03	56.8	
24	0	609.29*	143	13	1.71	1218.62	1212	13	3.96E-02	10.0	
25	0	661.81*	42	38	1.40	1323.66	1319	13	1.18E-02	33.8	
26	0	686.22	13	9	2.84	1372.48	1368	9	3.59E-03	50.4	
27	0	768.23	14	6	1.02	1536.53	1533	8	3.94E-03	42.3	
28	0	773.26	16	5	2.89	1546.59	1541	10	4.52E-03	35.5	
29	0	787.40	13	13	0.85	1574.86	1566	13	3.64E-03	63.0	
30	0	796.61	7	21	0.68	1593.29	1583	12	1.94E-03	136.3	
31	0	833.27	8	4	1.07	1666.61	1661	8	2.15E-03	57.7	
32	0	836.55	8	10	0.84	1673.18	1668	8	2.23E-03	76.8	
33	0	912.10*	25	28	1.51	1824.29	1818	15	7.02E-03	51.7	
34	0	921.57	9	1	1.57	1843.23	1840	7	2.38E-03	42.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	950.93	17	10	1.28	1901.96	1895	14	4.71E-03	47.1	
36	0	971.23	19	32	1.73	1942.58	1933	19	5.16E-03	77.8	
37	0	991.22	8	8	3.06	1982.56	1974	11	2.08E-03	81.9	
38	0	1103.09	10	4	0.94	2206.34	2201	9	2.68E-03	50.9	
39	0	1120.47	29	6	1.41	2241.11	2236	11	7.92E-03	24.6	
40	0	1139.92	5	12	3.62	2280.03	2274	10	1.39E-03	138.9	
41	0	1155.28	7	15	2.19	2310.74	2305	10	1.94E-03	110.2	
42	0	1175.99	5	20	2.81	2352.17	2345	11	1.52E-03	161.7	
43	0	1214.48	11	11	2.31	2429.18	2423	12	3.08E-03	68.7	
44	0	1255.35	12	6	2.47	2510.94	2506	11	3.33E-03	48.0	
45	0	1460.72*	256	0	2.28	2921.81	2914	15	7.11E-02	6.4	
46	0	1764.58	27	0	2.54	3529.78	3524	11	7.50E-03	19.2	
47	0	1847.69*	10	0	1.00	3696.08	3691	10	2.91E-03	33.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 20:25:38

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041222.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 08:00:00	Acquisition date	: 10-APR-2025 19:25:04
Sample ID	: G1206041222	Sample quantity	: 127.47 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA1	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.33 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	243	10.66*	9.678E-01	1.390E+01	1.390E+01	12.70
BA-137M	661.66	43	89.90*	1.973E+00	1.413E-01	1.416E-01	67.61
CS-137	661.66	43	85.10*	1.973E+00	1.492E-01	1.496E-01	67.61
TL-208	277.37	------	6.60	4.070E+00	------ Line Not Found		------
	583.19	29	85.00*	2.201E+00	9.181E-02	9.181E-02	113.66
	860.56	------	12.50	1.559E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.515E+00	------ Line Not Found		------
	351.06	155	12.92*	3.368E+00	2.099E+00	2.099E+00	23.38
PB-212	74.82	89	10.28	3.734E+00	1.372E+00	1.372E+00	51.70
	77.11	166	17.10	3.958E+00	1.443E+00	1.443E+00	34.78
	238.63	220	43.60*	4.554E+00	6.524E-01	6.524E-01	24.81
	300.09	19	3.30	3.820E+00	8.770E-01	8.770E-01	121.49
BI-214	609.32	144	45.49*	2.121E+00	8.761E-01	8.762E-01	20.04
	1120.29	28	14.92	1.224E+00	8.894E-01	8.894E-01	49.19
	1764.49	25	15.30	8.349E-01	1.168E+00	1.168E+00	38.49
PB-214	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------ Line Not Found		------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.877E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
RN-222	609.32	144	45.49*	2.121E+00	8.761E-01	8.762E-01	20.04
	1120.29	28	14.92	1.224E+00	8.894E-01	8.894E-01	49.19
	1764.49	25	15.30	8.349E-01	1.168E+00	1.168E+00	38.49
RA-224	240.99	78	4.10*	4.509E+00	2.496E+00	2.496E+00	45.34
RA-226	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------ Line Not Found		------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.877E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
TH-228	74.82	89	10.28	3.734E+00	1.372E+00	1.372E+00	51.70
	77.11	166	17.10	3.958E+00	1.443E+00	1.443E+00	34.78
	238.63	220	43.60*	4.554E+00	6.524E-01	6.524E-01	24.81
	300.09	19	3.30	3.820E+00	8.770E-01	8.770E-01	121.49
TH-230	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------ Line Not Found		------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.876E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
PA-231	283.69	------	1.70	3.999E+00	------ Line Not Found		------
	301.36	19	5.35*	3.820E+00	5.409E-01	5.409E-01	121.49
U-234	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------ Line Not Found		------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.876E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
AM-243	43.53	------	5.90	3.984E-01	------	Line Not Found	------
	74.66	89	67.20*	3.734E+00	2.098E-01	2.098E-01	51.70
ANH-511	511.00	36	100.00*	2.470E+00	8.649E-02	8.649E-02	95.82

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:25:39.12

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041222.CNF;1  *
* Acquisition date : 10-APR-2025 19:25:04 Sensitivity     : 3.000       *
* Detector ID      : GAM01                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****       *
* Sample date      :  7-MAR-2025 08:00:00 Analyst initials: MXR1         *
* Sample ID        : G1206041222          Sample Quantity : 1.2747E+02 GRAM  *
* Batch Number     : 2767515              Wet Weight      :    0.00000  *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000  *
* Nuclide Library  : SOLID.NLB;18                                       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19        *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.390E+01	1.730E+00	6.151E-01
BA-137M	1.416E-01	9.380E-02	9.013E-02
CS-137	1.496E-01	9.909E-02	9.521E-02
TL-208	9.181E-02	1.023E-01	8.438E-02
BI-211	2.099E+00	4.810E-01	4.208E-01
PB-212	6.524E-01	1.586E-01	1.089E-01
BI-214	8.762E-01	1.720E-01	1.254E-01
PB-214	7.618E-01	1.746E-01	1.530E-01
RN-222	8.762E-01	1.720E-01	1.254E-01
RA-224	2.496E+00	1.109E+00	1.308E+00
RA-226	7.618E-01	1.746E-01	1.530E-01
TH-228	6.524E-01	1.586E-01	1.089E-01
TH-230	7.618E-01	1.746E-01	1.530E-01
PA-231	5.409E-01	6.441E-01	8.908E-01
U-234	7.618E-01	1.746E-01	1.530E-01
AM-243	2.098E-01	1.063E-01	1.058E-01
ANH-511	8.649E-02	8.122E-02	4.418E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-2.667E-01	4.037E-01	6.938E-01	NOT IDENT.
NA-22	-1.783E-02	4.062E-02	7.571E-02	NOT IDENT.
NA-24	0.000E+00	1.532E+15	0.000E+00	SHORT HLIF
AL-26	-1.301E-03	3.559E-02	7.716E-02	NOT IDENT.
SC-46	1.129E-02	5.318E-02	1.098E-01	FAIL ABUN
V-48	9.747E-02	1.830E-01	3.814E-01	NOT IDENT.
CR-51	-9.016E-02	5.853E-01	1.099E+00	NOT IDENT.
MN-52	-3.435E+00	2.930E+00	4.027E+00	NOT IDENT.
MN-54	7.441E-02	3.368E-02	9.143E-02	NOT IDENT.
CO-56	-2.925E-02	4.883E-02	8.951E-02	NOT IDENT.
MN-56	0.000E+00	1.669E+41	0.000E+00	SHORT HLIF
CO-57	5.325E-03	2.736E-02	5.373E-02	NOT IDENT.
CO-58	-3.687E-02	5.225E-02	8.470E-02	NOT IDENT.

FE-59	-7.425E-02	1.395E-01	2.132E-01	NOT IDENT.
CO-60	5.648E-02	4.692E-02	1.141E-01	NOT IDENT.
ZN-65	1.044E-01	9.440E-02	2.141E-01	NOT IDENT.
GE-68	1.287E-02	1.550E+00	3.092E+00	NOT IDENT.
AS-73	-7.333E-01	1.341E+00	2.303E+00	NOT IDENT.
AS-74	1.793E-01	1.924E-01	4.218E-01	NOT IDENT.
SE-75	-6.755E-04	4.866E-02	9.280E-02	FAIL ABUN
BR-77	0.000E+00	7.007E+03	0.000E+00	SHORT HLIF
SR-82	-7.906E-01	7.951E-01	9.859E-01	NOT IDENT.
RB-83	-1.861E-02	1.227E-01	1.560E-01	NOT IDENT.
RB-84	1.881E-02	1.020E-01	2.155E-01	NOT IDENT.
KR-85	-1.488E-01	1.123E+01	1.472E+01	NOT IDENT.
SR-85	-9.665E-04	7.297E-02	9.560E-02	NOT IDENT.
RB-86	-1.607E-01	1.802E+00	3.564E+00	NOT IDENT.
Y-88	-1.044E-03	2.587E-02	6.599E-02	NOT IDENT.
Y-91	1.205E+01	2.893E+01	6.102E+01	NOT IDENT.
NB-94	1.229E-02	3.787E-02	7.446E-02	NOT IDENT.
NB-95	2.648E-02	5.997E-02	1.105E-01	NOT IDENT.
NB-95M	1.252E-01	1.547E-01	2.890E-01	NOT IDENT.
ZR-95	-4.920E-02	9.481E-02	1.618E-01	NOT IDENT.
NB-97	0.000E+00	8.113E+40	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.171E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.799E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	6.441E+39	0.000E+00	SHORT HLIF
RH-101	-2.013E-02	3.087E-02	5.691E-02	NOT IDENT.
RH-102	-7.916E-02	6.309E-02	9.254E-02	FAIL ABUN
RU-103	2.261E-02	5.299E-02	1.087E-01	FAIL ABUN
RH-106	-5.802E-02	3.407E-01	6.299E-01	NOT IDENT.
RU-106	-5.802E-02	3.407E-01	6.299E-01	NOT IDENT.
AG-108M	2.037E-02	2.540E-02	5.522E-02	NOT IDENT.
CD-109	1.059E+00	1.095E+00	1.754E+00	NOT IDENT.
AG-110	8.990E-01	9.395E-01	1.875E+00	NOT IDENT.
AG-110M	2.580E-03	5.219E-02	1.076E-01	NOT IDENT.
SN-113	-1.149E-03	5.432E-02	9.811E-02	NOT IDENT.
CD-115	0.000E+00	4.367E+03	0.000E+00	SHORT HLIF
SN-117M	-3.815E-02	1.587E-01	2.980E-01	NOT IDENT.
SB-122	0.000E+00	2.800E+02	0.000E+00	SHORT HLIF
TE-123M	-5.699E-03	3.485E-02	6.574E-02	NOT IDENT.
SB-124	-3.933E-02	7.206E-02	1.570E-01	NOT IDENT.
SB-125	6.520E-02	9.236E-02	1.922E-01	NOT IDENT.
TE-125M	3.924E+00	1.181E+01	2.360E+01	NOT IDENT.
I-126	-2.712E-01	8.322E-01	1.288E+00	NOT IDENT.
SB-126	-3.992E-01	4.008E-01	6.016E-01	NOT IDENT.
SN-126	1.316E-01	1.064E-01	1.749E-01	FAIL ABUN
SB-127	5.382E+01	5.312E+01	9.362E+01	FAIL ABUN
I-131	6.070E-01	6.464E-01	1.355E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.817E+01	0.000E+00	SHORT HLIF
BA-133	-2.021E-04	4.454E-02	7.627E-02	NOT IDENT.
I-133	0.000E+00	2.909E+10	0.000E+00	SHORT HLIF
CS-134	2.947E-02	7.873E-02	1.035E-01	FAIL ABUN
I-135	0.000E+00	1.135E+37	0.000E+00	SHORT HLIF
CS-136	2.083E-01	3.327E-01	7.296E-01	NOT IDENT.
LA-138	-8.808E-04	6.185E-02	1.282E-01	FAIL ABUN
CE-139	2.506E-03	3.143E-02	6.079E-02	NOT IDENT.
BA-140	-3.027E-01	7.999E-01	1.433E+00	NOT IDENT.
LA-140	-5.082E-02	2.668E-01	5.362E-01	NOT IDENT.
CE-141	-4.844E-02	9.541E-02	1.766E-01	NOT IDENT.
CE-143	0.000E+00	2.760E+06	0.000E+00	SHORT HLIF
CE-144	2.538E-02	2.031E-01	3.965E-01	NOT IDENT.
PM-144	2.939E-02	3.760E-02	7.976E-02	NOT IDENT.
PR-144	2.171E+00	2.834E+00	6.003E+00	NOT IDENT.
PM-146	-1.048E-02	4.229E-02	7.796E-02	NOT IDENT.
ND-147	2.465E-01	1.789E+00	3.532E+00	FAIL ABUN
PM-147	3.814E+01	7.570E+02	1.474E+03	NOT IDENT.
PM-149	0.000E+00	3.962E+04	0.000E+00	SHORT HLIF
EU-150	9.158E-03	2.654E-02	4.834E-02	FAIL ABUN
EU-152	-1.883E-02	1.148E-01	2.120E-01	NOT IDENT.
GD-153	-2.926E-02	1.029E-01	1.764E-01	NOT IDENT.
EU-154	-5.002E-02	1.140E-01	2.124E-01	NOT IDENT.
EU-155	1.011E-01	1.086E-01	2.248E-01	FAIL ABUN
TB-160	-9.281E-02	1.687E-01	3.113E-01	FAIL ABUN
HO-166M	-2.874E-02	6.455E-02	1.123E-01	FAIL ABUN
TM-171	7.409E+00	2.319E+01	4.372E+01	NOT IDENT.
HF-172	-6.293E-02	1.861E-01	3.521E-01	NOT IDENT.
LU-172	-9.359E-03	6.225E-02	1.241E-01	FAIL ABUN
LU-176	-1.315E-02	2.558E-02	4.606E-02	NOT IDENT.
HF-181	-1.416E-02	6.318E-02	1.163E-01	NOT IDENT.

TA-182	6.124E-02	2.582E-01	5.206E-01	FAIL ABUN
RE-183	-4.589E-02	3.043E-01	5.424E-01	NOT IDENT.
RE-184	-9.534E-02	1.490E-01	2.721E-01	NOT IDENT.
W-188	2.916E+00	9.588E+00	1.705E+01	NOT IDENT.
IR-192	1.052E-02	4.255E-02	8.309E-02	FAIL ABUN
HG-203	1.333E-02	5.317E-02	1.031E-01	NOT IDENT.
TL-204	-5.346E+00	6.804E+00	1.019E+01	NOT IDENT.
BI-207	1.718E-02	4.994E-02	1.088E-01	FAIL ABUN
BI-210	-1.769E+00	5.088E+00	8.967E+00	NOT IDENT.
PB-210	-1.769E+00	5.088E+00	8.967E+00	NOT IDENT.
PB-211	-2.444E-01	7.087E-01	1.290E+00	FAIL ABUN
BI-212	-8.738E-02	6.856E-01	1.235E+00	NOT IDENT.
BI-213	-9.015E-03	1.050E-01	1.985E-01	NOT IDENT.
RN-219	1.672E-01	4.163E-01	7.668E-01	NOT IDENT.
RA-223	-2.153E-02	6.292E-01	1.195E+00	FAIL ABUN
AC-225	4.977E-01	2.156E+00	4.205E+00	NOT IDENT.
AC-227	-2.584E-02	2.377E-01	4.503E-01	FAIL ABUN
TH-227	-2.584E-02	2.377E-01	4.503E-01	FAIL ABUN
AC-228	3.831E-01	3.884E-01	5.167E-01	FAIL ABUN
RA-228	3.831E-01	3.884E-01	5.167E-01	FAIL ABUN
TH-229	1.487E-01	5.867E-01	1.032E+00	FAIL ABUN
TH-231	-2.153E-02	6.292E-01	1.195E+00	FAIL ABUN
TH-232	3.831E-01	3.884E-01	5.167E-01	FAIL ABUN
PA-233	-4.047E-02	6.412E-02	1.136E-01	FAIL ABUN
PA-234	2.716E-02	3.155E-01	5.879E-01	NOT IDENT.
PA-234M	8.300E-01	1.817E+00	3.441E+00	FAIL ABUN
TH-234	8.300E-01	1.817E+00	3.441E+00	FAIL ABUN
U-235	1.247E-01	2.055E-01	4.142E-01	FAIL ABUN
NP-237	-4.047E-02	6.412E-02	1.136E-01	FAIL ABUN
NP-238	0.000E+00	1.401E+04	0.000E+00	SHORT HLIF
U-238	8.300E-01	1.817E+00	3.441E+00	FAIL ABUN
NP-239	-1.671E-02	2.774E-01	5.355E-01	NOT IDENT.
PU-239	1.948E+02	3.296E+02	6.651E+02	NOT IDENT.
AM-241	-1.085E-01	1.990E-01	3.400E-01	NOT IDENT.
CM-243	-9.775E-02	1.103E-01	2.014E-01	NOT IDENT.
BK-247	-3.068E-02	7.790E-02	1.429E-01	NOT IDENT.
CM-247	-1.099E-02	4.025E-02	6.542E-02	NOT IDENT.
CF-249	-7.349E-03	4.433E-02	7.349E-02	NOT IDENT.
CF-251	-7.074E-02	1.456E-01	2.375E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:25:37.72

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	243	10.66*	9.678E-01	1.390E+01	1.390E+01	12.70
BA-137M	661.66	43	89.90*	1.973E+00	1.413E-01	1.416E-01	67.61
CS-137	661.66	43	85.10*	1.973E+00	1.492E-01	1.496E-01	67.61
TL-208	277.37	------	6.60	4.070E+00	------	Line Not Found	------
	583.19	29	85.00*	2.201E+00	9.181E-02	9.181E-02	113.66
	860.56	------	12.50	1.559E+00	------	Line Not Found	------
BI-211	72.87	------	1.23	3.515E+00	------	Line Not Found	------
	351.06	155	12.92*	3.368E+00	2.099E+00	2.099E+00	23.38
PB-212	74.82	89	10.28	3.734E+00	1.372E+00	1.372E+00	51.70
	77.11	166	17.10	3.958E+00	1.443E+00	1.443E+00	34.78
	238.63	220	43.60*	4.554E+00	6.524E-01	6.524E-01	24.81
	300.09	19	3.30	3.820E+00	8.770E-01	8.770E-01	121.49
BI-214	609.32	144	45.49*	2.121E+00	8.761E-01	8.762E-01	20.04
	1120.29	28	14.92	1.224E+00	8.894E-01	8.894E-01	49.19
	1764.49	25	15.30	8.349E-01	1.168E+00	1.168E+00	38.49
PB-214	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------	Line Not Found	------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.877E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
RN-222	609.32	144	45.49*	2.121E+00	8.761E-01	8.762E-01	20.04
	1120.29	28	14.92	1.224E+00	8.894E-01	8.894E-01	49.19
	1764.49	25	15.30	8.349E-01	1.168E+00	1.168E+00	38.49
RA-224	240.99	78	4.10*	4.509E+00	2.496E+00	2.496E+00	45.34
RA-226	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------	Line Not Found	------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.877E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
TH-228	74.82	89	10.28	3.734E+00	1.372E+00	1.372E+00	51.70
	77.11	166	17.10	3.958E+00	1.443E+00	1.443E+00	34.78
	238.63	220	43.60*	4.554E+00	6.524E-01	6.524E-01	24.81
	300.09	19	3.30	3.820E+00	8.770E-01	8.770E-01	121.49
TH-230	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------	Line Not Found	------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34
	295.22	108	18.42	3.876E+00	8.876E-01	8.876E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
PA-231	283.69	------	1.70	3.999E+00	------	Line Not Found	------
	301.36	19	5.35*	3.820E+00	5.409E-01	5.409E-01	121.49
U-234	74.82	89	5.80	3.734E+00	2.431E+00	2.431E+00	51.70
	77.11	166	9.70	3.958E+00	2.544E+00	2.544E+00	34.78
	87.09	------	3.41	4.791E+00	------	Line Not Found	------
	242.00	78	7.25	4.509E+00	1.411E+00	1.411E+00	45.34

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	295.22	108	18.42	3.876E+00	8.876E-01	8.876E-01	38.48
	351.93	155	35.60*	3.368E+00	7.618E-01	7.618E-01	23.38
AM-243	43.53	------	5.90	3.984E-01	------ Line Not Found		------
	74.66	89	67.20*	3.734E+00	2.098E-01	2.098E-01	51.70
ANH-511	511.00	36	100.00*	2.470E+00	8.649E-02	8.649E-02	95.82

Flag: "*" = Keyline

Sample ID : G1206041222 Acquisition date : 10-APR-2025 19:25:04

Total number of lines in spectrum 47
Number of unidentified lines 17
Number of lines tentatively identified by NID 30 63.83%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.390E+01	1.390E+01	0.177E+01	12.70	
BA-137M	30.08Y	1.00	1.413E-01	1.416E-01	0.957E-01	67.61	
CS-137	30.08Y	1.00	1.492E-01	1.496E-01	1.011E-01	67.61	
TL-208	1.41E+10Y	1.00	9.181E-02	9.181E-02	10.44E-02	113.66	
BI-211	7.04E+08Y	1.00	2.099E+00	2.099E+00	0.491E+00	23.38	
PB-212	1.41E+10Y	1.00	6.524E-01	6.524E-01	1.618E-01	24.81	
BI-214	1600.00Y	1.00	8.761E-01	8.762E-01	1.756E-01	20.04	
PB-214	1600.00Y	1.00	7.618E-01	7.618E-01	1.781E-01	23.38	
RN-222	1600.00Y	1.00	8.761E-01	8.762E-01	1.756E-01	20.04	
RA-224	1.41E+10Y	1.00	2.496E+00	2.496E+00	1.131E+00	45.34	
RA-226	1600.00Y	1.00	7.618E-01	7.618E-01	1.781E-01	23.38	
TH-228	1.41E+10Y	1.00	6.524E-01	6.524E-01	1.618E-01	24.81	
TH-230	7.54E+04Y	1.00	7.618E-01	7.618E-01	1.781E-01	23.38	
PA-231	7.04E+08Y	1.00	5.409E-01	5.409E-01	6.572E-01	121.49	
U-234	2.45E+05Y	1.00	7.618E-01	7.618E-01	1.781E-01	23.38	
AM-243	7370.00Y	1.00	2.098E-01	2.098E-01	1.085E-01	51.70	
ANH-511	1.00E+09Y	1.00	8.649E-02	8.649E-02	8.288E-02	95.82	
Total Activity :			2.581E+01	2.582E+01			

Grand Total Activity : 2.581E+01 2.582E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
6	35.69	33	33	1.87	71.50	66	17	7.70E-03	****	8.12E-02	
0	85.51	88	174	4.02	171.11	165	12	2.15E-02	68.4	4.67E+00	T
0	92.50	98	237	1.60	185.09	178	15	2.42E-02	78.0	5.14E+00	T
2	180.22	24	87	1.63	360.52	356	27	6.21E-03	****	5.43E+00	T
2	185.68	56	78	1.53	371.43	356	27	1.43E-02	74.1	5.35E+00	T
0	338.04	45	43	0.68	676.12	672	10	1.20E-02	62.7	3.48E+00	T
0	385.76	20	31	1.56	771.56	767	9	5.23E-03	****	3.12E+00	
0	400.09	24	44	4.62	800.22	789	15	6.33E-03	****	3.03E+00	T
0	517.59	10	39	1.23	1035.22	1028	13	2.74E-03	****	2.44E+00	
0	523.14	8	12	1.20	1046.31	1042	7	2.23E-03	****	2.42E+00	T
0	555.15	12	10	2.06	1110.32	1105	8	3.35E-03	****	2.30E+00	
3	562.00	17	14	2.16	1124.03	1118	32	4.55E-03	****	2.28E+00	T
3	567.20	21	17	2.16	1134.43	1118	32	5.87E-03	****	2.26E+00	
0	686.22	13	9	2.84	1372.48	1368	9	3.59E-03	****	1.91E+00	T
0	768.23	14	6	1.02	1536.53	1533	8	3.94E-03	84.5	1.73E+00	T
0	773.26	16	5	2.89	1546.59	1541	10	4.52E-03	71.1	1.72E+00	T
0	787.40	13	13	0.85	1574.86	1566	13	3.64E-03	****	1.69E+00	T
0	796.61	7	21	0.68	1593.29	1583	12	1.94E-03	****	1.67E+00	T
0	833.27	8	4	1.07	1666.61	1661	8	2.15E-03	****	1.61E+00	T
0	836.55	8	10	0.84	1673.18	1668	8	2.23E-03	****	1.60E+00	T
0	912.10	25	28	1.51	1824.29	1818	15	7.02E-03	****	1.48E+00	T
0	921.57	8	1	1.57	1843.23	1840	7	2.38E-03	84.5	1.46E+00	
0	950.93	17	10	1.28	1901.96	1895	14	4.71E-03	94.1	1.42E+00	
0	971.23	18	32	1.73	1942.58	1933	19	5.16E-03	****	1.40E+00	
0	991.22	7	7	3.06	1982.56	1974	11	2.08E-03	****	1.37E+00	
0	1103.09	9	4	0.94	2206.34	2201	9	2.68E-03	****	1.24E+00	
0	1139.92	5	12	3.62	2280.03	2274	10	1.39E-03	****	1.21E+00	
0	1155.28	7	14	2.19	2310.74	2305	10	1.94E-03	****	1.19E+00	
0	1175.99	5	19	2.81	2352.17	2345	11	1.52E-03	****	1.17E+00	
0	1214.48	11	11	2.31	2429.18	2423	12	3.08E-03	****	1.14E+00	
0	1255.35	12	6	2.47	2510.94	2506	11	3.33E-03	95.9	1.10E+00	
0	1847.69	10	0	1.00	3696.08	3691	10	2.91E-03	67.4	8.09E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:25:48.81

```
**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041222.CNF;1   *
* Acquisition date : 10-APR-2025 19:25:04 Sensitivity     : 3.000        *
* Detector ID      : GAM01                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****        *
* Sample date      :  7-MAR-2025 08:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1206041222          Analyst initials: MXR1         *
* Batch Number     : 2767515              Sample Quantity : 1.2747E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19         *
**************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.303E-01
BA-137M	4.053E-02
CS-137	4.281E-02
TL-208	3.789E-02
BI-211	1.918E-01
PB-212	5.035E-02
BI-214	5.433E-02
PB-214	6.976E-02
RN-222	5.433E-02
RA-224	6.099E-01
RA-226	6.976E-02
TH-228	5.035E-02
TH-230	6.976E-02
PA-231	4.056E-01
U-234	6.976E-02
AM-243	4.959E-02
ANH-511	1.882E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.004E-01	NOT IDENT.
NA-22	3.034E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.888E-02	NOT IDENT.
SC-46	4.785E-02	FAIL ABUN
V-48	1.648E-01	NOT IDENT.
CR-51	4.959E-01	NOT IDENT.
MN-52	1.429E+00	NOT IDENT.
MN-54	4.032E-02	NOT IDENT.
CO-56	3.784E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.511E-02	NOT IDENT.
CO-58	3.548E-02	NOT IDENT.
FE-59	8.718E-02	NOT IDENT.

CO-60	4.934E-02	NOT IDENT.
ZN-65	9.290E-02	NOT IDENT.
GE-68	1.332E+00	NOT IDENT.
AS-73	1.065E+00	NOT IDENT.
AS-74	1.867E-01	NOT IDENT.
SE-75	4.240E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	4.130E-01	NOT IDENT.
RB-83	6.827E-02	NOT IDENT.
RB-84	9.192E-02	NOT IDENT.
KR-85	6.596E+00	NOT IDENT.
SR-85	4.285E-02	NOT IDENT.
RB-86	1.520E+00	NOT IDENT.
Y-88	2.066E-02	NOT IDENT.
Y-91	2.648E+01	NOT IDENT.
NB-94	3.293E-02	NOT IDENT.
NB-95	4.852E-02	NOT IDENT.
NB-95M	1.341E-01	NOT IDENT.
ZR-95	6.866E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.640E-02	NOT IDENT.
RH-102	3.915E-02	FAIL ABUN
RU-103	4.791E-02	FAIL ABUN
RH-106	2.734E-01	NOT IDENT.
RU-106	2.734E-01	NOT IDENT.
AG-108M	2.445E-02	NOT IDENT.
CD-109	8.287E-01	NOT IDENT.
AG-110	8.387E-01	NOT IDENT.
AG-110M	4.583E-02	NOT IDENT.
SN-113	4.408E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.395E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.080E-02	NOT IDENT.
SB-124	4.964E-02	NOT IDENT.
SB-125	8.641E-02	NOT IDENT.
TE-125M	1.100E+01	NOT IDENT.
I-126	5.648E-01	NOT IDENT.
SB-126	2.442E-01	NOT IDENT.
SN-126	8.283E-02	FAIL ABUN
SB-127	4.112E+01	FAIL ABUN
I-131	6.177E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.419E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.599E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	3.176E-01	NOT IDENT.
LA-138	5.173E-02	FAIL ABUN
CE-139	2.824E-02	NOT IDENT.
BA-140	6.251E-01	NOT IDENT.
LA-140	2.077E-01	NOT IDENT.
CE-141	8.231E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.848E-01	NOT IDENT.
PM-144	3.531E-02	NOT IDENT.
PR-144	2.656E+00	NOT IDENT.
PM-146	3.437E-02	NOT IDENT.
ND-147	1.538E+00	FAIL ABUN
PM-147	6.875E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.176E-02	FAIL ABUN
EU-152	9.707E-02	NOT IDENT.
GD-153	8.236E-02	NOT IDENT.
EU-154	8.513E-02	NOT IDENT.
EU-155	1.054E-01	FAIL ABUN
TB-160	1.314E-01	FAIL ABUN
HO-166M	4.814E-02	FAIL ABUN
TM-171	2.026E+01	NOT IDENT.
HF-172	1.635E-01	NOT IDENT.
LU-172	5.153E-02	FAIL ABUN
LU-176	2.072E-02	NOT IDENT.
HF-181	5.137E-02	NOT IDENT.
TA-182	2.282E-01	FAIL ABUN

RE-183	2.520E-01	NOT IDENT.
RE-184	1.083E-01	NOT IDENT.
W-188	7.800E+00	NOT IDENT.
IR-192	3.785E-02	FAIL ABUN
HG-203	4.746E-02	NOT IDENT.
TL-204	4.771E+00	NOT IDENT.
BI-207	4.602E-02	FAIL ABUN
BI-210	4.161E+00	NOT IDENT.
PB-210	4.161E+00	NOT IDENT.
PB-211	5.736E-01	FAIL ABUN
BI-212	5.514E-01	NOT IDENT.
BI-213	8.811E-02	NOT IDENT.
RN-219	3.428E-01	NOT IDENT.
RA-223	5.410E-01	FAIL ABUN
AC-225	1.941E+00	NOT IDENT.
AC-227	2.053E-01	FAIL ABUN
TH-227	2.053E-01	FAIL ABUN
AC-228	2.375E-01	FAIL ABUN
RA-228	2.375E-01	FAIL ABUN
TH-229	4.807E-01	FAIL ABUN
TH-231	5.410E-01	FAIL ABUN
TH-232	2.375E-01	FAIL ABUN
PA-233	5.110E-02	FAIL ABUN
PA-234	2.473E-01	NOT IDENT.
PA-234M	1.628E+00	FAIL ABUN
TH-234	1.628E+00	FAIL ABUN
U-235	1.945E-01	FAIL ABUN
NP-237	5.110E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.628E+00	FAIL ABUN
NP-239	2.503E-01	NOT IDENT.
PU-239	3.108E+02	NOT IDENT.
AM-241	1.582E-01	NOT IDENT.
CM-243	9.366E-02	NOT IDENT.
BK-247	6.500E-02	NOT IDENT.
CM-247	2.898E-02	NOT IDENT.
CF-249	3.280E-02	NOT IDENT.
CF-251	1.101E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 20:25:52.96

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041222.CNF;1      *
* Acquisition date : 10-APR-2025 19:25:04 Sensitivity     : 3.000                *
* Detector ID      : GAM01                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****                *
* Sample date      :  7-MAR-2025 08:00:00 Nuclide Library : SOLID                *
* Sample ID        : G1206041222          Analyst initials: MXR1                 *
* Batch Number     : 2767515              Sample Quantity : 1.2747E+02 GRAM      *
*                                         Quantity Err(%) : 1.5690E-03 %         *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19                 *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.390E+01	2.130E+00	2.130E+00
BA-137M	1.416E-01	9.465E-02	9.465E-02
CS-137	1.496E-01	9.999E-02	9.999E-02
TL-208	9.181E-02	1.026E-01	1.026E-01
BI-211	2.099E+00	5.106E-01	5.106E-01
PB-212	6.524E-01	1.668E-01	1.668E-01
BI-214	8.762E-01	1.894E-01	1.894E-01
PB-214	7.618E-01	1.849E-01	1.849E-01
RN-222	8.762E-01	1.894E-01	1.894E-01
RA-224	2.496E+00	1.126E+00	1.126E+00
RA-226	7.618E-01	1.849E-01	1.849E-01
TH-228	6.524E-01	1.668E-01	1.668E-01
TH-230	7.618E-01	1.849E-01	1.849E-01
PA-231	5.409E-01	6.552E-01	6.552E-01
U-234	7.618E-01	1.849E-01	1.849E-01
AM-243	2.098E-01	1.076E-01	1.076E-01
ANH-511	8.649E-02	8.158E-02	8.158E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-2.667E-01	4.044E-01	4.219E-01	NOT IDENT.
NA-22	-1.783E-02	4.065E-02	4.144E-02	NOT IDENT.
NA-24	-2.146E+14	1.532E+15	1.535E+15	SHORT HLIF
AL-26	-1.301E-03	3.559E-02	3.560E-02	NOT IDENT.
SC-46	1.129E-02	5.319E-02	5.343E-02	FAIL ABUN
V-48	9.747E-02	1.833E-01	1.885E-01	NOT IDENT.
CR-51	-9.016E-02	5.854E-01	5.868E-01	NOT IDENT.
MN-52	-3.435E+00	2.944E+00	3.327E+00	NOT IDENT.
MN-54	7.441E-02	3.447E-02	4.810E-02	NOT IDENT.
CO-56	-2.925E-02	4.891E-02	5.066E-02	NOT IDENT.
MN-56	-1.000E+41	1.672E+41	0.000E+00	SHORT HLIF
CO-57	5.325E-03	2.737E-02	2.747E-02	NOT IDENT.
CO-58	-3.687E-02	5.238E-02	5.495E-02	NOT IDENT.

FE-59	-7.425E-02	1.398E-01	1.437E-01	NOT IDENT.
CO-60	5.648E-02	4.716E-02	5.359E-02	NOT IDENT.
ZN-65	1.044E-01	9.489E-02	1.059E-01	NOT IDENT.
GE-68	1.287E-02	1.550E+00	1.550E+00	NOT IDENT.
AS-73	-7.333E-01	1.349E+00	1.389E+00	NOT IDENT.
AS-74	1.793E-01	1.934E-01	2.096E-01	NOT IDENT.
SE-75	-6.755E-04	4.866E-02	4.866E-02	FAIL ABUN
BR-77	2.882E+04	2.962E+04	3.235E+04	SHORT HLIF
SR-82	-7.906E-01	7.987E-01	8.747E-01	NOT IDENT.
RB-83	-1.861E-02	1.227E-01	1.230E-01	NOT IDENT.
RB-84	1.881E-02	1.021E-01	1.024E-01	NOT IDENT.
KR-85	-1.488E-01	1.123E+01	1.123E+01	NOT IDENT.
SR-85	-9.665E-04	7.297E-02	7.298E-02	NOT IDENT.
RB-86	-1.607E-01	1.802E+00	1.803E+00	NOT IDENT.
Y-88	-1.044E-03	2.587E-02	2.588E-02	NOT IDENT.
Y-91	1.205E+01	2.894E+01	2.945E+01	NOT IDENT.
NB-94	1.229E-02	3.789E-02	3.829E-02	NOT IDENT.
NB-95	2.648E-02	6.002E-02	6.119E-02	NOT IDENT.
NB-95M	1.252E-01	1.552E-01	1.651E-01	NOT IDENT.
ZR-95	-4.920E-02	9.492E-02	9.748E-02	NOT IDENT.
NB-97	1.000E+41	8.163E+40	0.000E+00	SHORT HLIF
ZR-97	3.271E+14	3.184E+14	3.509E+14	SHORT HLIF
MO-99	3.580E+02	1.799E+03	1.806E+03	SHORT HLIF
TC-99M	-4.849E+39	6.465E+39	0.000E+00	SHORT HLIF
RH-101	-2.013E-02	3.109E-02	3.239E-02	NOT IDENT.
RH-102	-7.916E-02	6.373E-02	7.304E-02	FAIL ABUN
RU-103	2.261E-02	5.303E-02	5.400E-02	FAIL ABUN
RH-106	-5.802E-02	3.408E-01	3.418E-01	NOT IDENT.
RU-106	-5.802E-02	3.408E-01	3.418E-01	NOT IDENT.
AG-108M	2.037E-02	2.545E-02	2.706E-02	NOT IDENT.
CD-109	1.059E+00	1.100E+00	1.199E+00	NOT IDENT.
AG-110	8.990E-01	9.429E-01	1.026E+00	NOT IDENT.
AG-110M	2.580E-03	5.219E-02	5.221E-02	NOT IDENT.
SN-113	-1.149E-03	5.432E-02	5.432E-02	NOT IDENT.
CD-115	-5.187E+02	4.367E+03	4.373E+03	SHORT HLIF
SN-117M	-3.815E-02	1.588E-01	1.597E-01	NOT IDENT.
SB-122	8.416E+01	2.801E+02	2.826E+02	SHORT HLIF
TE-123M	-5.699E-03	3.486E-02	3.495E-02	NOT IDENT.
SB-124	-3.933E-02	7.213E-02	7.428E-02	NOT IDENT.
SB-125	6.520E-02	9.253E-02	9.708E-02	NOT IDENT.
TE-125M	3.924E+00	1.181E+01	1.194E+01	NOT IDENT.
I-126	-2.712E-01	8.327E-01	8.416E-01	NOT IDENT.
SB-126	-3.992E-01	4.041E-01	4.424E-01	NOT IDENT.
SN-126	1.316E-01	1.070E-01	1.224E-01	FAIL ABUN
SB-127	5.382E+01	5.402E+01	5.921E+01	FAIL ABUN
I-131	6.070E-01	6.483E-01	7.037E-01	NOT IDENT.
I-132	1.000E+41	3.087E+41	0.000E+00	SHORT HLIF
TE-132	-3.162E+01	4.830E+01	5.036E+01	SHORT HLIF
BA-133	-2.021E-04	4.454E-02	4.454E-02	NOT IDENT.
I-133	-2.692E+09	2.910E+10	2.912E+10	SHORT HLIF
CS-134	2.947E-02	7.878E-02	7.989E-02	FAIL ABUN
I-135	1.796E+36	1.144E+37	0.000E+00	SHORT HLIF
CS-136	2.083E-01	3.337E-01	3.466E-01	NOT IDENT.
LA-138	-8.808E-04	6.185E-02	6.185E-02	FAIL ABUN
CE-139	2.506E-03	3.143E-02	3.145E-02	NOT IDENT.
BA-140	-3.027E-01	8.004E-01	8.119E-01	NOT IDENT.
LA-140	-5.082E-02	2.668E-01	2.678E-01	NOT IDENT.
CE-141	-4.844E-02	9.547E-02	9.794E-02	NOT IDENT.
CE-143	3.060E+06	2.770E+06	3.094E+06	SHORT HLIF
CE-144	2.538E-02	2.031E-01	2.034E-01	NOT IDENT.
PM-144	2.939E-02	3.769E-02	3.995E-02	NOT IDENT.
PR-144	2.171E+00	2.841E+00	3.005E+00	NOT IDENT.
PM-146	-1.048E-02	4.230E-02	4.256E-02	NOT IDENT.
ND-147	2.465E-01	1.789E+00	1.792E+00	FAIL ABUN
PM-147	3.814E+01	7.570E+02	7.572E+02	NOT IDENT.
PM-149	2.113E+04	3.974E+04	4.087E+04	SHORT HLIF
EU-150	9.158E-03	2.655E-02	2.687E-02	FAIL ABUN
EU-152	-1.883E-02	1.149E-01	1.152E-01	NOT IDENT.
GD-153	-2.926E-02	1.029E-01	1.037E-01	NOT IDENT.
EU-154	-5.002E-02	1.140E-01	1.163E-01	NOT IDENT.
EU-155	1.011E-01	1.090E-01	1.181E-01	FAIL ABUN
TB-160	-9.281E-02	1.689E-01	1.741E-01	FAIL ABUN
HO-166M	-2.874E-02	6.461E-02	6.590E-02	FAIL ABUN
TM-171	7.409E+00	2.320E+01	2.344E+01	NOT IDENT.
HF-172	-6.293E-02	1.864E-01	1.885E-01	NOT IDENT.
LU-172	-9.359E-03	6.226E-02	6.240E-02	FAIL ABUN
LU-176	-1.315E-02	2.560E-02	2.628E-02	NOT IDENT.
HF-181	-1.416E-02	6.319E-02	6.352E-02	NOT IDENT.

TA-182	6.124E-02	2.582E-01	2.597E-01	FAIL ABUN
RE-183	-4.589E-02	3.043E-01	3.050E-01	NOT IDENT.
RE-184	-9.534E-02	1.495E-01	1.555E-01	NOT IDENT.
W-188	2.916E+00	9.595E+00	9.684E+00	NOT IDENT.
IR-192	1.052E-02	4.256E-02	4.282E-02	FAIL ABUN
HG-203	1.333E-02	5.318E-02	5.352E-02	NOT IDENT.
TL-204	-5.346E+00	6.825E+00	7.238E+00	NOT IDENT.
BI-207	1.718E-02	4.997E-02	5.056E-02	FAIL ABUN
BI-210	-1.769E+00	5.091E+00	5.153E+00	NOT IDENT.
PB-210	-1.769E+00	5.091E+00	5.153E+00	NOT IDENT.
PB-211	-2.444E-01	7.090E-01	7.175E-01	FAIL ABUN
BI-212	-8.738E-02	6.857E-01	6.868E-01	NOT IDENT.
BI-213	-9.015E-03	1.050E-01	1.051E-01	NOT IDENT.
RN-219	1.672E-01	4.170E-01	4.238E-01	NOT IDENT.
RA-223	-2.153E-02	6.292E-01	6.293E-01	FAIL ABUN
AC-225	4.977E-01	2.156E+00	2.168E+00	NOT IDENT.
AC-227	-2.584E-02	2.377E-01	2.380E-01	FAIL ABUN
TH-227	-2.584E-02	2.377E-01	2.380E-01	FAIL ABUN
AC-228	3.831E-01	3.905E-01	4.270E-01	FAIL ABUN
RA-228	3.831E-01	3.905E-01	4.270E-01	FAIL ABUN
TH-229	1.487E-01	5.868E-01	5.906E-01	FAIL ABUN
TH-231	-2.153E-02	6.292E-01	6.293E-01	FAIL ABUN
TH-232	3.831E-01	3.905E-01	4.270E-01	FAIL ABUN
PA-233	-4.047E-02	6.420E-02	6.674E-02	FAIL ABUN
PA-234	2.716E-02	3.171E-01	3.173E-01	NOT IDENT.
PA-234M	8.300E-01	1.827E+00	1.865E+00	FAIL ABUN
TH-234	8.300E-01	1.827E+00	1.865E+00	FAIL ABUN
U-235	1.247E-01	2.057E-01	2.132E-01	FAIL ABUN
NP-237	-4.047E-02	6.420E-02	6.674E-02	FAIL ABUN
NP-238	4.358E+03	1.401E+04	1.415E+04	SHORT HLIF
U-238	8.300E-01	1.827E+00	1.865E+00	FAIL ABUN
NP-239	-1.671E-02	2.774E-01	2.775E-01	NOT IDENT.
PU-239	1.948E+02	3.299E+02	3.414E+02	NOT IDENT.
AM-241	-1.085E-01	1.992E-01	2.051E-01	NOT IDENT.
CM-243	-9.775E-02	1.108E-01	1.192E-01	NOT IDENT.
BK-247	-3.068E-02	7.816E-02	7.938E-02	NOT IDENT.
CM-247	-1.099E-02	4.030E-02	4.060E-02	NOT IDENT.
CF-249	-7.349E-03	4.434E-02	4.446E-02	NOT IDENT.
CF-251	-7.074E-02	1.458E-01	1.493E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	55.8367	85.43	62.5096	131.20	66.3567
45.60	37.3567	86.55	62.5911	133.02	61.2857
46.54	52.6158	86.79	62.6082	133.52	60.4496
49.72	0.0000	86.94	62.6194	136.00	62.3130
51.35	53.0281	87.09	69.2228	136.47	60.6077
51.87	44.8159	87.57	64.3141	140.51	0.0000
52.39	47.2130	88.03	64.3478	143.76	54.0198
52.97	50.7997	88.34	64.3708	144.24	60.1434
53.44	62.6591	88.47	64.3803	145.44	74.1649
54.07	55.6195	89.96	62.8362	152.43	60.5554
57.36	0.0000	1093.63	62.8845	153.25	74.6474
57.53	66.6158	91.11	62.9178	323.87	74.7062
57.98	60.7080	92.59	63.0218	156.02	69.5349
59.27	76.3262	93.35	63.0751	158.56	76.7330
59.32	76.3318	94.56	63.1594	159.00	77.6418
59.54	72.7770	94.65	63.1656	162.33	64.5782
60.96	82.4897	94.67	63.1671	162.66	64.5946
61.17	82.5145	94.87	63.1808	163.33	54.0048
62.93	76.7255	97.43	73.7775	165.86	55.8857
63.29	68.3681	98.43	77.6126	176.31	56.3330
63.58	73.1955	98.44	77.6135	176.60	60.3699
64.28	76.8700	99.53	52.6381	177.52	65.7809
66.73	85.5638	100.11	59.3588	181.07	0.0000
67.24	68.7395	102.03	70.3700	181.52	58.3462
125.81	68.7799	103.18	78.8420	184.41	58.4692
67.75	68.7864	103.37	78.8578	143.76	58.5247
68.89	60.4309	105.21	56.3142	193.51	55.6824
69.67	72.5922	105.31	56.3200	197.03	58.0892
70.82	95.3198	106.12	56.3670	198.01	44.5049
70.83	95.3210	106.47	67.3279	201.83	51.9079
72.81	68.0300	109.28	56.5483	203.43	51.9647
72.87	68.0355	111.00	53.2639	205.31	63.8982
74.66	74.2795	111.76	0.0000	210.85	54.0581
74.82	74.2944	114.06	66.9934	215.65	29.4131
74.97	74.3084	116.30	0.0000	218.12	44.1914
77.11	74.5080	116.74	69.7193	222.11	40.6140
78.74	74.6579	119.76	66.5107	227.09	50.9297
79.69	60.4494	121.12	63.1812	227.38	49.0864
80.03	58.8395	121.22	63.1873	228.16	0.0000
80.12	58.8464	121.78	65.7838	228.18	56.5248
80.19	58.8512	122.06	64.0919	116.74	56.5248
80.57	53.9718	122.92	69.2753	235.69	39.1024
81.00	58.9091	123.07	59.0207	235.96	39.1093
81.07	58.9138	265.00	55.6306	238.63	50.3663
81.75	46.6784	125.81	63.4586	238.98	0.0000
82.47	60.6523	127.23	68.6936	240.99	64.4503
83.79	62.3890	127.91	61.0037	242.00	37.8530
84.00	62.4048	129.30	55.9189	244.70	28.0853

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	37.6204	344.28	42.4795	563.25	15.1182
252.80	31.9850	345.93	31.1437	564.24	0.0000
254.15	0.0000	351.06	35.6807	569.33	15.1501
256.23	37.7059	351.93	35.6953	946.00	15.1507
260.90	0.0000	355.39	0.0000	569.70	15.1519
264.66	37.8914	356.01	25.3335	583.19	26.0947
264.80	37.8947	364.49	21.9436	584.27	26.1045
265.00	40.7412	366.42	0.0000	595.83	9.8269
269.46	47.4945	372.51	24.0273	427.87	14.2172
270.03	47.5098	375.05	22.0510	602.52	0.0000
271.23	46.5915	377.52	23.0791	604.72	1.6427
273.65	44.7510	356.01	19.6234	607.14	6.5759
276.40	45.7744	388.16	25.7112	609.32	14.2579
277.37	38.1657	388.63	27.2291	610.33	14.2627
277.60	38.1706	391.69	26.6605	614.28	16.4783
278.00	39.1340	264.66	24.3325	618.01	15.3985
279.20	40.1150	401.81	18.2585	620.36	12.1082
279.54	42.9886	402.40	24.3511	621.93	16.5192
279.70	50.6353	404.85	26.4089	630.19	0.0000
280.46	43.9663	410.95	33.6069	631.29	25.4061
283.69	40.2150	413.71	23.4511	633.25	11.0531
284.31	38.3130	414.70	18.3607	634.78	11.0583
285.41	35.4606	423.72	25.5987	635.95	14.3811
285.90	0.0000	427.09	22.5590	636.99	15.4925
287.50	38.3797	427.87	17.4375	657.50	11.6946
290.67	33.1601	433.94	11.3117	657.76	8.3542
293.27	0.0000	439.40	14.4292	657.90	0.0000
351.93	47.6943	440.45	19.5910	661.66	26.7656
295.96	47.7124	453.88	21.7716	664.57	0.0000
879.38	40.5405	463.37	13.5287	666.33	21.7780
299.98	34.7747	468.07	22.9373	666.50	21.7796
300.09	34.7769	473.00	22.9820	667.71	0.0000
300.13	34.7776	475.06	14.6366	677.62	14.5689
301.36	34.8003	476.78	15.6924	685.70	14.6049
302.85	24.6694	477.60	21.9767	692.65	0.0000
256.23	30.5009	482.18	22.0156	695.00	13.5190
304.85	25.5669	487.02	16.8050	696.49	11.2708
306.78	34.8999	492.35	0.0000	696.51	11.2712
308.46	31.0488	497.08	13.7064	697.00	18.0365
311.90	36.9370	505.52	22.2117	697.30	18.0378
316.51	31.1784	507.63	0.0000	697.49	22.5488
319.41	32.2004	511.00	11.1285	702.65	15.8081
320.08	31.2350	514.00	25.4648	706.68	18.0879
321.04	28.3209	514.00	25.4648	711.68	16.9824
323.87	31.2956	520.40	19.1433	720.70	15.8924
325.23	32.2957	520.69	0.0000	721.93	0.0000
328.76	30.3920	522.65	0.0000	722.78	13.6304
333.37	35.3745	527.90	0.0000	722.91	13.6309
333.97	22.1159	528.26	15.9985	723.31	12.4963
334.37	35.3921	529.59	16.0065	724.19	13.6357
338.28	30.5352	529.87	0.0000	727.33	25.0221
338.32	30.5358	531.02	13.8792	733.00	20.5063
311.90	36.9781	537.26	20.3305	735.93	10.2616
340.48	36.9781	546.56	0.0000	333.97	20.5320
340.55	36.9789	552.55	16.1377	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	12.5719	667.71	0.0000	1434.09	9.9823
747.24	11.4388	962.31	15.4192	1435.80	5.9912
748.06	5.7206	964.08	13.0663	1457.56	0.0000
752.31	16.0371	966.17	8.7152	1460.82	3.0088
753.82	9.1680	911.20	17.2599	1489.16	4.0313
756.73	16.0570	983.53	8.5076	1505.03	5.0528
756.80	16.0576	984.45	0.0000	1584.12	5.1199
884.68	18.9626	1274.44	6.3995	1596.21	5.1300
765.81	12.0735	1002.74	10.0715	1620.50	5.1501
766.84	18.9781	1004.73	12.8242	1621.92	2.0605
772.60	0.0000	507.63	0.0000	1678.03	0.0000
776.52	22.4890	1025.87	0.0000	1690.97	1.0416
739.50	0.0000	1028.54	0.0000	1750.46	0.0000
778.90	12.6946	1037.84	6.4604	1764.49	3.1600
783.70	8.6667	1038.76	0.0000	1063.66	1.4057
788.74	10.4147	631.29	12.9464	1771.35	1.0544
792.07	9.2660	1048.07	9.2505	1791.20	0.0000
795.86	6.9565	1049.04	10.1776	1808.65	3.1809
810.06	12.8025	1050.41	12.9567	1810.72	0.0000
810.29	12.8033	1063.66	7.4258	1836.06	1.0646
344.28	12.8038	1077.00	12.1018		
810.76	16.2974	1077.34	13.0344		
815.77	10.4908	1085.87	4.6637		
1048.07	6.9990	1093.63	9.3433		
832.01	4.2145	1099.45	11.9742		
834.85	0.0000	1112.07	15.0078		
835.71	11.2492	1112.84	15.0107		
836.80	0.0000	1115.54	4.5056		
846.75	0.0000	1120.29	10.3360		
846.77	15.8654	1120.55	10.3367		
856.80	15.9066	1221.41	9.0223		
860.56	7.9610	1129.67	11.2983		
871.09	9.7563	1131.51	0.0000		
873.19	15.0856	1147.95	0.0000		
875.33	0.0000	1173.23	7.6006		
879.38	15.1095	1177.95	18.2590		
880.51	10.6685	1189.05	9.5313		
881.60	9.7821	1204.77	10.5173		
883.24	8.0068	1221.41	14.3903		
884.68	10.6798	1231.02	12.4954		
889.28	13.3653	1235.36	15.3916		
894.76	12.4914	1238.28	10.5878		
898.04	10.7157	1260.41	0.0000		
900.72	5.3613	1271.87	6.7821		
903.28	9.8355	1274.44	8.7237		
911.20	11.6464	1274.54	8.7242		
912.08	11.6487	1291.59	6.8077		
923.98	0.0000	1298.22	0.0000		
926.50	3.0831	1312.11	9.7632		
929.11	15.2968	1332.49	3.9202		
935.54	9.9134	1362.66	0.0000		
937.49	17.1312	1365.19	6.9017		
944.13	6.0205	1368.63	0.0000		
946.00	8.6733	1384.29	6.9257		
949.00	8.6798	1408.01	3.9746		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 22:22:35.35

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041223.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM02.CNF;680
                                    Background date  : 6-APR-2025 11:01:02.
Sample date      : 19-MAR-2025 00:00:00 Acquisition date : 10-APR-2025 22:07:00
Sample ID        : G1206041223          Sample quantity  : 1.15000E+02 GRAM
Detector name    : GAM02                Detector geometry: CAN
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:03.07  0.3%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767515              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.43	3204	2273	0.96	93.61	89	9	3.56E+00	3.2	
2	0	59.56	12899	2133	0.89	119.89	115	10	1.43E+01	1.1	
3	0	119.87*	77	448	1.99	240.58	237	8	8.51E-02	49.2	
4	0	141.67	25	350	1.09	284.18	282	6	2.80E-02	118.8	
5	0	186.57*	67	548	2.55	374.02	369	10	7.44E-02	66.8	
6	0	217.67	39	337	0.57	436.27	434	7	4.35E-02	79.5	
7	0	310.98	64	305	2.15	622.95	619	9	7.08E-02	50.9	
8	0	323.98	59	297	2.10	648.96	644	9	6.50E-02	54.9	
9	0	541.56	41	283	4.87	1084.22	1075	16	4.57E-02	92.9	
10	0	662.33*	9832	182	1.54	1325.79	1317	18	1.09E+01	1.1	
11	1	817.94	32	93	1.79	1637.00	1620	36	3.61E-02	59.7	1.42E+00
12	1	822.26	37	87	1.97	1645.64	1620	36	4.12E-02	56.4	
13	0	855.13	45	103	0.54	1711.37	1705	13	5.04E-02	48.6	
14	0	902.90	43	139	5.31	1806.91	1800	15	4.75E-02	62.0	
15	0	924.93	23	117	1.33	1850.95	1843	10	2.58E-02	91.1	
16	0	1124.77	42	122	3.64	2250.52	2239	22	4.72E-02	67.8	
17	0	1174.35	2418	136	1.91	2349.65	2339	22	2.69E+00	2.4	
18	0	1333.76	2233	46	1.90	2668.32	2660	17	2.48E+00	2.2	
19	0	1380.84	7	2	0.69	2762.44	2755	11	7.41E-03	61.0	
20	0	1954.35	7	2	1.33	3908.53	3904	9	7.90E-03	52.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 22:22:37

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041223.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 19-MAR-2025 00:00:00	Acquisition date	: 10-APR-2025 22:07:00
Sample ID	: G1206041223	Sample quantity	: 115.00 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA2	Detector geometry	: CAN
Elapsed live time	: 0 00:15:00.00	Elapsed real time	: 0 00:15:03.07 0.3%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	2303	99.85	1.246E+00	4.835E+01	4.875E+01	4.76
	1332.49	2115	99.98*	1.110E+00	4.978E+01	5.019E+01	4.46
BA-137M	661.66	9602	89.90*	2.128E+00	1.310E+02	1.312E+02	2.12
CS-137	661.66	9602	85.10*	2.128E+00	1.384E+02	1.386E+02	2.12
PM-147	121.22	80	0.00*	6.258E+00	1.176E+04	1.196E+04	98.46
BI-210	46.54	3489	4.25*	4.538E-01	4.724E+03	4.733E+03	6.43
PB-210	46.54	3489	4.25*	4.538E-01	4.724E+03	4.733E+03	6.43
AC-225	218.12	40	11.40*	4.943E+00	1.857E+00	9.097E+00	158.91
PA-233	300.13	------	6.63	3.944E+00	------ Line Not Found		------
	311.90	64	38.50*	3.843E+00	1.134E+00	1.134E+00	101.84
	340.48	------	4.45	3.596E+00	------ Line Not Found		------
AM-241	59.54	13910	35.90*	1.864E+00	5.428E+02	5.428E+02	2.23

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 22:22:38.40

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041223.CNF;1		
Acquisition date	: 10-APR-2025 22:07:00	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:03.07	Half life ratio	: *****
Sample date	: 19-MAR-2025 00:00:00	Analyst initials	: MXR1
Sample ID	: G1206041223	Sample Quantity	: 1.1500E+02 GRAM
Batch Number	: 2767515	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2024 07:24:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;21		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
CO-60	5.019E+01	2.192E+00	5.447E-01
BA-137M	1.312E+02	2.725E+00	6.192E-01
CS-137	1.386E+02	2.878E+00	6.541E-01
PM-147	1.196E+04	1.154E+04	1.207E+04
BI-210	4.733E+03	2.983E+02	1.993E+02
PB-210	4.733E+03	2.983E+02	1.993E+02
AC-225	9.097E+00	1.417E+01	1.702E+01
PA-233	1.134E+00	1.132E+00	1.227E+00
AM-241	5.428E+02	1.187E+01	5.215E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-2.110E-02	5.410E+00	9.459E+00	NOT IDENT.
NA-22	-8.885E-02	2.205E-01	3.948E-01	NOT IDENT.
NA-24	0.000E+00	1.272E+10	0.000E+00	SHORT HLIF
AL-26	1.139E-01	2.068E-01	4.735E-01	NOT IDENT.
K-40	-1.577E+00	1.934E+00	3.386E+00	NOT IDENT.
SC-46	-1.355E-01	4.911E-01	8.777E-01	NOT IDENT.
V-48	-8.295E-01	1.199E+00	2.060E+00	NOT IDENT.
CR-51	-3.206E+00	5.625E+00	8.873E+00	NOT IDENT.
MN-52	4.861E-02	2.557E+00	5.365E+00	NOT IDENT.
MN-54	1.457E-02	3.953E-01	7.260E-01	NOT IDENT.
CO-56	7.509E-02	4.614E-01	8.542E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.579E-02	2.529E-01	4.061E-01	NOT IDENT.
CO-58	-1.323E-01	4.682E-01	7.422E-01	NOT IDENT.
FE-59	5.801E-01	1.219E+00	2.256E+00	NOT IDENT.
ZN-65	4.829E-01	1.044E+00	1.811E+00	NOT IDENT.
GE-68	1.062E+01	1.525E+01	2.875E+01	NOT IDENT.
AS-73	-1.732E+01	2.455E+01	4.373E+01	NOT IDENT.
AS-74	-6.346E-01	1.311E+00	2.217E+00	NOT IDENT.
SE-75	-1.647E-01	4.725E-01	8.559E-01	FAIL ABUN
BR-77	3.630E+01	9.059E+02	1.519E+03	NOT IDENT.

SR-82	-1.479E+00	3.907E+00	7.054E+00	NOT IDENT.
RB-83	-1.508E-01	9.376E-01	1.629E+00	NOT IDENT.
RB-84	-9.626E-01	1.026E+00	1.751E+00	NOT IDENT.
KR-85	-3.531E+01	8.127E+01	1.392E+02	NOT IDENT.
SR-85	-2.031E-01	4.675E-01	8.008E-01	NOT IDENT.
RB-86	1.874E-01	1.286E+01	2.308E+01	NOT IDENT.
Y-88	4.344E-03	1.602E-01	3.646E-01	NOT IDENT.
Y-91	1.096E+02	1.586E+02	3.166E+02	NOT IDENT.
NB-94	5.588E-02	3.028E-01	5.368E-01	NOT IDENT.
NB-95	2.911E-01	4.224E-01	8.173E-01	NOT IDENT.
NB-95M	-7.345E-01	1.376E+00	2.236E+00	NOT IDENT.
ZR-95	2.911E-02	8.183E-01	1.416E+00	NOT IDENT.
NB-97	0.000E+00	1.632E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.489E+10	0.000E+00	SHORT HLIF
MO-99	-1.470E+02	8.705E+02	1.487E+03	FAIL ABUN
TC-99M	0.000E+00	9.536E+26	0.000E+00	SHORT HLIF
RH-101	3.417E-03	2.803E-01	4.902E-01	FAIL ABUN
RH-102	6.700E-02	5.766E-01	1.015E+00	NOT IDENT.
RU-103	-4.284E-01	5.856E-01	9.894E-01	NOT IDENT.
RH-106	-1.905E+00	3.670E+00	6.158E+00	NOT IDENT.
RU-106	-1.905E+00	3.670E+00	6.158E+00	NOT IDENT.
AG-108M	1.206E-01	4.387E-01	7.811E-01	NOT IDENT.
CD-109	-1.749E+00	6.607E+00	1.168E+01	NOT IDENT.
AG-110	9.385E-01	9.590E+00	1.491E+01	NOT IDENT.
AG-110M	2.014E-01	5.943E-01	1.106E+00	NOT IDENT.
SN-113	-2.883E-01	5.800E-01	1.012E+00	NOT IDENT.
CD-115	0.000E+00	1.587E+03	0.000E+00	SHORT HLIF
SN-117M	-3.609E-01	7.327E-01	1.233E+00	NOT IDENT.
SB-122	4.125E+01	1.559E+02	2.780E+02	NOT IDENT.
TE-123M	-1.772E-01	2.643E-01	4.409E-01	NOT IDENT.
SB-124	-2.329E-02	3.936E-01	8.616E-01	NOT IDENT.
SB-125	-3.305E-02	1.288E+00	2.273E+00	NOT IDENT.
TE-125M	-8.731E+01	9.547E+01	1.619E+02	NOT IDENT.
I-126	-6.807E-01	3.087E+00	4.710E+00	NOT IDENT.
SB-126	-1.537E-01	2.086E+00	3.607E+00	NOT IDENT.
SN-126	-4.315E-02	6.419E-01	1.144E+00	NOT IDENT.
SB-127	-4.084E+00	4.758E+01	8.283E+01	NOT IDENT.
I-131	5.084E-01	2.810E+00	5.073E+00	NOT IDENT.
I-132	0.000E+00	1.256E+41	0.000E+00	SHORT HLIF
TE-132	2.149E+01	4.112E+01	7.057E+01	NOT IDENT.
BA-133	-1.778E-01	4.789E-01	8.475E-01	NOT IDENT.
I-133	0.000E+00	3.742E+07	0.000E+00	SHORT HLIF
CS-134	-1.393E-01	4.000E-01	7.211E-01	NOT IDENT.
I-135	0.000E+00	9.986E+24	0.000E+00	SHORT HLIF
CS-136	8.713E-01	1.993E+00	3.682E+00	FAIL ABUN
LA-138	1.423E-01	2.435E-01	5.713E-01	NOT IDENT.
CE-139	7.270E-02	2.874E-01	4.989E-01	NOT IDENT.
BA-140	-3.500E+00	5.247E+00	7.787E+00	NOT IDENT.
LA-140	-4.874E-02	4.193E-01	9.474E-01	NOT IDENT.
CE-141	-5.905E-02	6.718E-01	1.158E+00	NOT IDENT.
CE-143	0.000E+00	5.943E+04	0.000E+00	SHORT HLIF
CE-144	6.160E-01	1.857E+00	3.277E+00	NOT IDENT.
PM-144	5.508E-02	2.946E-01	5.258E-01	NOT IDENT.
PR-144	3.814E+00	2.211E+01	3.941E+01	NOT IDENT.
PM-146	5.798E-01	6.579E-01	1.192E+00	NOT IDENT.
ND-147	6.623E+00	1.137E+01	2.054E+01	NOT IDENT.
PM-149	0.000E+00	1.074E+04	0.000E+00	SHORT HLIF
EU-150	-6.673E-02	2.968E-01	5.311E-01	NOT IDENT.
EU-152	-1.331E-01	1.073E+00	1.925E+00	NOT IDENT.
GD-153	-1.862E-01	7.960E-01	1.399E+00	NOT IDENT.
EU-154	-2.508E-01	6.224E-01	1.114E+00	NOT IDENT.
EU-155	-3.820E-01	9.467E-01	1.646E+00	NOT IDENT.
TB-160	2.111E+00	1.788E+00	3.471E+00	FAIL ABUN
HO-166M	-5.976E-02	6.006E-01	1.034E+00	NOT IDENT.
TM-171	2.508E+01	4.927E+02	8.919E+02	NOT IDENT.
HF-172	3.176E-02	1.711E+00	2.994E+00	NOT IDENT.
LU-172	5.383E-01	8.149E-01	1.521E+00	FAIL ABUN
LU-176	1.077E-01	3.252E-01	5.412E-01	NOT IDENT.
HF-181	-2.190E-01	6.945E-01	1.200E+00	NOT IDENT.
TA-182	-9.142E-01	1.318E+00	2.218E+00	NOT IDENT.
RE-183	0.000E+00	5.728E+00	1.215E+01	FAIL ABUN
RE-184	2.763E+00	3.355E+00	3.166E+00	FAIL ABUN
W-188	-1.033E+01	7.856E+01	1.427E+02	NOT IDENT.
IR-192	1.933E-01	4.160E-01	7.683E-01	NOT IDENT.
HG-203	-1.034E-01	4.282E-01	7.763E-01	NOT IDENT.
TL-204	-5.054E+01	4.623E+01	8.008E+01	NOT IDENT.
BI-207	1.632E-01	5.863E-01	1.079E+00	NOT IDENT.
TL-208	2.770E-01	3.800E-01	6.984E-01	NOT IDENT.

BI-211	3.763E-01	2.285E+00	4.154E+00	NOT IDENT.
PB-211	-6.311E+00	9.310E+00	1.606E+01	NOT IDENT.
BI-212	3.815E+00	4.354E+00	8.234E+00	NOT IDENT.
PB-212	9.624E-02	6.010E-01	1.014E+00	NOT IDENT.
BI-213	1.914E-01	1.576E+00	2.784E+00	NOT IDENT.
BI-214	-4.411E-01	7.010E-01	1.181E+00	NOT IDENT.
PB-214	-1.426E-01	8.390E-01	1.503E+00	NOT IDENT.
RN-219	6.371E+00	5.199E+00	9.708E+00	NOT IDENT.
RN-222	-4.411E-01	7.010E-01	1.181E+00	NOT IDENT.
RA-223	1.034E+01	1.114E+01	1.331E+01	FAIL ABUN
RA-224	-1.012E+00	6.323E+00	1.046E+01	NOT IDENT.
RA-226	-1.426E-01	8.390E-01	1.503E+00	NOT IDENT.
AC-227	-1.547E+00	2.495E+00	4.482E+00	NOT IDENT.
TH-227	-1.547E+00	2.495E+00	4.482E+00	NOT IDENT.
AC-228	3.192E-01	1.713E+00	3.149E+00	NOT IDENT.
RA-228	3.192E-01	1.713E+00	3.149E+00	NOT IDENT.
TH-228	9.624E-02	6.010E-01	1.014E+00	NOT IDENT.
TH-229	3.574E-01	5.394E+00	9.158E+00	NOT IDENT.
TH-230	-1.426E-01	8.390E-01	1.503E+00	NOT IDENT.
PA-231	-1.802E+00	4.894E+00	8.776E+00	NOT IDENT.
TH-231	1.034E+01	1.114E+01	1.331E+01	FAIL ABUN
TH-232	3.192E-01	1.713E+00	3.149E+00	NOT IDENT.
PA-234	2.187E+00	4.230E+00	7.813E+00	NOT IDENT.
PA-234M	4.900E+00	1.437E+01	2.495E+01	NOT IDENT.
TH-234	4.900E+00	1.437E+01	2.495E+01	NOT IDENT.
U-234	-1.426E-01	8.390E-01	1.503E+00	NOT IDENT.
U-235	-1.098E+00	1.993E+00	3.101E+00	FAIL ABUN
NP-237	1.134E+00	1.132E+00	1.298E+00	FAIL ABUN
NP-238	0.000E+00	3.211E+03	0.000E+00	SHORT HLIF
U-238	4.900E+00	1.437E+01	2.495E+01	NOT IDENT.
NP-239	1.290E-01	2.604E+00	4.241E+00	NOT IDENT.
PU-239	-4.194E+02	3.022E+03	5.243E+03	NOT IDENT.
AM-243	-3.639E-02	4.881E-01	8.813E-01	NOT IDENT.
CM-243	6.053E-01	9.610E-01	1.744E+00	NOT IDENT.
BK-247	-2.561E-01	8.147E-01	1.478E+00	FAIL ABUN
CM-247	3.588E-01	4.843E-01	8.866E-01	NOT IDENT.
CF-249	-4.377E-02	4.855E-01	8.635E-01	NOT IDENT.
CF-251	-3.205E-01	1.201E+00	2.026E+00	NOT IDENT.
ANH-511	7.348E-02	3.568E-01	6.486E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 22:22:36.59

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	2303	99.85	1.246E+00	4.835E+01	4.875E+01	4.76
	1332.49	2115	99.98*	1.110E+00	4.978E+01	5.019E+01	4.46
BA-137M	661.66	9602	89.90*	2.128E+00	1.310E+02	1.312E+02	2.12
CS-137	661.66	9602	85.10*	2.128E+00	1.384E+02	1.386E+02	2.12
PM-147	121.22	80	0.00*	6.258E+00	1.176E+04	1.196E+04	98.46
BI-210	46.54	3489	4.25*	4.538E-01	4.724E+03	4.733E+03	6.43
PB-210	46.54	3489	4.25*	4.538E-01	4.724E+03	4.733E+03	6.43
AC-225	218.12	40	11.40*	4.943E+00	1.857E+00	9.097E+00	158.91
PA-233	300.13	------	6.63	3.944E+00	------ Line Not Found		------
	311.90	64	38.50*	3.843E+00	1.134E+00	1.134E+00	101.84
	340.48	------	4.45	3.596E+00	------ Line Not Found		------
AM-241	59.54	13910	35.90*	1.864E+00	5.428E+02	5.428E+02	2.23

Flag: "*" = Keyline

Sample ID : G1206041223 Acquisition date : 10-APR-2025 22:07:00

Total number of lines in spectrum 20
Number of unidentified lines 6
Number of lines tentatively identified by NID 14 70.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	5.27Y	1.01	4.978E+01	5.019E+01	0.224E+01	4.46	
BA-137M	30.08Y	1.00	1.310E+02	1.312E+02	0.028E+02	2.12	
CS-137	30.08Y	1.00	1.384E+02	1.386E+02	0.029E+02	2.12	
PM-147	2.62Y	1.02	1.176E+04	1.196E+04	1.178E+04	98.46	
BI-210	22.20Y	1.00	4.724E+03	4.733E+03	0.304E+03	6.43	
PB-210	22.20Y	1.00	4.724E+03	4.733E+03	0.304E+03	6.43	
AC-225	10.00D	4.90	1.857E+00	9.097E+00	14.46E+00	158.91	
PA-233	2.14E+06Y	1.00	1.134E+00	1.134E+00	1.155E+00	101.84	
AM-241	432.60Y	1.00	5.428E+02	5.428E+02	0.121E+02	2.23	
Total Activity :			2.208E+04	2.230E+04			

Grand Total Activity : 2.208E+04 2.230E+04

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1206041223 Acquisition date : 10-APR-2025 22:07:00

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	141.67	26	364	1.09	284.18	282	6	2.80E-02	****	6.16E+00	T
0	186.57	69	565	2.55	374.02	369	10	7.44E-02	****	5.45E+00	T
0	323.98	59	299	2.10	648.96	644	9	6.50E-02	****	3.73E+00	T
0	541.56	41	279	4.87	1084.22	1075	16	4.57E-02	****	2.52E+00	
1	817.94	31	90	1.79	1637.00	1620	36	3.61E-02	****	1.76E+00	T
1	822.26	36	84	1.97	1645.64	1620	36	4.12E-02	****	1.75E+00	
0	855.13	44	99	0.54	1711.37	1705	13	5.04E-02	97.2	1.69E+00	
0	902.90	41	134	5.31	1806.91	1800	15	4.75E-02	****	1.60E+00	T
0	924.93	22	112	1.33	1850.95	1843	10	2.58E-02	****	1.57E+00	T
0	1124.77	41	116	3.64	2250.52	2239	22	4.72E-02	****	1.30E+00	
0	1380.84	6	2	0.69	2762.44	2755	11	7.41E-03	****	1.08E+00	
0	1954.35	7	2	1.33	3908.53	3904	9	7.90E-03	****	8.80E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 22:22:52.73

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041223.CNF;1		
Acquisition date	: 10-APR-2025 22:07:00	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:03.07	Half life ratio	: *****
Sample date	: 19-MAR-2025 00:00:00	Nuclide Library	: SOLID
Sample ID	: G1206041223	Analyst initials	: MXR1
Batch Number	: 2767515	Sample Quantity	: 1.1500E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2024 07:24:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;21		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
CO-60	2.405E-01
BA-137M	2.912E-01
CS-137	3.076E-01
PM-147	5.831E+03
BI-210	9.786E+01
PB-210	9.786E+01
AC-225	8.200E+00
PA-233	5.894E-01
AM-241	2.554E+00

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	4.567E+00	NOT IDENT.
NA-22	1.664E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.978E-01	NOT IDENT.
K-40	1.372E+00	NOT IDENT.
SC-46	4.127E-01	NOT IDENT.
V-48	9.655E-01	NOT IDENT.
CR-51	4.269E+00	NOT IDENT.
MN-52	2.105E+00	NOT IDENT.
MN-54	3.416E-01	NOT IDENT.
CO-56	4.018E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.960E-01	NOT IDENT.
CO-58	3.461E-01	NOT IDENT.
FE-59	1.061E+00	NOT IDENT.
ZN-65	8.489E-01	NOT IDENT.
GE-68	1.352E+01	NOT IDENT.
AS-73	2.149E+01	NOT IDENT.
AS-74	1.046E+00	NOT IDENT.
SE-75	4.121E-01	FAIL ABUN
BR-77	7.333E+02	NOT IDENT.
SR-82	3.290E+00	NOT IDENT.

RB-83	7.785E-01	NOT IDENT.
RB-84	8.251E-01	NOT IDENT.
KR-85	6.651E+01	NOT IDENT.
SR-85	3.826E-01	NOT IDENT.
RB-86	1.084E+01	NOT IDENT.
Y-88	1.365E-01	NOT IDENT.
Y-91	1.437E+02	NOT IDENT.
NB-94	2.510E-01	NOT IDENT.
NB-95	3.845E-01	NOT IDENT.
NB-95M	1.079E+00	NOT IDENT.
ZR-95	6.641E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	6.948E+02	FAIL ABUN
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.367E-01	FAIL ABUN
RH-102	4.790E-01	NOT IDENT.
RU-103	4.733E-01	NOT IDENT.
RH-106	2.915E+00	NOT IDENT.
RU-106	2.915E+00	NOT IDENT.
AG-108M	3.776E-01	NOT IDENT.
CD-109	5.645E+00	NOT IDENT.
AG-110	7.064E+00	NOT IDENT.
AG-110M	5.215E-01	NOT IDENT.
SN-113	4.868E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	5.942E-01	NOT IDENT.
SB-122	1.320E+02	NOT IDENT.
TE-123M	2.123E-01	NOT IDENT.
SB-124	3.276E-01	NOT IDENT.
SB-125	1.097E+00	NOT IDENT.
TE-125M	7.811E+01	NOT IDENT.
I-126	2.182E+00	NOT IDENT.
SB-126	1.684E+00	NOT IDENT.
SN-126	5.531E-01	NOT IDENT.
SB-127	3.854E+01	NOT IDENT.
I-131	2.445E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	3.408E+01	NOT IDENT.
BA-133	4.074E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.373E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.735E+00	FAIL ABUN
LA-138	2.342E-01	NOT IDENT.
CE-139	2.409E-01	NOT IDENT.
BA-140	3.696E+00	NOT IDENT.
LA-140	3.409E-01	NOT IDENT.
CE-141	5.594E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.584E+00	NOT IDENT.
PM-144	2.447E-01	NOT IDENT.
PR-144	1.834E+01	NOT IDENT.
PM-146	5.774E-01	NOT IDENT.
ND-147	9.824E+00	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.555E-01	NOT IDENT.
EU-152	9.254E-01	NOT IDENT.
GD-153	6.768E-01	NOT IDENT.
EU-154	4.697E-01	NOT IDENT.
EU-155	7.947E-01	NOT IDENT.
TB-160	1.647E+00	FAIL ABUN
HO-166M	4.845E-01	NOT IDENT.
TM-171	4.382E+02	NOT IDENT.
HF-172	1.446E+00	NOT IDENT.
LU-172	7.177E-01	FAIL ABUN
LU-176	2.609E-01	NOT IDENT.
HF-181	5.771E-01	NOT IDENT.
TA-182	9.844E-01	NOT IDENT.
RE-183	5.999E+00	FAIL ABUN
RE-184	1.493E+00	FAIL ABUN
W-188	6.863E+01	NOT IDENT.
IR-192	3.703E-01	NOT IDENT.
HG-203	3.735E-01	NOT IDENT.
TL-204	3.868E+01	NOT IDENT.
BI-207	5.052E-01	NOT IDENT.
TL-208	3.318E-01	NOT IDENT.
BI-211	1.999E+00	NOT IDENT.

PB-211	7.735E+00	NOT IDENT.
BI-212	3.848E+00	NOT IDENT.
PB-212	4.894E-01	NOT IDENT.
BI-213	1.347E+00	NOT IDENT.
BI-214	5.566E-01	NOT IDENT.
PB-214	7.232E-01	NOT IDENT.
RN-219	4.687E+00	NOT IDENT.
RN-222	5.566E-01	NOT IDENT.
RA-223	6.416E+00	FAIL ABUN
RA-224	5.043E+00	NOT IDENT.
RA-226	7.232E-01	NOT IDENT.
AC-227	2.157E+00	NOT IDENT.
TH-227	2.157E+00	NOT IDENT.
AC-228	1.489E+00	NOT IDENT.
RA-228	1.489E+00	NOT IDENT.
TH-228	4.894E-01	NOT IDENT.
TH-229	4.429E+00	NOT IDENT.
TH-230	7.232E-01	NOT IDENT.
PA-231	4.221E+00	NOT IDENT.
TH-231	6.416E+00	FAIL ABUN
TH-232	1.489E+00	NOT IDENT.
PA-234	3.716E+00	NOT IDENT.
PA-234M	1.207E+01	NOT IDENT.
TH-234	1.207E+01	NOT IDENT.
U-234	7.232E-01	NOT IDENT.
U-235	1.498E+00	FAIL ABUN
NP-237	6.253E-01	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.207E+01	NOT IDENT.
NP-239	2.049E+00	NOT IDENT.
PU-239	2.531E+03	NOT IDENT.
AM-243	4.269E-01	NOT IDENT.
CM-243	8.435E-01	NOT IDENT.
BK-247	7.115E-01	FAIL ABUN
CM-247	4.279E-01	NOT IDENT.
CF-249	4.154E-01	NOT IDENT.
CF-251	9.766E-01	NOT IDENT.
ANH-511	3.110E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 22:22:58.09

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041223.CNF;1  *
* Acquisition date : 10-APR-2025 22:07:00 Sensitivity     : 3.000        *
* Detector ID      : GAM02                Energy tolerance: 1.500        *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:15:03.07     Half life ratio : *****        *
* Sample date      : 19-MAR-2025 00:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1206041223          Analyst initials: MXR1         *
* Batch Number     : 2767515              Sample Quantity : 1.1500E+02 GRAM  *
*                                         Quantity Err(%) : 1.7391E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 19-SEP-2024 07:24:06 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;21         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
CO-60	5.019E+01	6.233E+00	6.233E+00
BA-137M	1.312E+02	1.100E+01	1.100E+01
CS-137	1.386E+02	1.161E+01	1.161E+01
PM-147	1.196E+04	1.158E+04	1.158E+04
BI-210	4.733E+03	6.013E+02	6.013E+02
PB-210	4.733E+03	6.013E+02	6.013E+02
AC-225	9.097E+00	1.420E+01	1.420E+01
PA-233	1.134E+00	1.137E+00	1.137E+00
AM-241	5.428E+02	6.665E+01	6.665E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-2.110E-02	5.410E+00	5.410E+00	NOT IDENT.
NA-22	-8.885E-02	2.207E-01	2.244E-01	NOT IDENT.
NA-24	-1.841E+09	1.272E+10	1.275E+10	SHORT HLIF
AL-26	1.139E-01	2.070E-01	2.133E-01	NOT IDENT.
K-40	-1.577E+00	1.942E+00	2.068E+00	NOT IDENT.
SC-46	-1.355E-01	4.914E-01	4.952E-01	NOT IDENT.
V-48	-8.295E-01	1.203E+00	1.260E+00	NOT IDENT.
CR-51	-3.206E+00	5.633E+00	5.816E+00	NOT IDENT.
MN-52	4.861E-02	2.557E+00	2.557E+00	NOT IDENT.
MN-54	1.457E-02	3.953E-01	3.953E-01	NOT IDENT.
CO-56	7.509E-02	4.614E-01	4.627E-01	NOT IDENT.
MN-56	1.000E+41	6.675E+41	0.000E+00	SHORT HLIF
CO-57	-4.579E-02	2.529E-01	2.537E-01	NOT IDENT.
CO-58	-1.323E-01	4.684E-01	4.722E-01	NOT IDENT.
FE-59	5.801E-01	1.221E+00	1.249E+00	NOT IDENT.
ZN-65	4.829E-01	1.045E+00	1.068E+00	NOT IDENT.
GE-68	1.062E+01	1.529E+01	1.602E+01	NOT IDENT.
AS-73	-1.732E+01	2.487E+01	2.606E+01	NOT IDENT.
AS-74	-6.346E-01	1.313E+00	1.343E+00	NOT IDENT.
SE-75	-1.647E-01	4.728E-01	4.786E-01	FAIL ABUN
BR-77	3.630E+01	9.062E+02	9.064E+02	NOT IDENT.

SR-82	-1.479E+00	3.909E+00	3.966E+00	NOT IDENT.
RB-83	-1.508E-01	9.379E-01	9.403E-01	NOT IDENT.
RB-84	-9.626E-01	1.033E+00	1.120E+00	NOT IDENT.
KR-85	-3.531E+01	8.133E+01	8.287E+01	NOT IDENT.
SR-85	-2.031E-01	4.679E-01	4.767E-01	NOT IDENT.
RB-86	1.874E-01	1.286E+01	1.286E+01	NOT IDENT.
Y-88	4.344E-03	1.602E-01	1.602E-01	NOT IDENT.
Y-91	1.096E+02	1.589E+02	1.664E+02	NOT IDENT.
NB-94	5.588E-02	3.028E-01	3.039E-01	NOT IDENT.
NB-95	2.911E-01	4.233E-01	4.432E-01	NOT IDENT.
NB-95M	-7.345E-01	1.378E+00	1.418E+00	NOT IDENT.
ZR-95	2.911E-02	8.183E-01	8.184E-01	NOT IDENT.
NB-97	1.000E+41	1.634E+41	0.000E+00	SHORT HLIF
ZR-97	3.513E+08	4.489E+10	4.489E+10	SHORT HLIF
MO-99	-1.470E+02	8.707E+02	8.732E+02	FAIL ABUN
TC-99M	4.095E+26	9.547E+26	0.000E+00	SHORT HLIF
RH-101	3.417E-03	2.803E-01	2.803E-01	FAIL ABUN
RH-102	6.700E-02	5.766E-01	5.774E-01	NOT IDENT.
RU-103	-4.284E-01	5.869E-01	6.178E-01	NOT IDENT.
RH-106	-1.905E+00	3.675E+00	3.774E+00	NOT IDENT.
RU-106	-1.905E+00	3.675E+00	3.774E+00	NOT IDENT.
AG-108M	1.206E-01	4.388E-01	4.422E-01	NOT IDENT.
CD-109	-1.749E+00	6.609E+00	6.656E+00	NOT IDENT.
AG-110	9.385E-01	9.590E+00	9.600E+00	NOT IDENT.
AG-110M	2.014E-01	5.948E-01	6.017E-01	NOT IDENT.
SN-113	-2.883E-01	5.805E-01	5.949E-01	NOT IDENT.
CD-115	-1.531E+02	1.587E+03	1.589E+03	SHORT HLIF
SN-117M	-3.609E-01	7.332E-01	7.510E-01	NOT IDENT.
SB-122	4.125E+01	1.559E+02	1.570E+02	NOT IDENT.
TE-123M	-1.772E-01	2.646E-01	2.764E-01	NOT IDENT.
SB-124	-2.329E-02	3.936E-01	3.937E-01	NOT IDENT.
SB-125	-3.305E-02	1.289E+00	1.289E+00	NOT IDENT.
TE-125M	-8.731E+01	9.573E+01	1.035E+02	NOT IDENT.
I-126	-6.807E-01	3.088E+00	3.103E+00	NOT IDENT.
SB-126	-1.537E-01	2.086E+00	2.087E+00	NOT IDENT.
SN-126	-4.315E-02	6.419E-01	6.422E-01	NOT IDENT.
SB-127	-4.084E+00	4.758E+01	4.762E+01	NOT IDENT.
I-131	5.084E-01	2.811E+00	2.820E+00	NOT IDENT.
I-132	-1.000E+41	1.892E+41	0.000E+00	SHORT HLIF
TE-132	2.149E+01	4.119E+01	4.231E+01	NOT IDENT.
BA-133	-1.778E-01	4.792E-01	4.858E-01	NOT IDENT.
I-133	1.465E+07	3.750E+07	3.808E+07	SHORT HLIF
CS-134	-1.393E-01	4.003E-01	4.052E-01	NOT IDENT.
I-135	-1.222E+25	1.191E+25	0.000E+00	SHORT HLIF
CS-136	8.713E-01	1.996E+00	2.034E+00	FAIL ABUN
LA-138	1.423E-01	2.440E-01	2.523E-01	NOT IDENT.
CE-139	7.270E-02	2.878E-01	2.897E-01	NOT IDENT.
BA-140	-3.500E+00	5.255E+00	5.487E+00	NOT IDENT.
LA-140	-4.874E-02	4.193E-01	4.199E-01	NOT IDENT.
CE-141	-5.905E-02	6.718E-01	6.724E-01	NOT IDENT.
CE-143	-3.828E+02	5.943E+04	5.943E+04	SHORT HLIF
CE-144	6.160E-01	1.858E+00	1.878E+00	NOT IDENT.
PM-144	5.508E-02	2.947E-01	2.957E-01	NOT IDENT.
PR-144	3.814E+00	2.211E+01	2.218E+01	NOT IDENT.
PM-146	5.798E-01	6.606E-01	7.105E-01	NOT IDENT.
ND-147	6.623E+00	1.138E+01	1.177E+01	NOT IDENT.
PM-149	-8.498E+02	1.074E+04	1.075E+04	SHORT HLIF
EU-150	-6.673E-02	2.968E-01	2.984E-01	NOT IDENT.
EU-152	-1.331E-01	1.073E+00	1.075E+00	NOT IDENT.
GD-153	-1.862E-01	7.962E-01	8.006E-01	NOT IDENT.
EU-154	-2.508E-01	6.230E-01	6.331E-01	NOT IDENT.
EU-155	-3.820E-01	9.474E-01	9.629E-01	NOT IDENT.
TB-160	2.111E+00	1.807E+00	2.043E+00	FAIL ABUN
HO-166M	-5.976E-02	6.006E-01	6.012E-01	NOT IDENT.
TM-171	2.508E+01	4.928E+02	4.929E+02	NOT IDENT.
HF-172	3.176E-02	1.711E+00	1.711E+00	NOT IDENT.
LU-172	5.383E-01	8.182E-01	8.534E-01	FAIL ABUN
LU-176	1.077E-01	3.254E-01	3.290E-01	NOT IDENT.
HF-181	-2.190E-01	6.948E-01	7.018E-01	NOT IDENT.
TA-182	-9.142E-01	1.321E+00	1.384E+00	NOT IDENT.
RE-183	6.645E+01	1.106E+01	3.193E+01	FAIL ABUN
RE-184	2.763E+00	3.376E+00	3.599E+00	FAIL ABUN
W-188	-1.033E+01	7.857E+01	7.871E+01	NOT IDENT.
IR-192	1.933E-01	4.164E-01	4.254E-01	NOT IDENT.
HG-203	-1.034E-01	4.283E-01	4.308E-01	NOT IDENT.
TL-204	-5.054E+01	4.658E+01	5.186E+01	NOT IDENT.
BI-207	1.632E-01	5.865E-01	5.911E-01	NOT IDENT.
TL-208	2.770E-01	3.808E-01	4.007E-01	NOT IDENT.

BI-211	3.763E-01	2.285E+00	2.292E+00	NOT IDENT.
PB-211	-6.311E+00	9.326E+00	9.750E+00	NOT IDENT.
BI-212	3.815E+00	4.369E+00	4.695E+00	NOT IDENT.
PB-212	9.624E-02	6.011E-01	6.026E-01	NOT IDENT.
BI-213	1.914E-01	1.576E+00	1.579E+00	NOT IDENT.
BI-214	-4.411E-01	7.019E-01	7.295E-01	NOT IDENT.
PB-214	-1.426E-01	8.391E-01	8.416E-01	NOT IDENT.
RN-219	6.371E+00	5.279E+00	6.010E+00	NOT IDENT.
RN-222	-4.411E-01	7.019E-01	7.295E-01	NOT IDENT.
RA-223	1.034E+01	1.119E+01	1.212E+01	FAIL ABUN
RA-224	-1.012E+00	6.324E+00	6.340E+00	NOT IDENT.
RA-226	-1.426E-01	8.391E-01	8.416E-01	NOT IDENT.
AC-227	-1.547E+00	2.507E+00	2.602E+00	NOT IDENT.
TH-227	-1.547E+00	2.507E+00	2.602E+00	NOT IDENT.
AC-228	3.192E-01	1.713E+00	1.720E+00	NOT IDENT.
RA-228	3.192E-01	1.713E+00	1.720E+00	NOT IDENT.
TH-228	9.624E-02	6.011E-01	6.026E-01	NOT IDENT.
TH-229	3.574E-01	5.394E+00	5.397E+00	NOT IDENT.
TH-230	-1.426E-01	8.391E-01	8.416E-01	NOT IDENT.
PA-231	-1.802E+00	4.912E+00	4.978E+00	NOT IDENT.
TH-231	1.034E+01	1.119E+01	1.212E+01	FAIL ABUN
TH-232	3.192E-01	1.713E+00	1.720E+00	NOT IDENT.
PA-234	2.187E+00	4.921E+00	5.019E+00	NOT IDENT.
PA-234M	4.900E+00	1.442E+01	1.459E+01	NOT IDENT.
TH-234	4.900E+00	1.442E+01	1.459E+01	NOT IDENT.
U-234	-1.426E-01	8.391E-01	8.416E-01	NOT IDENT.
U-235	-1.098E+00	1.995E+00	2.055E+00	FAIL ABUN
NP-237	1.134E+00	1.137E+00	1.247E+00	FAIL ABUN
NP-238	-7.472E+02	3.213E+03	3.230E+03	SHORT HLIF
U-238	4.900E+00	1.442E+01	1.459E+01	NOT IDENT.
NP-239	1.290E-01	2.604E+00	2.605E+00	NOT IDENT.
PU-239	-4.194E+02	3.023E+03	3.028E+03	NOT IDENT.
AM-243	-3.639E-02	4.881E-01	4.884E-01	NOT IDENT.
CM-243	6.053E-01	9.633E-01	1.001E+00	NOT IDENT.
BK-247	-2.561E-01	8.167E-01	8.248E-01	FAIL ABUN
CM-247	3.588E-01	4.887E-01	5.148E-01	NOT IDENT.
CF-249	-4.377E-02	4.855E-01	4.859E-01	NOT IDENT.
CF-251	-3.205E-01	1.202E+00	1.211E+00	NOT IDENT.
ANH-511	7.348E-02	3.569E-01	3.584E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	893.7002	85.43	284.2886	131.20	274.4990
45.60	936.5696	86.55	307.4148	133.02	272.1593
46.54	939.7466	86.79	307.5860	133.52	264.9191
49.72	879.7775	86.94	284.3253	136.00	246.7299
51.35	970.5231	87.09	284.4233	136.47	273.7663
51.87	1010.2145	87.57	286.6922	140.51	292.5559
52.39	1015.5000	88.03	291.8781	143.76	289.7705
52.97	1030.7440	88.34	289.1573	144.24	279.8445
53.44	1096.2963	88.47	270.6769	145.44	272.3999
54.07	1071.8348	89.96	288.2713	152.43	248.9911
57.36	0.0000	90.64	264.1668	153.25	260.3397
57.53	1208.4584	91.11	282.1434	154.21	225.3724
57.98	745.3707	92.59	289.0009	156.02	247.0504
59.27	748.3204	93.35	288.5002	158.56	255.7932
59.32	748.4340	94.56	290.2639	159.00	252.6248
59.54	748.9356	94.65	290.3220	162.33	238.2274
60.96	269.2053	94.67	290.3332	162.66	239.4634
61.17	269.3746	94.87	272.6166	163.33	267.7044
62.93	274.4339	97.43	298.0624	165.86	248.4665
63.29	258.8494	98.43	268.7332	176.31	220.2525
63.58	267.6208	98.44	268.7373	176.60	235.1825
64.28	260.8158	99.53	291.3930	177.52	246.9155
66.73	272.8084	100.11	300.7736	181.07	251.5746
67.24	287.0892	102.03	270.7814	181.52	247.1339
67.68	293.0049	103.18	268.4008	184.41	258.4907
67.75	293.0604	103.37	257.4027	185.72	263.5728
68.89	263.2851	105.21	278.6402	193.51	281.4878
69.67	262.9142	105.31	278.6968	197.03	256.9614
70.82	317.9744	106.12	280.1714	198.01	277.2575
70.83	317.9848	106.47	263.1002	201.83	295.1355
72.81	284.8809	109.28	291.1448	203.43	256.6942
72.87	284.9248	111.00	237.8074	205.31	267.9681
74.66	309.8823	111.76	247.4005	210.85	288.9074
74.82	310.0099	114.06	263.9727	215.65	227.3496
74.97	335.6591	116.30	259.5805	218.12	233.6431
77.11	310.8835	116.74	265.3262	222.11	254.1110
78.74	309.2995	119.76	253.2820	227.09	255.5882
79.69	312.9018	121.12	273.0769	227.38	255.6731
80.03	314.1190	121.22	273.1268	228.16	240.0607
80.12	314.1940	121.78	273.4079	228.18	240.0667
80.19	314.2491	122.06	263.7779	235.69	277.7687
80.57	298.2394	122.92	265.5910	235.96	277.8514
81.00	306.2348	123.07	265.6625	238.63	247.8548
81.07	306.2884	123.68	235.1631	238.98	247.9499
81.75	316.4145	125.81	260.3062	240.99	247.2656
82.47	273.6148	127.23	257.7952	242.00	227.7371
83.79	320.8752	127.91	263.3970	244.70	233.3792
84.00	292.0280	129.30	267.2232	252.40	215.2939

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	227.9082	351.06	209.5207	569.33	101.7266
254.15	0.0000	351.93	220.6617	569.50	101.7344
256.23	241.3066	355.39	0.0000	569.70	104.9257
260.90	0.0000	356.01	218.6412	583.19	97.1689
264.66	236.6659	364.49	228.4670	584.27	113.2547
264.80	236.7000	366.42	233.4507	595.83	106.4403
265.00	236.7513	372.51	212.2378	600.60	114.2597
269.46	226.7859	375.05	194.0055	602.52	0.0000
270.03	225.2166	377.52	211.2037	604.72	91.8239
271.23	215.2806	383.85	199.0907	607.14	86.5332
273.65	214.0996	388.16	216.7059	609.32	103.9609
276.40	206.9890	388.63	218.6706	610.33	96.4312
277.37	205.4736	391.69	232.4017	614.28	91.2017
277.60	214.9422	400.66	243.4792	618.01	103.3457
278.00	215.0291	401.81	206.5632	620.36	108.9193
279.20	223.8561	402.40	223.7931	621.93	119.9097
279.54	228.2257	404.85	256.6369	630.19	0.0000
279.70	213.6703	410.95	261.6139	631.29	89.8210
280.46	214.6912	413.71	251.5791	633.25	93.2005
283.69	208.4759	414.70	260.4086	634.78	79.0078
284.31	204.2939	423.72	264.9915	635.95	92.2305
285.41	220.9063	427.09	271.4437	636.99	81.2928
285.90	0.0000	427.87	255.1023	657.50	106.5547
287.50	219.6248	433.94	267.8777	657.76	106.5703
290.67	213.3531	439.40	272.8015	657.90	0.0000
293.27	0.0000	440.45	280.8281	661.66	83.4167
295.22	215.1501	453.88	269.5786	664.57	0.0000
295.96	212.6809	463.37	306.0637	666.33	58.5263
298.58	194.8573	468.07	317.9746	666.50	58.5306
299.98	216.1099	473.00	303.0000	667.71	0.0000
300.09	217.0050	475.06	265.3558	677.62	43.7163
300.13	217.0151	476.78	270.6592	685.70	61.8929
301.36	223.3948	477.60	259.7746	692.65	63.2256
302.85	224.5833	482.18	221.3070	695.00	54.2539
304.50	226.6791	487.02	185.6621	696.49	56.5552
304.85	231.1470	492.35	0.0000	696.51	56.5552
306.78	223.1947	497.08	187.8568	697.00	61.0950
308.46	242.0528	505.52	179.6559	697.30	61.1038
311.90	200.7956	507.63	0.0000	697.49	62.2398
316.51	214.0670	511.00	153.6301	702.65	64.6608
319.41	239.1055	514.00	168.2775	706.68	81.8320
320.08	239.2475	514.00	168.2775	711.68	76.3265
321.04	238.1174	520.40	159.6545	720.70	67.4937
323.87	197.5835	520.69	164.8372	721.93	0.0000
325.23	201.3977	522.65	0.0000	722.78	73.2839
328.76	205.6117	527.90	0.0000	722.91	65.2708
333.37	216.3477	528.26	152.1261	723.31	67.5730
333.97	220.9670	529.59	156.3885	724.19	60.7270
334.37	209.3154	529.87	0.0000	727.33	48.1917
338.28	209.1088	531.02	140.9749	733.00	57.5195
338.32	209.1135	537.26	138.8941	735.93	57.5948
340.48	199.5227	546.56	0.0000	737.46	58.7882
340.55	199.5317	552.55	120.7088	739.50	71.5336
344.28	208.3466	563.25	98.2108	744.23	77.4660
345.93	200.4358	564.24	108.8340	747.24	63.6788

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	60.2266	962.31	91.7989	1435.80	3.2758
752.31	63.8220	964.08	113.6389	1457.56	0.0000
753.82	67.3481	966.17	111.8278	1460.82	9.8899
756.73	75.5741	968.97	95.8156	1489.16	5.5334
756.80	75.5768	983.53	92.4975	1505.03	7.7772
763.94	81.6439	984.45	0.0000	1584.12	8.1527
765.81	68.2881	996.26	79.5045	1596.21	2.7253
766.84	84.0850	1002.74	69.1238	1620.50	2.7407
772.60	0.0000	1004.73	73.9757	1621.92	1.8277
776.52	73.0049	1021.30	0.0000	1678.03	0.0000
777.92	81.8490	1025.87	0.0000	1690.97	3.7131
778.90	68.6761	1028.54	0.0000	1750.46	0.0000
783.70	83.8179	1037.84	89.3945	1764.49	4.7161
788.74	81.3451	1038.76	0.0000	1770.23	4.7219
792.07	77.9185	1046.59	63.3456	1771.35	4.7231
795.86	78.0447	1048.07	78.9780	1791.20	0.0000
801.95	68.4653	1049.04	90.7068	1808.65	4.7605
1093.63	82.7944	1050.41	92.7039	1810.72	0.0000
810.29	82.8029	1063.66	65.6669	1836.06	2.8726
810.45	82.8086	1077.00	78.7549		
810.76	71.3940	1077.34	66.9500		
815.77	67.9658	1085.87	66.1494		
818.51	68.0447	1093.63	77.2050		
832.01	73.8245	1099.45	72.3896		
834.85	83.8243	1112.07	78.6577		
835.71	85.6560	1112.84	71.7056		
836.80	0.0000	1115.54	63.7930		
846.75	0.0000	1120.29	52.7098		
846.77	79.7017	1120.55	52.7130		
856.80	68.3818	1121.30	52.9256		
860.56	68.4828	1129.67	52.8645		
871.09	82.3041	1131.51	0.0000		
873.19	81.4548	1147.95	0.0000		
875.33	0.0000	1173.23	49.7267		
879.38	83.4879	1177.95	37.3997		
880.51	92.7025	1189.05	25.4929		
881.60	114.7804	1204.77	22.5398		
883.24	101.9894	1221.41	30.8881		
884.68	82.7408	1231.02	15.4871		
889.28	90.2540	1235.36	16.5410		
894.76	96.9058	1238.28	11.3813		
898.04	97.5820	1260.41	0.0000		
900.72	93.2419	1271.87	11.4921		
903.28	92.5934	1274.44	13.5911		
911.20	93.7998	1274.54	13.5919		
912.08	98.4757	1291.59	9.4548		
923.98	0.0000	1298.22	0.0000		
926.50	101.6248	1312.11	16.9053		
929.11	111.1275	1332.49	19.1250		
935.54	133.0817	1362.66	0.0000		
937.49	113.4818	1365.19	3.2158		
944.13	125.0406	1368.63	0.0000		
946.00	111.0139	1384.29	8.6191		
949.00	108.3109	1408.01	10.8411		
954.55	0.0000	1434.09	4.3657		

Batch 2767517 Check-list

This check-list was completed on 11-APR-25 by Tim Winters

This batch was reviewed by Spencer Collins on 11-APR-25 and Tim Winters on 11-APR-25.

Batch ID: 2767517 **Product:** GSCGAMMS **Description:** Gamma Spec Solid RAD A-013

#	Criteria	Yes	No	Comments
Preparation Information				
1	Did any sample(s) require dilution?		No	
2	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
3	Was the preservation correct for this analysis?	Yes		
Internal Checklist Information				
4	Are instrument source checks within limits?	Yes		
5	Have sample historical results been reviewed for this batch?	Yes		
Technical Information				
6	Were any additional radionuclides added that were not requested by the client?		No	
7	Were all the samples prepared/analyzed within the required holding time period?	Yes		
Quality Control (QC) Information				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
11	Has the method required detection limit been met?	Yes		
Miscellaneous Information				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

Prep Logbook

Gamma Spectroscopy

Batch ID: **2767517**
Analyst: Maggie Stamps (MXR1)
Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Lab SOP: GL-RAD-A-013 REV# 29
Instrument: No instrument-manual method

Due Dates for Lab: 12-APR-2025 **Hold: 18-MAR-2025** **Package: 13-APR-2025** **SDG: 14-AP**

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1206041226	84680-278	1556	1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Adjusted Aliquot (g)
1	714507021	19-MAR-2025	.1	Dry to Dry	134.45	134.45	134.45
2	714507022	19-MAR-2025	.1	Dry to Dry	128.23	128.23	128.23
3	714507023	19-MAR-2025	.1	Dry to Dry	105.68	105.68	105.68
4	714507024	19-MAR-2025	.1	Dry to Dry	119.69	119.69	119.69
5	1206041224 MB	19-MAR-2025	.1	Dry to Wet	134.45	134.45	134.45
6	1206041225 DUP (714507021)	19-MAR-2025	.1	Dry to Dry	134.45	134.45	134.45
7	1206041226 LCS	19-MAR-2025	.1	Dry to Wet	115	115	115

Reagent/Solvent Lot ID	Description	Amount

Comments:

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:15.07

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507021.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;901
Background date : 7-APR-2025 07:38:46.
Sample date : 7-MAR-2025 10:00:00. Acquisition date : 10-APR-2025 20:45:51
Sample ID : G714507021 Sample quantity : 1.34450E+02 GRAM
Detector name : GAM01 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.36 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767517 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	7	35.79*	64	18	2.05	71.69	67	26	1.79E-02	26.6	2.47E+00
2	7	38.78*	40	71	2.25	77.68	67	26	1.11E-02	60.1	
3	7	40.70*	26	55	1.40	81.51	67	26	7.24E-03	61.4	
4	7	42.39	29	74	1.37	84.88	67	26	7.96E-03	54.4	
5	7	44.73*	12	83	1.45	89.57	67	26	3.34E-03	122.4	
6	0	63.71*	11	176	1.60	127.53	122	10	3.10E-03	229.9	
7	2	74.91	127	144	1.36	149.91	143	17	3.54E-02	19.0	1.04E+00
8	2	77.20*	198	139	1.26	154.50	143	17	5.50E-02	13.1	
9	0	87.26*	41	190	1.05	174.62	171	8	1.14E-02	60.3	
10	0	92.95*	85	206	1.10	185.99	181	9	2.35E-02	34.1	
11	0	186.07*	77	203	1.19	372.20	367	12	2.13E-02	40.6	
12	0	209.68	73	112	2.04	419.43	414	11	2.02E-02	30.5	
13	1	238.61*	307	63	1.27	477.28	471	19	8.54E-02	7.4	2.19E+00
14	1	241.86	146	75	1.54	483.78	471	19	4.06E-02	14.0	
15	0	295.18*	262	78	1.29	590.42	584	13	7.29E-02	9.3	
16	0	338.62	70	86	1.28	677.28	670	11	1.96E-02	28.0	
17	0	351.78*	401	58	1.53	703.61	696	13	1.12E-01	6.4	
18	0	459.88	10	13	1.28	919.79	916	6	2.86E-03	64.0	
19	0	467.98	17	19	2.41	936.00	932	9	4.81E-03	50.5	
20	0	478.49	36	49	1.65	957.01	950	15	1.01E-02	46.3	
21	0	497.52	17	13	3.39	995.06	990	10	4.61E-03	47.1	
22	0	510.65*	32	55	1.96	1021.34	1013	18	8.83E-03	63.4	
23	0	532.27	27	19	3.33	1064.57	1058	15	7.48E-03	40.0	
24	0	539.42	20	17	1.46	1078.87	1073	10	5.47E-03	45.7	
25	0	566.51	41	17	3.35	1133.05	1128	11	1.14E-02	24.8	
26	0	583.53*	69	42	1.14	1167.10	1160	14	1.92E-02	23.6	
27	0	599.25	22	13	1.68	1198.54	1193	10	6.15E-03	38.5	
28	0	604.62	16	21	3.30	1209.27	1203	12	4.47E-03	62.1	
29	0	609.32*	289	24	1.29	1218.68	1214	12	8.04E-02	6.8	
30	6	619.93	11	3	1.91	1239.91	1238	12	3.14E-03	31.0	4.67E-01
31	6	623.38	14	6	1.35	1246.79	1238	12	3.79E-03	36.6	
32	0	665.06	19	11	1.28	1330.17	1326	8	5.15E-03	39.7	
33	0	705.40	23	23	5.34	1410.84	1403	15	6.25E-03	50.6	
34	0	727.01	35	16	1.03	1454.06	1449	11	9.60E-03	28.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	733.65	22	12	1.11	1467.34	1462	12	6.00E-03	38.7	
36	2	764.11	17	3	2.09	1528.28	1521	22	4.69E-03	45.9	8.81E-01
37	2	768.27	38	9	2.09	1536.60	1521	22	1.06E-02	23.5	
38	0	786.09	19	11	0.74	1572.24	1568	8	5.33E-03	38.3	
39	0	795.54	28	9	1.80	1591.15	1586	11	7.82E-03	29.1	
40	0	911.27*	58	16	1.30	1822.63	1816	13	1.60E-02	19.9	
41	0	928.56	7	4	0.88	1857.21	1853	8	1.94E-03	62.3	
42	3	964.34	17	21	2.42	1928.80	1919	24	4.67E-03	61.1	6.98E-01
43	3	969.01	28	14	2.09	1938.14	1919	24	7.80E-03	30.3	
44	0	1000.17*	10	0	0.83	2000.46	1996	9	2.82E-03	38.5	
45	0	1032.29	10	3	3.89	2064.72	2058	11	2.82E-03	44.7	
46	0	1120.79	63	3	2.65	2241.75	2235	14	1.74E-02	14.1	
47	0	1154.45	5	12	1.17	2309.08	2304	9	1.29E-03	140.0	
48	0	1238.54	28	6	2.12	2477.32	2471	14	7.85E-03	27.1	
49	0	1326.56	10	0	1.61	2653.40	2648	10	2.78E-03	31.6	
50	0	1377.22	12	3	1.28	2754.76	2751	7	3.26E-03	39.2	
51	0	1408.26	14	4	1.14	2816.85	2812	8	3.89E-03	36.4	
52	0	1460.91*	54	3	1.79	2922.18	2915	13	1.49E-02	16.3	
53	0	1509.09	8	2	0.67	3018.58	3014	9	2.10E-03	51.4	
54	0	1527.64	10	0	0.73	3055.70	3051	9	2.78E-03	31.6	
55	0	1764.13	50	0	2.34	3528.88	3521	13	1.39E-02	14.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:46:16

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507021.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 10:00:00	Acquisition date	: 10-APR-2025 20:45:51
Sample ID	: G714507021	Sample quantity	: 134.45 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA1	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.36 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	38	10.44*	2.610E+00	7.736E-01	1.212E+00	92.61
K-40	1460.82	51	10.66*	9.677E-01	2.767E+00	2.767E+00	32.56
RU-103	497.08	17	91.00*	2.525E+00	4.187E-02	7.696E-02	94.29
	610.33	296	5.76	2.121E+00	1.352E+00	2.485E+01	13.67
RH-106	621.93	14	9.93*	2.080E+00	3.771E-01	4.021E-01	73.20
	1050.41	------	1.56	1.299E+00	------ Line Not Found		------
RU-106	621.93	14	9.93*	2.080E+00	3.771E-01	4.021E-01	73.20
	1050.41	------	1.56	1.299E+00	------ Line Not Found		------
CD-109	88.03	48	3.70*	4.803E+00	1.515E+00	1.595E+00	120.59
SN-126	64.28	13	9.60	2.459E+00	3.157E-01	3.157E-01	459.88
	86.94	48	8.90	4.803E+00	6.297E-01	6.297E-01	120.59
	87.57	48	37.00*	4.803E+00	1.515E-01	1.515E-01	120.59
CS-134	563.25	------	8.34	2.271E+00	------ Line Not Found		------
	569.33	------	15.37	2.250E+00	------ Line Not Found		------
	604.72	16	97.62	2.136E+00	4.410E-02	4.552E-02	124.27
	795.86	28	85.46*	1.674E+00	1.100E-01	1.135E-01	58.29
	801.95	------	8.69	1.662E+00	------ Line Not Found		------
	1365.19	------	3.02	1.026E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.070E+00	------ Line Not Found		------
	583.19	71	85.00*	2.202E+00	2.115E-01	2.115E-01	47.14
	860.56	------	12.50	1.559E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.515E+00	------ Line Not Found		------
	351.06	427	12.92*	3.369E+00	5.483E+00	5.483E+00	12.82
BI-212	727.33	35	6.67*	1.815E+00	1.608E+00	1.608E+00	56.81
	1620.50	------	1.47	8.896E-01	------ Line Not Found		------
PB-212	74.82	151	10.28	3.729E+00	2.198E+00	2.198E+00	38.06
	77.11	234	17.10	3.958E+00	1.929E+00	1.929E+00	26.16
	238.63	337	43.60*	4.553E+00	9.468E-01	9.468E-01	14.88
	300.09	------	3.30	3.827E+00	------ Line Not Found		------
BI-214	609.32	296	45.49*	2.121E+00	1.712E+00	1.713E+00	13.67
	1120.29	61	14.92	1.224E+00	1.871E+00	1.871E+00	28.21
	1764.49	47	15.30	8.351E-01	2.055E+00	2.055E+00	28.28
PB-214	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.212E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
RN-222	609.32	296	45.49*	2.121E+00	1.712E+00	1.713E+00	13.67
	1120.29	61	14.92	1.224E+00	1.871E+00	1.871E+00	28.21
	1764.49	47	15.30	8.351E-01	2.055E+00	2.055E+00	28.28
RA-224	240.99	160	4.10*	4.508E+00	4.823E+00	4.823E+00	28.01
RA-226	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.212E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
AC-228	105.21	------	1.10	5.682E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	75	11.27	3.475E+00	1.072E+00	1.072E+00	56.09
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	57	25.80*	1.480E+00	8.347E-01	8.347E-01	39.83
	968.97	28	15.80	1.399E+00	6.997E-01	6.997E-01	60.62
RA-228	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	75	11.27	3.475E+00	1.072E+00	1.072E+00	56.09
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	57	25.80*	1.480E+00	8.347E-01	8.347E-01	39.83
	968.97	28	15.80	1.399E+00	6.997E-01	6.997E-01	60.62
TH-228	74.82	151	10.28	3.729E+00	2.198E+00	2.198E+00	38.06
	77.11	234	17.10	3.958E+00	1.929E+00	1.929E+00	26.16
	238.63	337	43.60*	4.553E+00	9.468E-01	9.468E-01	14.88
	300.09	------	3.30	3.827E+00	------ Line Not Found		------
TH-230	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.211E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
TH-232	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	75	11.27	3.475E+00	1.072E+00	1.072E+00	56.09
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	57	25.80*	1.480E+00	8.347E-01	8.347E-01	39.83
	968.97	28	15.80	1.399E+00	6.997E-01	6.997E-01	60.62
PA-234M	63.29	13	3.70*	2.459E+00	8.192E-01	8.192E-01	459.88
	92.59	99	4.23	5.162E+00	2.528E+00	2.528E+00	68.27
TH-234	63.29	13	3.70*	2.459E+00	8.192E-01	8.192E-01	459.88
	92.59	99	4.23	5.162E+00	2.528E+00	2.528E+00	68.27
U-234	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.211E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
U-238	63.29	13	3.70*	2.459E+00	8.192E-01	8.192E-01	459.88
	92.59	99	4.23	5.162E+00	2.528E+00	2.528E+00	68.27
AM-243	43.53	35	5.90	3.315E-01	1.005E+01	1.005E+01	108.76
	74.66	151	67.20*	3.729E+00	3.362E-01	3.362E-01	38.06
ANH-511	511.00	33	100.00*	2.470E+00	7.445E-02	7.445E-02	126.86

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:17.43

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507021.CNF;1		
Acquisition date	: 10-APR-2025 20:45:51	Sensitivity	: 3.000
Detector ID	: GAM01	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.36	Half life ratio	: *****
Sample date	: 7-MAR-2025 10:00:00	Analyst initials	: MXR1
Sample ID	: G714507021	Sample Quantity	: 1.3445E+02 GRAM
Batch Number	: 2767517	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 5-JUN-2024 05:42:50	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.212E+00	1.100E+00	8.204E-01
K-40	2.767E+00	8.831E-01	8.152E-01
RU-103	7.696E-02	7.111E-02	9.385E-02
RH-106	4.021E-01	2.884E-01	6.859E-01
RU-106	4.021E-01	2.884E-01	6.859E-01
CD-109	1.595E+00	1.885E+00	2.080E+00
SN-126	1.515E-01	1.790E-01	1.925E-01
CS-134	1.135E-01	6.486E-02	7.887E-02
TL-208	2.115E-01	9.770E-02	6.716E-02
BI-211	5.483E+00	6.891E-01	4.213E-01
BI-212	1.608E+00	8.951E-01	8.464E-01
PB-212	9.468E-01	1.381E-01	1.166E-01
BI-214	1.713E+00	2.295E-01	1.475E-01
PB-214	1.990E+00	2.501E-01	1.532E-01
RN-222	1.713E+00	2.295E-01	1.475E-01
RA-224	4.823E+00	1.324E+00	1.249E+00
RA-226	1.990E+00	2.501E-01	1.532E-01
AC-228	8.347E-01	3.258E-01	3.161E-01
RA-228	8.347E-01	3.258E-01	3.161E-01
TH-228	9.468E-01	1.381E-01	1.166E-01
TH-230	1.990E+00	2.501E-01	1.532E-01
TH-232	8.347E-01	3.258E-01	3.161E-01
PA-234M	8.192E-01	3.692E+00	3.048E+00
TH-234	8.192E-01	3.692E+00	3.048E+00
U-234	1.990E+00	2.501E-01	1.532E-01
U-238	8.192E-01	3.692E+00	3.048E+00
AM-243	3.362E-01	1.254E-01	1.145E-01
ANH-511	7.445E-02	9.256E-02	5.696E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	-1.003E-02	4.503E-02	8.699E-02	NOT IDENT.
NA-24	0.000E+00	1.749E+15	0.000E+00	SHORT HLIF

AL-26	1.923E-02	4.092E-02	9.597E-02	NOT IDENT.
SC-46	-2.080E-02	4.412E-02	8.319E-02	FAIL ABUN
V-48	5.523E-02	1.533E-01	3.340E-01	NOT IDENT.
CR-51	-3.261E-02	6.041E-01	1.146E+00	NOT IDENT.
MN-52	1.601E+00	2.249E+00	5.735E+00	NOT IDENT.
MN-54	-1.221E-04	3.903E-02	7.870E-02	NOT IDENT.
CO-56	2.658E-02	4.755E-02	1.041E-01	FAIL ABUN
MN-56	0.000E+00	1.789E+41	0.000E+00	SHORT HLIF
CO-57	1.311E-02	2.928E-02	5.841E-02	NOT IDENT.
CO-58	-7.967E-03	4.293E-02	7.994E-02	NOT IDENT.
FE-59	9.392E-02	1.001E-01	2.446E-01	NOT IDENT.
CO-60	8.387E-03	3.877E-02	8.207E-02	NOT IDENT.
ZN-65	4.453E-02	9.363E-02	1.877E-01	NOT IDENT.
GE-68	2.898E-01	1.182E+00	2.550E+00	NOT IDENT.
AS-73	1.047E+00	1.484E+00	2.854E+00	NOT IDENT.
AS-74	-7.834E-02	2.458E-01	3.862E-01	NOT IDENT.
SE-75	2.057E-02	5.168E-02	1.019E-01	NOT IDENT.
BR-77	0.000E+00	6.053E+03	0.000E+00	SHORT HLIF
SR-82	5.365E-02	5.528E-01	1.078E+00	NOT IDENT.
RB-83	-3.901E-02	8.826E-02	1.569E-01	NOT IDENT.
RB-84	1.163E-01	1.128E-01	2.585E-01	NOT IDENT.
KR-85	6.816E-01	8.211E+00	1.402E+01	NOT IDENT.
SR-85	4.365E-03	5.332E-02	9.102E-02	NOT IDENT.
RB-86	2.527E-01	1.427E+00	3.054E+00	NOT IDENT.
Y-88	-2.880E-02	4.704E-02	8.031E-02	NOT IDENT.
Y-91	-2.571E+00	2.330E+01	4.644E+01	NOT IDENT.
NB-94	2.741E-04	3.962E-02	6.650E-02	NOT IDENT.
NB-95	6.565E-02	5.898E-02	1.270E-01	NOT IDENT.
NB-95M	1.727E-02	1.745E-01	3.000E-01	NOT IDENT.
ZR-95	-7.847E-02	9.168E-02	1.448E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.706E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.618E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	6.785E+39	0.000E+00	SHORT HLIF
RH-101	-5.308E-03	3.490E-02	6.691E-02	NOT IDENT.
RH-102	-3.996E-02	6.171E-02	1.043E-01	FAIL ABUN
AG-108M	-4.886E-03	3.139E-02	5.847E-02	NOT IDENT.
AG-110	3.457E-01	6.904E-01	1.452E+00	NOT IDENT.
AG-110M	-4.912E-02	5.607E-02	9.730E-02	FAIL ABUN
SN-113	-1.184E-02	5.610E-02	1.035E-01	NOT IDENT.
CD-115	0.000E+00	5.302E+03	0.000E+00	SHORT HLIF
SN-117M	-5.112E-02	1.553E-01	2.918E-01	NOT IDENT.
SB-122	0.000E+00	3.265E+02	0.000E+00	SHORT HLIF
TE-123M	-2.352E-02	3.329E-02	6.089E-02	NOT IDENT.
SB-124	-9.824E-02	1.155E-01	1.933E-01	NOT IDENT.
SB-125	-9.542E-02	9.851E-02	1.634E-01	FAIL ABUN
TE-125M	7.598E+00	1.370E+01	2.754E+01	NOT IDENT.
I-126	1.032E+00	8.020E-01	1.383E+00	FAIL ABUN
SB-126	1.656E-01	3.926E-01	8.122E-01	FAIL ABUN
SB-127	2.296E+01	4.200E+01	8.761E+01	NOT IDENT.
I-131	-2.876E-01	6.948E-01	1.256E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.520E+01	0.000E+00	SHORT HLIF
BA-133	7.562E-02	4.752E-02	9.814E-02	NOT IDENT.
I-133	0.000E+00	3.176E+10	0.000E+00	SHORT HLIF
I-135	0.000E+00	1.029E+37	0.000E+00	SHORT HLIF
CS-136	-5.130E-02	2.133E-01	4.326E-01	NOT IDENT.
BA-137M	1.121E-02	4.297E-02	8.033E-02	NOT IDENT.
CS-137	1.184E-02	4.540E-02	8.486E-02	NOT IDENT.
LA-138	-7.729E-02	5.656E-02	6.566E-02	NOT IDENT.
CE-139	-7.867E-03	3.721E-02	7.017E-02	NOT IDENT.
BA-140	3.916E-01	8.451E-01	1.366E+00	NOT IDENT.
LA-140	-1.326E-01	2.237E-01	3.934E-01	NOT IDENT.
CE-141	-1.421E-01	1.037E-01	1.814E-01	NOT IDENT.
CE-143	0.000E+00	2.777E+06	0.000E+00	SHORT HLIF
CE-144	-1.931E-01	2.169E-01	3.948E-01	NOT IDENT.
PM-144	4.166E-03	3.679E-02	7.082E-02	NOT IDENT.
PR-144	2.862E-01	2.776E+00	5.337E+00	NOT IDENT.
PM-146	2.587E-02	4.523E-02	9.176E-02	NOT IDENT.
ND-147	0.000E+00	3.440E+00	3.947E+00	FAIL ABUN
PM-147	-1.085E+02	8.345E+02	1.606E+03	NOT IDENT.
PM-149	0.000E+00	4.478E+04	0.000E+00	SHORT HLIF
EU-150	-2.044E-02	3.545E-02	5.529E-02	FAIL ABUN
EU-152	1.176E-01	1.052E-01	2.206E-01	FAIL ABUN
GD-153	-4.604E-02	1.089E-01	1.977E-01	NOT IDENT.
EU-154	-2.814E-02	1.263E-01	2.441E-01	NOT IDENT.
EU-155	-5.009E-02	1.168E-01	2.220E-01	FAIL ABUN
TB-160	-5.366E-02	1.774E-01	3.404E-01	FAIL ABUN

HO-166M	5.918E-02	6.583E-02	1.374E-01	NOT IDENT.
TM-171	3.920E+00	2.869E+01	5.264E+01	NOT IDENT.
HF-172	-3.098E-03	2.154E-01	4.165E-01	FAIL ABUN
LU-172	3.831E-02	6.076E-02	1.378E-01	FAIL ABUN
LU-176	-1.035E-02	2.900E-02	5.311E-02	FAIL ABUN
HF-181	-3.189E-03	6.891E-02	1.163E-01	NOT IDENT.
TA-182	1.389E-01	1.741E-01	4.099E-01	FAIL ABUN
RE-183	-3.817E-01	3.160E-01	5.100E-01	NOT IDENT.
RE-184	1.317E-02	1.802E-01	3.711E-01	NOT IDENT.
W-188	-1.652E+00	1.070E+01	1.782E+01	FAIL ABUN
IR-192	1.311E-02	4.621E-02	8.982E-02	FAIL ABUN
HG-203	-3.247E-02	5.702E-02	1.025E-01	NOT IDENT.
TL-204	4.088E+00	6.682E+00	1.162E+01	NOT IDENT.
BI-207	2.145E-02	4.608E-02	1.033E-01	FAIL ABUN
BI-210	-3.481E+00	6.267E+00	1.004E+01	NOT IDENT.
PB-210	-3.481E+00	6.267E+00	1.004E+01	NOT IDENT.
PB-211	3.468E-01	7.615E-01	1.515E+00	NOT IDENT.
BI-213	-3.127E-02	1.121E-01	2.056E-01	NOT IDENT.
RN-219	-1.195E-02	4.695E-01	8.807E-01	NOT IDENT.
RA-223	3.727E-01	6.695E-01	1.340E+00	FAIL ABUN
AC-225	-8.029E-01	2.296E+00	4.264E+00	NOT IDENT.
AC-227	-1.942E-01	2.728E-01	4.866E-01	NOT IDENT.
TH-227	-1.942E-01	2.728E-01	4.866E-01	NOT IDENT.
TH-229	-3.916E-01	5.773E-01	1.047E+00	FAIL ABUN
PA-231	-6.673E-02	5.369E-01	1.002E+00	NOT IDENT.
TH-231	3.727E-01	6.695E-01	1.340E+00	FAIL ABUN
PA-233	-1.321E-02	6.112E-02	1.146E-01	NOT IDENT.
PA-234	-3.230E-02	3.064E-01	6.109E-01	FAIL ABUN
U-235	1.724E-01	2.224E-01	4.501E-01	FAIL ABUN
NP-237	-1.321E-02	6.112E-02	1.146E-01	NOT IDENT.
NP-238	0.000E+00	9.649E+03	0.000E+00	SHORT HLIF
NP-239	-8.789E-02	2.880E-01	5.495E-01	NOT IDENT.
PU-239	9.665E+00	3.917E+02	7.561E+02	NOT IDENT.
AM-241	1.620E-01	2.048E-01	3.718E-01	NOT IDENT.
CM-243	9.111E-03	1.131E-01	2.226E-01	NOT IDENT.
BK-247	4.022E-02	8.227E-02	1.637E-01	NOT IDENT.
CM-247	-9.694E-03	4.331E-02	7.948E-02	NOT IDENT.
CF-249	8.555E-03	4.463E-02	8.601E-02	NOT IDENT.
CF-251	-3.940E-02	1.420E-01	2.662E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:15.90

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	38	10.44*	2.610E+00	7.736E-01	1.212E+00	92.61
K-40	1460.82	51	10.66*	9.677E-01	2.767E+00	2.767E+00	32.56
RU-103	497.08	17	91.00*	2.525E+00	4.187E-02	7.696E-02	94.29
	610.33	296	5.76	2.121E+00	1.352E+00	2.485E+00	13.67
RH-106	621.93	14	9.93*	2.080E+00	3.771E-01	4.021E-01	73.20
	1050.41	------	1.56	1.299E+00	------ Line Not Found		------
RU-106	621.93	14	9.93*	2.080E+00	3.771E-01	4.021E-01	73.20
	1050.41	------	1.56	1.299E+00	------ Line Not Found		------
CD-109	88.03	48	3.70*	4.803E+00	1.515E+00	1.595E+00	120.59
SN-126	64.28	13	9.60	2.459E+00	3.157E-01	3.157E-01	459.88
	86.94	48	8.90	4.803E+00	6.297E-01	6.297E-01	120.59
	87.57	48	37.00*	4.803E+00	1.515E-01	1.515E-01	120.59
CS-134	563.25	------	8.34	2.271E+00	------ Line Not Found		------
	569.33	------	15.37	2.250E+00	------ Line Not Found		------
	604.72	16	97.62	2.136E+00	4.410E-02	4.552E-02	124.27
	795.86	28	85.46*	1.674E+00	1.100E-01	1.135E-01	58.29
	801.95	------	8.69	1.662E+00	------ Line Not Found		------
	1365.19	------	3.02	1.026E+00	------ Line Not Found		------
TL-208	277.37	------	6.60	4.070E+00	------ Line Not Found		------
	583.19	71	85.00*	2.202E+00	2.115E-01	2.115E-01	47.14
	860.56	------	12.50	1.559E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.515E+00	------ Line Not Found		------
	351.06	427	12.92*	3.369E+00	5.483E+00	5.483E+00	12.82
BI-212	727.33	35	6.67*	1.815E+00	1.608E+00	1.608E+00	56.81
	1620.50	------	1.47	8.896E-01	------ Line Not Found		------
PB-212	74.82	151	10.28	3.729E+00	2.198E+00	2.198E+00	38.06
	77.11	234	17.10	3.958E+00	1.929E+00	1.929E+00	26.16
	238.63	337	43.60*	4.553E+00	9.468E-01	9.468E-01	14.88
	300.09	------	3.30	3.827E+00	------ Line Not Found		------
BI-214	609.32	296	45.49*	2.121E+00	1.712E+00	1.713E+00	13.67
	1120.29	61	14.92	1.224E+00	1.871E+00	1.871E+00	28.21
	1764.49	47	15.30	8.351E-01	2.055E+00	2.055E+00	28.28
PB-214	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.212E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
RN-222	609.32	296	45.49*	2.121E+00	1.712E+00	1.713E+00	13.67
	1120.29	61	14.92	1.224E+00	1.871E+00	1.871E+00	28.21
	1764.49	47	15.30	8.351E-01	2.055E+00	2.055E+00	28.28
RA-224	240.99	160	4.10*	4.508E+00	4.823E+00	4.823E+00	28.01
RA-226	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.212E+00	18.68

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
AC-228	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	75	11.27	3.475E+00	1.072E+00	1.072E+00	56.09
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	57	25.80*	1.480E+00	8.347E-01	8.347E-01	39.83
	968.97	28	15.80	1.399E+00	6.997E-01	6.997E-01	60.62
RA-228	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	75	11.27	3.475E+00	1.072E+00	1.072E+00	56.09
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	57	25.80*	1.480E+00	8.347E-01	8.347E-01	39.83
	968.97	28	15.80	1.399E+00	6.997E-01	6.997E-01	60.62
TH-228	74.82	151	10.28	3.729E+00	2.198E+00	2.198E+00	38.06
	77.11	234	17.10	3.958E+00	1.929E+00	1.929E+00	26.16
	238.63	337	43.60*	4.553E+00	9.468E-01	9.468E-01	14.88
	300.09	------	3.30	3.827E+00	------ Line Not Found		------
TH-230	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.211E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
TH-232	105.21	------	1.10	5.682E+00	------ Line Not Found		------
	338.32	75	11.27	3.475E+00	1.072E+00	1.072E+00	56.09
	835.71	------	1.61	1.601E+00	------ Line Not Found		------
	911.20	57	25.80*	1.480E+00	8.347E-01	8.347E-01	39.83
	968.97	28	15.80	1.399E+00	6.997E-01	6.997E-01	60.62
PA-234M	63.29	13	3.70*	2.459E+00	8.192E-01	8.192E-01	459.88
	92.59	99	4.23	5.162E+00	2.528E+00	2.528E+00	68.27
TH-234	63.29	13	3.70*	2.459E+00	8.192E-01	8.192E-01	459.88
	92.59	99	4.23	5.162E+00	2.528E+00	2.528E+00	68.27
U-234	74.82	151	5.80	3.729E+00	3.895E+00	3.895E+00	38.06
	77.11	234	9.70	3.958E+00	3.401E+00	3.401E+00	26.16
	87.09	48	3.41	4.803E+00	1.643E+00	1.643E+00	120.59
	242.00	160	7.25	4.508E+00	2.728E+00	2.728E+00	28.01
	295.22	283	18.42	3.877E+00	2.211E+00	2.211E+00	18.68
	351.93	427	35.60*	3.369E+00	1.990E+00	1.990E+00	12.82
U-238	63.29	13	3.70*	2.459E+00	8.192E-01	8.192E-01	459.88
	92.59	99	4.23	5.162E+00	2.528E+00	2.528E+00	68.27
AM-243	43.53	35	5.90	3.315E-01	1.005E+01	1.005E+01	108.76
	74.66	151	67.20*	3.729E+00	3.362E-01	3.362E-01	38.06
ANH-511	511.00	33	100.00*	2.470E+00	7.445E-02	7.445E-02	126.86

Flag: "*" = Keyline

Sample ID : G714507021 Acquisition date : 10-APR-2025 20:45:51

Total number of lines in spectrum 55
Number of unidentified lines 14
Number of lines tentatively identified by NID 41 74.55%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.57	7.736E-01	1.212E+00	1.122E+00	92.61	
K-40	1.25E+09Y	1.00	2.767E+00	2.767E+00	0.901E+00	32.56	
RU-103	39.26D	1.84	4.187E-02	7.696E-02	7.256E-02	94.29	
RH-106	371.80D	1.07	3.771E-01	4.021E-01	2.943E-01	73.20	
RU-106	371.80D	1.07	3.771E-01	4.021E-01	2.943E-01	73.20	
CD-109	461.40D	1.05	1.515E+00	1.595E+00	1.924E+00	120.59	
SN-126	2.30E+05Y	1.00	1.515E-01	1.515E-01	1.826E-01	120.59	
CS-134	2.07Y	1.03	1.100E-01	1.135E-01	0.662E-01	58.29	
TL-208	1.41E+10Y	1.00	2.115E-01	2.115E-01	0.997E-01	47.14	
BI-211	7.04E+08Y	1.00	5.483E+00	5.483E+00	0.703E+00	12.82	
BI-212	1.41E+10Y	1.00	1.608E+00	1.608E+00	0.913E+00	56.81	
PB-212	1.41E+10Y	1.00	9.468E-01	9.468E-01	1.409E-01	14.88	
BI-214	1600.00Y	1.00	1.712E+00	1.713E+00	0.234E+00	13.67	
PB-214	1600.00Y	1.00	1.990E+00	1.990E+00	0.255E+00	12.82	
RN-222	1600.00Y	1.00	1.712E+00	1.713E+00	0.234E+00	13.67	
RA-224	1.41E+10Y	1.00	4.823E+00	4.823E+00	1.351E+00	28.01	
RA-226	1600.00Y	1.00	1.990E+00	1.990E+00	0.255E+00	12.82	
AC-228	1.41E+10Y	1.00	8.347E-01	8.347E-01	3.324E-01	39.83	
RA-228	1.41E+10Y	1.00	8.347E-01	8.347E-01	3.324E-01	39.83	
TH-228	1.41E+10Y	1.00	9.468E-01	9.468E-01	1.409E-01	14.88	
TH-230	7.54E+04Y	1.00	1.990E+00	1.990E+00	0.255E+00	12.82	
TH-232	1.41E+10Y	1.00	8.347E-01	8.347E-01	3.324E-01	39.83	
PA-234M	4.47E+09Y	1.00	8.192E-01	8.192E-01	37.67E-01	459.88	
TH-234	4.47E+09Y	1.00	8.192E-01	8.192E-01	37.67E-01	459.88	
U-234	2.45E+05Y	1.00	1.990E+00	1.990E+00	0.255E+00	12.82	
U-238	4.47E+09Y	1.00	8.192E-01	8.192E-01	37.67E-01	459.88	
AM-243	7370.00Y	1.00	3.362E-01	3.362E-01	1.280E-01	38.06	
ANH-511	1.00E+09Y	1.00	7.445E-02	7.445E-02	9.445E-02	126.86	
	Total Activity :		3.689E+01	3.750E+01			

Grand Total Activity : 3.689E+01 3.750E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
7	35.79	80	22	2.05	71.69	67	26	1.79E-02	53.2	8.32E-02	
7	38.78	49	88	2.25	77.68	67	26	1.11E-02	****	1.69E-01	
7	40.70	32	67	1.40	81.51	67	26	7.24E-03	****	2.46E-01	
7	44.73	15	102	1.45	89.57	67	26	3.34E-03	****	4.76E-01	T
0	186.07	86	227	1.19	372.20	367	12	2.13E-02	81.1	5.34E+00	T
0	209.68	81	124	2.04	419.43	414	11	2.02E-02	61.1	4.97E+00	T
0	459.88	11	13	1.28	919.79	916	6	2.86E-03	****	2.70E+00	
0	467.98	18	19	2.41	936.00	932	9	4.81E-03	****	2.66E+00	T
0	532.27	28	20	3.33	1064.57	1058	15	7.48E-03	80.1	2.38E+00	T
0	539.42	20	18	1.46	1078.87	1073	10	5.47E-03	91.3	2.36E+00	
0	566.51	42	17	3.35	1133.05	1128	11	1.14E-02	49.5	2.26E+00	
0	599.25	23	13	1.68	1198.54	1193	10	6.15E-03	76.9	2.15E+00	T
6	619.93	12	3	1.91	1239.91	1238	12	3.14E-03	62.0	2.09E+00	T
0	665.06	19	12	1.28	1330.17	1326	8	5.15E-03	79.3	1.96E+00	T
0	705.40	23	23	5.34	1410.84	1403	15	6.25E-03	****	1.86E+00	T
0	733.65	22	12	1.11	1467.34	1462	12	6.00E-03	77.4	1.80E+00	T
2	764.11	17	3	2.09	1528.28	1521	22	4.69E-03	91.9	1.74E+00	T
2	768.27	38	9	2.09	1536.60	1521	22	1.06E-02	47.0	1.73E+00	T
0	786.09	19	11	0.74	1572.24	1568	8	5.33E-03	76.5	1.69E+00	
0	928.56	7	4	0.88	1857.21	1853	8	1.94E-03	****	1.45E+00	T
3	964.34	17	21	2.42	1928.80	1919	24	4.67E-03	****	1.41E+00	T
0	1000.17	10	0	0.83	2000.46	1996	9	2.82E-03	77.0	1.36E+00	
0	1032.29	10	3	3.89	2064.72	2058	11	2.82E-03	89.3	1.32E+00	
0	1154.45	5	12	1.17	2309.08	2304	9	1.29E-03	****	1.19E+00	
0	1238.54	27	6	2.12	2477.32	2471	14	7.85E-03	54.1	1.12E+00	T
0	1326.56	10	0	1.61	2653.40	2648	10	2.78E-03	63.2	1.05E+00	
0	1377.22	11	3	1.28	2754.76	2751	7	3.26E-03	78.3	1.02E+00	
0	1408.26	13	4	1.14	2816.85	2812	8	3.89E-03	72.8	9.98E-01	T
0	1509.09	7	2	0.67	3018.58	3014	9	2.10E-03	****	9.42E-01	
0	1527.64	10	0	0.73	3055.70	3051	9	2.78E-03	63.2	9.33E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:27.29

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507021.CNF;1    *
* Acquisition date : 10-APR-2025 20:45:51 Sensitivity     : 3.000          *
* Detector ID      : GAM01                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****          *
* Sample date      :  7-MAR-2025 10:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507021           Analyst initials: MXR1           *
* Batch Number     : 2767517              Sample Quantity : 1.3445E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	3.660E-01
K-40	3.343E-01
RU-103	4.077E-02
RH-106	3.034E-01
RU-106	3.034E-01
CD-109	9.937E-01
SN-126	9.185E-02
CS-134	3.392E-02
TL-208	2.948E-02
BI-211	1.929E-01
BI-212	3.600E-01
PB-212	5.437E-02
BI-214	6.579E-02
PB-214	7.017E-02
RN-222	6.579E-02
RA-224	5.826E-01
RA-226	7.017E-02
AC-228	1.381E-01
RA-228	1.381E-01
TH-228	5.437E-02
TH-230	7.017E-02
TH-232	1.381E-01
PA-234M	1.435E+00
TH-234	1.435E+00
U-234	7.017E-02
U-238	1.435E+00
AM-243	5.409E-02
ANH-511	2.537E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	3.636E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.878E-02	NOT IDENT.

SC-46	3.489E-02	FAIL ABUN
V-48	1.424E-01	NOT IDENT.
CR-51	5.222E-01	NOT IDENT.
MN-52	2.315E+00	NOT IDENT.
MN-54	3.421E-02	NOT IDENT.
CO-56	4.546E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.753E-02	NOT IDENT.
CO-58	3.343E-02	NOT IDENT.
FE-59	1.039E-01	NOT IDENT.
CO-60	3.371E-02	NOT IDENT.
ZN-65	8.037E-02	NOT IDENT.
GE-68	1.072E+00	NOT IDENT.
AS-73	1.344E+00	NOT IDENT.
AS-74	1.700E-01	NOT IDENT.
SE-75	4.715E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.630E-01	NOT IDENT.
RB-83	6.916E-02	NOT IDENT.
RB-84	1.142E-01	NOT IDENT.
KR-85	6.284E+00	NOT IDENT.
SR-85	4.080E-02	NOT IDENT.
RB-86	1.277E+00	NOT IDENT.
Y-88	2.845E-02	NOT IDENT.
Y-91	1.939E+01	NOT IDENT.
NB-94	2.915E-02	NOT IDENT.
NB-95	5.711E-02	NOT IDENT.
NB-95M	1.401E-01	NOT IDENT.
ZR-95	6.072E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.149E-02	NOT IDENT.
RH-102	4.539E-02	FAIL ABUN
AG-108M	2.623E-02	NOT IDENT.
AG-110	6.314E-01	NOT IDENT.
AG-110M	4.106E-02	FAIL ABUN
SN-113	4.699E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.368E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.846E-02	NOT IDENT.
SB-124	6.924E-02	NOT IDENT.
SB-125	7.246E-02	FAIL ABUN
TE-125M	1.301E+01	NOT IDENT.
I-126	6.162E-01	FAIL ABUN
SB-126	3.523E-01	FAIL ABUN
SB-127	3.841E+01	NOT IDENT.
I-131	5.710E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.532E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
I-135	0.000E+00	SHORT HLIF
CS-136	1.714E-01	NOT IDENT.
BA-137M	3.584E-02	NOT IDENT.
CS-137	3.786E-02	NOT IDENT.
LA-138	2.105E-02	NOT IDENT.
CE-139	3.303E-02	NOT IDENT.
BA-140	5.959E-01	NOT IDENT.
LA-140	1.394E-01	NOT IDENT.
CE-141	8.500E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.846E-01	NOT IDENT.
PM-144	3.105E-02	NOT IDENT.
PR-144	2.339E+00	NOT IDENT.
PM-146	4.148E-02	NOT IDENT.
ND-147	1.757E+00	FAIL ABUN
PM-147	7.556E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.535E-02	FAIL ABUN
EU-152	1.018E-01	FAIL ABUN
GD-153	9.329E-02	NOT IDENT.
EU-154	1.020E-01	NOT IDENT.
EU-155	1.043E-01	FAIL ABUN
TB-160	1.471E-01	FAIL ABUN
HO-166M	6.108E-02	NOT IDENT.

TM-171	2.479E+01	NOT IDENT.
HF-172	1.962E-01	FAIL ABUN
LU-172	5.894E-02	FAIL ABUN
LU-176	2.435E-02	FAIL ABUN
HF-181	5.166E-02	NOT IDENT.
TA-182	1.744E-01	FAIL ABUN
RE-183	2.366E-01	NOT IDENT.
RE-184	1.592E-01	NOT IDENT.
W-188	8.217E+00	FAIL ABUN
IR-192	4.138E-02	FAIL ABUN
HG-203	4.733E-02	NOT IDENT.
TL-204	5.499E+00	NOT IDENT.
BI-207	4.368E-02	FAIL ABUN
BI-210	4.709E+00	NOT IDENT.
PB-210	4.709E+00	NOT IDENT.
PB-211	6.896E-01	NOT IDENT.
BI-213	9.216E-02	NOT IDENT.
RN-219	4.016E-01	NOT IDENT.
RA-223	6.163E-01	FAIL ABUN
AC-225	1.978E+00	NOT IDENT.
AC-227	2.243E-01	NOT IDENT.
TH-227	2.243E-01	NOT IDENT.
TH-229	4.898E-01	FAIL ABUN
PA-231	4.631E-01	NOT IDENT.
TH-231	6.163E-01	FAIL ABUN
PA-233	5.186E-02	NOT IDENT.
PA-234	2.611E-01	FAIL ABUN
U-235	2.130E-01	FAIL ABUN
NP-237	5.186E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.580E-01	NOT IDENT.
PU-239	3.573E+02	NOT IDENT.
AM-241	1.746E-01	NOT IDENT.
CM-243	1.046E-01	NOT IDENT.
BK-247	7.571E-02	NOT IDENT.
CM-247	3.619E-02	NOT IDENT.
CF-249	3.924E-02	NOT IDENT.
CF-251	1.249E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:31.41

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507021.CNF;1    *
* Acquisition date : 10-APR-2025 20:45:51 Sensitivity     : 3.000          *
* Detector ID      : GAM01                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****          *
* Sample date      :  7-MAR-2025 10:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507021           Analyst initials: MXR1           *
* Batch Number     : 2767517              Sample Quantity : 1.3445E+02 GRAM   *
*                                         Quantity Err(%) : 1.4875E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-JUN-2024 05:42:50 Eff. Geometry   : CAN            *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;19           *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.212E+00	1.105E+00	1.105E+00
K-40	2.767E+00	9.172E-01	9.172E-01
RU-103	7.696E-02	7.146E-02	7.146E-02
RH-106	4.021E-01	2.913E-01	2.913E-01
RU-106	4.021E-01	2.913E-01	2.913E-01
CD-109	1.595E+00	1.892E+00	1.892E+00
SN-126	1.515E-01	1.795E-01	1.795E-01
CS-134	1.135E-01	6.578E-02	6.578E-02
TL-208	2.115E-01	9.955E-02	9.955E-02
BI-211	5.483E+00	8.214E-01	8.214E-01
BI-212	1.608E+00	9.086E-01	9.086E-01
PB-212	9.468E-01	1.572E-01	1.572E-01
BI-214	1.713E+00	2.767E-01	2.767E-01
PB-214	1.990E+00	2.964E-01	2.964E-01
RN-222	1.713E+00	2.767E-01	2.767E-01
RA-224	4.823E+00	1.379E+00	1.379E+00
RA-226	1.990E+00	2.964E-01	2.964E-01
AC-228	8.347E-01	3.374E-01	3.374E-01
RA-228	8.347E-01	3.374E-01	3.374E-01
TH-228	9.468E-01	1.572E-01	1.572E-01
TH-230	1.990E+00	2.963E-01	2.963E-01
TH-232	8.347E-01	3.374E-01	3.374E-01
PA-234M	8.192E-01	3.696E+00	3.696E+00
TH-234	8.192E-01	3.696E+00	3.696E+00
U-234	1.990E+00	2.963E-01	2.963E-01
U-238	8.192E-01	3.696E+00	3.696E+00
AM-243	3.362E-01	1.282E-01	1.282E-01
ANH-511	7.445E-02	9.279E-02	9.279E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	-1.003E-02	4.504E-02	4.526E-02	NOT IDENT.
NA-24	1.082E+15	1.752E+15	1.819E+15	SHORT HLIF

AL-26	1.923E-02	4.095E-02	4.185E-02	NOT IDENT.
SC-46	-2.080E-02	4.417E-02	4.516E-02	FAIL ABUN
V-48	5.523E-02	1.534E-01	1.554E-01	NOT IDENT.
CR-51	-3.261E-02	6.041E-01	6.043E-01	NOT IDENT.
MN-52	1.601E+00	2.253E+00	2.366E+00	NOT IDENT.
MN-54	-1.221E-04	3.903E-02	3.903E-02	NOT IDENT.
CO-56	2.658E-02	4.762E-02	4.911E-02	FAIL ABUN
MN-56	1.000E+41	1.791E+41	0.000E+00	SHORT HLIF
CO-57	1.311E-02	2.929E-02	2.988E-02	NOT IDENT.
CO-58	-7.967E-03	4.294E-02	4.309E-02	NOT IDENT.
FE-59	9.392E-02	1.007E-01	1.092E-01	NOT IDENT.
CO-60	8.387E-03	3.877E-02	3.896E-02	NOT IDENT.
ZN-65	4.453E-02	9.372E-02	9.585E-02	NOT IDENT.
GE-68	2.898E-01	1.182E+00	1.189E+00	NOT IDENT.
AS-73	1.047E+00	1.500E+00	1.573E+00	NOT IDENT.
AS-74	-7.834E-02	2.460E-01	2.485E-01	NOT IDENT.
SE-75	2.057E-02	5.170E-02	5.253E-02	NOT IDENT.
BR-77	4.150E+04	4.185E+04	4.584E+04	SHORT HLIF
SR-82	5.365E-02	5.528E-01	5.534E-01	NOT IDENT.
RB-83	-3.901E-02	8.848E-02	9.021E-02	NOT IDENT.
RB-84	1.163E-01	1.134E-01	1.250E-01	NOT IDENT.
KR-85	6.816E-01	8.211E+00	8.217E+00	NOT IDENT.
SR-85	4.365E-03	5.332E-02	5.336E-02	NOT IDENT.
RB-86	2.527E-01	1.427E+00	1.432E+00	NOT IDENT.
Y-88	-2.880E-02	4.709E-02	4.885E-02	NOT IDENT.
Y-91	-2.571E+00	2.330E+01	2.333E+01	NOT IDENT.
NB-94	2.741E-04	3.962E-02	3.962E-02	NOT IDENT.
NB-95	6.565E-02	5.932E-02	6.629E-02	NOT IDENT.
NB-95M	1.727E-02	1.745E-01	1.747E-01	NOT IDENT.
ZR-95	-7.847E-02	9.198E-02	9.855E-02	NOT IDENT.
NB-97	-1.000E+41	4.165E+41	0.000E+00	SHORT HLIF
ZR-97	1.256E+14	3.708E+14	3.751E+14	SHORT HLIF
MO-99	4.310E+02	1.619E+03	1.630E+03	SHORT HLIF
TC-99M	-7.811E+39	6.842E+39	0.000E+00	SHORT HLIF
RH-101	-5.308E-03	3.491E-02	3.500E-02	NOT IDENT.
RH-102	-3.996E-02	6.187E-02	6.444E-02	FAIL ABUN
AG-108M	-4.886E-03	3.139E-02	3.147E-02	NOT IDENT.
AG-110	3.457E-01	6.911E-01	7.085E-01	NOT IDENT.
AG-110M	-4.912E-02	5.631E-02	6.050E-02	FAIL ABUN
SN-113	-1.184E-02	5.611E-02	5.636E-02	NOT IDENT.
CD-115	-3.414E+03	5.313E+03	5.532E+03	SHORT HLIF
SN-117M	-5.112E-02	1.553E-01	1.570E-01	NOT IDENT.
SB-122	1.570E+02	3.268E+02	3.344E+02	SHORT HLIF
TE-123M	-2.352E-02	3.333E-02	3.498E-02	NOT IDENT.
SB-124	-9.824E-02	1.158E-01	1.240E-01	NOT IDENT.
SB-125	-9.542E-02	9.883E-02	1.078E-01	FAIL ABUN
TE-125M	7.598E+00	1.371E+01	1.413E+01	NOT IDENT.
I-126	1.032E+00	8.086E-01	9.329E-01	FAIL ABUN
SB-126	1.656E-01	3.932E-01	4.002E-01	FAIL ABUN
SB-127	2.296E+01	4.221E+01	4.346E+01	NOT IDENT.
I-131	-2.876E-01	6.952E-01	7.072E-01	NOT IDENT.
I-132	-1.000E+41	8.874E+41	0.000E+00	SHORT HLIF
TE-132	-6.520E+00	4.521E+01	4.530E+01	SHORT HLIF
BA-133	7.562E-02	4.790E-02	5.879E-02	NOT IDENT.
I-133	9.884E+09	3.184E+10	3.215E+10	SHORT HLIF
I-135	9.519E+35	1.032E+37	0.000E+00	SHORT HLIF
CS-136	-5.130E-02	2.134E-01	2.146E-01	NOT IDENT.
BA-137M	1.121E-02	4.299E-02	4.328E-02	NOT IDENT.
CS-137	1.184E-02	4.541E-02	4.572E-02	NOT IDENT.
LA-138	-7.729E-02	5.693E-02	6.675E-02	NOT IDENT.
CE-139	-7.867E-03	3.725E-02	3.742E-02	NOT IDENT.
BA-140	3.916E-01	8.458E-01	8.640E-01	NOT IDENT.
LA-140	-1.326E-01	2.240E-01	2.318E-01	NOT IDENT.
CE-141	-1.421E-01	1.042E-01	1.223E-01	NOT IDENT.
CE-143	4.214E+06	2.797E+06	3.381E+06	SHORT HLIF
CE-144	-1.931E-01	2.174E-01	2.342E-01	NOT IDENT.
PM-144	4.166E-03	3.679E-02	3.684E-02	NOT IDENT.
PR-144	2.862E-01	2.776E+00	2.779E+00	NOT IDENT.
PM-146	2.587E-02	4.531E-02	4.678E-02	NOT IDENT.
ND-147	4.383E+00	3.462E+00	3.987E+00	FAIL ABUN
PM-147	-1.085E+02	8.345E+02	8.359E+02	NOT IDENT.
PM-149	1.686E+04	4.485E+04	4.549E+04	SHORT HLIF
EU-150	-2.044E-02	3.549E-02	3.667E-02	FAIL ABUN
EU-152	1.176E-01	1.057E-01	1.182E-01	FAIL ABUN
GD-153	-4.604E-02	1.090E-01	1.110E-01	NOT IDENT.
EU-154	-2.814E-02	1.263E-01	1.270E-01	NOT IDENT.
EU-155	-5.009E-02	1.169E-01	1.191E-01	FAIL ABUN
TB-160	-5.366E-02	1.775E-01	1.791E-01	FAIL ABUN

HO-166M	5.918E-02	6.608E-02	7.126E-02	NOT IDENT.
TM-171	3.920E+00	2.869E+01	2.874E+01	NOT IDENT.
HF-172	-3.098E-03	2.154E-01	2.154E-01	FAIL ABUN
LU-172	3.831E-02	6.097E-02	6.337E-02	FAIL ABUN
LU-176	-1.035E-02	2.901E-02	2.938E-02	FAIL ABUN
HF-181	-3.189E-03	6.892E-02	6.893E-02	NOT IDENT.
TA-182	1.389E-01	1.745E-01	1.854E-01	FAIL ABUN
RE-183	-3.817E-01	3.187E-01	3.622E-01	NOT IDENT.
RE-184	1.317E-02	1.802E-01	1.803E-01	NOT IDENT.
W-188	-1.652E+00	1.070E+01	1.073E+01	FAIL ABUN
IR-192	1.311E-02	4.622E-02	4.660E-02	FAIL ABUN
HG-203	-3.247E-02	5.707E-02	5.892E-02	NOT IDENT.
TL-204	4.088E+00	6.694E+00	6.943E+00	NOT IDENT.
BI-207	2.145E-02	4.612E-02	4.712E-02	FAIL ABUN
BI-210	-3.481E+00	6.276E+00	6.469E+00	NOT IDENT.
PB-210	-3.481E+00	6.276E+00	6.469E+00	NOT IDENT.
PB-211	3.468E-01	7.621E-01	7.780E-01	NOT IDENT.
BI-213	-3.127E-02	1.121E-01	1.130E-01	NOT IDENT.
RN-219	-1.195E-02	4.695E-01	4.695E-01	NOT IDENT.
RA-223	3.727E-01	6.703E-01	6.911E-01	FAIL ABUN
AC-225	-8.029E-01	2.298E+00	2.326E+00	NOT IDENT.
AC-227	-1.942E-01	2.743E-01	2.879E-01	NOT IDENT.
TH-227	-1.942E-01	2.743E-01	2.879E-01	NOT IDENT.
TH-229	-3.916E-01	5.781E-01	6.045E-01	FAIL ABUN
PA-231	-6.673E-02	5.371E-01	5.379E-01	NOT IDENT.
TH-231	3.727E-01	6.703E-01	6.911E-01	FAIL ABUN
PA-233	-1.321E-02	6.113E-02	6.142E-02	NOT IDENT.
PA-234	-3.230E-02	3.087E-01	3.090E-01	FAIL ABUN
U-235	1.724E-01	2.228E-01	2.360E-01	FAIL ABUN
NP-237	-1.321E-02	6.113E-02	6.142E-02	NOT IDENT.
NP-238	3.835E+03	9.657E+03	9.810E+03	SHORT HLIF
NP-239	-8.789E-02	2.881E-01	2.909E-01	NOT IDENT.
PU-239	9.665E+00	3.917E+02	3.917E+02	NOT IDENT.
AM-241	1.620E-01	2.052E-01	2.179E-01	NOT IDENT.
CM-243	9.111E-03	1.131E-01	1.132E-01	NOT IDENT.
BK-247	4.022E-02	8.270E-02	8.467E-02	NOT IDENT.
CM-247	-9.694E-03	4.335E-02	4.357E-02	NOT IDENT.
CF-249	8.555E-03	4.464E-02	4.481E-02	NOT IDENT.
CF-251	-3.940E-02	1.421E-01	1.432E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	43.0408	81.75	126.1135	123.68	91.5765
879.38	77.8264	82.47	116.7967	125.81	89.1851
46.54	82.6262	83.79	100.1507	127.23	89.3017
228.16	0.0000	265.00	106.7451	127.91	97.0904
52.39	84.8449	193.51	108.5693	129.30	98.0731
1093.63	80.1970	105.31	143.3008	131.20	90.4865
52.39	83.8030	86.79	143.3397	133.02	81.1389
125.81	66.1578	86.94	143.3654	133.52	89.8109
53.44	69.7526	87.09	143.3902	136.00	96.9313
54.07	79.2874	87.57	143.4698	136.47	103.0331
293.27	0.0000	88.03	153.4447	739.50	0.0000
482.18	80.8906	306.78	153.4996	140.51	0.0000
57.98	84.5151	88.47	128.7606	143.76	72.3168
59.27	47.7039	143.76	153.7834	144.24	75.8329
59.32	47.7074	90.64	151.4194	145.44	108.1935
59.54	58.8579	531.02	153.9830	152.43	94.7823
60.96	73.3242	92.59	119.4097	1048.07	86.9422
61.17	73.3462	93.35	119.5107	154.21	87.8896
62.93	86.3161	94.56	88.0907	158.56	84.4980
63.29	86.3597	311.90	88.0993	159.00	85.5825
290.67	86.3947	946.00	88.1015	162.33	79.6170
87.57	86.4787	94.87	88.1206	537.26	89.3706
66.73	93.1963	97.43	105.0391	163.33	89.4178
67.24	102.9082	98.43	96.8071	165.86	91.3687
67.68	114.2310	98.44	96.8083	427.87	82.2641
1221.41	114.2418	103.37	81.0460	176.60	84.0706
70.82	93.0636	116.74	81.0460	177.52	83.2330
97.43	111.3080	100.11	86.1120	181.07	0.0000
70.82	85.6263	102.03	88.8002	181.52	79.4406
279.20	85.6274	103.18	78.8420	184.41	99.8474
1063.66	95.9708	103.37	78.8578	185.72	91.8388
72.87	95.9787	911.20	92.4561	193.51	86.0135
351.06	95.9787	105.31	92.4656	197.03	73.5191
74.66	96.1981	106.12	86.6537	198.01	89.9182
351.93	96.2174	106.47	86.6846	201.83	88.3345
238.63	96.2174	109.28	82.7124	203.43	82.9612
351.93	96.2174	111.00	97.2278	205.31	72.5701
238.63	96.2174	111.76	0.0000	210.85	57.7231
74.97	96.2354	114.06	82.2577	215.65	62.5028
77.11	96.4940	116.30	0.0000	218.12	62.6045
78.74	101.1757	116.74	86.7240	222.11	59.9979
256.23	106.1950	119.76	79.3013	227.09	52.7817
80.03	101.3347	264.66	87.9414	227.38	52.7910
133.52	101.3466	121.22	87.9498	228.16	0.0000
364.49	101.3548	344.28	90.5595	228.18	50.9650
711.68	94.8595	122.06	78.6194	235.69	64.2397
356.01	90.0000	122.92	80.3935	235.96	64.2509
323.87	90.0072	1274.44	79.5496	238.63	64.3569

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	47.2803	531.02	9.6086
240.99	64.4503	338.32	47.2813	537.26	9.6302
242.00	64.4903	340.48	36.9781	1260.41	0.0000
244.70	51.9579	340.55	36.9789	552.55	17.2135
685.70	47.0256	344.28	28.6489	795.86	27.5368
388.16	47.9775	345.93	34.1097	564.24	0.0000
507.63	0.0000	351.06	39.6452	569.33	12.9858
256.23	61.2721	351.93	39.6615	569.50	12.9863
527.90	0.0000	355.39	0.0000	569.70	12.9873
264.66	43.5752	356.01	20.8629	583.19	17.3965
264.80	43.5789	364.49	40.8949	584.27	17.4030
265.00	41.6886	366.42	0.0000	595.83	22.9294
269.46	56.9934	372.51	28.0319	600.60	0.0000
270.03	51.3105	375.05	33.0765	602.52	0.0000
401.81	73.2152	377.52	26.0894	604.72	19.7124
273.65	73.3154	383.85	42.2657	607.14	6.5759
276.40	46.7281	388.16	33.2733	609.32	23.0320
583.19	50.5695	666.33	29.2460	610.33	23.0397
277.60	50.5760	391.69	36.3552	614.28	14.8304
402.40	55.3603	400.66	34.4711	618.01	13.1987
279.20	60.1725	401.81	36.5171	884.68	19.8135
279.54	55.4075	402.40	38.5559	621.93	19.8230
279.70	56.3676	404.85	27.4246	630.19	0.0000
280.46	49.7011	410.95	45.8276	631.29	23.1969
301.36	63.1949	413.71	28.5492	633.25	12.1584
284.31	56.5117	720.70	26.5210	634.78	14.3759
285.41	50.7949	423.72	32.7663	635.95	22.1248
285.90	0.0000	427.09	24.6099	636.99	15.4925
287.50	51.8126	427.87	34.8750	657.50	10.0239
290.67	50.4610	433.94	27.7652	657.76	15.5945
293.27	0.0000	439.40	32.9811	657.90	0.0000
295.22	54.9207	440.45	26.8088	661.66	13.3828
316.51	54.9416	453.88	21.7716	664.57	0.0000
298.58	46.3320	463.37	14.5694	666.33	8.3762
299.98	39.1215	468.07	23.9799	666.50	8.3768
300.09	39.1240	473.00	29.2498	667.71	0.0000
300.13	39.1248	631.29	18.8185	677.62	11.2069
311.90	39.1248	696.49	23.0156	685.70	11.2345
301.36	52.2004	477.60	23.0232	692.65	0.0000
302.85	49.3388	482.18	22.0156	695.00	18.0254
304.50	45.5093	487.02	23.1069	696.49	15.7791
304.85	45.5169	492.35	0.0000	696.51	15.7796
306.78	47.5026	497.08	14.7608	697.00	16.9092
308.46	33.9597	505.52	9.5193	697.30	16.9104
311.90	34.0209	507.63	0.0000	697.49	15.7842
316.51	40.9216	511.00	22.2570	702.65	16.9373
319.41	40.0065	514.00	23.8733	706.68	16.9574
320.08	36.1155	514.00	23.8733	711.68	10.8688
321.04	37.1101	520.40	24.4609	720.70	10.2166
323.87	34.2295	520.69	0.0000	721.93	0.0000
325.23	40.1250	667.71	0.0000	1690.97	13.6304
1596.21	41.1763	527.90	0.0000	722.91	13.6309
333.37	48.6400	528.26	22.3979	723.31	20.4485
333.97	53.0782	529.59	19.2078	756.73	10.2268
334.37	47.1895	529.87	0.0000	727.33	10.9187

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	10.9367	935.54	17.1231	1362.66	0.0000
735.93	11.9719	937.49	15.3279	1365.19	8.8737
737.46	10.2660	983.53	9.9338	1368.63	0.0000
739.50	0.0000	946.00	12.6486	1384.29	7.9150
1434.09	12.5719	949.00	7.2332	1408.01	2.9810
747.24	16.0143	954.55	0.0000	1434.09	1.9965
748.06	14.8736	962.31	10.8842	1435.80	9.9854
752.31	16.0371	964.08	10.8885	1457.56	0.0000
753.82	14.8980	966.17	10.8940	1460.82	7.0205
756.73	18.3509	968.97	10.9010	1489.16	4.0313
756.80	18.3516	983.53	8.2038	1505.03	6.4676
763.94	12.6418	984.45	0.0000	1584.12	7.1679
765.81	12.6485	996.26	7.3137	1596.21	5.1300
766.84	12.6521	1002.74	1.4649	1620.50	4.1201
772.60	0.0000	1004.73	4.3969	1621.92	7.2119
776.52	11.5328	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	5.2078
778.90	19.6189	1028.54	0.0000	1750.46	0.0000
783.70	22.5334	1037.84	10.5476	1764.49	1.6854
1435.80	12.1505	1038.76	0.0000	1770.23	2.1085
903.28	12.1616	1046.59	4.6237	1771.35	1.0544
795.86	12.7537	1048.07	6.4753	1791.20	0.0000
801.95	8.1294	1049.04	8.3271	1808.65	3.1809
810.06	9.3109	1050.41	8.3293	1810.72	0.0000
810.29	9.3115	1063.66	6.4976	1836.06	5.3229
810.45	9.3118	1077.00	7.4473		
810.76	10.4769	1077.34	7.4482		
815.77	9.3252	1085.87	8.3947		
818.51	6.9990	1093.63	6.5403		
832.01	15.8044	1099.45	3.7419		
834.85	14.9373	1112.07	12.1938		
835.71	16.6981	1112.84	8.4435		
836.80	0.0000	1115.54	7.5093		
846.75	0.0000	1120.29	10.3360		
846.77	10.5769	1120.55	10.3367		
856.80	14.1392	1121.30	10.3380		
860.56	8.8455	1808.65	10.3568		
871.09	7.9824	1131.51	0.0000		
873.19	16.8604	1147.95	0.0000		
875.33	0.0000	1332.49	9.5007		
879.38	16.8871	1177.95	7.6079		
880.51	13.3356	1189.05	9.5313		
881.60	8.8928	1204.77	9.5612		
883.24	12.4551	1221.41	4.7968		
884.68	18.6897	1231.02	6.7283		
889.28	13.3653	1235.36	12.3133		
894.76	13.3836	1238.28	5.7751		
1836.06	11.6087	1260.41	0.0000		
900.72	10.7227	1271.87	8.7198		
903.28	11.6237	1274.44	10.6623		
911.20	16.1257	1274.54	10.6630		
912.08	16.1290	1291.59	4.8627		
984.45	0.0000	1298.22	0.0000		
926.50	11.5102	1312.11	6.8342		
929.11	14.3970	1332.49	5.6002		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:58.20

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507022.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;814
                                    Background date  : 6-APR-2025 11:01:07.
Sample date      : 7-MAR-2025 10:30:00. Acquisition date : 10-APR-2025 20:46:23
Sample ID        : G714507022           Sample quantity  : 1.28230E+02 GRAM
Detector name    : GAM04                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.69  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767517              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	74.70	168	163	1.07	150.23	144	18	4.65E-02	14.6	1.48E+00
2	2	77.07	256	164	0.96	154.96	144	18	7.10E-02	10.2	
3	2	79.09	38	165	0.98	159.00	144	18	1.05E-02	59.7	
4	0	83.81*	53	173	1.24	168.44	166	6	1.48E-02	41.9	
5	3	87.27	106	198	1.21	175.36	172	20	2.95E-02	24.2	8.78E-01
6	3	89.88	88	195	1.21	180.58	172	20	2.44E-02	28.9	
7	3	92.57*	193	192	1.22	185.97	172	20	5.36E-02	14.5	
8	0	104.91	68	182	2.14	210.64	207	9	1.89E-02	37.6	
9	0	135.76	38	187	2.68	272.32	270	8	1.06E-02	64.3	
10	0	143.74*	49	201	1.50	288.27	285	8	1.36E-02	52.6	
11	0	186.06*	307	314	1.27	372.91	366	14	8.52E-02	13.6	
12	0	210.24	82	250	4.42	421.25	415	14	2.28E-02	42.8	
13	2	238.73*	228	188	1.10	478.24	474	15	6.33E-02	11.3	4.65E+00
14	2	242.08	321	121	1.17	484.93	474	15	8.92E-02	8.2	
15	0	257.69	54	125	4.03	516.14	511	11	1.49E-02	42.8	
16	0	295.27*	587	153	1.23	591.29	584	13	1.63E-01	6.0	
17	0	352.04*	1014	113	1.16	704.82	699	13	2.82E-01	3.8	
18	0	416.81	20	33	1.37	834.36	831	6	5.43E-03	52.4	
19	0	478.73	70	60	4.47	958.17	948	19	1.93E-02	29.6	
20	0	511.26*	35	66	1.51	1023.23	1017	14	9.83E-03	57.0	
21	0	548.26	18	52	4.18	1097.24	1090	14	5.00E-03	88.5	
22	2	583.62*	78	35	1.74	1167.96	1155	33	2.17E-02	19.1	1.14E+00
23	2	591.46	18	20	1.75	1183.63	1155	33	4.87E-03	60.0	
24	1	609.52*	707	27	1.45	1219.75	1214	27	1.97E-01	4.0	1.62E+00
25	1	613.55	25	30	1.61	1227.82	1214	27	6.82E-03	44.4	
26	0	665.72	28	23	1.17	1332.14	1328	9	7.84E-03	35.7	
27	2	703.03	14	12	1.34	1406.77	1405	14	3.83E-03	42.9	1.72E+00
28	2	705.82	17	33	1.85	1412.36	1405	14	4.62E-03	74.1	
29	0	719.58	26	21	1.83	1439.87	1433	12	7.24E-03	40.2	
30	0	769.16	65	58	1.74	1539.04	1530	19	1.80E-02	31.6	
31	0	783.61	7	20	0.89	1567.94	1561	8	2.06E-03	110.5	
32	0	822.17	27	36	1.63	1645.07	1636	18	7.50E-03	55.6	
33	0	860.64	19	18	1.48	1722.01	1718	10	5.33E-03	46.8	
34	0	911.49*	56	33	1.65	1823.73	1819	11	1.55E-02	24.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	934.81	53	25	1.46	1870.38	1865	12	1.47E-02	23.1	
36	0	969.26*	48	56	5.73	1939.28	1921	28	1.34E-02	46.3	
37	0	1002.03	12	9	1.04	2004.83	2000	9	3.33E-03	53.5	
38	0	1007.39	13	12	1.01	2015.54	2011	11	3.59E-03	57.5	
39	0	1061.25*	20	47	9.16	2123.29	2097	28	5.53E-03	102.3	
40	0	1120.99*	148	14	1.75	2242.79	2237	16	4.10E-02	10.3	
41	0	1155.62	12	8	1.43	2312.08	2307	9	3.21E-03	54.9	
42	6	1181.99	11	3	2.04	2364.82	2362	11	2.96E-03	39.2	1.26E+00
43	6	1184.49	10	3	1.39	2369.83	2362	11	2.77E-03	42.0	
44	0	1238.38	72	4	1.47	2477.64	2470	15	2.01E-02	13.1	
45	0	1281.97	13	11	0.67	2564.84	2559	9	3.70E-03	52.7	
46	0	1377.80	34	7	1.53	2756.54	2749	14	9.44E-03	23.8	
47	0	1391.93	6	4	1.07	2784.82	2781	6	1.69E-03	67.1	
48	0	1408.59	26	11	2.33	2818.14	2813	10	7.31E-03	31.4	
49	0	1461.13*	44	10	2.14	2923.27	2918	11	1.22E-02	22.1	
50	0	1471.82	6	9	2.74	2944.66	2937	9	1.69E-03	97.3	
51	0	1475.24*	5	0	0.58	2951.50	2948	6	1.36E-03	51.0	
52	0	1729.51	30	0	2.21	3460.23	3454	12	8.33E-03	18.3	
53	0	1765.15*	111	18	2.00	3531.56	3524	14	3.08E-02	12.6	
54	0	1848.03	18	0	0.83	3697.39	3692	10	5.00E-03	23.6	
55	0	1872.07	7	2	1.31	3745.50	3741	9	1.87E-03	55.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:46:59

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507022.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 10:30:00	Acquisition date	: 10-APR-2025 20:46:23
Sample ID	: G714507022	Sample quantity	: 128.23 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA4	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.69 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	71	10.44*	2.382E+00	1.677E+00	2.626E+00	59.21
K-40	1460.82	42	10.66*	8.746E-01	2.626E+00	2.626E+00	44.25
CD-109	88.03	121	3.70*	3.820E+00	4.998E+00	5.264E+00	48.49
SN-126	64.28	------	9.60	1.539E+00	------ Line Not Found		------
	86.94	121	8.90	3.820E+00	2.078E+00	2.078E+00	48.49
	87.57	121	37.00*	3.820E+00	4.998E-01	4.998E-01	48.49
EU-155	86.55	121	30.70	3.820E+00	6.024E-01	6.107E-01	48.49
	105.31	77	21.10*	4.789E+00	4.437E-01	4.499E-01	75.18
TL-208	277.37	------	6.60	3.532E+00	------ Line Not Found		------
	583.19	79	85.00*	2.039E+00	2.665E-01	2.665E-01	38.27
	860.56	19	12.50	1.441E+00	6.151E-01	6.151E-01	93.66
BI-211	72.87	------	1.23	2.469E+00	------ Line Not Found		------
	351.06	1060	12.92*	2.983E+00	1.611E+01	1.611E+01	7.66
PB-212	74.82	192	10.28	2.662E+00	4.112E+00	4.112E+00	29.17
	77.11	293	17.10	2.906E+00	3.450E+00	3.450E+00	20.45
	238.63	244	43.60*	3.920E+00	8.353E-01	8.353E-01	22.64
	300.09	------	3.30	3.342E+00	------ Line Not Found		------
BI-214	609.32	714	45.49*	1.967E+00	4.670E+00	4.671E+00	8.04
	1120.29	143	14.92	1.111E+00	5.049E+00	5.049E+00	20.56
	1764.49	104	15.30	7.786E-01	5.118E+00	5.118E+00	25.25
PB-214	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.424E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
RN-222	609.32	714	45.49*	1.967E+00	4.670E+00	4.671E+00	8.04
	1120.29	143	14.92	1.111E+00	5.049E+00	5.049E+00	20.56
	1764.49	104	15.30	7.786E-01	5.118E+00	5.118E+00	25.25
RA-224	240.99	344	4.10*	3.883E+00	1.264E+01	1.264E+01	16.48
RA-226	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.424E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
AC-228	105.21	77	1.10	4.789E+00	8.511E+00	8.511E+00	75.18
	338.32	------	11.27	3.069E+00	------ Line Not Found		------
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	55	25.80*	1.363E+00	9.106E-01	9.106E-01	48.10
	968.97	47	15.80	1.283E+00	1.364E+00	1.364E+00	92.55
RA-228	105.21	77	1.10	4.789E+00	8.511E+00	8.511E+00	75.18
	338.32	------	11.27	3.069E+00	------ Line Not Found		------
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	55	25.80*	1.363E+00	9.106E-01	9.106E-01	48.10
	968.97	47	15.80	1.283E+00	1.364E+00	1.364E+00	92.55
TH-228	74.82	192	10.28	2.662E+00	4.112E+00	4.112E+00	29.17
	77.11	293	17.10	2.906E+00	3.450E+00	3.450E+00	20.45
	238.63	244	43.60*	3.920E+00	8.353E-01	8.353E-01	22.64

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	300.09	------	3.30	3.342E+00	------ Line Not Found		------
TH-230	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.423E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
TH-232	105.21	77	1.10	4.789E+00	8.511E+00	8.511E+00	75.18
	338.32	------	11.27	3.069E+00	------ Line Not Found		------
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	55	25.80*	1.363E+00	9.106E-01	9.106E-01	48.10
	968.97	47	15.80	1.283E+00	1.364E+00	1.364E+00	92.55
U-234	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.423E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
U-235	89.96	100	3.47	4.012E+00	4.187E+00	4.187E+00	57.82
	93.35	219	5.60	4.192E+00	5.456E+00	5.456E+00	28.92
	143.76	54	10.96*	5.110E+00	5.653E-01	5.653E-01	105.29
	163.33	------	5.08	4.900E+00	------ Line Not Found		------
	185.72	334	57.20	4.591E+00	7.438E-01	7.438E-01	27.30
	205.31	------	5.01	4.329E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	9.616E-02	------ Line Not Found		------
	74.66	192	67.20*	2.662E+00	6.290E-01	6.290E-01	29.17
ANH-511	511.00	36	100.00*	2.265E+00	9.335E-02	9.335E-02	114.03

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:47:00.47

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507022.CNF;1    *
* Acquisition date : 10-APR-2025 20:46:23 Sensitivity     : 3.000          *
* Detector ID      : GAM04                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.69     Half life ratio : *****          *
* Sample date      :  7-MAR-2025 10:30:00 Analyst initials: MXR1           *
* Sample ID        : G714507022           Sample Quantity : 1.2823E+02 GRAM   *
* Batch Number     : 2767517              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;18                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	2.626E+00	1.524E+00	1.053E+00
K-40	2.626E+00	1.139E+00	9.853E-01
CD-109	5.264E+00	2.501E+00	2.055E+00
SN-126	4.998E-01	2.375E-01	1.968E-01
EU-155	4.499E-01	3.315E-01	2.743E-01
TL-208	2.665E-01	9.996E-02	9.040E-02
BI-211	1.611E+01	1.209E+00	5.313E-01
PB-212	8.353E-01	1.853E-01	1.735E-01
BI-214	4.671E+00	3.679E-01	1.670E-01
PB-214	5.845E+00	4.388E-01	1.932E-01
RN-222	4.671E+00	3.679E-01	1.670E-01
RA-224	1.264E+01	2.041E+00	1.860E+00
RA-226	5.845E+00	4.388E-01	1.932E-01
AC-228	9.106E-01	4.292E-01	4.212E-01
RA-228	9.106E-01	4.292E-01	4.212E-01
TH-228	8.353E-01	1.853E-01	1.735E-01
TH-230	5.845E+00	4.388E-01	1.932E-01
TH-232	9.106E-01	4.292E-01	4.212E-01
U-234	5.845E+00	4.388E-01	1.932E-01
U-235	5.653E-01	5.833E-01	5.557E-01
AM-243	6.290E-01	1.798E-01	1.819E-01
ANH-511	9.335E-02	1.043E-01	7.554E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-22	1.219E-02	4.565E-02	9.959E-02	NOT IDENT.
NA-24	0.000E+00	2.075E+15	0.000E+00	SHORT HLIF
AL-26	1.364E-02	4.814E-02	1.069E-01	NOT IDENT.
SC-46	5.116E-03	6.915E-02	1.309E-01	FAIL ABUN
V-48	-2.286E-02	2.482E-01	4.552E-01	NOT IDENT.
CR-51	-7.664E-01	8.509E-01	1.351E+00	NOT IDENT.
MN-52	2.287E+00	3.008E+00	7.397E+00	FAIL ABUN
MN-54	-7.382E-03	5.174E-02	9.553E-02	NOT IDENT.

CO-56	2.945E-02	6.077E-02	1.245E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.554E-02	3.965E-02	7.560E-02	FAIL ABUN
CO-58	-2.886E-02	6.947E-02	1.227E-01	NOT IDENT.
FE-59	-8.887E-02	1.457E-01	2.658E-01	NOT IDENT.
CO-60	5.454E-02	5.707E-02	1.314E-01	NOT IDENT.
ZN-65	-1.374E-02	1.354E-01	2.337E-01	NOT IDENT.
GE-68	-5.025E-01	1.685E+00	3.247E+00	NOT IDENT.
AS-73	2.830E+00	3.270E+00	6.767E+00	NOT IDENT.
AS-74	7.485E-02	3.065E-01	5.428E-01	NOT IDENT.
SE-75	-1.710E-02	7.760E-02	1.353E-01	FAIL ABUN
BR-77	0.000E+00	8.074E+03	0.000E+00	SHORT HLIF
SR-82	3.391E-01	7.729E-01	1.506E+00	NOT IDENT.
RB-83	3.559E-03	1.012E-01	1.978E-01	NOT IDENT.
RB-84	4.656E-02	1.023E-01	2.220E-01	NOT IDENT.
KR-85	8.606E+00	9.673E+00	1.884E+01	NOT IDENT.
SR-85	5.574E-02	6.279E-02	1.223E-01	NOT IDENT.
RB-86	-1.704E+00	2.193E+00	3.877E+00	NOT IDENT.
Y-88	-4.290E-02	6.782E-02	1.151E-01	NOT IDENT.
Y-91	5.470E+00	3.041E+01	6.299E+01	NOT IDENT.
NB-94	4.651E-02	3.909E-02	1.004E-01	FAIL ABUN
NB-95	-2.032E-02	8.594E-02	1.373E-01	NOT IDENT.
NB-95M	-5.455E-02	2.907E-01	4.659E-01	NOT IDENT.
ZR-95	-6.796E-02	9.773E-02	1.661E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.044E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.301E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	9.454E+39	0.000E+00	SHORT HLIF
RH-101	1.875E-04	4.879E-02	9.031E-02	NOT IDENT.
RH-102	-6.071E-02	7.223E-02	1.224E-01	NOT IDENT.
RU-103	1.039E-02	6.907E-02	1.368E-01	FAIL ABUN
RH-106	-5.439E-01	5.203E-01	7.221E-01	NOT IDENT.
RU-106	-5.439E-01	5.203E-01	7.221E-01	NOT IDENT.
AG-108M	2.632E-03	4.057E-02	7.899E-02	FAIL ABUN
AG-110	7.870E-01	8.871E-01	1.931E+00	NOT IDENT.
AG-110M	1.867E-02	6.298E-02	1.276E-01	FAIL ABUN
SN-113	-1.379E-02	7.342E-02	1.394E-01	NOT IDENT.
CD-115	0.000E+00	5.728E+03	0.000E+00	SHORT HLIF
SN-117M	-7.393E-03	2.397E-01	4.351E-01	NOT IDENT.
SB-122	0.000E+00	3.800E+02	0.000E+00	SHORT HLIF
TE-123M	4.917E-02	5.059E-02	9.762E-02	NOT IDENT.
SB-124	-5.035E-02	1.589E-01	3.013E-01	NOT IDENT.
SB-125	-4.007E-02	1.248E-01	2.343E-01	NOT IDENT.
TE-125M	-3.113E+00	2.124E+01	3.637E+01	NOT IDENT.
I-126	1.751E+00	1.225E+00	2.018E+00	FAIL ABUN
SB-126	1.149E+00	9.062E-01	1.223E+00	FAIL ABUN
SB-127	-2.700E+01	6.040E+01	1.077E+02	FAIL ABUN
I-131	2.612E-01	7.929E-01	1.597E+00	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.606E+01	0.000E+00	SHORT HLIF
BA-133	-2.780E-02	6.500E-02	9.868E-02	NOT IDENT.
I-133	0.000E+00	3.862E+10	0.000E+00	SHORT HLIF
CS-134	5.195E-02	5.926E-02	1.242E-01	NOT IDENT.
I-135	0.000E+00	8.812E+36	0.000E+00	SHORT HLIF
CS-136	-5.577E-02	5.032E-01	8.081E-01	NOT IDENT.
BA-137M	-1.236E-02	4.366E-02	7.446E-02	NOT IDENT.
CS-137	-1.306E-02	4.613E-02	7.866E-02	NOT IDENT.
LA-138	-4.214E-02	7.115E-02	1.272E-01	NOT IDENT.
CE-139	-1.361E-02	5.363E-02	9.572E-02	NOT IDENT.
BA-140	-2.856E-01	1.084E+00	2.015E+00	NOT IDENT.
LA-140	-4.903E-01	4.279E-01	6.364E-01	NOT IDENT.
CE-141	1.844E-02	1.549E-01	2.654E-01	NOT IDENT.
CE-143	0.000E+00	3.544E+06	0.000E+00	SHORT HLIF
CE-144	-1.242E-01	3.469E-01	5.761E-01	FAIL ABUN
PM-144	2.201E-02	5.408E-02	1.060E-01	NOT IDENT.
PR-144	1.610E+00	4.081E+00	7.990E+00	NOT IDENT.
PM-146	1.111E-02	5.828E-02	1.146E-01	NOT IDENT.
ND-147	-1.804E+00	2.597E+00	4.590E+00	FAIL ABUN
PM-147	-9.227E+01	1.194E+03	2.205E+03	NOT IDENT.
PM-149	0.000E+00	6.044E+04	0.000E+00	SHORT HLIF
EU-150	-1.293E-02	4.413E-02	7.499E-02	FAIL ABUN
EU-152	3.816E-02	1.541E-01	2.771E-01	FAIL ABUN
GD-153	8.399E-03	1.304E-01	2.476E-01	NOT IDENT.
EU-154	8.817E-02	1.179E-01	2.843E-01	NOT IDENT.
TB-160	-7.848E-02	1.903E-01	3.383E-01	FAIL ABUN
HO-166M	-1.997E-02	8.600E-02	1.500E-01	FAIL ABUN
TM-171	1.299E+01	6.567E+01	1.304E+02	NOT IDENT.
HF-172	-4.846E-02	2.821E-01	5.180E-01	NOT IDENT.

LU-172	-2.800E-02	6.745E-02	1.294E-01	FAIL ABUN
LU-176	-2.890E-02	4.030E-02	6.594E-02	FAIL ABUN
HF-181	2.516E-02	8.138E-02	1.494E-01	NOT IDENT.
TA-182	-8.228E-02	1.940E-01	3.693E-01	FAIL ABUN
RE-183	9.195E-02	6.483E-01	1.275E+00	NOT IDENT.
RE-184	-5.960E-02	2.764E-01	4.988E-01	NOT IDENT.
W-188	-7.032E+00	1.426E+01	2.187E+01	NOT IDENT.
IR-192	-5.136E-03	6.116E-02	1.074E-01	FAIL ABUN
HG-203	7.773E-03	9.223E-02	1.629E-01	NOT IDENT.
TL-204	3.286E+00	9.902E+00	1.810E+01	FAIL ABUN
BI-207	2.566E-02	4.781E-02	1.077E-01	FAIL ABUN
BI-210	8.044E+00	2.103E+01	4.199E+01	NOT IDENT.
PB-210	8.044E+00	2.103E+01	4.199E+01	NOT IDENT.
PB-211	-2.604E-01	1.070E+00	2.014E+00	NOT IDENT.
BI-212	9.397E-01	8.155E-01	1.703E+00	NOT IDENT.
BI-213	-4.228E-02	1.335E-01	2.511E-01	NOT IDENT.
RN-219	9.651E-02	6.011E-01	1.172E+00	NOT IDENT.
RA-223	2.883E-01	9.713E-01	1.764E+00	FAIL ABUN
AC-225	-6.117E-01	3.352E+00	5.937E+00	NOT IDENT.
AC-227	0.000E+00	7.945E-01	7.577E-01	FAIL ABUN
TH-227	0.000E+00	7.945E-01	7.577E-01	FAIL ABUN
TH-229	7.399E-01	8.603E-01	1.633E+00	FAIL ABUN
PA-231	-2.674E-01	7.292E-01	1.242E+00	NOT IDENT.
TH-231	2.883E-01	9.713E-01	1.764E+00	FAIL ABUN
PA-233	2.766E-02	1.007E-01	1.808E-01	NOT IDENT.
PA-234	-1.580E-01	4.224E-01	7.437E-01	NOT IDENT.
PA-234M	2.132E+00	2.908E+00	5.845E+00	FAIL ABUN
TH-234	2.132E+00	2.908E+00	5.845E+00	FAIL ABUN
NP-237	2.766E-02	1.007E-01	1.808E-01	NOT IDENT.
NP-238	0.000E+00	1.729E+04	0.000E+00	SHORT HLIF
U-238	2.132E+00	2.908E+00	5.845E+00	FAIL ABUN
NP-239	-1.502E-01	3.951E-01	7.191E-01	FAIL ABUN
PU-239	-2.243E+01	5.331E+02	9.813E+02	NOT IDENT.
AM-241	2.505E-04	3.832E-01	7.460E-01	NOT IDENT.
CM-243	1.213E-02	1.603E-01	2.809E-01	NOT IDENT.
BK-247	-6.014E-02	1.267E-01	2.155E-01	FAIL ABUN
CM-247	2.467E-02	5.532E-02	1.103E-01	NOT IDENT.
CF-249	3.560E-02	6.244E-02	1.251E-01	NOT IDENT.
CF-251	6.009E-02	2.054E-01	3.790E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:46:59.01

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	71	10.44*	2.382E+00	1.677E+00	2.626E+00	59.21
K-40	1460.82	42	10.66*	8.746E-01	2.626E+00	2.626E+00	44.25
CD-109	88.03	121	3.70*	3.820E+00	4.998E+00	5.264E+00	48.49
SN-126	64.28	------	9.60	1.539E+00	------ Line Not Found		------
	86.94	121	8.90	3.820E+00	2.078E+00	2.078E+00	48.49
	87.57	121	37.00*	3.820E+00	4.998E-01	4.998E-01	48.49
EU-155	86.55	121	30.70	3.820E+00	6.024E-01	6.107E-01	48.49
	105.31	77	21.10*	4.789E+00	4.437E-01	4.499E-01	75.18
TL-208	277.37	------	6.60	3.532E+00	------ Line Not Found		------
	583.19	79	85.00*	2.039E+00	2.665E-01	2.665E-01	38.27
	860.56	19	12.50	1.441E+00	6.151E-01	6.151E-01	93.66
BI-211	72.87	------	1.23	2.469E+00	------ Line Not Found		------
	351.06	1060	12.92*	2.983E+00	1.611E+01	1.611E+01	7.66
PB-212	74.82	192	10.28	2.662E+00	4.112E+00	4.112E+00	29.17
	77.11	293	17.10	2.906E+00	3.450E+00	3.450E+00	20.45
	238.63	244	43.60*	3.920E+00	8.353E-01	8.353E-01	22.64
	300.09	------	3.30	3.342E+00	------ Line Not Found		------
BI-214	609.32	714	45.49*	1.967E+00	4.670E+00	4.671E+00	8.04
	1120.29	143	14.92	1.111E+00	5.049E+00	5.049E+00	20.56
	1764.49	104	15.30	7.786E-01	5.118E+00	5.118E+00	25.25
PB-214	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.424E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
RN-222	609.32	714	45.49*	1.967E+00	4.670E+00	4.671E+00	8.04
	1120.29	143	14.92	1.111E+00	5.049E+00	5.049E+00	20.56
	1764.49	104	15.30	7.786E-01	5.118E+00	5.118E+00	25.25
RA-224	240.99	344	4.10*	3.883E+00	1.264E+01	1.264E+01	16.48
RA-226	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.424E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
AC-228	105.21	77	1.10	4.789E+00	8.511E+00	8.511E+00	75.18
	338.32	------	11.27	3.069E+00	------ Line Not Found		------
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	55	25.80*	1.363E+00	9.106E-01	9.106E-01	48.10
	968.97	47	15.80	1.283E+00	1.364E+00	1.364E+00	92.55
RA-228	105.21	77	1.10	4.789E+00	8.511E+00	8.511E+00	75.18
	338.32	------	11.27	3.069E+00	------ Line Not Found		------
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	55	25.80*	1.363E+00	9.106E-01	9.106E-01	48.10
	968.97	47	15.80	1.283E+00	1.364E+00	1.364E+00	92.55
TH-228	74.82	192	10.28	2.662E+00	4.112E+00	4.112E+00	29.17

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	293	17.10	2.906E+00	3.450E+00	3.450E+00	20.45
	238.63	244	43.60*	3.920E+00	8.353E-01	8.353E-01	22.64
	300.09	------	3.30	3.342E+00	------ Line Not Found		------
TH-230	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.423E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
TH-232	105.21	77	1.10	4.789E+00	8.511E+00	8.511E+00	75.18
	338.32	------	11.27	3.069E+00	------ Line Not Found		------
	835.71	------	1.61	1.482E+00	------ Line Not Found		------
	911.20	55	25.80*	1.363E+00	9.106E-01	9.106E-01	48.10
	968.97	47	15.80	1.283E+00	1.364E+00	1.364E+00	92.55
U-234	74.82	192	5.80	2.662E+00	7.288E+00	7.288E+00	29.17
	77.11	293	9.70	2.906E+00	6.082E+00	6.082E+00	20.45
	87.09	121	3.41	3.820E+00	5.423E+00	5.423E+00	48.49
	242.00	344	7.25	3.883E+00	7.148E+00	7.148E+00	16.48
	295.22	620	18.42	3.380E+00	5.834E+00	5.834E+00	12.02
	351.93	1060	35.60*	2.983E+00	5.845E+00	5.845E+00	7.66
U-235	89.96	100	3.47	4.012E+00	4.187E+00	4.187E+00	57.82
	93.35	219	5.60	4.192E+00	5.456E+00	5.456E+00	28.92
	143.76	54	10.96*	5.110E+00	5.653E-01	5.653E-01	105.29
	163.33	------	5.08	4.900E+00	------ Line Not Found		------
	185.72	334	57.20	4.591E+00	7.438E-01	7.438E-01	27.30
	205.31	------	5.01	4.329E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	9.616E-02	------ Line Not Found		------
	74.66	192	67.20*	2.662E+00	6.290E-01	6.290E-01	29.17
ANH-511	511.00	36	100.00*	2.265E+00	9.335E-02	9.335E-02	114.03

Flag: "*" = Keyline

Sample ID : G714507022 Acquisition date : 10-APR-2025 20:46:23

Total number of lines in spectrum	55	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	37	67.27%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.57	1.677E+00	2.626E+00	1.555E+00	59.21	
K-40	1.25E+09Y	1.00	2.626E+00	2.626E+00	1.162E+00	44.25	
CD-109	461.40D	1.05	4.998E+00	5.264E+00	2.553E+00	48.49	
SN-126	2.30E+05Y	1.00	4.998E-01	4.998E-01	2.424E-01	48.49	
EU-155	4.75Y	1.01	4.437E-01	4.499E-01	3.382E-01	75.18	
TL-208	1.41E+10Y	1.00	2.665E-01	2.665E-01	1.020E-01	38.27	
BI-211	7.04E+08Y	1.00	1.611E+01	1.611E+01	0.123E+01	7.66	
PB-212	1.41E+10Y	1.00	8.353E-01	8.353E-01	1.891E-01	22.64	
BI-214	1600.00Y	1.00	4.670E+00	4.671E+00	0.375E+00	8.04	
PB-214	1600.00Y	1.00	5.845E+00	5.845E+00	0.448E+00	7.66	
RN-222	1600.00Y	1.00	4.670E+00	4.671E+00	0.375E+00	8.04	
RA-224	1.41E+10Y	1.00	1.264E+01	1.264E+01	0.208E+01	16.48	
RA-226	1600.00Y	1.00	5.845E+00	5.845E+00	0.448E+00	7.66	
AC-228	1.41E+10Y	1.00	9.106E-01	9.106E-01	4.380E-01	48.10	
RA-228	1.41E+10Y	1.00	9.106E-01	9.106E-01	4.380E-01	48.10	
TH-228	1.41E+10Y	1.00	8.353E-01	8.353E-01	1.891E-01	22.64	
TH-230	7.54E+04Y	1.00	5.845E+00	5.845E+00	0.448E+00	7.66	
TH-232	1.41E+10Y	1.00	9.106E-01	9.106E-01	4.380E-01	48.10	
U-234	2.45E+05Y	1.00	5.845E+00	5.845E+00	0.448E+00	7.66	
U-235	7.04E+08Y	1.00	5.653E-01	5.653E-01	5.952E-01	105.29	
AM-243	7370.00Y	1.00	6.290E-01	6.290E-01	1.835E-01	29.17	
ANH-511	1.00E+09Y	1.00	9.335E-02	9.335E-02	10.64E-02	114.03	
			---------	---------			
	Total Activity :		7.767E+01	7.889E+01			
	Grand Total Activity :		7.767E+01	7.889E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	79.09	43	188	0.98	159.00	144	18	1.05E-02	****	3.11E+00	T
0	83.81	61	198	1.24	168.44	166	6	1.48E-02	83.7	3.54E+00	T
0	135.76	42	207	2.68	272.32	270	8	1.06E-02	****	5.16E+00	T
0	210.24	89	270	4.42	421.25	415	14	2.28E-02	85.7	4.26E+00	T
0	257.69	57	134	4.03	516.14	511	11	1.49E-02	85.6	3.72E+00	T
0	416.81	20	35	1.37	834.36	831	6	5.43E-03	****	2.64E+00	
0	548.26	18	53	4.18	1097.24	1090	14	5.00E-03	****	2.14E+00	
2	591.46	18	20	1.75	1183.63	1155	33	4.87E-03	****	2.02E+00	
1	613.55	25	30	1.61	1227.82	1214	27	6.82E-03	88.8	1.96E+00	T
0	665.72	28	23	1.17	1332.14	1328	9	7.84E-03	71.4	1.82E+00	T
2	703.03	14	12	1.34	1406.77	1405	14	3.83E-03	85.8	1.74E+00	T
2	705.82	17	33	1.85	1412.36	1405	14	4.62E-03	****	1.73E+00	T
0	719.58	26	21	1.83	1439.87	1433	12	7.24E-03	80.5	1.70E+00	T
0	769.16	64	58	1.74	1539.04	1530	19	1.80E-02	63.1	1.60E+00	
0	783.61	7	19	0.89	1567.94	1561	8	2.06E-03	****	1.58E+00	T
0	822.17	27	36	1.63	1645.07	1636	18	7.50E-03	****	1.51E+00	
0	934.81	52	24	1.46	1870.38	1865	12	1.47E-02	46.2	1.33E+00	T
0	1002.03	12	9	1.04	2004.83	2000	9	3.33E-03	****	1.24E+00	T
0	1007.39	13	12	1.01	2015.54	2011	11	3.59E-03	****	1.23E+00	
0	1061.25	19	45	9.16	2123.29	2097	28	5.53E-03	****	1.17E+00	
0	1155.62	11	8	1.43	2312.08	2307	9	3.21E-03	****	1.08E+00	
6	1181.99	10	3	2.04	2364.82	2362	11	2.96E-03	78.4	1.06E+00	
6	1184.49	10	3	1.39	2369.83	2362	11	2.77E-03	84.0	1.05E+00	
0	1238.38	70	4	1.47	2477.64	2470	15	2.01E-02	26.3	1.01E+00	T
0	1281.97	13	10	0.67	2564.84	2559	9	3.70E-03	****	9.78E-01	
0	1377.80	32	7	1.53	2756.54	2749	14	9.44E-03	47.6	9.18E-01	
0	1391.93	6	4	1.07	2784.82	2781	6	1.69E-03	****	9.10E-01	
0	1408.59	25	10	2.33	2818.14	2813	10	7.31E-03	62.8	9.01E-01	T
0	1471.82	6	8	2.74	2944.66	2937	9	1.69E-03	****	8.70E-01	
0	1475.24	5	0	0.58	2951.50	2948	6	1.36E-03	****	8.68E-01	
0	1729.51	28	0	2.21	3460.23	3454	12	8.33E-03	36.5	7.86E-01	
0	1848.03	17	0	0.83	3697.39	3692	10	5.00E-03	47.1	7.66E-01	
0	1872.07	6	2	1.31	3745.50	3741	9	1.87E-03	****	7.64E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:47:10.02

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507022.CNF;1    *
* Acquisition date : 10-APR-2025 20:46:23 Sensitivity     : 3.000       *
* Detector ID      : GAM04                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.69     Half life ratio : *****       *
* Sample date      :  7-MAR-2025 10:30:00 Nuclide Library : SOLID        *
* Sample ID        : G714507022           Analyst initials: MXR1        *
* Batch Number     : 2767517              Sample Quantity : 1.2823E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	4.762E-01
K-40	4.078E-01
CD-109	9.671E-01
SN-126	9.263E-02
EU-155	1.290E-01
TL-208	4.058E-02
BI-211	2.448E-01
PB-212	8.205E-02
BI-214	7.458E-02
PB-214	8.902E-02
RN-222	7.458E-02
RA-224	8.793E-01
RA-226	8.902E-02
AC-228	1.880E-01
RA-228	1.880E-01
TH-228	8.205E-02
TH-230	8.902E-02
TH-232	1.880E-01
U-234	8.902E-02
U-235	2.633E-01
AM-243	8.633E-02
ANH-511	3.423E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	4.152E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.320E-02	NOT IDENT.
SC-46	5.785E-02	FAIL ABUN
V-48	1.996E-01	NOT IDENT.
CR-51	6.152E-01	NOT IDENT.
MN-52	3.060E+00	FAIL ABUN
MN-54	4.197E-02	NOT IDENT.
CO-56	5.482E-02	FAIL ABUN

MN-56	0.000E+00	SHORT HLIF
CO-57	3.577E-02	FAIL ABUN
CO-58	5.397E-02	NOT IDENT.
FE-59	1.117E-01	NOT IDENT.
CO-60	5.719E-02	NOT IDENT.
ZN-65	1.014E-01	NOT IDENT.
GE-68	1.390E+00	NOT IDENT.
AS-73	3.187E+00	NOT IDENT.
AS-74	2.454E-01	NOT IDENT.
SE-75	6.305E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	6.674E-01	NOT IDENT.
RB-83	8.836E-02	NOT IDENT.
RB-84	9.399E-02	NOT IDENT.
KR-85	8.597E+00	NOT IDENT.
SR-85	5.579E-02	NOT IDENT.
RB-86	1.652E+00	NOT IDENT.
Y-88	4.458E-02	NOT IDENT.
Y-91	2.707E+01	NOT IDENT.
NB-94	4.559E-02	FAIL ABUN
NB-95	6.143E-02	NOT IDENT.
NB-95M	2.210E-01	NOT IDENT.
ZR-95	6.994E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	4.279E-02	NOT IDENT.
RH-102	5.359E-02	NOT IDENT.
RU-103	6.141E-02	FAIL ABUN
RH-106	3.166E-01	NOT IDENT.
RU-106	3.166E-01	NOT IDENT.
AG-108M	3.603E-02	FAIL ABUN
AG-110	8.596E-01	NOT IDENT.
AG-110M	5.523E-02	FAIL ABUN
SN-113	6.420E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.066E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	4.643E-02	NOT IDENT.
SB-124	1.196E-01	NOT IDENT.
SB-125	1.065E-01	NOT IDENT.
TE-125M	1.725E+01	NOT IDENT.
I-126	9.249E-01	FAIL ABUN
SB-126	5.514E-01	FAIL ABUN
SB-127	4.784E+01	FAIL ABUN
I-131	7.319E-01	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.492E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.588E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	3.527E-01	NOT IDENT.
BA-137M	3.236E-02	NOT IDENT.
CS-137	3.419E-02	NOT IDENT.
LA-138	4.995E-02	NOT IDENT.
CE-139	4.538E-02	NOT IDENT.
BA-140	9.092E-01	NOT IDENT.
LA-140	2.526E-01	NOT IDENT.
CE-141	1.258E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.726E-01	FAIL ABUN
PM-144	4.811E-02	NOT IDENT.
PR-144	3.625E+00	NOT IDENT.
PM-146	5.227E-02	NOT IDENT.
ND-147	2.050E+00	FAIL ABUN
PM-147	1.045E+03	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.478E-02	FAIL ABUN
EU-152	1.285E-01	FAIL ABUN
GD-153	1.168E-01	NOT IDENT.
EU-154	1.190E-01	NOT IDENT.
TB-160	1.430E-01	FAIL ABUN
HO-166M	6.639E-02	FAIL ABUN
TM-171	6.138E+01	NOT IDENT.
HF-172	2.445E-01	NOT IDENT.
LU-172	5.323E-02	FAIL ABUN

LU-176	3.035E-02	FAIL ABUN
HF-181	6.731E-02	NOT IDENT.
TA-182	1.492E-01	FAIL ABUN
RE-183	6.007E-01	NOT IDENT.
RE-184	2.196E-01	NOT IDENT.
W-188	1.011E+01	NOT IDENT.
IR-192	4.952E-02	FAIL ABUN
HG-203	7.676E-02	NOT IDENT.
TL-204	8.576E+00	FAIL ABUN
BI-207	4.473E-02	FAIL ABUN
BI-210	1.993E+01	NOT IDENT.
PB-210	1.993E+01	NOT IDENT.
PB-211	9.284E-01	NOT IDENT.
BI-212	7.807E-01	NOT IDENT.
BI-213	1.133E-01	NOT IDENT.
RN-219	5.413E-01	NOT IDENT.
RA-223	8.184E-01	FAIL ABUN
AC-225	2.783E+00	NOT IDENT.
AC-227	3.561E-01	FAIL ABUN
TH-227	3.561E-01	FAIL ABUN
TH-229	7.754E-01	FAIL ABUN
PA-231	5.756E-01	NOT IDENT.
TH-231	8.184E-01	FAIL ABUN
PA-233	8.394E-02	NOT IDENT.
PA-234	3.214E-01	NOT IDENT.
PA-234M	2.767E+00	FAIL ABUN
TH-234	2.767E+00	FAIL ABUN
NP-237	8.394E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	2.767E+00	FAIL ABUN
NP-239	3.393E-01	FAIL ABUN
PU-239	4.656E+02	NOT IDENT.
AM-241	3.513E-01	NOT IDENT.
CM-243	1.322E-01	NOT IDENT.
BK-247	1.003E-01	FAIL ABUN
CM-247	5.104E-02	NOT IDENT.
CF-249	5.818E-02	NOT IDENT.
CF-251	1.796E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:47:14.05

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507022.CNF;1   *
* Acquisition date : 10-APR-2025 20:46:23 Sensitivity     : 3.000           *
* Detector ID      : GAM04                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.69     Half life ratio : *****           *
* Sample date      :  7-MAR-2025 10:30:00 Nuclide Library : SOLID           *
* Sample ID        : G714507022           Analyst initials: MXR1            *
* Batch Number     : 2767517              Sample Quantity : 1.2823E+02 GRAM *
*                                         Quantity Err(%) : 1.5597E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  5-NOV-2024 09:52:52 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM04_CAN.CNF;20            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	2.626E+00	1.540E+00	1.540E+00
K-40	2.626E+00	1.179E+00	1.179E+00
CD-109	5.264E+00	2.565E+00	2.565E+00
SN-126	4.998E-01	2.422E-01	2.422E-01
EU-155	4.499E-01	3.342E-01	3.342E-01
TL-208	2.665E-01	1.025E-01	1.025E-01
BI-211	1.611E+01	2.005E+00	2.005E+00
PB-212	8.353E-01	2.044E-01	2.044E-01
BI-214	4.671E+00	5.368E-01	5.368E-01
PB-214	5.845E+00	7.215E-01	7.215E-01
RN-222	4.671E+00	5.368E-01	5.368E-01
RA-224	1.264E+01	2.435E+00	2.435E+00
RA-226	5.845E+00	7.215E-01	7.215E-01
AC-228	9.106E-01	4.446E-01	4.446E-01
RA-228	9.106E-01	4.446E-01	4.446E-01
TH-228	8.353E-01	2.044E-01	2.044E-01
TH-230	5.845E+00	7.214E-01	7.214E-01
TH-232	9.106E-01	4.446E-01	4.446E-01
U-234	5.845E+00	7.214E-01	7.214E-01
U-235	5.653E-01	5.851E-01	5.851E-01
AM-243	6.290E-01	1.901E-01	1.901E-01
ANH-511	9.335E-02	1.046E-01	1.046E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-22	1.219E-02	4.567E-02	4.600E-02	NOT IDENT.
NA-24	-2.398E+15	2.097E+15	2.359E+15	SHORT HLIF
AL-26	1.364E-02	4.815E-02	4.854E-02	NOT IDENT.
SC-46	5.116E-03	6.915E-02	6.919E-02	FAIL ABUN
V-48	-2.286E-02	2.482E-01	2.485E-01	NOT IDENT.
CR-51	-7.664E-01	8.550E-01	9.222E-01	NOT IDENT.
MN-52	2.287E+00	3.020E+00	3.191E+00	FAIL ABUN
MN-54	-7.382E-03	5.175E-02	5.185E-02	NOT IDENT.

CO-56	2.945E-02	6.086E-02	6.229E-02	FAIL ABUN
MN-56	1.000E+41	2.057E+41	0.000E+00	SHORT HLIF
CO-57	1.554E-02	3.967E-02	4.028E-02	FAIL ABUN
CO-58	-2.886E-02	6.954E-02	7.075E-02	NOT IDENT.
FE-59	-8.887E-02	1.461E-01	1.515E-01	NOT IDENT.
CO-60	5.454E-02	5.742E-02	6.246E-02	NOT IDENT.
ZN-65	-1.374E-02	1.354E-01	1.356E-01	NOT IDENT.
GE-68	-5.025E-01	1.686E+00	1.702E+00	NOT IDENT.
AS-73	2.830E+00	3.344E+00	3.579E+00	NOT IDENT.
AS-74	7.485E-02	3.066E-01	3.084E-01	NOT IDENT.
SE-75	-1.710E-02	7.762E-02	7.800E-02	FAIL ABUN
BR-77	3.639E+04	3.726E+04	4.071E+04	SHORT HLIF
SR-82	3.391E-01	7.736E-01	7.886E-01	NOT IDENT.
RB-83	3.559E-03	1.012E-01	1.012E-01	NOT IDENT.
RB-84	4.656E-02	1.025E-01	1.046E-01	NOT IDENT.
KR-85	8.606E+00	9.700E+00	1.045E+01	NOT IDENT.
SR-85	5.574E-02	6.297E-02	6.780E-02	NOT IDENT.
RB-86	-1.704E+00	2.201E+00	2.331E+00	NOT IDENT.
Y-88	-4.290E-02	6.791E-02	7.061E-02	NOT IDENT.
Y-91	5.470E+00	3.042E+01	3.052E+01	NOT IDENT.
NB-94	4.651E-02	3.931E-02	4.455E-02	FAIL ABUN
NB-95	-2.032E-02	8.596E-02	8.645E-02	NOT IDENT.
NB-95M	-5.455E-02	2.908E-01	2.918E-01	NOT IDENT.
ZR-95	-6.796E-02	9.796E-02	1.026E-01	NOT IDENT.
NB-97	1.000E+41	3.888E+41	0.000E+00	SHORT HLIF
ZR-97	3.705E+14	4.057E+14	4.387E+14	SHORT HLIF
MO-99	3.481E+02	2.301E+03	2.306E+03	SHORT HLIF
TC-99M	6.963E+38	9.454E+39	0.000E+00	SHORT HLIF
RH-101	1.875E-04	4.879E-02	4.879E-02	NOT IDENT.
RH-102	-6.071E-02	7.252E-02	7.752E-02	NOT IDENT.
RU-103	1.039E-02	6.908E-02	6.923E-02	FAIL ABUN
RH-106	-5.439E-01	5.229E-01	5.775E-01	NOT IDENT.
RU-106	-5.439E-01	5.229E-01	5.775E-01	NOT IDENT.
AG-108M	2.632E-03	4.057E-02	4.058E-02	FAIL ABUN
AG-110	7.870E-01	8.895E-01	9.576E-01	NOT IDENT.
AG-110M	1.867E-02	6.303E-02	6.359E-02	FAIL ABUN
SN-113	-1.379E-02	7.343E-02	7.369E-02	NOT IDENT.
CD-115	5.464E+03	5.752E+03	6.257E+03	SHORT HLIF
SN-117M	-7.393E-03	2.397E-01	2.397E-01	NOT IDENT.
SB-122	-1.212E+01	3.800E+02	3.801E+02	SHORT HLIF
TE-123M	4.917E-02	5.072E-02	5.535E-02	NOT IDENT.
SB-124	-5.035E-02	1.589E-01	1.605E-01	NOT IDENT.
SB-125	-4.007E-02	1.249E-01	1.262E-01	NOT IDENT.
TE-125M	-3.113E+00	2.125E+01	2.129E+01	NOT IDENT.
I-126	1.751E+00	1.236E+00	1.467E+00	FAIL ABUN
SB-126	1.149E+00	9.180E-01	1.054E+00	FAIL ABUN
SB-127	-2.700E+01	6.060E+01	6.181E+01	FAIL ABUN
I-131	2.612E-01	7.932E-01	8.019E-01	FAIL ABUN
I-132	-1.000E+41	1.925E+43	0.000E+00	SHORT HLIF
TE-132	-1.408E+01	7.608E+01	7.635E+01	SHORT HLIF
BA-133	-2.780E-02	6.506E-02	6.625E-02	NOT IDENT.
I-133	-2.527E+10	3.905E+10	4.068E+10	SHORT HLIF
CS-134	5.195E-02	5.951E-02	6.395E-02	NOT IDENT.
I-135	2.568E+36	9.042E+36	0.000E+00	SHORT HLIF
CS-136	-5.577E-02	5.033E-01	5.039E-01	NOT IDENT.
BA-137M	-1.236E-02	4.367E-02	4.403E-02	NOT IDENT.
CS-137	-1.306E-02	4.614E-02	4.651E-02	NOT IDENT.
LA-138	-4.214E-02	7.131E-02	7.380E-02	NOT IDENT.
CE-139	-1.361E-02	5.371E-02	5.406E-02	NOT IDENT.
BA-140	-2.856E-01	1.084E+00	1.092E+00	NOT IDENT.
LA-140	-4.903E-01	4.309E-01	4.843E-01	NOT IDENT.
CE-141	1.844E-02	1.549E-01	1.552E-01	NOT IDENT.
CE-143	4.191E+06	3.578E+06	4.046E+06	SHORT HLIF
CE-144	-1.242E-01	3.471E-01	3.516E-01	FAIL ABUN
PM-144	2.201E-02	5.411E-02	5.501E-02	NOT IDENT.
PR-144	1.610E+00	4.084E+00	4.148E+00	NOT IDENT.
PM-146	1.111E-02	5.829E-02	5.850E-02	NOT IDENT.
ND-147	-1.804E+00	2.602E+00	2.726E+00	FAIL ABUN
PM-147	-9.227E+01	1.194E+03	1.195E+03	NOT IDENT.
PM-149	6.709E+01	6.044E+04	6.044E+04	SHORT HLIF
EU-150	-1.293E-02	4.415E-02	4.453E-02	FAIL ABUN
EU-152	3.816E-02	1.542E-01	1.551E-01	FAIL ABUN
GD-153	8.399E-03	1.304E-01	1.305E-01	NOT IDENT.
EU-154	8.817E-02	1.183E-01	1.248E-01	NOT IDENT.
TB-160	-7.848E-02	1.905E-01	1.938E-01	FAIL ABUN
HO-166M	-1.997E-02	8.602E-02	8.649E-02	FAIL ABUN
TM-171	1.299E+01	6.570E+01	6.596E+01	NOT IDENT.
HF-172	-4.846E-02	2.822E-01	2.830E-01	NOT IDENT.

LU-172	-2.800E-02	6.757E-02	6.873E-02	FAIL ABUN
LU-176	-2.890E-02	4.043E-02	4.248E-02	FAIL ABUN
HF-181	2.516E-02	8.141E-02	8.220E-02	NOT IDENT.
TA-182	-8.228E-02	1.942E-01	1.977E-01	FAIL ABUN
RE-183	9.195E-02	6.485E-01	6.498E-01	NOT IDENT.
RE-184	-5.960E-02	2.765E-01	2.778E-01	NOT IDENT.
W-188	-7.032E+00	1.430E+01	1.465E+01	NOT IDENT.
IR-192	-5.136E-03	6.117E-02	6.121E-02	FAIL ABUN
HG-203	7.773E-03	9.224E-02	9.230E-02	NOT IDENT.
TL-204	3.286E+00	9.910E+00	1.002E+01	FAIL ABUN
BI-207	2.566E-02	4.789E-02	4.927E-02	FAIL ABUN
BI-210	8.044E+00	2.106E+01	2.137E+01	NOT IDENT.
PB-210	8.044E+00	2.106E+01	2.137E+01	NOT IDENT.
PB-211	-2.604E-01	1.070E+00	1.077E+00	NOT IDENT.
BI-212	9.397E-01	8.205E-01	9.234E-01	NOT IDENT.
BI-213	-4.228E-02	1.335E-01	1.349E-01	NOT IDENT.
RN-219	9.651E-02	6.013E-01	6.029E-01	NOT IDENT.
RA-223	2.883E-01	9.719E-01	9.806E-01	FAIL ABUN
AC-225	-6.117E-01	3.353E+00	3.365E+00	NOT IDENT.
AC-227	9.474E-01	8.097E-01	9.155E-01	FAIL ABUN
TH-227	9.474E-01	8.097E-01	9.155E-01	FAIL ABUN
TH-229	7.399E-01	8.624E-01	9.247E-01	FAIL ABUN
PA-231	-2.674E-01	7.320E-01	7.419E-01	NOT IDENT.
TH-231	2.883E-01	9.719E-01	9.806E-01	FAIL ABUN
PA-233	2.766E-02	1.007E-01	1.015E-01	NOT IDENT.
PA-234	-1.580E-01	4.598E-01	4.653E-01	NOT IDENT.
PA-234M	2.132E+00	2.954E+00	3.106E+00	FAIL ABUN
TH-234	2.132E+00	2.954E+00	3.106E+00	FAIL ABUN
NP-237	2.766E-02	1.007E-01	1.015E-01	NOT IDENT.
NP-238	-1.198E+03	1.729E+04	1.730E+04	SHORT HLIF
U-238	2.132E+00	2.954E+00	3.106E+00	FAIL ABUN
NP-239	-1.502E-01	3.955E-01	4.012E-01	FAIL ABUN
PU-239	-2.243E+01	5.331E+02	5.332E+02	NOT IDENT.
AM-241	2.505E-04	3.832E-01	3.832E-01	NOT IDENT.
CM-243	1.213E-02	1.603E-01	1.604E-01	NOT IDENT.
BK-247	-6.014E-02	1.274E-01	1.302E-01	FAIL ABUN
CM-247	2.467E-02	5.551E-02	5.661E-02	NOT IDENT.
CF-249	3.560E-02	6.256E-02	6.458E-02	NOT IDENT.
CF-251	6.009E-02	2.056E-01	2.074E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	94.3886	81.75	91.2858	123.68	91.1830
879.38	95.8556	82.47	107.5681	125.81	99.2942
46.54	106.7433	83.79	98.2909	127.23	108.3078
228.16	0.0000	265.00	98.3368	127.91	100.6142
52.39	94.3062	193.51	102.8533	129.30	116.5069
1093.63	80.3699	105.31	85.6169	131.20	104.0979
52.39	82.1555	86.79	85.6602	133.02	108.9966
125.81	76.4795	86.94	85.6884	133.52	114.3397
53.44	67.4291	87.09	85.7158	136.00	117.7562
54.07	85.0691	87.57	85.8039	136.47	117.8433
293.27	0.0000	88.03	85.8877	739.50	0.0000
482.18	85.0800	306.78	85.9441	140.51	0.0000
57.98	84.3441	88.47	85.9679	143.76	109.1514
59.27	89.7270	143.76	86.2373	144.24	109.2312
59.32	89.7396	90.64	86.3594	145.44	107.0850
59.54	87.2528	531.02	86.4439	152.43	130.8385
60.96	87.5931	92.59	86.7075	1048.07	118.8085
61.17	101.2574	93.35	86.8425	154.21	98.6340
62.93	83.7834	94.56	88.2817	158.56	132.5311
63.29	79.5848	311.90	88.2979	159.00	97.2570
290.67	86.4975	946.00	88.3015	162.33	122.3919
87.57	100.3846	94.87	88.3367	537.26	114.2147
66.73	111.3859	97.43	91.5640	163.33	110.2001
67.24	98.5619	98.43	88.9644	165.86	118.8499
67.68	96.0757	98.44	88.9658	427.87	113.1729
1221.41	84.8386	103.37	96.5855	176.60	124.7470
70.82	113.7325	116.74	96.5855	177.52	99.7054
97.43	106.7063	100.11	109.7112	181.07	0.0000
70.82	100.0298	102.03	83.3663	181.52	106.8997
279.20	100.0324	103.18	79.8079	184.41	86.8197
1063.66	116.5871	103.37	81.0840	185.72	86.9623
72.87	116.6043	911.20	82.6182	193.51	94.2238
351.06	116.6043	105.31	82.6336	197.03	107.5272
74.66	117.1046	106.12	82.7585	198.01	100.1180
351.93	117.1492	106.47	97.8694	201.83	104.8963
238.63	117.1492	109.28	118.5576	203.43	113.7607
351.93	117.1492	111.00	118.6113	205.31	112.9248
238.63	117.1492	111.76	0.0000	210.85	83.0485
74.97	117.1908	114.06	103.0430	215.65	76.1750
77.11	117.7794	116.30	0.0000	218.12	79.3235
78.74	118.2228	116.74	103.5291	222.11	82.9926
256.23	115.2132	119.76	115.6339	227.09	84.5549
80.03	95.0928	264.66	113.0045	227.38	84.5804
133.52	95.1131	121.22	113.0242	228.16	0.0000
364.49	95.1286	344.28	108.2966	228.18	89.1089
711.68	91.0445	122.06	92.8696	235.69	119.7624
356.01	117.9361	122.92	124.9747	235.96	119.7949
323.87	117.9553	1274.44	125.0061	238.63	100.2323

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	51.7656	531.02	33.6108
240.99	100.4781	338.32	51.7668	537.26	32.7897
242.00	100.5813	340.48	98.7744	1260.41	0.0000
244.70	57.4183	340.55	98.7793	552.55	26.9252
685.70	69.6665	344.28	49.5349	795.86	28.5059
388.16	76.1688	345.93	58.2795	564.24	0.0000
507.63	0.0000	351.06	46.0626	569.33	27.6453
256.23	59.6136	351.93	46.0942	569.50	24.7876
527.90	0.0000	355.39	0.0000	569.70	24.7897
264.66	68.1935	356.01	43.3228	583.19	25.9255
264.80	72.8284	364.49	35.2170	584.27	25.9409
265.00	72.8418	366.42	0.0000	595.83	26.0947
269.46	80.1182	372.51	40.4893	600.60	24.2208
270.03	69.7064	375.05	44.7910	602.52	0.0000
401.81	79.0898	377.52	50.7983	604.72	16.0193
273.65	79.2704	383.85	39.1251	607.14	29.1614
276.40	82.9799	388.16	47.7786	609.32	23.3545
583.19	79.5443	666.33	49.5015	610.33	23.3662
277.60	74.8809	391.69	48.7548	614.28	23.4121
402.40	74.9102	400.66	39.5949	618.01	23.4561
279.20	86.7097	401.81	45.6569	884.68	20.5480
279.54	90.2532	402.40	43.0898	621.93	33.7827
279.70	85.5781	404.85	50.9336	630.19	0.0000
280.46	69.2144	410.95	50.2804	631.29	27.5443
301.36	67.0648	413.71	53.4159	633.25	24.6165
284.31	62.3940	720.70	43.0215	634.78	16.7517
285.41	54.2081	423.72	48.9681	635.95	23.6621
285.90	0.0000	427.09	33.3033	636.99	24.6613
287.50	59.0332	427.87	38.5815	657.50	11.9536
290.67	61.5691	433.94	35.2148	657.76	11.9551
293.27	0.0000	439.40	36.2237	657.90	0.0000
295.22	65.3847	440.45	33.5964	661.66	14.9713
316.51	65.4283	453.88	32.9953	664.57	0.0000
298.58	77.8984	463.37	30.5012	666.33	21.0060
299.98	49.3432	468.07	29.6907	666.50	24.0088
300.09	59.6954	473.00	25.7197	667.71	0.0000
300.13	59.6970	631.29	29.8183	677.62	25.1373
311.90	59.6970	696.49	29.8499	685.70	27.2494
301.36	62.1515	477.60	29.8646	692.65	0.0000
302.85	59.8389	482.18	23.1410	695.00	28.3783
304.50	41.9470	487.02	23.6635	696.49	26.3682
304.85	45.5564	492.35	0.0000	696.51	26.3682
306.78	60.0418	497.08	23.8058	697.00	30.4321
308.46	46.9005	505.52	30.3648	697.30	30.4358
311.90	48.2434	507.63	0.0000	697.49	28.4090
316.51	48.4314	511.00	31.3839	702.65	25.9327
319.41	44.9074	514.00	22.1914	706.68	28.5264
320.08	52.2186	514.00	22.1914	711.68	23.2806
321.04	52.2606	520.40	23.2015	720.70	13.8389
323.87	48.7292	520.69	0.0000	721.93	0.0000
325.23	50.0025	667.71	0.0000	1690.97	20.0078
1596.21	37.9165	527.90	0.0000	722.91	15.3918
333.37	57.7001	528.26	24.2364	723.31	15.3943
333.97	61.4136	529.59	32.6501	756.73	27.7207
334.37	41.7747	529.87	0.0000	727.33	22.6177

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	17.5202	935.54	21.1879	1362.66	0.0000
735.93	19.6061	937.49	15.0650	1365.19	9.5117
737.46	21.6844	983.53	19.0150	1368.63	0.0000
739.50	0.0000	946.00	17.9082	1384.29	9.8312
1434.09	15.5334	949.00	16.8060	1408.01	13.4617
747.24	14.5167	954.55	0.0000	1434.09	2.9035
748.06	12.4473	962.31	16.8842	1435.80	8.7138
752.31	15.5872	964.08	16.8945	1457.56	0.0000
753.82	9.3582	966.17	16.9061	1460.82	7.7930
756.73	16.6569	968.97	16.9226	1489.16	8.8275
756.80	16.6576	983.53	18.1406	1505.03	11.8140
763.94	12.5308	984.45	0.0000	1584.12	5.0134
765.81	28.2162	996.26	15.0299	1596.21	15.0815
766.84	18.8188	1002.74	6.8467	1620.50	3.0326
772.60	0.0000	1004.73	6.8513	1621.92	4.0447
776.52	15.1154	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	7.1854
778.90	18.9126	1028.54	0.0000	1750.46	0.0000
783.70	30.0041	1037.84	9.2350	1764.49	5.2124
1435.80	21.0986	1038.76	0.0000	1770.23	0.0000
903.28	24.2962	1046.59	15.6281	1771.35	2.7839
795.86	15.8698	1048.07	17.3718	1791.20	0.0000
801.95	22.2715	1049.04	17.3779	1808.65	4.2075
810.06	19.1521	1050.41	10.4312	1810.72	0.0000
810.29	19.1536	1063.66	1.7458	1836.06	8.4614
810.45	20.2192	1077.00	19.2863		
810.76	23.4144	1077.34	14.9041		
815.77	14.3965	1085.87	13.1854		
818.51	20.8171	1093.63	10.5740		
832.01	16.0980	1099.45	15.0068		
834.85	19.3389	1112.07	11.5202		
835.71	18.2707	1112.84	15.0690		
836.80	0.0000	1115.54	15.6138		
846.75	0.0000	1120.29	9.7727		
846.77	12.9521	1120.55	9.7734		
856.80	16.2524	1121.30	9.7754		
860.56	15.1906	1808.65	4.4547		
871.09	18.5184	1131.51	0.0000		
873.19	15.2624	1147.95	0.0000		
875.33	0.0000	1332.49	11.7328		
879.38	14.2050	1177.95	10.1220		
880.51	12.0250	1189.05	10.8801		
881.60	6.5615	1204.77	10.9292		
883.24	17.5085	1221.41	9.1510		
884.68	10.9485	1231.02	15.9041		
889.28	18.6442	1235.36	10.2895		
894.76	17.5827	1238.28	4.5972		
1836.06	19.8040	1260.41	0.0000		
900.72	17.6211	1271.87	9.2798		
903.28	20.9444	1274.44	3.7146		
911.20	23.2157	1274.54	6.5005		
912.08	23.2225	1291.59	10.2628		
984.45	0.0000	1298.22	0.0000		
926.50	15.5620	1312.11	2.8143		
929.11	8.0106	1332.49	6.6022		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:52:35.44

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507023.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM38.CNF;181
                                      Background date  : 6-APR-2025 11:02:24.
Sample date      : 7-MAR-2025 11:00:00. Acquisition date : 10-APR-2025 20:52:08
Sample ID        : G714507023           Sample quantity  : 1.05680E+02 GRAM
Detector name    : GAM38                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.41  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767517              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.41*	122	199	0.98	93.14	88	11	3.39E-02	24.9	
2	0	53.18	43	140	0.67	106.70	103	8	1.19E-02	50.0	
3	0	63.10*	132	168	0.80	126.54	122	8	3.66E-02	19.8	
4	2	74.74*	336	216	1.29	149.83	143	15	9.34E-02	9.5	4.87E+00
5	2	77.02	395	132	0.90	154.41	143	15	1.10E-01	6.7	
6	2	83.98*	65	149	1.32	168.34	165	14	1.80E-02	32.4	3.10E+00
7	2	87.04	144	179	1.09	174.46	165	14	3.99E-02	17.4	
8	6	89.91	74	96	1.23	180.21	178	12	2.05E-02	22.7	1.97E+00
9	6	92.71*	200	157	1.31	185.81	178	12	5.56E-02	13.6	
10	0	128.85*	43	132	1.02	258.13	253	9	1.20E-02	50.8	
11	0	185.94*	122	135	1.14	372.39	368	10	3.40E-02	20.6	
12	0	190.99	25	76	0.76	382.52	378	9	7.00E-03	66.8	
13	0	209.50	33	63	0.93	419.56	416	8	9.22E-03	44.7	
14	2	238.48*	288	46	1.17	477.54	472	20	7.99E-02	7.2	2.44E+00
15	2	241.86	208	45	1.68	484.31	472	20	5.77E-02	10.1	
16	0	251.03	28	69	4.29	502.66	497	12	7.71E-03	63.7	
17	0	256.61	40	68	0.82	513.84	509	11	1.12E-02	42.3	
18	0	270.57	54	58	0.93	541.77	538	9	1.50E-02	28.8	
19	0	295.09	330	57	1.03	590.84	585	12	9.16E-02	7.2	
20	0	300.85	11	56	1.10	602.36	599	8	3.06E-03	121.6	
21	0	313.65	21	88	4.91	627.99	616	15	5.81E-03	101.0	
22	0	338.49	73	52	1.25	677.69	671	14	2.04E-02	23.9	
23	4	351.85*	495	35	1.41	704.42	700	39	1.37E-01	4.9	2.51E+00
24	4	356.12	31	39	2.26	712.98	700	39	8.48E-03	59.9	
25	0	374.19	36	33	2.64	749.13	743	13	9.86E-03	37.1	
26	0	463.81	18	35	1.44	928.46	921	10	5.08E-03	66.2	
27	0	477.56	39	44	2.57	955.98	949	15	1.08E-02	40.8	
28	0	502.78	13	21	0.80	1006.44	1003	8	3.52E-03	67.9	
29	0	510.33*	40	48	1.40	1021.55	1014	16	1.11E-02	46.3	
30	0	535.76	24	33	5.96	1072.43	1062	19	6.72E-03	60.6	
31	0	552.00	18	17	1.19	1104.92	1101	11	4.87E-03	51.1	
32	0	583.01*	85	22	1.54	1166.97	1162	11	2.37E-02	15.4	
33	0	609.18*	310	25	1.19	1219.33	1214	12	8.62E-02	6.6	
34	0	666.38	7	7	1.23	1333.76	1329	6	1.87E-03	74.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	727.08*	13	10	0.83	1455.21	1452	6	3.72E-03	47.7	
36	0	768.74	43	26	1.05	1538.54	1528	21	1.20E-02	33.3	
37	0	826.89	20	7	2.34	1654.89	1646	15	5.45E-03	37.8	
38	0	833.22	6	9	1.85	1667.54	1660	9	1.69E-03	97.3	
39	0	871.35	8	10	0.54	1743.82	1737	9	2.22E-03	82.3	
40	0	887.98	12	15	4.22	1777.08	1770	15	3.33E-03	76.0	
41	0	910.96	53	15	1.93	1823.06	1818	10	1.47E-02	19.4	
42	0	933.77	25	16	2.64	1868.67	1861	13	6.89E-03	39.0	
43	0	964.21	17	6	2.06	1929.57	1926	8	4.82E-03	34.1	
44	0	969.82*	42	3	3.08	1940.79	1934	14	1.16E-02	19.0	
45	0	1119.94	50	19	1.44	2241.05	2233	15	1.39E-02	23.5	
46	0	1238.59	18	18	1.03	2478.34	2472	12	5.09E-03	54.3	
47	0	1281.82	5	6	0.94	2564.80	2555	12	1.39E-03	107.7	
48	0	1377.49*	33	0	3.46	2756.11	2748	16	9.03E-03	18.3	
49	0	1460.62*	35	0	2.26	2922.33	2914	14	9.61E-03	18.3	
50	0	1764.88*	30	5	1.60	3530.66	3525	11	8.45E-03	24.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:52:37

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507023.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 7-MAR-2025 11:00:00	Acquisition date	: 10-APR-2025 20:52:08
Sample ID	: G714507023	Sample quantity	: 105.68 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA38	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.41 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	38	10.44*	2.158E+00	1.184E+00	1.854E+00	81.61
K-40	1460.82	32	10.66*	7.423E-01	2.914E+00	2.914E+00	36.62
SC-46	889.28	11	99.98*	1.179E+00	6.872E-02	9.137E-02	152.07
	1120.55	47	99.99	9.471E-01	3.557E-01	4.730E-01	47.01
AS-73	53.44	44	10.30*	7.197E+00	4.212E-01	5.670E-01	100.08
CD-109	88.03	145	3.70*	7.414E+00	3.758E+00	3.958E+00	34.82
SN-126	64.28	134	9.60	7.504E+00	1.321E+00	1.321E+00	39.52
	86.94	145	8.90	7.414E+00	1.562E+00	1.562E+00	34.82
	87.57	145	37.00*	7.414E+00	3.758E-01	3.758E-01	34.82
TL-208	277.37	------	6.60	3.618E+00	------ Line Not Found		------
	583.19	82	85.00*	1.774E+00	3.866E-01	3.866E-01	30.85
	860.56	------	12.50	1.215E+00	------ Line Not Found		------
BI-210	46.54	125	4.25*	6.779E+00	3.084E+00	3.093E+00	49.72
PB-210	46.54	125	4.25*	6.779E+00	3.084E+00	3.093E+00	49.72
BI-211	72.87	------	1.23	7.566E+00	------ Line Not Found		------
	351.06	482	12.92*	2.902E+00	9.130E+00	9.130E+00	9.80
BI-212	727.33	13	6.67*	1.430E+00	9.545E-01	9.545E-01	95.31
	1620.50	------	1.47	6.759E-01	------ Line Not Found		------
PB-212	74.82	341	10.28	7.559E+00	3.114E+00	3.114E+00	19.04
	77.11	400	17.10	7.545E+00	2.202E+00	2.202E+00	13.44
	238.63	283	43.60*	4.131E+00	1.116E+00	1.116E+00	14.35
	300.09	11	3.30	3.360E+00	6.892E-01	6.892E-01	243.26
BI-214	609.32	298	45.49*	1.699E+00	2.737E+00	2.738E+00	13.14
	1120.29	47	14.92	9.471E-01	2.384E+00	2.384E+00	47.01
	1764.49	28	15.30	6.262E-01	2.103E+00	2.103E+00	48.15
PB-214	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.907E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.637E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
RN-222	609.32	298	45.49*	1.699E+00	2.737E+00	2.738E+00	13.14
	1120.29	47	14.92	9.471E-01	2.384E+00	2.384E+00	47.01
	1764.49	28	15.30	6.262E-01	2.103E+00	2.103E+00	48.15
RA-224	240.99	204	4.10*	4.081E+00	8.676E+00	8.676E+00	20.28
RA-226	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.907E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.637E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
AC-228	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	72	11.27	3.010E+00	1.499E+00	1.499E+00	47.86
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	50	25.80*	1.151E+00	1.204E+00	1.204E+00	38.76
	968.97	40	15.80	1.084E+00	1.639E+00	1.639E+00	38.09
RA-228	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	72	11.27	3.010E+00	1.499E+00	1.499E+00	47.86
	835.71	------	1.61	1.250E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	50	25.80*	1.151E+00	1.204E+00	1.204E+00	38.76
	968.97	40	15.80	1.084E+00	1.639E+00	1.639E+00	38.09
TH-228	74.82	341	10.28	7.559E+00	3.114E+00	3.114E+00	19.04
	77.11	400	17.10	7.545E+00	2.202E+00	2.202E+00	13.44
	238.63	283	43.60*	4.131E+00	1.116E+00	1.116E+00	14.35
	300.09	11	3.30	3.360E+00	6.892E-01	6.892E-01	243.26
TH-229	85.43	65	14.70	7.463E+00	4.235E-01	4.235E-01	64.86
	88.47	145	24.00	7.414E+00	5.794E-01	5.794E-01	34.82
	193.51	------	4.41*	4.895E+00	------ Line Not Found		------
	210.85	33	2.80	4.599E+00	1.808E+00	1.808E+00	89.37
TH-230	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.906E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.636E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
PA-231	283.69	------	1.70	3.545E+00	------ Line Not Found		------
	301.36	11	5.35*	3.360E+00	4.251E-01	4.251E-01	243.26
TH-232	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	72	11.27	3.010E+00	1.499E+00	1.499E+00	47.86
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	50	25.80*	1.151E+00	1.204E+00	1.204E+00	38.76
	968.97	40	15.80	1.084E+00	1.639E+00	1.639E+00	38.09
PA-234M	63.29	134	3.70*	7.504E+00	3.428E+00	3.428E+00	39.52
	92.59	202	4.23	7.305E+00	4.639E+00	4.639E+00	27.11
TH-234	63.29	134	3.70*	7.504E+00	3.428E+00	3.428E+00	39.52
	92.59	202	4.23	7.305E+00	4.639E+00	4.639E+00	27.11
U-234	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.906E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.636E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
U-235	89.96	74	3.47	7.361E+00	2.070E+00	2.070E+00	45.43
	93.35	202	5.60	7.305E+00	3.504E+00	3.504E+00	27.11
	143.76	------	10.96*	6.011E+00	------ Line Not Found		------
	163.33	------	5.08	5.537E+00	------ Line Not Found		------
	185.72	121	57.20	5.046E+00	2.979E-01	2.979E-01	41.12
	205.31	------	5.01	4.674E+00	------ Line Not Found		------
U-238	63.29	134	3.70*	7.504E+00	3.428E+00	3.428E+00	39.52
	92.59	202	4.23	7.305E+00	4.639E+00	4.639E+00	27.11
PU-239	129.30	43	0.01*	6.398E+00	7.623E+02	7.623E+02	101.54
	375.05	35	0.00	2.736E+00	5.767E+03	5.767E+03	74.23
	413.71	------	0.00	2.483E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	6.533E+00	------ Line Not Found		------
	74.66	341	67.20*	7.559E+00	4.764E-01	4.764E-01	19.04
ANH-511	511.00	38	100.00*	2.022E+00	1.351E-01	1.351E-01	92.69

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:52:37.99

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507023.CNF;1    *
* Acquisition date : 10-APR-2025 20:52:08 Sensitivity     : 3.000            *
* Detector ID      : GAM38                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****            *
* Sample date      :  7-MAR-2025 11:00:00 Analyst initials: MXR1             *
* Sample ID        : G714507023           Sample Quantity : 1.0568E+02 GRAM  *
* Batch Number     : 2767517              Wet Weight      :    0.00000       *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000       *
* Nuclide Library  : SOLID.NLB;18                                           *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5              *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.854E+00	1.483E+00	1.300E+00
K-40	2.914E+00	1.046E+00	7.715E-01
SC-46	9.137E-02	1.362E-01	1.770E-01
AS-73	5.670E-01	5.561E-01	5.468E-01
CD-109	3.958E+00	1.351E+00	1.007E+00
SN-126	3.758E-01	1.282E-01	1.595E-01
TL-208	3.866E-01	1.169E-01	1.142E-01
BI-210	3.093E+00	1.507E+00	1.031E+00
PB-210	3.093E+00	1.507E+00	1.031E+00
BI-211	9.130E+00	8.767E-01	5.634E-01
BI-212	9.545E-01	8.915E-01	1.754E+00
PB-212	1.116E+00	1.569E-01	1.358E-01
BI-214	2.738E+00	3.526E-01	1.925E-01
PB-214	3.314E+00	3.182E-01	2.050E-01
RN-222	2.738E+00	3.526E-01	1.925E-01
RA-224	8.676E+00	1.724E+00	1.458E+00
RA-226	3.314E+00	3.182E-01	2.050E-01
AC-228	1.204E+00	4.575E-01	4.684E-01
RA-228	1.204E+00	4.575E-01	4.684E-01
TH-228	1.116E+00	1.569E-01	1.358E-01
TH-229	-2.026E-01	7.377E-01	1.208E+00
TH-230	3.314E+00	3.182E-01	2.050E-01
PA-231	4.251E-01	1.013E+00	1.292E+00
TH-232	1.204E+00	4.575E-01	4.684E-01
PA-234M	3.428E+00	1.328E+00	1.243E+00
TH-234	3.428E+00	1.328E+00	1.243E+00
U-234	3.314E+00	3.182E-01	2.050E-01
U-235	7.571E-02	2.838E-01	4.985E-01
U-238	3.428E+00	1.328E+00	1.243E+00
PU-239	7.623E+02	7.586E+02	7.807E+02
AM-243	4.764E-01	8.892E-02	8.491E-02
ANH-511	1.351E-01	1.227E-01	8.577E-02

---- Non-Identified Nuclides ----

	Key-Line Activity	K.L. Cnt Uncert	MDA

Nuclide	(pCi/GRAM)	(1.96-sigma)	(pCi/GRAM)	
NA-22	1.965E-03	7.618E-02	1.367E-01	NOT IDENT.
NA-24	0.000E+00	2.391E+15	0.000E+00	SHORT HLIF
AL-26	-7.009E-04	3.320E-02	8.485E-02	NOT IDENT.
V-48	7.043E-02	2.990E-01	5.940E-01	NOT IDENT.
CR-51	-8.860E-02	8.542E-01	1.561E+00	NOT IDENT.
MN-52	5.651E-01	3.850E+00	8.572E+00	NOT IDENT.
MN-54	-4.804E-02	8.590E-02	1.255E-01	NOT IDENT.
CO-56	-1.742E-02	6.550E-02	1.233E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-6.333E-03	3.446E-02	5.851E-02	NOT IDENT.
CO-58	1.718E-02	7.170E-02	1.467E-01	NOT IDENT.
FE-59	-2.633E-02	2.163E-01	4.022E-01	NOT IDENT.
CO-60	-2.349E-02	5.605E-02	1.064E-01	NOT IDENT.
ZN-65	9.739E-02	1.620E-01	3.165E-01	NOT IDENT.
GE-68	-1.559E-02	1.928E+00	3.796E+00	NOT IDENT.
AS-74	6.556E-02	3.090E-01	6.184E-01	NOT IDENT.
SE-75	6.573E-05	6.246E-02	1.169E-01	NOT IDENT.
BR-77	0.000E+00	6.803E+03	0.000E+00	SHORT HLIF
SR-82	2.680E-01	1.093E+00	1.919E+00	NOT IDENT.
RB-83	5.570E-02	1.381E-01	2.660E-01	FAIL ABUN
RB-84	3.518E-01	2.140E-01	4.740E-01	NOT IDENT.
KR-85	5.803E+00	1.372E+01	2.349E+01	NOT IDENT.
SR-85	3.751E-02	8.903E-02	1.525E-01	NOT IDENT.
RB-86	1.852E-01	2.416E+00	4.826E+00	NOT IDENT.
Y-88	1.285E-02	6.669E-02	1.582E-01	NOT IDENT.
Y-91	-1.813E+01	3.762E+01	6.954E+01	NOT IDENT.
NB-94	-5.053E-02	5.942E-02	1.000E-01	FAIL ABUN
NB-95	5.291E-02	8.939E-02	1.844E-01	NOT IDENT.
NB-95M	-4.915E-02	2.391E-01	3.871E-01	NOT IDENT.
ZR-95	3.002E-02	1.640E-01	3.210E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.335E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.284E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	7.269E+39	0.000E+00	SHORT HLIF
RH-101	6.915E-03	4.310E-02	7.495E-02	NOT IDENT.
RH-102	-1.561E-02	9.129E-02	1.731E-01	NOT IDENT.
RU-103	1.752E-02	8.457E-02	1.607E-01	FAIL ABUN
RH-106	-2.709E-01	5.526E-01	9.989E-01	NOT IDENT.
RU-106	-2.709E-01	5.526E-01	9.989E-01	NOT IDENT.
AG-108M	-1.108E-02	5.332E-02	9.399E-02	NOT IDENT.
AG-110	-6.937E-01	1.278E+00	2.284E+00	NOT IDENT.
AG-110M	1.930E-02	1.202E-01	2.058E-01	NOT IDENT.
SN-113	-4.000E-02	8.735E-02	1.502E-01	NOT IDENT.
CD-115	0.000E+00	8.833E+03	0.000E+00	SHORT HLIF
SN-117M	-1.502E-01	1.877E-01	3.335E-01	NOT IDENT.
SB-122	0.000E+00	3.841E+02	0.000E+00	SHORT HLIF
TE-123M	-4.460E-02	4.082E-02	7.090E-02	NOT IDENT.
SB-124	8.086E-02	2.401E-01	5.241E-01	NOT IDENT.
SB-125	6.439E-02	1.664E-01	3.139E-01	FAIL ABUN
TE-125M	-2.253E+00	1.485E+01	2.542E+01	NOT IDENT.
I-126	5.649E-01	8.286E-01	1.958E+00	FAIL ABUN
SB-126	-6.417E-01	8.257E-01	1.403E+00	FAIL ABUN
SB-127	-3.217E+01	7.113E+01	1.286E+02	FAIL ABUN
I-131	1.131E-01	1.041E+00	1.885E+00	NOT IDENT.
I-132	0.000E+00	1.467E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.438E+01	0.000E+00	SHORT HLIF
BA-133	1.194E-01	1.402E-01	1.455E-01	FAIL ABUN
I-133	0.000E+00	4.517E+10	0.000E+00	SHORT HLIF
CS-134	1.110E-02	6.468E-02	1.295E-01	NOT IDENT.
I-135	0.000E+00	1.294E+37	0.000E+00	SHORT HLIF
CS-136	-2.214E-01	5.099E-01	8.941E-01	NOT IDENT.
BA-137M	7.402E-03	6.160E-02	1.085E-01	NOT IDENT.
CS-137	7.819E-03	6.507E-02	1.147E-01	NOT IDENT.
LA-138	-6.738E-02	1.001E-01	1.729E-01	NOT IDENT.
CE-139	-1.790E-02	4.030E-02	7.348E-02	NOT IDENT.
BA-140	-1.140E-01	1.284E+00	2.301E+00	NOT IDENT.
LA-140	1.425E-01	5.925E-01	1.227E+00	NOT IDENT.
CE-141	-1.297E-01	1.336E-01	2.102E-01	NOT IDENT.
CE-143	0.000E+00	3.922E+06	0.000E+00	SHORT HLIF
CE-144	-4.635E-02	2.779E-01	4.699E-01	NOT IDENT.
PM-144	9.121E-03	6.091E-02	1.194E-01	FAIL ABUN
PR-144	7.515E-01	4.615E+00	9.057E+00	NOT IDENT.
PM-146	-1.586E-02	6.781E-02	1.199E-01	NOT IDENT.
ND-147	-2.379E+00	3.475E+00	4.755E+00	FAIL ABUN
PM-147	-2.527E+02	9.994E+02	1.685E+03	NOT IDENT.
PM-149	0.000E+00	5.531E+04	0.000E+00	SHORT HLIF

EU-150	-3.044E-02	4.819E-02	7.165E-02	FAIL ABUN
EU-152	-1.223E-02	1.664E-01	2.699E-01	FAIL ABUN
GD-153	1.075E-01	1.012E-01	1.897E-01	NOT IDENT.
EU-154	4.638E-02	2.012E-01	3.861E-01	NOT IDENT.
EU-155	6.832E-02	1.292E-01	2.331E-01	FAIL ABUN
TB-160	-1.398E-01	3.170E-01	5.593E-01	FAIL ABUN
HO-166M	-5.856E-02	9.493E-02	1.666E-01	NOT IDENT.
TM-171	9.550E+00	9.366E+00	1.060E+01	FAIL ABUN
HF-172	3.369E-02	2.640E-01	4.250E-01	FAIL ABUN
LU-172	-8.159E-02	1.086E-01	1.746E-01	FAIL ABUN
LU-176	5.513E-03	4.381E-02	7.353E-02	FAIL ABUN
HF-181	-3.192E-02	1.094E-01	1.674E-01	NOT IDENT.
TA-182	-9.272E-04	3.341E-01	6.684E-01	FAIL ABUN
RE-183	-5.928E-02	1.075E-01	1.847E-01	NOT IDENT.
RE-184	5.056E-02	3.314E-01	6.508E-01	NOT IDENT.
W-188	-2.345E+00	1.254E+01	2.035E+01	FAIL ABUN
IR-192	2.357E-02	6.532E-02	1.139E-01	FAIL ABUN
HG-203	-2.521E-02	7.528E-02	1.343E-01	NOT IDENT.
TL-204	1.272E+00	4.154E+00	6.887E+00	NOT IDENT.
BI-207	2.893E-02	1.039E-01	2.043E-01	FAIL ABUN
PB-211	-1.142E-02	1.383E+00	2.479E+00	FAIL ABUN
BI-213	1.446E-02	1.459E-01	2.746E-01	NOT IDENT.
RN-219	-8.419E-02	7.573E-01	1.348E+00	FAIL ABUN
RA-223	-6.774E-02	9.162E-01	1.653E+00	FAIL ABUN
AC-225	-1.762E+00	2.910E+00	5.149E+00	NOT IDENT.
AC-227	7.624E-01	6.317E-01	7.726E-01	FAIL ABUN
TH-227	7.624E-01	6.317E-01	7.726E-01	FAIL ABUN
TH-231	-6.774E-02	9.162E-01	1.653E+00	FAIL ABUN
PA-233	5.711E-03	9.717E-02	1.800E-01	FAIL ABUN
PA-234	5.170E-01	4.202E-01	1.029E+00	NOT IDENT.
NP-237	5.711E-03	9.717E-02	1.800E-01	FAIL ABUN
NP-238	0.000E+00	2.102E+04	0.000E+00	SHORT HLIF
NP-239	-1.079E-01	3.475E-01	5.843E-01	NOT IDENT.
AM-241	3.457E-02	7.806E-02	1.336E-01	NOT IDENT.
CM-243	-1.292E-01	1.279E-01	2.039E-01	NOT IDENT.
BK-247	-2.953E-02	1.040E-01	1.885E-01	FAIL ABUN
CM-247	1.133E-02	7.065E-02	1.291E-01	NOT IDENT.
CF-249	6.421E-02	7.472E-02	1.459E-01	NOT IDENT.
CF-251	3.738E-02	1.730E-01	3.286E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:52:36.48

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	38	10.44*	2.158E+00	1.184E+00	1.854E+00	81.61
K-40	1460.82	32	10.66*	7.423E-01	2.914E+00	2.914E+00	36.62
SC-46	889.28	11	99.98*	1.179E+00	6.872E-02	9.137E-02	152.07
	1120.55	47	99.99	9.471E-01	3.557E-01	4.730E-01	47.01
AS-73	53.44	44	10.30*	7.197E+00	4.212E-01	5.670E-01	100.08
CD-109	88.03	145	3.70*	7.414E+00	3.758E+00	3.958E+00	34.82
SN-126	64.28	134	9.60	7.504E+00	1.321E+00	1.321E+00	39.52
	86.94	145	8.90	7.414E+00	1.562E+00	1.562E+00	34.82
	87.57	145	37.00*	7.414E+00	3.758E-01	3.758E-01	34.82
TL-208	277.37	------	6.60	3.618E+00	------	Line Not Found	------
	583.19	82	85.00*	1.774E+00	3.866E-01	3.866E-01	30.85
	860.56	------	12.50	1.215E+00	------	Line Not Found	------
BI-210	46.54	125	4.25*	6.779E+00	3.084E+00	3.093E+00	49.72
PB-210	46.54	125	4.25*	6.779E+00	3.084E+00	3.093E+00	49.72
BI-211	72.87	------	1.23	7.566E+00	------	Line Not Found	------
	351.06	482	12.92*	2.902E+00	9.130E+00	9.130E+00	9.80
BI-212	727.33	13	6.67*	1.430E+00	9.545E-01	9.545E-01	95.31
	1620.50	------	1.47	6.759E-01	------	Line Not Found	------
PB-212	74.82	341	10.28	7.559E+00	3.114E+00	3.114E+00	19.04
	77.11	400	17.10	7.545E+00	2.202E+00	2.202E+00	13.44
	238.63	283	43.60*	4.131E+00	1.116E+00	1.116E+00	14.35
	300.09	11	3.30	3.360E+00	6.892E-01	6.892E-01	243.26
BI-214	609.32	298	45.49*	1.699E+00	2.737E+00	2.738E+00	13.14
	1120.29	47	14.92	9.471E-01	2.384E+00	2.384E+00	47.01
	1764.49	28	15.30	6.262E-01	2.103E+00	2.103E+00	48.15
PB-214	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.907E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.637E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
RN-222	609.32	298	45.49*	1.699E+00	2.737E+00	2.738E+00	13.14
	1120.29	47	14.92	9.471E-01	2.384E+00	2.384E+00	47.01
	1764.49	28	15.30	6.262E-01	2.103E+00	2.103E+00	48.15
RA-224	240.99	204	4.10*	4.081E+00	8.676E+00	8.676E+00	20.28
RA-226	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.907E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.637E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
AC-228	105.21	------	1.10	7.016E+00	------	Line Not Found	------
	338.32	72	11.27	3.010E+00	1.499E+00	1.499E+00	47.86
	835.71	------	1.61	1.250E+00	------	Line Not Found	------
	911.20	50	25.80*	1.151E+00	1.204E+00	1.204E+00	38.76
	968.97	40	15.80	1.084E+00	1.639E+00	1.639E+00	38.09
RA-228	105.21	------	1.10	7.016E+00	------	Line Not Found	------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	72	11.27	3.010E+00	1.499E+00	1.499E+00	47.86
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	50	25.80*	1.151E+00	1.204E+00	1.204E+00	38.76
	968.97	40	15.80	1.084E+00	1.639E+00	1.639E+00	38.09
TH-228	74.82	341	10.28	7.559E+00	3.114E+00	3.114E+00	19.04
	77.11	400	17.10	7.545E+00	2.202E+00	2.202E+00	13.44
	238.63	283	43.60*	4.131E+00	1.116E+00	1.116E+00	14.35
	300.09	11	3.30	3.360E+00	6.892E-01	6.892E-01	243.26
TH-229	85.43	65	14.70	7.463E+00	4.235E-01	4.235E-01	64.86
	88.47	145	24.00	7.414E+00	5.794E-01	5.794E-01	34.82
	193.51	------	4.41*	4.895E+00	------ Line Not Found		------
	210.85	33	2.80	4.599E+00	1.808E+00	1.808E+00	89.37
TH-230	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.906E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.636E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
PA-231	283.69	------	1.70	3.545E+00	------ Line Not Found		------
	301.36	11	5.35*	3.360E+00	4.251E-01	4.251E-01	243.26
TH-232	105.21	------	1.10	7.016E+00	------ Line Not Found		------
	338.32	72	11.27	3.010E+00	1.499E+00	1.499E+00	47.86
	835.71	------	1.61	1.250E+00	------ Line Not Found		------
	911.20	50	25.80*	1.151E+00	1.204E+00	1.204E+00	38.76
	968.97	40	15.80	1.084E+00	1.639E+00	1.639E+00	38.09
PA-234M	63.29	134	3.70*	7.504E+00	3.428E+00	3.428E+00	39.52
	92.59	202	4.23	7.305E+00	4.639E+00	4.639E+00	27.11
TH-234	63.29	134	3.70*	7.504E+00	3.428E+00	3.428E+00	39.52
	92.59	202	4.23	7.305E+00	4.639E+00	4.639E+00	27.11
U-234	74.82	341	5.80	7.559E+00	5.520E+00	5.520E+00	19.04
	77.11	400	9.70	7.545E+00	3.881E+00	3.881E+00	13.44
	87.09	145	3.41	7.414E+00	4.078E+00	4.078E+00	34.82
	242.00	204	7.25	4.081E+00	4.906E+00	4.906E+00	20.28
	295.22	322	18.42	3.420E+00	3.636E+00	3.636E+00	14.33
	351.93	482	35.60*	2.902E+00	3.314E+00	3.314E+00	9.80
U-235	89.96	74	3.47	7.361E+00	2.070E+00	2.070E+00	45.43
	93.35	202	5.60	7.305E+00	3.504E+00	3.504E+00	27.11
	143.76	------	10.96*	6.011E+00	------ Line Not Found		------
	163.33	------	5.08	5.537E+00	------ Line Not Found		------
	185.72	121	57.20	5.046E+00	2.979E-01	2.979E-01	41.12
	205.31	------	5.01	4.674E+00	------ Line Not Found		------
U-238	63.29	134	3.70*	7.504E+00	3.428E+00	3.428E+00	39.52
	92.59	202	4.23	7.305E+00	4.639E+00	4.639E+00	27.11
PU-239	129.30	43	0.01*	6.398E+00	7.623E+02	7.623E+02	101.54
	375.05	35	0.00	2.736E+00	5.767E+03	5.767E+03	74.23
	413.71	------	0.00	2.483E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	6.533E+00	------ Line Not Found		------
	74.66	341	67.20*	7.559E+00	4.764E-01	4.764E-01	19.04
ANH-511	511.00	38	100.00*	2.022E+00	1.351E-01	1.351E-01	92.69

Flag: "*" = Keyline

Sample ID : G714507023 Acquisition date : 10-APR-2025 20:52:08

Total number of lines in spectrum 50
Number of unidentified lines 9
Number of lines tentatively identified by NID 41 82.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.57	1.184E+00	1.854E+00	1.513E+00	81.61	
K-40	1.25E+09Y	1.00	2.914E+00	2.914E+00	1.067E+00	36.62	
SC-46	83.79D	1.33	6.872E-02	9.137E-02	13.89E-02	152.07	
AS-73	80.30D	1.35	4.212E-01	5.670E-01	5.674E-01	100.08	
CD-109	461.40D	1.05	3.758E+00	3.958E+00	1.378E+00	34.82	
SN-126	2.30E+05Y	1.00	3.758E-01	3.758E-01	1.309E-01	34.82	
TL-208	1.41E+10Y	1.00	3.866E-01	3.866E-01	1.193E-01	30.85	
BI-210	22.20Y	1.00	3.084E+00	3.093E+00	1.538E+00	49.72	
PB-210	22.20Y	1.00	3.084E+00	3.093E+00	1.538E+00	49.72	
BI-211	7.04E+08Y	1.00	9.130E+00	9.130E+00	0.895E+00	9.80	
BI-212	1.41E+10Y	1.00	9.545E-01	9.545E-01	9.097E-01	95.31	
PB-212	1.41E+10Y	1.00	1.116E+00	1.116E+00	0.160E+00	14.35	
BI-214	1600.00Y	1.00	2.737E+00	2.738E+00	0.360E+00	13.14	
PB-214	1600.00Y	1.00	3.314E+00	3.314E+00	0.325E+00	9.80	
RN-222	1600.00Y	1.00	2.737E+00	2.738E+00	0.360E+00	13.14	
RA-224	1.41E+10Y	1.00	8.676E+00	8.676E+00	1.759E+00	20.28	
RA-226	1600.00Y	1.00	3.314E+00	3.314E+00	0.325E+00	9.80	
AC-228	1.41E+10Y	1.00	1.204E+00	1.204E+00	0.467E+00	38.76	
RA-228	1.41E+10Y	1.00	1.204E+00	1.204E+00	0.467E+00	38.76	
TH-228	1.41E+10Y	1.00	1.116E+00	1.116E+00	0.160E+00	14.35	
TH-229	7340.00Y	1.00	5.794E-01	5.794E-01	2.018E-01	34.82	K
TH-230	7.54E+04Y	1.00	3.314E+00	3.314E+00	0.325E+00	9.80	
PA-231	7.04E+08Y	1.00	4.251E-01	4.251E-01	10.34E-01	243.26	
TH-232	1.41E+10Y	1.00	1.204E+00	1.204E+00	0.467E+00	38.76	
PA-234M	4.47E+09Y	1.00	3.428E+00	3.428E+00	1.355E+00	39.52	
TH-234	4.47E+09Y	1.00	3.428E+00	3.428E+00	1.355E+00	39.52	
U-234	2.45E+05Y	1.00	3.314E+00	3.314E+00	0.325E+00	9.80	
U-235	7.04E+08Y	1.00	2.979E-01	2.979E-01	1.225E-01	41.12	K
U-238	4.47E+09Y	1.00	3.428E+00	3.428E+00	1.355E+00	39.52	
PU-239	24110.00Y	1.00	7.623E+02	7.623E+02	7.740E+02	101.54	
AM-243	7370.00Y	1.00	4.764E-01	4.764E-01	0.907E-01	19.04	
ANH-511	1.00E+09Y	1.00	1.351E-01	1.351E-01	1.252E-01	92.69	
	Total Activity :		8.331E+02	8.341E+02			
	Grand Total Activity :		8.331E+02	8.341E+02			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	190.99	25	75	0.76	382.52	378	9	7.00E-03	****	4.94E+00	
0	251.03	27	68	4.29	502.66	497	12	7.71E-03	****	3.95E+00	T
0	256.61	40	67	0.82	513.84	509	11	1.12E-02	84.5	3.88E+00	T
0	270.57	53	57	0.93	541.77	538	9	1.50E-02	57.6	3.70E+00	T
0	313.65	20	86	4.91	627.99	616	15	5.81E-03	****	3.23E+00	
4	356.12	30	38	2.26	712.98	700	39	8.48E-03	****	2.87E+00	T
0	463.81	18	34	1.44	928.46	921	10	5.08E-03	****	2.22E+00	T
0	502.78	12	21	0.80	1006.44	1003	8	3.52E-03	****	2.05E+00	
0	535.76	23	32	5.96	1072.43	1062	19	6.72E-03	****	1.93E+00	
0	552.00	17	17	1.19	1104.92	1101	11	4.87E-03	****	1.87E+00	T
0	666.38	6	7	1.23	1333.76	1329	6	1.87E-03	****	1.56E+00	T
0	768.74	41	25	1.05	1538.54	1528	21	1.20E-02	66.6	1.35E+00	
0	826.89	19	7	2.34	1654.89	1646	15	5.45E-03	75.6	1.26E+00	
0	833.22	6	8	1.85	1667.54	1660	9	1.69E-03	****	1.25E+00	T
0	871.35	8	10	0.54	1743.82	1737	9	2.22E-03	****	1.20E+00	T
0	933.77	24	15	2.64	1868.67	1861	13	6.89E-03	78.1	1.12E+00	
0	964.21	16	5	2.06	1929.57	1926	8	4.82E-03	68.1	1.09E+00	T
0	1238.59	17	17	1.03	2478.34	2472	12	5.09E-03	****	8.63E-01	T
0	1281.82	5	6	0.94	2564.80	2555	12	1.39E-03	****	8.36E-01	
0	1377.49	31	0	3.46	2756.11	2748	16	9.03E-03	36.6	7.83E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:52:47.65

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507023.CNF;1   *
* Acquisition date : 10-APR-2025 20:52:08 Sensitivity     : 3.000           *
* Detector ID      : GAM38                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****           *
* Sample date      :  7-MAR-2025 11:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507023           Analyst initials: MXR1            *
* Batch Number     : 2767517              Sample Quantity : 1.0568E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5             *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	5.833E-01
K-40	2.651E-01
SC-46	7.773E-02
AS-73	2.559E-01
CD-109	4.665E-01
SN-126	7.625E-02
TL-208	5.074E-02
BI-210	4.821E-01
PB-210	4.821E-01
BI-211	2.562E-01
BI-212	7.768E-01
PB-212	6.259E-02
BI-214	8.386E-02
PB-214	9.324E-02
RN-222	8.386E-02
RA-224	6.720E-01
RA-226	9.324E-02
AC-228	2.020E-01
RA-228	2.020E-01
TH-228	6.259E-02
TH-229	5.595E-01
TH-230	9.324E-02
PA-231	5.928E-01
TH-232	2.020E-01
PA-234M	5.867E-01
TH-234	5.867E-01
U-234	9.324E-02
U-235	2.347E-01
U-238	5.867E-01
PU-239	3.666E+02
AM-243	4.057E-02
ANH-511	3.815E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

NA-22	5.672E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.682E-02	NOT IDENT.
V-48	2.572E-01	NOT IDENT.
CR-51	7.086E-01	NOT IDENT.
MN-52	3.382E+00	NOT IDENT.
MN-54	5.453E-02	NOT IDENT.
CO-56	5.110E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.739E-02	NOT IDENT.
CO-58	6.290E-02	NOT IDENT.
FE-59	1.711E-01	NOT IDENT.
CO-60	4.122E-02	NOT IDENT.
ZN-65	1.364E-01	NOT IDENT.
GE-68	1.568E+00	NOT IDENT.
AS-74	2.735E-01	NOT IDENT.
SE-75	5.321E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	8.384E-01	NOT IDENT.
RB-83	1.189E-01	FAIL ABUN
RB-84	2.129E-01	NOT IDENT.
KR-85	1.064E+01	NOT IDENT.
SR-85	6.907E-02	NOT IDENT.
RB-86	2.008E+00	NOT IDENT.
Y-88	5.922E-02	NOT IDENT.
Y-91	2.854E+01	NOT IDENT.
NB-94	4.354E-02	FAIL ABUN
NB-95	8.197E-02	NOT IDENT.
NB-95M	1.801E-01	NOT IDENT.
ZR-95	1.420E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.524E-02	NOT IDENT.
RH-102	7.597E-02	NOT IDENT.
RU-103	7.106E-02	FAIL ABUN
RH-106	4.378E-01	NOT IDENT.
RU-106	4.378E-01	NOT IDENT.
AG-108M	4.253E-02	NOT IDENT.
AG-110	9.937E-01	NOT IDENT.
AG-110M	9.067E-02	NOT IDENT.
SN-113	6.817E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.554E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.298E-02	NOT IDENT.
SB-124	2.163E-01	NOT IDENT.
SB-125	1.433E-01	FAIL ABUN
TE-125M	1.193E+01	NOT IDENT.
I-126	8.606E-01	FAIL ABUN
SB-126	6.166E-01	FAIL ABUN
SB-127	5.584E+01	FAIL ABUN
I-131	8.608E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	6.736E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	5.597E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	3.744E-01	NOT IDENT.
BA-137M	4.747E-02	NOT IDENT.
CS-137	5.014E-02	NOT IDENT.
LA-138	6.714E-02	NOT IDENT.
CE-139	3.414E-02	NOT IDENT.
BA-140	1.018E+00	NOT IDENT.
LA-140	5.188E-01	NOT IDENT.
CE-141	9.818E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.199E-01	NOT IDENT.
PM-144	5.281E-02	FAIL ABUN
PR-144	4.008E+00	NOT IDENT.
PM-146	5.339E-02	NOT IDENT.
ND-147	2.047E+00	FAIL ABUN
PM-147	7.903E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.255E-02	FAIL ABUN

EU-152	1.228E-01	FAIL ABUN
GD-153	8.980E-02	NOT IDENT.
EU-154	1.604E-01	NOT IDENT.
EU-155	1.100E-01	FAIL ABUN
TB-160	2.426E-01	FAIL ABUN
HO-166M	7.119E-02	NOT IDENT.
TM-171	5.005E+00	FAIL ABUN
HF-172	1.989E-01	FAIL ABUN
LU-172	7.107E-02	FAIL ABUN
LU-176	3.366E-02	FAIL ABUN
HF-181	7.392E-02	NOT IDENT.
TA-182	2.844E-01	FAIL ABUN
RE-183	8.699E-02	NOT IDENT.
RE-184	2.830E-01	NOT IDENT.
W-188	9.209E+00	FAIL ABUN
IR-192	5.194E-02	FAIL ABUN
HG-203	6.171E-02	NOT IDENT.
TL-204	3.280E+00	NOT IDENT.
BI-207	8.926E-02	FAIL ABUN
PB-211	1.140E+00	FAIL ABUN
BI-213	1.215E-01	NOT IDENT.
RN-219	6.171E-01	FAIL ABUN
RA-223	7.499E-01	FAIL ABUN
AC-225	2.369E+00	NOT IDENT.
AC-227	3.603E-01	FAIL ABUN
TH-227	3.603E-01	FAIL ABUN
TH-231	7.499E-01	FAIL ABUN
PA-233	8.233E-02	FAIL ABUN
PA-234	4.426E-01	NOT IDENT.
NP-237	8.233E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.741E-01	NOT IDENT.
AM-241	6.318E-02	NOT IDENT.
CM-243	9.541E-02	NOT IDENT.
BK-247	8.575E-02	FAIL ABUN
CM-247	5.935E-02	NOT IDENT.
CF-249	6.748E-02	NOT IDENT.
CF-251	1.537E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:52:52.03

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507023.CNF;1   *
* Acquisition date : 10-APR-2025 20:52:08 Sensitivity     : 3.000           *
* Detector ID      : GAM38                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.41     Half life ratio : *****           *
* Sample date      :  7-MAR-2025 11:00:00 Nuclide Library : SOLID           *
* Sample ID        : G714507023           Analyst initials: MXR1            *
* Batch Number     : 2767517              Sample Quantity : 1.0568E+02 GRAM *
*                                         Quantity Err(%) : 1.8925E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 29-JUL-2024 10:22:36 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;5              *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.854E+00	1.492E+00	1.492E+00
K-40	2.914E+00	1.078E+00	1.078E+00
SC-46	9.137E-02	1.364E-01	1.364E-01
AS-73	5.670E-01	5.684E-01	5.684E-01
CD-109	3.958E+00	1.406E+00	1.406E+00
SN-126	3.758E-01	1.320E-01	1.320E-01
TL-208	3.866E-01	1.221E-01	1.221E-01
BI-210	3.093E+00	1.534E+00	1.534E+00
PB-210	3.093E+00	1.534E+00	1.534E+00
BI-211	9.130E+00	1.162E+00	1.162E+00
BI-212	9.545E-01	8.961E-01	8.961E-01
PB-212	1.116E+00	1.941E-01	1.941E-01
BI-214	2.738E+00	4.315E-01	4.315E-01
PB-214	3.314E+00	4.182E-01	4.182E-01
RN-222	2.738E+00	4.315E-01	4.315E-01
RA-224	8.676E+00	1.934E+00	1.934E+00
RA-226	3.314E+00	4.182E-01	4.182E-01
AC-228	1.204E+00	4.727E-01	4.727E-01
RA-228	1.204E+00	4.727E-01	4.727E-01
TH-228	1.116E+00	1.941E-01	1.941E-01
TH-229	-2.026E-01	7.380E-01	7.380E-01
TH-230	3.314E+00	4.181E-01	4.181E-01
PA-231	4.251E-01	1.018E+00	1.018E+00
TH-232	1.204E+00	4.727E-01	4.727E-01
PA-234M	3.428E+00	1.537E+00	1.537E+00
TH-234	3.428E+00	1.537E+00	1.537E+00
U-234	3.314E+00	4.181E-01	4.181E-01
U-235	7.571E-02	2.840E-01	2.840E-01
U-238	3.428E+00	1.537E+00	1.537E+00
PU-239	7.623E+02	7.626E+02	7.626E+02
AM-243	4.764E-01	9.669E-02	9.669E-02
ANH-511	1.351E-01	1.233E-01	1.233E-01

---- Non-Identified Nuclides ----

	Key-Line Activity	K.L Act error	TPU

Nuclide	(pCi/GRAM)	(1.96-sigma)	(1.96-sigma)	
NA-22	1.965E-03	7.618E-02	7.619E-02	NOT IDENT.
NA-24	1.259E+15	2.394E+15	2.460E+15	SHORT HLIF
AL-26	-7.009E-04	3.320E-02	3.320E-02	NOT IDENT.
V-48	7.043E-02	2.991E-01	3.008E-01	NOT IDENT.
CR-51	-8.860E-02	8.542E-01	8.551E-01	NOT IDENT.
MN-52	5.651E-01	3.850E+00	3.859E+00	NOT IDENT.
MN-54	-4.804E-02	8.602E-02	8.870E-02	NOT IDENT.
CO-56	-1.742E-02	6.552E-02	6.599E-02	FAIL ABUN
MN-56	-1.000E+41	3.834E+41	0.000E+00	SHORT HLIF
CO-57	-6.333E-03	3.446E-02	3.458E-02	NOT IDENT.
CO-58	1.718E-02	7.171E-02	7.213E-02	NOT IDENT.
FE-59	-2.633E-02	2.163E-01	2.166E-01	NOT IDENT.
CO-60	-2.349E-02	5.609E-02	5.708E-02	NOT IDENT.
ZN-65	9.739E-02	1.622E-01	1.681E-01	NOT IDENT.
GE-68	-1.559E-02	1.928E+00	1.928E+00	NOT IDENT.
AS-74	6.556E-02	3.090E-01	3.104E-01	NOT IDENT.
SE-75	6.573E-05	6.246E-02	6.246E-02	NOT IDENT.
BR-77	4.838E+04	4.880E+04	5.345E+04	SHORT HLIF
SR-82	2.680E-01	1.093E+00	1.100E+00	NOT IDENT.
RB-83	5.570E-02	1.384E-01	1.406E-01	FAIL ABUN
RB-84	3.518E-01	2.166E-01	2.684E-01	NOT IDENT.
KR-85	5.803E+00	1.373E+01	1.397E+01	NOT IDENT.
SR-85	3.751E-02	8.910E-02	9.069E-02	NOT IDENT.
RB-86	1.852E-01	2.416E+00	2.418E+00	NOT IDENT.
Y-88	1.285E-02	6.670E-02	6.695E-02	NOT IDENT.
Y-91	-1.813E+01	3.765E+01	3.852E+01	NOT IDENT.
NB-94	-5.053E-02	5.960E-02	6.380E-02	FAIL ABUN
NB-95	5.291E-02	8.953E-02	9.265E-02	NOT IDENT.
NB-95M	-4.915E-02	2.392E-01	2.402E-01	NOT IDENT.
ZR-95	3.002E-02	1.640E-01	1.646E-01	NOT IDENT.
NB-97	-1.000E+41	2.255E+41	0.000E+00	SHORT HLIF
ZR-97	6.779E+14	6.364E+14	7.060E+14	SHORT HLIF
MO-99	3.390E+02	2.284E+03	2.289E+03	SHORT HLIF
TC-99M	9.575E+38	7.270E+39	0.000E+00	SHORT HLIF
RH-101	6.915E-03	4.312E-02	4.323E-02	NOT IDENT.
RH-102	-1.561E-02	9.131E-02	9.158E-02	NOT IDENT.
RU-103	1.752E-02	8.459E-02	8.495E-02	FAIL ABUN
RH-106	-2.709E-01	5.533E-01	5.666E-01	NOT IDENT.
RU-106	-2.709E-01	5.533E-01	5.666E-01	NOT IDENT.
AG-108M	-1.108E-02	5.333E-02	5.356E-02	NOT IDENT.
AG-110	-6.937E-01	1.280E+00	1.317E+00	NOT IDENT.
AG-110M	1.930E-02	1.202E-01	1.205E-01	NOT IDENT.
SN-113	-4.000E-02	8.741E-02	8.925E-02	NOT IDENT.
CD-115	2.416E+02	8.833E+03	8.834E+03	SHORT HLIF
SN-117M	-1.502E-01	1.885E-01	2.003E-01	NOT IDENT.
SB-122	-2.243E+02	3.846E+02	3.977E+02	SHORT HLIF
TE-123M	-4.460E-02	4.115E-02	4.580E-02	NOT IDENT.
SB-124	8.086E-02	2.401E-01	2.429E-01	NOT IDENT.
SB-125	6.439E-02	1.665E-01	1.690E-01	FAIL ABUN
TE-125M	-2.253E+00	1.485E+01	1.488E+01	NOT IDENT.
I-126	5.649E-01	8.305E-01	8.687E-01	FAIL ABUN
SB-126	-6.417E-01	8.298E-01	8.787E-01	FAIL ABUN
SB-127	-3.217E+01	7.137E+01	7.283E+01	FAIL ABUN
I-131	1.131E-01	1.041E+00	1.042E+00	NOT IDENT.
I-132	1.000E+41	2.581E+41	0.000E+00	SHORT HLIF
TE-132	1.652E+01	6.442E+01	6.485E+01	SHORT HLIF
BA-133	1.194E-01	1.406E-01	1.505E-01	FAIL ABUN
I-133	2.986E+10	4.570E+10	4.764E+10	SHORT HLIF
CS-134	1.110E-02	6.468E-02	6.488E-02	NOT IDENT.
I-135	3.368E+36	1.321E+37	0.000E+00	SHORT HLIF
CS-136	-2.214E-01	5.105E-01	5.202E-01	NOT IDENT.
BA-137M	7.402E-03	6.160E-02	6.169E-02	NOT IDENT.
CS-137	7.819E-03	6.508E-02	6.517E-02	NOT IDENT.
LA-138	-6.738E-02	1.003E-01	1.048E-01	NOT IDENT.
CE-139	-1.790E-02	4.051E-02	4.130E-02	NOT IDENT.
BA-140	-1.140E-01	1.284E+00	1.285E+00	NOT IDENT.
LA-140	1.425E-01	5.926E-01	5.961E-01	NOT IDENT.
CE-141	-1.297E-01	1.344E-01	1.465E-01	NOT IDENT.
CE-143	1.216E+07	4.041E+06	6.811E+06	SHORT HLIF
CE-144	-4.635E-02	2.780E-01	2.788E-01	NOT IDENT.
PM-144	9.121E-03	6.092E-02	6.106E-02	FAIL ABUN
PR-144	7.515E-01	4.615E+00	4.628E+00	NOT IDENT.
PM-146	-1.586E-02	6.783E-02	6.820E-02	NOT IDENT.
ND-147	-2.379E+00	3.482E+00	3.644E+00	FAIL ABUN
PM-147	-2.527E+02	9.997E+02	1.006E+03	NOT IDENT.
PM-149	2.207E+04	5.540E+04	5.629E+04	SHORT HLIF

EU-150	-3.044E-02	4.825E-02	5.017E-02	FAIL ABUN
EU-152	-1.223E-02	1.664E-01	1.665E-01	FAIL ABUN
GD-153	1.075E-01	1.017E-01	1.126E-01	NOT IDENT.
EU-154	4.638E-02	2.012E-01	2.023E-01	NOT IDENT.
EU-155	6.832E-02	1.294E-01	1.330E-01	FAIL ABUN
TB-160	-1.398E-01	3.173E-01	3.235E-01	FAIL ABUN
HO-166M	-5.856E-02	9.510E-02	9.869E-02	NOT IDENT.
TM-171	9.550E+00	9.408E+00	1.035E+01	FAIL ABUN
HF-172	3.369E-02	2.641E-01	2.645E-01	FAIL ABUN
LU-172	-8.159E-02	1.091E-01	1.152E-01	FAIL ABUN
LU-176	5.513E-03	4.382E-02	4.389E-02	FAIL ABUN
HF-181	-3.192E-02	1.094E-01	1.103E-01	NOT IDENT.
TA-182	-9.272E-04	3.341E-01	3.341E-01	FAIL ABUN
RE-183	-5.928E-02	1.077E-01	1.110E-01	NOT IDENT.
RE-184	5.056E-02	3.315E-01	3.323E-01	NOT IDENT.
W-188	-2.345E+00	1.254E+01	1.258E+01	FAIL ABUN
IR-192	2.357E-02	6.535E-02	6.620E-02	FAIL ABUN
HG-203	-2.521E-02	7.530E-02	7.615E-02	NOT IDENT.
TL-204	1.272E+00	4.156E+00	4.195E+00	NOT IDENT.
BI-207	2.893E-02	1.040E-01	1.048E-01	FAIL ABUN
PB-211	-1.142E-02	1.383E+00	1.383E+00	FAIL ABUN
BI-213	1.446E-02	1.459E-01	1.461E-01	NOT IDENT.
RN-219	-8.419E-02	7.574E-01	7.583E-01	FAIL ABUN
RA-223	-6.774E-02	9.162E-01	9.168E-01	FAIL ABUN
AC-225	-1.762E+00	2.918E+00	3.024E+00	NOT IDENT.
AC-227	7.624E-01	6.424E-01	7.285E-01	FAIL ABUN
TH-227	7.624E-01	6.424E-01	7.285E-01	FAIL ABUN
TH-231	-6.774E-02	9.162E-01	9.168E-01	FAIL ABUN
PA-233	5.711E-03	9.717E-02	9.721E-02	FAIL ABUN
PA-234	5.170E-01	7.268E-01	7.633E-01	NOT IDENT.
NP-237	5.711E-03	9.717E-02	9.721E-02	FAIL ABUN
NP-238	-6.684E+03	2.103E+04	2.124E+04	SHORT HLIF
NP-239	-1.079E-01	3.477E-01	3.511E-01	NOT IDENT.
AM-241	3.457E-02	7.811E-02	7.965E-02	NOT IDENT.
CM-243	-1.292E-01	1.288E-01	1.414E-01	NOT IDENT.
BK-247	-2.953E-02	1.042E-01	1.050E-01	FAIL ABUN
CM-247	1.133E-02	7.068E-02	7.087E-02	NOT IDENT.
CF-249	6.421E-02	7.505E-02	8.044E-02	NOT IDENT.
CF-251	3.738E-02	1.731E-01	1.739E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	71.3855	81.75	118.9027	123.68	78.1837
879.38	68.6475	82.47	122.0112	125.81	68.1721
46.54	68.8737	83.79	155.9002	127.23	78.6713
228.16	0.0000	265.00	155.9764	127.91	78.7647
52.39	70.6640	193.51	156.4934	129.30	78.9531
1093.63	61.4346	105.31	156.8961	131.20	67.2084
52.39	71.2367	86.79	156.9810	133.02	78.2497
125.81	71.3692	86.94	157.0354	133.52	75.9055
53.44	71.4759	87.09	157.0888	136.00	72.5903
54.07	71.6183	87.57	157.2597	136.47	79.9118
293.27	0.0000	88.03	52.9647	739.50	0.0000
482.18	91.7575	306.78	53.0017	140.51	0.0000
57.98	103.1110	88.47	53.0171	143.76	73.5095
59.27	88.8189	143.76	85.7014	144.24	73.5654
59.32	88.8321	90.64	85.8306	145.44	85.9897
59.54	88.8900	531.02	85.9197	152.43	85.6836
60.96	100.2458	92.59	86.1982	1048.07	80.8166
61.17	107.1770	93.35	86.3404	154.21	74.7089
62.93	95.2905	94.56	89.5508	158.56	74.9121
63.29	95.3876	311.90	89.5685	159.00	83.6049
290.67	105.1510	946.00	89.5721	162.33	68.8914
87.57	120.6071	94.87	89.6106	537.26	68.9247
66.73	102.5848	97.43	75.4568	163.33	68.1501
67.24	115.3056	98.43	85.7725	165.86	66.7101
67.68	124.8886	98.44	85.7743	427.87	59.1235
1221.41	124.9122	103.37	95.0178	176.60	59.1467
70.82	122.1367	116.74	95.0178	177.52	65.2290
97.43	116.7643	100.11	105.3242	181.07	0.0000
70.82	122.7615	102.03	81.8624	181.52	71.1913
279.20	122.7650	103.18	93.4493	184.41	79.2611
1063.66	152.1197	103.37	98.0452	185.72	75.4940
72.87	152.1437	911.20	78.9548	193.51	59.1669
351.06	152.1437	105.31	78.9700	197.03	80.1221
74.66	152.8387	106.12	76.8042	198.01	70.5241
351.93	152.9009	106.47	84.8873	201.83	67.3172
238.63	152.9009	109.28	81.8944	203.43	78.1002
351.93	152.9009	111.00	77.5367	205.31	53.3734
238.63	152.9009	111.76	0.0000	210.85	56.4183
74.97	152.9587	114.06	64.0201	215.65	46.8335
77.11	153.7780	116.30	0.0000	218.12	56.0014
78.74	123.8035	116.74	85.3971	222.11	52.6315
256.23	125.5316	119.76	76.4600	227.09	51.1060
80.03	108.3046	264.66	73.1104	227.38	44.7322
133.52	108.3290	121.22	82.5589	228.16	0.0000
364.49	134.3507	344.28	76.7387	228.18	50.2555
711.68	110.6154	122.06	76.7774	235.69	64.9592
356.01	156.3234	122.92	74.5289	235.96	63.5960
323.87	156.3497	1274.44	74.5491	238.63	46.2189

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	27.4323	531.02	22.6349
240.99	46.3374	338.32	27.4334	537.26	20.9692
242.00	46.3877	340.48	22.9024	1260.41	0.0000
244.70	44.6616	340.55	22.9037	552.55	14.9834
685.70	45.0264	344.28	35.2272	795.86	17.7332
388.16	25.3380	345.93	33.7412	564.24	0.0000
507.63	0.0000	351.06	33.8822	569.33	17.7930
256.23	45.2061	351.93	33.9057	569.50	17.7948
527.90	0.0000	355.39	0.0000	569.70	14.2373
264.66	34.1968	356.01	34.0172	583.19	21.5134
264.80	34.2019	364.49	34.2468	584.27	18.6558
265.00	38.9597	366.42	0.0000	595.83	16.2444
269.46	40.0885	372.51	27.1510	600.60	16.2850
270.03	37.2465	375.05	27.2045	602.52	0.0000
401.81	37.2901	377.52	17.2969	604.72	10.1551
273.65	40.2543	383.85	35.8137	607.14	10.1678
276.40	51.8950	388.16	34.8732	609.32	15.4509
583.19	52.9064	666.33	33.8288	610.33	15.4592
277.60	48.1069	391.69	40.2629	614.28	21.8694
402.40	43.3136	400.66	37.3299	618.01	20.0852
279.20	49.1458	401.81	41.6311	884.68	16.4531
279.54	48.1974	402.40	40.5807	621.93	22.8699
279.70	48.2056	404.85	43.8620	630.19	0.0000
280.46	35.6977	410.95	42.9801	631.29	19.3023
301.36	47.4219	413.71	34.4518	633.25	24.8420
284.31	50.3560	720.70	31.2444	634.78	24.8610
285.41	35.8671	423.72	35.7795	635.95	15.6625
285.90	0.0000	427.09	30.4296	636.99	16.5927
287.50	35.9386	427.87	30.4461	657.50	21.4179
290.67	33.6107	433.94	33.8495	657.76	20.4894
293.27	0.0000	439.40	26.3037	657.90	0.0000
295.22	36.3947	440.45	18.6449	661.66	14.9297
316.51	36.4197	453.88	25.4529	664.57	0.0000
298.58	41.2181	463.37	30.0657	666.33	19.4524
299.98	41.2711	468.07	29.0400	666.50	19.4543
300.09	41.2754	473.00	20.1683	667.71	0.0000
300.13	41.2767	631.29	31.9749	677.62	17.8658
311.90	41.2767	696.49	25.8329	685.70	19.8221
301.36	41.3232	477.60	25.8460	692.65	0.0000
302.85	45.8122	482.18	23.6669	695.00	20.8573
304.50	37.4944	487.02	13.5652	696.49	18.0253
304.85	37.5060	492.35	0.0000	696.51	18.0259
306.78	37.0766	497.08	17.0621	697.00	18.9789
308.46	38.6183	505.52	27.4404	697.30	19.9304
311.90	37.7433	507.63	0.0000	697.49	18.0340
316.51	29.9188	511.00	21.7954	702.65	25.6882
319.41	33.9938	514.00	24.1326	706.68	14.2978
320.08	34.0138	514.00	24.1326	711.68	18.1523
321.04	43.0534	520.40	18.4570	720.70	27.8203
323.87	32.1185	520.69	0.0000	721.93	0.0000
325.23	47.2285	667.71	0.0000	1690.97	18.4365
1596.21	39.3087	527.90	0.0000	722.91	19.9742
333.37	30.3552	528.26	13.9067	723.31	19.9773
333.97	45.5566	529.59	10.4381	756.73	18.4482
334.37	45.5713	529.87	0.0000	727.33	20.2060

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	10.6113	935.54	18.4207	1362.66	0.0000
735.93	21.2501	937.49	11.7305	1365.19	4.7805
737.46	13.5317	983.53	8.3992	1368.63	0.0000
739.50	0.0000	946.00	3.1519	1384.29	6.4059
1434.09	12.6033	949.00	12.6211	1408.01	2.9005
747.24	17.4738	954.55	0.0000	1434.09	3.8932
748.06	14.5665	962.31	20.2898	1435.80	8.7636
752.31	19.4586	964.08	13.5352	1457.56	0.0000
753.82	16.5507	966.17	4.2329	1460.82	1.6331
756.73	17.5463	968.97	5.0845	1489.16	7.8941
756.80	14.6223	983.53	11.7120	1505.03	6.9340
763.94	12.5164	984.45	0.0000	1584.12	11.1031
765.81	14.6796	996.26	12.8331	1596.21	8.0977
766.84	14.6860	1002.74	11.7902	1620.50	6.1072
772.60	0.0000	1004.73	11.7983	1621.92	5.0908
776.52	12.5840	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	5.1702
778.90	17.7144	1028.54	0.0000	1750.46	0.0000
783.70	18.7368	1037.84	5.4233	1764.49	4.2021
1435.80	27.6702	1038.76	0.0000	1770.23	15.7771
903.28	15.8340	1046.59	15.2296	1771.35	7.3644
795.86	11.8942	1048.07	13.0605	1791.20	0.0000
801.95	12.9183	1049.04	11.9755	1808.65	1.0603
810.06	12.9615	1050.41	8.7134	1810.72	0.0000
810.29	9.9713	1063.66	13.1272	1836.06	2.1325
810.45	9.9719	1077.00	7.6909		
810.76	9.9731	1077.34	7.6917		
815.77	12.9917	1085.87	7.7131		
818.51	12.5776	1093.63	13.2554		
832.01	20.9244	1099.45	12.1729		
834.85	22.5593	1112.07	5.9258		
835.71	20.9555	1112.84	5.3344		
836.80	0.0000	1115.54	7.1188		
846.75	0.0000	1120.29	11.1395		
846.77	10.1193	1120.55	11.1401		
856.80	17.2708	1121.30	8.9146		
860.56	10.1743	1808.65	6.7031		
871.09	3.2691	1131.51	0.0000		
873.19	4.9077	1147.95	0.0000		
875.33	0.0000	1332.49	4.5288		
879.38	19.4726	1177.95	10.8844		
880.51	14.0617	1189.05	6.3704		
881.60	6.5648	1204.77	10.9717		
883.24	14.7801	1221.41	11.0250		
884.68	16.4312	1231.02	16.1234		
889.28	17.4887	1235.36	7.6872		
894.76	19.2437	1238.28	12.9254		
1836.06	6.1930	1260.41	0.0000		
900.72	21.6979	1271.87	4.1426		
903.28	12.4105	1274.44	6.2184		
911.20	13.2773	1274.54	7.7734		
912.08	13.2816	1291.59	6.5608		
984.45	0.0000	1298.22	0.0000		
926.50	5.5636	1312.11	6.5977		
929.11	11.6949	1332.49	6.6346		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:53:18.73

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507024.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM41.CNF;698
                                    Background date  : 6-APR-2025 11:02:34.
Sample date      : 6-MAR-2025 12:00:00. Acquisition date : 10-APR-2025 20:52:39
Sample ID        : G714507024           Sample quantity  : 1.19690E+02 GRAM
Detector name    : GAM41                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.36  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767517              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.45*	159	117	0.88	93.65	89	9	4.40E-02	15.2	
2	1	63.16*	76	124	0.92	127.06	121	12	2.12E-02	29.2	1.80E+00
3	0	68.76*	60	280	2.46	138.24	133	12	1.67E-02	57.4	
4	2	74.79*	215	132	0.84	150.30	145	15	5.98E-02	10.7	6.94E-01
5	2	77.07*	368	141	0.89	154.85	145	15	1.02E-01	7.2	
6	0	84.15*	56	149	0.97	169.01	166	7	1.57E-02	39.2	
7	0	87.31	100	162	1.12	175.33	172	7	2.77E-02	23.4	
8	0	89.87	37	135	0.92	180.43	178	6	1.02E-02	53.3	
9	5	92.67*	181	75	1.23	186.03	183	13	5.03E-02	11.6	1.34E+00
10	5	94.56*	27	74	1.00	189.82	183	13	7.63E-03	67.0	
11	0	99.05*	46	77	1.97	198.80	195	8	1.27E-02	37.2	
12	0	143.77*	19	67	0.73	288.18	285	6	5.29E-03	76.1	
13	0	154.33	23	52	1.37	309.29	307	5	6.51E-03	50.9	
14	0	185.84*	114	179	1.15	372.28	366	13	3.17E-02	26.9	
15	0	209.42	20	123	1.26	419.40	415	10	5.58E-03	106.2	
16	1	235.85	20	35	1.27	472.23	470	20	5.49E-03	42.9	3.15E+00
17	1	238.62*	325	59	1.27	477.77	470	20	9.02E-02	6.9	
18	1	241.85	138	46	1.28	484.23	470	20	3.84E-02	13.2	
19	0	270.39	40	46	1.84	541.28	537	9	1.12E-02	33.8	
20	4	295.13*	258	27	1.26	590.72	587	19	7.17E-02	7.2	2.05E+00
21	4	299.34*	35	30	1.80	599.14	587	19	9.81E-03	39.5	
22	0	327.84	24	67	1.13	656.12	650	12	6.72E-03	70.2	
23	0	338.93	33	71	1.15	678.29	672	11	9.24E-03	52.1	
24	0	351.88*	369	65	1.20	704.18	697	13	1.03E-01	6.9	
25	0	389.97	15	40	0.71	780.33	774	9	4.15E-03	81.0	
26	0	462.59	29	42	0.70	925.50	918	13	8.03E-03	49.9	
27	0	477.55	28	16	1.05	955.41	952	7	7.79E-03	30.2	
28	0	510.86*	6	54	1.44	1022.01	1016	12	1.60E-03	299.8	
29	0	556.09	33	73	9.13	1112.43	1096	29	9.03E-03	77.3	
30	0	565.25	21	11	3.24	1130.73	1126	9	5.69E-03	36.6	
31	0	583.36*	82	26	1.18	1166.95	1161	12	2.29E-02	17.0	
32	0	609.25*	251	19	1.45	1218.71	1211	14	6.97E-02	7.3	
33	0	664.91	18	6	1.20	1330.00	1326	9	4.91E-03	35.4	
34	0	679.41*	6	10	1.37	1358.97	1352	8	1.61E-03	106.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	705.48	10	28	3.94	1411.10	1401	15	2.75E-03	117.9	
36	0	727.77	28	24	1.34	1455.68	1451	12	7.78E-03	39.8	
37	0	768.19	34	27	1.49	1536.49	1529	15	9.53E-03	36.8	
38	0	840.38	14	17	5.15	1680.83	1670	14	4.00E-03	66.8	
39	0	860.54	17	15	2.13	1721.13	1711	15	4.70E-03	55.5	
40	0	911.38*	53	21	1.04	1822.79	1817	15	1.47E-02	24.1	
41	0	934.01	17	12	0.72	1868.06	1861	12	4.72E-03	47.4	
42	0	969.71*	31	29	0.59	1939.44	1930	13	8.70E-03	40.0	
43	0	1001.10	14	5	1.06	2002.21	1997	10	3.89E-03	40.1	
44	0	1036.50	12	6	0.67	2073.00	2066	11	3.19E-03	49.3	
45	0	1120.11*	60	7	1.86	2240.20	2234	13	1.66E-02	16.0	
46	0	1154.76	13	6	2.61	2309.50	2303	12	3.61E-03	46.8	
47	0	1238.11	17	12	1.41	2476.18	2469	12	4.72E-03	47.4	
48	0	1460.35*	33	7	1.99	2920.68	2913	13	9.15E-03	24.8	
49	0	1729.53	12	2	0.86	3459.11	3454	9	3.25E-03	37.3	
50	0	1764.37*	47	6	1.75	3528.80	3522	12	1.29E-02	18.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:53:20

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507024.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 6-MAR-2025 12:00:00 Acquisition date : 10-APR-2025 20:52:39
Sample ID : G714507024 Sample quantity : 119.69 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA41 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.36 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
RA-223	144.24	U-235	143.76

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	2.471E+00	6.839E-01	1.084E+00	60.30	OK
K-40	1460.82	10.66*	8.771E-01	2.091E+00	2.091E+00	49.51	OK
NB-95M	235.69	24.80*	4.600E+00	1.129E-01	1.655E-01	85.85	OK
CD-109	88.03	3.70*	7.760E+00	2.375E+00	2.504E+00	46.84	OK
I-126	388.63	35.60	2.983E+00	8.929E-02	5.954E-01	161.96	OK
	666.33	32.90*	1.806E+00	1.839E-01	1.226E+00	70.87	OK
	753.82	4.15	1.603E+00	----- Line Not Found		-----	Absent
SN-126	64.28	9.60	7.778E+00	7.095E-01	7.095E-01	58.43	OK
	86.94	8.90	7.760E+00	9.872E-01	9.872E-01	46.84	OK
	87.57	37.00*	7.760E+00	2.375E-01	2.375E-01	46.84	OK
TL-208	277.37	6.60	4.030E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.045E+00	2.949E-01	2.949E-01	34.03	OK
	860.56	12.50	1.415E+00	5.844E-01	5.844E-01	110.93	OK
BI-210	46.54	4.25*	6.962E+00	3.766E+00	3.778E+00	30.45	OK
PB-210	46.54	4.25*	6.962E+00	3.766E+00	3.778E+00	30.45	OK
BI-211	72.87	1.23	7.876E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.275E+00	5.576E+00	5.576E+00	13.83	OK
BI-212	727.33	6.67*	1.657E+00	1.559E+00	1.559E+00	79.54	OK
	1620.50	1.47	8.028E-01	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	7.876E+00	1.829E+00	1.829E+00	21.32	OK
	77.11	17.10	7.868E+00	1.881E+00	1.881E+00	14.36	OK
	238.63	43.60*	4.558E+00	1.063E+00	1.063E+00	13.81	OK
	300.09	3.30	3.777E+00	1.824E+00	1.824E+00	79.01	OK
BI-214	609.32	45.49*	1.962E+00	1.746E+00	1.746E+00	14.64	OK
	1120.29	14.92	1.109E+00	2.180E+00	2.180E+00	31.94	OK
	1764.49	15.30	7.482E-01	2.387E+00	2.387E+00	36.85	OK
PB-214	74.82	5.80	7.876E+00	3.242E+00	3.242E+00	21.32	OK
	77.11	9.70	7.868E+00	3.316E+00	3.316E+00	14.36	OK
	87.09	3.41	7.760E+00	2.577E+00	2.577E+00	46.84	OK
	242.00	7.25	4.510E+00	2.753E+00	2.753E+00	26.34	OK
	295.22	18.42	3.823E+00	2.362E+00	2.362E+00	14.33	OK
	351.93	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83	OK
RN-222	609.32	45.49*	1.962E+00	1.746E+00	1.746E+00	14.64	OK
	1120.29	14.92	1.109E+00	2.180E+00	2.180E+00	31.94	OK
	1764.49	15.30	7.482E-01	2.387E+00	2.387E+00	36.85	OK
RA-223	81.07	15.00	7.838E+00	----- Line Not Found		-----	Absent
	83.79	24.70	7.804E+00	2.002E-01	2.002E-01	78.38	OK
	94.56	8.67	7.634E+00	2.824E-01	2.824E-01	133.99	OK
	144.24	3.27	6.431E+00	----- Line Not Found		-----	<<INT Reject
	154.21	5.70	6.186E+00	4.415E-01	4.415E-01	101.83	OK
	269.46	13.90	4.117E+00	4.577E-01	4.577E-01	67.59	OK
	323.87	3.99*	3.526E+00	----- Line Not Found		-----	Absent
	338.28	2.84	3.387E+00	2.214E+00	2.214E+00	104.20	OK
RA-224	240.99	4.10*	4.510E+00	4.868E+00	4.868E+00	26.34	OK
RA-226	74.82	5.80	7.876E+00	3.242E+00	3.242E+00	21.32	OK
	77.11	9.70	7.868E+00	3.316E+00	3.316E+00	14.36	OK
	87.09	3.41	7.760E+00	2.577E+00	2.577E+00	46.84	OK
	242.00	7.25	4.510E+00	2.753E+00	2.753E+00	26.34	OK
	295.22	18.42	3.823E+00	2.362E+00	2.362E+00	14.33	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	351.93	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83	OK
AC-228	105.21	1.10	7.404E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.387E+00	5.578E-01	5.578E-01	104.20	OK
	835.71	1.61	1.454E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.341E+00	9.338E-01	9.338E-01	48.28	OK
	968.97	15.80	1.266E+00	9.494E-01	9.494E-01	80.08	OK
RA-228	105.21	1.10	7.404E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.387E+00	5.578E-01	5.578E-01	104.20	OK
	835.71	1.61	1.454E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.341E+00	9.338E-01	9.338E-01	48.28	OK
	968.97	15.80	1.266E+00	9.494E-01	9.494E-01	80.08	OK
TH-228	74.82	10.28	7.876E+00	1.829E+00	1.829E+00	21.32	OK
	77.11	17.10	7.868E+00	1.881E+00	1.881E+00	14.36	OK
	238.63	43.60*	4.558E+00	1.063E+00	1.063E+00	13.81	OK
	300.09	3.30	3.777E+00	1.824E+00	1.824E+00	79.01	OK
TH-229	85.43	14.70	7.804E+00	3.365E-01	3.365E-01	78.38	OK
	88.47	24.00	7.760E+00	3.661E-01	3.661E-01	46.84	OK
	193.51	4.41*	5.337E+00	----- Line	Not Found	-----	Absent
	210.85	2.80	5.039E+00	9.331E-01	9.331E-01	212.38	OK
TH-230	74.82	5.80	7.876E+00	3.242E+00	3.242E+00	21.32	OK
	77.11	9.70	7.868E+00	3.316E+00	3.316E+00	14.36	OK
	87.09	3.41	7.760E+00	2.577E+00	2.577E+00	46.84	OK
	242.00	7.25	4.510E+00	2.753E+00	2.753E+00	26.34	OK
	295.22	18.42	3.823E+00	2.362E+00	2.362E+00	14.33	OK
	351.93	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83	OK
TH-232	105.21	1.10	7.404E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.387E+00	5.578E-01	5.578E-01	104.20	OK
	835.71	1.61	1.454E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.341E+00	9.338E-01	9.338E-01	48.28	OK
	968.97	15.80	1.266E+00	9.494E-01	9.494E-01	80.08	OK
PA-234M	63.29	3.70*	7.778E+00	1.841E+00	1.841E+00	58.43	OK
	92.59	4.23	7.670E+00	3.800E+00	3.800E+00	23.15	OK
TH-234	63.29	3.70*	7.778E+00	1.841E+00	1.841E+00	58.43	OK
	92.59	4.23	7.670E+00	3.800E+00	3.800E+00	23.15	OK
U-234	74.82	5.80	7.876E+00	3.242E+00	3.242E+00	21.32	OK
	77.11	9.70	7.868E+00	3.316E+00	3.316E+00	14.36	OK
	87.09	3.41	7.760E+00	2.577E+00	2.577E+00	46.84	OK
	242.00	7.25	4.510E+00	2.753E+00	2.753E+00	26.34	OK
	295.22	18.42	3.823E+00	2.362E+00	2.362E+00	14.33	OK
	351.93	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83	OK
U-235	89.96	3.47	7.720E+00	9.332E-01	9.332E-01	106.53	OK
	93.35	5.60	7.670E+00	2.871E+00	2.871E+00	23.15	OK
	143.76	10.96*	6.442E+00	6.074E-02	6.074E-02	462.75	OK
	163.33	5.08	5.977E+00	----- Line	Not Found	-----	Absent
	185.72	57.20	5.490E+00	2.391E-01	2.391E-01	53.84	OK
	205.31	5.01	5.114E+00	----- Line	Not Found	-----	Absent
U-238	63.29	3.70*	7.778E+00	1.841E+00	1.841E+00	58.43	OK
	92.59	4.23	7.670E+00	3.800E+00	3.800E+00	23.15	OK
AM-243	43.53	5.90	6.691E+00	----- Line	Not Found	-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	74.66	67.20*	7.876E+00	2.798E-01	2.798E-01	21.32	OK
ANH-511	511.00	100.00*	2.319E+00	1.558E-02	1.558E-02	599.69	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:53:21.11

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507024.CNF;1		
Acquisition date	: 10-APR-2025 20:52:39	Sensitivity	: 3.000
Detector ID	: GAM41	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.36	Half life ratio	: *****
Sample date	: 6-MAR-2025 12:00:00	Analyst initials	: MXR1
Sample ID	: G714507024	Sample Quantity	: 1.1969E+02 GRAM
Batch Number	: 2767517	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 5-SEP-2024 06:18:38	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;12		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.084E+00	6.408E-01	1.056E+00
K-40	2.091E+00	1.014E+00	9.915E-01
NB-95M	1.655E-01	1.393E-01	2.780E-01
CD-109	2.504E+00	1.150E+00	1.001E+00
I-126	1.226E+00	8.516E-01	1.443E+00
SN-126	2.375E-01	1.090E-01	1.129E-01
TL-208	2.949E-01	9.833E-02	8.214E-02
BI-210	3.778E+00	1.127E+00	7.825E-01
PB-210	3.778E+00	1.127E+00	7.825E-01
BI-211	5.576E+00	7.560E-01	4.071E-01
BI-212	1.559E+00	1.215E+00	1.193E+00
PB-212	1.063E+00	1.439E-01	1.090E-01
BI-214	1.746E+00	2.505E-01	1.076E-01
PB-214	2.024E+00	2.744E-01	1.481E-01
RN-222	1.746E+00	2.505E-01	1.076E-01
RA-223	2.812E-01	7.032E-01	1.313E+00
RA-224	4.868E+00	1.257E+00	1.170E+00
RA-226	2.024E+00	2.744E-01	1.481E-01
AC-228	9.338E-01	4.419E-01	3.475E-01
RA-228	9.338E-01	4.419E-01	3.475E-01
TH-228	1.063E+00	1.439E-01	1.090E-01
TH-229	-6.994E-02	5.782E-01	1.032E+00
TH-230	2.024E+00	2.744E-01	1.481E-01
TH-232	9.338E-01	4.419E-01	3.475E-01
PA-234M	1.841E+00	1.054E+00	8.896E-01
TH-234	1.841E+00	1.054E+00	8.896E-01
U-234	2.024E+00	2.744E-01	1.481E-01
U-235	6.074E-02	2.755E-01	3.566E-01
U-238	1.841E+00	1.054E+00	8.896E-01
AM-243	2.798E-01	5.845E-02	5.520E-02
ANH-511	1.558E-02	9.158E-02	7.711E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)

NA-22	5.515E-02	5.194E-02	1.247E-01	NOT IDENT.
NA-24	0.000E+00	4.580E+15	0.000E+00	SHORT HLIF
AL-26	-1.370E-02	4.519E-02	9.184E-02	NOT IDENT.
SC-46	-1.445E-02	5.260E-02	1.029E-01	FAIL ABUN
V-48	3.998E-02	2.092E-01	4.362E-01	NOT IDENT.
CR-51	-2.053E-01	5.826E-01	1.109E+00	NOT IDENT.
MN-52	-1.782E+00	3.069E+00	5.353E+00	NOT IDENT.
MN-54	-7.028E-03	6.156E-02	9.898E-02	NOT IDENT.
CO-56	-6.484E-02	5.764E-02	8.118E-02	FAIL ABUN
MN-56	0.000E+00	8.930E+40	0.000E+00	SHORT HLIF
CO-57	-1.347E-03	2.225E-02	4.160E-02	NOT IDENT.
CO-58	1.045E-02	5.374E-02	1.079E-01	NOT IDENT.
FE-59	-1.429E-01	1.329E-01	2.053E-01	NOT IDENT.
CO-60	-3.245E-03	4.526E-02	9.192E-02	NOT IDENT.
ZN-65	3.220E-02	1.131E-01	2.170E-01	NOT IDENT.
GE-68	-2.373E-01	1.582E+00	3.111E+00	NOT IDENT.
AS-73	-1.448E-02	2.515E-01	4.851E-01	NOT IDENT.
AS-74	1.103E-01	2.342E-01	4.831E-01	NOT IDENT.
SE-75	-2.148E-02	5.157E-02	8.776E-02	NOT IDENT.
BR-77	0.000E+00	8.250E+03	0.000E+00	SHORT HLIF
SR-82	-5.671E-01	7.221E-01	1.160E+00	NOT IDENT.
RB-83	-3.006E-02	9.153E-02	1.694E-01	NOT IDENT.
RB-84	4.287E-02	1.205E-01	2.612E-01	NOT IDENT.
KR-85	5.909E+00	9.829E+00	1.829E+01	NOT IDENT.
SR-85	3.863E-02	6.445E-02	1.199E-01	NOT IDENT.
RB-86	-8.141E-01	2.085E+00	3.894E+00	NOT IDENT.
Y-88	-2.692E-02	4.655E-02	8.643E-02	NOT IDENT.
Y-91	4.151E+01	2.563E+01	6.818E+01	NOT IDENT.
NB-94	1.378E-02	4.402E-02	8.669E-02	NOT IDENT.
NB-95	6.562E-02	7.377E-02	1.473E-01	NOT IDENT.
ZR-95	-3.255E-02	1.175E-01	2.113E-01	NOT IDENT.
NB-97	0.000E+00	1.250E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.018E+15	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.929E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	6.654E+40	0.000E+00	SHORT HLIF
RH-101	-1.366E-03	3.207E-02	5.915E-02	NOT IDENT.
RH-102	-8.245E-02	6.993E-02	1.066E-01	FAIL ABUN
RU-103	4.931E-03	5.545E-02	1.112E-01	FAIL ABUN
RH-106	1.519E-01	3.744E-01	7.687E-01	NOT IDENT.
RU-106	1.519E-01	3.744E-01	7.687E-01	NOT IDENT.
AG-108M	-1.806E-02	3.411E-02	6.178E-02	NOT IDENT.
AG-110	-8.834E-02	9.590E-01	1.801E+00	NOT IDENT.
AG-110M	-9.814E-03	6.305E-02	1.251E-01	FAIL ABUN
SN-113	-4.618E-02	6.877E-02	1.076E-01	NOT IDENT.
CD-115	0.000E+00	7.477E+03	0.000E+00	SHORT HLIF
SN-117M	-1.109E-01	1.550E-01	2.659E-01	NOT IDENT.
SB-122	0.000E+00	5.085E+02	0.000E+00	SHORT HLIF
TE-123M	-5.725E-03	3.246E-02	5.854E-02	NOT IDENT.
SB-124	-4.503E-02	1.771E-01	3.327E-01	NOT IDENT.
SB-125	-3.807E-02	1.107E-01	2.051E-01	FAIL ABUN
TE-125M	9.293E+00	1.086E+01	2.145E+01	NOT IDENT.
SB-126	-3.113E-02	5.365E-01	1.014E+00	NOT IDENT.
SB-127	-2.556E+01	6.922E+01	1.245E+02	NOT IDENT.
I-131	-4.629E-01	6.881E-01	1.244E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.670E+01	0.000E+00	SHORT HLIF
BA-133	3.608E-02	4.615E-02	9.101E-02	NOT IDENT.
I-133	0.000E+00	7.684E+10	0.000E+00	SHORT HLIF
CS-134	-1.055E-02	4.569E-02	8.400E-02	NOT IDENT.
I-135	0.000E+00	1.268E+38	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.199E-01	6.629E-01	FAIL ABUN
BA-137M	1.751E-02	4.622E-02	8.547E-02	NOT IDENT.
CS-137	1.849E-02	4.883E-02	9.029E-02	NOT IDENT.
LA-138	-4.045E-02	6.390E-02	1.088E-01	NOT IDENT.
CE-139	-8.729E-04	3.448E-02	6.277E-02	NOT IDENT.
BA-140	-4.033E-01	8.860E-01	1.601E+00	NOT IDENT.
LA-140	-2.521E-01	4.354E-01	7.403E-01	FAIL ABUN
CE-141	-6.753E-02	9.987E-02	1.579E-01	NOT IDENT.
CE-143	0.000E+00	4.081E+06	0.000E+00	SHORT HLIF
CE-144	-9.812E-02	1.921E-01	3.411E-01	NOT IDENT.
PM-144	1.126E-02	5.029E-02	9.688E-02	FAIL ABUN
PR-144	8.163E-01	3.798E+00	7.310E+00	NOT IDENT.
PM-146	-3.725E-02	5.078E-02	8.990E-02	NOT IDENT.
ND-147	7.248E-01	2.419E+00	4.920E+00	FAIL ABUN
PM-147	-1.362E+02	6.262E+02	1.154E+03	NOT IDENT.
PM-149	0.000E+00	5.736E+04	0.000E+00	SHORT HLIF
EU-150	2.571E-02	2.820E-02	5.663E-02	FAIL ABUN

EU-152	-1.826E-02	8.483E-02	1.648E-01	NOT IDENT.
GD-153	4.092E-02	6.742E-02	1.170E-01	FAIL ABUN
EU-154	1.583E-01	1.465E-01	3.520E-01	NOT IDENT.
EU-155	-3.127E-02	8.969E-02	1.641E-01	FAIL ABUN
TB-160	-7.161E-02	1.982E-01	3.786E-01	FAIL ABUN
HO-166M	8.651E-03	7.160E-02	1.398E-01	FAIL ABUN
TM-171	-7.545E-01	4.137E+00	7.928E+00	NOT IDENT.
HF-172	1.517E-02	1.772E-01	3.326E-01	FAIL ABUN
LU-172	-3.181E-03	6.786E-02	1.388E-01	FAIL ABUN
LU-176	7.821E-04	2.789E-02	5.009E-02	FAIL ABUN
HF-181	-6.028E-02	6.835E-02	1.159E-01	NOT IDENT.
TA-182	2.088E-01	2.758E-01	6.033E-01	FAIL ABUN
RE-183	4.279E-02	6.947E-02	1.418E-01	NOT IDENT.
RE-184	1.193E-01	2.302E-01	5.008E-01	NOT IDENT.
W-188	1.626E+00	8.876E+00	1.633E+01	FAIL ABUN
IR-192	9.253E-04	4.542E-02	8.801E-02	FAIL ABUN
HG-203	-6.462E-02	5.838E-02	8.908E-02	NOT IDENT.
TL-204	1.219E+00	3.267E+00	5.360E+00	FAIL ABUN
BI-207	1.863E-02	5.883E-02	1.268E-01	FAIL ABUN
PB-211	-4.569E-01	8.530E-01	1.548E+00	NOT IDENT.
BI-213	-6.011E-02	1.042E-01	1.882E-01	NOT IDENT.
RN-219	1.673E-01	4.592E-01	9.256E-01	FAIL ABUN
AC-225	1.482E+00	2.371E+00	4.580E+00	NOT IDENT.
AC-227	-2.629E-01	2.821E-01	4.476E-01	FAIL ABUN
TH-227	-2.629E-01	2.821E-01	4.476E-01	FAIL ABUN
PA-231	1.014E-01	5.382E-01	9.106E-01	NOT IDENT.
TH-231	2.812E-01	7.032E-01	1.313E+00	FAIL ABUN
PA-233	-2.462E-02	7.342E-02	1.244E-01	FAIL ABUN
PA-234	1.364E-01	3.428E-01	7.473E-01	FAIL ABUN
NP-237	-2.462E-02	7.342E-02	1.244E-01	FAIL ABUN
NP-238	0.000E+00	2.069E+04	0.000E+00	SHORT HLIF
NP-239	-7.954E-02	2.129E-01	3.882E-01	FAIL ABUN
PU-239	1.680E+02	3.339E+02	6.414E+02	NOT IDENT.
AM-241	7.728E-03	5.146E-02	9.471E-02	NOT IDENT.
CM-243	-9.886E-03	8.922E-02	1.665E-01	FAIL ABUN
BK-247	-4.217E-02	8.616E-02	1.449E-01	FAIL ABUN
CM-247	4.197E-03	4.274E-02	8.364E-02	NOT IDENT.
CF-249	2.181E-02	4.494E-02	9.177E-02	NOT IDENT.
CF-251	-1.238E-01	1.331E-01	2.208E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:53:19.55

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	28	10.44*	2.471E+00	6.839E-01	1.084E+00	60.30
K-40	1460.82	31	10.66*	8.771E-01	2.091E+00	2.091E+00	49.51
NB-95M	235.69	21	24.80*	4.600E+00	1.129E-01	1.655E-01	85.85
CD-109	88.03	109	3.70*	7.760E+00	2.375E+00	2.504E+00	46.84
I-126	388.63	15	35.60	2.983E+00	8.929E-02	5.954E-01	161.96
	666.33	17	32.90*	1.806E+00	1.839E-01	1.226E+00	70.87
	753.82	------	4.15	1.603E+00	------ Line Not Found		------
SN-126	64.28	84	9.60	7.778E+00	7.095E-01	7.095E-01	58.43
	86.94	109	8.90	7.760E+00	9.872E-01	9.872E-01	46.84
	87.57	109	37.00*	7.760E+00	2.375E-01	2.375E-01	46.84
TL-208	277.37	------	6.60	4.030E+00	------ Line Not Found		------
	583.19	82	85.00*	2.045E+00	2.949E-01	2.949E-01	34.03
	860.56	16	12.50	1.415E+00	5.844E-01	5.844E-01	110.93
BI-210	46.54	178	4.25*	6.962E+00	3.766E+00	3.778E+00	30.45
PB-210	46.54	178	4.25*	6.962E+00	3.766E+00	3.778E+00	30.45
BI-211	72.87	------	1.23	7.876E+00	------ Line Not Found		------
	351.06	376	12.92*	3.275E+00	5.576E+00	5.576E+00	13.83
BI-212	727.33	27	6.67*	1.657E+00	1.559E+00	1.559E+00	79.54
	1620.50	------	1.47	8.028E-01	------ Line Not Found		------
PB-212	74.82	236	10.28	7.876E+00	1.829E+00	1.829E+00	21.32
	77.11	403	17.10	7.868E+00	1.881E+00	1.881E+00	14.36
	238.63	337	43.60*	4.558E+00	1.063E+00	1.063E+00	13.81
	300.09	36	3.30	3.777E+00	1.824E+00	1.824E+00	79.01
BI-214	609.32	248	45.49*	1.962E+00	1.746E+00	1.746E+00	14.64
	1120.29	58	14.92	1.109E+00	2.180E+00	2.180E+00	31.94
	1764.49	44	15.30	7.482E-01	2.387E+00	2.387E+00	36.85
PB-214	74.82	236	5.80	7.876E+00	3.242E+00	3.242E+00	21.32
	77.11	403	9.70	7.868E+00	3.316E+00	3.316E+00	14.36
	87.09	109	3.41	7.760E+00	2.577E+00	2.577E+00	46.84
	242.00	143	7.25	4.510E+00	2.753E+00	2.753E+00	26.34
	295.22	265	18.42	3.823E+00	2.362E+00	2.362E+00	14.33
	351.93	376	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83
RN-222	609.32	248	45.49*	1.962E+00	1.746E+00	1.746E+00	14.64
	1120.29	58	14.92	1.109E+00	2.180E+00	2.180E+00	31.94
	1764.49	44	15.30	7.482E-01	2.387E+00	2.387E+00	36.85
RA-223	81.07	------	15.00	7.838E+00	------ Line Not Found		------
	83.79	62	24.70	7.804E+00	2.002E-01	2.002E-01	78.38
	94.56	30	8.67	7.634E+00	2.824E-01	2.824E-01	133.99
	144.24	20	3.27	6.442E+00	6.030E-01	6.030E-01	152.25
	154.21	25	5.70	6.186E+00	4.415E-01	4.415E-01	101.83
	269.46	42	13.90	4.117E+00	4.577E-01	4.577E-01	67.59
	323.87	------	3.99*	3.526E+00	------ Line Not Found		------
	338.28	34	2.84	3.387E+00	2.214E+00	2.214E+00	104.20
RA-224	240.99	143	4.10*	4.510E+00	4.868E+00	4.868E+00	26.34
RA-226	74.82	236	5.80	7.876E+00	3.242E+00	3.242E+00	21.32
	77.11	403	9.70	7.868E+00	3.316E+00	3.316E+00	14.36
	87.09	109	3.41	7.760E+00	2.577E+00	2.577E+00	46.84

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	242.00	143	7.25	4.510E+00	2.753E+00	2.753E+00	26.34
	295.22	265	18.42	3.823E+00	2.362E+00	2.362E+00	14.33
	351.93	376	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83
AC-228	105.21	------	1.10	7.404E+00	------	Line Not Found	------
	338.32	34	11.27	3.387E+00	5.578E-01	5.578E-01	104.20
	835.71	------	1.61	1.454E+00	------	Line Not Found	------
	911.20	52	25.80*	1.341E+00	9.338E-01	9.338E-01	48.28
	968.97	30	15.80	1.266E+00	9.494E-01	9.494E-01	80.08
RA-228	105.21	------	1.10	7.404E+00	------	Line Not Found	------
	338.32	34	11.27	3.387E+00	5.578E-01	5.578E-01	104.20
	835.71	------	1.61	1.454E+00	------	Line Not Found	------
	911.20	52	25.80*	1.341E+00	9.338E-01	9.338E-01	48.28
	968.97	30	15.80	1.266E+00	9.494E-01	9.494E-01	80.08
TH-228	74.82	236	10.28	7.876E+00	1.829E+00	1.829E+00	21.32
	77.11	403	17.10	7.868E+00	1.881E+00	1.881E+00	14.36
	238.63	337	43.60*	4.558E+00	1.063E+00	1.063E+00	13.81
	300.09	36	3.30	3.777E+00	1.824E+00	1.824E+00	79.01
TH-229	85.43	62	14.70	7.804E+00	3.365E-01	3.365E-01	78.38
	88.47	109	24.00	7.760E+00	3.661E-01	3.661E-01	46.84
	193.51	------	4.41*	5.337E+00	------	Line Not Found	------
	210.85	21	2.80	5.039E+00	9.331E-01	9.331E-01	212.38
TH-230	74.82	236	5.80	7.876E+00	3.242E+00	3.242E+00	21.32
	77.11	403	9.70	7.868E+00	3.316E+00	3.316E+00	14.36
	87.09	109	3.41	7.760E+00	2.577E+00	2.577E+00	46.84
	242.00	143	7.25	4.510E+00	2.753E+00	2.753E+00	26.34
	295.22	265	18.42	3.823E+00	2.362E+00	2.362E+00	14.33
	351.93	376	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83
TH-232	105.21	------	1.10	7.404E+00	------	Line Not Found	------
	338.32	34	11.27	3.387E+00	5.578E-01	5.578E-01	104.20
	835.71	------	1.61	1.454E+00	------	Line Not Found	------
	911.20	52	25.80*	1.341E+00	9.338E-01	9.338E-01	48.28
	968.97	30	15.80	1.266E+00	9.494E-01	9.494E-01	80.08
PA-234M	63.29	84	3.70*	7.778E+00	1.841E+00	1.841E+00	58.43
	92.59	197	4.23	7.670E+00	3.800E+00	3.800E+00	23.15
TH-234	63.29	84	3.70*	7.778E+00	1.841E+00	1.841E+00	58.43
	92.59	197	4.23	7.670E+00	3.800E+00	3.800E+00	23.15
U-234	74.82	236	5.80	7.876E+00	3.242E+00	3.242E+00	21.32
	77.11	403	9.70	7.868E+00	3.316E+00	3.316E+00	14.36
	87.09	109	3.41	7.760E+00	2.577E+00	2.577E+00	46.84
	242.00	143	7.25	4.510E+00	2.753E+00	2.753E+00	26.34
	295.22	265	18.42	3.823E+00	2.362E+00	2.362E+00	14.33
	351.93	376	35.60*	3.275E+00	2.024E+00	2.024E+00	13.83
U-235	89.96	40	3.47	7.720E+00	9.332E-01	9.332E-01	106.53
	93.35	197	5.60	7.670E+00	2.871E+00	2.871E+00	23.15
	143.76	20	10.96*	6.442E+00	1.799E-01	1.799E-01	152.25
	163.33	------	5.08	5.977E+00	------	Line Not Found	------
	185.72	120	57.20	5.490E+00	2.391E-01	2.391E-01	53.84
	205.31	------	5.01	5.114E+00	------	Line Not Found	------
U-238	63.29	84	3.70*	7.778E+00	1.841E+00	1.841E+00	58.43

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	92.59	197	4.23	7.670E+00	3.800E+00	3.800E+00	23.15
AM-243	43.53	------	5.90	6.691E+00	------	Line Not Found	------
	74.66	236	67.20*	7.876E+00	2.798E-01	2.798E-01	21.32
ANH-511	511.00	6	100.00*	2.319E+00	1.558E-02	1.558E-02	599.69

Flag: "*" = Keyline

Sample ID : G714507024 Acquisition date : 10-APR-2025 20:52:39

Total number of lines in spectrum 50
Number of unidentified lines 7
Number of lines tentatively identified by NID 43 86.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.59	6.839E-01	1.084E+00	0.654E+00	60.30	
K-40	1.25E+09Y	1.00	2.091E+00	2.091E+00	1.035E+00	49.51	
NB-95M	64.03D	1.47	1.129E-01	1.655E-01	1.421E-01	85.85	
CD-109	461.40D	1.05	2.375E+00	2.504E+00	1.173E+00	46.84	
I-126	12.93D	6.67	1.839E-01	1.226E+00	0.869E+00	70.87	
SN-126	2.30E+05Y	1.00	2.375E-01	2.375E-01	1.112E-01	46.84	
TL-208	1.41E+10Y	1.00	2.949E-01	2.949E-01	1.003E-01	34.03	
BI-210	22.20Y	1.00	3.766E+00	3.778E+00	1.150E+00	30.45	
PB-210	22.20Y	1.00	3.766E+00	3.778E+00	1.150E+00	30.45	
BI-211	7.04E+08Y	1.00	5.576E+00	5.576E+00	0.771E+00	13.83	
BI-212	1.41E+10Y	1.00	1.559E+00	1.559E+00	1.240E+00	79.54	
PB-212	1.41E+10Y	1.00	1.063E+00	1.063E+00	0.147E+00	13.81	
BI-214	1600.00Y	1.00	1.746E+00	1.746E+00	0.256E+00	14.64	
PB-214	1600.00Y	1.00	2.024E+00	2.024E+00	0.280E+00	13.83	
RN-222	1600.00Y	1.00	1.746E+00	1.746E+00	0.256E+00	14.64	
RA-223	7.04E+08Y	1.00	2.002E-01	2.002E-01	1.569E-01	78.38	K
RA-224	1.41E+10Y	1.00	4.868E+00	4.868E+00	1.282E+00	26.34	
RA-226	1600.00Y	1.00	2.024E+00	2.024E+00	0.280E+00	13.83	
AC-228	1.41E+10Y	1.00	9.338E-01	9.338E-01	4.509E-01	48.28	
RA-228	1.41E+10Y	1.00	9.338E-01	9.338E-01	4.509E-01	48.28	
TH-228	1.41E+10Y	1.00	1.063E+00	1.063E+00	0.147E+00	13.81	
TH-229	7340.00Y	1.00	3.661E-01	3.661E-01	1.715E-01	46.84	K
TH-230	7.54E+04Y	1.00	2.024E+00	2.024E+00	0.280E+00	13.83	
TH-232	1.41E+10Y	1.00	9.338E-01	9.338E-01	4.509E-01	48.28	
PA-234M	4.47E+09Y	1.00	1.841E+00	1.841E+00	1.076E+00	58.43	
TH-234	4.47E+09Y	1.00	1.841E+00	1.841E+00	1.076E+00	58.43	
U-234	2.45E+05Y	1.00	2.024E+00	2.024E+00	0.280E+00	13.83	
U-235	7.04E+08Y	1.00	1.799E-01	1.799E-01	2.739E-01	152.25	
U-238	4.47E+09Y	1.00	1.841E+00	1.841E+00	1.076E+00	58.43	
AM-243	7370.00Y	1.00	2.798E-01	2.798E-01	0.596E-01	21.32	
ANH-511	1.00E+09Y	1.00	1.558E-02	1.558E-02	9.345E-02	599.69	
	Total Activity :		4.859E+01	5.024E+01			

Grand Total Activity : 4.859E+01 5.024E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G714507024 Acquisition date : 10-APR-2025 20:52:39

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	68.76	66	309	2.46	138.24	133	12	1.67E-02	****	7.86E+00	T
0	99.05	50	84	1.97	198.80	195	8	1.27E-02	74.5	7.54E+00	T
0	327.84	25	68	1.13	656.12	650	12	6.72E-03	****	3.49E+00	T
0	462.59	29	42	0.70	925.50	918	13	8.03E-03	99.8	2.55E+00	T
0	556.09	32	72	9.13	1112.43	1096	29	9.03E-03	****	2.14E+00	
0	565.25	20	10	3.24	1130.73	1126	9	5.69E-03	73.2	2.11E+00	T
0	679.41	6	10	1.37	1358.97	1352	8	1.61E-03	****	1.77E+00	
0	705.48	10	28	3.94	1411.10	1401	15	2.75E-03	****	1.71E+00	T
0	768.19	34	26	1.49	1536.49	1529	15	9.53E-03	73.6	1.57E+00	T
0	840.38	14	16	5.15	1680.83	1670	14	4.00E-03	****	1.45E+00	
0	934.01	16	12	0.72	1868.06	1861	12	4.72E-03	94.9	1.31E+00	
0	1001.10	14	5	1.06	2002.21	1997	10	3.89E-03	80.2	1.23E+00	
0	1036.50	11	5	0.67	2073.00	2066	11	3.19E-03	98.6	1.19E+00	T
0	1154.76	12	6	2.61	2309.50	2303	12	3.61E-03	93.6	1.08E+00	
0	1238.11	16	11	1.41	2476.18	2469	12	4.72E-03	94.9	1.01E+00	T
0	1729.53	11	2	0.86	3459.11	3454	9	3.25E-03	74.5	7.61E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:53:30.66

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507024.CNF;1    *
* Acquisition date : 10-APR-2025 20:52:39 Sensitivity     : 3.000          *
* Detector ID      : GAM41                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 12:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507024           Analyst initials: MXR1           *
* Batch Number     : 2767517              Sample Quantity : 1.1969E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-SEP-2024 06:18:38 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;12          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	4.757E-01
K-40	4.053E-01
NB-95M	1.280E-01
CD-109	4.687E-01
I-126	6.254E-01
SN-126	5.343E-02
TL-208	3.616E-02
BI-210	3.616E-01
PB-210	3.616E-01
BI-211	1.833E-01
BI-212	5.193E-01
PB-212	5.019E-02
BI-214	4.424E-02
PB-214	6.671E-02
RN-222	4.424E-02
RA-223	5.953E-01
RA-224	5.386E-01
RA-226	6.671E-02
AC-228	1.492E-01
RA-228	1.492E-01
TH-228	5.019E-02
TH-229	4.792E-01
TH-230	6.671E-02
TH-232	1.492E-01
PA-234M	4.145E-01
TH-234	4.145E-01
U-234	6.671E-02
U-235	1.660E-01
U-238	4.145E-01
AM-243	2.596E-02
ANH-511	3.487E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

NA-22	5.353E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.438E-02	NOT IDENT.
SC-46	4.313E-02	FAIL ABUN
V-48	1.865E-01	NOT IDENT.
CR-51	4.956E-01	NOT IDENT.
MN-52	1.911E+00	NOT IDENT.
MN-54	4.317E-02	NOT IDENT.
CO-56	3.244E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.922E-02	NOT IDENT.
CO-58	4.585E-02	NOT IDENT.
FE-59	7.953E-02	NOT IDENT.
CO-60	3.693E-02	NOT IDENT.
ZN-65	9.184E-02	NOT IDENT.
GE-68	1.304E+00	NOT IDENT.
AS-73	2.271E-01	NOT IDENT.
AS-74	2.129E-01	NOT IDENT.
SE-75	3.960E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	4.848E-01	NOT IDENT.
RB-83	7.362E-02	NOT IDENT.
RB-84	1.118E-01	NOT IDENT.
KR-85	8.285E+00	NOT IDENT.
SR-85	5.431E-02	NOT IDENT.
RB-86	1.629E+00	NOT IDENT.
Y-88	2.842E-02	NOT IDENT.
Y-91	2.932E+01	NOT IDENT.
NB-94	3.837E-02	NOT IDENT.
NB-95	6.576E-02	NOT IDENT.
ZR-95	9.125E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.768E-02	NOT IDENT.
RH-102	4.511E-02	FAIL ABUN
RU-103	4.822E-02	FAIL ABUN
RH-106	3.367E-01	NOT IDENT.
RU-106	3.367E-01	NOT IDENT.
AG-108M	2.739E-02	NOT IDENT.
AG-110	7.860E-01	NOT IDENT.
AG-110M	5.318E-02	FAIL ABUN
SN-113	4.832E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.230E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.719E-02	NOT IDENT.
SB-124	1.319E-01	NOT IDENT.
SB-125	9.178E-02	FAIL ABUN
TE-125M	1.005E+01	NOT IDENT.
SB-126	4.378E-01	NOT IDENT.
SB-127	5.454E+01	NOT IDENT.
I-131	5.518E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.122E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.524E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.734E-01	FAIL ABUN
BA-137M	3.750E-02	NOT IDENT.
CS-137	3.961E-02	NOT IDENT.
LA-138	3.987E-02	NOT IDENT.
CE-139	2.921E-02	NOT IDENT.
BA-140	6.921E-01	NOT IDENT.
LA-140	2.956E-01	FAIL ABUN
CE-141	7.302E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.578E-01	NOT IDENT.
PM-144	4.314E-02	FAIL ABUN
PR-144	3.254E+00	NOT IDENT.
PM-146	3.981E-02	NOT IDENT.
ND-147	2.188E+00	FAIL ABUN
PM-147	5.327E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.571E-02	FAIL ABUN
EU-152	7.271E-02	NOT IDENT.

GD-153	5.410E-02	FAIL ABUN
EU-154	1.513E-01	NOT IDENT.
EU-155	7.642E-02	FAIL ABUN
TB-160	1.607E-01	FAIL ABUN
HO-166M	6.060E-02	FAIL ABUN
TM-171	3.703E+00	NOT IDENT.
HF-172	1.548E-01	FAIL ABUN
LU-172	5.707E-02	FAIL ABUN
LU-176	2.256E-02	FAIL ABUN
HF-181	5.019E-02	NOT IDENT.
TA-182	2.638E-01	FAIL ABUN
RE-183	6.616E-02	NOT IDENT.
RE-184	2.174E-01	NOT IDENT.
W-188	7.381E+00	FAIL ABUN
IR-192	3.999E-02	FAIL ABUN
HG-203	4.009E-02	NOT IDENT.
TL-204	2.538E+00	FAIL ABUN
BI-207	5.362E-02	FAIL ABUN
PB-211	6.955E-01	NOT IDENT.
BI-213	8.173E-02	NOT IDENT.
RN-219	4.181E-01	FAIL ABUN
AC-225	2.111E+00	NOT IDENT.
AC-227	2.028E-01	FAIL ABUN
TH-227	2.028E-01	FAIL ABUN
PA-231	4.125E-01	NOT IDENT.
TH-231	5.953E-01	FAIL ABUN
PA-233	5.607E-02	FAIL ABUN
PA-234	3.190E-01	FAIL ABUN
NP-237	5.607E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.788E-01	FAIL ABUN
PU-239	3.006E+02	NOT IDENT.
AM-241	4.419E-02	NOT IDENT.
CM-243	7.767E-02	FAIL ABUN
BK-247	6.562E-02	FAIL ABUN
CM-247	3.772E-02	NOT IDENT.
CF-249	4.156E-02	NOT IDENT.
CF-251	1.016E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:53:34.95

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G714507024.CNF;1    *
* Acquisition date : 10-APR-2025 20:52:39 Sensitivity     : 3.000          *
* Detector ID      : GAM41                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.36     Half life ratio : *****          *
* Sample date      :  6-MAR-2025 12:00:00 Nuclide Library : SOLID          *
* Sample ID        : G714507024           Analyst initials: MXR1           *
* Batch Number     : 2767517              Sample Quantity : 1.1969E+02 GRAM   *
*                                         Quantity Err(%) : 1.6710E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  5-SEP-2024 06:18:38 Eff. Geometry   : CAN            *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;12            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.084E+00	6.477E-01	6.477E-01
K-40	2.091E+00	1.032E+00	1.032E+00
NB-95M	1.655E-01	1.409E-01	1.409E-01
CD-109	2.504E+00	1.177E+00	1.177E+00
I-126	1.226E+00	8.596E-01	8.596E-01
SN-126	2.375E-01	1.109E-01	1.109E-01
TL-208	2.949E-01	1.017E-01	1.017E-01
BI-210	3.778E+00	1.179E+00	1.179E+00
PB-210	3.778E+00	1.179E+00	1.179E+00
BI-211	5.576E+00	9.100E-01	9.100E-01
BI-212	1.559E+00	1.224E+00	1.224E+00
PB-212	1.063E+00	1.890E-01	1.890E-01
BI-214	1.746E+00	2.931E-01	2.931E-01
PB-214	2.024E+00	3.286E-01	3.286E-01
RN-222	1.746E+00	2.931E-01	2.931E-01
RA-223	2.812E-01	7.038E-01	7.038E-01
RA-224	4.868E+00	1.375E+00	1.375E+00
RA-226	2.024E+00	3.286E-01	3.286E-01
AC-228	9.338E-01	4.523E-01	4.523E-01
RA-228	9.338E-01	4.523E-01	4.523E-01
TH-228	1.063E+00	1.890E-01	1.890E-01
TH-229	-6.994E-02	5.783E-01	5.783E-01
TH-230	2.024E+00	3.286E-01	3.286E-01
TH-232	9.338E-01	4.523E-01	4.523E-01
PA-234M	1.841E+00	1.132E+00	1.132E+00
TH-234	1.841E+00	1.132E+00	1.132E+00
U-234	2.024E+00	3.286E-01	3.286E-01
U-235	6.095E-02	2.760E-01	2.760E-01
U-238	1.841E+00	1.132E+00	1.132E+00
AM-243	2.798E-01	6.251E-02	6.251E-02
ANH-511	1.558E-02	9.159E-02	9.159E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)

NA-22	5.515E-02	5.215E-02	5.777E-02	NOT IDENT.
NA-24	9.599E+14	4.581E+15	4.601E+15	SHORT HLIF
AL-26	-1.370E-02	4.520E-02	4.562E-02	NOT IDENT.
SC-46	-1.445E-02	5.262E-02	5.302E-02	FAIL ABUN
V-48	3.998E-02	2.093E-01	2.101E-01	NOT IDENT.
CR-51	-2.053E-01	5.829E-01	5.902E-01	NOT IDENT.
MN-52	-1.782E+00	3.073E+00	3.176E+00	NOT IDENT.
MN-54	-7.028E-03	6.156E-02	6.165E-02	NOT IDENT.
CO-56	-6.484E-02	5.798E-02	6.493E-02	FAIL ABUN
MN-56	-1.000E+41	8.982E+40	0.000E+00	SHORT HLIF
CO-57	-1.347E-03	2.225E-02	2.226E-02	NOT IDENT.
CO-58	1.045E-02	5.375E-02	5.396E-02	NOT IDENT.
FE-59	-1.429E-01	1.338E-01	1.485E-01	NOT IDENT.
CO-60	-3.245E-03	4.526E-02	4.529E-02	NOT IDENT.
ZN-65	3.220E-02	1.132E-01	1.141E-01	NOT IDENT.
GE-68	-2.373E-01	1.582E+00	1.586E+00	NOT IDENT.
AS-73	-1.448E-02	2.515E-01	2.516E-01	NOT IDENT.
AS-74	1.103E-01	2.345E-01	2.397E-01	NOT IDENT.
SE-75	-2.148E-02	5.161E-02	5.251E-02	NOT IDENT.
BR-77	6.097E+04	6.320E+04	6.892E+04	SHORT HLIF
SR-82	-5.671E-01	7.240E-01	7.678E-01	NOT IDENT.
RB-83	-3.006E-02	9.165E-02	9.265E-02	NOT IDENT.
RB-84	4.287E-02	1.206E-01	1.221E-01	NOT IDENT.
KR-85	5.909E+00	9.843E+00	1.020E+01	NOT IDENT.
SR-85	3.863E-02	6.453E-02	6.684E-02	NOT IDENT.
RB-86	-8.141E-01	2.086E+00	2.118E+00	NOT IDENT.
Y-88	-2.692E-02	4.659E-02	4.815E-02	NOT IDENT.
Y-91	4.151E+01	2.587E+01	3.193E+01	NOT IDENT.
NB-94	1.378E-02	4.404E-02	4.448E-02	NOT IDENT.
NB-95	6.562E-02	7.401E-02	7.971E-02	NOT IDENT.
ZR-95	-3.255E-02	1.175E-01	1.185E-01	NOT IDENT.
NB-97	-1.000E+41	1.253E+41	0.000E+00	SHORT HLIF
ZR-97	5.387E+14	1.019E+15	1.048E+15	SHORT HLIF
MO-99	5.076E+02	2.929E+03	2.938E+03	SHORT HLIF
TC-99M	4.890E+40	6.687E+40	0.000E+00	SHORT HLIF
RH-101	-1.366E-03	3.208E-02	3.208E-02	NOT IDENT.
RH-102	-8.245E-02	7.053E-02	7.972E-02	FAIL ABUN
RU-103	4.931E-03	5.546E-02	5.550E-02	FAIL ABUN
RH-106	1.519E-01	3.747E-01	3.809E-01	NOT IDENT.
RU-106	1.519E-01	3.747E-01	3.809E-01	NOT IDENT.
AG-108M	-1.806E-02	3.414E-02	3.510E-02	NOT IDENT.
AG-110	-8.834E-02	9.590E-01	9.599E-01	NOT IDENT.
AG-110M	-9.814E-03	6.306E-02	6.321E-02	FAIL ABUN
SN-113	-4.618E-02	6.888E-02	7.195E-02	NOT IDENT.
CD-115	-3.868E+03	7.487E+03	7.687E+03	SHORT HLIF
SN-117M	-1.109E-01	1.555E-01	1.634E-01	NOT IDENT.
SB-122	7.087E+02	5.123E+02	6.037E+02	SHORT HLIF
TE-123M	-5.725E-03	3.246E-02	3.257E-02	NOT IDENT.
SB-124	-4.503E-02	1.771E-01	1.783E-01	NOT IDENT.
SB-125	-3.807E-02	1.107E-01	1.120E-01	FAIL ABUN
TE-125M	9.293E+00	1.089E+01	1.167E+01	NOT IDENT.
SB-126	-3.113E-02	5.365E-01	5.367E-01	NOT IDENT.
SB-127	-2.556E+01	6.938E+01	7.033E+01	NOT IDENT.
I-131	-4.629E-01	6.893E-01	7.202E-01	NOT IDENT.
I-132	-1.000E+41	6.854E+41	0.000E+00	SHORT HLIF
TE-132	-6.243E+01	5.739E+01	6.392E+01	SHORT HLIF
BA-133	3.608E-02	4.626E-02	4.904E-02	NOT IDENT.
I-133	-2.309E+10	7.703E+10	7.773E+10	SHORT HLIF
CS-134	-1.055E-02	4.570E-02	4.594E-02	NOT IDENT.
I-135	1.164E+37	1.272E+38	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.199E-01	0.000E+00	FAIL ABUN
BA-137M	1.751E-02	4.625E-02	4.692E-02	NOT IDENT.
CS-137	1.849E-02	4.886E-02	4.956E-02	NOT IDENT.
LA-138	-4.045E-02	6.399E-02	6.654E-02	NOT IDENT.
CE-139	-8.729E-04	3.448E-02	3.448E-02	NOT IDENT.
BA-140	-4.033E-01	8.867E-01	9.052E-01	NOT IDENT.
LA-140	-2.521E-01	4.359E-01	4.505E-01	FAIL ABUN
CE-141	-6.753E-02	1.001E-01	1.047E-01	NOT IDENT.
CE-143	3.683E+06	4.097E+06	4.421E+06	SHORT HLIF
CE-144	-9.812E-02	1.923E-01	1.973E-01	NOT IDENT.
PM-144	1.126E-02	5.030E-02	5.056E-02	FAIL ABUN
PR-144	8.163E-01	3.799E+00	3.817E+00	NOT IDENT.
PM-146	-3.725E-02	5.093E-02	5.363E-02	NOT IDENT.
ND-147	7.248E-01	2.420E+00	2.442E+00	FAIL ABUN
PM-147	-1.362E+02	6.263E+02	6.293E+02	NOT IDENT.
PM-149	-1.983E+04	5.744E+04	5.814E+04	SHORT HLIF
EU-150	2.571E-02	2.830E-02	3.058E-02	FAIL ABUN

EU-152	-1.826E-02	8.485E-02	8.525E-02	NOT IDENT.
GD-153	4.092E-02	6.751E-02	6.999E-02	FAIL ABUN
EU-154	1.583E-01	1.472E-01	1.636E-01	NOT IDENT.
EU-155	-3.127E-02	8.974E-02	9.084E-02	FAIL ABUN
TB-160	-7.161E-02	1.983E-01	2.009E-01	FAIL ABUN
HO-166M	8.651E-03	7.160E-02	7.171E-02	FAIL ABUN
TM-171	-7.545E-01	4.137E+00	4.151E+00	NOT IDENT.
HF-172	1.517E-02	1.773E-01	1.774E-01	FAIL ABUN
LU-172	-3.181E-03	6.786E-02	6.788E-02	FAIL ABUN
LU-176	7.821E-04	2.789E-02	2.790E-02	FAIL ABUN
HF-181	-6.028E-02	6.855E-02	7.374E-02	NOT IDENT.
TA-182	2.088E-01	2.764E-01	2.920E-01	FAIL ABUN
RE-183	4.279E-02	6.962E-02	7.224E-02	NOT IDENT.
RE-184	1.193E-01	2.307E-01	2.369E-01	NOT IDENT.
W-188	1.626E+00	8.879E+00	8.909E+00	FAIL ABUN
IR-192	9.253E-04	4.542E-02	4.542E-02	FAIL ABUN
HG-203	-6.462E-02	5.871E-02	6.554E-02	NOT IDENT.
TL-204	1.219E+00	3.270E+00	3.315E+00	FAIL ABUN
BI-207	1.863E-02	5.886E-02	5.945E-02	FAIL ABUN
PB-211	-4.569E-01	8.540E-01	8.785E-01	NOT IDENT.
BI-213	-6.011E-02	1.043E-01	1.078E-01	NOT IDENT.
RN-219	1.673E-01	4.598E-01	4.660E-01	FAIL ABUN
AC-225	1.482E+00	2.380E+00	2.472E+00	NOT IDENT.
AC-227	-2.629E-01	2.853E-01	3.090E-01	FAIL ABUN
TH-227	-2.629E-01	2.853E-01	3.090E-01	FAIL ABUN
PA-231	1.014E-01	5.387E-01	5.406E-01	NOT IDENT.
TH-231	2.812E-01	7.038E-01	7.151E-01	FAIL ABUN
PA-233	-2.462E-02	7.346E-02	7.429E-02	FAIL ABUN
PA-234	1.364E-01	3.769E-01	3.819E-01	FAIL ABUN
NP-237	-2.462E-02	7.346E-02	7.429E-02	FAIL ABUN
NP-238	4.630E+03	2.069E+04	2.080E+04	SHORT HLIF
NP-239	-7.954E-02	2.131E-01	2.161E-01	FAIL ABUN
PU-239	1.680E+02	3.343E+02	3.427E+02	NOT IDENT.
AM-241	7.728E-03	5.146E-02	5.158E-02	NOT IDENT.
CM-243	-9.886E-03	8.922E-02	8.934E-02	FAIL ABUN
BK-247	-4.217E-02	8.667E-02	8.873E-02	FAIL ABUN
CM-247	4.197E-03	4.275E-02	4.279E-02	NOT IDENT.
CF-249	2.181E-02	4.500E-02	4.607E-02	NOT IDENT.
CF-251	-1.238E-01	1.346E-01	1.457E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	35.3615	81.75	91.8672	123.68	56.3318
879.38	49.5552	82.47	109.7431	125.81	58.5164
46.54	49.7395	83.79	91.1759	127.23	72.3670
228.16	0.0000	265.00	91.2252	127.91	65.6073
52.39	60.3038	193.51	53.5107	129.30	62.8350
1093.63	70.8911	105.31	89.4394	131.20	57.1486
52.39	62.9540	86.79	89.4936	133.02	60.3084
125.81	64.7034	86.94	103.8524	133.52	62.3434
53.44	64.8123	87.09	103.8922	136.00	60.6398
54.07	56.8379	87.57	104.0179	136.47	48.7525
293.27	0.0000	88.03	71.8195	739.50	0.0000
482.18	63.2760	306.78	71.8756	140.51	0.0000
57.98	52.6729	88.47	71.8988	143.76	61.4859
59.27	61.7174	143.76	104.6400	144.24	57.8381
59.32	61.7277	90.64	54.2148	145.44	66.0471
59.54	61.7727	531.02	54.2775	152.43	61.3815
60.96	62.0615	92.59	58.1045	1048.07	62.8317
61.17	62.1039	93.35	58.2114	154.21	53.3552
62.93	62.4565	94.56	58.3804	158.56	39.7930
63.29	62.5280	311.90	58.3926	159.00	61.0148
290.67	62.5853	946.00	58.3955	162.33	67.5807
87.57	62.7236	94.87	58.4233	537.26	69.6969
66.73	72.7941	97.43	33.0617	163.33	56.2338
67.24	88.1674	98.43	51.5490	165.86	60.6409
67.68	88.2848	98.44	51.5502	427.87	45.6842
1221.41	88.3038	103.37	51.6797	176.60	51.0183
70.82	88.6069	116.74	51.6797	177.52	63.8608
97.43	88.8132	100.11	59.1411	181.07	0.0000
70.82	89.1140	102.03	55.6870	181.52	68.5215
279.20	89.1171	103.18	60.4832	184.41	59.1341
1063.66	82.7358	103.37	67.0254	185.72	59.2457
72.87	82.7505	911.20	69.1695	193.51	59.9036
351.06	82.7505	105.31	69.1847	197.03	52.5352
74.66	83.1731	106.12	52.4492	198.01	60.2771
351.93	83.2104	106.47	58.1132	201.83	49.5751
238.63	83.2104	109.28	53.7523	203.43	60.7219
351.93	83.2104	111.00	72.8795	205.31	53.1277
238.63	83.2104	111.76	0.0000	210.85	55.7465
74.97	83.2456	114.06	54.2977	215.65	53.8506
77.11	83.7437	116.30	0.0000	218.12	34.8882
78.74	96.9701	116.74	52.6825	222.11	35.0647
256.23	106.5897	119.76	50.1140	227.09	28.4534
80.03	98.4794	264.66	52.1827	227.38	34.1563
133.52	98.5050	121.22	52.1930	228.16	0.0000
364.49	98.5229	344.28	43.5426	228.18	46.7262
711.68	96.8626	122.06	50.3437	235.69	44.8533
356.01	104.0260	122.92	60.1273	235.96	44.8676
323.87	89.9379	1274.44	60.1448	238.63	45.0104

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	28.1291	531.02	15.7357
240.99	45.1360	338.32	28.1298	537.26	18.7580
242.00	45.1899	340.48	25.6226	1260.41	0.0000
244.70	35.6460	340.55	25.6238	552.55	19.4318
685.70	31.6629	344.28	21.4244	795.86	18.0520
388.16	31.6773	345.93	18.0225	564.24	0.0000
507.63	0.0000	351.06	27.5872	569.33	15.0974
256.23	48.2884	351.93	27.6081	569.50	15.0989
527.90	0.0000	355.39	0.0000	569.70	13.2886
264.66	35.6644	356.01	19.4806	583.19	18.2629
264.80	35.6699	364.49	29.6511	584.27	18.2747
265.00	39.2449	366.42	0.0000	595.83	13.2856
269.46	37.0452	372.51	23.7057	600.60	12.2964
270.03	37.0679	375.05	18.4767	602.52	0.0000
401.81	37.1162	377.52	21.1592	604.72	13.8653
273.65	54.4172	383.85	26.5863	607.14	7.1991
276.40	38.5244	388.16	24.0112	609.32	7.2079
583.19	44.5901	666.33	24.0200	610.33	7.2119
277.60	44.6003	391.69	37.4558	614.28	15.4877
402.40	36.1780	400.66	25.1483	618.01	16.5540
279.20	47.0909	401.81	24.2721	884.68	18.6475
279.54	32.6129	402.40	26.9818	621.93	12.4424
279.70	32.6179	404.85	34.2419	630.19	0.0000
280.46	30.2261	410.95	37.1195	631.29	23.9686
301.36	20.6228	413.71	28.1253	633.25	15.6482
284.31	36.4169	720.70	29.0547	634.78	9.3970
285.41	35.2429	423.72	29.2533	635.95	13.5819
285.90	0.0000	427.09	23.8280	636.99	10.4533
287.50	20.7037	427.87	29.3438	657.50	16.9069
290.67	26.8796	433.94	27.6337	657.76	24.3074
293.27	0.0000	439.40	21.2705	657.90	0.0000
295.22	22.0935	440.45	21.2869	661.66	12.7075
316.51	22.1100	453.88	27.0990	664.57	0.0000
298.58	22.1677	463.37	20.6953	666.33	14.3306
299.98	22.1984	468.07	23.5942	666.50	14.3317
300.09	22.2012	473.00	26.1367	667.71	0.0000
300.13	22.2017	631.29	15.6470	677.62	12.8120
311.90	22.2017	696.49	28.4827	685.70	18.2244
301.36	27.9923	477.60	27.5486	692.65	0.0000
302.85	26.3841	482.18	24.7749	695.00	18.3088
304.50	18.1686	487.02	20.0759	696.49	19.4004
304.85	22.3050	492.35	0.0000	696.51	19.4004
306.78	27.3134	497.08	13.4733	697.00	18.3274
308.46	28.6012	505.52	20.3215	697.30	19.4084
311.90	33.6866	507.63	0.0000	697.49	19.4099
316.51	30.9116	511.00	30.1044	702.65	16.2164
319.41	30.1582	514.00	21.8921	706.68	27.6219
320.08	28.5007	514.00	21.8921	711.68	13.0303
321.04	32.7214	520.40	18.5616	720.70	14.1780
323.87	23.9750	520.69	0.0000	721.93	0.0000
325.23	29.0595	667.71	0.0000	1690.97	13.1006
1596.21	28.7318	527.90	0.0000	722.91	18.0140
333.37	33.0959	528.26	18.6536	723.31	11.4660
333.97	19.1043	529.59	17.6865	756.73	19.6641
334.37	28.0297	529.87	0.0000	727.33	15.3171

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	9.8734	935.54	14.3525	1362.66	0.0000
735.93	10.9855	937.49	2.8727	1365.19	9.2834
737.46	18.6892	983.53	7.2000	1368.63	0.0000
739.50	0.0000	946.00	8.1057	1384.29	5.1846
1434.09	11.0286	949.00	9.9181	1408.01	11.4800
747.24	14.3573	954.55	0.0000	1434.09	5.2548
748.06	12.1534	962.31	13.0491	1435.80	6.3083
752.31	14.3912	964.08	15.9597	1457.56	0.0000
753.82	11.0779	966.17	14.5205	1460.82	6.7734
756.73	16.6394	968.97	10.9017	1489.16	0.0000
756.80	16.6400	983.53	10.0473	1505.03	11.7755
763.94	15.0255	984.45	0.0000	1584.12	8.7339
765.81	10.0254	996.26	2.9365	1596.21	9.8547
766.84	20.0603	1002.74	5.8869	1620.50	5.5069
772.60	0.0000	1004.73	7.3640	1621.92	4.4070
776.52	16.7902	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	6.7181
778.90	12.3262	1028.54	0.0000	1750.46	0.0000
783.70	15.7221	1037.84	5.9613	1764.49	3.0356
1435.80	9.0042	1038.76	0.0000	1770.23	9.1187
903.28	11.2720	1046.59	5.6060	1771.35	0.9121
795.86	11.2907	1048.07	7.4785	1791.20	0.0000
801.95	11.3212	1049.04	6.5458	1808.65	4.5977
810.06	10.2253	1050.41	9.3555	1810.72	0.0000
810.29	10.2264	1063.66	7.5190	1836.06	3.6998
810.45	9.0908	1077.00	12.2740		
810.76	9.0918	1077.34	10.3870		
815.77	14.8064	1085.87	12.3113		
818.51	9.1224	1093.63	7.5962		
832.01	20.6448	1099.45	12.3676		
834.85	17.2247	1112.07	10.5092		
835.71	12.0616	1112.84	7.6450		
836.80	0.0000	1115.54	7.6519		
846.75	0.0000	1120.29	7.6636		
846.77	16.1579	1120.55	7.6646		
856.80	8.6923	1121.30	7.6665		
860.56	6.9646	1808.65	5.7656		
871.09	13.9897	1131.51	0.0000		
873.19	13.1268	1147.95	0.0000		
875.33	0.0000	1332.49	8.7704		
879.38	14.0371	1177.95	6.8317		
880.51	12.2880	1189.05	9.7937		
881.60	8.7811	1204.77	0.9842		
883.24	11.4230	1221.41	8.9028		
884.68	12.3090	1231.02	13.2284		
889.28	11.4508	1235.36	11.1262		
894.76	14.1245	1238.28	6.3637		
1836.06	12.3752	1260.41	0.0000		
900.72	14.1582	1271.87	9.0390		
903.28	9.7435	1274.44	4.0203		
911.20	12.4397	1274.54	4.0205		
912.08	12.4440	1291.59	4.0405		
984.45	0.0000	1298.22	0.0000		
926.50	10.2159	1312.11	8.1294		
929.11	2.8634	1332.49	6.1326		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:54:02.06

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041224.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM52.CNF;102
                                    Background date  : 6-APR-2025 11:02:55.
Sample date      : 19-MAR-2025 00:00:00 Acquisition date : 10-APR-2025 20:53:33
Sample ID        : G1206041224          Sample quantity  : 1.34450E+02 GRAM
Detector name    : GAM52                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.33  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767517              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	93.06*	21	45	1.10	186.39	181	12	5.78E-03	71.1	
2	0	166.31	14	21	0.83	332.94	328	8	3.80E-03	64.9	
3	0	173.71	14	16	1.75	347.74	344	7	4.00E-03	54.1	
4	0	186.46*	10	35	0.82	373.24	368	10	2.70E-03	127.5	
5	0	343.10	16	17	0.54	686.61	681	11	4.31E-03	56.8	
6	0	428.62	7	3	0.82	857.70	853	8	1.83E-03	64.3	
7	0	448.65	5	7	1.34	897.78	890	9	1.40E-03	103.4	
8	0	484.07	19	8	1.55	968.64	964	10	5.38E-03	34.9	
9	0	511.33*	0	12	2.45	1023.18	1016	17	9.70E-05	****	
10	0	553.32	6	2	1.13	1107.18	1103	7	1.74E-03	53.2	
11	0	556.32	6	5	1.37	1113.19	1109	7	1.57E-03	79.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:54:03

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041224.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 19-MAR-2025 00:00:00	Acquisition date	: 10-APR-2025 20:53:33
Sample ID	: G1206041224	Sample quantity	: 134.45 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA52	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.33 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CE-139	165.86	15	80.00*	6.849E+00	1.566E-02	1.757E-02	129.89
ANH-511	511.00	0	100.00*	3.000E+00	6.734E-04	6.734E-04	6765.28

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:54:04.02

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041224.CNF;1		
Acquisition date	: 10-APR-2025 20:53:33	Sensitivity	: 3.000
Detector ID	: GAM52	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.33	Half life ratio	: *****
Sample date	: 19-MAR-2025 00:00:00	Analyst initials	: MXR1
Sample ID	: G1206041224	Sample Quantity	: 1.3445E+02 GRAM
Batch Number	: 2767517	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 3-SEP-2024 08:39:54	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM52_CAN.CNF;5		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
CE-139	1.757E-02	2.236E-02	2.302E-02
ANH-511	6.734E-04	4.464E-02	3.351E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-8.877E-02	1.936E-01	3.681E-01	NOT IDENT.
NA-22	6.063E-03	2.312E-02	5.554E-02	NOT IDENT.
NA-24	0.000E+00	2.199E+09	0.000E+00	SHORT HLIF
AL-26	-2.939E-04	1.679E-02	4.340E-02	NOT IDENT.
K-40	-5.682E-02	2.475E-01	6.323E-01	NOT IDENT.
SC-46	-8.471E-03	2.779E-02	5.209E-02	NOT IDENT.
V-48	-1.460E-02	5.252E-02	1.017E-01	NOT IDENT.
CR-51	-7.805E-02	2.608E-01	4.678E-01	NOT IDENT.
MN-52	1.069E-02	4.640E-01	1.024E+00	NOT IDENT.
MN-54	4.946E-04	1.311E-02	3.071E-02	NOT IDENT.
CO-56	-4.117E-04	2.853E-02	5.730E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-2.870E-03	1.046E-02	2.009E-02	NOT IDENT.
CO-58	1.516E-02	2.325E-02	5.603E-02	NOT IDENT.
FE-59	-6.455E-03	4.006E-02	9.159E-02	NOT IDENT.
CO-60	-7.841E-03	2.817E-02	5.665E-02	NOT IDENT.
ZN-65	1.347E-02	5.147E-02	1.183E-01	NOT IDENT.
GE-68	4.463E-01	8.433E-01	1.995E+00	NOT IDENT.
AS-73	-2.447E-01	2.239E-01	3.924E-01	NOT IDENT.
AS-74	3.774E-02	5.493E-02	1.366E-01	NOT IDENT.
SE-75	3.173E-03	2.189E-02	4.346E-02	NOT IDENT.
BR-77	-3.685E+00	4.332E+01	8.581E+01	NOT IDENT.
SR-82	8.662E-02	2.234E-01	5.103E-01	NOT IDENT.
RB-83	-3.317E-03	3.447E-02	7.237E-02	FAIL ABUN
RB-84	4.399E-02	4.135E-02	1.118E-01	NOT IDENT.
KR-85	1.613E+00	4.130E+00	8.898E+00	NOT IDENT.
SR-85	9.230E-03	2.374E-02	5.114E-02	NOT IDENT.
RB-86	5.027E-01	7.316E-01	1.750E+00	NOT IDENT.

Y-88	6.183E-03	3.116E-02	7.467E-02	NOT IDENT.
Y-91	-1.582E+00	8.889E+00	1.996E+01	NOT IDENT.
NB-94	1.359E-02	1.515E-02	3.910E-02	NOT IDENT.
NB-95	3.468E-03	2.543E-02	5.379E-02	NOT IDENT.
NB-95M	6.787E-03	5.245E-02	1.051E-01	NOT IDENT.
ZR-95	-9.546E-04	3.098E-02	6.869E-02	NOT IDENT.
NB-97	0.000E+00	1.886E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.891E+09	0.000E+00	SHORT HLIF
MO-99	-6.936E+00	4.668E+01	9.413E+01	NOT IDENT.
TC-99M	0.000E+00	2.616E+25	0.000E+00	SHORT HLIF
RH-101	-7.120E-03	1.094E-02	1.967E-02	NOT IDENT.
RH-102	6.606E-03	2.192E-02	5.248E-02	NOT IDENT.
RU-103	-9.389E-04	2.195E-02	4.620E-02	NOT IDENT.
RH-106	-9.236E-02	1.813E-01	3.333E-01	NOT IDENT.
RU-106	-9.236E-02	1.813E-01	3.333E-01	NOT IDENT.
AG-108M	-4.227E-03	1.557E-02	3.094E-02	NOT IDENT.
CD-109	-4.520E-03	2.636E-01	5.363E-01	NOT IDENT.
AG-110	1.611E-01	2.407E-01	6.701E-01	NOT IDENT.
AG-110M	1.284E-02	2.442E-02	6.062E-02	NOT IDENT.
SN-113	4.156E-03	2.182E-02	4.763E-02	NOT IDENT.
CD-115	0.000E+00	5.878E+01	0.000E+00	SHORT HLIF
SN-117M	-1.746E-02	3.113E-02	5.593E-02	NOT IDENT.
SB-122	-8.433E+00	6.718E+00	9.290E+00	NOT IDENT.
TE-123M	-4.881E-03	1.210E-02	2.235E-02	NOT IDENT.
SB-124	-1.170E-03	7.521E-02	1.664E-01	NOT IDENT.
SB-125	3.785E-02	4.769E-02	8.870E-02	FAIL ABUN
TE-125M	1.663E+00	3.675E+00	8.025E+00	NOT IDENT.
I-126	-1.679E-01	1.765E-01	2.770E-01	NOT IDENT.
SB-126	1.498E-01	1.302E-01	3.253E-01	NOT IDENT.
SN-126	2.263E-03	2.535E-02	5.238E-02	NOT IDENT.
SB-127	1.293E+00	2.928E+00	6.652E+00	NOT IDENT.
I-131	3.289E-02	1.093E-01	2.411E-01	NOT IDENT.
I-132	0.000E+00	9.476E+40	0.000E+00	SHORT HLIF
TE-132	1.393E+00	1.599E+00	3.609E+00	NOT IDENT.
BA-133	-7.479E-04	2.111E-02	4.385E-02	NOT IDENT.
I-133	0.000E+00	1.428E+06	0.000E+00	SHORT HLIF
CS-134	1.408E-02	2.161E-02	5.218E-02	NOT IDENT.
I-135	0.000E+00	1.305E+24	0.000E+00	SHORT HLIF
CS-136	-1.027E-02	9.263E-02	1.864E-01	NOT IDENT.
BA-137M	-5.536E-03	1.926E-02	3.741E-02	NOT IDENT.
CS-137	-5.848E-03	2.034E-02	3.951E-02	NOT IDENT.
LA-138	1.570E-03	3.629E-02	8.318E-02	NOT IDENT.
BA-140	-5.947E-02	2.066E-01	4.086E-01	NOT IDENT.
LA-140	3.629E-02	5.246E-02	1.780E-01	NOT IDENT.
CE-141	-1.966E-02	3.268E-02	5.832E-02	NOT IDENT.
CE-143	0.000E+00	2.826E+03	0.000E+00	SHORT HLIF
CE-144	4.679E-02	7.248E-02	1.615E-01	NOT IDENT.
PM-144	-1.837E-04	1.629E-02	3.462E-02	NOT IDENT.
PR-144	-3.717E-02	1.217E+00	2.576E+00	NOT IDENT.
PM-146	-3.363E-03	1.809E-02	3.753E-02	NOT IDENT.
ND-147	-1.882E-01	4.180E-01	8.033E-01	NOT IDENT.
PM-147	-2.877E+02	2.925E+02	4.927E+02	NOT IDENT.
PM-149	0.000E+00	4.798E+02	0.000E+00	SHORT HLIF
EU-150	4.126E-03	1.150E-02	2.592E-02	NOT IDENT.
EU-152	8.361E-02	9.300E-02	9.266E-02	FAIL ABUN
GD-153	2.068E-02	3.251E-02	6.817E-02	NOT IDENT.
EU-154	1.968E-02	6.621E-02	1.597E-01	NOT IDENT.
EU-155	4.055E-03	3.363E-02	7.093E-02	NOT IDENT.
TB-160	2.949E-02	7.632E-02	1.778E-01	NOT IDENT.
HO-166M	2.198E-02	2.722E-02	7.003E-02	NOT IDENT.
TM-171	3.248E+00	4.542E+00	1.060E+01	NOT IDENT.
HF-172	1.987E-02	5.993E-02	1.311E-01	NOT IDENT.
LU-172	-2.197E-03	3.084E-02	6.944E-02	NOT IDENT.
LU-176	-3.645E-03	1.346E-02	2.431E-02	NOT IDENT.
HF-181	-8.155E-03	3.260E-02	5.665E-02	NOT IDENT.
TA-182	-7.520E-03	7.899E-02	1.804E-01	NOT IDENT.
RE-183	-5.194E-03	5.642E-02	1.178E-01	NOT IDENT.
RE-184	1.897E-02	9.292E-02	1.984E-01	NOT IDENT.
W-188	-8.571E-01	3.575E+00	6.568E+00	NOT IDENT.
IR-192	-6.203E-03	2.025E-02	3.603E-02	NOT IDENT.
HG-203	7.937E-04	2.100E-02	4.051E-02	NOT IDENT.
TL-204	1.023E+00	1.658E+00	3.611E+00	NOT IDENT.
BI-207	-6.598E-03	2.264E-02	4.868E-02	NOT IDENT.
TL-208	4.515E-03	1.882E-02	4.238E-02	NOT IDENT.
BI-210	-3.912E-01	1.136E+00	2.220E+00	NOT IDENT.
PB-210	-3.912E-01	1.136E+00	2.220E+00	NOT IDENT.
BI-211	-4.114E-02	1.104E-01	2.173E-01	NOT IDENT.
PB-211	-1.515E-01	3.491E-01	6.773E-01	NOT IDENT.

BI-212	8.310E-02	2.461E-01	5.628E-01	NOT IDENT.
PB-212	5.638E-03	2.833E-02	5.867E-02	NOT IDENT.
BI-213	-1.559E-02	3.815E-02	7.643E-02	NOT IDENT.
BI-214	-2.944E-02	4.351E-02	8.297E-02	NOT IDENT.
PB-214	1.473E-02	4.117E-02	8.902E-02	NOT IDENT.
RN-219	7.162E-02	1.822E-01	4.138E-01	NOT IDENT.
RN-222	-2.944E-02	4.351E-02	8.297E-02	NOT IDENT.
RA-223	-5.209E-02	3.230E-01	5.960E-01	NOT IDENT.
RA-224	-5.670E-02	2.818E-01	5.225E-01	NOT IDENT.
AC-225	2.423E-01	4.055E-01	8.842E-01	NOT IDENT.
RA-226	1.473E-02	4.117E-02	8.902E-02	NOT IDENT.
AC-227	-3.624E-02	1.217E-01	2.211E-01	NOT IDENT.
TH-227	-3.624E-02	1.217E-01	2.211E-01	NOT IDENT.
AC-228	-5.490E-02	7.039E-02	1.297E-01	NOT IDENT.
RA-228	-5.490E-02	7.039E-02	1.297E-01	NOT IDENT.
TH-228	5.638E-03	2.833E-02	5.867E-02	NOT IDENT.
TH-229	-8.070E-02	1.929E-01	3.529E-01	NOT IDENT.
TH-230	1.473E-02	4.117E-02	8.902E-02	NOT IDENT.
PA-231	-1.273E-01	2.190E-01	3.678E-01	NOT IDENT.
TH-231	-5.209E-02	3.230E-01	5.960E-01	NOT IDENT.
TH-232	-5.490E-02	7.039E-02	1.297E-01	NOT IDENT.
PA-233	2.330E-03	3.370E-02	6.505E-02	NOT IDENT.
PA-234	-9.229E-02	2.141E-01	3.864E-01	NOT IDENT.
PA-234M	-1.867E-01	4.687E-01	9.528E-01	FAIL ABUN
TH-234	-1.867E-01	4.687E-01	9.528E-01	FAIL ABUN
U-234	1.473E-02	4.117E-02	8.902E-02	NOT IDENT.
U-235	4.887E-02	8.547E-02	1.812E-01	FAIL ABUN
NP-237	2.330E-03	3.370E-02	6.505E-02	NOT IDENT.
NP-238	0.000E+00	1.401E+02	0.000E+00	SHORT HLIF
U-238	-1.867E-01	4.687E-01	9.528E-01	FAIL ABUN
NP-239	1.845E-02	9.769E-02	2.038E-01	NOT IDENT.
PU-239	7.608E+01	1.317E+02	2.855E+02	NOT IDENT.
AM-241	3.111E-02	4.517E-02	1.020E-01	NOT IDENT.
AM-243	1.612E-03	1.902E-02	3.878E-02	NOT IDENT.
CM-243	-5.798E-03	4.154E-02	8.208E-02	NOT IDENT.
BK-247	-4.575E-03	3.934E-02	7.394E-02	NOT IDENT.
CM-247	2.990E-04	1.689E-02	3.600E-02	NOT IDENT.
CF-249	-9.156E-03	1.425E-02	2.691E-02	NOT IDENT.
CF-251	2.357E-03	4.810E-02	9.696E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:54:02.79

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CE-139	165.86	15	80.00*	6.849E+00	1.566E-02	1.757E-02	129.89
ANH-511	511.00	0	100.00*	3.000E+00	6.734E-04	6.734E-04	6765.28

Flag: "*" = Keyline

Sample ID : G1206041224 Acquisition date : 10-APR-2025 20:53:33

Total number of lines in spectrum 11
Number of unidentified lines 4
Number of lines tentatively identified by NID 7 63.64%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CE-139	137.64D	1.12	1.566E-02	1.757E-02	2.282E-02	129.89	
ANH-511	1.00E+09Y	1.00	6.734E-04	6.734E-04	455.5E-04	6765.28	
	Total Activity :		1.633E-02	1.824E-02			
	Grand Total Activity :		1.633E-02	1.824E-02			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1206041224 Acquisition date : 10-APR-2025 20:53:33

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	93.06	24	53	1.10	186.39	181	12	5.78E-03	****	7.38E+00	T
0	173.71	16	17	1.75	347.74	344	7	4.00E-03	****	6.69E+00	
0	186.46	11	39	0.82	373.24	368	10	2.70E-03	****	6.42E+00	T
0	343.10	17	18	0.54	686.61	681	11	4.31E-03	****	4.16E+00	T
0	428.62	7	4	0.82	857.70	853	8	1.83E-03	****	3.48E+00	T
0	448.65	5	7	1.34	897.78	890	9	1.40E-03	****	3.35E+00	
0	484.07	20	8	1.55	968.64	964	10	5.38E-03	69.8	3.15E+00	
0	553.32	6	2	1.13	1107.18	1103	7	1.74E-03	****	2.80E+00	T
0	556.32	6	6	1.37	1113.19	1109	7	1.57E-03	****	2.79E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:54:13.16

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041224.CNF;1   *
* Acquisition date : 10-APR-2025 20:53:33 Sensitivity     : 3.000       *
* Detector ID      : GAM52                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****       *
* Sample date      : 19-MAR-2025 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1206041224          Analyst initials: MXR1        *
* Batch Number     : 2767517              Sample Quantity : 1.3445E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-SEP-2024 08:39:54 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM52_CAN.CNF;5         *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
CE-139	9.903E-03
ANH-511	1.419E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.527E-01	NOT IDENT.
NA-22	2.159E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.372E-02	NOT IDENT.
K-40	2.519E-01	NOT IDENT.
SC-46	2.087E-02	NOT IDENT.
V-48	3.807E-02	NOT IDENT.
CR-51	2.023E-01	NOT IDENT.
MN-52	3.965E-01	NOT IDENT.
MN-54	1.112E-02	NOT IDENT.
CO-56	2.364E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	8.766E-03	NOT IDENT.
CO-58	2.310E-02	NOT IDENT.
FE-59	3.245E-02	NOT IDENT.
CO-60	2.195E-02	NOT IDENT.
ZN-65	4.786E-02	NOT IDENT.
GE-68	8.274E-01	NOT IDENT.
AS-73	1.635E-01	NOT IDENT.
AS-74	5.617E-02	NOT IDENT.
SE-75	1.875E-02	NOT IDENT.
BR-77	3.799E+01	NOT IDENT.
SR-82	2.086E-01	NOT IDENT.
RB-83	2.922E-02	FAIL ABUN
RB-84	4.589E-02	NOT IDENT.
KR-85	3.853E+00	NOT IDENT.
SR-85	2.214E-02	NOT IDENT.
RB-86	7.351E-01	NOT IDENT.
Y-88	2.795E-02	NOT IDENT.

Y-91	7.071E+00	NOT IDENT.
NB-94	1.613E-02	NOT IDENT.
NB-95	2.214E-02	NOT IDENT.
NB-95M	4.520E-02	NOT IDENT.
ZR-95	2.571E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	3.755E+01	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	8.288E-03	NOT IDENT.
RH-102	2.065E-02	NOT IDENT.
RU-103	1.897E-02	NOT IDENT.
RH-106	1.346E-01	NOT IDENT.
RU-106	1.346E-01	NOT IDENT.
AG-108M	1.299E-02	NOT IDENT.
CD-109	2.371E-01	NOT IDENT.
AG-110	2.590E-01	NOT IDENT.
AG-110M	2.406E-02	NOT IDENT.
SN-113	2.017E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.380E-02	NOT IDENT.
SB-122	3.291E+00	NOT IDENT.
TE-123M	9.647E-03	NOT IDENT.
SB-124	6.229E-02	NOT IDENT.
SB-125	3.680E-02	FAIL ABUN
TE-125M	3.511E+00	NOT IDENT.
I-126	1.048E-01	NOT IDENT.
SB-126	1.392E-01	NOT IDENT.
SN-126	2.318E-02	NOT IDENT.
SB-127	2.767E+00	NOT IDENT.
I-131	1.033E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	1.580E+00	NOT IDENT.
BA-133	1.882E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.150E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	7.219E-02	NOT IDENT.
BA-137M	1.511E-02	NOT IDENT.
CS-137	1.596E-02	NOT IDENT.
LA-138	3.128E-02	NOT IDENT.
BA-140	1.661E-01	NOT IDENT.
LA-140	6.230E-02	NOT IDENT.
CE-141	2.552E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	7.073E-02	NOT IDENT.
PM-144	1.375E-02	NOT IDENT.
PR-144	1.021E+00	NOT IDENT.
PM-146	1.516E-02	NOT IDENT.
ND-147	3.157E-01	NOT IDENT.
PM-147	2.096E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.106E-02	NOT IDENT.
EU-152	3.928E-02	FAIL ABUN
GD-153	3.021E-02	NOT IDENT.
EU-154	6.240E-02	NOT IDENT.
EU-155	3.052E-02	NOT IDENT.
TB-160	7.137E-02	NOT IDENT.
HO-166M	2.863E-02	NOT IDENT.
TM-171	4.659E+00	NOT IDENT.
HF-172	5.618E-02	NOT IDENT.
LU-172	2.619E-02	NOT IDENT.
LU-176	1.032E-02	NOT IDENT.
HF-181	2.391E-02	NOT IDENT.
TA-182	6.537E-02	NOT IDENT.
RE-183	5.099E-02	NOT IDENT.
RE-184	8.133E-02	NOT IDENT.
W-188	2.770E+00	NOT IDENT.
IR-192	1.539E-02	NOT IDENT.
HG-203	1.750E-02	NOT IDENT.
TL-204	1.625E+00	NOT IDENT.
BI-207	1.748E-02	NOT IDENT.
TL-208	1.780E-02	NOT IDENT.
BI-210	9.986E-01	NOT IDENT.
PB-210	9.986E-01	NOT IDENT.
BI-211	9.398E-02	NOT IDENT.
PB-211	2.826E-01	NOT IDENT.
BI-212	2.285E-01	NOT IDENT.

PB-212	2.606E-02	NOT IDENT.
BI-213	2.946E-02	NOT IDENT.
BI-214	3.491E-02	NOT IDENT.
PB-214	3.918E-02	NOT IDENT.
RN-219	1.750E-01	NOT IDENT.
RN-222	3.491E-02	NOT IDENT.
RA-223	2.533E-01	NOT IDENT.
RA-224	2.261E-01	NOT IDENT.
AC-225	3.844E-01	NOT IDENT.
RA-226	3.918E-02	NOT IDENT.
AC-227	9.473E-02	NOT IDENT.
TH-227	9.473E-02	NOT IDENT.
AC-228	4.783E-02	NOT IDENT.
RA-228	4.783E-02	NOT IDENT.
TH-228	2.606E-02	NOT IDENT.
TH-229	1.481E-01	NOT IDENT.
TH-230	3.918E-02	NOT IDENT.
PA-231	1.523E-01	NOT IDENT.
TH-231	2.533E-01	NOT IDENT.
TH-232	4.783E-02	NOT IDENT.
PA-233	2.802E-02	NOT IDENT.
PA-234	1.553E-01	NOT IDENT.
PA-234M	4.295E-01	FAIL ABUN
TH-234	4.295E-01	FAIL ABUN
U-234	3.918E-02	NOT IDENT.
U-235	8.078E-02	FAIL ABUN
NP-237	2.802E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	4.295E-01	FAIL ABUN
NP-239	8.897E-02	NOT IDENT.
PU-239	1.263E+02	NOT IDENT.
AM-241	4.542E-02	NOT IDENT.
AM-243	1.745E-02	NOT IDENT.
CM-243	3.608E-02	NOT IDENT.
BK-247	3.184E-02	NOT IDENT.
CM-247	1.507E-02	NOT IDENT.
CF-249	1.034E-02	NOT IDENT.
CF-251	4.162E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:54:16.85

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041224.CNF;1  *
* Acquisition date : 10-APR-2025 20:53:33 Sensitivity     : 3.000       *
* Detector ID      : GAM52                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****       *
* Sample date      : 19-MAR-2025 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1206041224          Analyst initials: MXR1        *
* Batch Number     : 2767517              Sample Quantity : 1.3445E+02 GRAM  *
*                                         Quantity Err(%) : 1.4875E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-SEP-2024 08:39:54 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM52_CAN.CNF;5         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
CE-139	1.757E-02	2.269E-02	2.269E-02
ANH-511	6.734E-04	4.464E-02	4.464E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-8.877E-02	1.937E-01	1.978E-01	NOT IDENT.
NA-22	6.063E-03	2.313E-02	2.329E-02	NOT IDENT.
NA-24	1.543E+09	2.206E+09	2.313E+09	SHORT HLIF
AL-26	-2.939E-04	1.679E-02	1.679E-02	NOT IDENT.
K-40	-5.682E-02	2.475E-01	2.489E-01	NOT IDENT.
SC-46	-8.471E-03	2.781E-02	2.807E-02	NOT IDENT.
V-48	-1.460E-02	5.255E-02	5.296E-02	NOT IDENT.
CR-51	-7.805E-02	2.609E-01	2.633E-01	NOT IDENT.
MN-52	1.069E-02	4.640E-01	4.640E-01	NOT IDENT.
MN-54	4.946E-04	1.311E-02	1.311E-02	NOT IDENT.
CO-56	-4.117E-04	2.853E-02	2.853E-02	NOT IDENT.
MN-56	-1.000E+41	8.899E+42	0.000E+00	SHORT HLIF
CO-57	-2.870E-03	1.046E-02	1.054E-02	NOT IDENT.
CO-58	1.516E-02	2.330E-02	2.428E-02	NOT IDENT.
FE-59	-6.455E-03	4.007E-02	4.017E-02	NOT IDENT.
CO-60	-7.841E-03	2.818E-02	2.841E-02	NOT IDENT.
ZN-65	1.347E-02	5.149E-02	5.185E-02	NOT IDENT.
GE-68	4.463E-01	8.445E-01	8.682E-01	NOT IDENT.
AS-73	-2.447E-01	2.297E-01	2.548E-01	NOT IDENT.
AS-74	3.774E-02	5.508E-02	5.765E-02	NOT IDENT.
SE-75	3.173E-03	2.189E-02	2.194E-02	NOT IDENT.
BR-77	-3.685E+00	4.339E+01	4.342E+01	NOT IDENT.
SR-82	8.662E-02	2.236E-01	2.270E-01	NOT IDENT.
RB-83	-3.317E-03	3.448E-02	3.451E-02	FAIL ABUN
RB-84	4.399E-02	4.169E-02	4.616E-02	NOT IDENT.
KR-85	1.613E+00	4.132E+00	4.196E+00	NOT IDENT.
SR-85	9.230E-03	2.375E-02	2.412E-02	NOT IDENT.
RB-86	5.027E-01	7.334E-01	7.677E-01	NOT IDENT.

Y-88	6.183E-03	3.116E-02	3.129E-02	NOT IDENT.
Y-91	-1.582E+00	8.890E+00	8.919E+00	NOT IDENT.
NB-94	1.359E-02	1.519E-02	1.638E-02	NOT IDENT.
NB-95	3.468E-03	2.543E-02	2.548E-02	NOT IDENT.
NB-95M	6.787E-03	5.246E-02	5.255E-02	NOT IDENT.
ZR-95	-9.546E-04	3.098E-02	3.098E-02	NOT IDENT.
NB-97	1.000E+41	1.888E+41	0.000E+00	SHORT HLIF
ZR-97	5.763E+07	1.891E+09	1.891E+09	SHORT HLIF
MO-99	-6.936E+00	4.668E+01	4.679E+01	NOT IDENT.
TC-99M	1.808E+25	2.625E+25	0.000E+00	SHORT HLIF
RH-101	-7.120E-03	1.102E-02	1.148E-02	NOT IDENT.
RH-102	6.606E-03	2.193E-02	2.214E-02	NOT IDENT.
RU-103	-9.389E-04	2.195E-02	2.195E-02	NOT IDENT.
RH-106	-9.236E-02	1.816E-01	1.863E-01	NOT IDENT.
RU-106	-9.236E-02	1.816E-01	1.863E-01	NOT IDENT.
AG-108M	-4.227E-03	1.557E-02	1.569E-02	NOT IDENT.
CD-109	-4.520E-03	2.636E-01	2.636E-01	NOT IDENT.
AG-110	1.611E-01	2.411E-01	2.518E-01	NOT IDENT.
AG-110M	1.284E-02	2.448E-02	2.515E-02	NOT IDENT.
SN-113	4.156E-03	2.182E-02	2.190E-02	NOT IDENT.
CD-115	-3.868E+01	5.890E+01	6.142E+01	SHORT HLIF
SN-117M	-1.746E-02	3.118E-02	3.215E-02	NOT IDENT.
SB-122	-8.433E+00	6.757E+00	7.754E+00	NOT IDENT.
TE-123M	-4.881E-03	1.211E-02	1.231E-02	NOT IDENT.
SB-124	-1.170E-03	7.521E-02	7.521E-02	NOT IDENT.
SB-125	3.785E-02	4.780E-02	5.075E-02	FAIL ABUN
TE-125M	1.663E+00	3.678E+00	3.754E+00	NOT IDENT.
I-126	-1.679E-01	1.772E-01	1.927E-01	NOT IDENT.
SB-126	1.498E-01	1.316E-01	1.479E-01	NOT IDENT.
SN-126	2.263E-03	2.535E-02	2.537E-02	NOT IDENT.
SB-127	1.293E+00	2.933E+00	2.990E+00	NOT IDENT.
I-131	3.289E-02	1.094E-01	1.104E-01	NOT IDENT.
I-132	-1.000E+41	1.702E+41	0.000E+00	SHORT HLIF
TE-132	1.393E+00	1.607E+00	1.726E+00	NOT IDENT.
BA-133	-7.479E-04	2.111E-02	2.111E-02	NOT IDENT.
I-133	-5.746E+05	1.432E+06	1.455E+06	SHORT HLIF
CS-134	1.408E-02	2.166E-02	2.257E-02	NOT IDENT.
I-135	-5.152E+23	1.333E+24	0.000E+00	SHORT HLIF
CS-136	-1.027E-02	9.264E-02	9.276E-02	NOT IDENT.
BA-137M	-5.536E-03	1.926E-02	1.943E-02	NOT IDENT.
CS-137	-5.848E-03	2.035E-02	2.052E-02	NOT IDENT.
LA-138	1.570E-03	3.629E-02	3.630E-02	NOT IDENT.
BA-140	-5.947E-02	2.066E-01	2.084E-01	NOT IDENT.
LA-140	3.629E-02	5.258E-02	5.507E-02	NOT IDENT.
CE-141	-1.966E-02	3.273E-02	3.391E-02	NOT IDENT.
CE-143	-7.218E+02	2.826E+03	2.845E+03	SHORT HLIF
CE-144	4.679E-02	7.260E-02	7.560E-02	NOT IDENT.
PM-144	-1.837E-04	1.629E-02	1.629E-02	NOT IDENT.
PR-144	-3.717E-02	1.217E+00	1.217E+00	NOT IDENT.
PM-146	-3.363E-03	1.809E-02	1.815E-02	NOT IDENT.
ND-147	-1.882E-01	4.184E-01	4.269E-01	NOT IDENT.
PM-147	-2.877E+02	2.933E+02	3.207E+02	NOT IDENT.
PM-149	-8.733E+01	4.800E+02	4.816E+02	SHORT HLIF
EU-150	4.126E-03	1.151E-02	1.166E-02	NOT IDENT.
EU-152	8.361E-02	9.334E-02	1.007E-01	FAIL ABUN
GD-153	2.068E-02	3.256E-02	3.387E-02	NOT IDENT.
EU-154	1.968E-02	6.624E-02	6.683E-02	NOT IDENT.
EU-155	4.055E-03	3.363E-02	3.368E-02	NOT IDENT.
TB-160	2.949E-02	7.641E-02	7.756E-02	NOT IDENT.
HO-166M	2.198E-02	2.731E-02	2.905E-02	NOT IDENT.
TM-171	3.248E+00	4.554E+00	4.783E+00	NOT IDENT.
HF-172	1.987E-02	6.003E-02	6.069E-02	NOT IDENT.
LU-172	-2.197E-03	3.084E-02	3.086E-02	NOT IDENT.
LU-176	-3.645E-03	1.346E-02	1.356E-02	NOT IDENT.
HF-181	-8.155E-03	3.261E-02	3.282E-02	NOT IDENT.
TA-182	-7.520E-03	7.899E-02	7.906E-02	NOT IDENT.
RE-183	-5.194E-03	5.642E-02	5.647E-02	NOT IDENT.
RE-184	1.897E-02	9.296E-02	9.335E-02	NOT IDENT.
W-188	-8.571E-01	3.577E+00	3.598E+00	NOT IDENT.
IR-192	-6.203E-03	2.025E-02	2.044E-02	NOT IDENT.
HG-203	7.937E-04	2.100E-02	2.100E-02	NOT IDENT.
TL-204	1.023E+00	1.661E+00	1.724E+00	NOT IDENT.
BI-207	-6.598E-03	2.265E-02	2.284E-02	NOT IDENT.
TL-208	4.515E-03	1.882E-02	1.893E-02	NOT IDENT.
BI-210	-3.912E-01	1.137E+00	1.151E+00	NOT IDENT.
PB-210	-3.912E-01	1.137E+00	1.151E+00	NOT IDENT.
BI-211	-4.114E-02	1.104E-01	1.120E-01	NOT IDENT.
PB-211	-1.515E-01	3.494E-01	3.560E-01	NOT IDENT.

BI-212	8.310E-02	2.462E-01	2.491E-01	NOT IDENT.
PB-212	5.638E-03	2.834E-02	2.845E-02	NOT IDENT.
BI-213	-1.559E-02	3.817E-02	3.881E-02	NOT IDENT.
BI-214	-2.944E-02	4.358E-02	4.556E-02	NOT IDENT.
PB-214	1.473E-02	4.119E-02	4.172E-02	NOT IDENT.
RN-219	7.162E-02	1.825E-01	1.853E-01	NOT IDENT.
RN-222	-2.944E-02	4.358E-02	4.556E-02	NOT IDENT.
RA-223	-5.209E-02	3.231E-01	3.239E-01	NOT IDENT.
RA-224	-5.670E-02	2.818E-01	2.830E-01	NOT IDENT.
AC-225	2.423E-01	4.064E-01	4.208E-01	NOT IDENT.
RA-226	1.473E-02	4.119E-02	4.172E-02	NOT IDENT.
AC-227	-3.624E-02	1.218E-01	1.229E-01	NOT IDENT.
TH-227	-3.624E-02	1.218E-01	1.229E-01	NOT IDENT.
AC-228	-5.490E-02	7.073E-02	7.494E-02	NOT IDENT.
RA-228	-5.490E-02	7.073E-02	7.494E-02	NOT IDENT.
TH-228	5.638E-03	2.834E-02	2.845E-02	NOT IDENT.
TH-229	-8.070E-02	1.930E-01	1.964E-01	NOT IDENT.
TH-230	1.473E-02	4.119E-02	4.172E-02	NOT IDENT.
PA-231	-1.273E-01	2.209E-01	2.282E-01	NOT IDENT.
TH-231	-5.209E-02	3.231E-01	3.239E-01	NOT IDENT.
TH-232	-5.490E-02	7.073E-02	7.494E-02	NOT IDENT.
PA-233	2.330E-03	3.370E-02	3.372E-02	NOT IDENT.
PA-234	-9.229E-02	2.389E-01	2.425E-01	NOT IDENT.
PA-234M	-1.867E-01	4.706E-01	4.781E-01	FAIL ABUN
TH-234	-1.867E-01	4.706E-01	4.781E-01	FAIL ABUN
U-234	1.473E-02	4.119E-02	4.172E-02	NOT IDENT.
U-235	4.887E-02	8.558E-02	8.837E-02	FAIL ABUN
NP-237	2.330E-03	3.370E-02	3.372E-02	NOT IDENT.
NP-238	-9.073E+01	1.405E+02	1.463E+02	SHORT HLIF
U-238	-1.867E-01	4.706E-01	4.781E-01	FAIL ABUN
NP-239	1.845E-02	9.771E-02	9.807E-02	NOT IDENT.
PU-239	7.608E+01	1.318E+02	1.362E+02	NOT IDENT.
AM-241	3.111E-02	4.526E-02	4.738E-02	NOT IDENT.
AM-243	1.612E-03	1.902E-02	1.904E-02	NOT IDENT.
CM-243	-5.798E-03	4.154E-02	4.162E-02	NOT IDENT.
BK-247	-4.575E-03	3.935E-02	3.940E-02	NOT IDENT.
CM-247	2.990E-04	1.689E-02	1.689E-02	NOT IDENT.
CF-249	-9.156E-03	1.429E-02	1.487E-02	NOT IDENT.
CF-251	2.357E-03	4.810E-02	4.811E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	18.6316	85.43	15.9647	131.20	16.2593
45.60	18.7505	86.55	24.4714	133.02	15.2845
46.54	24.7866	86.79	20.7165	133.52	10.1971
49.72	16.3913	86.94	20.7227	136.00	17.3984
51.35	8.6670	87.09	18.8445	136.47	12.2897
51.87	9.5475	87.57	15.0898	140.51	10.3012
52.39	10.4306	88.03	16.0475	143.76	11.3837
52.97	13.9297	88.34	16.3722	144.24	15.5335
53.44	19.1781	88.47	16.3763	145.44	19.7088
54.07	10.4787	89.96	20.2142	152.43	13.6149
57.36	0.0000	90.64	10.1204	153.25	22.0174
57.53	16.7448	91.11	15.1943	154.21	15.7471
57.98	14.9997	92.59	15.2374	156.02	14.7327
59.27	13.2791	93.35	15.2594	158.56	16.8938
59.32	13.2808	94.56	15.2942	159.00	17.9600
59.54	14.1741	94.65	15.2968	162.33	15.5621
60.96	20.4487	94.67	15.2974	162.66	21.2302
61.17	18.6804	94.87	15.3031	163.33	18.4153
62.93	15.1884	97.43	12.8132	165.86	12.7903
63.29	18.7787	98.43	22.1433	176.31	12.9575
63.58	18.7920	98.44	22.1437	176.60	11.5218
64.28	16.1349	99.53	23.1524	177.52	11.8951
66.73	23.4433	100.11	17.3824	181.07	17.3760
67.24	19.8605	102.03	21.3185	181.52	18.8340
67.68	18.0736	103.18	19.4200	184.41	14.5374
67.75	18.9805	103.37	19.4266	185.72	12.0118
68.89	20.8434	105.21	11.6936	193.51	13.2220
69.67	22.6969	105.31	11.6957	197.03	9.9561
70.82	19.1154	106.12	12.6882	198.01	24.3640
70.83	19.1158	106.47	11.7192	201.83	24.4673
72.81	28.3449	109.28	11.7758	203.43	16.7118
72.87	28.3487	111.00	19.6835	205.31	16.7461
74.66	20.1983	111.76	17.7377	210.85	17.9697
74.82	22.9609	114.06	13.8489	215.65	14.6748
74.97	22.9683	116.30	15.8855	218.12	9.0541
77.11	15.6912	116.74	13.9097	222.11	13.6373
78.74	26.8607	119.76	14.9759	227.09	7.9957
79.69	9.2809	121.12	22.0122	227.38	9.1406
80.03	9.2874	121.22	22.0156	228.16	8.0043
80.12	8.3604	121.78	19.0303	228.18	8.0045
80.19	9.2906	122.06	19.0387	235.69	11.5208
80.57	12.0874	122.92	10.0340	235.96	18.4385
81.00	15.8209	123.07	10.0363	238.63	10.3988
81.07	17.6846	123.68	16.0734	238.98	12.7139
81.75	21.4381	125.81	9.0712	240.99	16.2131
82.47	22.4035	127.23	16.1617	242.00	11.5921
83.79	15.9119	127.91	18.2008	244.70	5.8112
84.00	15.9187	129.30	13.1728	252.40	11.7075

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	12.8829	351.06	14.3942	569.33	9.6582
254.15	0.0000	351.93	11.0142	569.50	12.5567
256.23	15.2740	355.39	0.0000	569.70	12.5578
260.90	0.0000	356.01	12.7466	583.19	3.8901
264.66	11.8402	364.49	9.4048	584.27	4.8651
264.80	14.2101	366.42	8.5614	595.83	2.9357
265.00	14.2126	372.51	7.7384	600.60	5.8850
269.46	8.3240	375.05	7.7521	602.52	0.0000
270.03	13.0873	377.52	14.6682	604.72	9.8279
271.23	13.1014	383.85	5.1996	607.14	11.8071
273.65	9.5486	388.16	7.8224	609.32	9.8494
276.40	9.5718	388.63	6.0860	610.33	5.9126
277.37	14.3698	391.69	8.7124	614.28	10.8604
277.60	14.3727	400.66	7.8882	618.01	3.9561
278.00	16.7741	401.81	7.0171	620.36	7.9209
279.20	13.1934	402.40	8.7748	621.93	9.9084
279.54	11.9977	404.85	12.3044	630.19	0.0000
279.70	11.9992	410.95	12.3537	631.29	2.9856
280.46	8.4050	413.71	16.7959	633.25	4.9805
283.69	9.6326	414.70	13.2681	634.78	3.9873
284.31	7.2283	423.72	5.3380	635.95	5.9841
285.41	10.8526	427.09	9.3614	636.99	6.9849
285.90	0.0000	427.87	3.5680	657.50	1.0072
287.50	9.6641	433.94	11.6403	657.76	1.0073
290.67	12.1124	439.40	8.0859	657.90	0.0000
293.27	0.0000	440.45	6.2932	661.66	8.0726
295.22	6.0794	453.88	7.2511	664.57	0.0000
295.96	9.7332	463.37	9.1156	666.33	10.1119
298.58	8.5349	468.07	6.3986	666.50	8.0902
299.98	8.5449	473.00	6.4171	667.71	0.0000
300.09	8.5456	475.06	8.2604	677.62	4.0651
300.13	8.5460	476.78	8.2687	685.70	5.0993
301.36	13.4428	477.60	11.9492	692.65	7.1605
302.85	7.3414	482.18	12.4417	695.00	7.1678
304.50	13.4774	487.02	6.9312	696.49	5.1231
304.85	12.2559	492.35	0.0000	696.51	5.1231
306.78	13.5026	497.08	7.4354	697.00	9.2238
308.46	13.5207	505.52	7.0036	697.30	9.2249
311.90	12.3257	507.63	0.0000	697.49	4.1003
316.51	14.8451	511.00	10.3030	702.65	2.0547
319.41	11.1594	514.00	10.3201	706.68	4.1164
320.08	12.4060	514.00	10.3201	711.68	2.0626
321.04	17.3812	520.40	6.5901	720.70	3.1056
323.87	12.4426	520.69	3.7664	721.93	0.0000
325.23	8.7190	522.65	0.0000	722.78	11.3970
328.76	11.2409	527.90	0.0000	722.91	9.3252
333.37	8.3561	528.26	7.5635	723.31	4.1453
333.97	8.3598	529.59	8.5148	724.19	8.2936
334.37	10.0349	529.87	0.0000	727.33	4.1522
338.28	11.3228	531.02	7.5745	733.00	5.2024
338.32	10.0649	537.26	8.5496	735.93	5.2087
340.48	8.8211	546.56	0.0000	737.46	5.2120
340.55	8.8216	552.55	9.5756	739.50	6.2598
344.28	5.0549	563.25	3.8514	744.23	5.2264
345.93	12.6529	564.24	10.5967	747.24	6.2795

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	4.1877	962.31	2.2645	1435.80	2.9068
752.31	4.1950	964.08	11.3289	1457.56	0.0000
753.82	4.1974	966.17	7.9357	1460.82	0.9747
756.73	3.1517	968.97	5.6736	1489.16	2.9432
756.80	3.1519	983.53	4.5605	1505.03	3.9387
763.94	8.4290	984.45	0.0000	1584.12	1.0022
765.81	6.3264	996.26	5.7243	1596.21	0.0000
766.84	6.3291	1002.74	2.2944	1620.50	2.0203
772.60	0.0000	1004.73	3.4438	1621.92	1.0104
776.52	4.2357	1021.30	0.0000	1678.03	0.0000
777.92	5.2974	1025.87	0.0000	1690.97	3.0756
778.90	5.2995	1028.54	0.0000	1750.46	0.0000
783.70	3.1857	1037.84	5.8000	1764.49	2.0813
788.74	3.1919	1038.76	0.0000	1770.23	1.0419
792.07	5.3267	1046.59	4.6527	1771.35	1.0421
795.86	3.2008	1048.07	4.6546	1791.20	0.0000
801.95	1.0694	1049.04	1.1640	1808.65	1.0497
810.06	4.2910	1050.41	4.6582	1810.72	0.0000
810.29	4.2913	1063.66	3.5078	1836.06	2.1107
810.45	3.2188	1077.00	4.4025		
810.76	3.2191	1077.34	4.4028		
815.77	1.0751	1085.87	3.5313		
818.51	8.6094	1093.63	3.5396		
832.01	6.4900	1099.45	2.6592		
834.85	2.1656	1112.07	4.4485		
835.71	0.0000	1112.84	3.5598		
836.80	0.0000	1115.54	4.4531		
846.75	0.0000	1120.29	1.7837		
846.77	7.6130	1120.55	1.7839		
856.80	9.8240	1121.30	0.0000		
860.56	4.3722	1129.67	2.6829		
871.09	4.3888	1131.51	0.0000		
873.19	2.1960	1147.95	0.0000		
875.33	0.0000	1173.23	0.9055		
879.38	3.3014	1177.95	3.6267		
880.51	7.7064	1189.05	1.8190		
881.60	1.1013	1204.77	2.7404		
883.24	8.8158	1221.41	2.7530		
884.68	2.2051	1231.02	2.7601		
889.28	7.7303	1235.36	0.0000		
894.76	5.5324	1238.28	0.9218		
898.04	7.7542	1260.41	0.0000		
900.72	3.3263	1271.87	5.5807		
903.28	5.5489	1274.44	2.7922		
911.20	3.3385	1274.54	2.7922		
912.08	5.5658	1291.59	1.8698		
923.98	0.0000	1298.22	0.0000		
926.50	3.3561	1312.11	1.8796		
929.11	4.4787	1332.49	5.6686		
935.54	3.3665	1362.66	0.0000		
937.49	4.4915	1365.19	4.7626		
944.13	4.5016	1368.63	0.0000		
946.00	7.8827	1384.29	1.9139		
949.00	1.1272	1408.01	1.9250		
954.55	0.0000	1434.09	3.8743		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:04:00.78

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041225.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;812
Background date : 6-APR-2025 11:02:03.
Sample date : 7-MAR-2025 10:00:00. Acquisition date : 10-APR-2025 22:03:39
Sample ID : G1206041225 Sample quantity : 1.34450E+02 GRAM
Detector name : GAM29 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.43 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2767517 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.75*	40	184	1.14	93.93	88	10	1.12E-02	66.3	
2	0	63.25*	48	163	0.92	126.92	123	8	1.32E-02	50.0	
3	4	74.69*	180	178	1.27	149.78	143	15	5.01E-02	15.3	1.29E+00
4	4	77.05	254	126	1.08	154.49	143	15	7.05E-02	9.8	
5	0	83.86*	37	120	1.61	168.11	166	6	1.02E-02	50.6	
6	0	87.21	93	118	0.85	174.80	172	6	2.58E-02	21.3	
7	4	89.91	79	77	1.04	180.20	178	12	2.20E-02	19.4	1.20E+00
8	4	92.60*	89	181	1.41	185.57	178	12	2.46E-02	30.3	
9	0	143.71*	18	133	1.24	287.74	284	8	4.94E-03	117.4	
10	0	185.91*	163	195	1.52	372.11	367	12	4.53E-02	19.3	
11	0	209.34	81	97	1.21	418.94	415	9	2.25E-02	24.6	
12	0	215.89	59	163	6.04	432.02	424	17	1.63E-02	51.9	
13	2	238.55*	397	113	1.35	477.34	471	22	1.10E-01	6.9	1.08E+00
14	2	241.80	159	104	1.33	483.83	471	22	4.41E-02	14.0	
15	0	278.51	24	81	0.88	557.21	552	9	6.67E-03	70.6	
16	0	294.85	301	125	1.34	589.88	583	14	8.36E-02	9.8	
17	0	329.73	21	106	2.70	659.60	651	13	5.70E-03	106.2	
18	4	338.15*	102	55	1.97	676.43	670	18	2.83E-02	18.5	2.22E+00
19	4	342.28	22	24	1.98	684.70	670	18	6.06E-03	42.1	
20	0	351.76	484	91	1.56	703.65	697	14	1.34E-01	6.2	
21	0	462.86	32	34	0.93	925.75	921	11	8.90E-03	40.0	
22	0	477.94	47	58	2.92	955.89	948	19	1.29E-02	41.6	
23	0	562.50	15	48	0.53	1124.94	1116	15	4.27E-03	101.9	
24	0	583.02*	122	18	0.96	1165.98	1161	11	3.38E-02	11.8	
25	0	609.11*	356	40	1.82	1218.14	1211	15	9.88E-02	6.7	
26	0	629.11	11	19	1.52	1258.13	1250	11	3.01E-03	83.9	
27	4	658.93	17	1	1.52	1317.74	1315	11	4.65E-03	29.8	2.16E+00
28	4	661.26	45	12	1.37	1322.39	1315	11	1.24E-02	20.4	
29	0	664.81	18	17	1.30	1329.49	1326	9	5.03E-03	48.0	
30	0	677.63	11	19	0.65	1355.12	1351	10	3.15E-03	75.7	
31	0	727.66	39	27	1.40	1455.15	1448	15	1.07E-02	33.2	
32	0	744.23*	17	27	4.08	1488.28	1481	13	4.73E-03	71.2	
33	0	769.14	29	45	1.62	1538.09	1530	10	8.11E-03	46.8	
34	0	785.78*	31	21	4.18	1571.35	1562	17	8.68E-03	38.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	910.59*	94	10	1.86	1820.90	1814	13	2.61E-02	12.9	
36	0	953.10	21	0	2.00	1905.90	1900	12	5.83E-03	21.8	
37	0	965.00*	25	32	3.02	1929.69	1918	16	6.83E-03	55.9	
38	0	968.54	53	7	1.06	1936.78	1933	10	1.48E-02	16.7	
39	0	1103.25	10	2	1.56	2206.14	2201	10	2.71E-03	43.8	
40	0	1119.76	66	14	1.54	2239.14	2234	11	1.83E-02	16.5	
41	0	1132.34*	11	5	0.64	2264.31	2258	12	3.00E-03	55.7	
42	0	1212.00	9	10	0.84	2423.59	2415	10	2.37E-03	77.8	
43	0	1237.51*	26	4	2.29	2474.60	2470	9	7.34E-03	25.0	
44	0	1377.23	37	4	2.62	2754.01	2747	15	1.03E-02	20.0	
45	0	1424.69	11	0	1.06	2848.91	2844	9	3.06E-03	30.2	
46	0	1459.88*	81	0	2.13	2919.29	2913	13	2.24E-02	11.6	
47	0	1508.57	12	6	1.42	3016.66	3011	9	3.40E-03	47.0	
48	0	1587.84	11	2	1.88	3175.19	3171	9	3.09E-03	38.2	
49	0	1763.38*	69	0	2.04	3526.26	3519	13	1.92E-02	12.3	
50	0	1846.39	14	0	1.67	3692.29	3686	11	3.89E-03	26.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 23:04:02

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041225.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : MXR1
Sample date : 7-MAR-2025 10:00:00 Acquisition date : 10-APR-2025 22:03:39
Sample ID : G1206041225 Sample quantity : 134.45 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA29 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.43 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
TL-208	277.37	HG-203	279.20

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	3.364E+00	7.714E-01	1.209E+00	83.20	OK
K-40	1460.82	10.66*	1.291E+00	3.123E+00	3.123E+00	23.14	OK
CD-109	88.03	3.70*	6.265E+00	2.619E+00	2.758E+00	42.65	OK
AG-110	657.50	4.50*	2.606E+00	8.093E-01	8.906E-01	59.57	OK
SN-126	64.28	9.60	3.453E+00	9.602E-01	9.602E-01	99.99	OK
	86.94	8.90	6.265E+00	1.089E+00	1.089E+00	42.65	OK
	87.57	37.00*	6.265E+00	2.619E-01	2.619E-01	42.65	OK
BA-137M	661.66	89.90*	2.599E+00	1.084E-01	1.086E-01	40.82	OK
CS-137	661.66	85.10*	2.599E+00	1.145E-01	1.148E-01	40.82	OK
HG-203	70.83	3.69	4.557E+00	----- Line Not Found		-----	Absent
	72.87	6.19	4.824E+00	----- Line Not Found		-----	Absent
	279.20	81.56*	4.957E+00	1.287E-02	2.151E-02	396.19	OK
TL-208	277.37	6.60	4.970E+00	----- Line Not Found		-----	<<INT Reject
	583.19	85.00*	2.881E+00	2.845E-01	2.845E-01	23.63	OK
	860.56	12.50	2.067E+00	----- Line Not Found		-----	Absent
BI-210	46.54	4.25*	9.964E-01	6.495E+00	6.515E+00	132.67	OK
PB-210	46.54	4.25*	9.964E-01	6.495E+00	6.515E+00	132.67	OK
BI-211	72.87	1.23	4.824E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	4.211E+00	5.285E+00	5.285E+00	12.36	OK
BI-212	727.33	6.67*	2.396E+00	1.363E+00	1.363E+00	66.34	OK
	1620.50	1.47	1.193E+00	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	5.050E+00	2.298E+00	2.298E+00	30.52	OK
	77.11	17.10	5.324E+00	1.840E+00	1.840E+00	19.57	OK
	238.63	43.60*	5.496E+00	1.013E+00	1.013E+00	13.76	OK
	300.09	3.30	4.709E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	2.781E+00	1.605E+00	1.605E+00	13.30	OK
	1120.29	14.92	1.626E+00	1.482E+00	1.482E+00	32.90	OK
	1764.49	15.30	1.130E+00	2.101E+00	2.101E+00	24.63	OK
PB-214	74.82	5.80	5.050E+00	4.073E+00	4.073E+00	30.52	OK
	77.11	9.70	5.324E+00	3.244E+00	3.244E+00	19.57	OK
	87.09	3.41	6.265E+00	2.841E+00	2.841E+00	42.65	OK
	242.00	7.25	5.448E+00	2.453E+00	2.453E+00	27.96	OK
	295.22	18.42	4.766E+00	2.063E+00	2.063E+00	19.57	OK
	351.93	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36	OK
RN-222	609.32	45.49*	2.781E+00	1.605E+00	1.605E+00	13.30	OK
	1120.29	14.92	1.626E+00	1.482E+00	1.482E+00	32.90	OK
	1764.49	15.30	1.130E+00	2.101E+00	2.101E+00	24.63	OK
RA-224	240.99	4.10*	5.448E+00	4.338E+00	4.338E+00	27.96	OK
RA-226	74.82	5.80	5.050E+00	4.073E+00	4.073E+00	30.52	OK
	77.11	9.70	5.324E+00	3.244E+00	3.244E+00	19.57	OK
	87.09	3.41	6.265E+00	2.841E+00	2.841E+00	42.65	OK
	242.00	7.25	5.448E+00	2.453E+00	2.453E+00	27.96	OK
	295.22	18.42	4.766E+00	2.063E+00	2.063E+00	19.57	OK
	351.93	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36	OK
AC-228	105.21	1.10	7.119E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.331E+00	1.243E+00	1.243E+00	37.10	OK
	835.71	1.61	2.122E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.964E+00	1.026E+00	1.026E+00	25.88	OK
	968.97	15.80	1.857E+00	9.981E-01	9.981E-01	33.39	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
RA-228	105.21	1.10	7.119E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.331E+00	1.243E+00	1.243E+00	37.10	OK
	835.71	1.61	2.122E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.964E+00	1.026E+00	1.026E+00	25.88	OK
	968.97	15.80	1.857E+00	9.981E-01	9.981E-01	33.39	OK
TH-228	74.82	10.28	5.050E+00	2.298E+00	2.298E+00	30.52	OK
	77.11	17.10	5.324E+00	1.840E+00	1.840E+00	19.57	OK
	238.63	43.60*	5.496E+00	1.013E+00	1.013E+00	13.76	OK
	300.09	3.30	4.709E+00	----- Line	Not Found	-----	Absent
TH-230	74.82	5.80	5.050E+00	4.073E+00	4.073E+00	30.52	OK
	77.11	9.70	5.324E+00	3.244E+00	3.244E+00	19.57	OK
	87.09	3.41	6.265E+00	2.841E+00	2.841E+00	42.65	OK
	242.00	7.25	5.448E+00	2.453E+00	2.453E+00	27.96	OK
	295.22	18.42	4.766E+00	2.063E+00	2.063E+00	19.57	OK
	351.93	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36	OK
TH-232	105.21	1.10	7.119E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	4.331E+00	1.243E+00	1.243E+00	37.10	OK
	835.71	1.61	2.122E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.964E+00	1.026E+00	1.026E+00	25.88	OK
	968.97	15.80	1.857E+00	9.981E-01	9.981E-01	33.39	OK
PA-234M	63.29	3.70*	3.453E+00	2.491E+00	2.491E+00	99.99	OK
	92.59	4.23	6.616E+00	2.063E+00	2.063E+00	60.56	OK
TH-234	63.29	3.70*	3.453E+00	2.491E+00	2.491E+00	99.99	OK
	92.59	4.23	6.616E+00	2.063E+00	2.063E+00	60.56	OK
U-234	74.82	5.80	5.050E+00	4.073E+00	4.073E+00	30.52	OK
	77.11	9.70	5.324E+00	3.244E+00	3.244E+00	19.57	OK
	87.09	3.41	6.265E+00	2.841E+00	2.841E+00	42.65	OK
	242.00	7.25	5.448E+00	2.453E+00	2.453E+00	27.96	OK
	295.22	18.42	4.766E+00	2.063E+00	2.063E+00	19.57	OK
	351.93	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36	OK
U-235	89.96	3.47	6.453E+00	2.306E+00	2.306E+00	38.87	OK
	93.35	5.60	6.616E+00	1.558E+00	1.558E+00	60.56	OK
	143.76	10.96*	7.129E+00	1.442E-01	1.442E-01	234.77	OK
	163.33	5.08	6.806E+00	----- Line	Not Found	-----	Absent
	185.72	57.20	6.387E+00	2.776E-01	2.776E-01	38.60	OK
	205.31	5.01	6.036E+00	----- Line	Not Found	-----	Absent
U-238	63.29	3.70*	3.453E+00	2.491E+00	2.491E+00	99.99	OK
	92.59	4.23	6.616E+00	2.063E+00	2.063E+00	60.56	OK
AM-243	43.53	5.90	6.496E-01	----- Line	Not Found	-----	Absent
	74.66	67.20*	5.050E+00	3.515E-01	3.516E-01	30.52	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:04:03.11

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041225.CNF;1  *
* Acquisition date : 10-APR-2025 22:03:39 Sensitivity     : 3.000    *
* Detector ID      : GAM29                Energy tolerance: 1.500    *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000   *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****    *
* Sample date      :  7-MAR-2025 10:00:00 Analyst initials: MXR1     *
* Sample ID        : G1206041225          Sample Quantity : 1.3445E+02 GRAM  *
* Batch Number     : 2767517              Wet Weight      :    0.00000  *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000  *
* Nuclide Library  : SOLID.NLB;18                                    *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 29-JUL-2024 09:02:37 Eff. Geometry   : CAN      *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;19     *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.209E+00	9.861E-01	5.910E-01
K-40	3.123E+00	7.080E-01	2.983E-01
CD-109	2.758E+00	1.153E+00	1.146E+00
AG-110	8.906E-01	5.200E-01	9.045E-01
SN-126	2.619E-01	1.094E-01	1.094E-01
BA-137M	1.086E-01	4.346E-02	5.162E-02
CS-137	1.148E-01	4.592E-02	5.453E-02
HG-203	2.151E-02	8.351E-02	8.425E-02
TL-208	2.845E-01	6.588E-02	6.085E-02
BI-210	6.515E+00	8.470E+00	6.618E+00
PB-210	6.515E+00	8.470E+00	6.618E+00
BI-211	5.285E+00	6.402E-01	3.446E-01
BI-212	1.363E+00	8.858E-01	8.617E-01
PB-212	1.013E+00	1.366E-01	1.032E-01
BI-214	1.605E+00	2.093E-01	1.047E-01
PB-214	1.918E+00	2.324E-01	1.253E-01
RN-222	1.605E+00	2.093E-01	1.047E-01
RA-224	4.338E+00	1.189E+00	1.106E+00
RA-226	1.918E+00	2.324E-01	1.253E-01
AC-228	1.026E+00	2.602E-01	2.224E-01
RA-228	1.026E+00	2.602E-01	2.224E-01
TH-228	1.013E+00	1.366E-01	1.032E-01
TH-230	1.918E+00	2.323E-01	1.253E-01
TH-232	1.026E+00	2.602E-01	2.224E-01
PA-234M	2.491E+00	2.441E+00	2.299E+00
TH-234	2.491E+00	2.441E+00	2.299E+00
U-234	1.918E+00	2.323E-01	1.253E-01
U-235	1.442E-01	3.317E-01	3.192E-01
U-238	2.491E+00	2.441E+00	2.299E+00
AM-243	3.516E-01	1.052E-01	8.657E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)

NA-22	-1.105E-02	3.414E-02	6.495E-02	NOT IDENT.
NA-24	0.000E+00	1.187E+15	0.000E+00	SHORT HLIF
AL-26	1.216E-02	2.945E-02	6.874E-02	NOT IDENT.
SC-46	-2.902E-02	3.888E-02	6.309E-02	FAIL ABUN
V-48	-4.426E-02	1.192E-01	2.302E-01	NOT IDENT.
CR-51	-1.583E-01	5.466E-01	1.029E+00	NOT IDENT.
MN-52	6.436E-01	2.078E+00	4.640E+00	FAIL ABUN
MN-54	2.190E-02	3.347E-02	6.926E-02	NOT IDENT.
CO-56	-4.694E-03	3.881E-02	7.234E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	9.034E-03	2.499E-02	4.680E-02	NOT IDENT.
CO-58	-6.894E-03	3.283E-02	6.148E-02	NOT IDENT.
FE-59	-1.585E-02	7.145E-02	1.269E-01	NOT IDENT.
CO-60	3.788E-02	3.776E-02	8.699E-02	NOT IDENT.
ZN-65	-1.426E-02	7.564E-02	1.295E-01	NOT IDENT.
GE-68	9.991E-01	1.087E+00	2.480E+00	NOT IDENT.
AS-73	1.035E-01	9.600E-01	1.838E+00	NOT IDENT.
AS-74	-5.358E-02	1.739E-01	3.174E-01	NOT IDENT.
SE-75	-1.475E-02	3.959E-02	7.515E-02	FAIL ABUN
BR-77	0.000E+00	6.081E+03	0.000E+00	SHORT HLIF
SR-82	3.678E-01	4.293E-01	9.450E-01	NOT IDENT.
RB-83	2.069E-02	6.071E-02	1.243E-01	NOT IDENT.
RB-84	-4.001E-02	8.027E-02	1.388E-01	NOT IDENT.
KR-85	-1.945E+01	8.105E+00	1.139E+01	NOT IDENT.
SR-85	-1.264E-01	5.266E-02	7.402E-02	NOT IDENT.
RB-86	9.410E-01	1.375E+00	3.032E+00	NOT IDENT.
Y-88	1.195E-03	3.248E-02	7.157E-02	NOT IDENT.
Y-91	3.482E+00	1.872E+01	3.575E+01	NOT IDENT.
NB-94	3.077E-02	2.653E-02	5.896E-02	NOT IDENT.
NB-95	1.407E-02	6.291E-02	1.065E-01	NOT IDENT.
NB-95M	-2.094E-02	1.692E-01	2.678E-01	NOT IDENT.
ZR-95	-1.141E-02	7.434E-02	1.380E-01	NOT IDENT.
NB-97	0.000E+00	5.838E+40	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.765E+14	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.578E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	7.091E+39	0.000E+00	SHORT HLIF
RH-101	-5.479E-03	3.193E-02	5.703E-02	NOT IDENT.
RH-102	-4.589E-02	4.865E-02	6.549E-02	NOT IDENT.
RU-103	-3.732E-02	4.664E-02	8.043E-02	FAIL ABUN
RH-106	-1.579E-01	2.818E-01	4.649E-01	NOT IDENT.
RU-106	-1.579E-01	2.818E-01	4.649E-01	NOT IDENT.
AG-108M	-1.127E-02	2.548E-02	4.666E-02	NOT IDENT.
AG-110M	1.927E-02	4.228E-02	8.743E-02	FAIL ABUN
SN-113	5.351E-03	4.090E-02	8.043E-02	NOT IDENT.
CD-115	0.000E+00	4.425E+03	0.000E+00	SHORT HLIF
SN-117M	-1.148E-01	1.390E-01	2.319E-01	NOT IDENT.
SB-122	0.000E+00	2.815E+02	0.000E+00	SHORT HLIF
TE-123M	-2.557E-02	2.985E-02	4.963E-02	NOT IDENT.
SB-124	7.668E-02	9.004E-02	2.281E-01	NOT IDENT.
SB-125	6.462E-03	7.601E-02	1.485E-01	FAIL ABUN
TE-125M	9.469E+00	1.106E+01	2.159E+01	NOT IDENT.
I-126	2.450E-01	5.350E-01	1.002E+00	NOT IDENT.
SB-126	1.813E-01	3.236E-01	6.779E-01	NOT IDENT.
SB-127	2.665E+01	2.903E+01	6.573E+01	NOT IDENT.
I-131	1.184E-01	5.380E-01	1.062E+00	NOT IDENT.
I-132	0.000E+00	1.037E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.496E+01	0.000E+00	SHORT HLIF
BA-133	2.524E-02	3.779E-02	7.178E-02	NOT IDENT.
I-133	0.000E+00	3.127E+10	0.000E+00	SHORT HLIF
CS-134	-3.429E-02	3.875E-02	6.228E-02	FAIL ABUN
I-135	0.000E+00	7.898E+36	0.000E+00	SHORT HLIF
CS-136	-8.899E-03	2.680E-01	5.313E-01	NOT IDENT.
LA-138	1.738E-02	4.840E-02	1.066E-01	NOT IDENT.
CE-139	1.728E-02	3.009E-02	5.657E-02	NOT IDENT.
BA-140	-4.787E-02	7.190E-01	1.356E+00	NOT IDENT.
LA-140	-8.203E-02	1.718E-01	3.187E-01	FAIL ABUN
CE-141	-2.384E-03	8.938E-02	1.486E-01	NOT IDENT.
CE-143	0.000E+00	2.315E+06	0.000E+00	SHORT HLIF
CE-144	-2.488E-02	1.857E-01	3.337E-01	NOT IDENT.
PM-144	1.220E-02	2.830E-02	5.753E-02	FAIL ABUN
PR-144	9.443E-01	2.143E+00	4.361E+00	NOT IDENT.
PM-146	-5.991E-03	3.576E-02	6.763E-02	NOT IDENT.
ND-147	-1.818E+00	1.821E+00	3.032E+00	FAIL ABUN
PM-147	-4.083E+02	7.359E+02	1.281E+03	NOT IDENT.
PM-149	0.000E+00	3.257E+04	0.000E+00	SHORT HLIF
EU-150	-5.470E-03	3.137E-02	4.209E-02	FAIL ABUN
EU-152	-9.169E-03	8.681E-02	1.498E-01	FAIL ABUN
GD-153	-3.293E-02	7.779E-02	1.381E-01	NOT IDENT.

EU-154	-3.100E-02	9.578E-02	1.822E-01	NOT IDENT.
EU-155	-7.243E-03	9.242E-02	1.691E-01	FAIL ABUN
TB-160	5.547E-02	1.217E-01	2.546E-01	FAIL ABUN
HO-166M	-1.295E-02	5.328E-02	9.720E-02	NOT IDENT.
TM-171	1.298E+00	1.753E+01	3.352E+01	NOT IDENT.
HF-172	3.304E-02	1.841E-01	3.389E-01	FAIL ABUN
LU-172	5.525E-03	4.168E-02	8.942E-02	FAIL ABUN
LU-176	5.617E-03	2.281E-02	4.525E-02	FAIL ABUN
HF-181	-3.461E-02	6.218E-02	9.669E-02	NOT IDENT.
TA-182	1.018E-01	1.505E-01	3.374E-01	NOT IDENT.
RE-183	-9.041E-04	2.275E-01	4.298E-01	NOT IDENT.
RE-184	1.198E-01	1.367E-01	3.058E-01	NOT IDENT.
W-188	5.332E+00	6.950E+00	1.355E+01	FAIL ABUN
IR-192	-5.465E-03	3.544E-02	6.791E-02	FAIL ABUN
TL-204	-3.604E+00	4.896E+00	7.917E+00	FAIL ABUN
BI-207	-7.632E-03	4.834E-02	1.047E-01	FAIL ABUN
PB-211	-6.499E-02	6.549E-01	1.242E+00	NOT IDENT.
BI-213	-5.634E-02	9.088E-02	1.625E-01	NOT IDENT.
RN-219	-7.481E-02	3.542E-01	6.670E-01	NOT IDENT.
RA-223	-9.781E-02	6.674E-01	1.137E+00	FAIL ABUN
AC-225	5.509E-01	2.297E+00	3.842E+00	NOT IDENT.
AC-227	-1.390E-01	2.231E-01	4.134E-01	NOT IDENT.
TH-227	-1.390E-01	2.231E-01	4.134E-01	NOT IDENT.
TH-229	-4.189E-01	5.298E-01	8.736E-01	FAIL ABUN
PA-231	1.176E-01	3.954E-01	7.883E-01	NOT IDENT.
TH-231	-9.781E-02	6.674E-01	1.137E+00	FAIL ABUN
PA-233	-2.671E-02	5.042E-02	9.354E-02	NOT IDENT.
PA-234	-1.572E-01	2.336E-01	3.826E-01	NOT IDENT.
NP-237	-2.671E-02	5.042E-02	9.354E-02	NOT IDENT.
NP-238	0.000E+00	8.644E+03	0.000E+00	SHORT HLIF
NP-239	-9.398E-02	2.491E-01	4.412E-01	FAIL ABUN
PU-239	1.730E+02	3.305E+02	6.209E+02	NOT IDENT.
AM-241	1.469E-01	1.524E-01	2.876E-01	NOT IDENT.
CM-243	4.270E-02	9.058E-02	1.735E-01	FAIL ABUN
BK-247	-2.502E-02	6.358E-02	1.205E-01	FAIL ABUN
CM-247	9.097E-03	3.179E-02	6.310E-02	FAIL ABUN
CF-249	2.127E-02	3.633E-02	7.362E-02	NOT IDENT.
CF-251	-5.073E-02	1.194E-01	2.053E-01	NOT IDENT.
ANH-511	-2.672E-02	4.555E-02	9.614E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:04:01.61

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	49	10.44*	3.364E+00	7.714E-01	1.209E+00	83.20
K-40	1460.82	77	10.66*	1.291E+00	3.123E+00	3.123E+00	23.14
CD-109	88.03	109	3.70*	6.265E+00	2.619E+00	2.758E+00	42.65
AG-110	657.50	17	4.50*	2.606E+00	8.093E-01	8.906E-01	59.57
SN-126	64.28	57	9.60	3.453E+00	9.602E-01	9.602E-01	99.99
	86.94	109	8.90	6.265E+00	1.089E+00	1.089E+00	42.65
	87.57	109	37.00*	6.265E+00	2.619E-01	2.619E-01	42.65
BA-137M	661.66	45	89.90*	2.599E+00	1.084E-01	1.086E-01	40.82
CS-137	661.66	45	85.10*	2.599E+00	1.145E-01	1.148E-01	40.82
HG-203	70.83	------	3.69	4.557E+00	------ Line Not Found		------
	72.87	------	6.19	4.824E+00	------ Line Not Found		------
	279.20	26	81.56*	4.957E+00	3.589E-02	5.999E-02	141.24
TL-208	277.37	26	6.60	4.957E+00	4.436E-01	4.436E-01	141.24
	583.19	125	85.00*	2.881E+00	2.845E-01	2.845E-01	23.63
	860.56	------	12.50	2.067E+00	------ Line Not Found		------
BI-210	46.54	49	4.25*	9.964E-01	6.495E+00	6.515E+00	132.67
PB-210	46.54	49	4.25*	9.964E-01	6.495E+00	6.515E+00	132.67
BI-211	72.87	------	1.23	4.824E+00	------ Line Not Found		------
	351.06	515	12.92*	4.211E+00	5.285E+00	5.285E+00	12.36
BI-212	727.33	39	6.67*	2.396E+00	1.363E+00	1.363E+00	66.34
	1620.50	------	1.47	1.193E+00	------ Line Not Found		------
PB-212	74.82	214	10.28	5.050E+00	2.298E+00	2.298E+00	30.52
	77.11	300	17.10	5.324E+00	1.840E+00	1.840E+00	19.57
	238.63	435	43.60*	5.496E+00	1.013E+00	1.013E+00	13.76
	300.09	------	3.30	4.709E+00	------ Line Not Found		------
BI-214	609.32	364	45.49*	2.781E+00	1.605E+00	1.605E+00	13.30
	1120.29	64	14.92	1.626E+00	1.482E+00	1.482E+00	32.90
	1764.49	65	15.30	1.130E+00	2.101E+00	2.101E+00	24.63
PB-214	74.82	214	5.80	5.050E+00	4.073E+00	4.073E+00	30.52
	77.11	300	9.70	5.324E+00	3.244E+00	3.244E+00	19.57
	87.09	109	3.41	6.265E+00	2.841E+00	2.841E+00	42.65
	242.00	174	7.25	5.448E+00	2.453E+00	2.453E+00	27.96
	295.22	324	18.42	4.766E+00	2.063E+00	2.063E+00	19.57
	351.93	515	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36
RN-222	609.32	364	45.49*	2.781E+00	1.605E+00	1.605E+00	13.30
	1120.29	64	14.92	1.626E+00	1.482E+00	1.482E+00	32.90
	1764.49	65	15.30	1.130E+00	2.101E+00	2.101E+00	24.63
RA-224	240.99	174	4.10*	5.448E+00	4.338E+00	4.338E+00	27.96
RA-226	74.82	214	5.80	5.050E+00	4.073E+00	4.073E+00	30.52
	77.11	300	9.70	5.324E+00	3.244E+00	3.244E+00	19.57
	87.09	109	3.41	6.265E+00	2.841E+00	2.841E+00	42.65
	242.00	174	7.25	5.448E+00	2.453E+00	2.453E+00	27.96
	295.22	324	18.42	4.766E+00	2.063E+00	2.063E+00	19.57
	351.93	515	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36
AC-228	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	109	11.27	4.331E+00	1.243E+00	1.243E+00	37.10
	835.71	------	1.61	2.122E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	93	25.80*	1.964E+00	1.026E+00	1.026E+00	25.88
	968.97	52	15.80	1.857E+00	9.981E-01	9.981E-01	33.39
RA-228	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	109	11.27	4.331E+00	1.243E+00	1.243E+00	37.10
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	93	25.80*	1.964E+00	1.026E+00	1.026E+00	25.88
	968.97	52	15.80	1.857E+00	9.981E-01	9.981E-01	33.39
TH-228	74.82	214	10.28	5.050E+00	2.298E+00	2.298E+00	30.52
	77.11	300	17.10	5.324E+00	1.840E+00	1.840E+00	19.57
	238.63	435	43.60*	5.496E+00	1.013E+00	1.013E+00	13.76
	300.09	------	3.30	4.709E+00	------ Line Not Found		------
TH-230	74.82	214	5.80	5.050E+00	4.073E+00	4.073E+00	30.52
	77.11	300	9.70	5.324E+00	3.244E+00	3.244E+00	19.57
	87.09	109	3.41	6.265E+00	2.841E+00	2.841E+00	42.65
	242.00	174	7.25	5.448E+00	2.453E+00	2.453E+00	27.96
	295.22	324	18.42	4.766E+00	2.063E+00	2.063E+00	19.57
	351.93	515	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36
TH-232	105.21	------	1.10	7.119E+00	------ Line Not Found		------
	338.32	109	11.27	4.331E+00	1.243E+00	1.243E+00	37.10
	835.71	------	1.61	2.122E+00	------ Line Not Found		------
	911.20	93	25.80*	1.964E+00	1.026E+00	1.026E+00	25.88
	968.97	52	15.80	1.857E+00	9.981E-01	9.981E-01	33.39
PA-234M	63.29	57	3.70*	3.453E+00	2.491E+00	2.491E+00	99.99
	92.59	103	4.23	6.616E+00	2.063E+00	2.063E+00	60.56
TH-234	63.29	57	3.70*	3.453E+00	2.491E+00	2.491E+00	99.99
	92.59	103	4.23	6.616E+00	2.063E+00	2.063E+00	60.56
U-234	74.82	214	5.80	5.050E+00	4.073E+00	4.073E+00	30.52
	77.11	300	9.70	5.324E+00	3.244E+00	3.244E+00	19.57
	87.09	109	3.41	6.265E+00	2.841E+00	2.841E+00	42.65
	242.00	174	7.25	5.448E+00	2.453E+00	2.453E+00	27.96
	295.22	324	18.42	4.766E+00	2.063E+00	2.063E+00	19.57
	351.93	515	35.60*	4.211E+00	1.918E+00	1.918E+00	12.36
U-235	89.96	92	3.47	6.453E+00	2.306E+00	2.306E+00	38.87
	93.35	103	5.60	6.616E+00	1.558E+00	1.558E+00	60.56
	143.76	20	10.96*	7.129E+00	1.442E-01	1.442E-01	234.77
	163.33	------	5.08	6.806E+00	------ Line Not Found		------
	185.72	182	57.20	6.387E+00	2.776E-01	2.776E-01	38.60
	205.31	------	5.01	6.036E+00	------ Line Not Found		------
U-238	63.29	57	3.70*	3.453E+00	2.491E+00	2.491E+00	99.99
	92.59	103	4.23	6.616E+00	2.063E+00	2.063E+00	60.56
AM-243	43.53	------	5.90	6.496E-01	------ Line Not Found		------
	74.66	214	67.20*	5.050E+00	3.515E-01	3.516E-01	30.52

Flag: "*" = Keyline

Sample ID : G1206041225 Acquisition date : 10-APR-2025 22:03:39

Total number of lines in spectrum 50
Number of unidentified lines 11
Number of lines tentatively identified by NID 39 78.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	1.57	7.714E-01	1.209E+00	1.006E+00	83.20	
K-40	1.25E+09Y	1.00	3.123E+00	3.123E+00	0.722E+00	23.14	
CD-109	461.40D	1.05	2.619E+00	2.758E+00	1.176E+00	42.65	
AG-110	249.76D	1.10	8.093E-01	8.906E-01	5.306E-01	59.57	
SN-126	2.30E+05Y	1.00	2.619E-01	2.619E-01	1.117E-01	42.65	
BA-137M	30.08Y	1.00	1.084E-01	1.086E-01	0.444E-01	40.82	
CS-137	30.08Y	1.00	1.145E-01	1.148E-01	0.469E-01	40.82	
HG-203	46.59D	1.67	3.589E-02	5.999E-02	8.473E-02	141.24	
TL-208	1.41E+10Y	1.00	2.845E-01	2.845E-01	0.672E-01	23.63	
BI-210	22.20Y	1.00	6.495E+00	6.515E+00	8.643E+00	132.67	
PB-210	22.20Y	1.00	6.495E+00	6.515E+00	8.643E+00	132.67	
BI-211	7.04E+08Y	1.00	5.285E+00	5.285E+00	0.653E+00	12.36	
BI-212	1.41E+10Y	1.00	1.363E+00	1.363E+00	0.904E+00	66.34	
PB-212	1.41E+10Y	1.00	1.013E+00	1.013E+00	0.139E+00	13.76	
BI-214	1600.00Y	1.00	1.605E+00	1.605E+00	0.214E+00	13.30	
PB-214	1600.00Y	1.00	1.918E+00	1.918E+00	0.237E+00	12.36	
RN-222	1600.00Y	1.00	1.605E+00	1.605E+00	0.214E+00	13.30	
RA-224	1.41E+10Y	1.00	4.338E+00	4.338E+00	1.213E+00	27.96	
RA-226	1600.00Y	1.00	1.918E+00	1.918E+00	0.237E+00	12.36	
AC-228	1.41E+10Y	1.00	1.026E+00	1.026E+00	0.266E+00	25.88	
RA-228	1.41E+10Y	1.00	1.026E+00	1.026E+00	0.266E+00	25.88	
TH-228	1.41E+10Y	1.00	1.013E+00	1.013E+00	0.139E+00	13.76	
TH-230	7.54E+04Y	1.00	1.918E+00	1.918E+00	0.237E+00	12.36	
TH-232	1.41E+10Y	1.00	1.026E+00	1.026E+00	0.266E+00	25.88	
PA-234M	4.47E+09Y	1.00	2.491E+00	2.491E+00	2.491E+00	99.99	
TH-234	4.47E+09Y	1.00	2.491E+00	2.491E+00	2.491E+00	99.99	
U-234	2.45E+05Y	1.00	1.918E+00	1.918E+00	0.237E+00	12.36	
U-235	7.04E+08Y	1.00	1.442E-01	1.442E-01	3.384E-01	234.77	
U-238	4.47E+09Y	1.00	2.491E+00	2.491E+00	2.491E+00	99.99	
AM-243	7370.00Y	1.00	3.515E-01	3.516E-01	1.073E-01	30.52	
	Total Activity :		5.606E+01	5.678E+01			
	Grand Total Activity :		5.606E+01	5.678E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	83.86	43	140	1.61	168.11	166	6	1.02E-02	****	6.00E+00	T
0	209.34	89	107	1.21	418.94	415	9	2.25E-02	49.1	5.97E+00	
0	215.89	65	180	6.04	432.02	424	17	1.63E-02	****	5.86E+00	T
0	329.73	22	114	2.70	659.60	651	13	5.70E-03	****	4.41E+00	T
4	342.28	23	26	1.98	684.70	670	18	6.06E-03	84.3	4.29E+00	
0	462.86	33	35	0.93	925.75	921	11	8.90E-03	80.1	3.45E+00	T
0	562.50	16	49	0.53	1124.94	1116	15	4.27E-03	****	2.96E+00	T
0	629.11	11	20	1.52	1258.13	1250	11	3.01E-03	****	2.71E+00	T
0	664.81	18	17	1.30	1329.49	1326	9	5.03E-03	96.0	2.59E+00	T
0	677.63	12	19	0.65	1355.12	1351	10	3.15E-03	****	2.55E+00	T
0	744.23	17	27	4.08	1488.28	1481	13	4.73E-03	****	2.35E+00	T
0	769.14	29	45	1.62	1538.09	1530	10	8.11E-03	93.5	2.28E+00	
0	785.78	31	21	4.18	1571.35	1562	17	8.68E-03	77.3	2.24E+00	
0	953.10	21	0	2.00	1905.90	1900	12	5.83E-03	43.6	1.88E+00	T
0	965.00	24	32	3.02	1929.69	1918	16	6.83E-03	****	1.86E+00	T
0	1103.25	10	2	1.56	2206.14	2201	10	2.71E-03	87.6	1.65E+00	
0	1132.34	11	5	0.64	2264.31	2258	12	3.00E-03	****	1.61E+00	T
0	1212.00	8	10	0.84	2423.59	2415	10	2.37E-03	****	1.51E+00	
0	1237.51	26	4	2.29	2474.60	2470	9	7.34E-03	50.0	1.49E+00	T
0	1377.23	36	4	2.62	2754.01	2747	15	1.03E-02	40.0	1.35E+00	
0	1424.69	11	0	1.06	2848.91	2844	9	3.06E-03	60.3	1.32E+00	
0	1508.57	12	5	1.42	3016.66	3011	9	3.40E-03	94.1	1.26E+00	
0	1587.84	11	2	1.88	3175.19	3171	9	3.09E-03	76.5	1.21E+00	
0	1846.39	13	0	1.67	3692.29	3686	11	3.89E-03	53.5	1.10E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:04:12.83

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041225.CNF;1  *
* Acquisition date : 10-APR-2025 22:03:39 Sensitivity     : 3.000       *
* Detector ID      : GAM29                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****       *
* Sample date      :  7-MAR-2025 10:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1206041225          Analyst initials: MXR1        *
* Batch Number     : 2767517              Sample Quantity : 1.3445E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 29-JUL-2024 09:02:37 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;19        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	2.611E-01
K-40	9.408E-02
CD-109	5.376E-01
AG-110	3.804E-01
SN-126	5.130E-02
BA-137M	2.252E-02
CS-137	2.379E-02
HG-203	3.891E-02
TL-208	2.729E-02
BI-210	3.115E+00
PB-210	3.115E+00
BI-211	1.581E-01
BI-212	3.830E-01
PB-212	4.837E-02
BI-214	4.628E-02
PB-214	5.749E-02
RN-222	4.628E-02
RA-224	5.181E-01
RA-226	5.749E-02
AC-228	9.618E-02
RA-228	9.618E-02
TH-228	4.837E-02
TH-230	5.749E-02
TH-232	9.618E-02
PA-234M	1.087E+00
TH-234	1.087E+00
U-234	5.749E-02
U-235	1.496E-01
U-238	1.087E+00
AM-243	4.095E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-22	2.710E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	2.759E-02	NOT IDENT.
SC-46	2.649E-02	FAIL ABUN
V-48	9.647E-02	NOT IDENT.
CR-51	4.735E-01	NOT IDENT.
MN-52	1.902E+00	FAIL ABUN
MN-54	3.075E-02	NOT IDENT.
CO-56	3.120E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.203E-02	NOT IDENT.
CO-58	2.580E-02	NOT IDENT.
FE-59	4.950E-02	NOT IDENT.
CO-60	3.800E-02	NOT IDENT.
ZN-65	5.458E-02	NOT IDENT.
GE-68	1.087E+00	NOT IDENT.
AS-73	8.648E-01	NOT IDENT.
AS-74	1.410E-01	NOT IDENT.
SE-75	3.444E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	4.150E-01	NOT IDENT.
RB-83	5.499E-02	NOT IDENT.
RB-84	5.804E-02	NOT IDENT.
KR-85	5.137E+00	NOT IDENT.
SR-85	3.337E-02	NOT IDENT.
RB-86	1.327E+00	NOT IDENT.
Y-88	2.718E-02	NOT IDENT.
Y-91	1.499E+01	NOT IDENT.
NB-94	2.638E-02	NOT IDENT.
NB-95	4.842E-02	NOT IDENT.
NB-95M	1.257E-01	NOT IDENT.
ZR-95	6.017E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.690E-02	NOT IDENT.
RH-102	2.758E-02	NOT IDENT.
RU-103	3.545E-02	FAIL ABUN
RH-106	2.023E-01	NOT IDENT.
RU-106	2.023E-01	NOT IDENT.
AG-108M	2.097E-02	NOT IDENT.
AG-110M	3.799E-02	FAIL ABUN
SN-113	3.646E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.083E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.316E-02	NOT IDENT.
SB-124	9.371E-02	NOT IDENT.
SB-125	6.700E-02	FAIL ABUN
TE-125M	1.018E+01	NOT IDENT.
I-126	4.434E-01	NOT IDENT.
SB-126	2.981E-01	NOT IDENT.
SB-127	2.874E+01	NOT IDENT.
I-131	4.858E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.289E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.698E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.318E-01	NOT IDENT.
LA-138	4.447E-02	NOT IDENT.
CE-139	2.657E-02	NOT IDENT.
BA-140	6.109E-01	NOT IDENT.
LA-140	1.164E-01	FAIL ABUN
CE-141	6.954E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.562E-01	NOT IDENT.
PM-144	2.547E-02	FAIL ABUN
PR-144	1.931E+00	NOT IDENT.
PM-146	3.038E-02	NOT IDENT.
ND-147	1.349E+00	FAIL ABUN
PM-147	6.016E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.920E-02	FAIL ABUN
EU-152	6.807E-02	FAIL ABUN
GD-153	6.469E-02	NOT IDENT.
EU-154	7.604E-02	NOT IDENT.

EU-155	7.925E-02	FAIL ABUN
TB-160	1.099E-01	FAIL ABUN
HO-166M	4.281E-02	NOT IDENT.
TM-171	1.576E+01	NOT IDENT.
HF-172	1.596E-01	FAIL ABUN
LU-172	3.719E-02	FAIL ABUN
LU-176	2.084E-02	FAIL ABUN
HF-181	4.331E-02	NOT IDENT.
TA-182	1.457E-01	NOT IDENT.
RE-183	2.025E-01	NOT IDENT.
RE-184	1.330E-01	NOT IDENT.
W-188	6.209E+00	FAIL ABUN
IR-192	3.110E-02	FAIL ABUN
TL-204	3.734E+00	FAIL ABUN
BI-207	4.637E-02	FAIL ABUN
PB-211	5.675E-01	NOT IDENT.
BI-213	7.292E-02	NOT IDENT.
RN-219	3.029E-01	NOT IDENT.
RA-223	5.248E-01	FAIL ABUN
AC-225	1.792E+00	NOT IDENT.
AC-227	1.911E-01	NOT IDENT.
TH-227	1.911E-01	NOT IDENT.
TH-229	4.085E-01	FAIL ABUN
PA-231	3.633E-01	NOT IDENT.
TH-231	5.248E-01	FAIL ABUN
PA-233	4.237E-02	NOT IDENT.
PA-234	1.578E-01	NOT IDENT.
NP-237	4.237E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.070E-01	FAIL ABUN
PU-239	2.934E+02	NOT IDENT.
AM-241	1.361E-01	NOT IDENT.
CM-243	8.142E-02	FAIL ABUN
BK-247	5.518E-02	FAIL ABUN
CM-247	2.875E-02	FAIL ABUN
CF-249	3.383E-02	NOT IDENT.
CF-251	9.577E-02	NOT IDENT.
ANH-511	4.568E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 23:04:16.80

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041225.CNF;1  *
* Acquisition date : 10-APR-2025 22:03:39 Sensitivity     : 3.000       *
* Detector ID      : GAM29                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.43     Half life ratio : *****       *
* Sample date      :  7-MAR-2025 10:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1206041225          Analyst initials: MXR1        *
* Batch Number     : 2767517              Sample Quantity : 1.3445E+02 GRAM  *
*                                         Quantity Err(%) : 1.4875E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 29-JUL-2024 09:02:37 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;19        *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.209E+00	9.917E-01	9.917E-01
K-40	3.123E+00	7.629E-01	7.629E-01
CD-109	2.758E+00	1.184E+00	1.184E+00
AG-110	8.906E-01	5.260E-01	5.260E-01
SN-126	2.619E-01	1.115E-01	1.115E-01
BA-137M	1.086E-01	4.453E-02	4.453E-02
CS-137	1.148E-01	4.704E-02	4.704E-02
HG-203	2.151E-02	8.372E-02	8.372E-02
TL-208	2.845E-01	7.064E-02	7.064E-02
BI-210	6.515E+00	8.494E+00	8.494E+00
PB-210	6.515E+00	8.494E+00	8.494E+00
BI-211	5.285E+00	7.731E-01	7.731E-01
BI-212	1.363E+00	8.961E-01	8.961E-01
PB-212	1.013E+00	1.593E-01	1.593E-01
BI-214	1.605E+00	2.540E-01	2.540E-01
PB-214	1.918E+00	2.788E-01	2.788E-01
RN-222	1.605E+00	2.540E-01	2.540E-01
RA-224	4.338E+00	1.240E+00	1.240E+00
RA-226	1.918E+00	2.788E-01	2.788E-01
AC-228	1.026E+00	2.866E-01	2.866E-01
RA-228	1.026E+00	2.866E-01	2.866E-01
TH-228	1.013E+00	1.593E-01	1.593E-01
TH-230	1.918E+00	2.788E-01	2.788E-01
TH-232	1.026E+00	2.866E-01	2.866E-01
PA-234M	2.491E+00	2.504E+00	2.504E+00
TH-234	2.491E+00	2.504E+00	2.504E+00
U-234	1.918E+00	2.788E-01	2.788E-01
U-235	1.442E-01	3.318E-01	3.318E-01
U-238	2.491E+00	2.504E+00	2.504E+00
AM-243	3.516E-01	1.084E-01	1.084E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)

NA-22	-1.105E-02	3.415E-02	3.452E-02	NOT IDENT.
NA-24	-5.840E+14	1.189E+15	1.217E+15	SHORT HLIF
AL-26	1.216E-02	2.946E-02	2.997E-02	NOT IDENT.
SC-46	-2.902E-02	3.902E-02	4.115E-02	FAIL ABUN
V-48	-4.426E-02	1.193E-01	1.210E-01	NOT IDENT.
CR-51	-1.583E-01	5.467E-01	5.514E-01	NOT IDENT.
MN-52	6.436E-01	2.079E+00	2.099E+00	FAIL ABUN
MN-54	2.190E-02	3.355E-02	3.497E-02	NOT IDENT.
CO-56	-4.694E-03	3.881E-02	3.887E-02	FAIL ABUN
MN-56	-1.000E+41	8.538E+41	0.000E+00	SHORT HLIF
CO-57	9.034E-03	2.500E-02	2.533E-02	NOT IDENT.
CO-58	-6.894E-03	3.283E-02	3.298E-02	NOT IDENT.
FE-59	-1.585E-02	7.148E-02	7.184E-02	NOT IDENT.
CO-60	3.788E-02	3.790E-02	4.157E-02	NOT IDENT.
ZN-65	-1.426E-02	7.565E-02	7.592E-02	NOT IDENT.
GE-68	9.991E-01	1.092E+00	1.181E+00	NOT IDENT.
AS-73	1.035E-01	9.603E-01	9.614E-01	NOT IDENT.
AS-74	-5.358E-02	1.740E-01	1.757E-01	NOT IDENT.
SE-75	-1.475E-02	3.961E-02	4.016E-02	FAIL ABUN
BR-77	4.510E+04	4.548E+04	4.982E+04	SHORT HLIF
SR-82	3.678E-01	4.309E-01	4.617E-01	NOT IDENT.
RB-83	2.069E-02	6.080E-02	6.151E-02	NOT IDENT.
RB-84	-4.001E-02	8.040E-02	8.240E-02	NOT IDENT.
KR-85	-1.945E+01	8.283E+00	1.206E+01	NOT IDENT.
SR-85	-1.264E-01	5.383E-02	7.840E-02	NOT IDENT.
RB-86	9.410E-01	1.378E+00	1.442E+00	NOT IDENT.
Y-88	1.195E-03	3.248E-02	3.248E-02	NOT IDENT.
Y-91	3.482E+00	1.872E+01	1.879E+01	NOT IDENT.
NB-94	3.077E-02	2.669E-02	3.008E-02	NOT IDENT.
NB-95	1.407E-02	6.292E-02	6.324E-02	NOT IDENT.
NB-95M	-2.094E-02	1.692E-01	1.695E-01	NOT IDENT.
ZR-95	-1.141E-02	7.435E-02	7.453E-02	NOT IDENT.
NB-97	1.000E+41	5.906E+40	0.000E+00	SHORT HLIF
ZR-97	-7.208E+14	3.818E+14	5.014E+14	SHORT HLIF
MO-99	4.516E+02	1.578E+03	1.591E+03	SHORT HLIF
TC-99M	7.728E+38	7.092E+39	0.000E+00	SHORT HLIF
RH-101	-5.479E-03	3.195E-02	3.205E-02	NOT IDENT.
RH-102	-4.589E-02	4.893E-02	5.312E-02	NOT IDENT.
RU-103	-3.732E-02	4.676E-02	4.969E-02	FAIL ABUN
RH-106	-1.579E-01	2.822E-01	2.910E-01	NOT IDENT.
RU-106	-1.579E-01	2.822E-01	2.910E-01	NOT IDENT.
AG-108M	-1.127E-02	2.550E-02	2.600E-02	NOT IDENT.
AG-110M	1.927E-02	4.234E-02	4.322E-02	FAIL ABUN
SN-113	5.351E-03	4.090E-02	4.098E-02	NOT IDENT.
CD-115	3.747E+03	4.441E+03	4.751E+03	SHORT HLIF
SN-117M	-1.148E-01	1.393E-01	1.486E-01	NOT IDENT.
SB-122	8.801E+01	2.816E+02	2.844E+02	SHORT HLIF
TE-123M	-2.557E-02	2.991E-02	3.205E-02	NOT IDENT.
SB-124	7.668E-02	9.025E-02	9.664E-02	NOT IDENT.
SB-125	6.462E-03	7.601E-02	7.607E-02	FAIL ABUN
TE-125M	9.469E+00	1.108E+01	1.188E+01	NOT IDENT.
I-126	2.450E-01	5.356E-01	5.468E-01	NOT IDENT.
SB-126	1.813E-01	3.244E-01	3.346E-01	NOT IDENT.
SB-127	2.665E+01	2.944E+01	3.179E+01	NOT IDENT.
I-131	1.184E-01	5.381E-01	5.407E-01	NOT IDENT.
I-132	-1.000E+41	2.369E+41	0.000E+00	SHORT HLIF
TE-132	2.266E+01	4.503E+01	4.618E+01	SHORT HLIF
BA-133	2.524E-02	3.784E-02	3.951E-02	NOT IDENT.
I-133	-2.293E+10	3.172E+10	3.336E+10	SHORT HLIF
CS-134	-3.429E-02	3.891E-02	4.187E-02	FAIL ABUN
I-135	-5.965E+35	7.912E+36	0.000E+00	SHORT HLIF
CS-136	-8.899E-03	2.680E-01	2.680E-01	NOT IDENT.
LA-138	1.738E-02	4.842E-02	4.905E-02	NOT IDENT.
CE-139	1.728E-02	3.031E-02	3.129E-02	NOT IDENT.
BA-140	-4.787E-02	7.190E-01	7.194E-01	NOT IDENT.
LA-140	-8.203E-02	1.720E-01	1.759E-01	FAIL ABUN
CE-141	-2.384E-03	8.938E-02	8.939E-02	NOT IDENT.
CE-143	6.126E+06	2.365E+06	3.636E+06	SHORT HLIF
CE-144	-2.488E-02	1.857E-01	1.860E-01	NOT IDENT.
PM-144	1.220E-02	2.833E-02	2.886E-02	FAIL ABUN
PR-144	9.443E-01	2.145E+00	2.187E+00	NOT IDENT.
PM-146	-5.991E-03	3.577E-02	3.587E-02	NOT IDENT.
ND-147	-1.818E+00	1.828E+00	2.004E+00	FAIL ABUN
PM-147	-4.083E+02	7.364E+02	7.591E+02	NOT IDENT.
PM-149	1.797E+04	3.268E+04	3.367E+04	SHORT HLIF
EU-150	-5.470E-03	3.137E-02	3.147E-02	FAIL ABUN
EU-152	-9.169E-03	8.681E-02	8.691E-02	FAIL ABUN
GD-153	-3.293E-02	7.783E-02	7.923E-02	NOT IDENT.

EU-154	-3.100E-02	9.582E-02	9.684E-02	NOT IDENT.
EU-155	-7.243E-03	9.242E-02	9.248E-02	FAIL ABUN
TB-160	5.547E-02	1.219E-01	1.244E-01	FAIL ABUN
HO-166M	-1.295E-02	5.330E-02	5.362E-02	NOT IDENT.
TM-171	1.298E+00	1.753E+01	1.754E+01	NOT IDENT.
HF-172	3.304E-02	1.842E-01	1.848E-01	FAIL ABUN
LU-172	5.525E-03	4.169E-02	4.176E-02	FAIL ABUN
LU-176	5.617E-03	2.282E-02	2.296E-02	FAIL ABUN
HF-181	-3.461E-02	6.226E-02	6.418E-02	NOT IDENT.
TA-182	1.018E-01	1.508E-01	1.576E-01	NOT IDENT.
RE-183	-9.041E-04	2.275E-01	2.275E-01	NOT IDENT.
RE-184	1.198E-01	1.376E-01	1.478E-01	NOT IDENT.
W-188	5.332E+00	6.983E+00	7.385E+00	FAIL ABUN
IR-192	-5.465E-03	3.545E-02	3.553E-02	FAIL ABUN
TL-204	-3.604E+00	4.908E+00	5.170E+00	FAIL ABUN
BI-207	-7.632E-03	4.835E-02	4.847E-02	FAIL ABUN
PB-211	-6.499E-02	6.549E-01	6.556E-01	NOT IDENT.
BI-213	-5.634E-02	9.101E-02	9.449E-02	NOT IDENT.
RN-219	-7.481E-02	3.543E-01	3.559E-01	NOT IDENT.
RA-223	-9.781E-02	6.675E-01	6.690E-01	FAIL ABUN
AC-225	5.509E-01	2.297E+00	2.311E+00	NOT IDENT.
AC-227	-1.390E-01	2.240E-01	2.326E-01	NOT IDENT.
TH-227	-1.390E-01	2.240E-01	2.326E-01	NOT IDENT.
TH-229	-4.189E-01	5.308E-01	5.634E-01	FAIL ABUN
PA-231	1.176E-01	3.962E-01	3.998E-01	NOT IDENT.
TH-231	-9.781E-02	6.675E-01	6.690E-01	FAIL ABUN
PA-233	-2.671E-02	5.047E-02	5.189E-02	NOT IDENT.
PA-234	-1.572E-01	2.952E-01	3.036E-01	NOT IDENT.
NP-237	-2.671E-02	5.047E-02	5.189E-02	NOT IDENT.
NP-238	-3.852E+03	8.654E+03	8.827E+03	SHORT HLIF
NP-239	-9.398E-02	2.492E-01	2.528E-01	FAIL ABUN
PU-239	1.730E+02	3.307E+02	3.398E+02	NOT IDENT.
AM-241	1.469E-01	1.529E-01	1.666E-01	NOT IDENT.
CM-243	4.270E-02	9.069E-02	9.271E-02	FAIL ABUN
BK-247	-2.502E-02	6.380E-02	6.479E-02	FAIL ABUN
CM-247	9.097E-03	3.183E-02	3.209E-02	FAIL ABUN
CF-249	2.127E-02	3.641E-02	3.765E-02	NOT IDENT.
CF-251	-5.073E-02	1.196E-01	1.217E-01	NOT IDENT.
ANH-511	-2.672E-02	4.561E-02	4.718E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	81.4176	81.75	87.9503	123.68	84.6042
879.38	85.7290	82.47	85.2619	125.81	82.6024
46.54	85.9227	83.79	89.6510	127.23	97.2879
228.16	0.0000	265.00	89.6823	127.91	99.6103
52.39	89.8479	193.51	92.7024	129.30	84.0866
1093.63	88.9642	105.31	92.8716	131.20	96.6476
52.39	81.1501	86.79	86.5726	133.02	75.4639
125.81	85.2182	86.94	86.5939	133.52	75.5110
53.44	81.3384	87.09	86.6151	136.00	85.9117
54.07	70.5244	87.57	76.1111	136.47	83.6983
293.27	0.0000	88.03	76.1671	739.50	0.0000
482.18	69.0466	306.78	76.2050	140.51	0.0000
57.98	88.1420	88.47	76.2209	143.76	74.1565
59.27	85.6999	143.76	90.5501	144.24	74.1972
59.32	85.7087	90.64	90.6471	145.44	71.6331
59.54	76.3688	531.02	90.7142	152.43	99.0898
60.96	94.0579	92.59	90.9238	1048.07	89.9542
61.17	103.5075	93.35	91.0313	154.21	87.7405
62.93	102.1863	94.56	92.6255	158.56	98.3279
63.29	102.2591	311.90	92.6381	159.00	87.0438
290.67	102.3177	946.00	92.6407	162.33	82.6983
87.57	96.0337	94.87	92.6692	537.26	78.0668
66.73	108.7207	97.43	77.2861	163.33	80.4540
67.24	110.1868	98.43	78.4770	165.86	65.4720
67.68	101.0892	98.44	78.4781	427.87	72.0931
1221.41	101.1020	103.37	71.0676	176.60	66.2035
70.82	90.0618	116.74	71.0676	177.52	74.5481
97.43	105.2257	100.11	67.8954	181.07	0.0000
70.82	115.0352	102.03	78.8947	181.52	74.4511
279.20	115.0377	103.18	66.0356	184.41	82.2102
1063.66	102.0537	103.37	66.0537	185.72	82.3165
72.87	102.0643	911.20	76.0001	193.51	90.1497
351.06	102.0643	105.31	76.0111	197.03	78.3896
74.66	102.3929	106.12	86.9702	198.01	72.4265
351.93	102.4223	106.47	81.5752	201.83	66.6276
238.63	102.4223	109.28	69.8862	203.43	80.0709
351.93	102.4223	111.00	74.4315	205.31	50.2318
238.63	102.4223	111.76	0.0000	210.85	53.7418
74.97	102.4495	114.06	87.9333	215.65	58.8779
77.11	102.8362	116.30	0.0000	218.12	59.0061
78.74	91.6685	116.74	87.1482	222.11	52.6328
256.23	100.1646	119.76	89.7123	227.09	69.3762
80.03	86.3020	264.66	94.3098	227.38	50.8058
133.52	86.3165	121.22	95.4318	228.16	0.0000
364.49	86.3266	344.28	78.8442	228.18	54.5609
711.68	73.1461	122.06	76.6511	235.69	81.5271
356.01	94.8108	122.92	82.2970	235.96	83.2092
323.87	100.3997	1274.44	76.7511	238.63	74.2201

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
238.98	0.0000	338.28	34.9597	531.02	36.8178
240.99	74.3640	338.32	34.9605	537.26	28.9410
242.00	74.4256	340.48	35.0097	1260.41	0.0000
244.70	74.5886	340.55	35.0113	552.55	18.0886
685.70	52.2822	344.28	35.0946	795.86	21.2042
388.16	47.2375	345.93	29.7263	564.24	0.0000
507.63	0.0000	351.06	41.5705	569.33	16.1986
256.23	62.5896	351.93	41.5930	569.50	16.1999
527.90	0.0000	355.39	0.0000	569.70	16.2012
264.66	46.8236	356.01	28.5552	583.19	25.4639
264.80	46.8292	364.49	34.6277	584.27	13.7571
265.00	46.8359	366.42	0.0000	595.83	25.6022
269.46	50.4138	372.51	32.0484	600.60	24.6270
270.03	53.8548	375.05	27.5122	602.52	0.0000
401.81	58.1816	377.52	33.9814	604.72	32.3793
273.65	52.7152	383.85	36.8742	607.14	19.5505
276.40	45.0937	388.16	33.2710	609.32	19.5682
583.19	47.2746	666.33	36.9775	610.33	19.5767
277.60	47.2824	391.69	29.6348	614.28	21.6725
402.40	47.2970	400.66	34.4421	618.01	15.5042
279.20	49.0598	401.81	36.3276	884.68	18.6233
279.54	49.0725	402.40	30.7488	621.93	22.3620
279.70	49.0783	404.85	39.1896	630.19	0.0000
280.46	46.5205	410.95	32.7698	631.29	21.8246
301.36	51.8127	413.71	25.3185	633.25	18.7214
284.31	48.3802	720.70	31.9006	634.78	10.4073
285.41	37.1788	423.72	35.8307	635.95	19.7832
285.90	0.0000	427.09	23.6160	636.99	20.8333
287.50	45.8941	427.87	27.4064	657.50	9.4519
290.67	27.3388	433.94	33.1856	657.76	9.4530
293.27	0.0000	439.40	39.9390	657.90	0.0000
295.22	46.1486	440.45	35.2039	661.66	15.7788
316.51	46.1734	453.88	28.7457	664.57	0.0000
298.58	56.2958	463.37	23.1094	666.33	14.2273
299.98	43.2460	468.07	17.3738	666.50	14.2278
300.09	43.2491	473.00	17.4170	667.71	0.0000
300.13	43.2501	631.29	14.5294	677.62	13.7601
311.90	43.2501	696.49	19.3892	685.70	7.4324
301.36	41.1011	477.60	19.3970	692.65	0.0000
302.85	43.7703	482.18	32.0782	695.00	20.2447
304.50	40.3155	487.02	24.3601	696.49	14.9257
304.85	40.3249	492.35	0.0000	696.51	14.9257
306.78	41.2570	497.08	29.3762	697.00	10.6632
308.46	38.6674	505.52	30.4797	697.30	11.7309
311.90	39.6396	507.63	0.0000	697.49	10.6653
316.51	42.4150	511.00	38.4458	702.65	10.6856
319.41	48.6957	514.00	76.0131	706.68	21.4038
320.08	49.6027	514.00	76.0131	711.68	21.4437
321.04	46.9756	520.40	15.8431	720.70	11.8334
323.87	51.9480	520.69	0.0000	721.93	0.0000
325.23	59.9950	667.71	0.0000	1690.97	20.9933
1596.21	48.1080	527.90	0.0000	722.91	20.9941
333.37	42.8916	528.26	20.8701	723.31	16.1517
333.97	40.2264	529.59	23.8662	756.73	6.4629
334.37	41.1307	529.87	0.0000	727.33	21.5674

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
733.00	14.5882	935.54	15.0164	1362.66	0.0000
735.93	11.8992	937.49	13.8696	1365.19	7.7407
737.46	24.6777	983.53	6.9485	1368.63	0.0000
739.50	0.0000	946.00	13.9048	1384.29	2.5911
1434.09	18.4450	949.00	5.2191	1408.01	7.8140
747.24	16.2921	954.55	0.0000	1434.09	4.9112
748.06	21.1861	962.31	17.4652	1435.80	5.8956
752.31	17.4102	964.08	17.4744	1457.56	0.0000
753.82	19.5967	966.17	0.0000	1460.82	0.9878
756.73	17.4375	968.97	8.7497	1489.16	5.9623
756.80	17.4375	983.53	12.3013	1505.03	6.3805
763.94	18.0281	984.45	0.0000	1584.12	8.1035
765.81	29.5192	996.26	14.1104	1596.21	5.0769
766.84	26.2490	1002.74	14.1362	1620.50	4.0808
772.60	0.0000	1004.73	16.7966	1621.92	5.1022
776.52	8.7793	1021.30	0.0000	1678.03	0.0000
777.92	0.0000	1025.87	0.0000	1690.97	2.0680
778.90	11.5322	1028.54	0.0000	1750.46	0.0000
783.70	16.5021	1037.84	8.0305	1764.49	3.3537
1435.80	16.5308	1038.76	0.0000	1770.23	3.1474
903.28	30.4514	1046.59	12.5217	1771.35	4.1973
795.86	25.4089	1048.07	16.1060	1791.20	0.0000
801.95	28.7824	1049.04	17.9004	1808.65	3.1690
810.06	12.2103	1050.41	17.0123	1810.72	0.0000
810.29	9.9910	1063.66	8.9862	1836.06	3.1844
810.45	9.9917	1077.00	9.9204		
810.76	11.1031	1077.34	8.1172		
815.77	7.7853	1085.87	10.8479		
818.51	12.2452	1093.63	7.2471		
832.01	14.5361	1099.45	5.8066		
834.85	13.4307	1112.07	5.4617		
835.71	16.7926	1112.84	5.4628		
836.80	0.0000	1115.54	11.6625		
846.75	0.0000	1120.29	10.0345		
846.77	14.6065	1120.55	10.0352		
856.80	20.2896	1121.30	7.2998		
860.56	16.9287	1808.65	10.2423		
871.09	14.7207	1131.51	0.0000		
873.19	6.7988	1147.95	0.0000		
875.33	0.0000	1332.49	8.3221		
879.38	9.0827	1177.95	9.2578		
880.51	14.7646	1189.05	12.0685		
881.60	13.6338	1204.77	7.4556		
883.24	13.6406	1221.41	7.4858		
884.68	10.2352	1231.02	9.3793		
889.28	17.0831	1235.36	9.0135		
894.76	13.6899	1238.28	9.0199		
1836.06	12.5616	1260.41	0.0000		
900.72	12.5724	1271.87	3.7886		
903.28	6.8630	1274.44	11.3723		
911.20	13.7598	1274.54	11.3723		
912.08	17.2040	1291.59	6.6603		
984.45	0.0000	1298.22	0.0000		
926.50	6.9119	1312.11	14.3408		
929.11	12.6816	1332.49	6.7236		

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:13:24.95

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041226.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM02.CNF;680
                                    Background date  : 6-APR-2025 11:01:02.
Sample date      : 19-MAR-2025 00:00:00 Acquisition date : 10-APR-2025 20:56:05
Sample ID        : G1206041226          Sample quantity  : 1.15000E+02 GRAM
Detector name    : GAM02                Detector geometry: CAN
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:03.08  0.3%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2767517              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.44	3222	2338	0.96	93.63	89	9	3.58E+00	3.2	
2	0	59.51	13362	2243	0.91	119.79	114	12	1.48E+01	1.1	
3	0	88.67	99	555	0.80	178.14	175	8	1.10E-01	42.5	
4	0	155.85	30	339	0.65	312.56	310	7	3.39E-02	101.7	
5	0	331.51	50	361	1.59	664.03	659	10	5.52E-02	73.0	
6	0	371.20	34	385	4.40	743.43	737	11	3.77E-02	113.9	
7	0	454.67	48	382	0.86	910.41	906	9	5.39E-02	74.1	
8	0	572.60	35	230	4.24	1146.32	1139	15	3.83E-02	97.7	
9	0	593.65	14	99	1.42	1188.42	1186	7	1.61E-02	116.6	
10	0	630.25	19	128	2.53	1261.62	1257	10	2.10E-02	114.1	
11	0	662.32*	9952	210	1.48	1325.77	1318	16	1.11E+01	1.1	
12	0	727.24*	49	93	0.74	1455.61	1449	15	5.43E-02	45.5	
13	0	804.11	14	96	0.90	1609.34	1606	9	1.59E-02	125.6	
14	0	839.40	19	71	0.57	1679.91	1675	9	2.16E-02	80.7	
15	0	1047.74	57	116	6.80	2096.51	2087	18	6.32E-02	46.5	
16	0	1096.19	18	162	4.50	2193.39	2181	18	2.00E-02	167.5	
17	0	1158.24	11	45	1.09	2317.44	2308	11	1.27E-02	126.0	
18	0	1174.32	2416	127	1.80	2349.59	2341	19	2.68E+00	2.3	
19	0	1254.84	21	11	2.23	2510.56	2502	14	2.38E-02	38.7	
20	0	1333.74	2281	10	2.07	2668.29	2659	19	2.53E+00	2.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 10-APR-2025 21:13:26

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041226.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: MXR1		
Sample date	: 19-MAR-2025 00:00:00	Acquisition date	: 10-APR-2025 20:56:05
Sample ID	: G1206041226	Sample quantity	: 115.00 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA2	Detector geometry	: CAN
Elapsed live time	: 0 00:15:00.00	Elapsed real time	: 0 00:15:03.08 0.3%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	2301	99.85	1.246E+00	4.831E+01	4.871E+01	4.65
	1332.49	2161	99.98*	1.110E+00	5.084E+01	5.126E+01	4.24
CD-109	88.03	105	3.70*	5.197E+00	1.422E+01	1.472E+01	85.09
BA-137M	661.66	9719	89.90*	2.128E+00	1.326E+02	1.328E+02	2.11
CS-137	661.66	9719	85.10*	2.128E+00	1.401E+02	1.403E+02	2.11
BI-210	46.54	3508	4.25*	4.545E-01	4.743E+03	4.752E+03	6.47
PB-210	46.54	3508	4.25*	4.545E-01	4.743E+03	4.752E+03	6.47
BI-212	727.33	48	6.67*	1.959E+00	9.501E+00	9.501E+00	91.00
	1620.50	------	1.47	9.561E-01	------ Line Not Found		------
AM-241	59.54	14409	35.90*	1.858E+00	5.641E+02	5.642E+02	2.26

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:13:27.02

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041226.CNF;1		
Acquisition date	: 10-APR-2025 20:56:05	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:03.08	Half life ratio	: *****
Sample date	: 19-MAR-2025 00:00:00	Analyst initials	: MXR1
Sample ID	: G1206041226	Sample Quantity	: 1.1500E+02 GRAM
Batch Number	: 2767517	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;18		

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2024 07:24:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;21		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
CO-60	5.126E+01	2.129E+00	4.039E-01
CD-109	1.472E+01	1.228E+01	1.163E+01
BA-137M	1.328E+02	2.745E+00	6.153E-01
CS-137	1.403E+02	2.900E+00	6.500E-01
BI-210	4.752E+03	3.014E+02	1.947E+02
PB-210	4.752E+03	3.014E+02	1.947E+02
BI-212	9.501E+00	8.473E+00	7.946E+00
AM-241	5.642E+02	1.250E+01	5.115E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	3.169E+00	5.302E+00	9.511E+00	NOT IDENT.
NA-22	-3.282E-02	2.407E-01	4.498E-01	NOT IDENT.
NA-24	0.000E+00	1.592E+10	0.000E+00	SHORT HLIF
AL-26	-3.403E-02	1.194E-01	2.523E-01	NOT IDENT.
K-40	-2.936E+00	2.237E+00	3.337E+00	NOT IDENT.
SC-46	2.328E-01	4.849E-01	9.112E-01	NOT IDENT.
V-48	-2.401E-01	1.324E+00	2.349E+00	NOT IDENT.
CR-51	-1.760E+00	4.858E+00	8.674E+00	NOT IDENT.
MN-52	-3.544E-01	3.711E+00	7.075E+00	NOT IDENT.
MN-54	-3.356E-03	4.140E-01	6.721E-01	NOT IDENT.
CO-56	3.602E-01	4.606E-01	8.866E-01	NOT IDENT.
MN-56	0.000E+00	1.276E+41	0.000E+00	SHORT HLIF
CO-57	-1.836E-01	2.374E-01	4.024E-01	NOT IDENT.
CO-58	-1.745E-01	3.959E-01	7.096E-01	NOT IDENT.
FE-59	-1.654E-01	1.414E+00	2.192E+00	NOT IDENT.
ZN-65	9.966E-01	1.079E+00	2.044E+00	NOT IDENT.
GE-68	1.530E+01	1.522E+01	2.929E+01	NOT IDENT.
AS-73	4.282E+00	2.376E+01	4.308E+01	NOT IDENT.
AS-74	2.698E-01	1.438E+00	2.285E+00	NOT IDENT.
SE-75	9.190E-02	4.810E-01	8.892E-01	NOT IDENT.
BR-77	-5.031E+02	9.100E+02	1.481E+03	NOT IDENT.
SR-82	8.540E-01	3.775E+00	7.138E+00	NOT IDENT.

RB-83	2.837E-01	8.987E-01	1.606E+00	NOT IDENT.
RB-84	6.596E-02	9.355E-01	1.714E+00	NOT IDENT.
KR-85	-7.003E+01	8.376E+01	1.402E+02	NOT IDENT.
SR-85	-4.032E-01	4.816E-01	8.061E-01	NOT IDENT.
RB-86	1.642E+01	1.225E+01	2.415E+01	NOT IDENT.
Y-88	2.215E-02	1.906E-01	4.251E-01	NOT IDENT.
Y-91	-8.681E+01	1.563E+02	2.688E+02	NOT IDENT.
NB-94	9.379E-02	2.981E-01	5.351E-01	NOT IDENT.
NB-95	3.092E-01	4.040E-01	7.892E-01	NOT IDENT.
NB-95M	-2.374E-01	1.380E+00	2.282E+00	NOT IDENT.
ZR-95	4.363E-01	7.660E-01	1.392E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.052E+10	0.000E+00	SHORT HLIF
MO-99	3.412E+02	8.488E+02	1.524E+03	NOT IDENT.
TC-99M	0.000E+00	6.250E+26	0.000E+00	SHORT HLIF
RH-101	-1.086E-01	2.743E-01	4.713E-01	NOT IDENT.
RH-102	3.930E-01	8.791E-01	1.095E+00	FAIL ABUN
RU-103	-2.620E-01	5.610E-01	9.622E-01	NOT IDENT.
RH-106	-1.198E+00	3.590E+00	6.106E+00	NOT IDENT.
RU-106	-1.198E+00	3.590E+00	6.106E+00	NOT IDENT.
AG-108M	2.223E-01	4.118E-01	7.432E-01	NOT IDENT.
AG-110	-6.494E+00	9.966E+00	1.442E+01	NOT IDENT.
AG-110M	2.510E-01	5.917E-01	1.107E+00	NOT IDENT.
SN-113	9.731E-02	5.869E-01	1.053E+00	NOT IDENT.
CD-115	0.000E+00	1.481E+03	0.000E+00	SHORT HLIF
SN-117M	1.755E-01	7.838E-01	1.262E+00	FAIL ABUN
SB-122	-2.010E+02	1.469E+02	2.331E+02	NOT IDENT.
TE-123M	1.557E-01	2.876E-01	4.709E-01	NOT IDENT.
SB-124	2.749E-02	4.583E-01	9.992E-01	NOT IDENT.
SB-125	-8.762E-01	1.274E+00	2.185E+00	NOT IDENT.
TE-125M	8.575E+01	9.197E+01	1.688E+02	NOT IDENT.
I-126	9.925E-01	3.165E+00	5.142E+00	NOT IDENT.
SB-126	5.005E-01	2.123E+00	3.604E+00	NOT IDENT.
SN-126	0.000E+00	1.186E+00	1.215E+00	FAIL ABUN
SB-127	2.785E+01	4.729E+01	8.724E+01	NOT IDENT.
I-131	1.576E+00	2.724E+00	5.005E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	-3.546E+01	4.128E+01	6.616E+01	NOT IDENT.
BA-133	-9.121E-03	4.788E-01	8.604E-01	NOT IDENT.
I-133	0.000E+00	3.372E+07	0.000E+00	SHORT HLIF
CS-134	2.060E-01	4.299E-01	8.149E-01	NOT IDENT.
I-135	0.000E+00	1.050E+25	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.892E+00	3.623E+00	FAIL ABUN
LA-138	6.599E-03	3.409E-01	6.627E-01	NOT IDENT.
CE-139	5.199E-03	2.774E-01	4.769E-01	NOT IDENT.
BA-140	2.703E+00	4.367E+00	7.999E+00	NOT IDENT.
LA-140	4.203E-01	5.933E-01	1.469E+00	NOT IDENT.
CE-141	-1.608E-01	6.490E-01	1.112E+00	NOT IDENT.
CE-143	0.000E+00	6.097E+04	0.000E+00	SHORT HLIF
CE-144	1.048E+00	1.831E+00	3.265E+00	NOT IDENT.
PM-144	-7.280E-02	3.167E-01	5.419E-01	NOT IDENT.
PR-144	-5.390E+00	2.381E+01	4.074E+01	NOT IDENT.
PM-146	6.730E-01	9.777E-01	1.170E+00	FAIL ABUN
ND-147	-1.884E+00	1.064E+01	1.850E+01	NOT IDENT.
PM-147	2.246E+03	6.777E+03	1.205E+04	NOT IDENT.
PM-149	0.000E+00	1.089E+04	0.000E+00	SHORT HLIF
EU-150	-5.283E-02	3.141E-01	5.061E-01	FAIL ABUN
EU-152	1.120E+00	1.104E+00	2.072E+00	NOT IDENT.
GD-153	-2.180E-01	8.227E-01	1.443E+00	NOT IDENT.
EU-154	-5.363E-02	6.864E-01	1.294E+00	NOT IDENT.
EU-155	-9.853E-02	9.760E-01	1.717E+00	NOT IDENT.
TB-160	-1.244E+00	1.606E+00	2.774E+00	FAIL ABUN
HO-166M	-2.931E-01	5.680E-01	9.443E-01	NOT IDENT.
TM-171	-1.009E+02	4.797E+02	8.641E+02	NOT IDENT.
HF-172	-6.856E-01	1.705E+00	2.929E+00	NOT IDENT.
LU-172	-4.734E-02	7.893E-01	1.406E+00	FAIL ABUN
LU-176	2.304E-01	2.908E-01	5.450E-01	FAIL ABUN
HF-181	3.051E-01	6.812E-01	1.220E+00	NOT IDENT.
TA-182	-7.647E-01	1.202E+00	2.044E+00	NOT IDENT.
RE-183	0.000E+00	5.718E+00	1.221E+01	FAIL ABUN
RE-184	-5.373E-01	1.714E+00	3.048E+00	NOT IDENT.
W-188	9.046E+00	8.105E+01	1.485E+02	NOT IDENT.
IR-192	-3.234E-01	3.895E-01	6.820E-01	NOT IDENT.
HG-203	1.561E-01	4.228E-01	7.860E-01	NOT IDENT.
TL-204	-3.157E+01	4.708E+01	8.293E+01	NOT IDENT.
BI-207	3.059E-01	6.222E-01	1.157E+00	NOT IDENT.
TL-208	-1.657E-01	3.735E-01	6.365E-01	NOT IDENT.
BI-211	1.422E+00	2.354E+00	4.348E+00	NOT IDENT.

PB-211	-2.414E+00	9.338E+00	1.640E+01	NOT IDENT.
PB-212	-2.286E-01	6.138E-01	1.008E+00	NOT IDENT.
BI-213	5.606E-01	1.494E+00	2.672E+00	NOT IDENT.
BI-214	3.149E-01	7.439E-01	1.342E+00	NOT IDENT.
PB-214	3.165E-01	8.452E-01	1.548E+00	NOT IDENT.
RN-219	3.140E-01	5.333E+00	9.495E+00	NOT IDENT.
RN-222	3.149E-01	7.439E-01	1.342E+00	NOT IDENT.
RA-223	-4.872E-01	6.994E+00	1.263E+01	NOT IDENT.
RA-224	1.390E+00	6.375E+00	1.074E+01	NOT IDENT.
AC-225	-6.834E-01	1.123E+01	1.877E+01	NOT IDENT.
RA-226	3.165E-01	8.452E-01	1.548E+00	NOT IDENT.
AC-227	2.164E-01	2.488E+00	4.596E+00	NOT IDENT.
TH-227	2.164E-01	2.488E+00	4.596E+00	NOT IDENT.
AC-228	1.115E+00	1.671E+00	3.168E+00	NOT IDENT.
RA-228	1.115E+00	1.671E+00	3.168E+00	NOT IDENT.
TH-228	-2.286E-01	6.138E-01	1.008E+00	NOT IDENT.
TH-229	-4.292E+00	5.660E+00	9.252E+00	FAIL ABUN
TH-230	3.165E-01	8.452E-01	1.548E+00	NOT IDENT.
PA-231	4.193E+00	5.083E+00	9.540E+00	NOT IDENT.
TH-231	-4.872E-01	6.994E+00	1.263E+01	NOT IDENT.
TH-232	1.115E+00	1.671E+00	3.168E+00	NOT IDENT.
PA-233	2.661E-01	6.949E-01	1.282E+00	NOT IDENT.
PA-234	3.056E+00	3.960E+00	7.459E+00	NOT IDENT.
PA-234M	-4.866E+00	1.414E+01	2.381E+01	NOT IDENT.
TH-234	-4.866E+00	1.414E+01	2.381E+01	NOT IDENT.
U-234	3.165E-01	8.452E-01	1.548E+00	NOT IDENT.
U-235	1.941E+00	1.790E+00	3.253E+00	FAIL ABUN
NP-237	2.661E-01	6.949E-01	1.282E+00	NOT IDENT.
NP-238	0.000E+00	3.314E+03	0.000E+00	SHORT HLIF
U-238	-4.866E+00	1.414E+01	2.381E+01	NOT IDENT.
NP-239	-9.692E-02	2.469E+00	4.326E+00	NOT IDENT.
PU-239	-4.247E+02	3.040E+03	5.273E+03	NOT IDENT.
AM-243	-7.022E-02	4.710E-01	8.492E-01	NOT IDENT.
CM-243	-8.706E-02	1.002E+00	1.766E+00	NOT IDENT.
BK-247	1.858E-01	8.296E-01	1.535E+00	NOT IDENT.
CM-247	1.436E-01	4.918E-01	8.837E-01	NOT IDENT.
CF-249	1.611E-01	4.973E-01	8.993E-01	NOT IDENT.
CF-251	8.846E-02	1.205E+00	2.065E+00	NOT IDENT.
ANH-511	6.506E-02	3.693E-01	6.680E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:13:25.71

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	2301	99.85	1.246E+00	4.831E+01	4.871E+01	4.65
	1332.49	2161	99.98*	1.110E+00	5.084E+01	5.126E+01	4.24
CD-109	88.03	105	3.70*	5.197E+00	1.422E+01	1.472E+01	85.09
BA-137M	661.66	9719	89.90*	2.128E+00	1.326E+02	1.328E+02	2.11
CS-137	661.66	9719	85.10*	2.128E+00	1.401E+02	1.403E+02	2.11
BI-210	46.54	3508	4.25*	4.545E-01	4.743E+03	4.752E+03	6.47
PB-210	46.54	3508	4.25*	4.545E-01	4.743E+03	4.752E+03	6.47
BI-212	727.33	48	6.67*	1.959E+00	9.501E+00	9.501E+00	91.00
	1620.50	------	1.47	9.561E-01	------	Line Not Found	------
AM-241	59.54	14409	35.90*	1.858E+00	5.641E+02	5.642E+02	2.26

Flag: "*" = Keyline

Sample ID : G1206041226 Acquisition date : 10-APR-2025 20:56:05

Total number of lines in spectrum	20	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	12	60.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	5.27Y	1.01	5.084E+01	5.126E+01	0.217E+01	4.24	
CD-109	461.40D	1.03	1.422E+01	1.472E+01	1.253E+01	85.09	
BA-137M	30.08Y	1.00	1.326E+02	1.328E+02	0.028E+02	2.11	
CS-137	30.08Y	1.00	1.401E+02	1.403E+02	0.030E+02	2.11	
BI-210	22.20Y	1.00	4.743E+03	4.752E+03	0.308E+03	6.47	
PB-210	22.20Y	1.00	4.743E+03	4.752E+03	0.308E+03	6.47	
BI-212	1.41E+10Y	1.00	9.501E+00	9.501E+00	8.646E+00	91.00	
AM-241	432.60Y	1.00	5.641E+02	5.642E+02	0.128E+02	2.26	
	Total Activity :		1.040E+04	1.042E+04			
	Grand Total Activity :		1.040E+04	1.042E+04			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1206041226 Acquisition date : 10-APR-2025 20:56:05

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	155.85	32	351	0.65	312.56	310	7	3.39E-02	****	5.96E+00	T
0	331.51	50	363	1.59	664.03	659	10	5.52E-02	****	3.67E+00	
0	371.20	34	385	4.40	743.43	737	11	3.77E-02	****	3.37E+00	T
0	454.67	48	379	0.86	910.41	906	9	5.39E-02	****	2.89E+00	T
0	572.60	34	227	4.24	1146.32	1139	15	3.83E-02	****	2.41E+00	
0	593.65	14	97	1.42	1188.42	1186	7	1.61E-02	****	2.34E+00	
0	630.25	19	125	2.53	1261.62	1257	10	2.10E-02	****	2.22E+00	T
0	804.11	14	93	0.90	1609.34	1606	9	1.59E-02	****	1.79E+00	
0	839.40	19	68	0.57	1679.91	1675	9	2.16E-02	****	1.72E+00	
0	1047.74	54	111	6.80	2096.51	2087	18	6.32E-02	93.1	1.39E+00	T
0	1096.19	17	155	4.50	2193.39	2181	18	2.00E-02	****	1.33E+00	
0	1158.24	11	42	1.09	2317.44	2308	11	1.27E-02	****	1.26E+00	
0	1254.84	20	10	2.23	2510.56	2502	14	2.38E-02	77.4	1.17E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:13:36.87

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041226.CNF;1		
Acquisition date	: 10-APR-2025 20:56:05	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:03.08	Half life ratio	: *****
Sample date	: 19-MAR-2025 00:00:00	Nuclide Library	: SOLID
Sample ID	: G1206041226	Analyst initials	: MXR1
Batch Number	: 2767517	Sample Quantity	: 1.1500E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2024 07:24:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;21		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
CO-60	1.700E-01
CD-109	5.621E+00
BA-137M	2.892E-01
CS-137	3.056E-01
BI-210	9.557E+01
PB-210	9.557E+01
BI-212	3.704E+00
AM-241	2.505E+00

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	4.593E+00	NOT IDENT.
NA-22	1.939E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	8.710E-02	NOT IDENT.
K-40	1.348E+00	NOT IDENT.
SC-46	4.295E-01	NOT IDENT.
V-48	1.110E+00	NOT IDENT.
CR-51	4.170E+00	NOT IDENT.
MN-52	2.964E+00	NOT IDENT.
MN-54	3.146E-01	NOT IDENT.
CO-56	4.180E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.942E-01	NOT IDENT.
CO-58	3.298E-01	NOT IDENT.
FE-59	1.029E+00	NOT IDENT.
ZN-65	9.657E-01	NOT IDENT.
GE-68	1.379E+01	NOT IDENT.
AS-73	2.116E+01	NOT IDENT.
AS-74	1.080E+00	NOT IDENT.
SE-75	4.288E-01	NOT IDENT.
BR-77	7.145E+02	NOT IDENT.
SR-82	3.333E+00	NOT IDENT.
RB-83	7.671E-01	NOT IDENT.

RB-84	8.064E-01	NOT IDENT.
KR-85	6.702E+01	NOT IDENT.
SR-85	3.853E-01	NOT IDENT.
RB-86	1.138E+01	NOT IDENT.
Y-88	1.668E-01	NOT IDENT.
Y-91	1.198E+02	NOT IDENT.
NB-94	2.501E-01	NOT IDENT.
NB-95	3.705E-01	NOT IDENT.
NB-95M	1.102E+00	NOT IDENT.
ZR-95	6.524E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	7.136E+02	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.272E-01	NOT IDENT.
RH-102	5.189E-01	FAIL ABUN
RU-103	4.596E-01	NOT IDENT.
RH-106	2.888E+00	NOT IDENT.
RU-106	2.888E+00	NOT IDENT.
AG-108M	3.587E-01	NOT IDENT.
AG-110	6.820E+00	NOT IDENT.
AG-110M	5.222E-01	NOT IDENT.
SN-113	5.075E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	6.086E-01	FAIL ABUN
SB-122	1.096E+02	NOT IDENT.
TE-123M	2.273E-01	NOT IDENT.
SB-124	3.965E-01	NOT IDENT.
SB-125	1.053E+00	NOT IDENT.
TE-125M	8.156E+01	NOT IDENT.
I-126	2.399E+00	NOT IDENT.
SB-126	1.682E+00	NOT IDENT.
SN-126	5.888E-01	FAIL ABUN
SB-127	4.077E+01	NOT IDENT.
I-131	2.412E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	3.189E+01	NOT IDENT.
BA-133	4.138E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.842E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.706E+00	FAIL ABUN
LA-138	2.800E-01	NOT IDENT.
CE-139	2.299E-01	NOT IDENT.
BA-140	3.802E+00	NOT IDENT.
LA-140	6.023E-01	NOT IDENT.
CE-141	5.363E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.579E+00	NOT IDENT.
PM-144	2.528E-01	NOT IDENT.
PR-144	1.901E+01	NOT IDENT.
PM-146	5.665E-01	FAIL ABUN
ND-147	8.803E+00	NOT IDENT.
PM-147	5.825E+03	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.430E-01	FAIL ABUN
EU-152	9.988E-01	NOT IDENT.
GD-153	6.988E-01	NOT IDENT.
EU-154	5.596E-01	NOT IDENT.
EU-155	8.302E-01	NOT IDENT.
TB-160	1.299E+00	FAIL ABUN
HO-166M	4.396E-01	NOT IDENT.
TM-171	4.243E+02	NOT IDENT.
HF-172	1.413E+00	NOT IDENT.
LU-172	6.603E-01	FAIL ABUN
LU-176	2.628E-01	FAIL ABUN
HF-181	5.870E-01	NOT IDENT.
TA-182	8.975E-01	NOT IDENT.
RE-183	6.028E+00	FAIL ABUN
RE-184	1.434E+00	NOT IDENT.
W-188	7.154E+01	NOT IDENT.
IR-192	3.271E-01	NOT IDENT.
HG-203	3.784E-01	NOT IDENT.
TL-204	4.011E+01	NOT IDENT.
BI-207	5.439E-01	NOT IDENT.
TL-208	3.008E-01	NOT IDENT.
BI-211	2.097E+00	NOT IDENT.
PB-211	7.906E+00	NOT IDENT.

PB-212	4.866E-01	NOT IDENT.
BI-213	1.290E+00	NOT IDENT.
BI-214	6.372E-01	NOT IDENT.
PB-214	7.458E-01	NOT IDENT.
RN-219	4.580E+00	NOT IDENT.
RN-222	6.372E-01	NOT IDENT.
RA-223	6.077E+00	NOT IDENT.
RA-224	5.185E+00	NOT IDENT.
AC-225	9.080E+00	NOT IDENT.
RA-226	7.458E-01	NOT IDENT.
AC-227	2.214E+00	NOT IDENT.
TH-227	2.214E+00	NOT IDENT.
AC-228	1.499E+00	NOT IDENT.
RA-228	1.499E+00	NOT IDENT.
TH-228	4.866E-01	NOT IDENT.
TH-229	4.476E+00	FAIL ABUN
TH-230	7.457E-01	NOT IDENT.
PA-231	4.603E+00	NOT IDENT.
TH-231	6.077E+00	NOT IDENT.
TH-232	1.499E+00	NOT IDENT.
PA-233	6.173E-01	NOT IDENT.
PA-234	3.539E+00	NOT IDENT.
PA-234M	1.150E+01	NOT IDENT.
TH-234	1.150E+01	NOT IDENT.
U-234	7.457E-01	NOT IDENT.
U-235	1.574E+00	FAIL ABUN
NP-237	6.173E-01	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	1.150E+01	NOT IDENT.
NP-239	2.091E+00	NOT IDENT.
PU-239	2.546E+03	NOT IDENT.
AM-243	4.108E-01	NOT IDENT.
CM-243	8.543E-01	NOT IDENT.
BK-247	7.403E-01	NOT IDENT.
CM-247	4.265E-01	NOT IDENT.
CF-249	4.333E-01	NOT IDENT.
CF-251	9.961E-01	NOT IDENT.
ANH-511	3.207E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 10-APR-2025 21:13:40.72

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1206041226.CNF;1		
Acquisition date	: 10-APR-2025 20:56:05	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:03.08	Half life ratio	: *****
Sample date	: 19-MAR-2025 00:00:00	Nuclide Library	: SOLID
Sample ID	: G1206041226	Analyst initials	: MXR1
Batch Number	: 2767517	Sample Quantity	: 1.1500E+02 GRAM
		Quantity Err(%)	: 1.7391E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2024 07:24:06	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;21		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
CO-60	5.126E+01	6.328E+00	6.328E+00
CD-109	1.472E+01	1.238E+01	1.238E+01
BA-137M	1.328E+02	1.113E+01	1.113E+01
CS-137	1.403E+02	1.175E+01	1.175E+01
BI-210	4.752E+03	6.040E+02	6.040E+02
PB-210	4.752E+03	6.040E+02	6.040E+02
BI-212	9.501E+00	8.522E+00	8.522E+00
AM-241	5.642E+02	6.936E+01	6.936E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	3.169E+00	5.309E+00	5.498E+00	NOT IDENT.
NA-22	-3.282E-02	2.407E-01	2.412E-01	NOT IDENT.
NA-24	9.500E+09	1.596E+10	1.653E+10	SHORT HLIF
AL-26	-3.403E-02	1.194E-01	1.204E-01	NOT IDENT.
K-40	-2.936E+00	2.263E+00	2.622E+00	NOT IDENT.
SC-46	2.328E-01	4.858E-01	4.970E-01	NOT IDENT.
V-48	-2.401E-01	1.324E+00	1.329E+00	NOT IDENT.
CR-51	-1.760E+00	4.861E+00	4.925E+00	NOT IDENT.
MN-52	-3.544E-01	3.712E+00	3.715E+00	NOT IDENT.
MN-54	-3.356E-03	4.140E-01	4.140E-01	NOT IDENT.
CO-56	3.602E-01	4.624E-01	4.900E-01	NOT IDENT.
MN-56	1.000E+41	1.281E+41	0.000E+00	SHORT HLIF
CO-57	-1.836E-01	2.379E-01	2.518E-01	NOT IDENT.
CO-58	-1.745E-01	3.963E-01	4.041E-01	NOT IDENT.
FE-59	-1.654E-01	1.414E+00	1.416E+00	NOT IDENT.
ZN-65	9.966E-01	1.084E+00	1.173E+00	NOT IDENT.
GE-68	1.530E+01	1.530E+01	1.679E+01	NOT IDENT.
AS-73	4.282E+00	2.378E+01	2.386E+01	NOT IDENT.
AS-74	2.698E-01	1.438E+00	1.443E+00	NOT IDENT.
SE-75	9.190E-02	4.811E-01	4.829E-01	NOT IDENT.
BR-77	-5.031E+02	9.698E+02	9.960E+02	NOT IDENT.
SR-82	8.540E-01	3.776E+00	3.796E+00	NOT IDENT.

RB-83	2.837E-01	8.998E-01	9.089E-01	NOT IDENT.
RB-84	6.596E-02	9.355E-01	9.360E-01	NOT IDENT.
KR-85	-7.003E+01	8.397E+01	8.971E+01	NOT IDENT.
SR-85	-4.032E-01	4.828E-01	5.159E-01	NOT IDENT.
RB-86	1.642E+01	1.237E+01	1.442E+01	NOT IDENT.
Y-88	2.215E-02	1.907E-01	1.909E-01	NOT IDENT.
Y-91	-8.681E+01	1.565E+02	1.613E+02	NOT IDENT.
NB-94	9.379E-02	2.983E-01	3.012E-01	NOT IDENT.
NB-95	3.092E-01	4.052E-01	4.285E-01	NOT IDENT.
NB-95M	-2.374E-01	1.380E+00	1.384E+00	NOT IDENT.
ZR-95	4.363E-01	7.672E-01	7.920E-01	NOT IDENT.
NB-97	-1.000E+41	7.112E+41	0.000E+00	SHORT HLIF
ZR-97	-1.996E+10	4.056E+10	4.154E+10	SHORT HLIF
MO-99	3.412E+02	8.495E+02	8.633E+02	NOT IDENT.
TC-99M	1.739E+26	6.253E+26	0.000E+00	SHORT HLIF
RH-101	-1.086E-01	2.751E-01	2.794E-01	NOT IDENT.
RH-102	3.930E-01	8.801E-01	8.978E-01	FAIL ABUN
RU-103	-2.620E-01	5.614E-01	5.737E-01	NOT IDENT.
RH-106	-1.198E+00	3.591E+00	3.632E+00	NOT IDENT.
RU-106	-1.198E+00	3.591E+00	3.632E+00	NOT IDENT.
AG-108M	2.223E-01	4.122E-01	4.242E-01	NOT IDENT.
AG-110	-6.494E+00	9.980E+00	1.040E+01	NOT IDENT.
AG-110M	2.510E-01	5.925E-01	6.032E-01	NOT IDENT.
SN-113	9.731E-02	5.870E-01	5.886E-01	NOT IDENT.
CD-115	1.549E+02	1.481E+03	1.483E+03	SHORT HLIF
SN-117M	1.755E-01	7.839E-01	7.879E-01	FAIL ABUN
SB-122	-2.010E+02	1.478E+02	1.734E+02	NOT IDENT.
TE-123M	1.557E-01	2.878E-01	2.962E-01	NOT IDENT.
SB-124	2.749E-02	4.583E-01	4.585E-01	NOT IDENT.
SB-125	-8.762E-01	1.276E+00	1.335E+00	NOT IDENT.
TE-125M	8.575E+01	9.223E+01	1.000E+02	NOT IDENT.
I-126	9.925E-01	3.167E+00	3.198E+00	NOT IDENT.
SB-126	5.005E-01	2.124E+00	2.136E+00	NOT IDENT.
SN-126	1.422E+00	1.194E+00	1.355E+00	FAIL ABUN
SB-127	2.785E+01	4.744E+01	4.907E+01	NOT IDENT.
I-131	1.576E+00	2.728E+00	2.819E+00	NOT IDENT.
I-132	1.000E+41	3.398E+41	0.000E+00	SHORT HLIF
TE-132	-3.546E+01	4.148E+01	4.445E+01	NOT IDENT.
BA-133	-9.121E-03	4.788E-01	4.788E-01	NOT IDENT.
I-133	-1.481E+06	3.372E+07	3.373E+07	SHORT HLIF
CS-134	2.060E-01	4.305E-01	4.404E-01	NOT IDENT.
I-135	-9.418E+24	1.163E+25	0.000E+00	SHORT HLIF
CS-136	4.268E+00	3.932E+00	4.377E+00	FAIL ABUN
LA-138	6.599E-03	3.409E-01	3.409E-01	NOT IDENT.
CE-139	5.199E-03	2.774E-01	2.774E-01	NOT IDENT.
BA-140	2.703E+00	4.373E+00	4.539E+00	NOT IDENT.
LA-140	4.203E-01	5.948E-01	6.243E-01	NOT IDENT.
CE-141	-1.608E-01	6.491E-01	6.531E-01	NOT IDENT.
CE-143	2.034E+04	6.100E+04	6.168E+04	SHORT HLIF
CE-144	1.048E+00	1.833E+00	1.893E+00	NOT IDENT.
PM-144	-7.280E-02	3.168E-01	3.185E-01	NOT IDENT.
PR-144	-5.390E+00	2.381E+01	2.394E+01	NOT IDENT.
PM-146	6.730E-01	9.801E-01	1.026E+00	FAIL ABUN
ND-147	-1.884E+00	1.064E+01	1.068E+01	NOT IDENT.
PM-147	2.246E+03	6.779E+03	6.854E+03	NOT IDENT.
PM-149	8.720E+03	1.098E+04	1.166E+04	SHORT HLIF
EU-150	-5.283E-02	3.142E-01	3.151E-01	FAIL ABUN
EU-152	1.120E+00	1.109E+00	1.219E+00	NOT IDENT.
GD-153	-2.180E-01	8.229E-01	8.287E-01	NOT IDENT.
EU-154	-5.363E-02	6.864E-01	6.868E-01	NOT IDENT.
EU-155	-9.853E-02	9.760E-01	9.770E-01	NOT IDENT.
TB-160	-1.244E+00	1.614E+00	1.708E+00	FAIL ABUN
HO-166M	-2.931E-01	5.687E-01	5.839E-01	NOT IDENT.
TM-171	-1.009E+02	4.799E+02	4.820E+02	NOT IDENT.
HF-172	-6.856E-01	1.709E+00	1.737E+00	NOT IDENT.
LU-172	-4.734E-02	7.893E-01	7.896E-01	FAIL ABUN
LU-176	2.304E-01	2.917E-01	3.096E-01	FAIL ABUN
HF-181	3.051E-01	6.817E-01	6.955E-01	NOT IDENT.
TA-182	-7.647E-01	1.205E+00	1.253E+00	NOT IDENT.
RE-183	6.923E+01	1.139E+01	3.323E+01	FAIL ABUN
RE-184	-5.373E-01	1.715E+00	1.732E+00	NOT IDENT.
W-188	9.046E+00	8.106E+01	8.116E+01	NOT IDENT.
IR-192	-3.234E-01	3.908E-01	4.171E-01	NOT IDENT.
HG-203	1.561E-01	4.231E-01	4.289E-01	NOT IDENT.
TL-204	-3.157E+01	4.721E+01	4.931E+01	NOT IDENT.
BI-207	3.059E-01	6.230E-01	6.381E-01	NOT IDENT.
TL-208	-1.657E-01	3.737E-01	3.811E-01	NOT IDENT.
BI-211	1.422E+00	2.358E+00	2.443E+00	NOT IDENT.

PB-211	-2.414E+00	9.341E+00	9.404E+00	NOT IDENT.
PB-212	-2.286E-01	6.142E-01	6.228E-01	NOT IDENT.
BI-213	5.606E-01	1.495E+00	1.516E+00	NOT IDENT.
BI-214	3.149E-01	7.443E-01	7.577E-01	NOT IDENT.
PB-214	3.165E-01	8.457E-01	8.576E-01	NOT IDENT.
RN-219	3.140E-01	5.333E+00	5.335E+00	NOT IDENT.
RN-222	3.149E-01	7.443E-01	7.577E-01	NOT IDENT.
RA-223	-4.872E-01	6.994E+00	6.998E+00	NOT IDENT.
RA-224	1.390E+00	6.377E+00	6.408E+00	NOT IDENT.
AC-225	-6.834E-01	1.123E+01	1.123E+01	NOT IDENT.
RA-226	3.165E-01	8.457E-01	8.576E-01	NOT IDENT.
AC-227	2.164E-01	2.488E+00	2.490E+00	NOT IDENT.
TH-227	2.164E-01	2.488E+00	2.490E+00	NOT IDENT.
AC-228	1.115E+00	1.677E+00	1.751E+00	NOT IDENT.
RA-228	1.115E+00	1.677E+00	1.751E+00	NOT IDENT.
TH-228	-2.286E-01	6.142E-01	6.228E-01	NOT IDENT.
TH-229	-4.292E+00	5.670E+00	5.991E+00	FAIL ABUN
TH-230	3.165E-01	8.456E-01	8.576E-01	NOT IDENT.
PA-231	4.193E+00	5.174E+00	5.509E+00	NOT IDENT.
TH-231	-4.872E-01	6.994E+00	6.998E+00	NOT IDENT.
TH-232	1.115E+00	1.677E+00	1.751E+00	NOT IDENT.
PA-233	2.661E-01	6.954E-01	7.057E-01	NOT IDENT.
PA-234	3.056E+00	5.294E+00	5.470E+00	NOT IDENT.
PA-234M	-4.866E+00	1.419E+01	1.436E+01	NOT IDENT.
TH-234	-4.866E+00	1.419E+01	1.436E+01	NOT IDENT.
U-234	3.165E-01	8.456E-01	8.576E-01	NOT IDENT.
U-235	1.941E+00	1.796E+00	1.998E+00	FAIL ABUN
NP-237	2.661E-01	6.954E-01	7.057E-01	NOT IDENT.
NP-238	4.597E+03	3.356E+03	3.945E+03	SHORT HLIF
U-238	-4.866E+00	1.419E+01	1.436E+01	NOT IDENT.
NP-239	-9.692E-02	2.469E+00	2.469E+00	NOT IDENT.
PU-239	-4.247E+02	3.040E+03	3.046E+03	NOT IDENT.
AM-243	-7.022E-02	4.710E-01	4.721E-01	NOT IDENT.
CM-243	-8.706E-02	1.003E+00	1.003E+00	NOT IDENT.
BK-247	1.858E-01	8.306E-01	8.348E-01	NOT IDENT.
CM-247	1.436E-01	4.925E-01	4.968E-01	NOT IDENT.
CF-249	1.611E-01	4.976E-01	5.029E-01	NOT IDENT.
CF-251	8.846E-02	1.205E+00	1.205E+00	NOT IDENT.
ANH-511	6.506E-02	3.693E-01	3.705E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	969.2241	85.43	283.3183	131.20	253.2200
45.60	893.3300	86.55	273.6900	133.02	276.4284
46.54	896.3603	86.79	273.8424	133.52	252.1004
49.72	878.6075	86.94	285.6236	136.00	270.3301
51.35	931.7021	87.09	285.7220	136.47	259.8095
51.87	923.5994	87.57	291.2428	140.51	259.4092
52.39	973.8884	88.03	277.2354	143.76	239.0607
52.97	1025.4218	88.34	277.4348	144.24	250.1201
53.44	988.7988	88.47	277.5171	145.44	258.2351
54.07	1060.2618	89.96	298.0764	152.43	218.8771
57.36	0.0000	90.64	318.1786	153.25	225.0394
57.53	715.5345	91.11	297.5449	154.21	238.6296
57.98	716.5293	92.59	282.7539	156.02	243.7268
59.27	719.3649	93.35	288.5002	158.56	235.7746
59.32	719.4741	94.56	311.0677	159.00	229.9961
59.54	719.9562	94.65	311.1300	162.33	250.5303
60.96	723.0344	94.67	311.1420	162.66	255.1293
61.17	723.4893	94.87	308.3046	163.33	241.9420
62.93	235.4033	97.43	318.9966	165.86	236.0994
63.29	264.9544	98.43	294.7074	176.31	248.7827
63.58	257.8447	98.44	294.7119	176.60	243.1741
64.28	219.1832	99.53	277.3741	177.52	241.1999
66.73	284.8304	100.11	304.7839	181.07	261.9133
67.24	281.5326	102.03	276.8211	181.52	268.9736
67.68	282.8054	103.18	273.4459	184.41	271.1845
67.75	282.8589	103.37	297.7796	185.72	313.2817
68.89	272.5884	105.21	288.7726	193.51	329.3758
69.67	299.2746	105.31	288.8313	197.03	307.4150
70.82	318.9096	106.12	259.8691	198.01	287.8309
70.83	318.9200	106.47	277.3219	201.83	269.1636
72.81	295.2231	109.28	230.8727	203.43	257.8771
72.87	295.2686	111.00	258.3081	205.31	252.5540
74.66	290.0423	111.76	269.9847	210.85	250.7048
74.82	288.2715	114.06	280.4709	215.65	255.7684
74.97	303.5114	116.30	290.9925	218.12	291.4517
77.11	312.7849	116.74	280.8726	222.11	290.4126
78.74	294.9800	119.76	288.7206	227.09	276.2787
79.69	274.6264	121.12	256.0096	227.38	276.3705
80.03	268.1503	121.22	256.0563	228.16	276.6182
80.12	268.2144	121.78	281.4288	228.18	276.6251
80.19	268.2614	122.06	285.7594	235.69	271.6234
80.57	292.4856	122.92	261.0480	235.96	271.7043
81.00	302.3949	123.07	261.1183	238.63	270.0508
81.07	302.4478	123.68	264.5585	238.98	270.1544
81.75	291.4091	125.81	267.6833	240.99	243.5566
82.47	300.5909	127.23	255.6821	242.00	273.5320
83.79	288.0145	127.91	260.2236	244.70	233.3792
84.00	288.1600	129.30	270.4044	252.40	232.8179

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	227.9082	351.06	213.1804	569.33	108.0845
254.15	0.0000	351.93	212.4212	569.50	108.0928
256.23	224.5492	355.39	0.0000	569.70	108.1052
260.90	0.0000	356.01	211.2919	583.19	109.9823
264.66	233.2849	364.49	208.1177	584.27	102.5703
264.80	233.3186	366.42	223.7236	595.83	93.5385
265.00	233.3691	372.51	220.6156	600.60	93.7792
269.46	233.5810	375.05	221.0544	602.52	0.0000
270.03	238.8145	377.52	226.1562	604.72	105.8676
271.23	232.2988	383.85	232.8986	607.14	116.8198
273.65	209.8347	388.16	218.5903	609.32	101.7951
276.40	242.0574	388.63	213.9578	610.33	110.5166
277.37	222.5964	391.69	223.8992	614.28	106.4019
277.60	219.2240	400.66	265.3542	618.01	100.0822
278.00	227.0227	401.81	243.6875	620.36	91.4922
279.20	205.8447	402.40	240.9347	621.93	112.2790
279.54	205.0600	404.85	249.0046	630.19	0.0000
279.70	207.6635	410.95	229.0319	631.29	93.6548
280.46	226.7139	413.71	252.5393	633.25	88.8146
283.69	240.3503	414.70	249.8385	634.78	105.3438
284.31	248.2559	423.72	255.3203	635.95	103.2103
285.41	236.4387	427.09	253.0243	636.99	110.9537
285.90	0.0000	427.87	263.8320	657.50	124.8688
287.50	223.9482	433.94	229.8878	657.76	124.8871
290.67	222.0260	439.40	242.4902	657.90	0.0000
293.27	0.0000	440.45	246.5808	661.66	82.3045
295.22	223.8606	453.88	293.2778	664.57	0.0000
295.96	227.4988	463.37	288.1769	666.33	56.8541
298.58	230.6831	468.07	324.9521	666.50	56.8583
299.98	237.9834	473.00	289.0000	667.71	0.0000
300.09	236.2555	475.06	287.3854	677.62	61.6512
300.13	236.2665	476.78	242.5908	685.70	55.1410
301.36	214.6342	477.60	236.7058	692.65	71.1288
302.85	221.0742	482.18	198.1703	695.00	57.6448
304.50	258.3087	487.02	194.7434	696.49	70.1284
304.85	251.3614	492.35	0.0000	696.51	70.1284
306.78	209.5477	497.08	168.5634	697.00	65.6205
308.46	213.3944	505.52	157.1989	697.30	65.6300
311.90	205.2184	507.63	0.0000	697.49	61.1082
316.51	213.1787	511.00	165.9205	702.65	61.2576
319.41	216.3972	514.00	185.7209	706.68	65.9202
320.08	218.3078	514.00	185.7209	711.68	72.9089
321.04	224.7400	520.40	139.0540	720.70	60.4012
323.87	219.9346	520.69	128.7791	721.93	0.0000
325.23	206.7683	522.65	0.0000	722.78	72.1388
328.76	188.5522	527.90	0.0000	722.91	54.9648
333.37	190.6564	528.26	124.1846	723.31	54.9746
333.97	198.8703	529.59	133.6034	724.19	46.4046
334.37	198.9399	529.87	0.0000	727.33	63.1081
338.28	190.0989	531.02	135.7920	733.00	75.9258
338.32	190.1031	537.26	104.0405	735.93	72.5695
340.48	224.9165	546.56	0.0000	737.46	74.9261
340.55	224.9266	552.55	109.1628	739.50	63.4572
344.28	196.5190	563.25	118.2754	744.23	71.6850
345.93	227.7679	564.24	121.5137	747.24	81.0457

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	71.8086	962.31	108.8338	1435.80	9.8273
752.31	78.9072	964.08	104.1690	1457.56	0.0000
753.82	63.8645	966.17	106.1416	1460.82	15.3843
756.73	60.4593	968.97	85.3802	1489.16	4.4268
756.80	60.4614	983.53	104.8941	1505.03	2.2220
763.94	68.8141	984.45	0.0000	1584.12	3.6234
765.81	61.2842	996.26	80.4624	1596.21	2.7253
766.84	70.0708	1002.74	83.5246	1620.50	4.5679
772.60	0.0000	1004.73	88.3866	1621.92	3.6555
776.52	61.5704	1021.30	0.0000	1678.03	0.0000
777.92	66.8873	1025.87	0.0000	1690.97	4.6414
778.90	68.6761	1028.54	0.0000	1750.46	0.0000
783.70	66.1720	1037.84	80.6494	1764.49	3.7729
788.74	78.6925	1038.76	0.0000	1770.23	3.7775
792.07	89.4291	1046.59	84.7857	1771.35	4.7231
795.86	78.9315	1048.07	84.8282	1791.20	0.0000
801.95	71.1328	1049.04	84.8547	1808.65	2.8563
1093.63	69.3352	1050.41	85.8730	1810.72	0.0000
810.29	69.3424	1063.66	71.5475	1836.06	3.8301
810.45	66.2877	1077.00	56.1129		
810.76	67.8243	1077.34	63.0117		
815.77	74.2258	1085.87	82.3694		
818.51	79.6839	1093.63	81.1642		
832.01	79.2263	1099.45	82.5043		
834.85	72.1069	1112.07	90.6057		
835.71	75.0166	1112.84	93.6156		
836.80	0.0000	1115.54	73.7606		
846.75	0.0000	1120.29	77.8667		
846.77	71.5504	1120.55	77.8715		
856.80	94.5706	1121.30	77.8905		
860.56	86.5141	1129.67	70.0854		
871.09	87.7910	1131.51	0.0000		
873.19	86.0309	1147.95	0.0000		
875.33	0.0000	1173.23	50.7416		
879.38	90.8275	1177.95	48.7822		
880.51	86.2776	1189.05	28.5520		
881.60	83.5602	1204.77	30.7361		
883.24	81.7753	1221.41	25.7401		
884.68	80.9021	1231.02	17.5520		
889.28	78.2816	1235.36	17.5748		
894.76	81.2163	1238.28	14.4854		
898.04	105.3442	1260.41	0.0000		
900.72	80.4766	1271.87	11.4921		
903.28	92.5934	1274.44	14.6366		
911.20	82.6553	1274.54	14.6375		
912.08	94.7596	1291.59	8.4043		
923.98	0.0000	1298.22	0.0000		
926.50	110.2181	1312.11	12.6790		
929.11	119.6758	1332.49	9.5625		
935.54	113.4006	1362.66	0.0000		
937.49	107.8546	1365.19	6.4316		
944.13	132.5619	1368.63	0.0000		
946.00	93.1388	1384.29	5.3870		
949.00	122.4384	1408.01	7.5887		
954.55	0.0000	1434.09	9.8229		

Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
10-APR-2025 08:39:59

Run Date	Detector	Parameter	Flag	Status	Comments
10-APR-25	GAM01	All Parameters Passed			
10-APR-25	GAM02	All Parameters Passed			
10-APR-25	GAM04	All Parameters Passed			
10-APR-25	GAM05	All Parameters Passed			
10-APR-25	GAM06	All Parameters Passed			
10-APR-25	GAM07	Bkg Check BACKRATE	Investigate		
03-DEC-24	GAM08	Cal Check may not have run since 10-APR-2025			Detector locked out.
01-DEC-24	GAM08	Bkg Check may not have run since 10-APR-2025			Detector locked out.
10-APR-25	GAM19	All Parameters Passed			
10-APR-25	GAM20	Cal Check NLACTVTY-59	Investigate		
06-APR-25	GAM20	Bkg Check may not have run since 10-APR-2025			Detector locked out.
10-APR-25	GAM21	All Parameters Passed			
30-JAN-25	GAM22	Cal Check may not have run since 10-APR-2025			Detector locked out.
08-FEB-25	GAM22	Bkg Check may not have run since 10-APR-2025			Detector locked out.
10-APR-25	GAM23	All Parameters Passed			
10-APR-25	GAM24	Cal Check PSFWHM-59	Investigate		
10-APR-25	GAM24	Cal Check NLACTVTY-1332	Investigate		
10-APR-25	GAM27	All Parameters Passed			
10-APR-25	GAM28	Cal Check PSFWHM-662	Investigate		
10-APR-25	GAM29	All Parameters Passed			
10-APR-25	GAM31	All Parameters Passed			
10-APR-25	GAM32	All Parameters Passed			
10-APR-25	GAM33	All Parameters Passed			
10-APR-25	GAM38	All Parameters Passed			
10-APR-25	GAM40	Cal Check PSFWHM-59	Investigate		
10-APR-25	GAM41	Bkg Check BACKRATE	Investigate		
10-APR-25	GAM43	Cal Check NLACTVTY-59	Investigate		
10-APR-25	GAM43	Cal Check NLACTVTY-1332	Investigate		
10-APR-25	GAM46	All Parameters Passed			
10-APR-25	GAM47	All Parameters Passed			
10-APR-25	GAM48	All Parameters Passed			
	GAM50	Cal Check may not have run since 10-APR-2025			Detector locked out.
	GAM50	Bkg Check may not have run since 10-APR-2025			Detector locked out.
10-APR-25	GAM52	All Parameters Passed			
09-APR-25	GAM53	Cal Check may not have run since 10-APR-2025			NOT RUN
09-APR-25	GAM56	Cal Check may not have run since 10-APR-2025			NOT RUN
10-APR-25	GAM61	Cal Check NLACTVTY-662	Investigate		
10-APR-25	XRAY1	All Parameters Passed			
10-APR-25	XRAY2	All Parameters Passed			

10-APR-25	XRAY3	All Parameters Passed			
10-APR-25	XRAY6	All Parameters Passed			
10-APR-25	XRAY7	All Parameters Passed			
10-APR-25	XRAY8	Cal Check PSFWHM-40	Investigate		

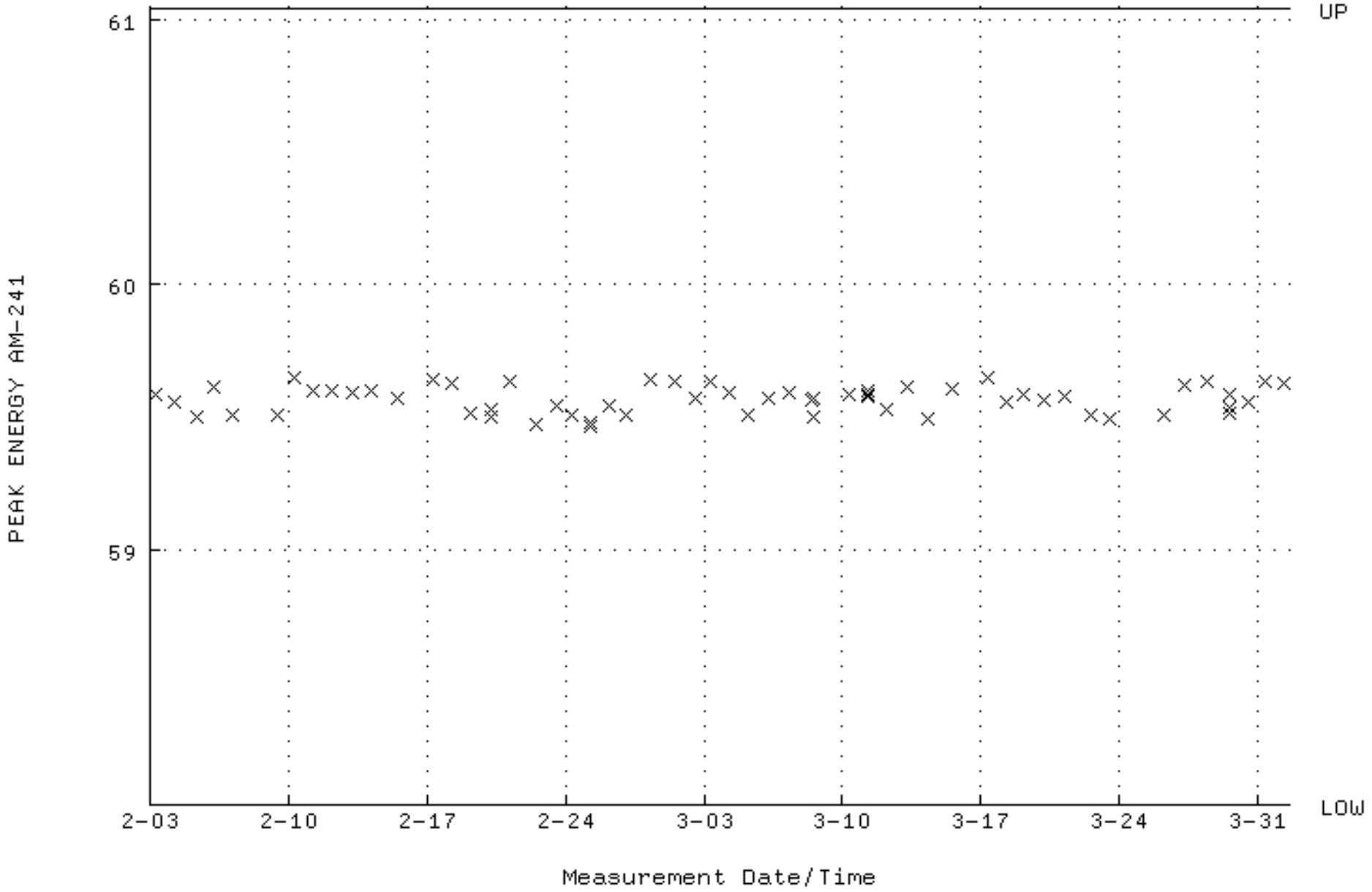
APPROVAL DATE: 10-APR-2025 APPROVAL TIME: 09:52:41

APPROVED BY: Rebekah Futch PROCEDURE # GL-RAD-I-001

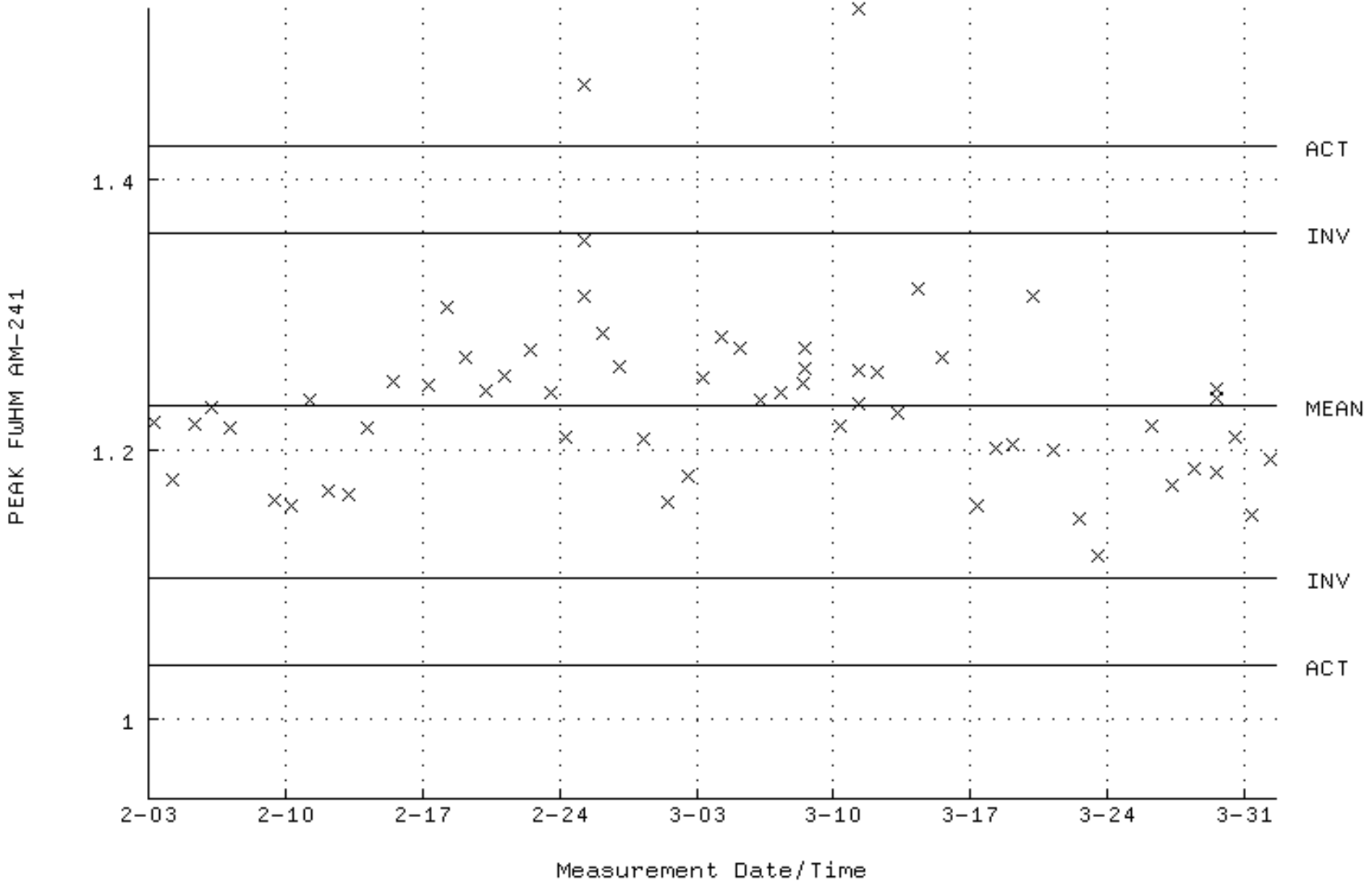
The Investigate flag does not indicate a lockout and is approved for use. Action flags that have not been approved are locked out of service.

Background and Efficiency Data

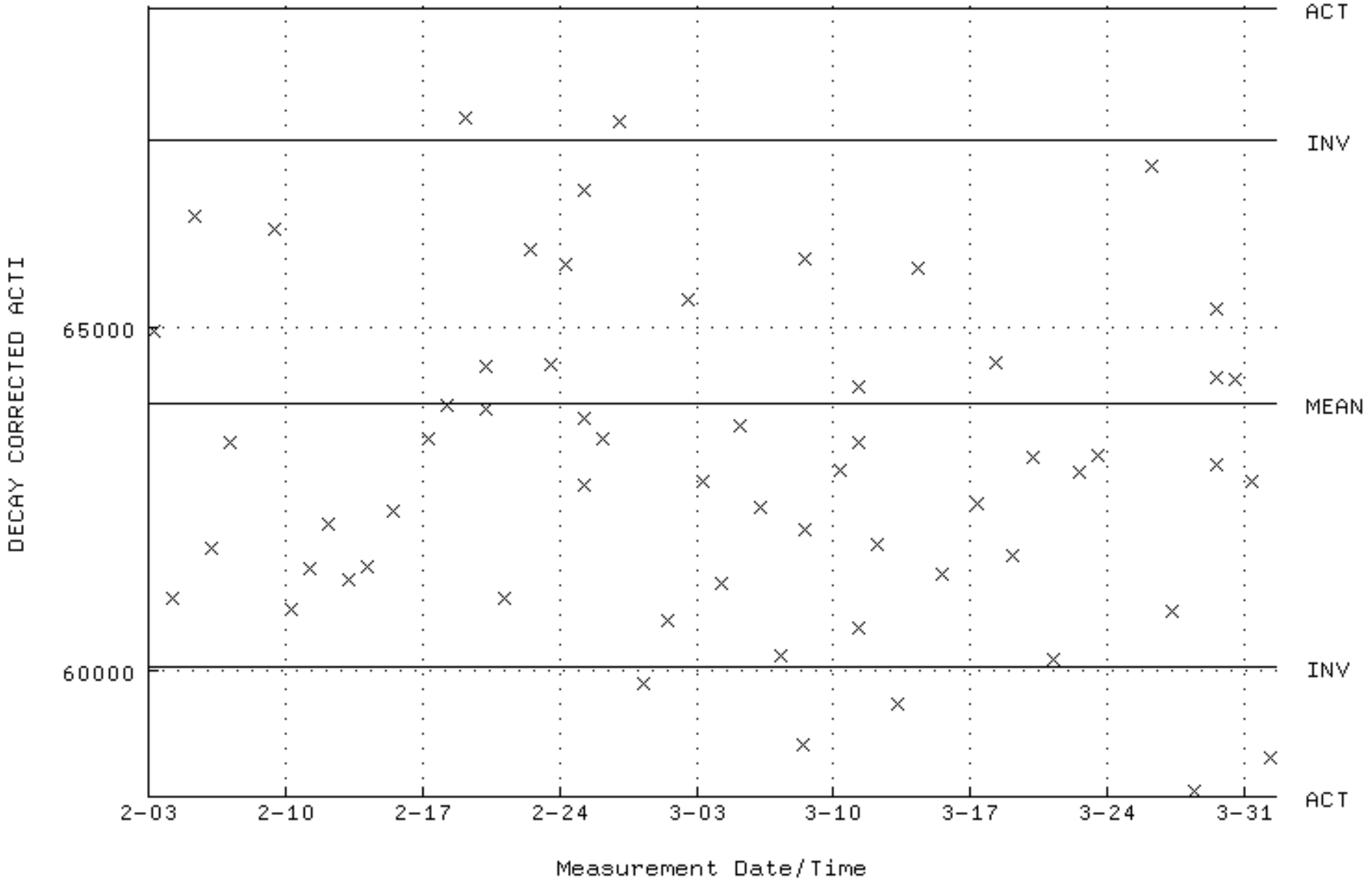
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 06:43:17 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



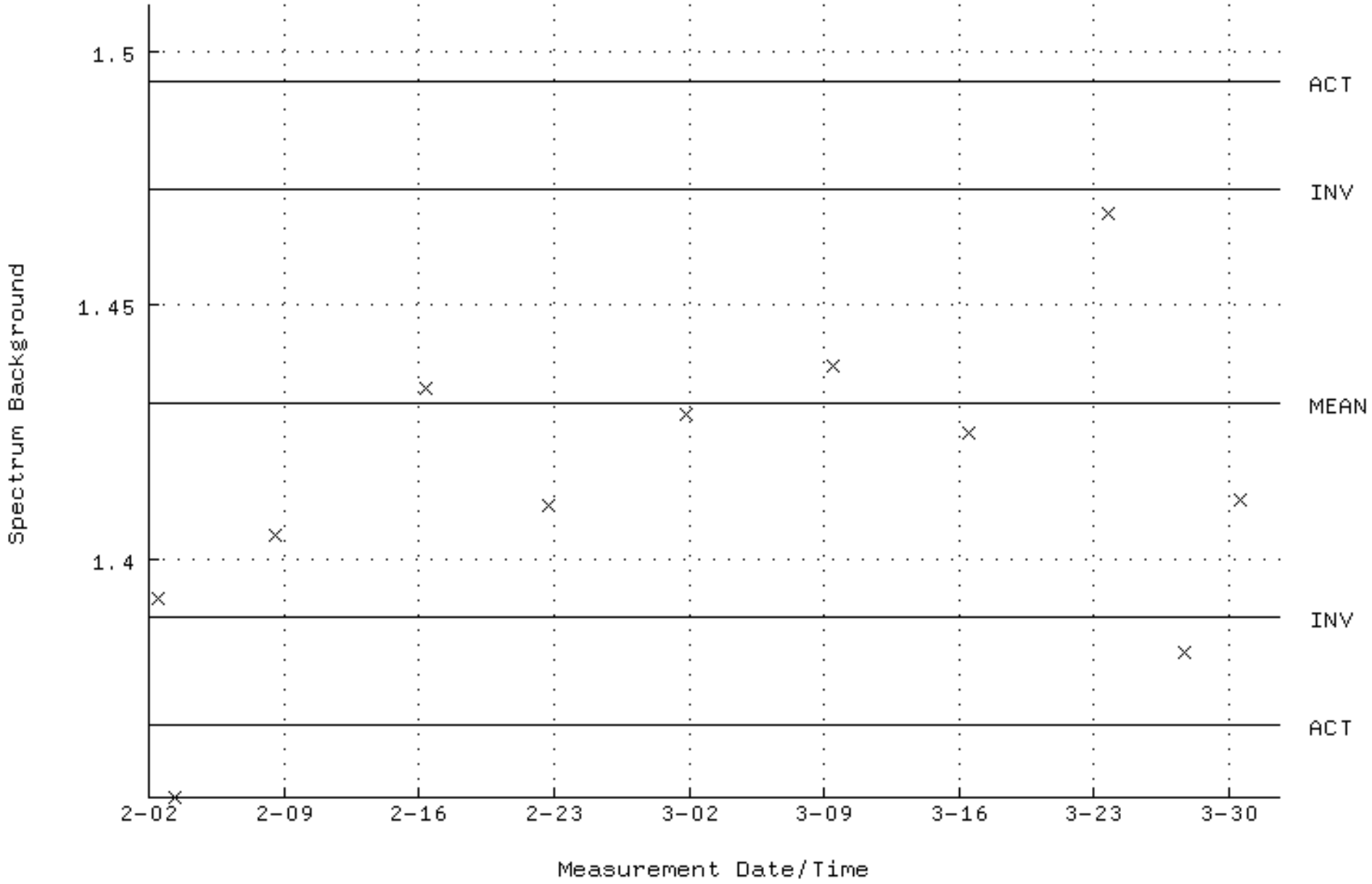
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 06:43:17 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.23320 +- 6.423878E-02 (5.21 %)



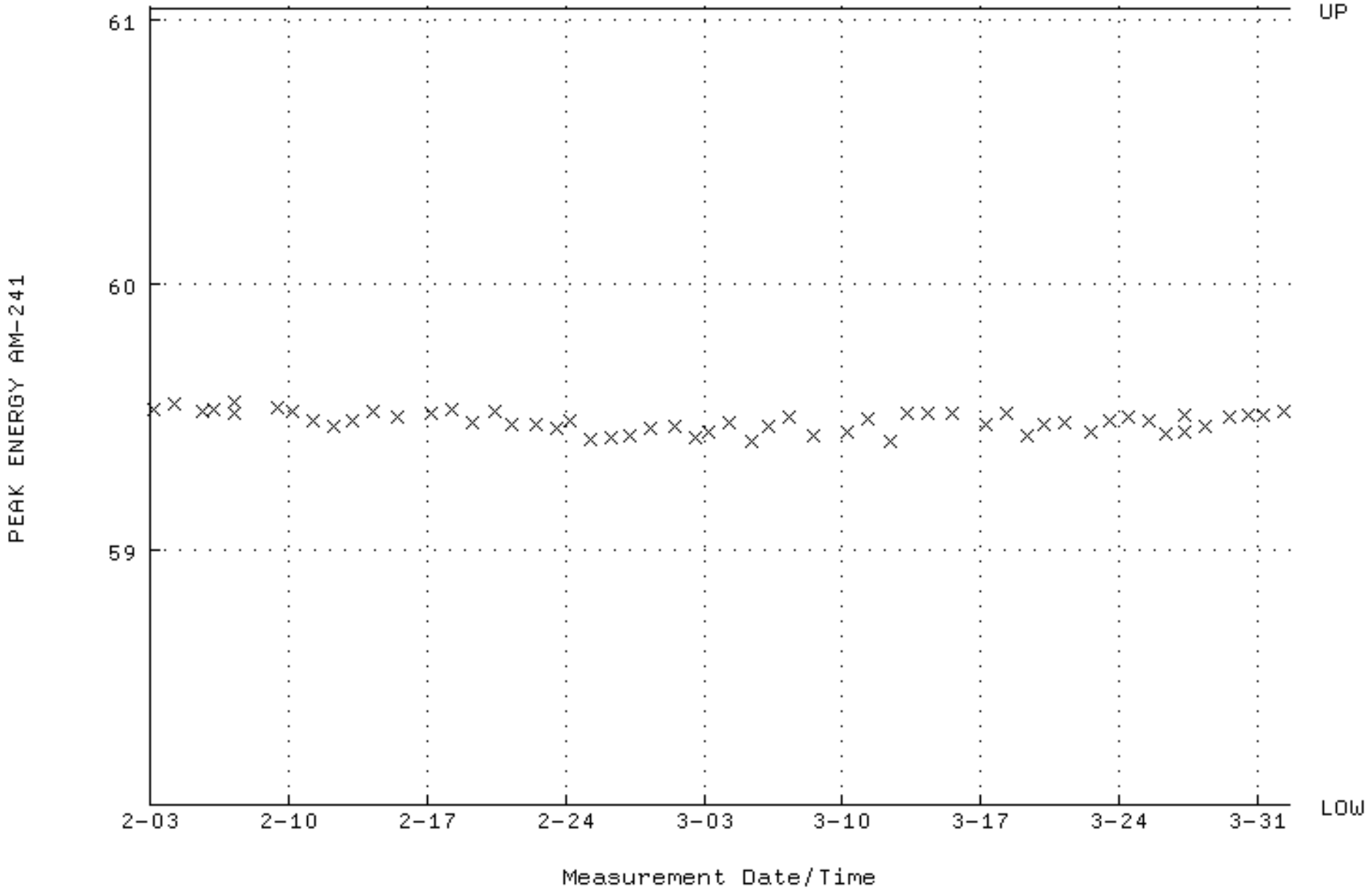
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 06:43:17 through 1-APR-2025 12:00:00
Mean +- Std Dev : 63899.8 +- 1914.80 (3.00 %)



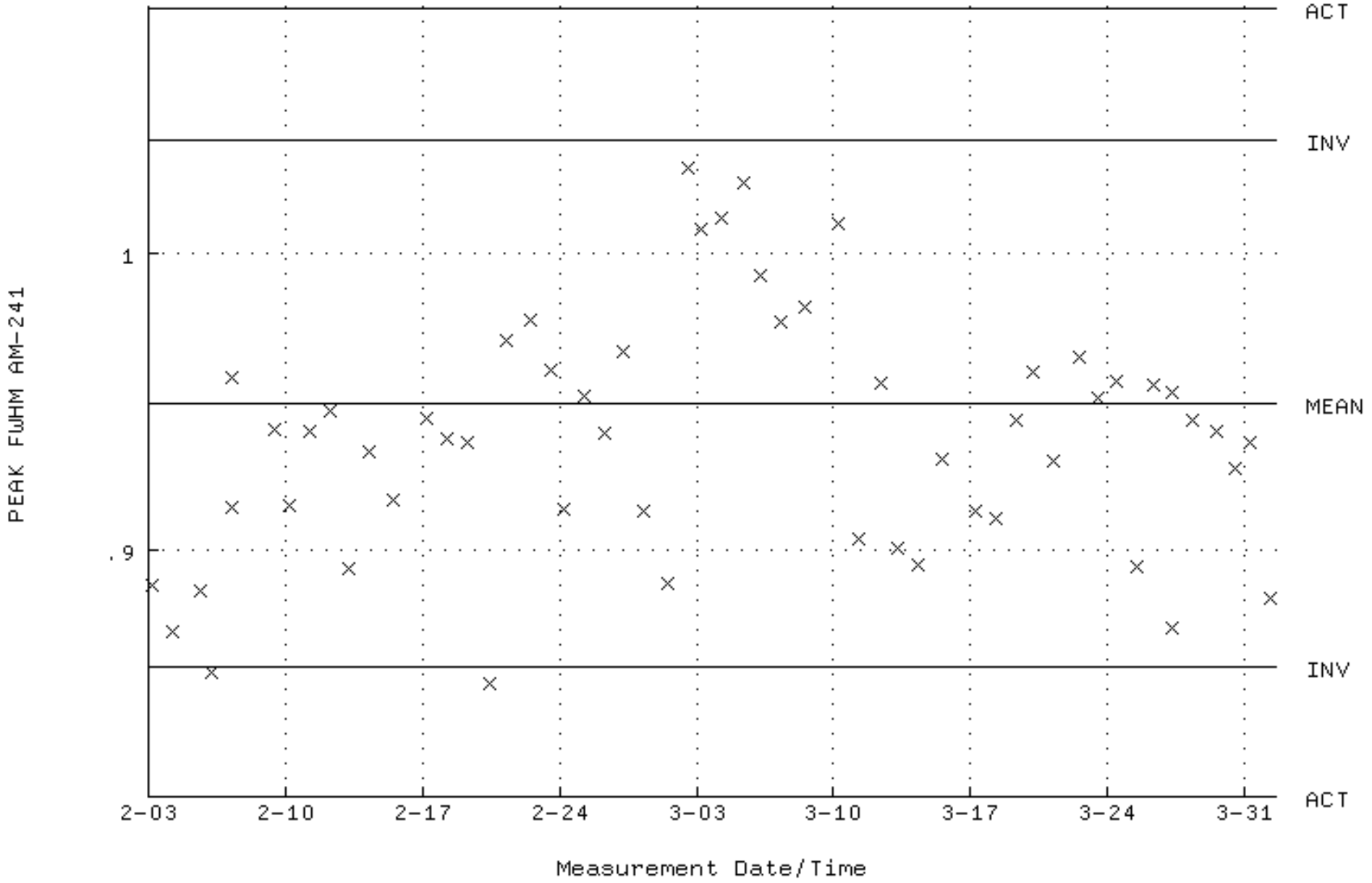
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM01.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:36:44 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.43087 +- 2.109282E-02 (1.47 %)



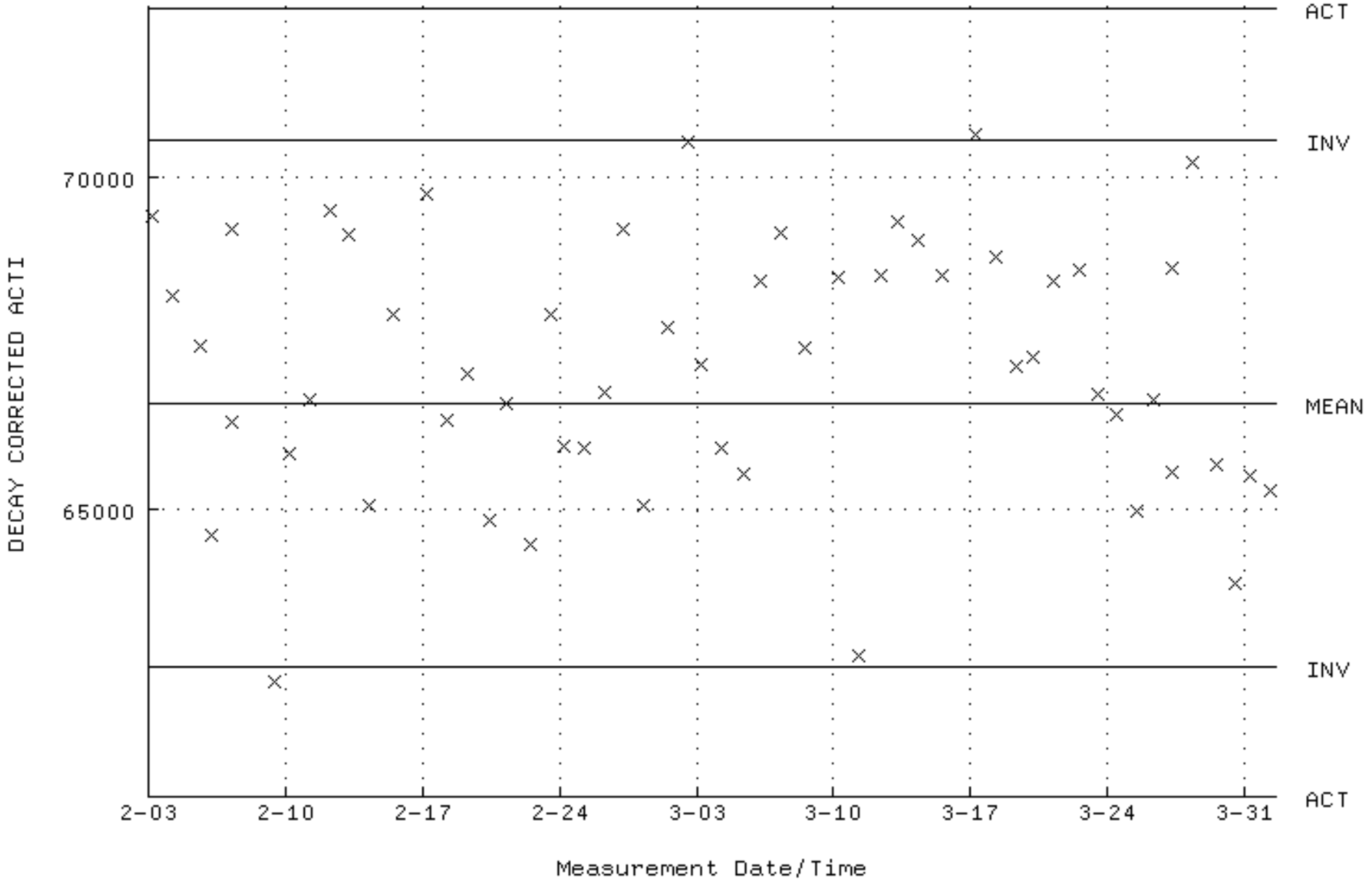
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM02_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 04:59:46 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



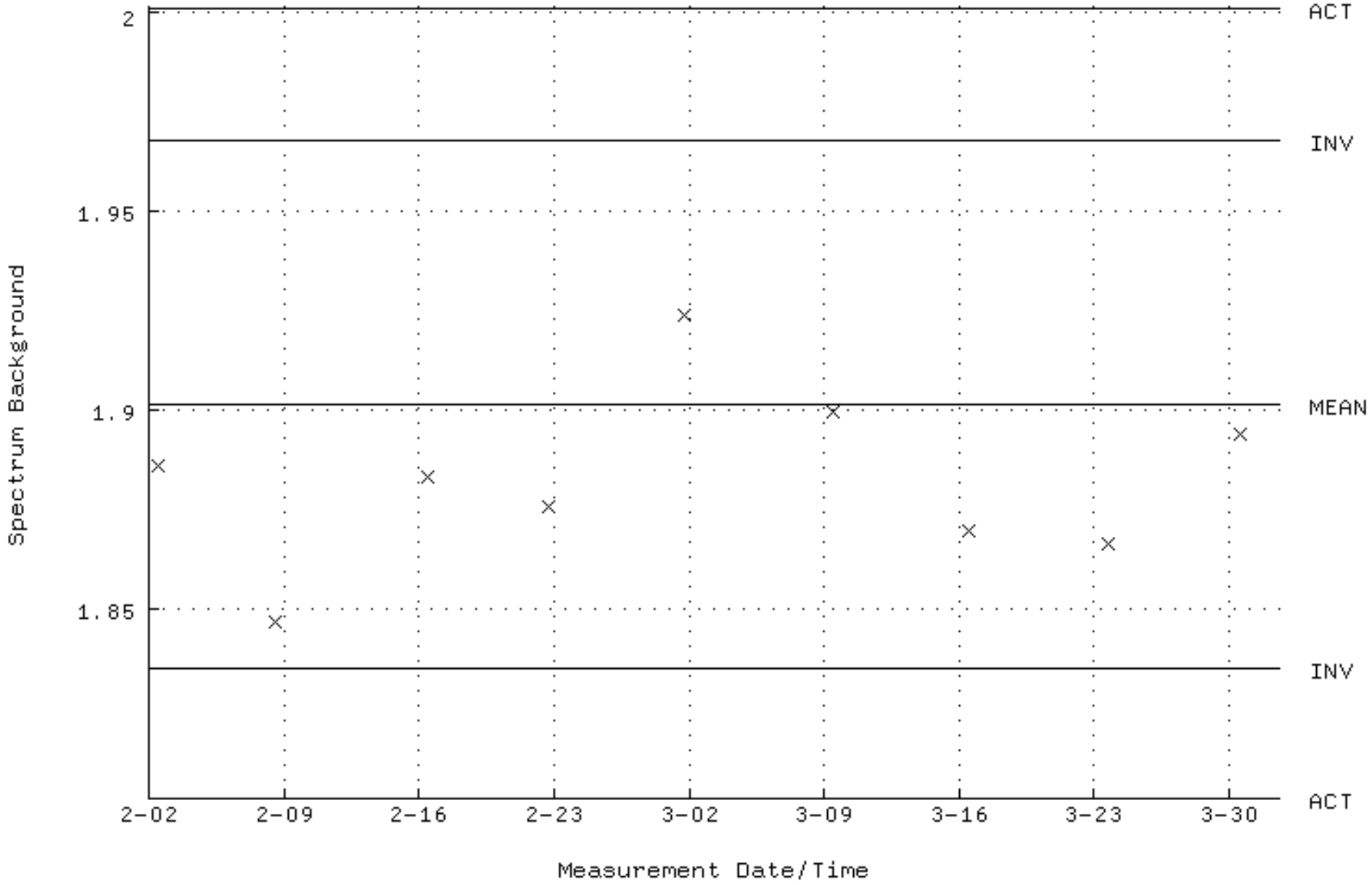
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM02_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 04:59:46 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.949607 +- 4.415848E-02 (4.65 %)



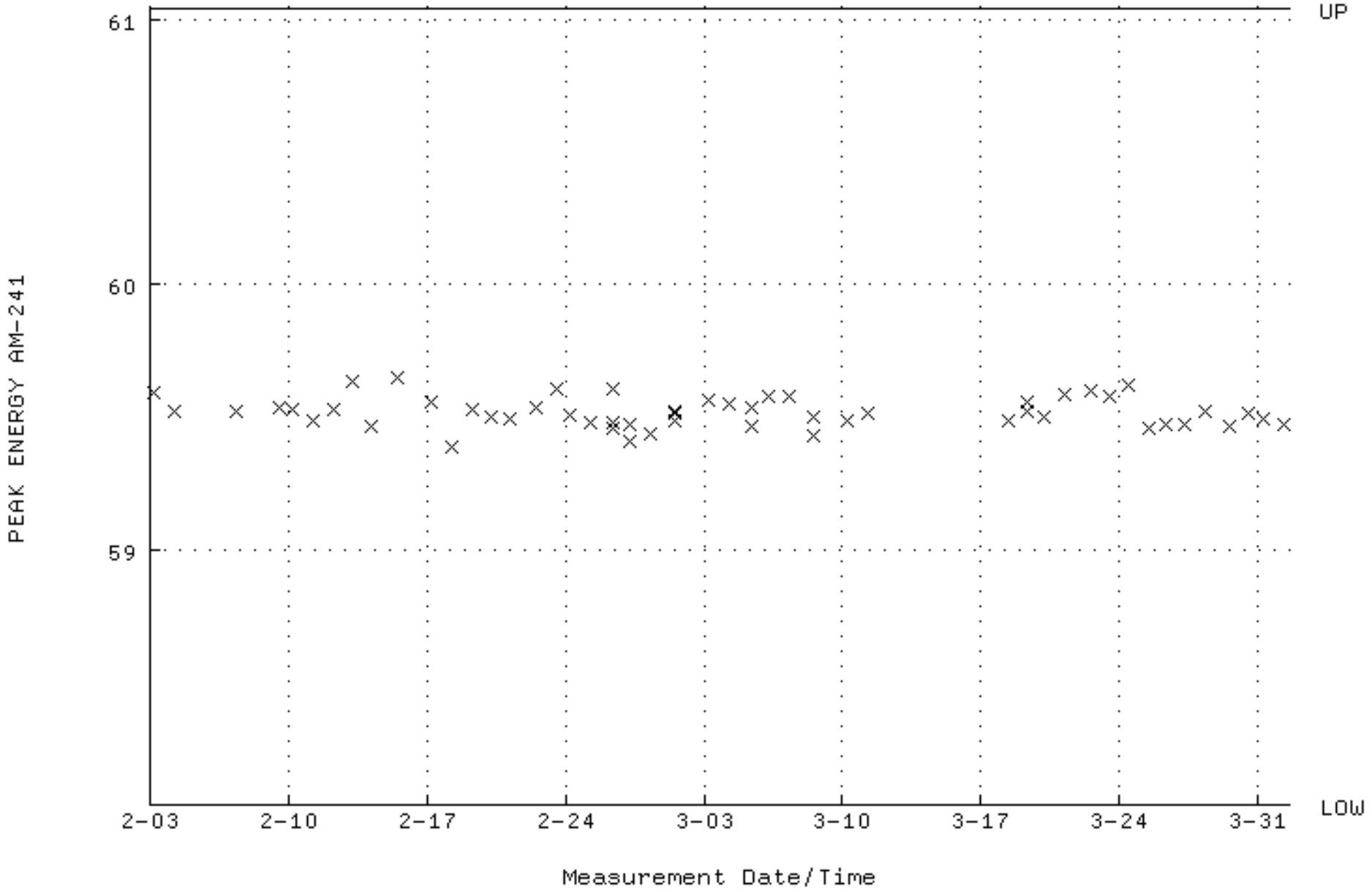
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM02_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 04:59:46 through 1-APR-2025 12:00:00
Mean +- Std Dev : 66606.7 +- 1985.97 (2.98 %)



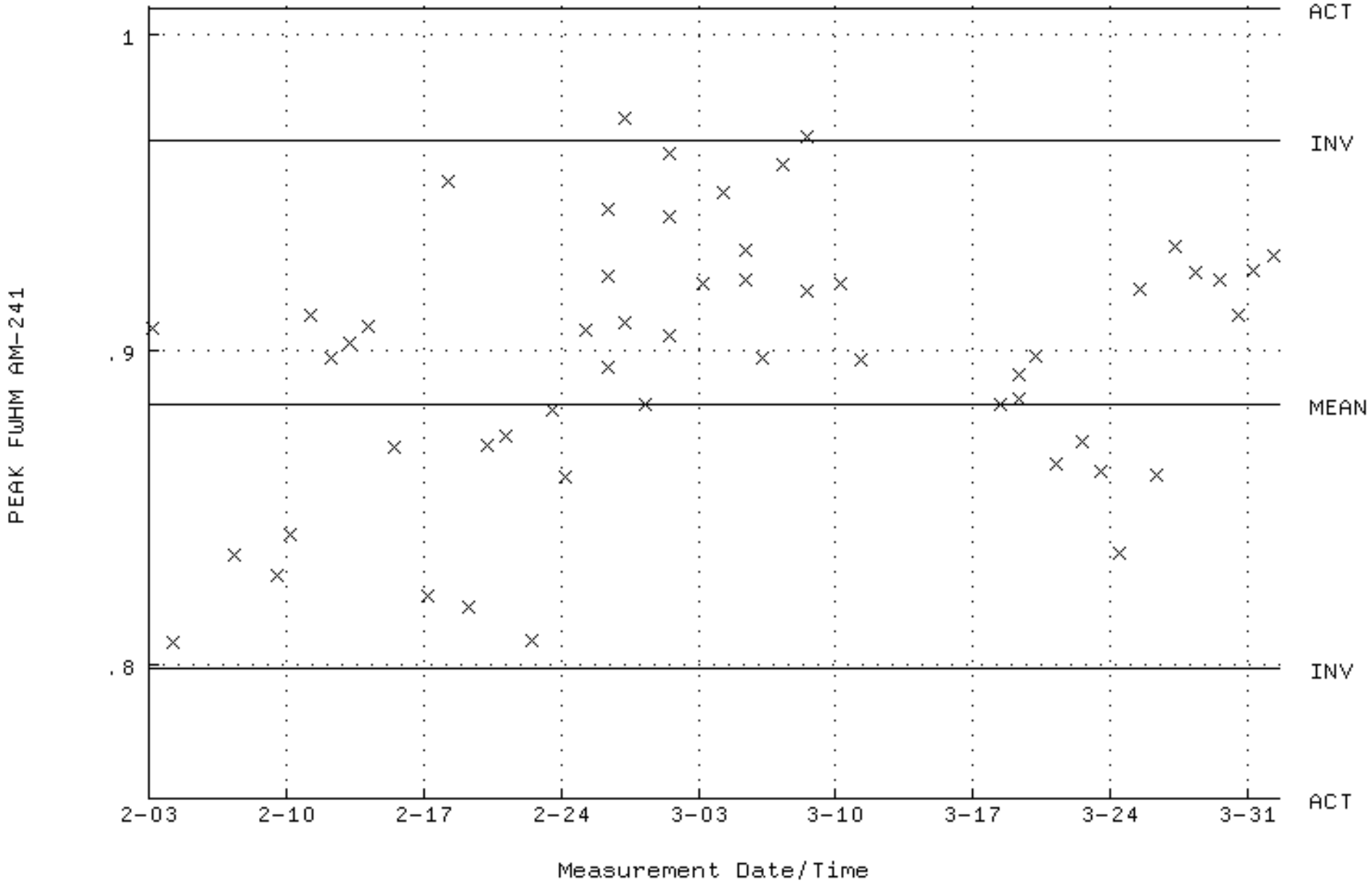
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM02.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:36:49 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.90144 +- 3.309586E-02 (1.74 %)



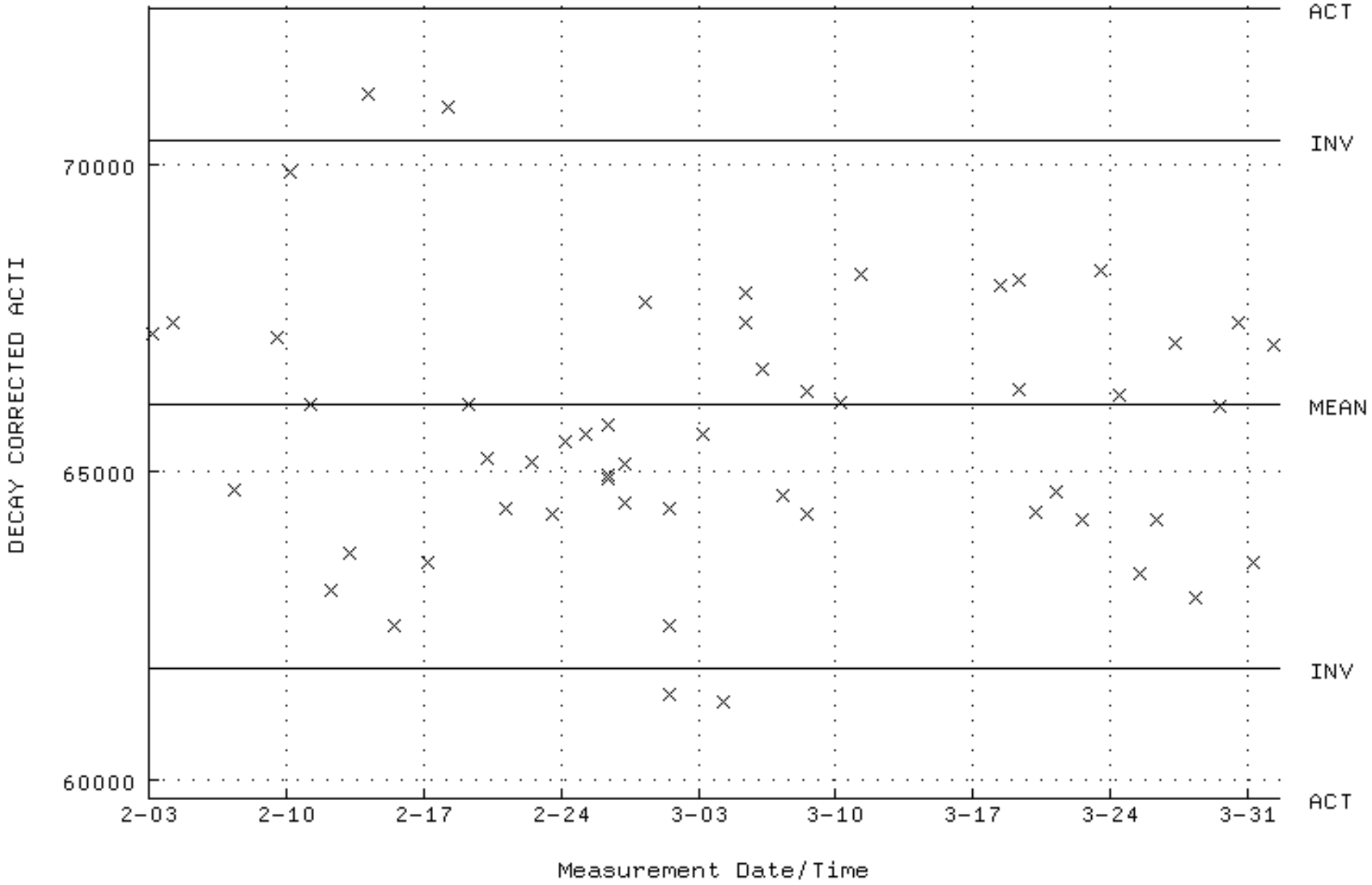
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 04:59:51 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



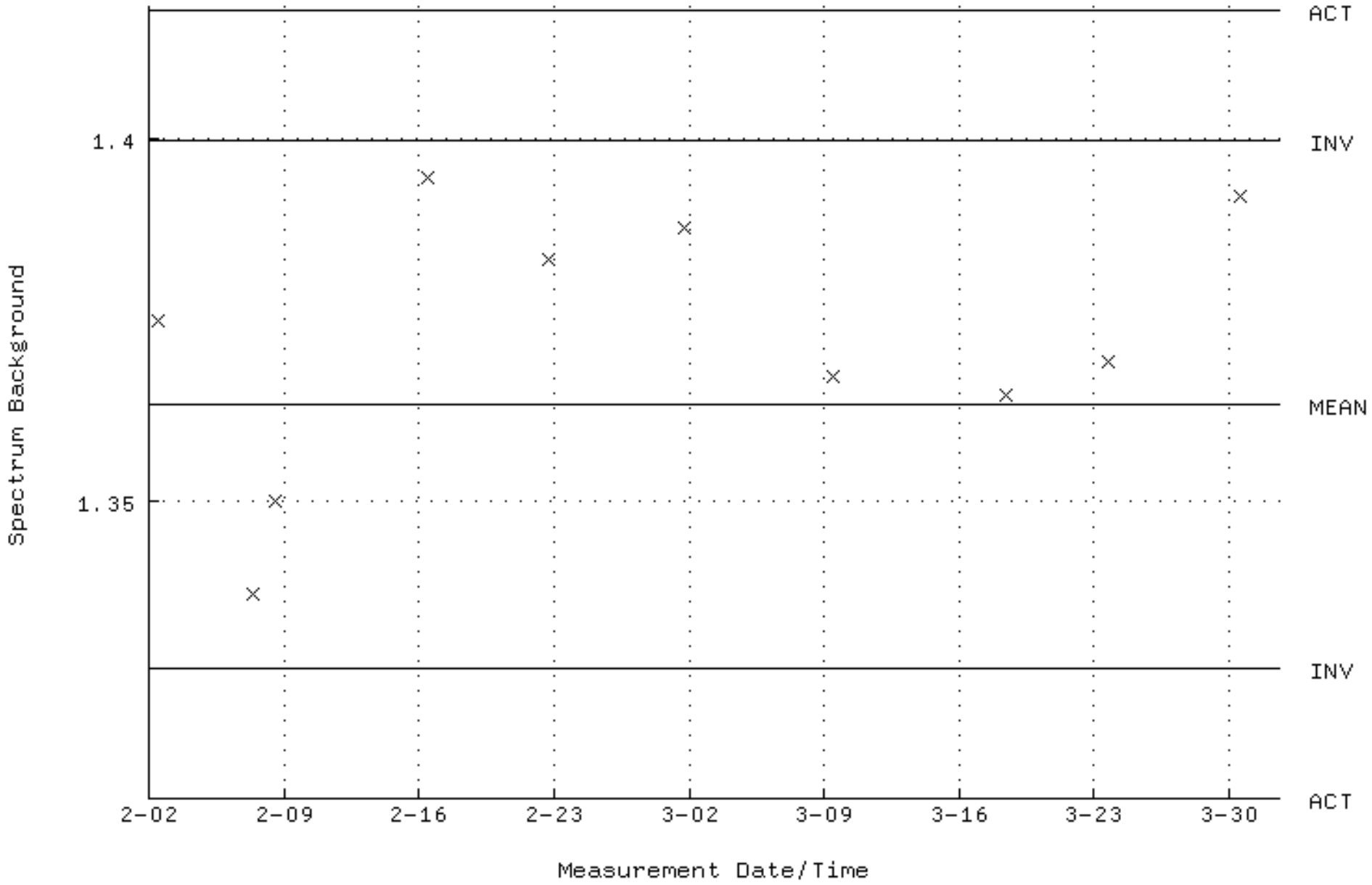
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM04_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 04:59:51 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.882883 +- 4.186578E-02 (4.74 %)



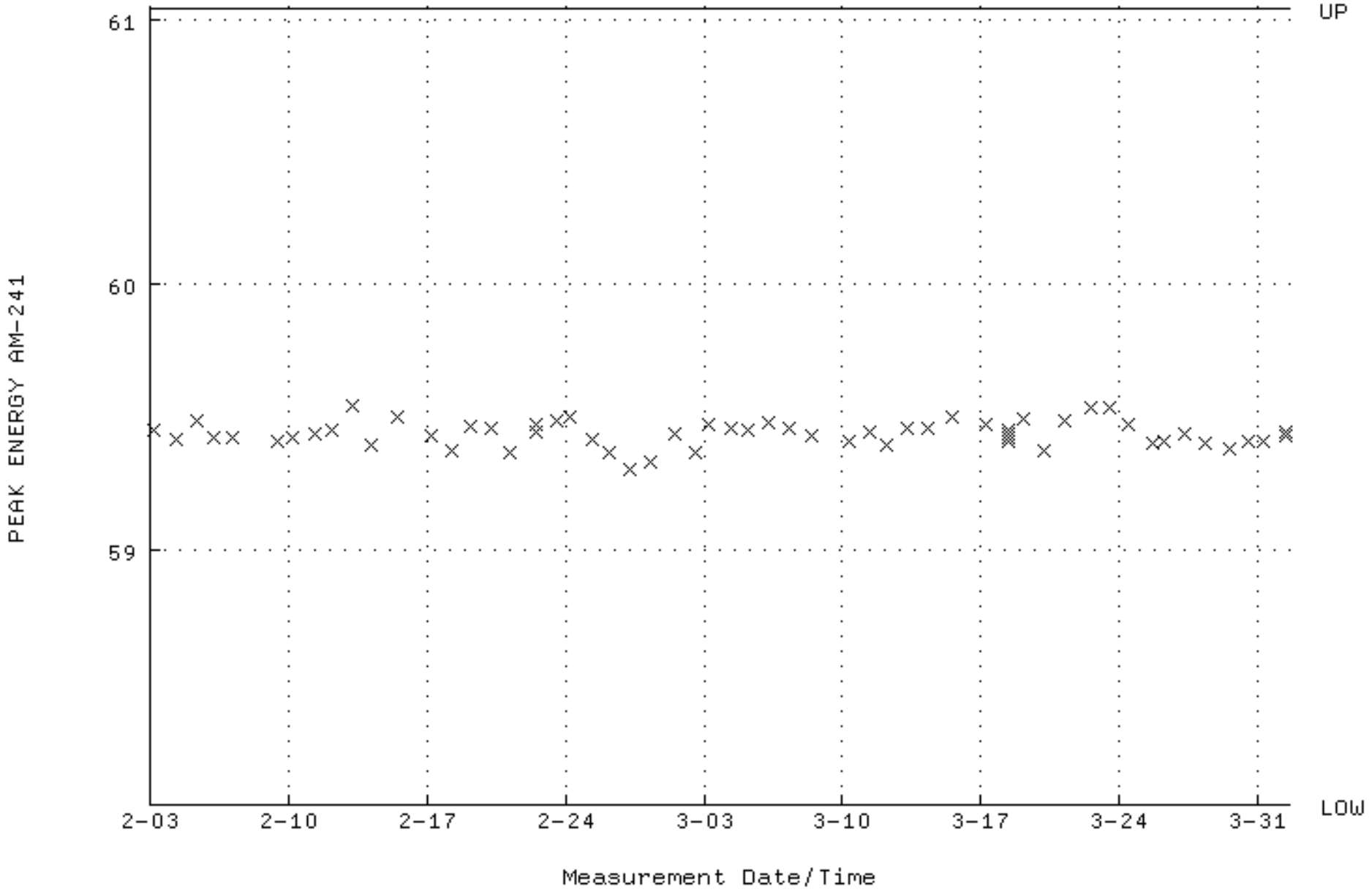
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Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 04:59:51 through 1-APR-2025 12:00:00
Mean +- Std Dev : 66115.8 +- 2138.53 (3.23 %)



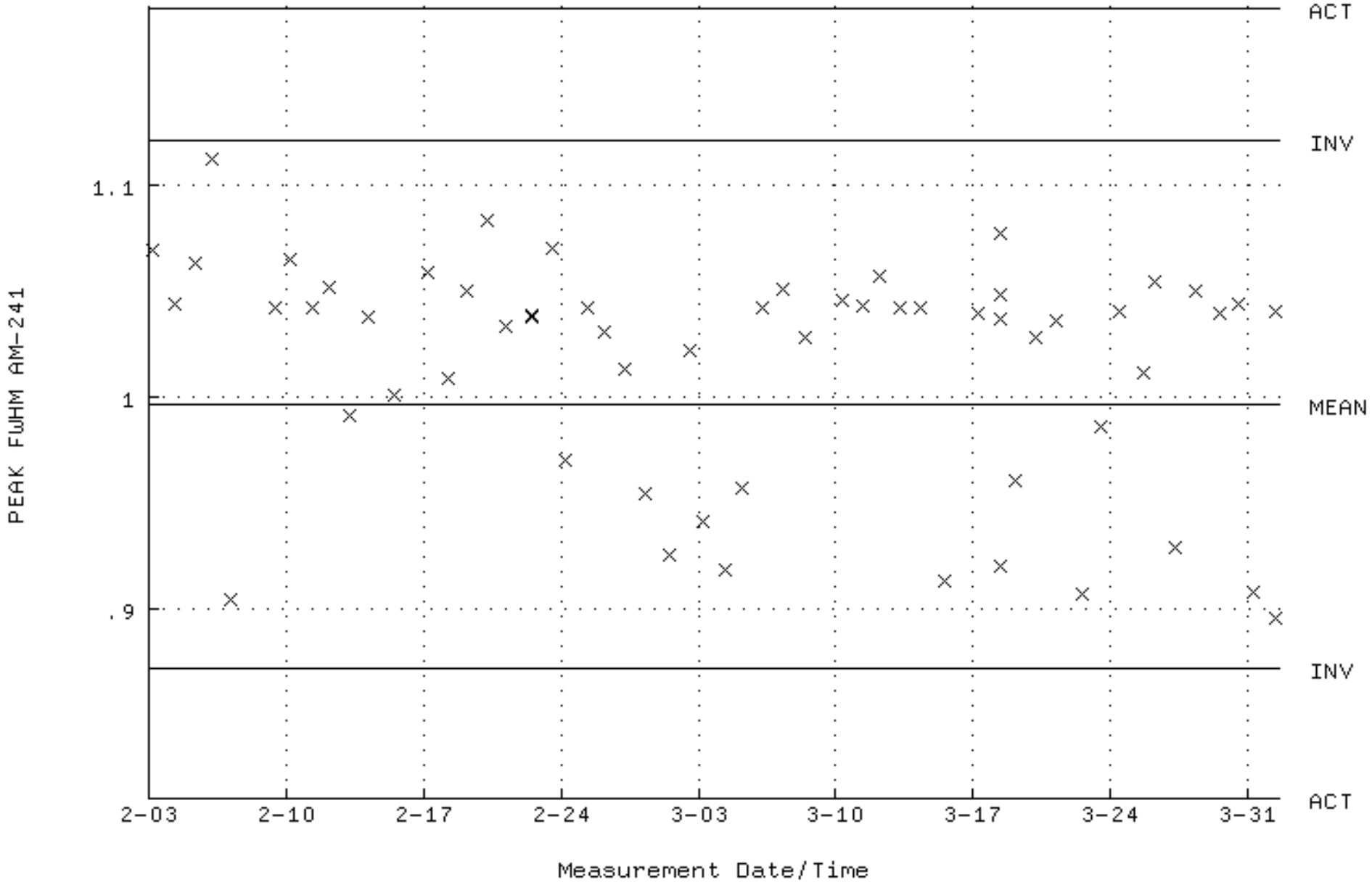
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM04.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:36:54 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.36338 +- 1.819350E-02 (1.33 %)



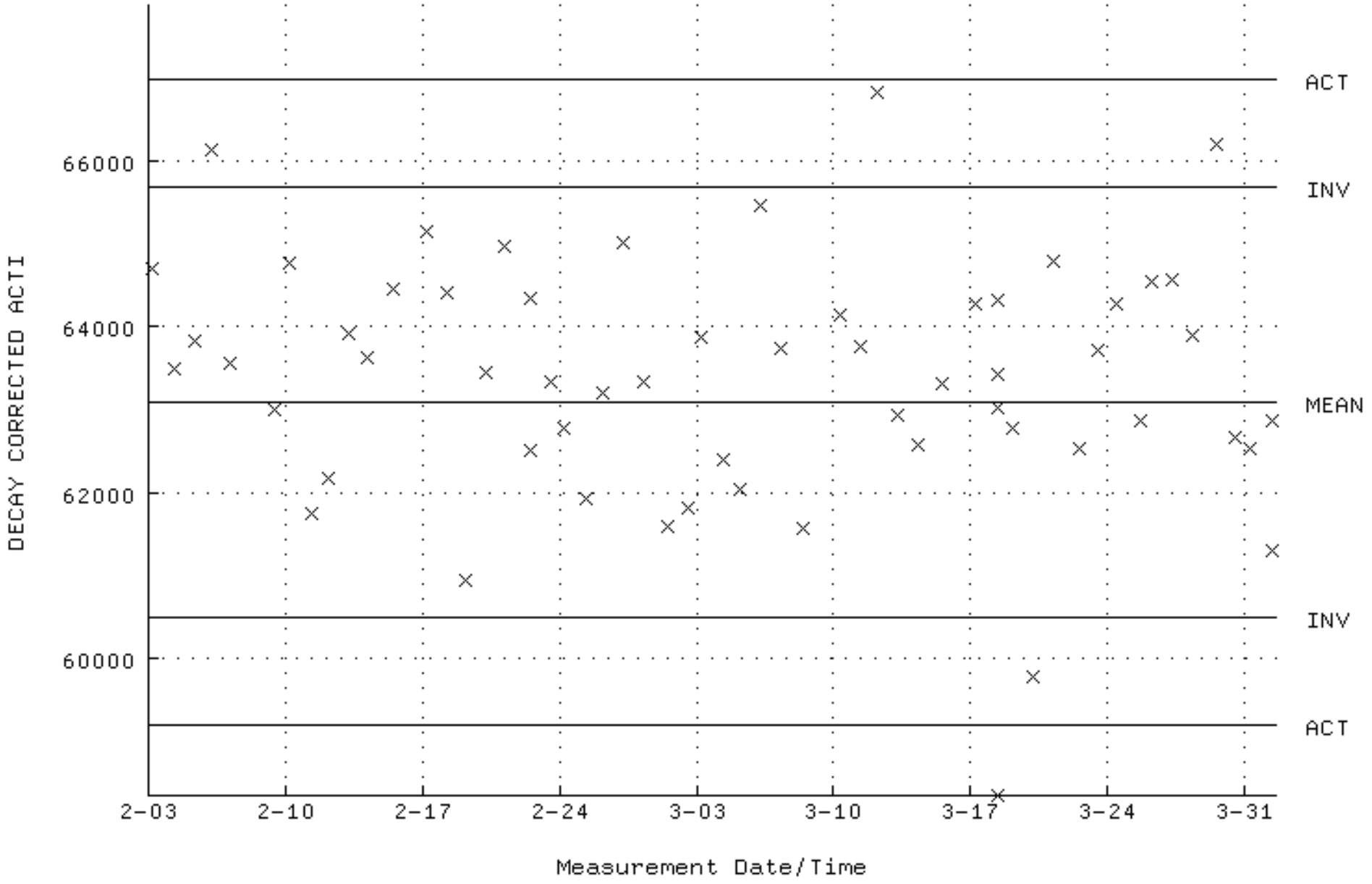
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 04:59:55 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



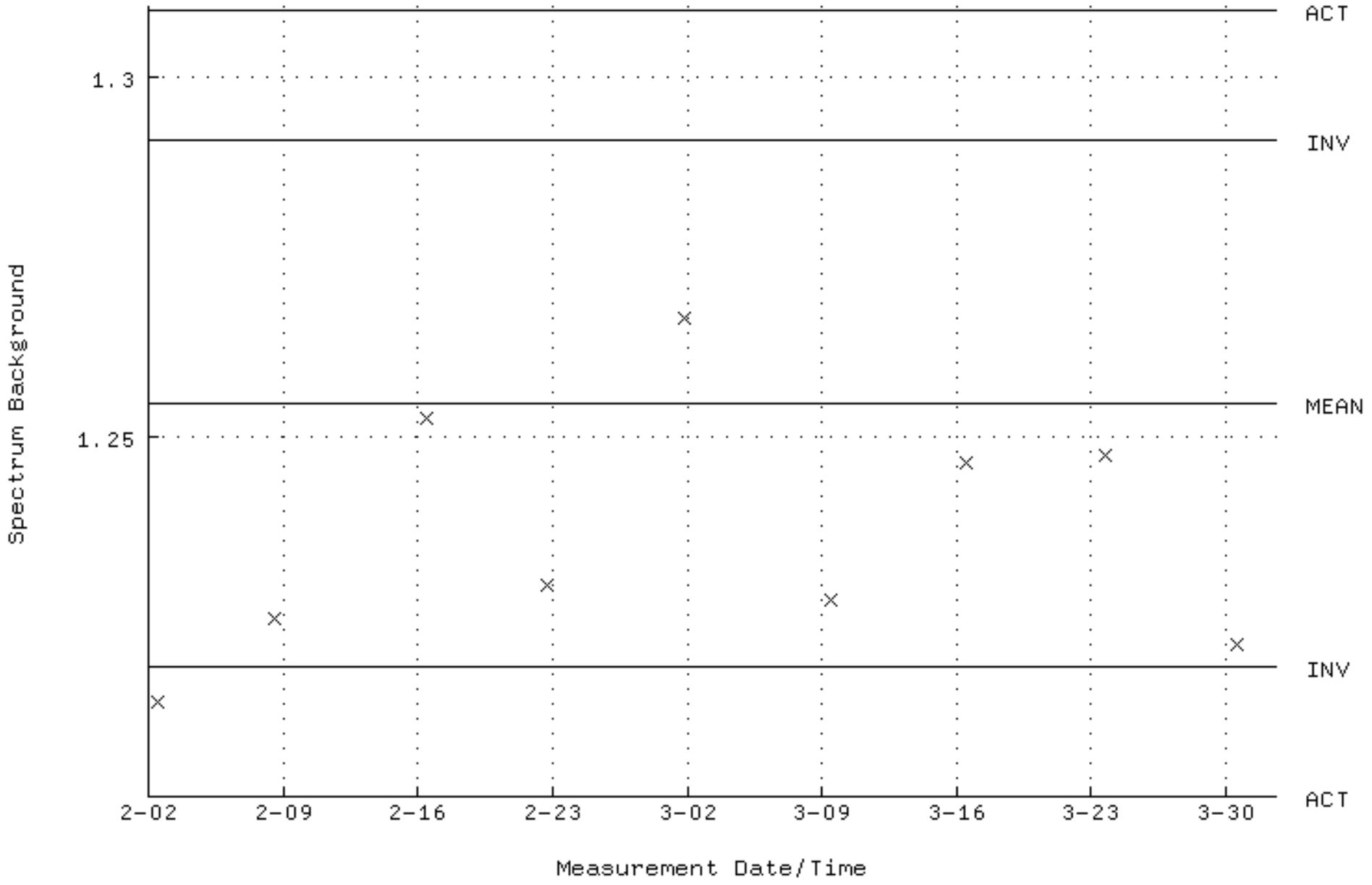
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 04:59:55 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.996804 +- 6.229915E-02 (6.25 %)



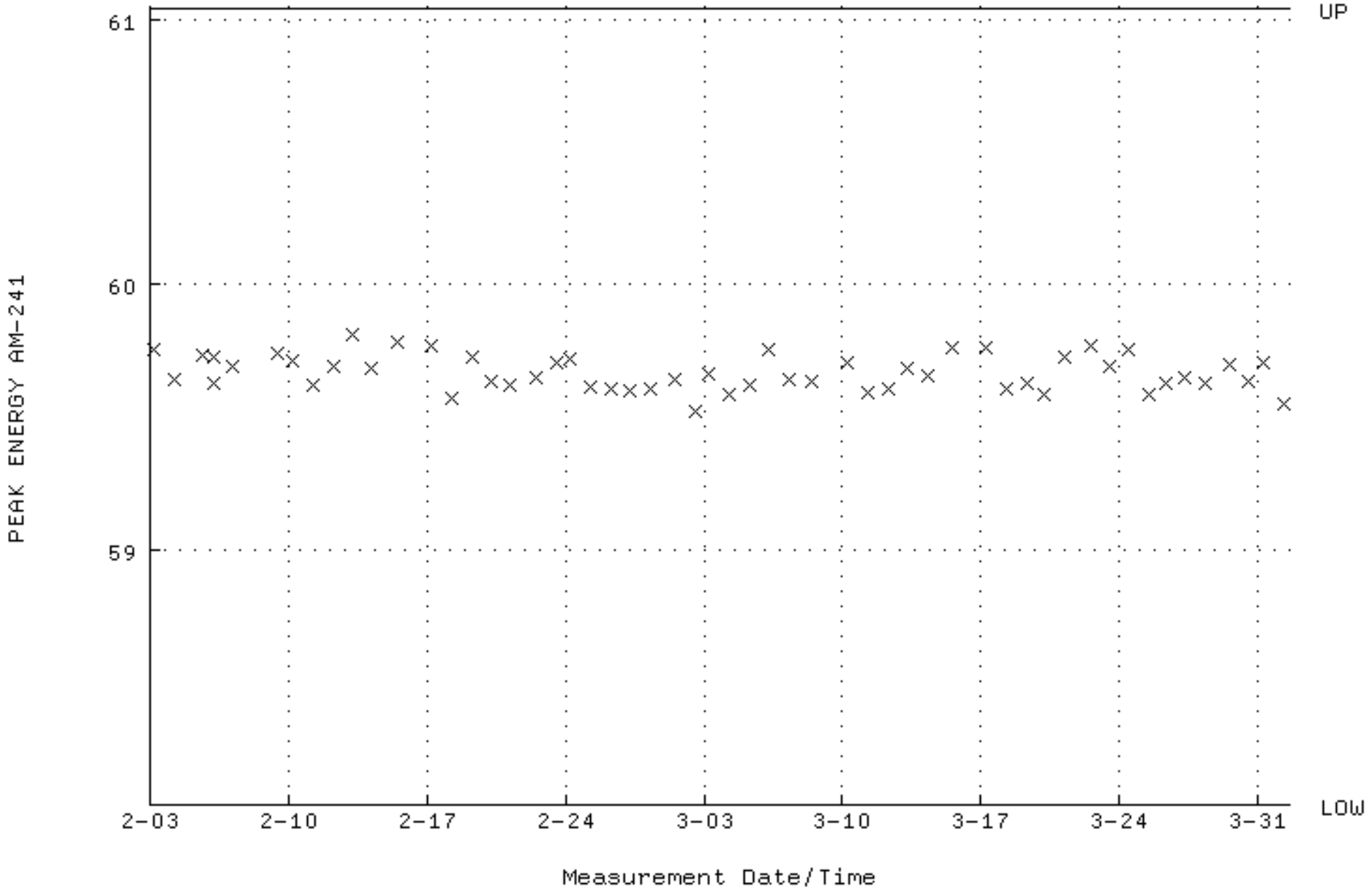
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 04:59:55 through 1-APR-2025 12:00:00
Mean +- Std Dev : 63101.3 +- 1296.73 (2.05 %)



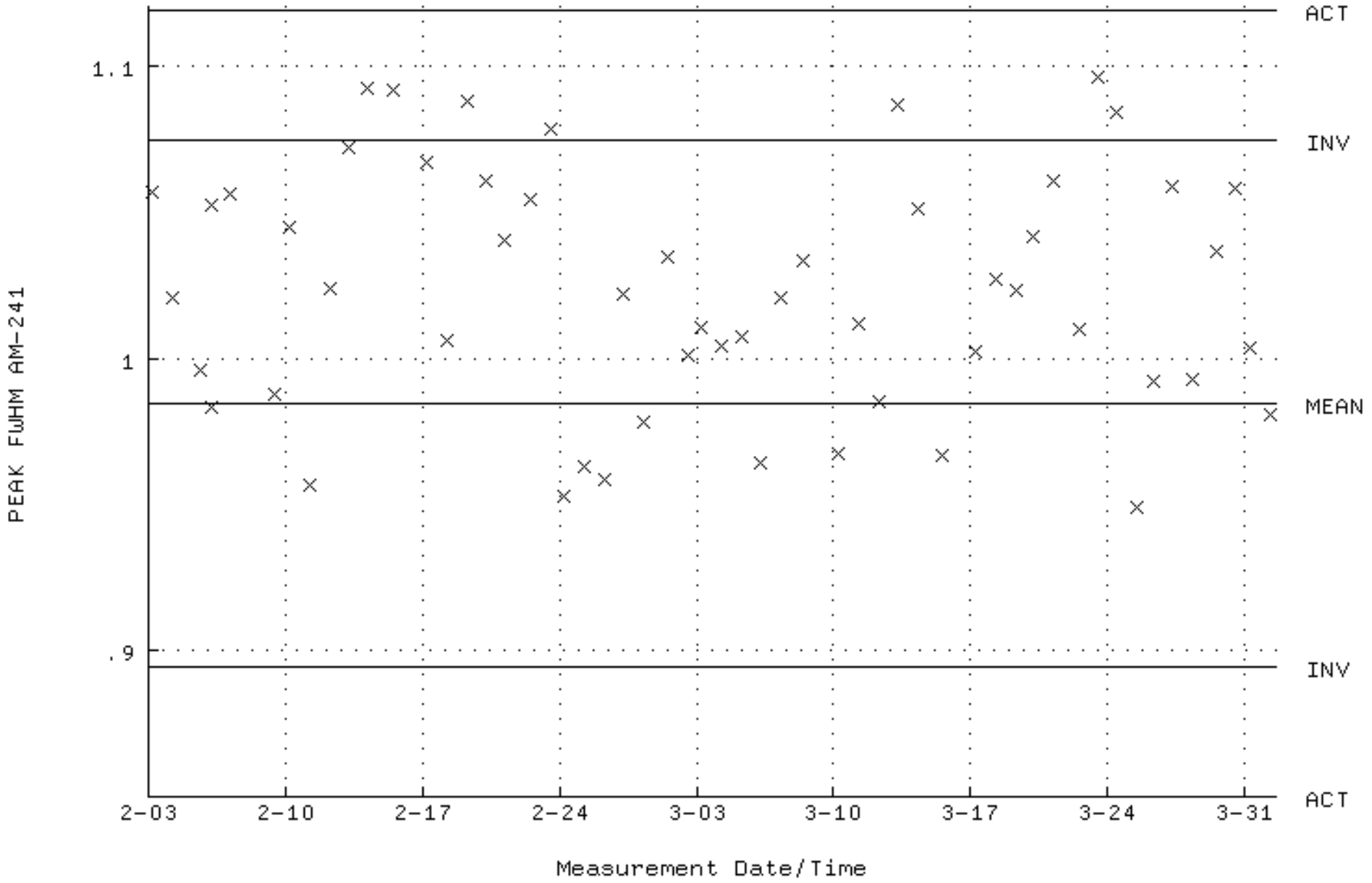
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM06.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:03 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.25484 +- 1.824749E-02 (1.45 %)



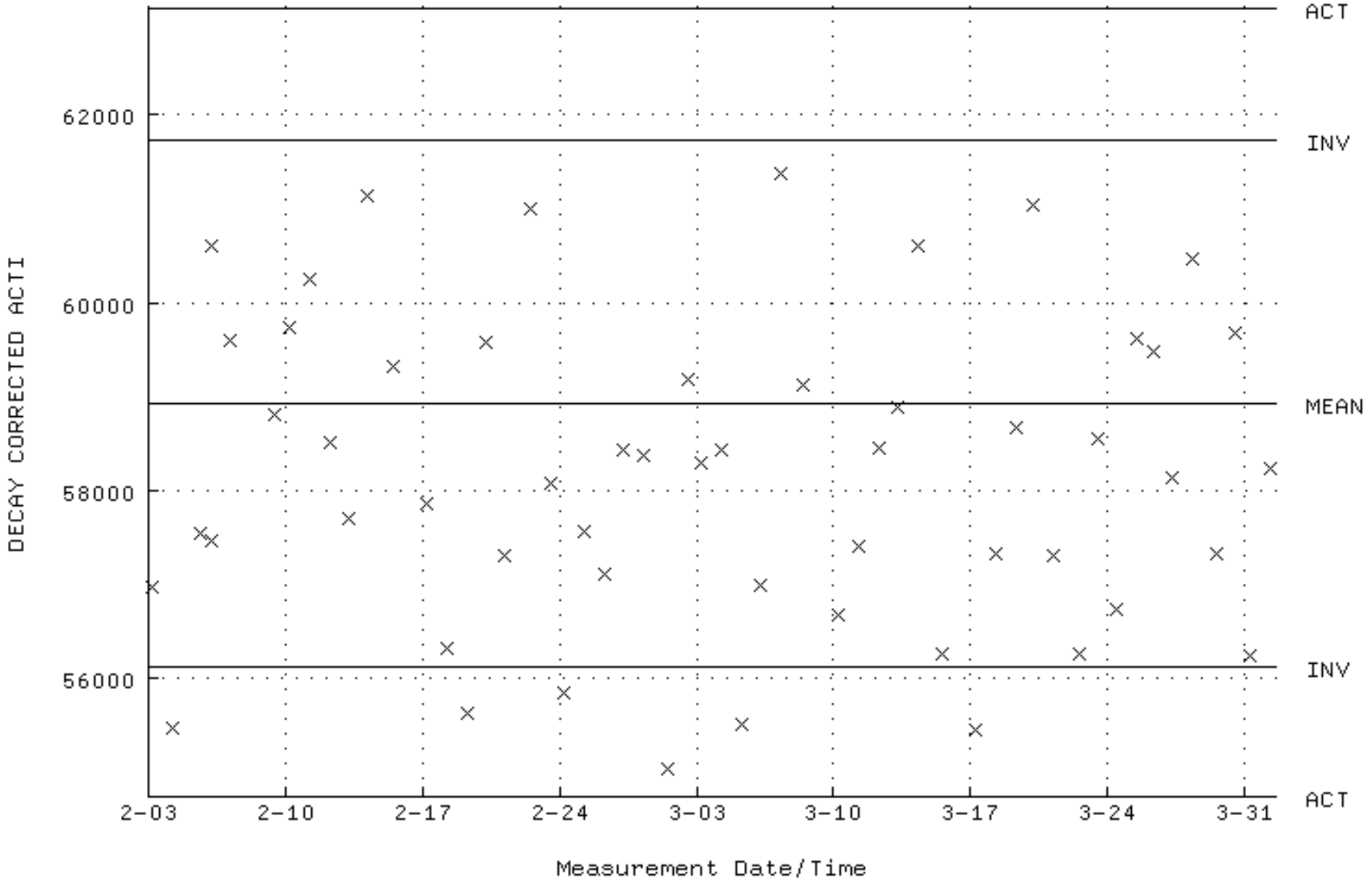
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:00 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



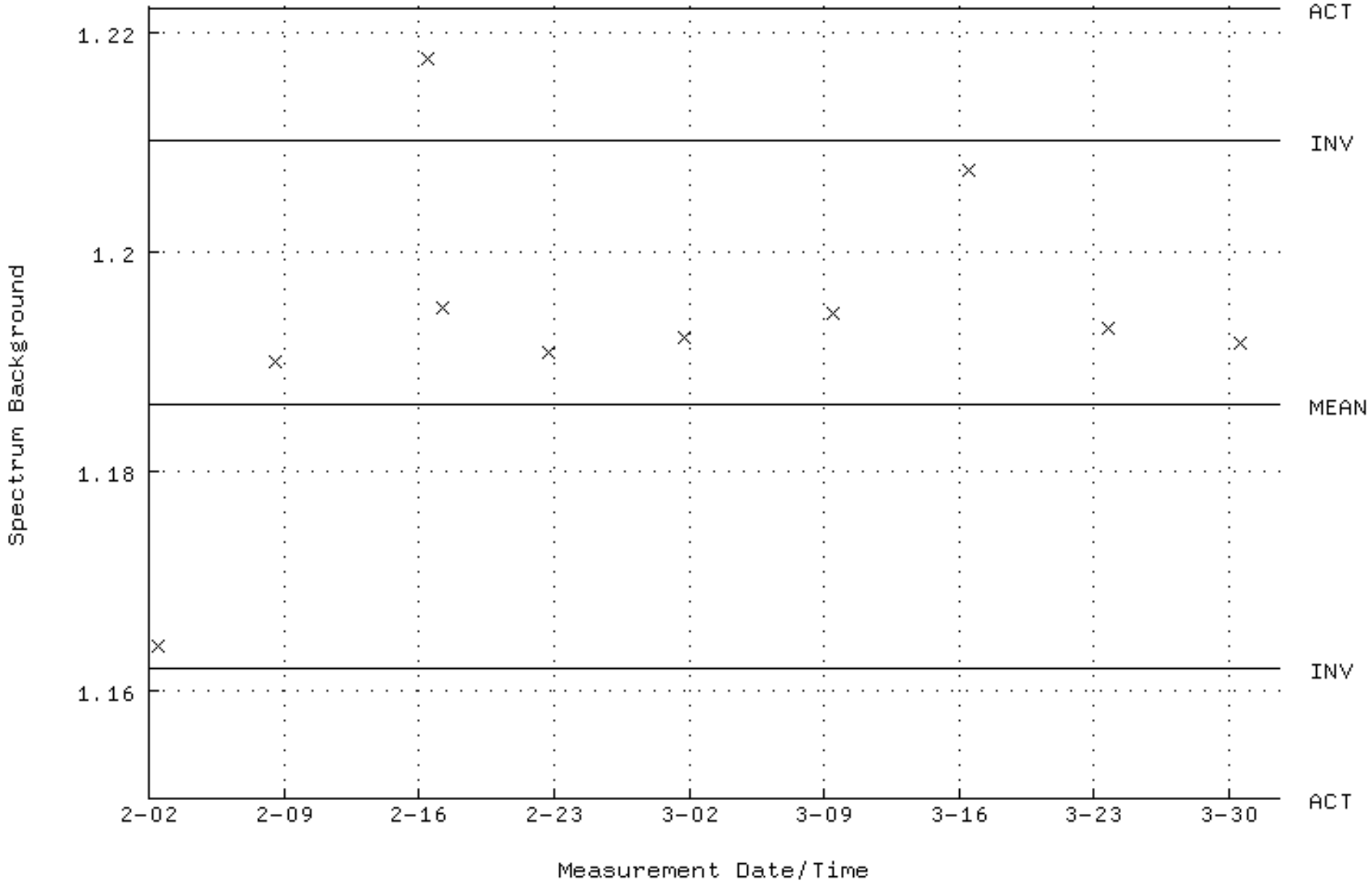
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:00 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.984864 +- 4.505772E-02 (4.58 %)



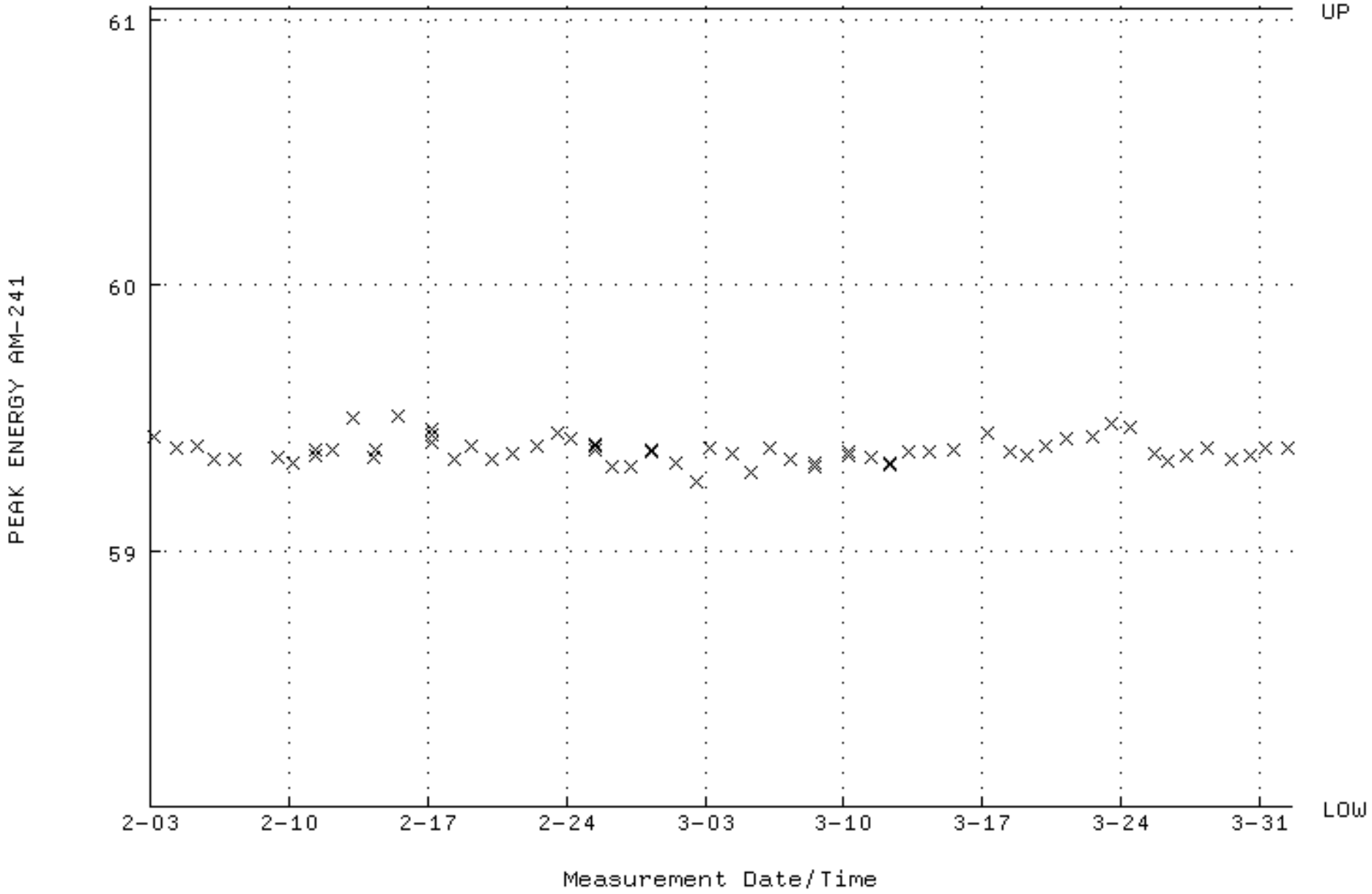
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:00 through 1-APR-2025 12:00:00
Mean +- Std Dev : 58931.9 +- 1401.28 (2.38 %)



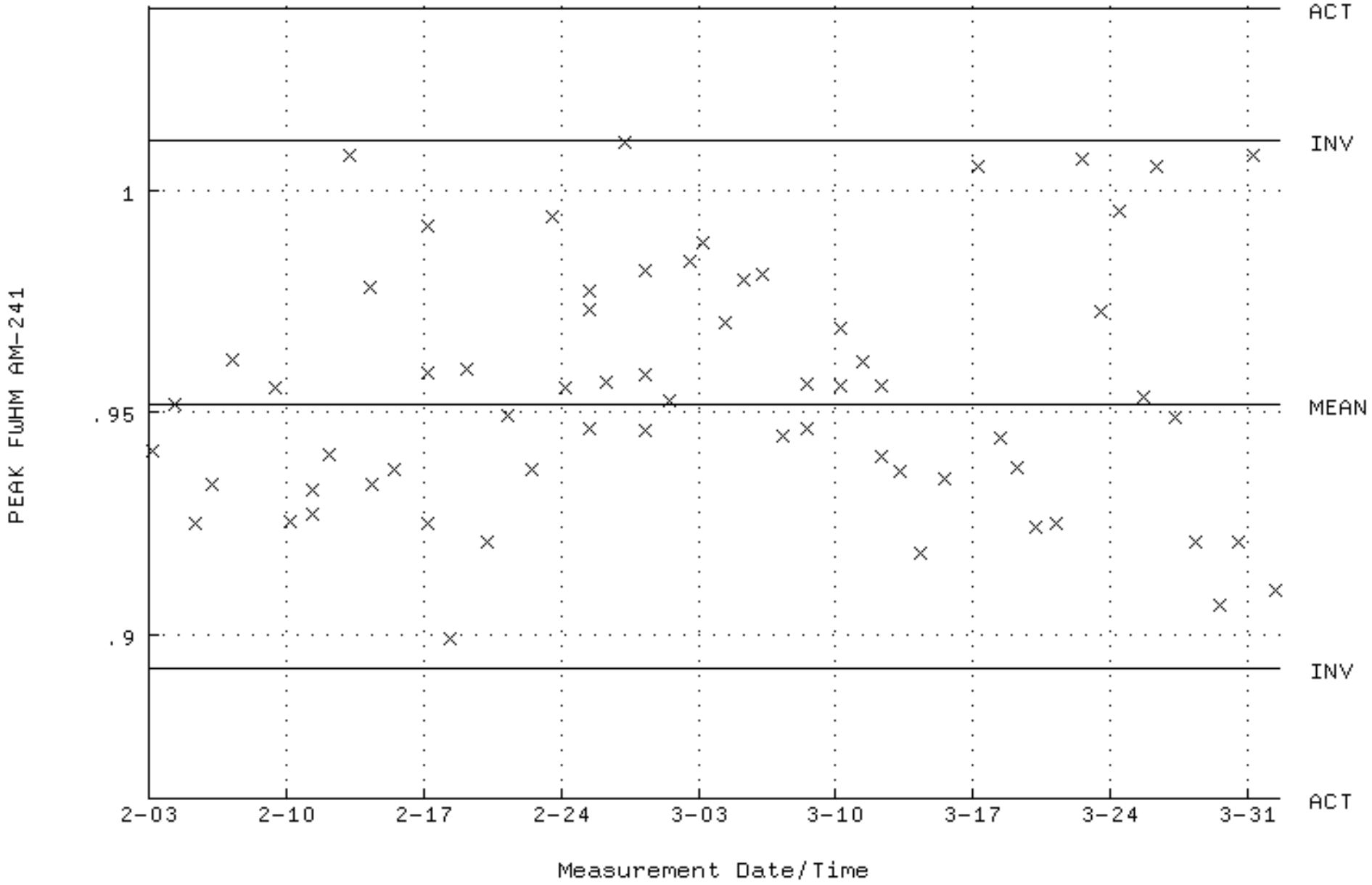
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM07.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:09 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.18615 +- 1.199064E-02 (1.01 %)



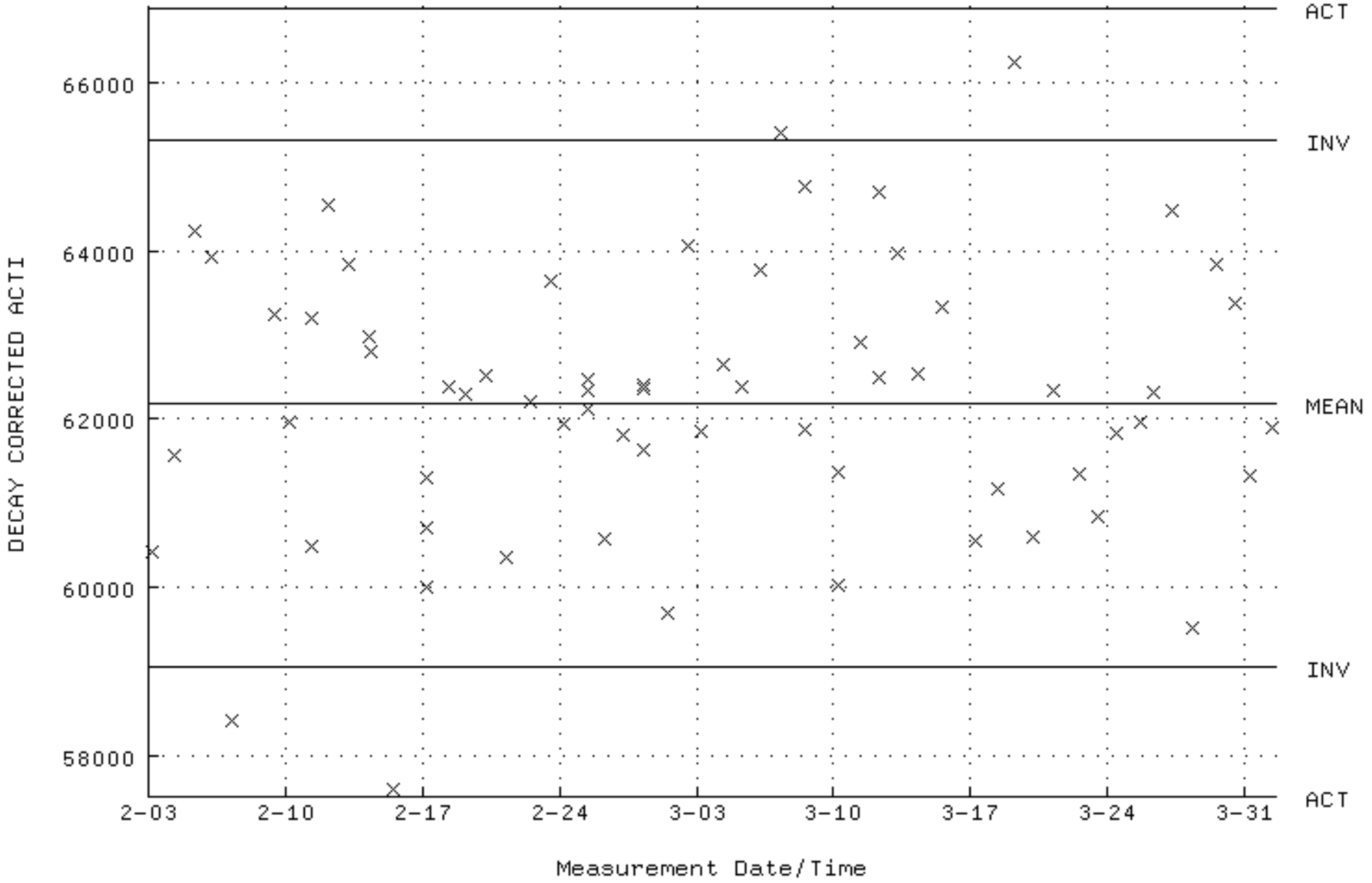
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:05 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



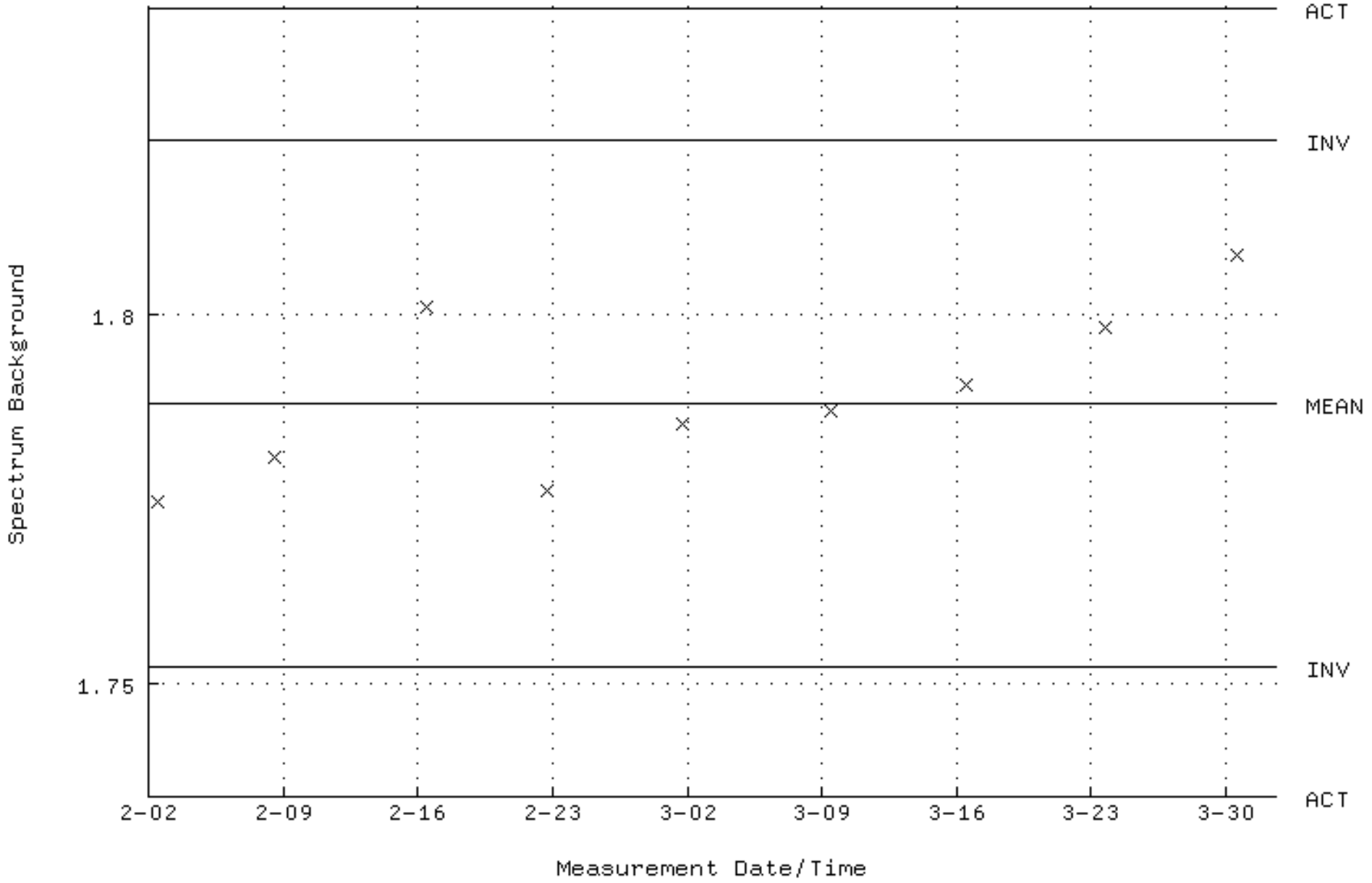
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:05 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.952049 +- 2.957311E-02 (3.11 %)



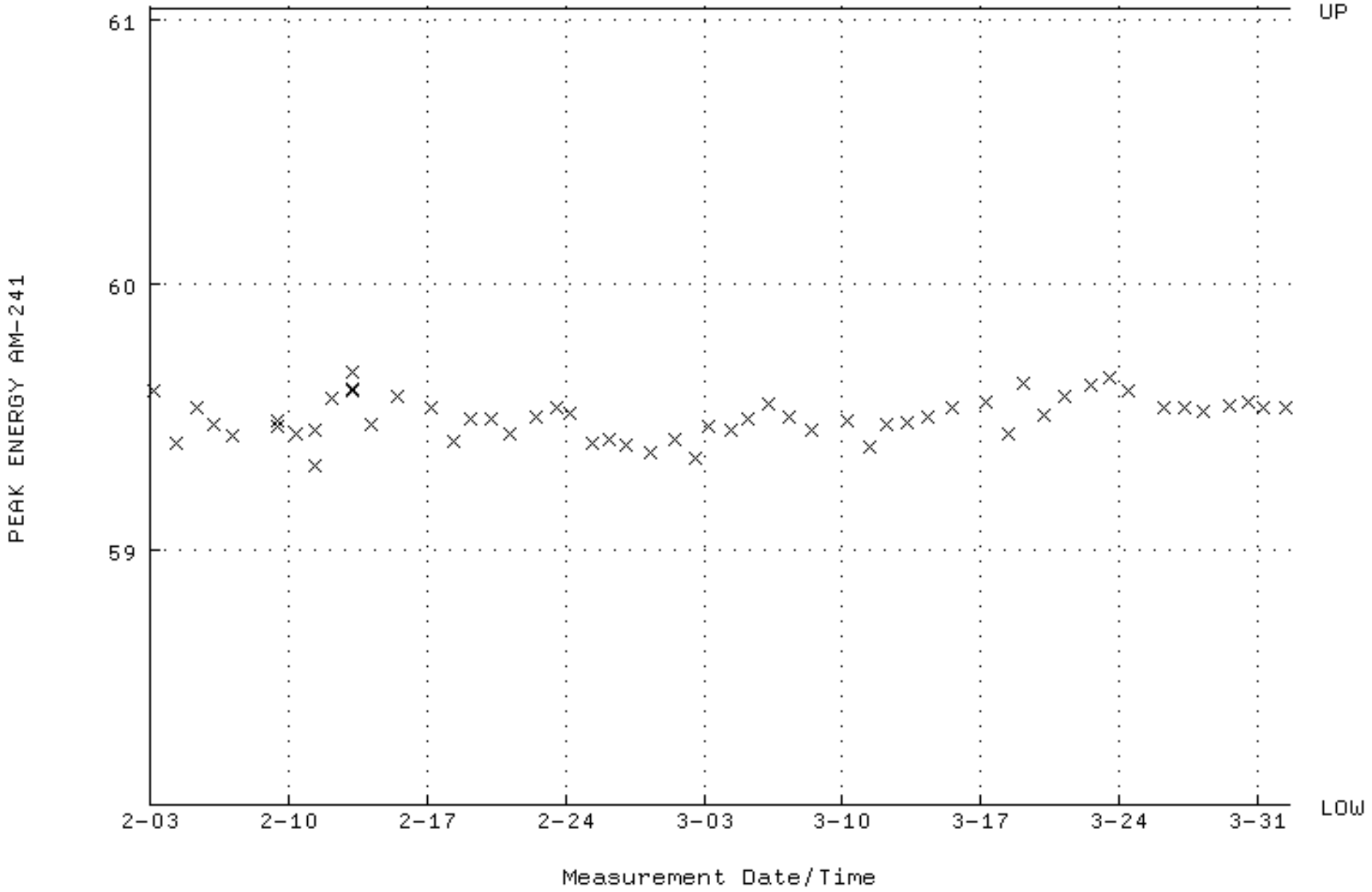
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:05 through 1-APR-2025 12:00:00
Mean +- Std Dev : 62198.0 +- 1563.17 (2.51 %)



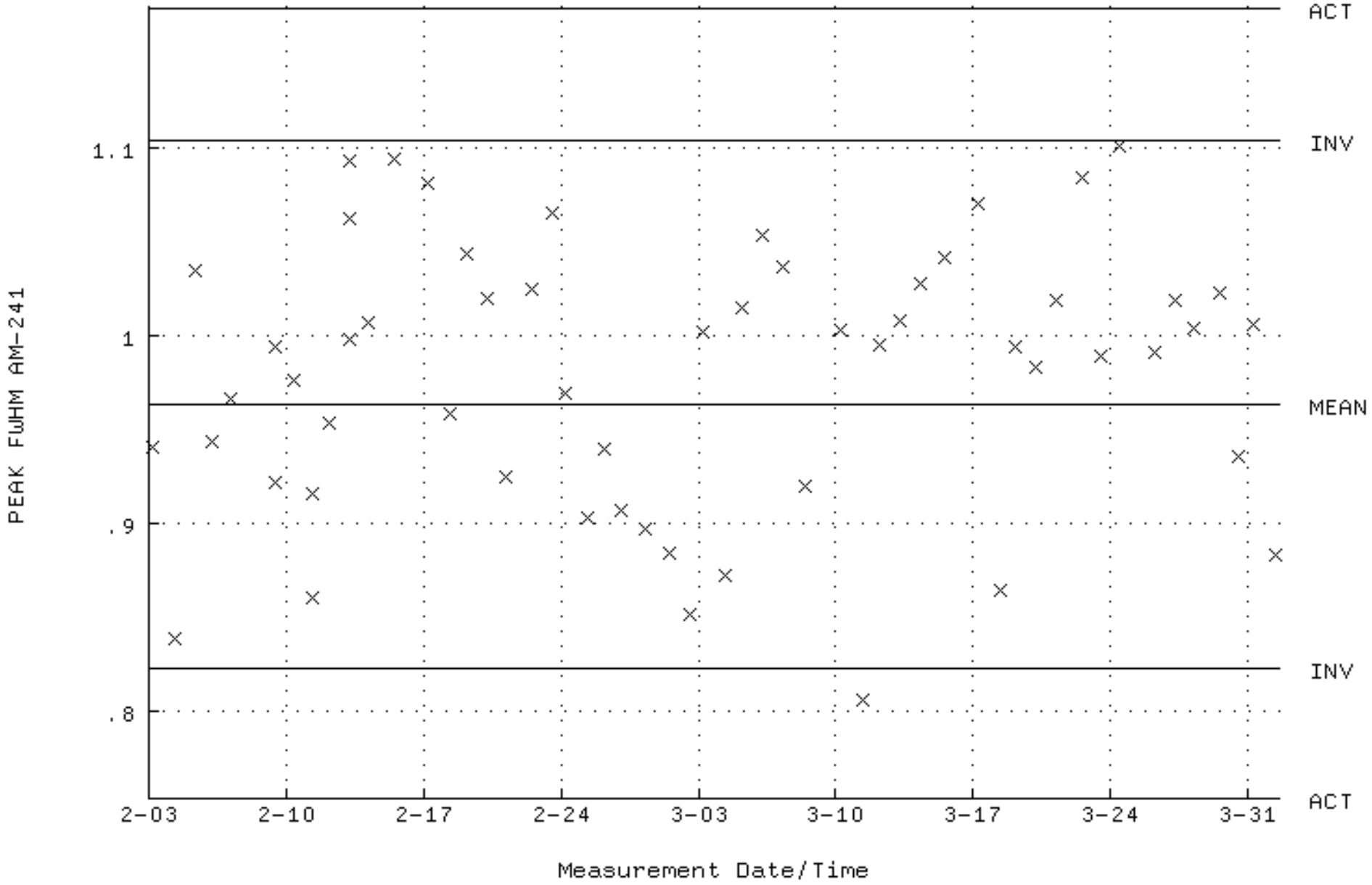
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM19.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:13 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.78812 +- 1.781009E-02 (1.00 %)



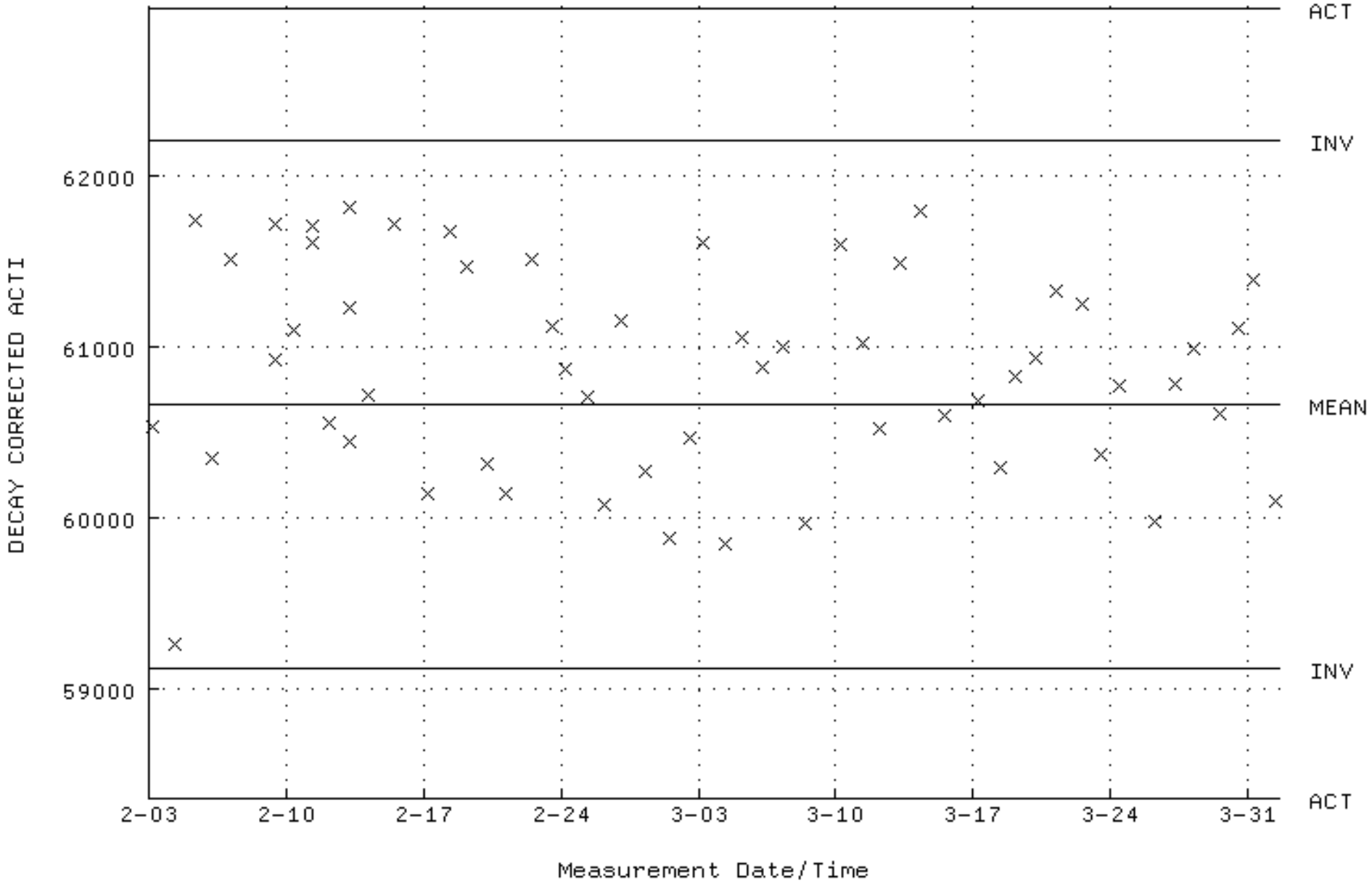
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM21_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:10 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



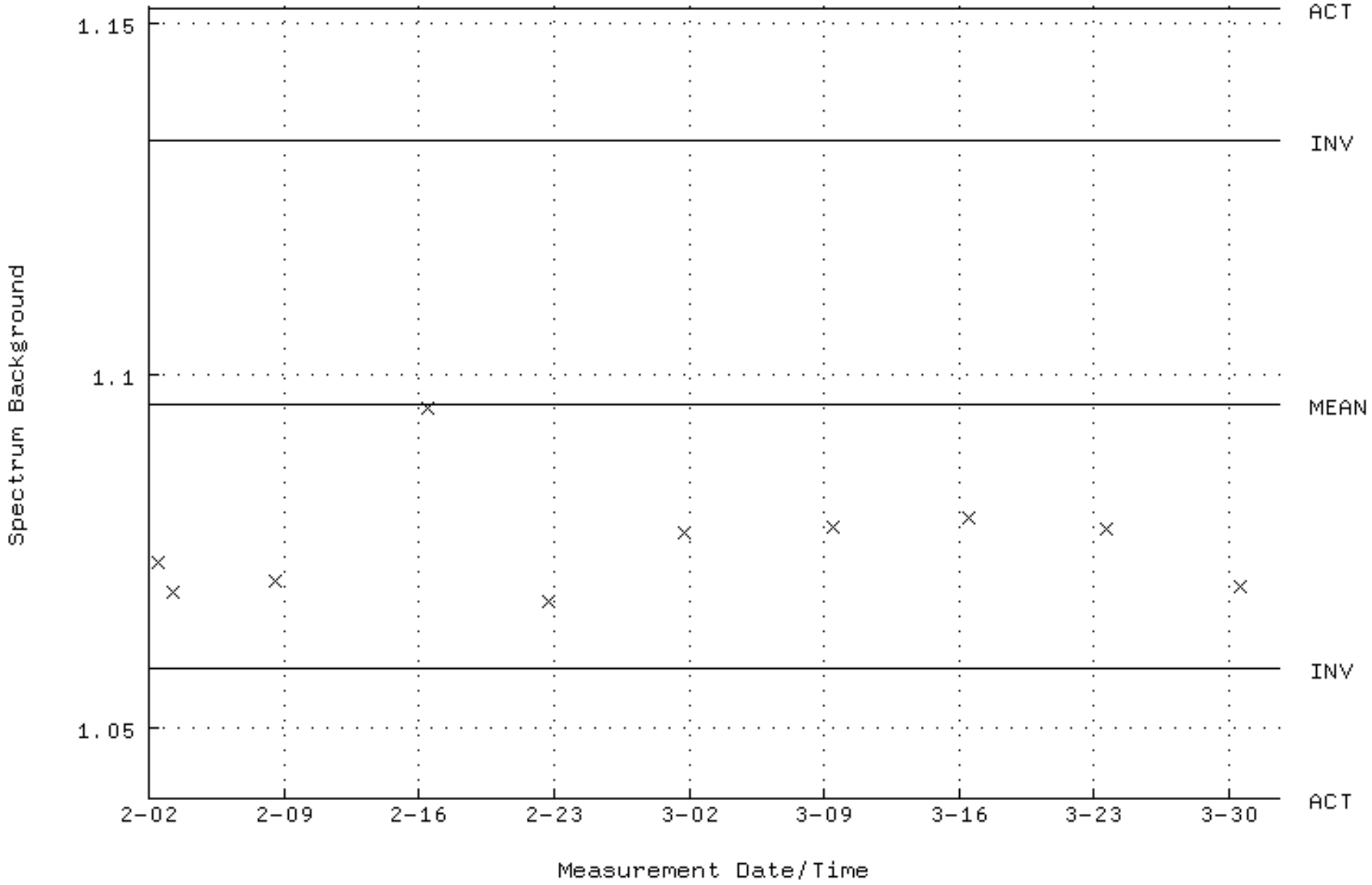
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM21_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:10 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.963962 +- 7.016561E-02 (7.28 %)



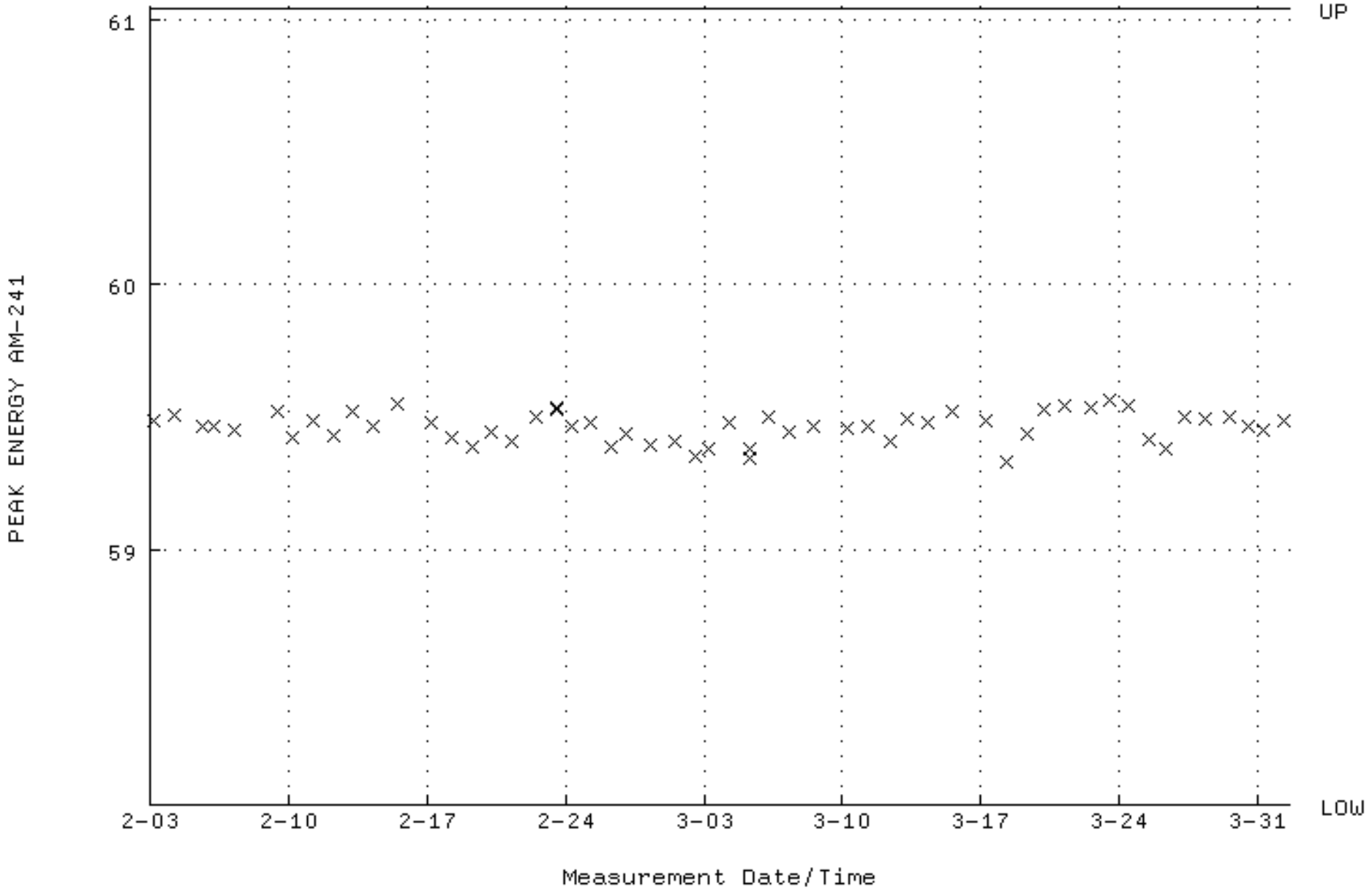
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM21_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:10 through 1-APR-2025 12:00:00
Mean +- Std Dev : 60673.1 +- 769.738 (1.27 %)



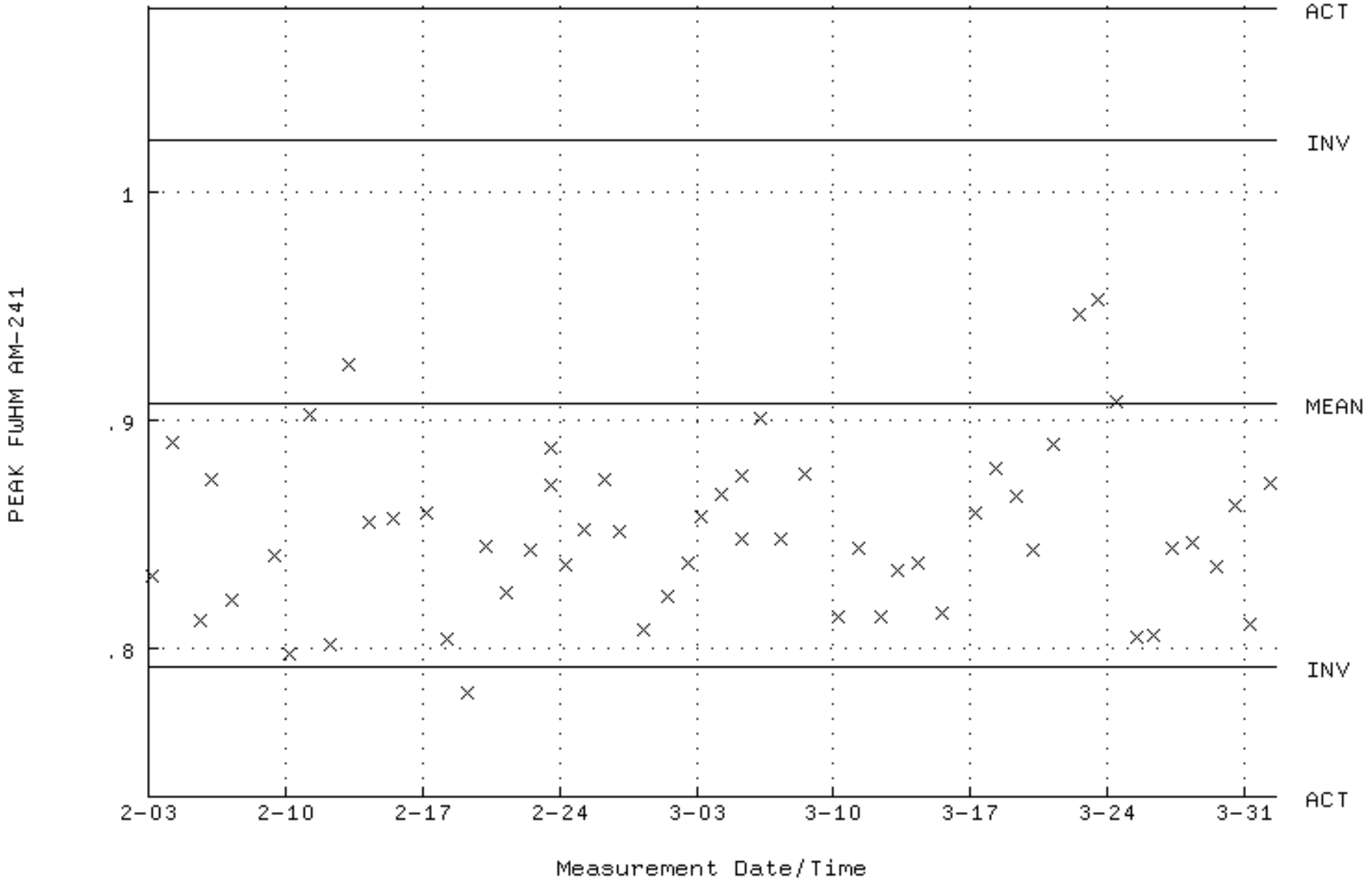
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM21.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:23 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.09599 +- 1.869267E-02 (1.71 %)



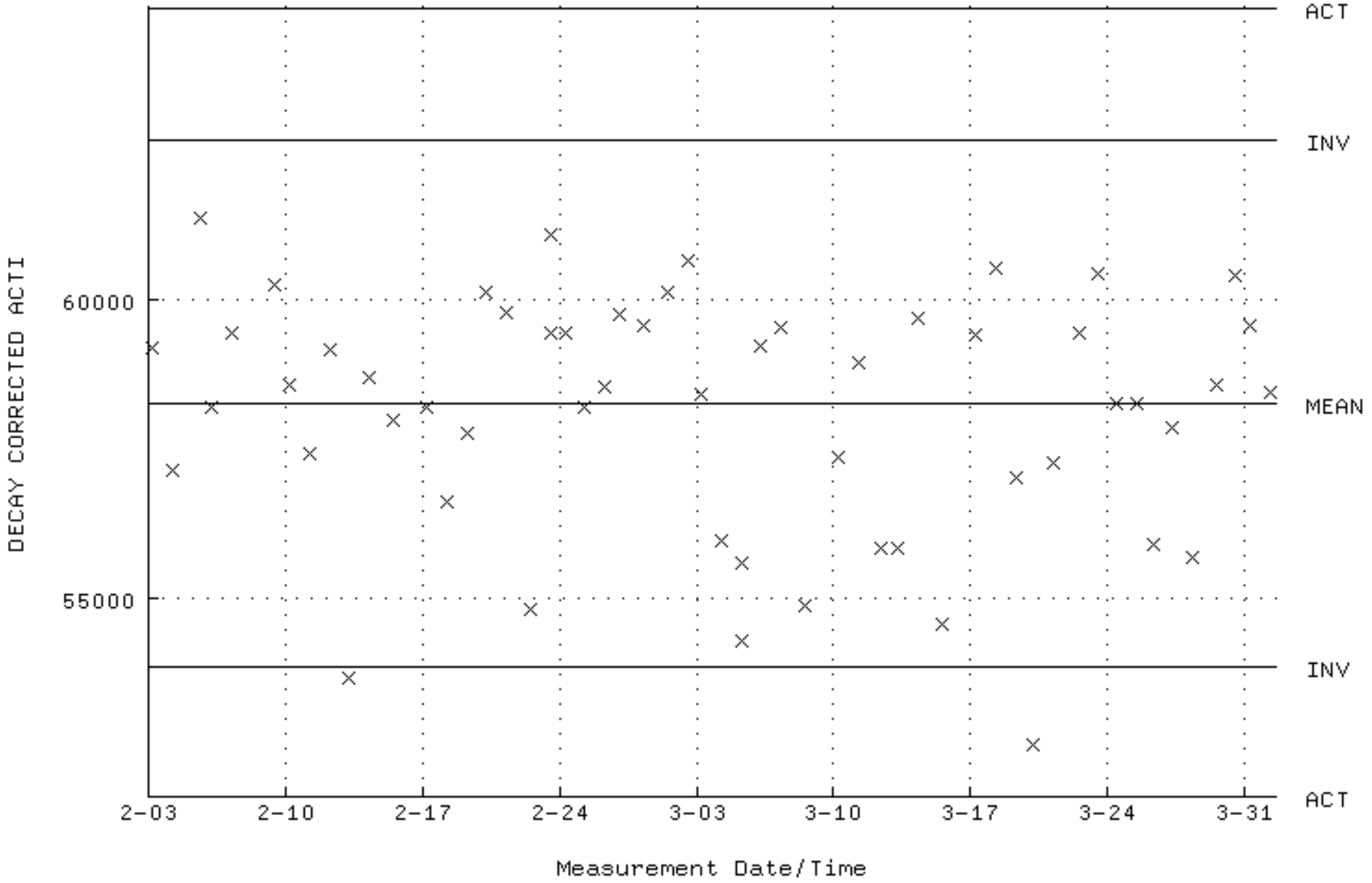
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM23_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:29:42 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



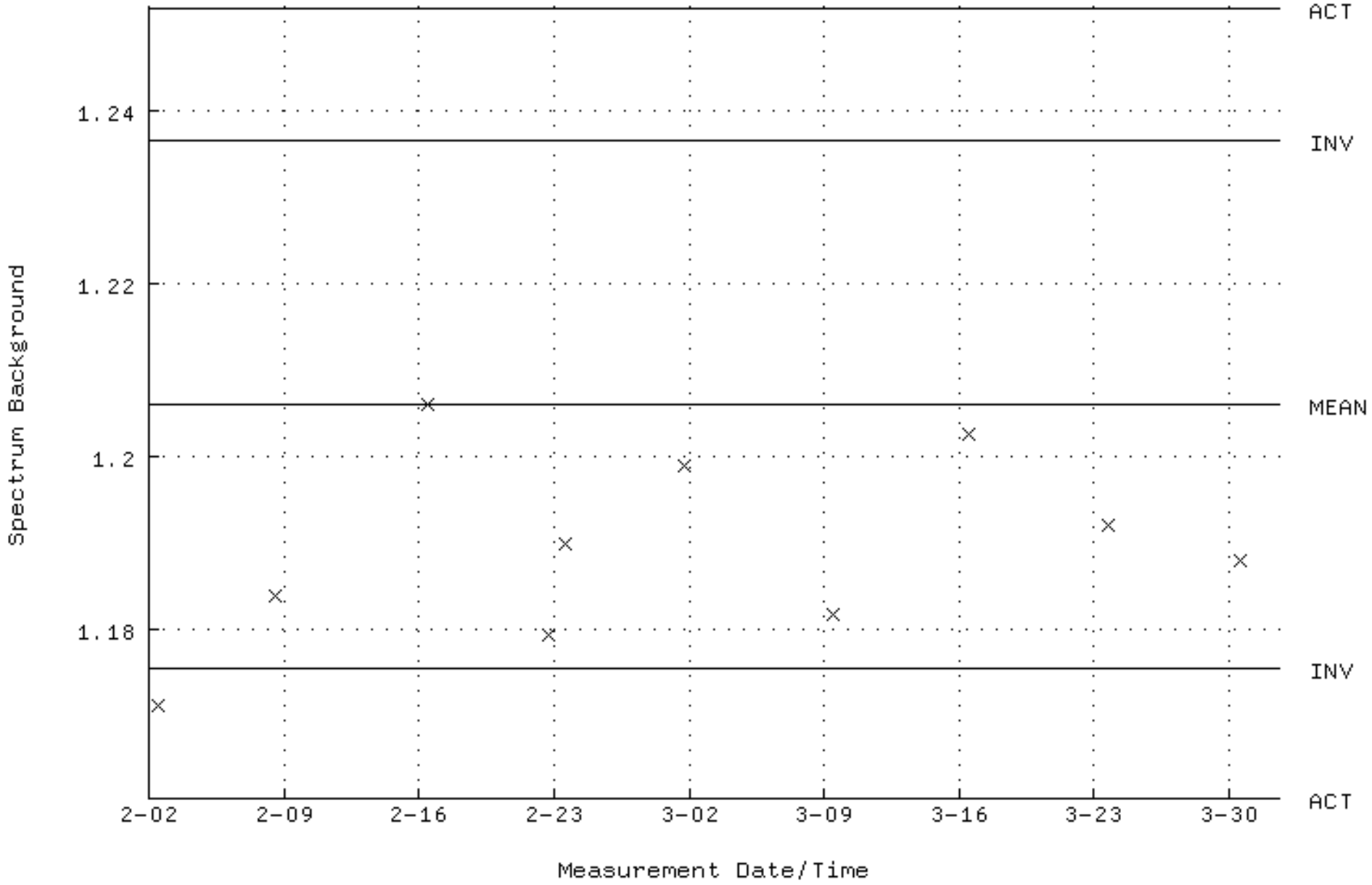
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM23_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:29:42 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.907997 +- 5.758887E-02 (6.34 %)



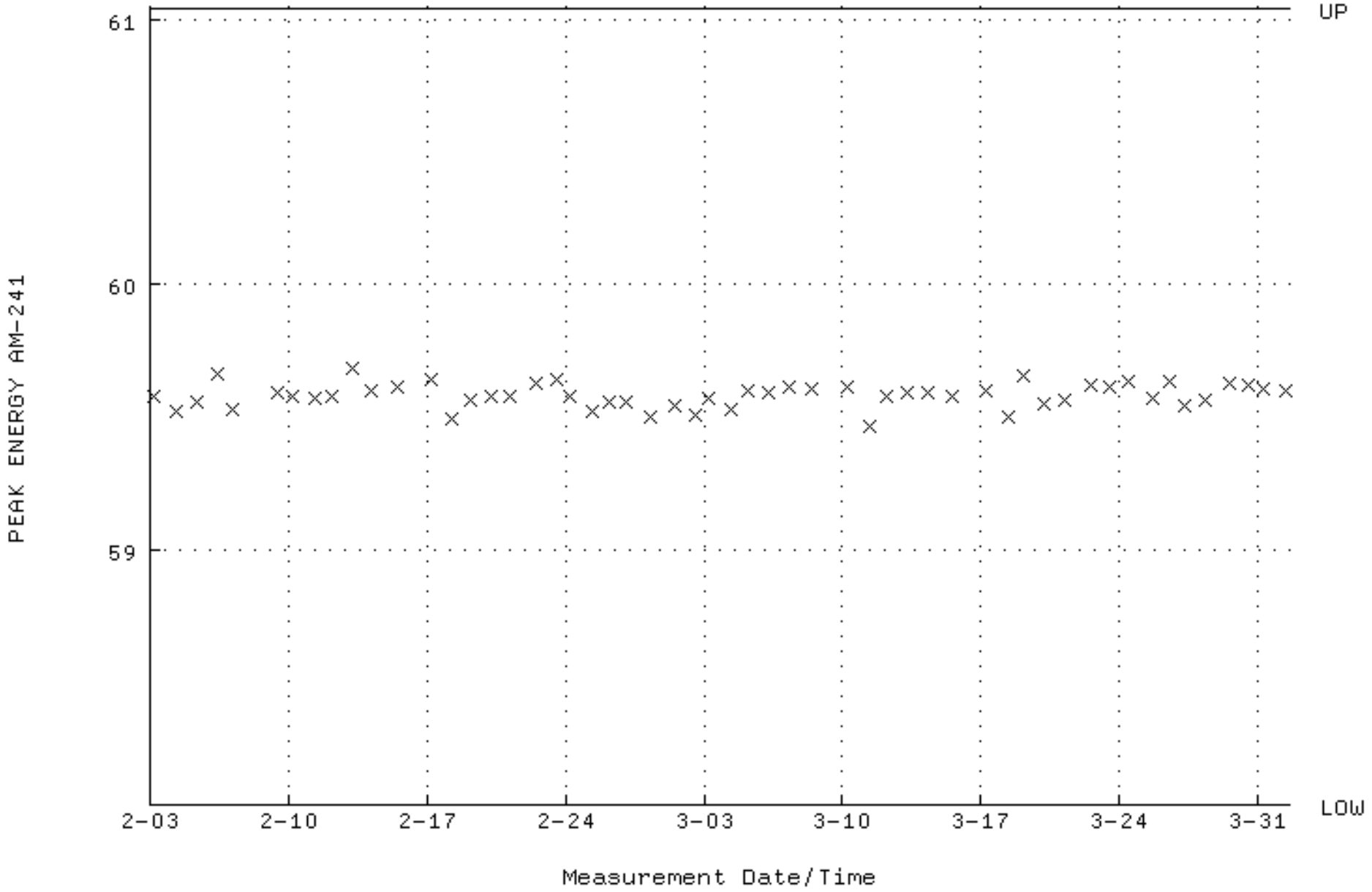
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM23_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:29:42 through 1-APR-2025 12:00:00
Mean +- Std Dev : 58285.5 +- 2202.56 (3.78 %)



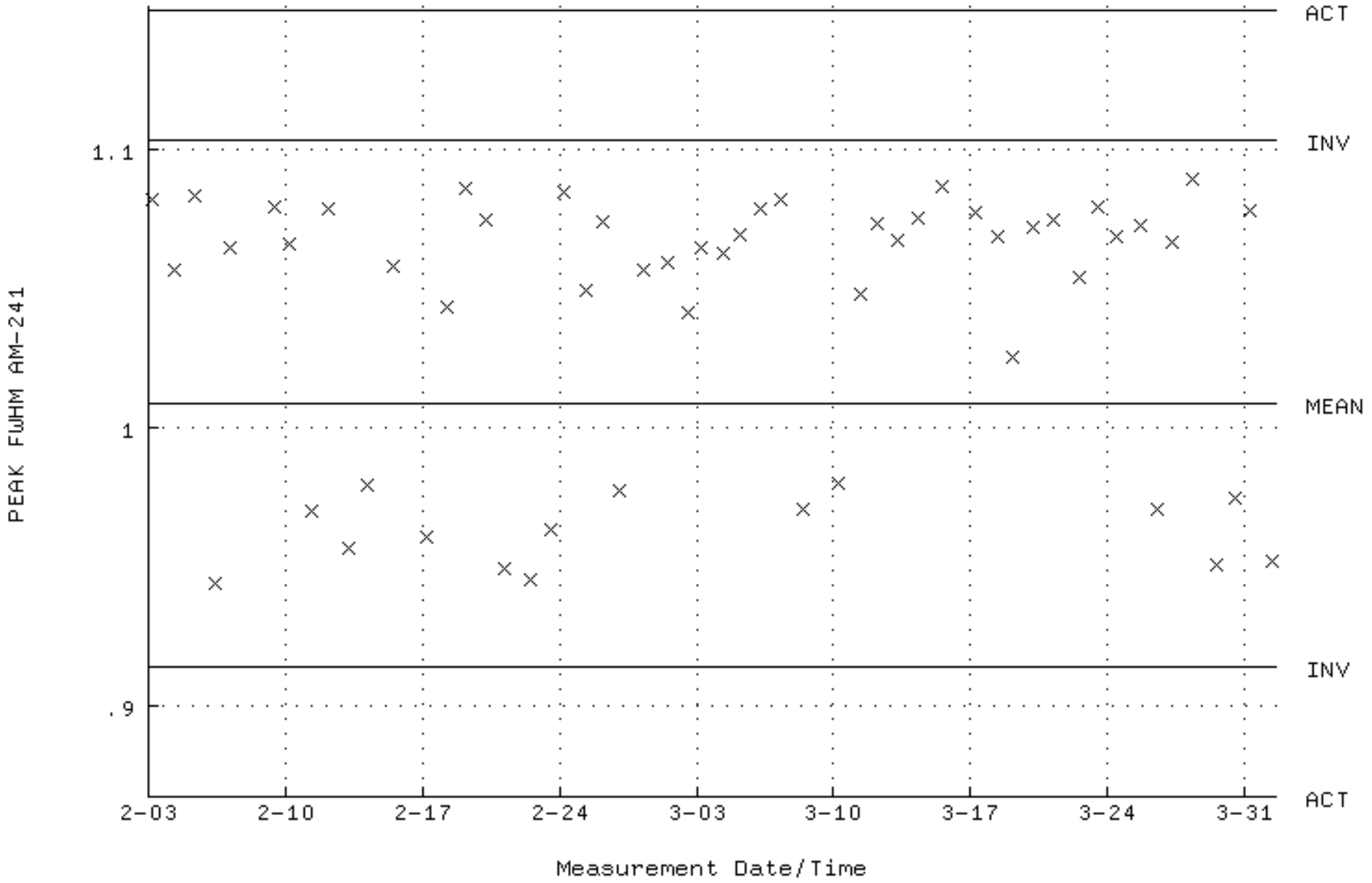
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM23.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:28 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.20621 +- 1.524024E-02 (1.26 %)



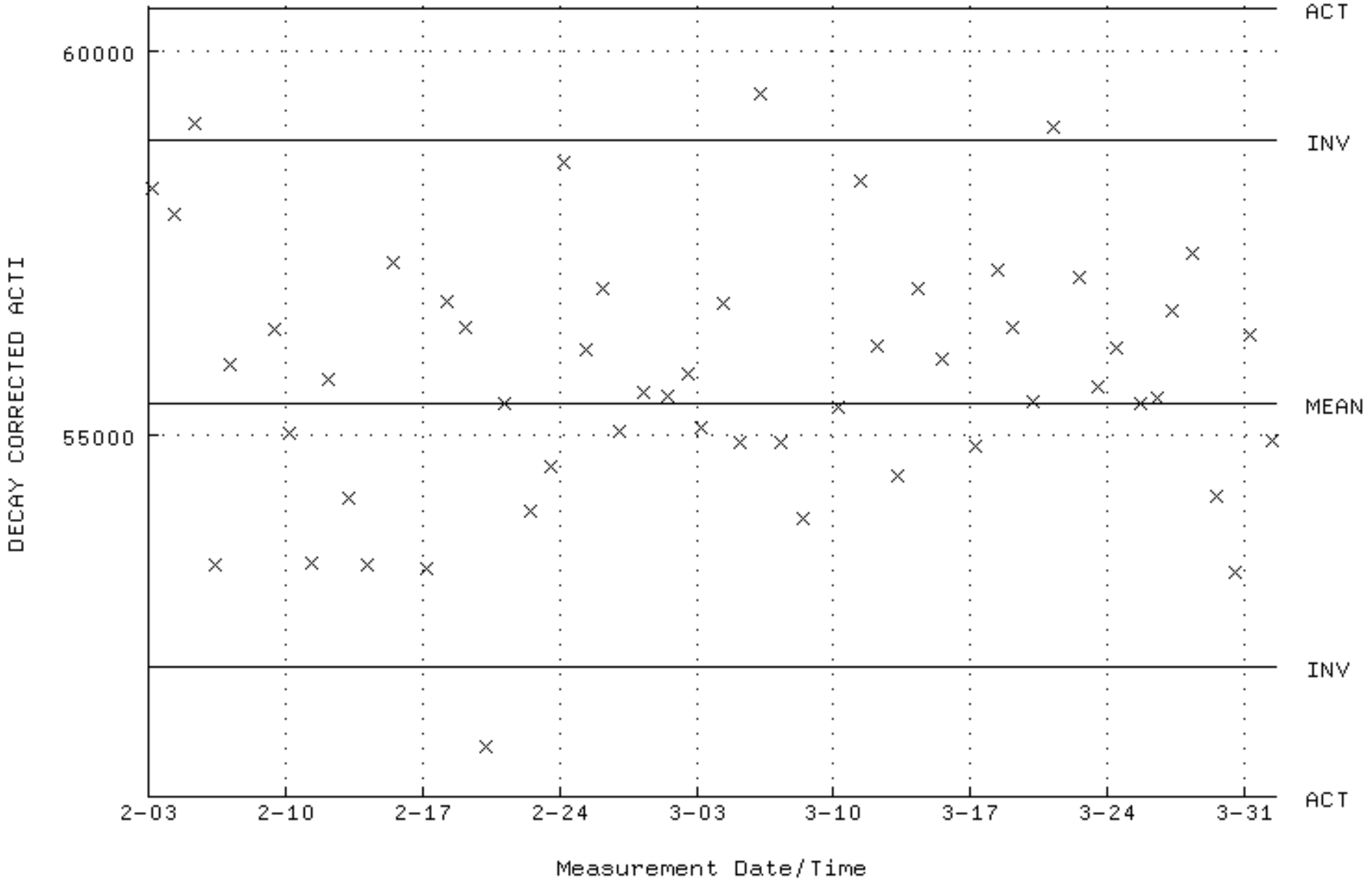
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:15 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



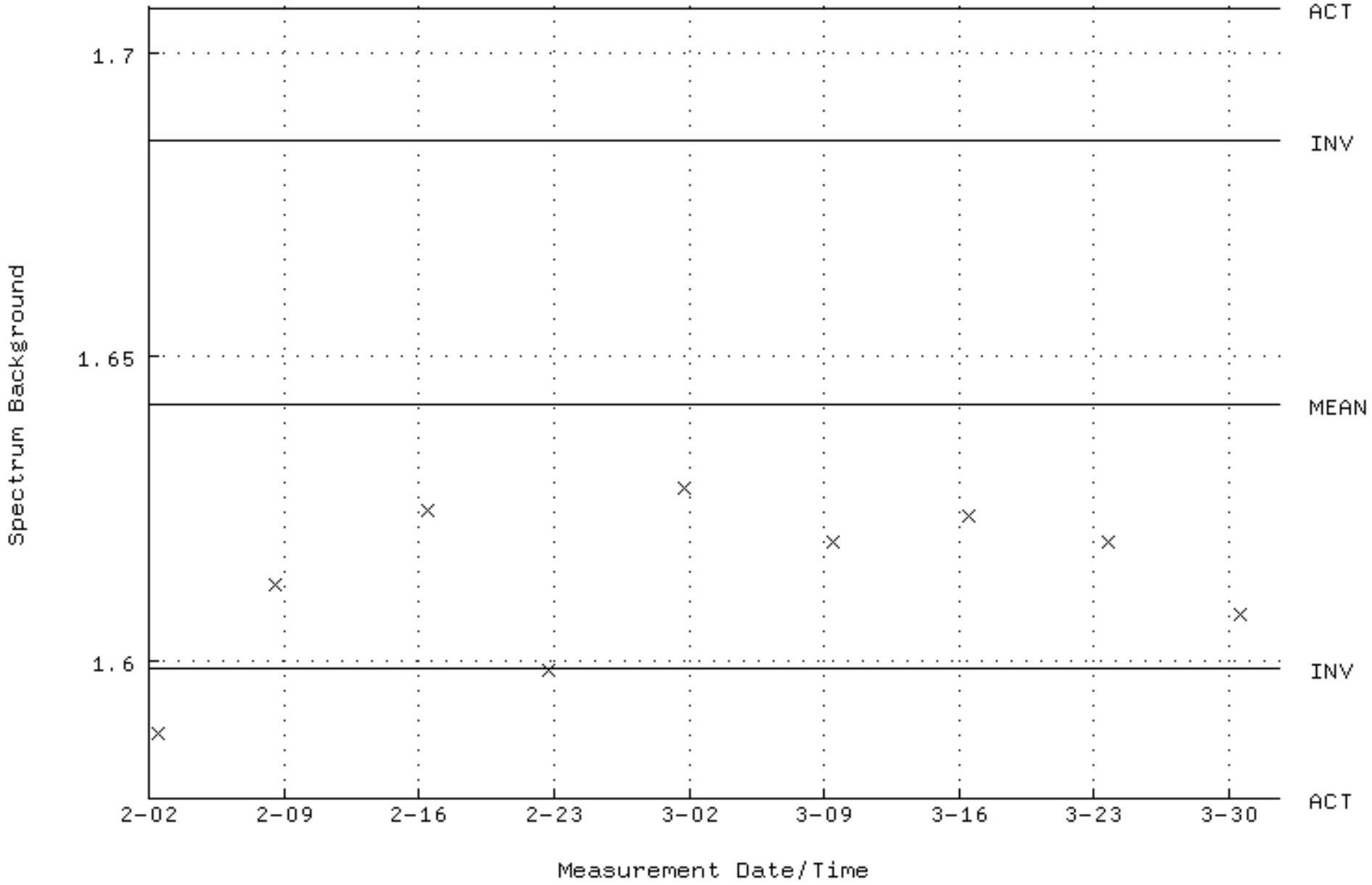
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:15 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.00903 +- 4.728629E-02 (4.69 %)



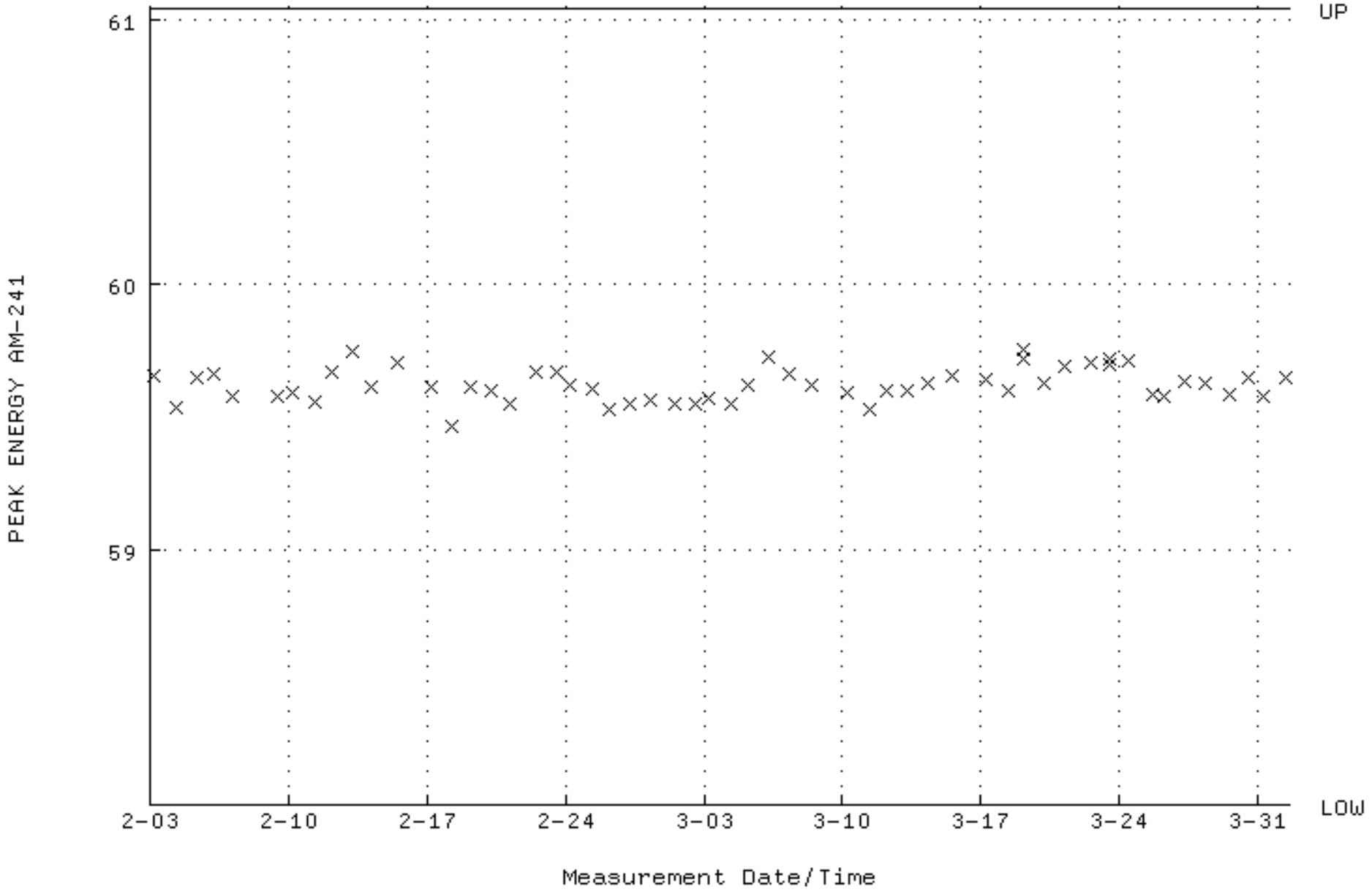
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:15 through 1-APR-2025 12:00:00
Mean +- Std Dev : 55429.2 +- 1710.68 (3.09 %)



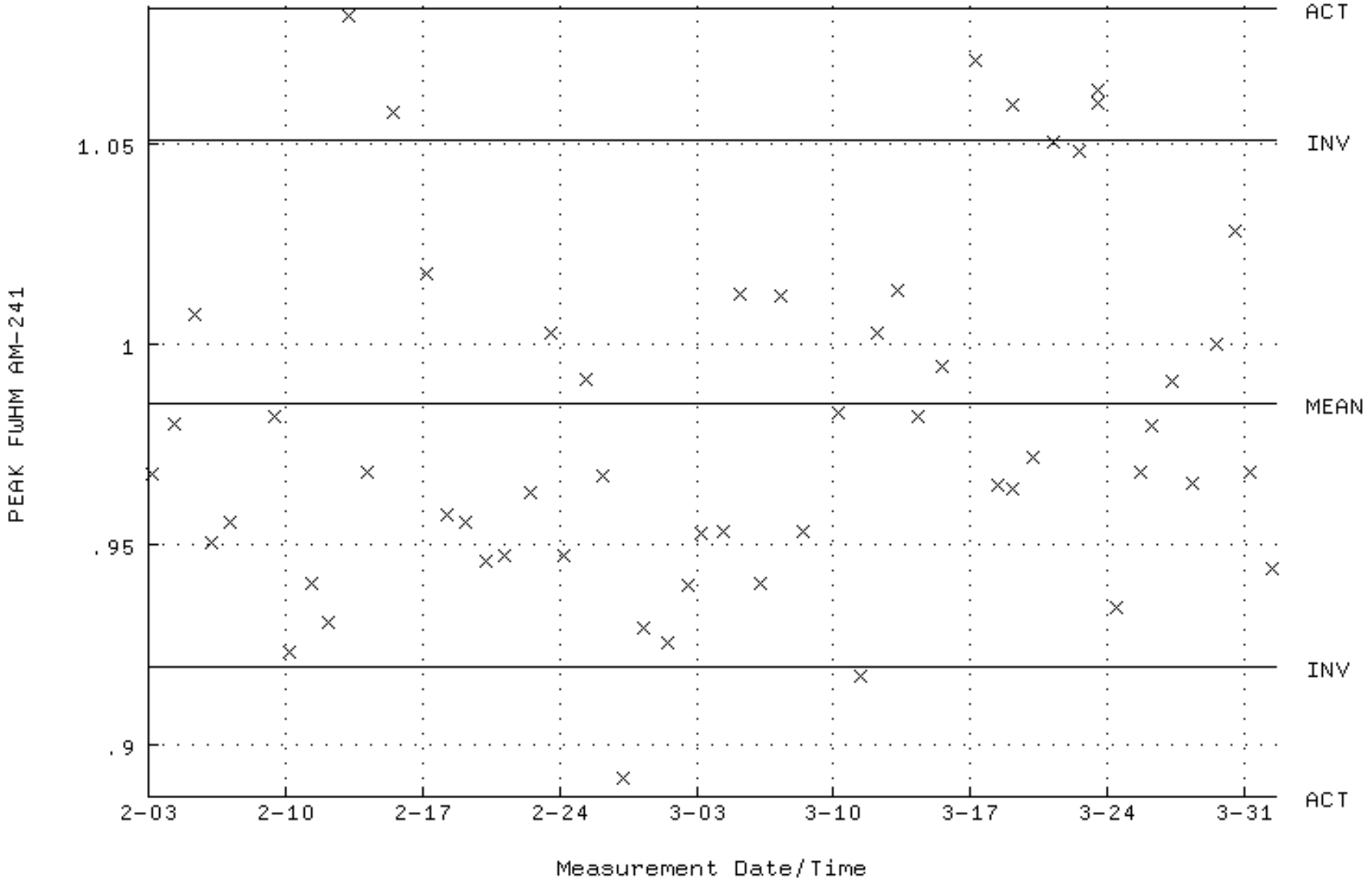
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM24.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:34 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.64232 +- 2.167035E-02 (1.32 %)



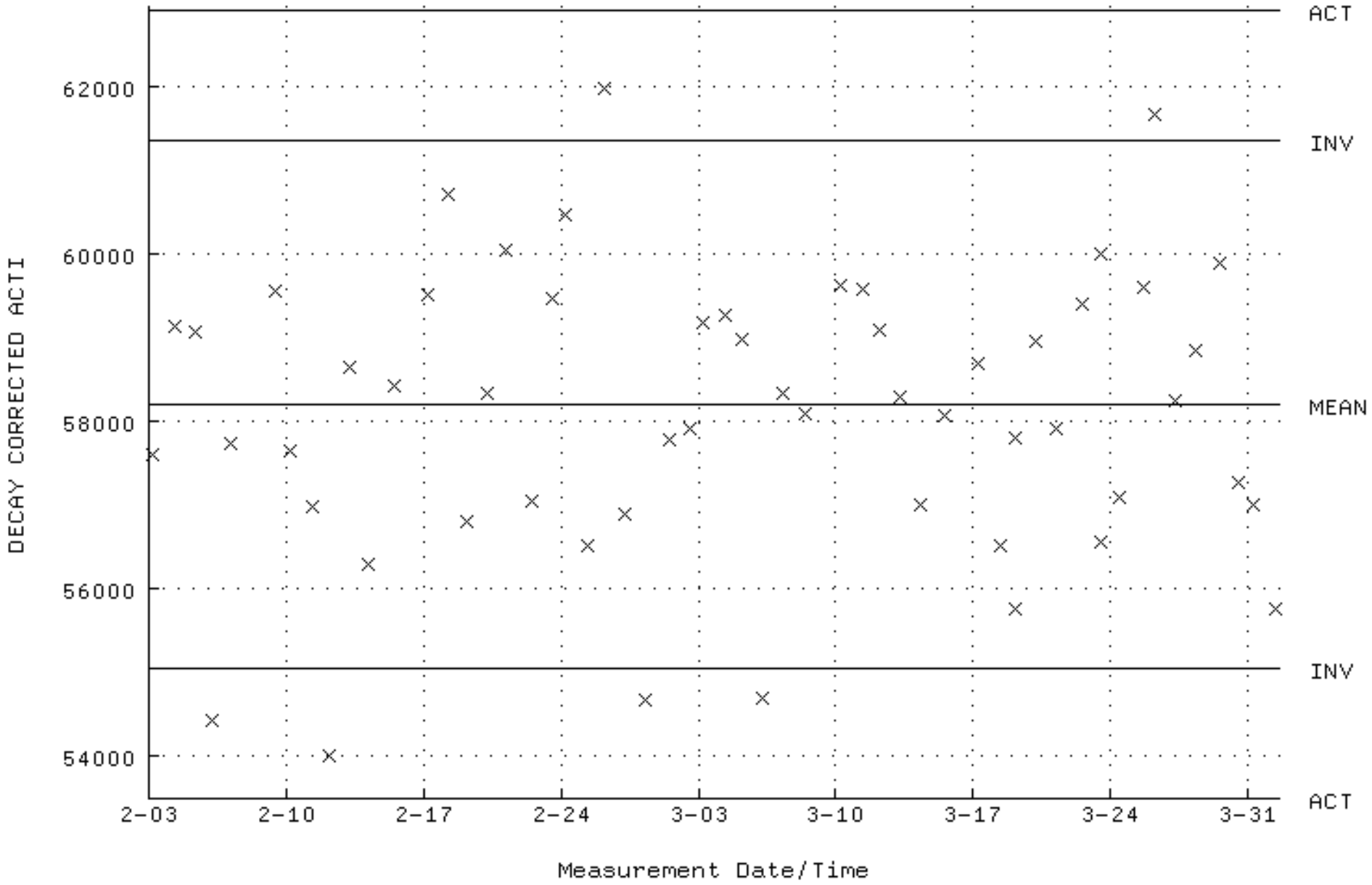
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:19 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



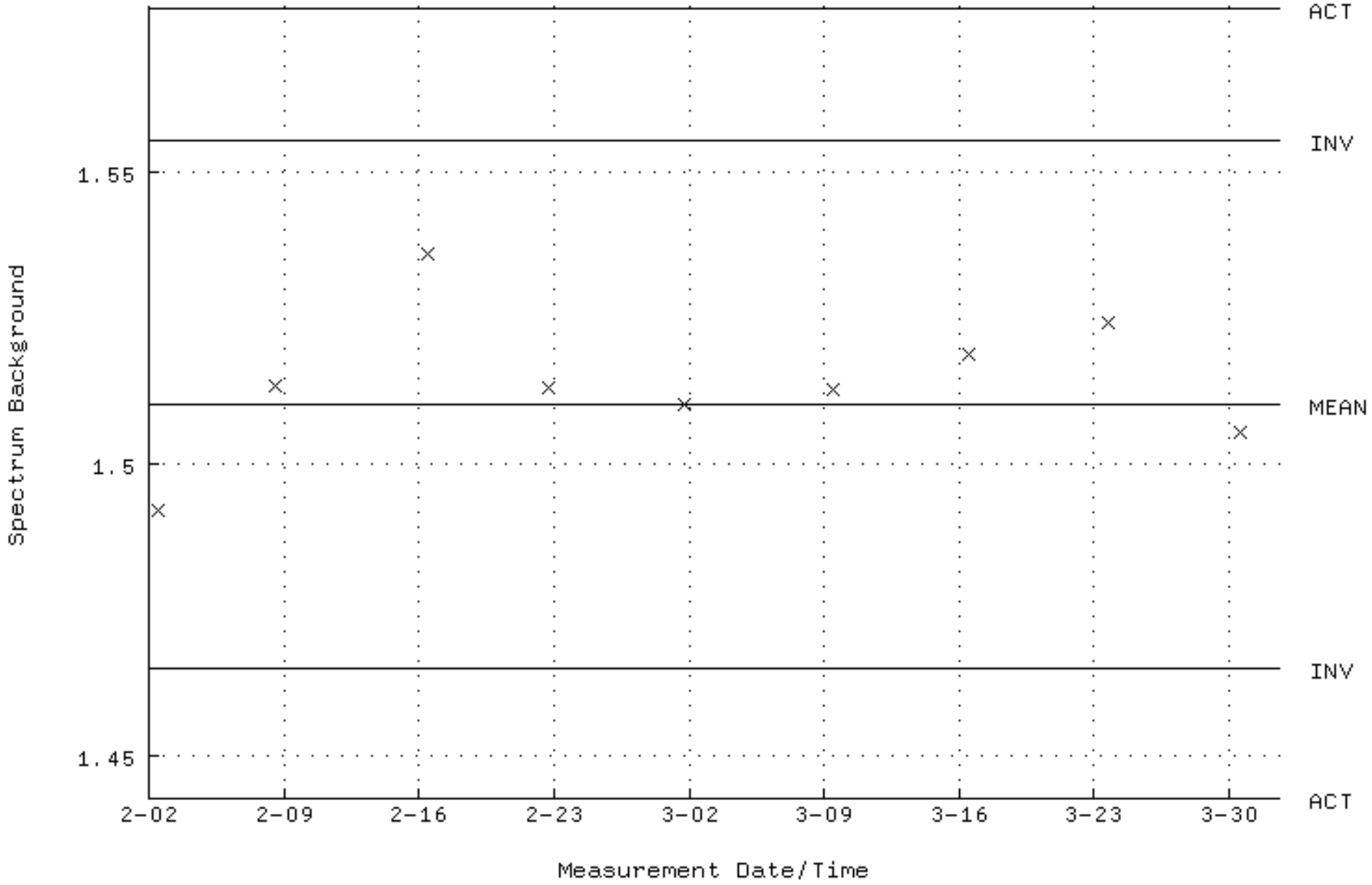
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:19 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.985452 +- 3.283878E-02 (3.33 %)



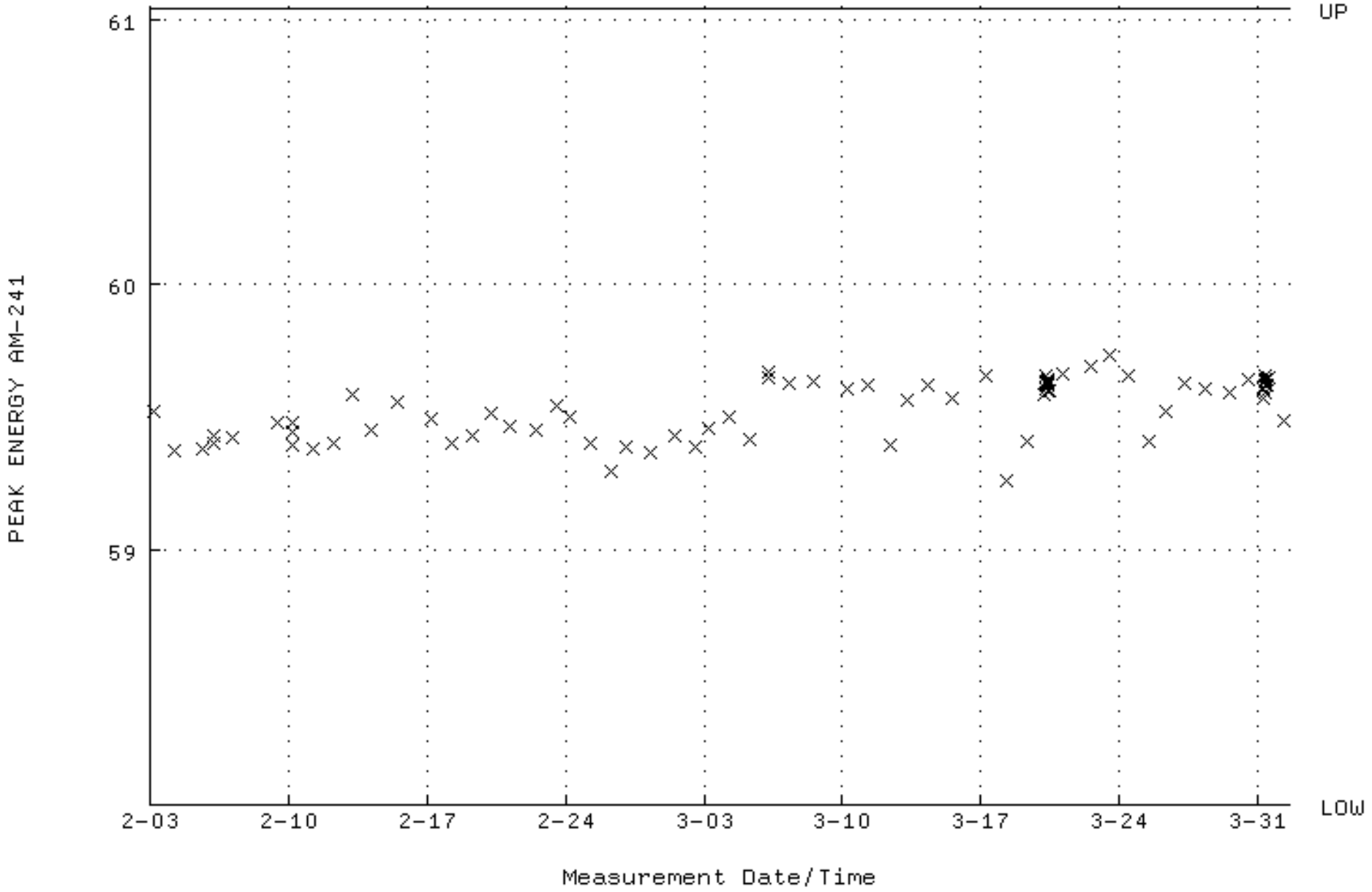
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM27_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:19 through 1-APR-2025 12:00:00
Mean +- Std Dev : 58211.9 +- 1570.59 (2.70 %)



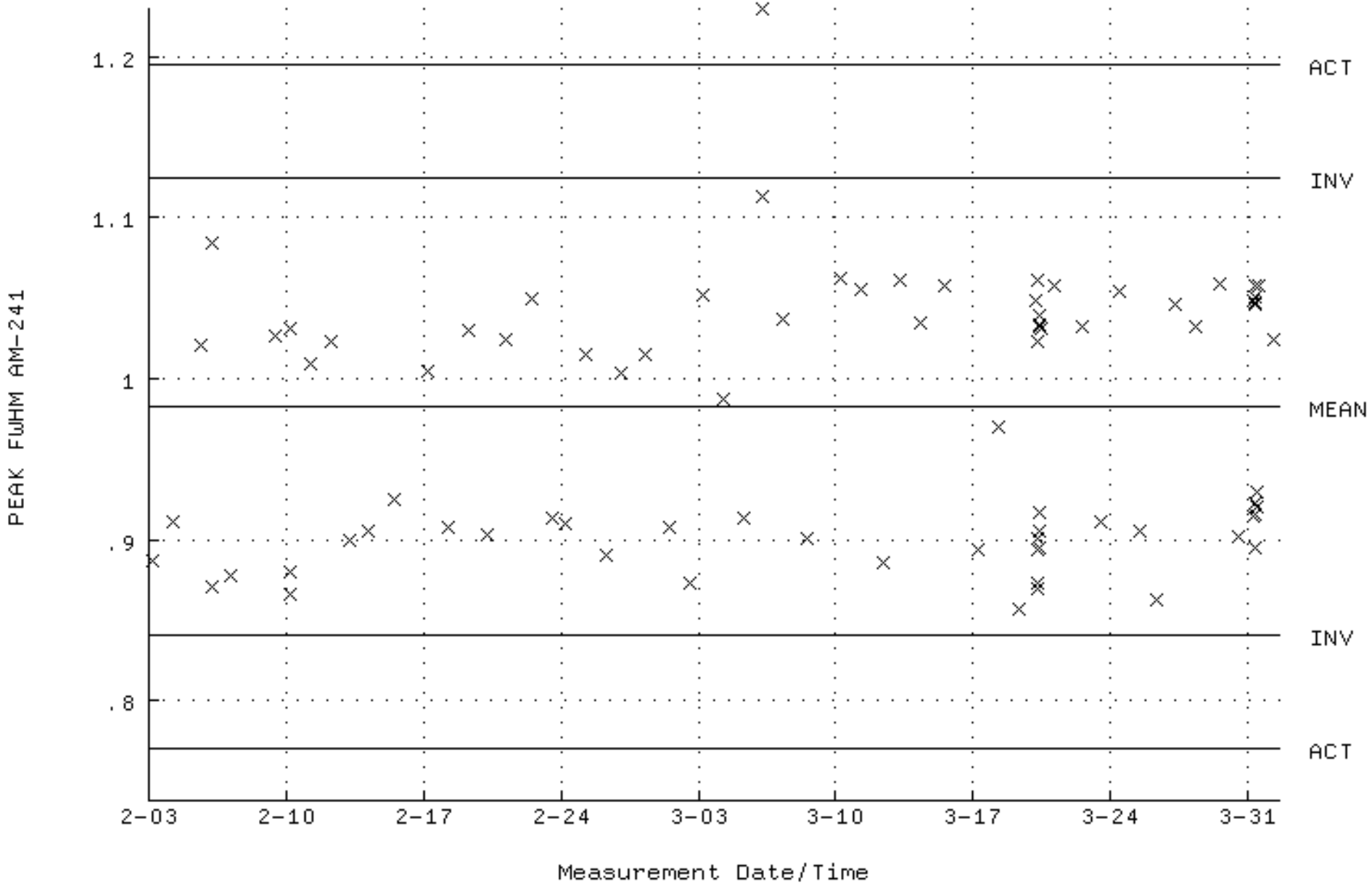
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM27.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:39 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.51036 +- 2.256303E-02 (1.49 %)



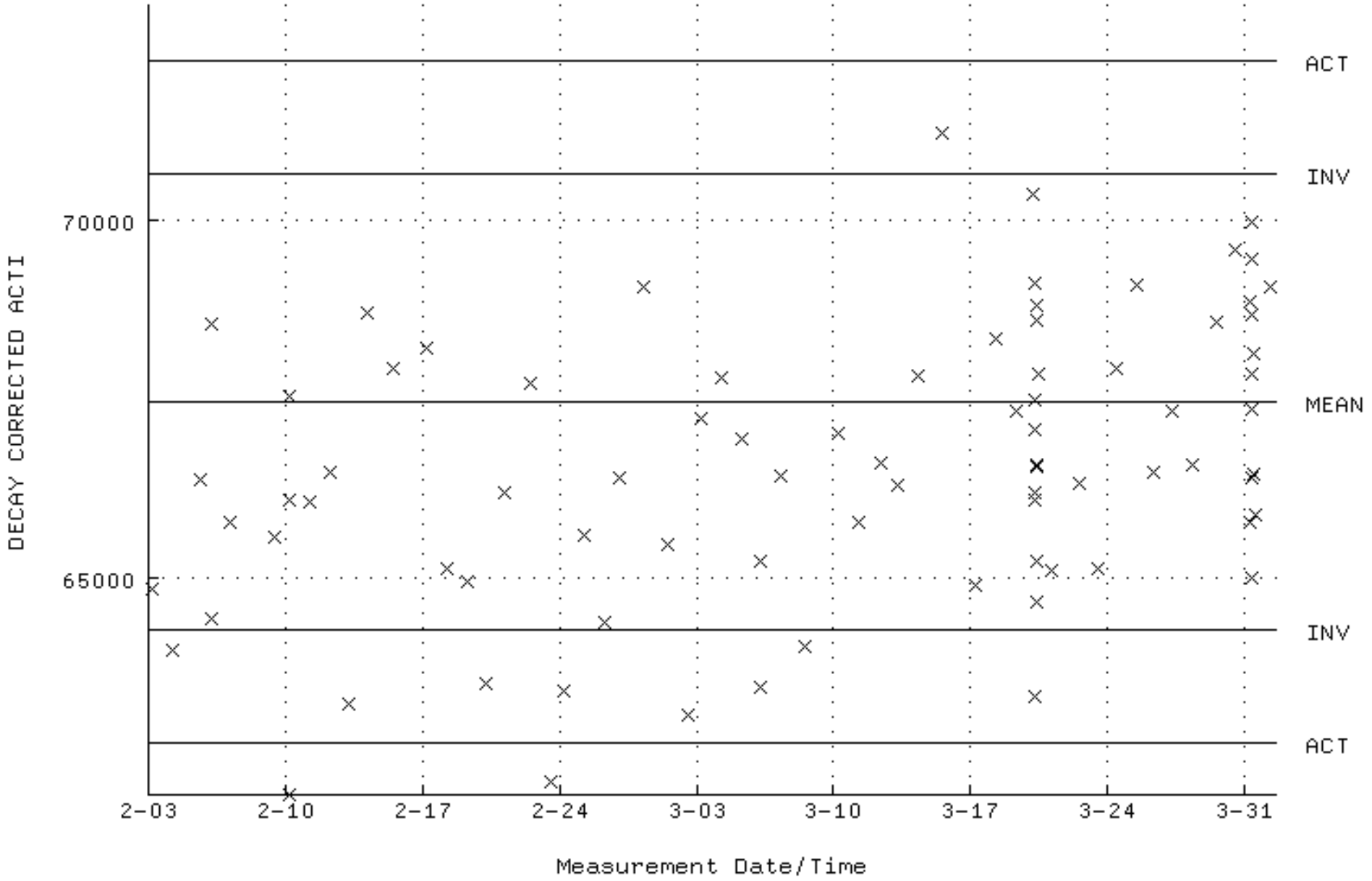
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:24 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



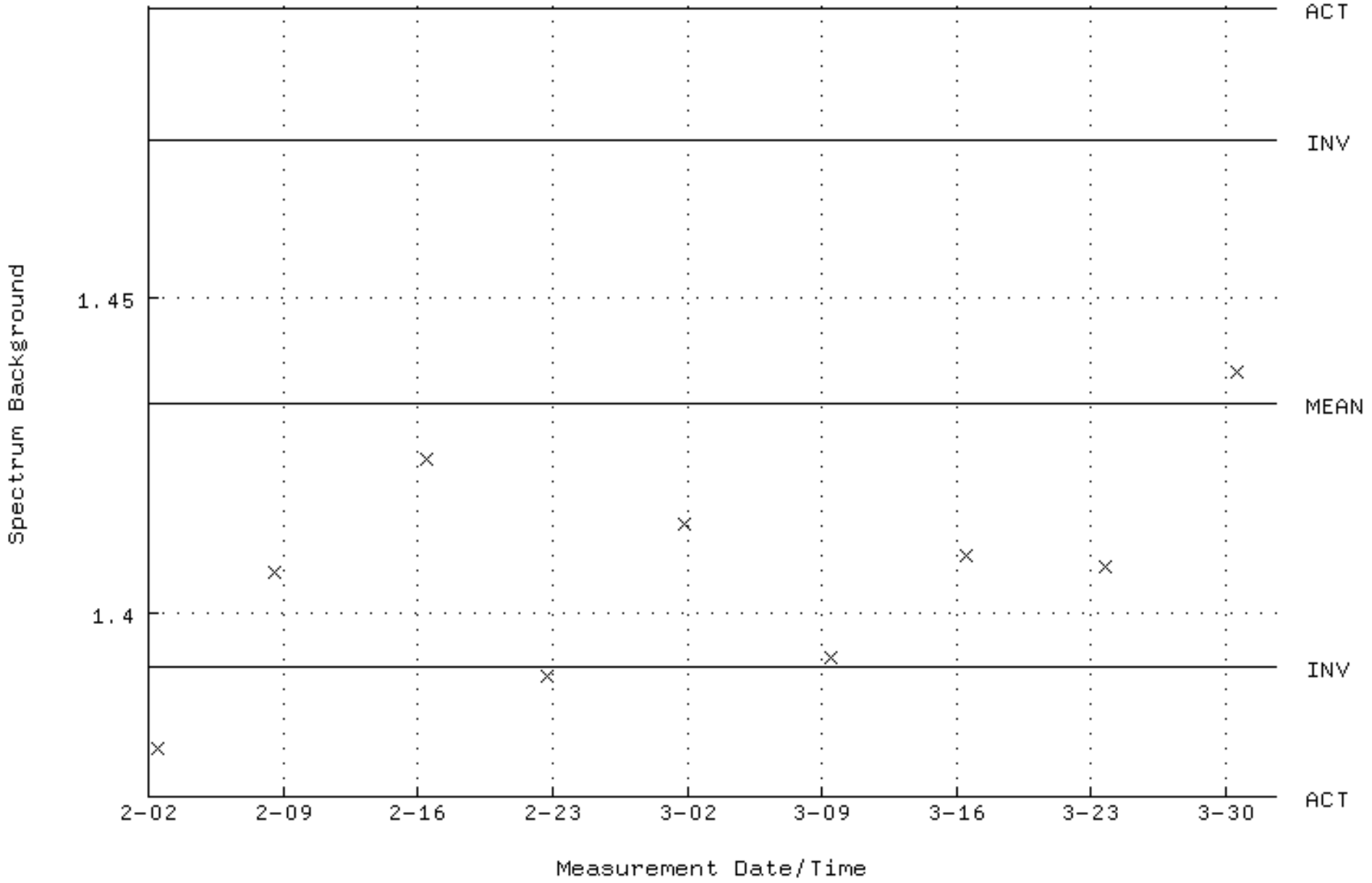
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:24 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.983377 +- 7.075209E-02 (7.19 %)



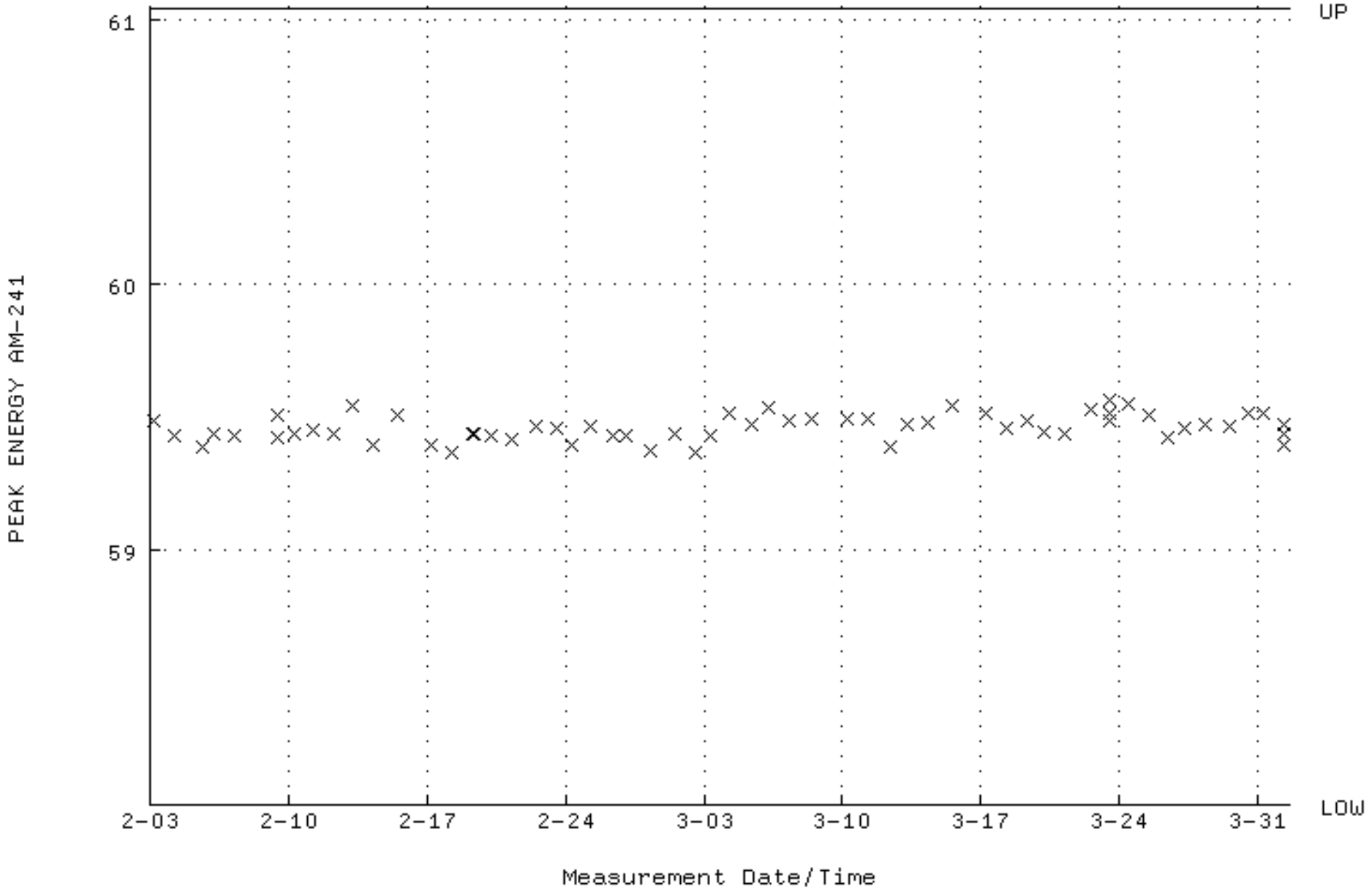
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM28_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:24 through 1-APR-2025 12:00:00
Mean +- Std Dev : 67475.7 +- 1583.50 (2.35 %)



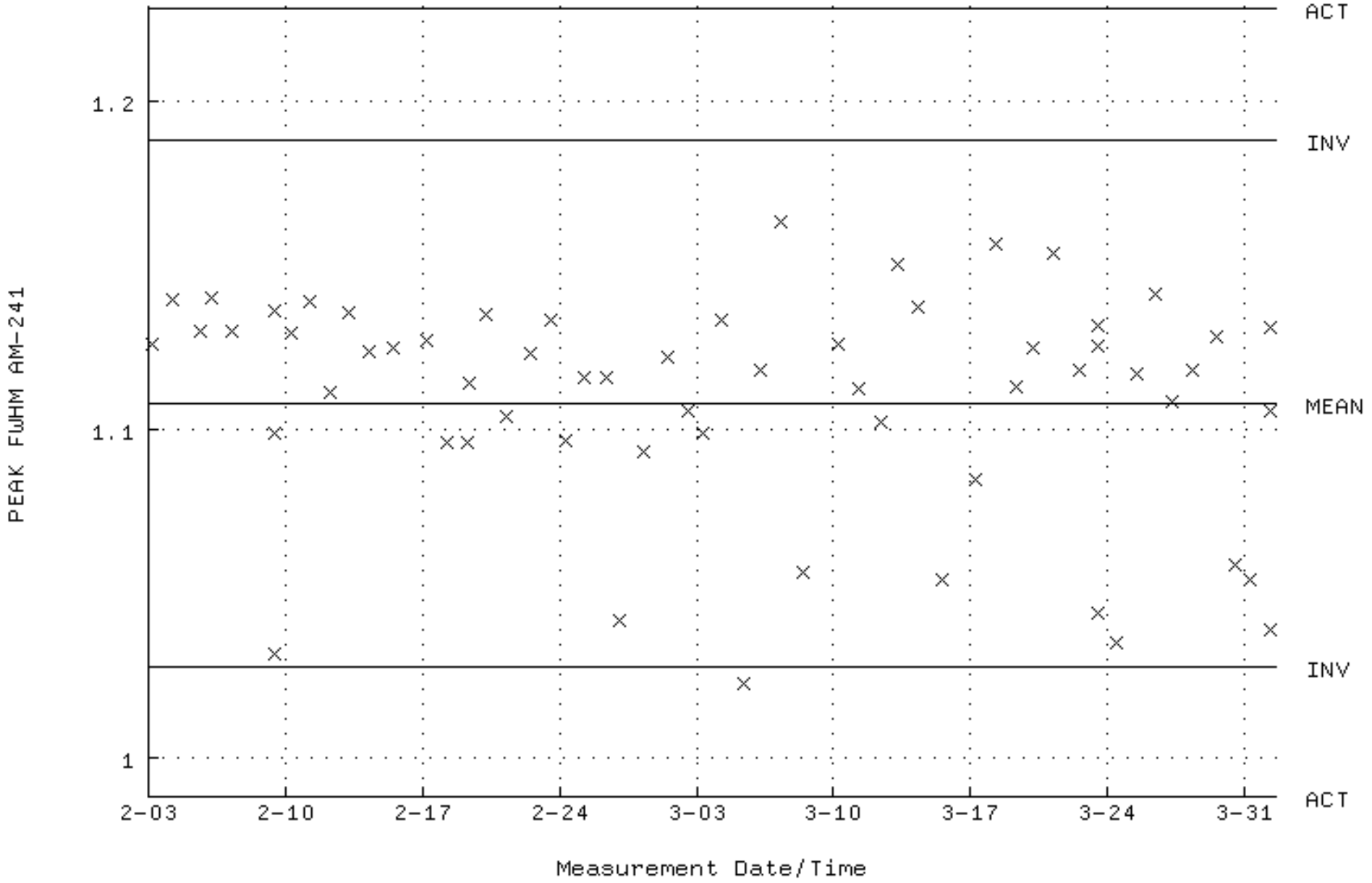
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM28.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:43 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.43343 +- 2.079300E-02 (1.45 %)



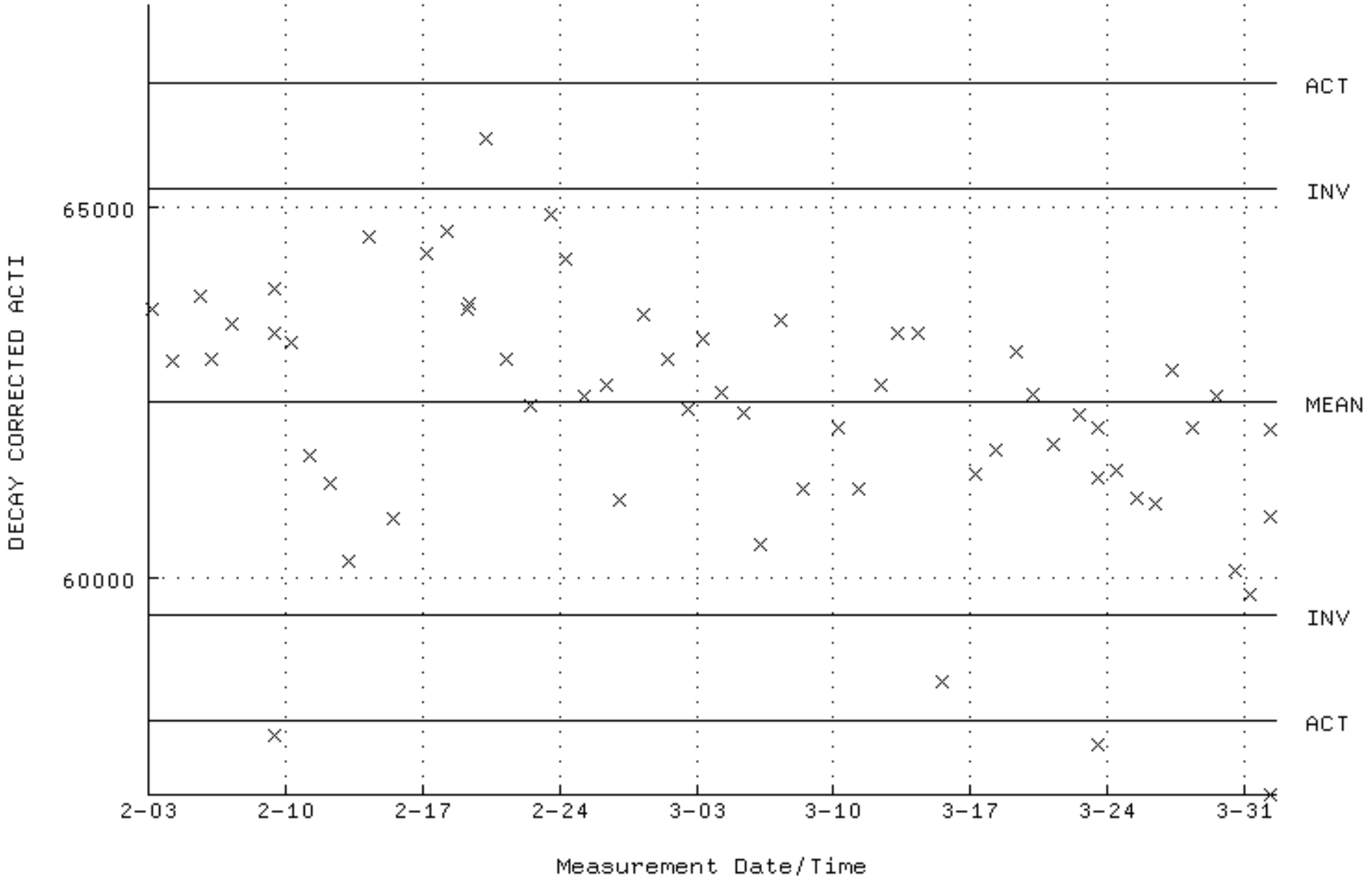
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:29:47 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



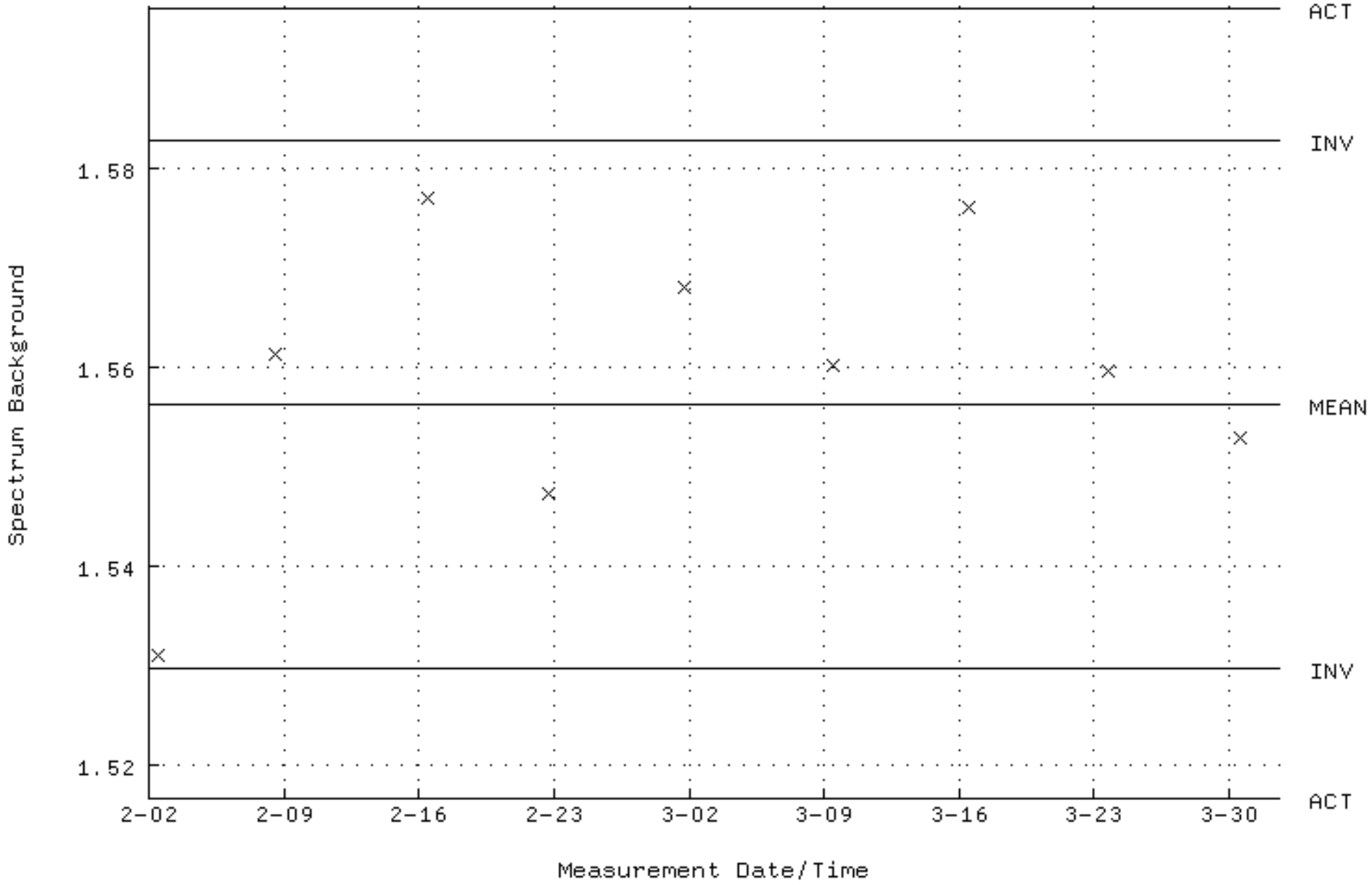
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:29:47 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.10820 +- 3.993281E-02 (3.60 %)



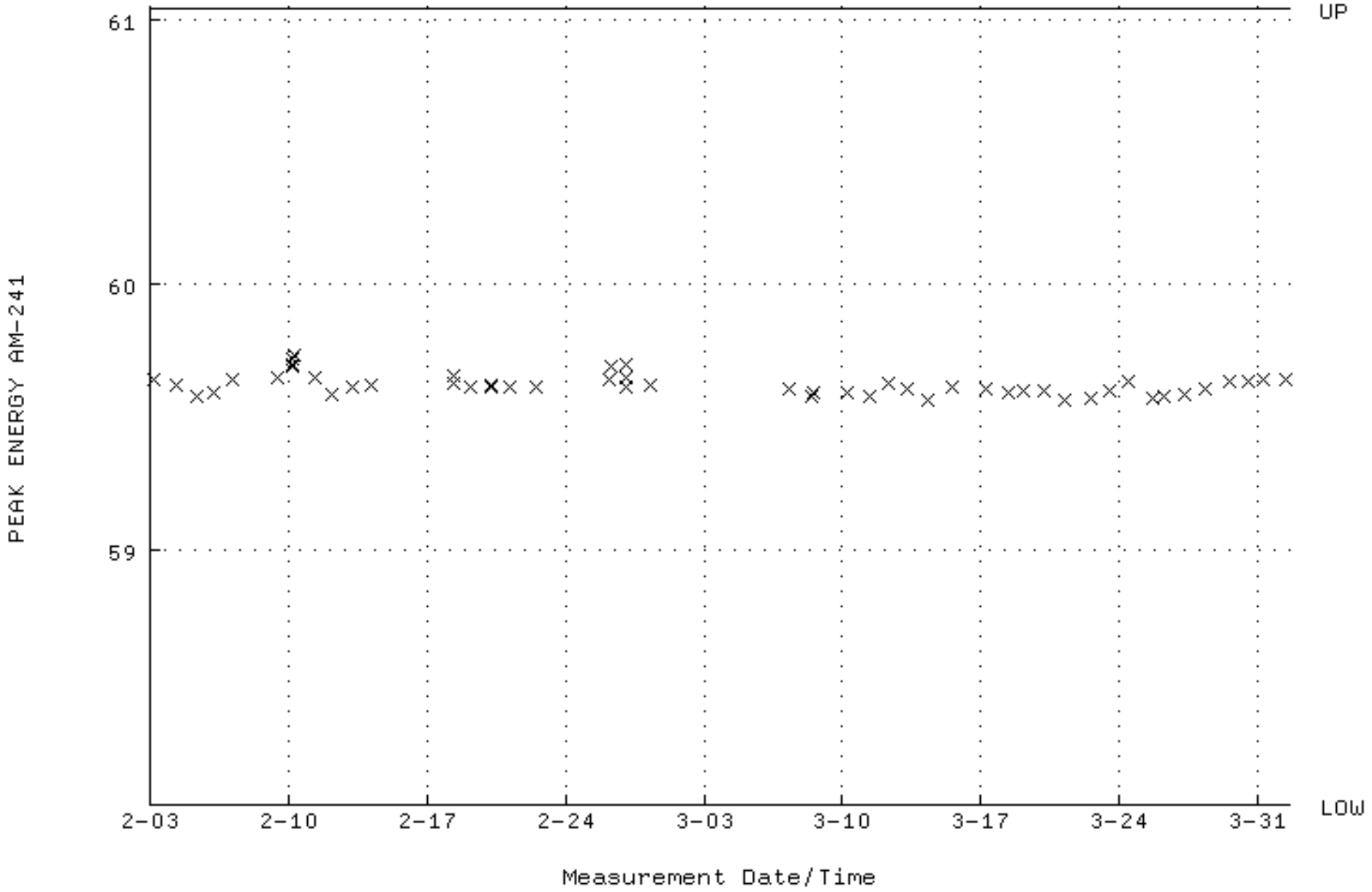
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:29:47 through 1-APR-2025 12:00:00
Mean +- Std Dev : 62382.7 +- 1439.29 (2.31 %)



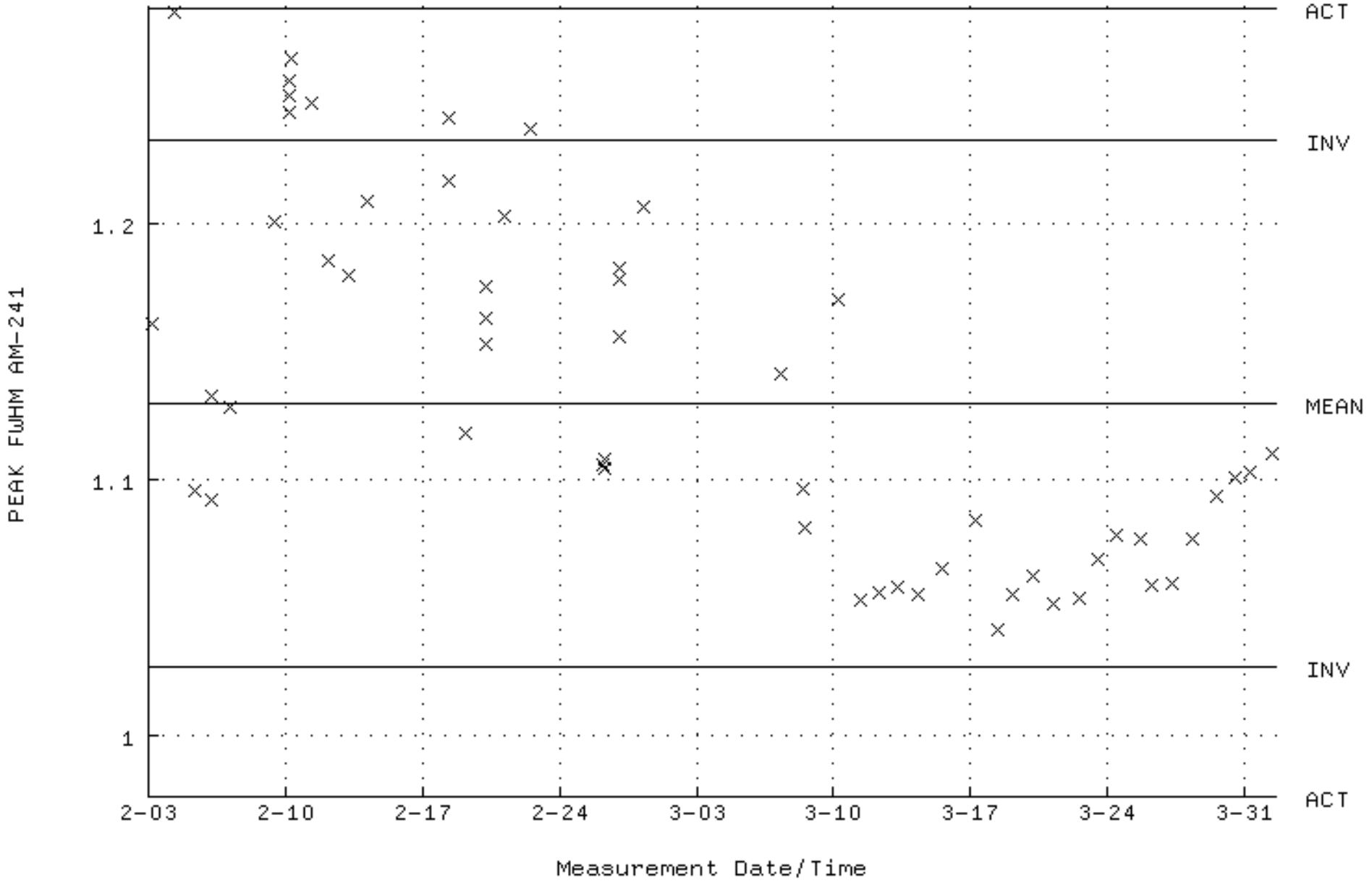
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM29.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:48 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.55639 +- 1.323348E-02 (0.85 %)



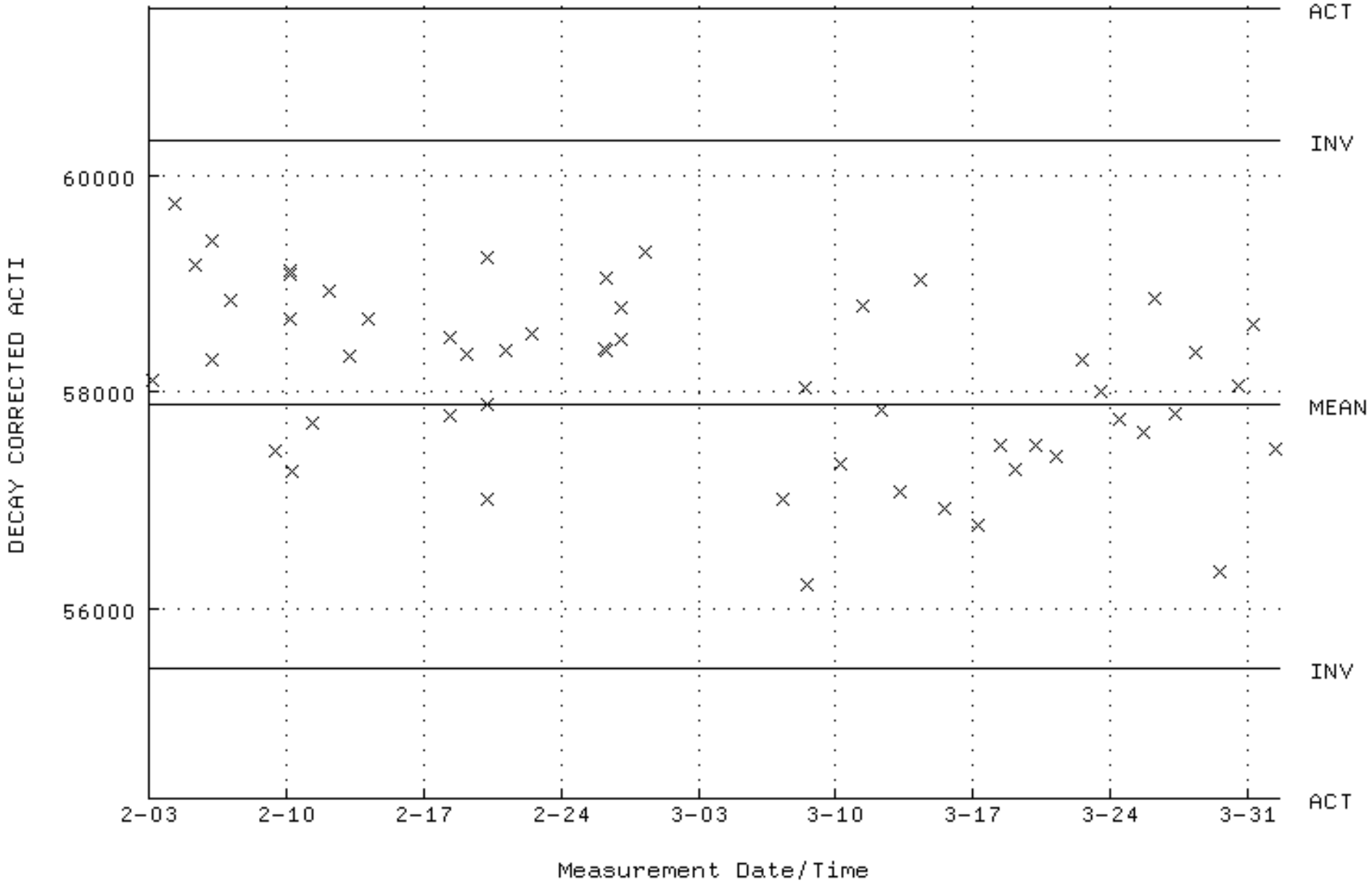
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:29 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



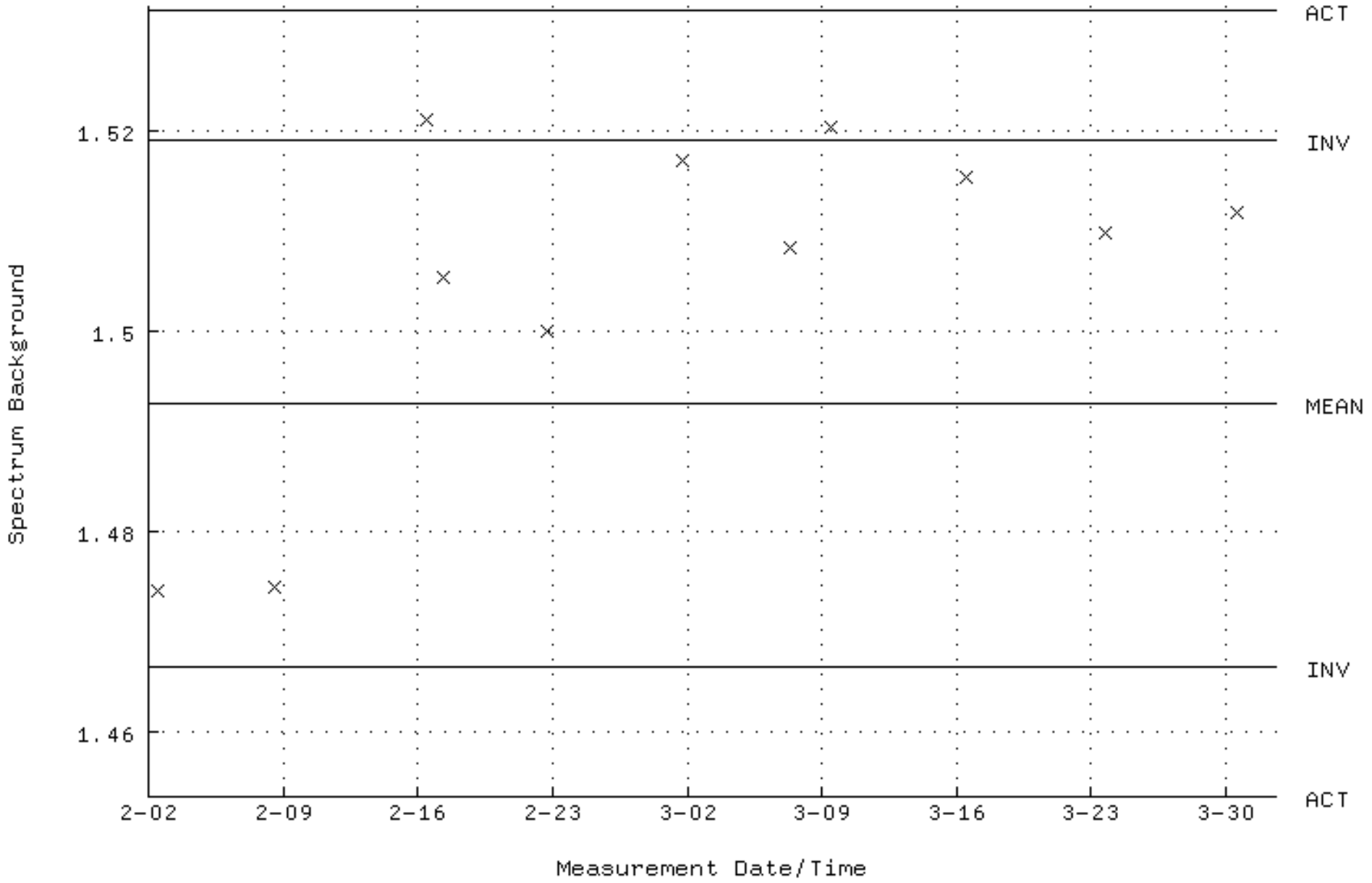
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:29 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.12975 +- 5.133290E-02 (4.54 %)



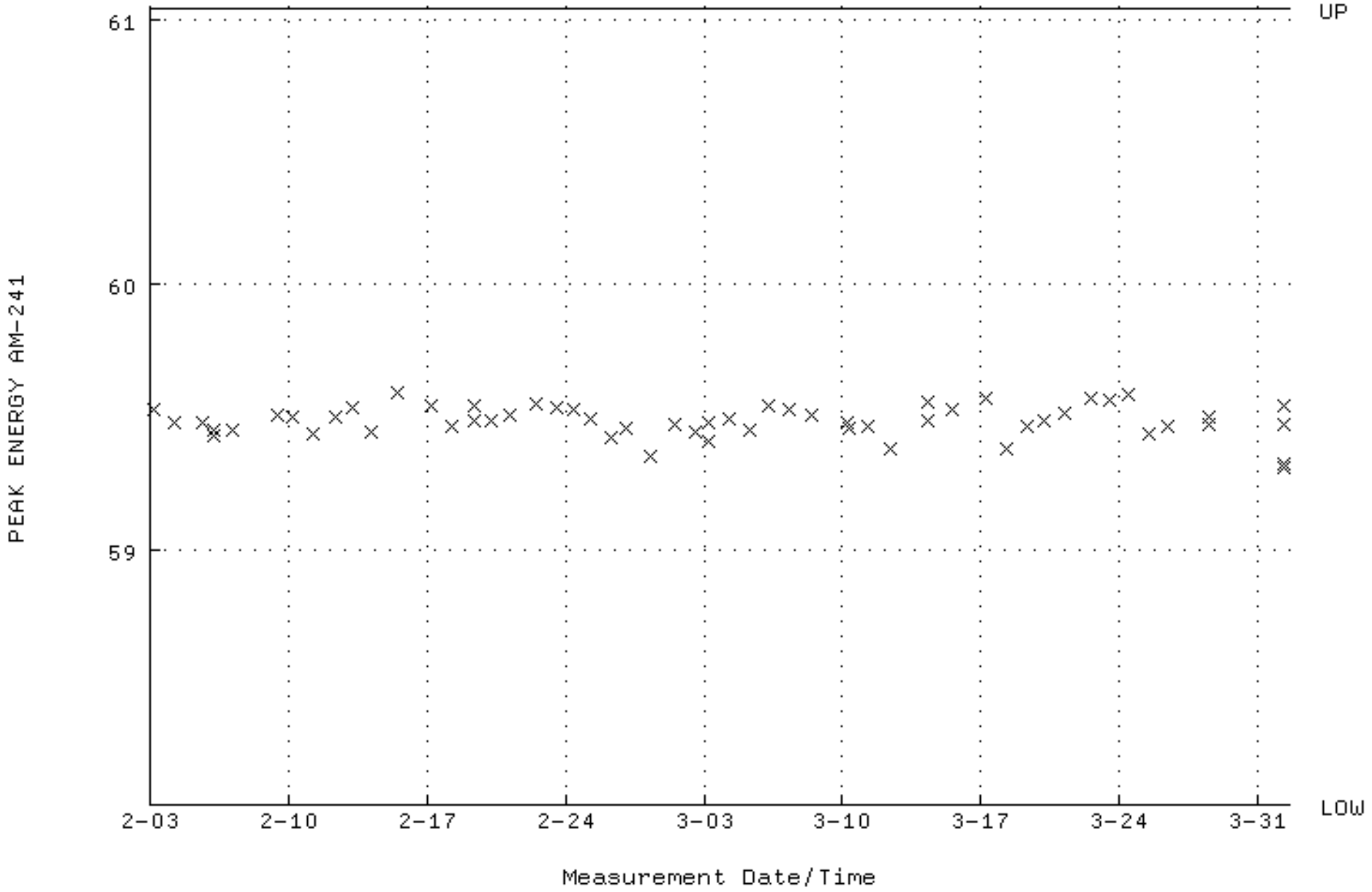
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:29 through 1-APR-2025 12:00:00
Mean +- Std Dev : 57893.2 +- 1219.02 (2.11 %)



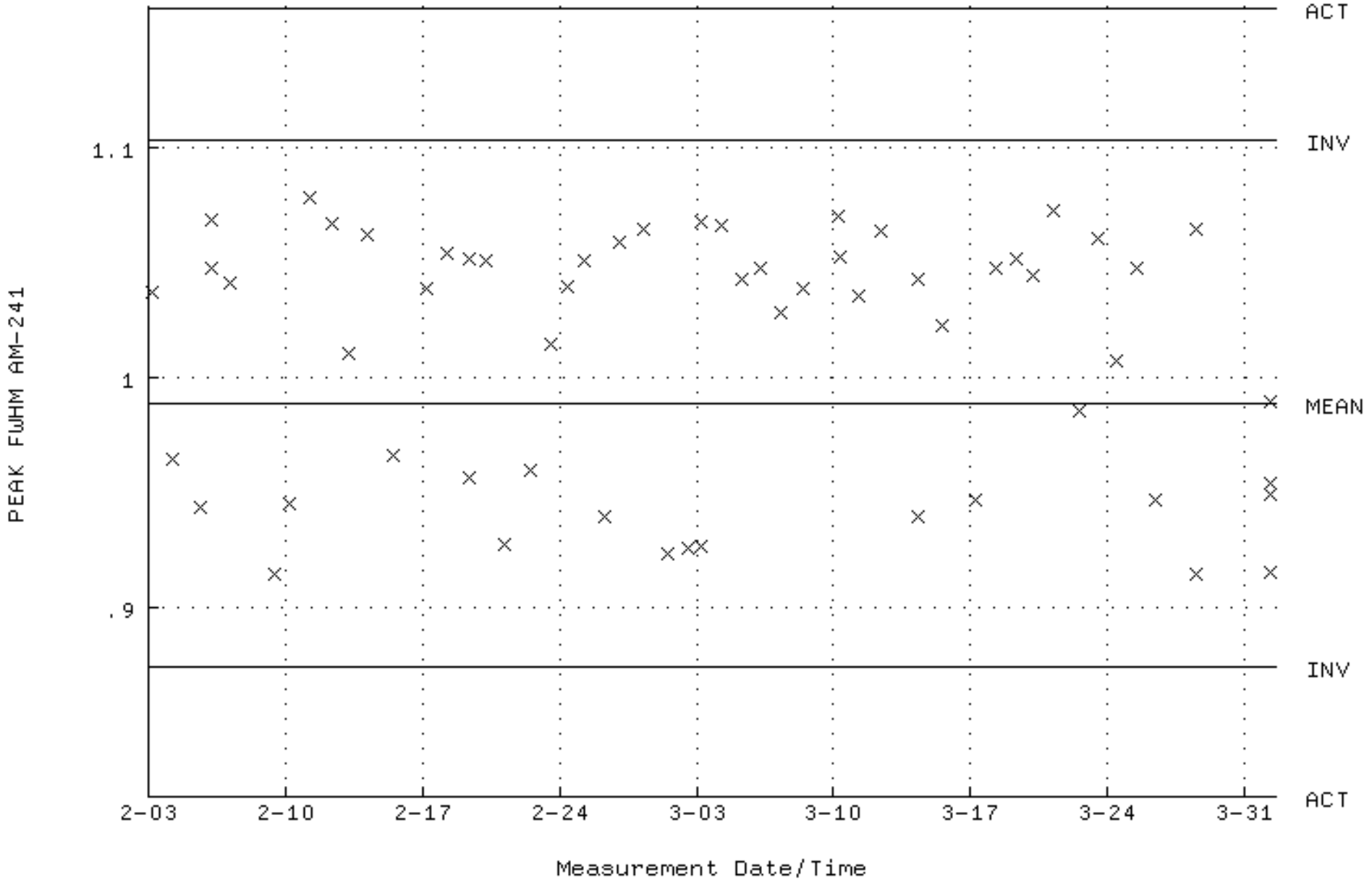
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM31.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:53 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.49284 +- 1.312122E-02 (0.88 %)



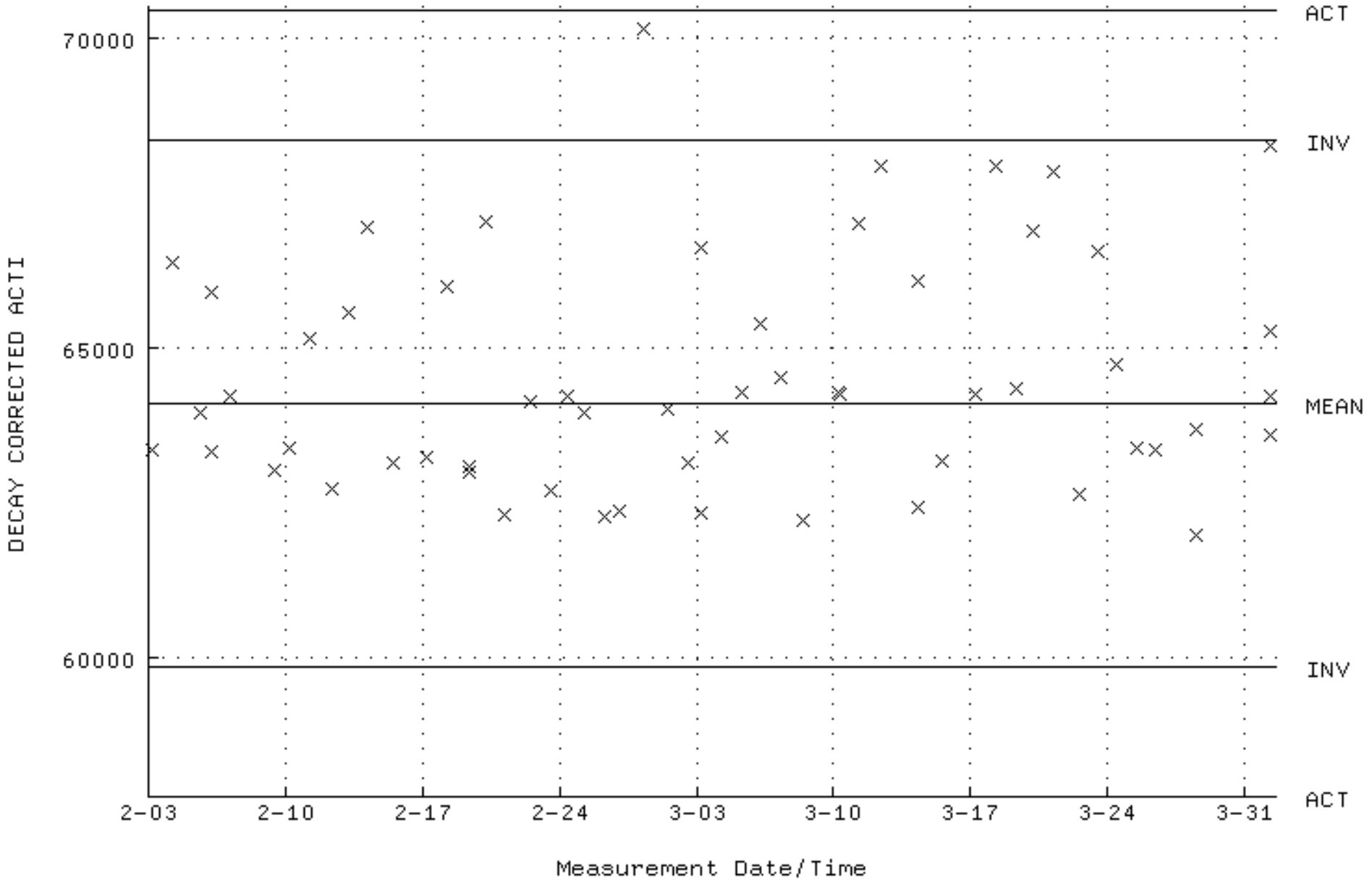
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:34 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



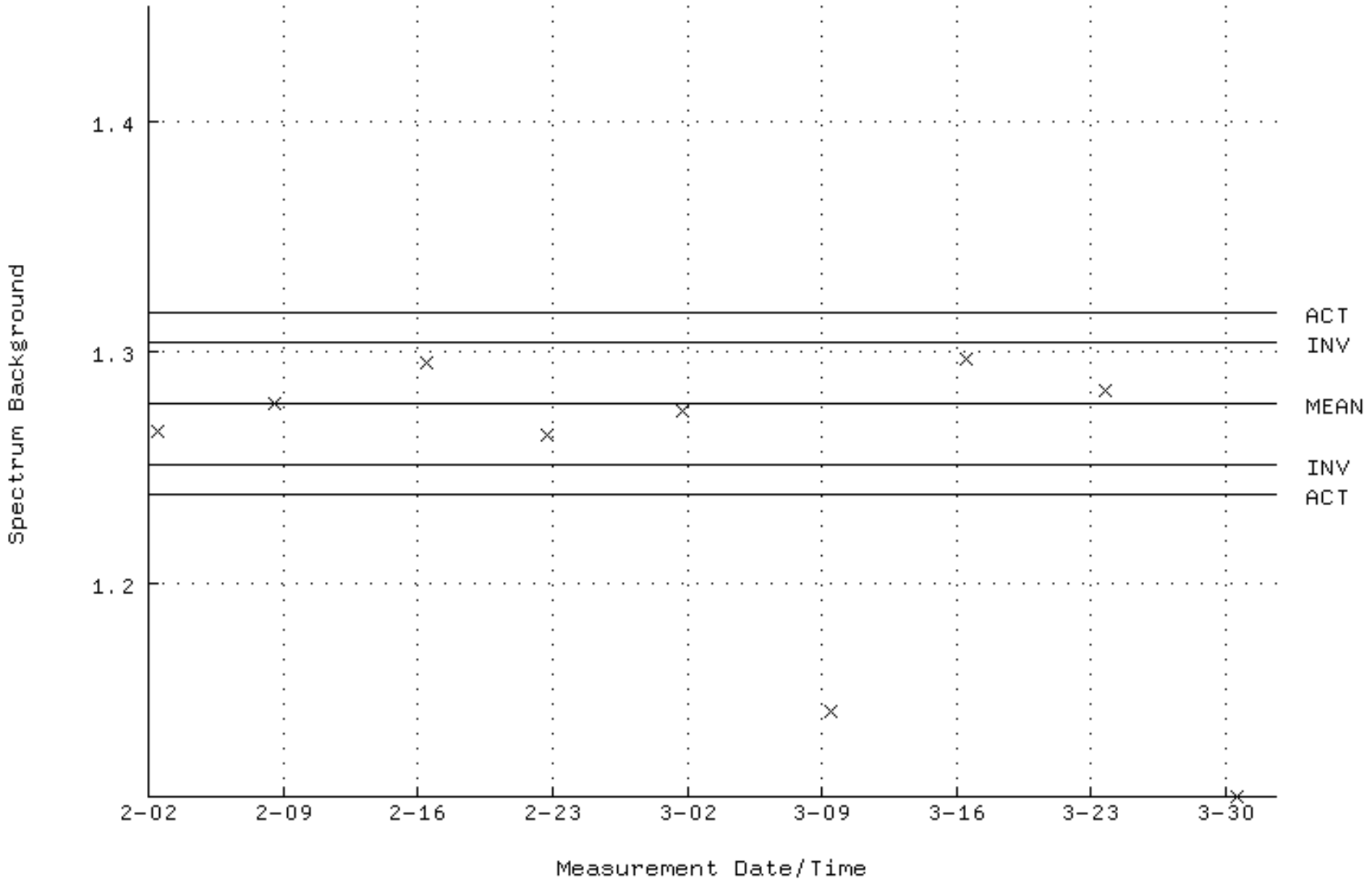
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:34 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.989093 +- 5.693431E-02 (5.76 %)



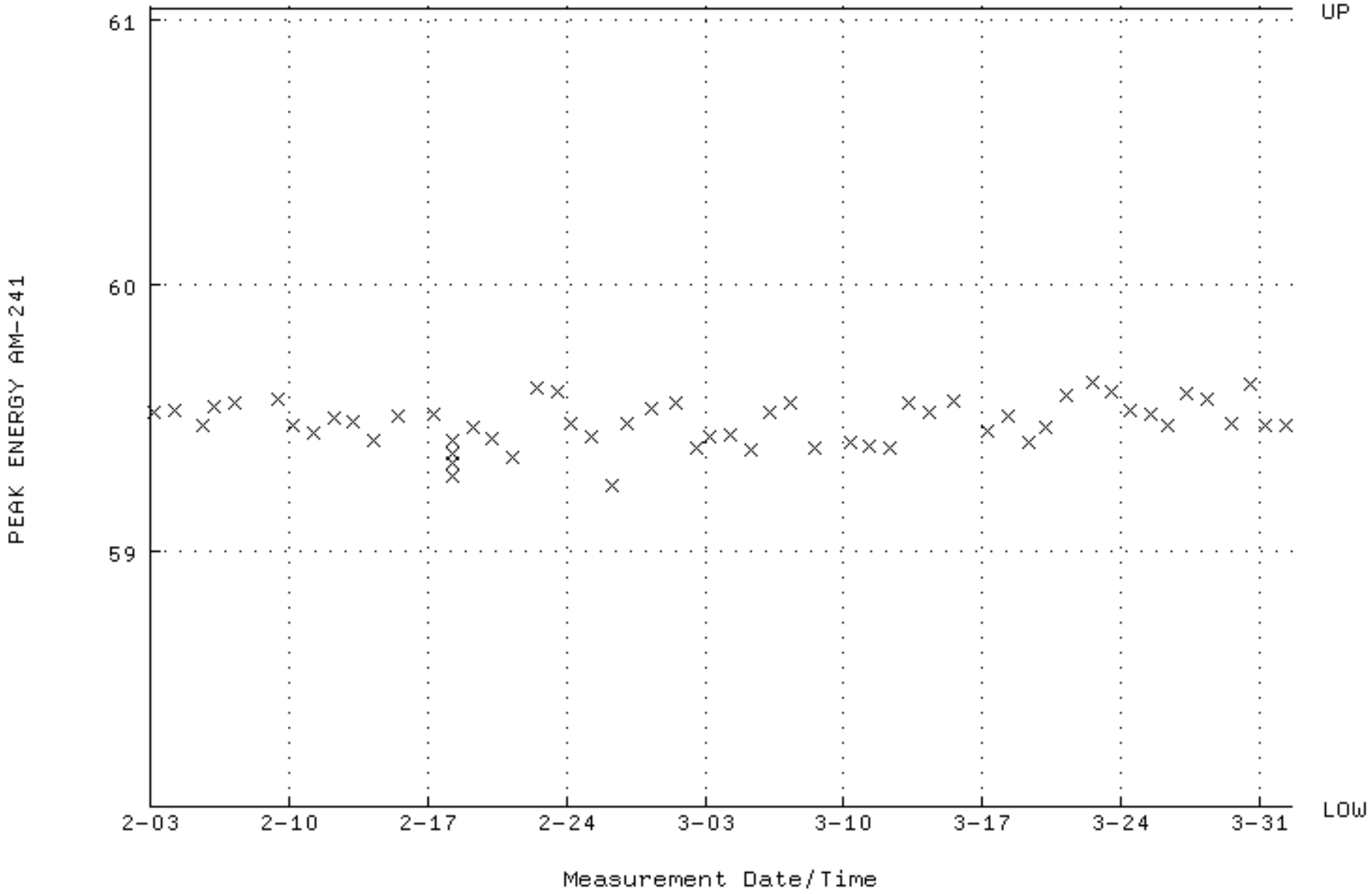
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:34 through 1-APR-2025 12:00:00
Mean +- Std Dev : 64123.1 +- 2120.97 (3.31 %)



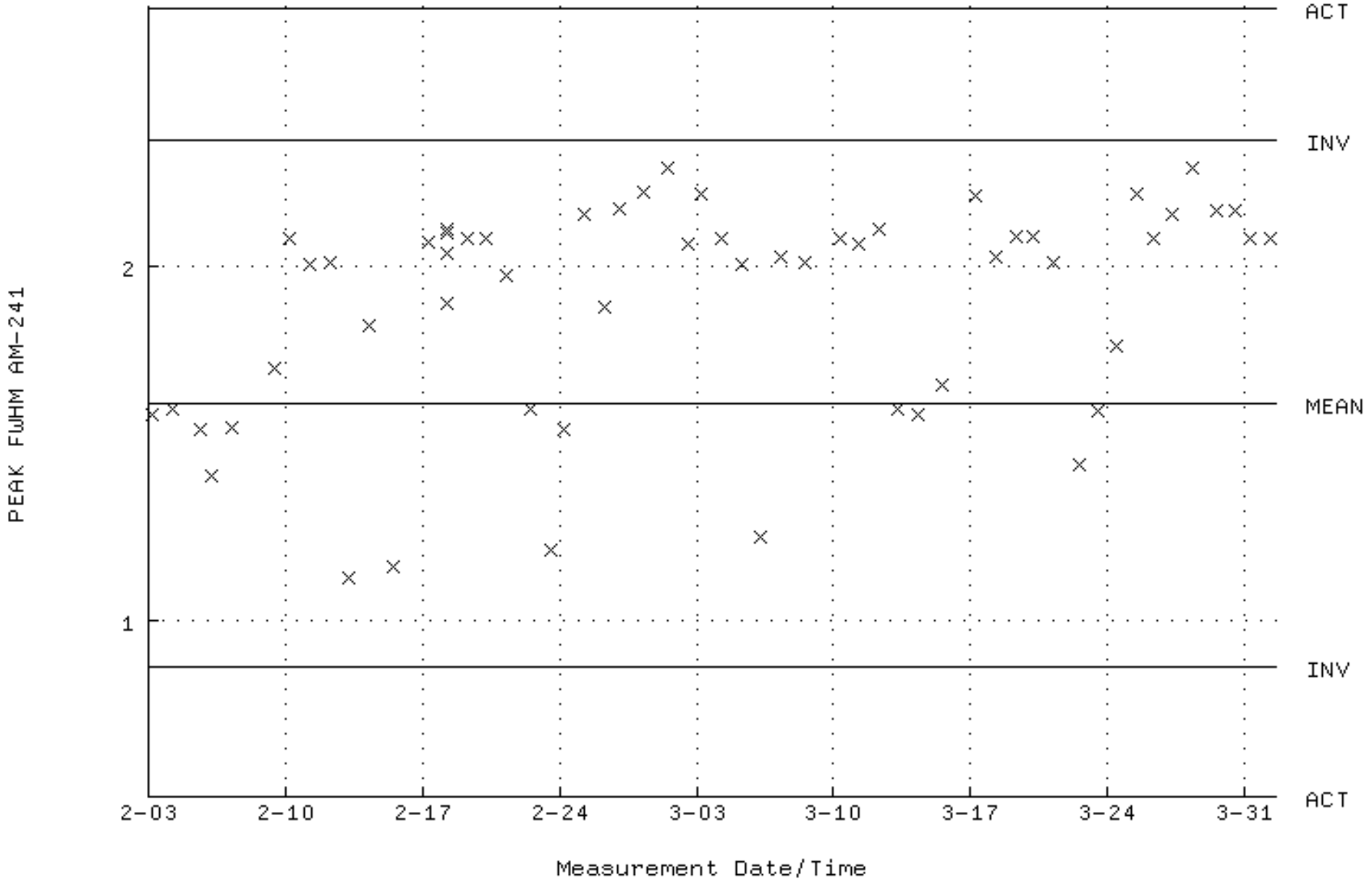
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM32.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:37:58 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.27822 +- 1.322203E-02 (1.03 %)



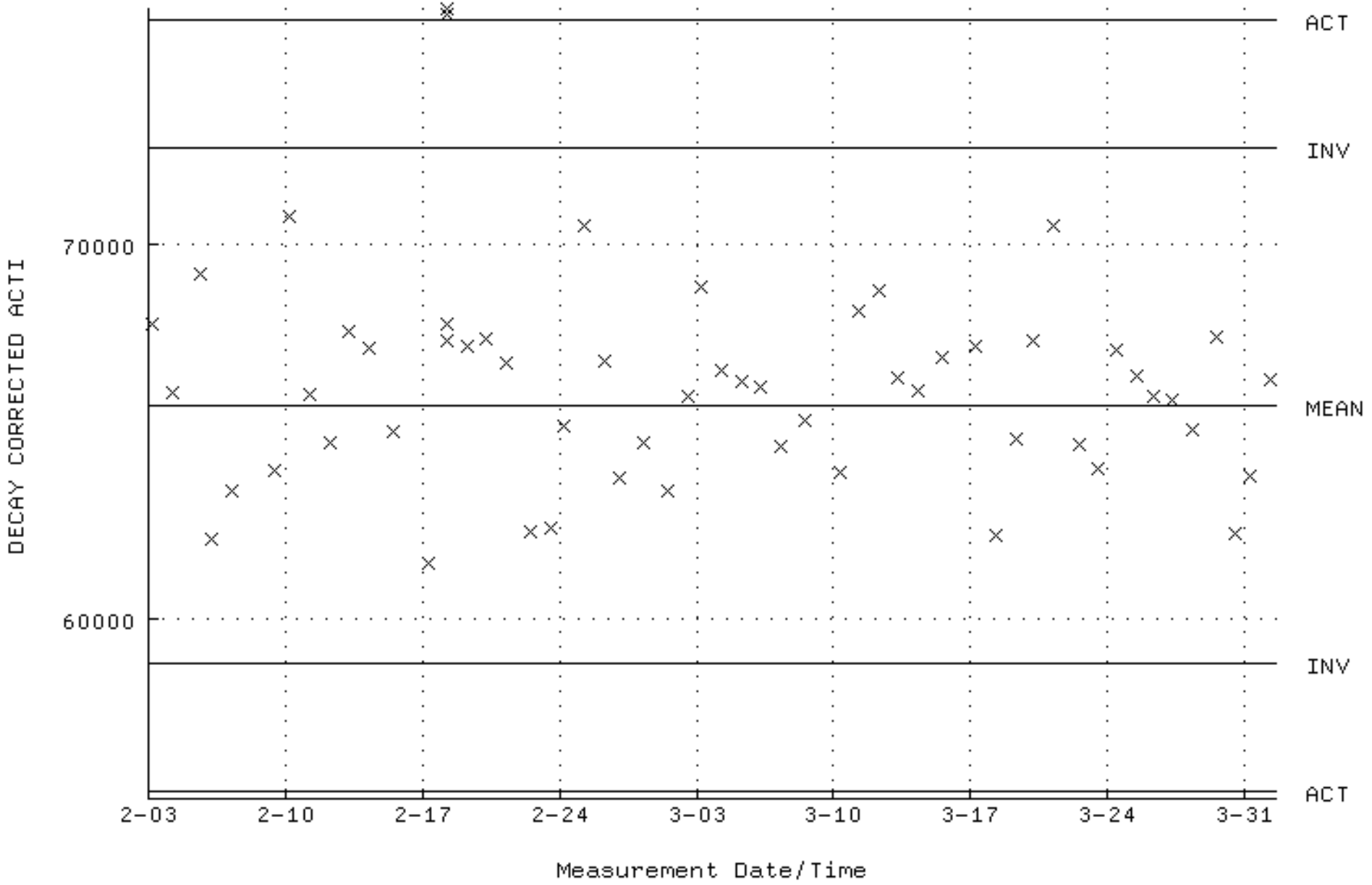
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:29:52 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



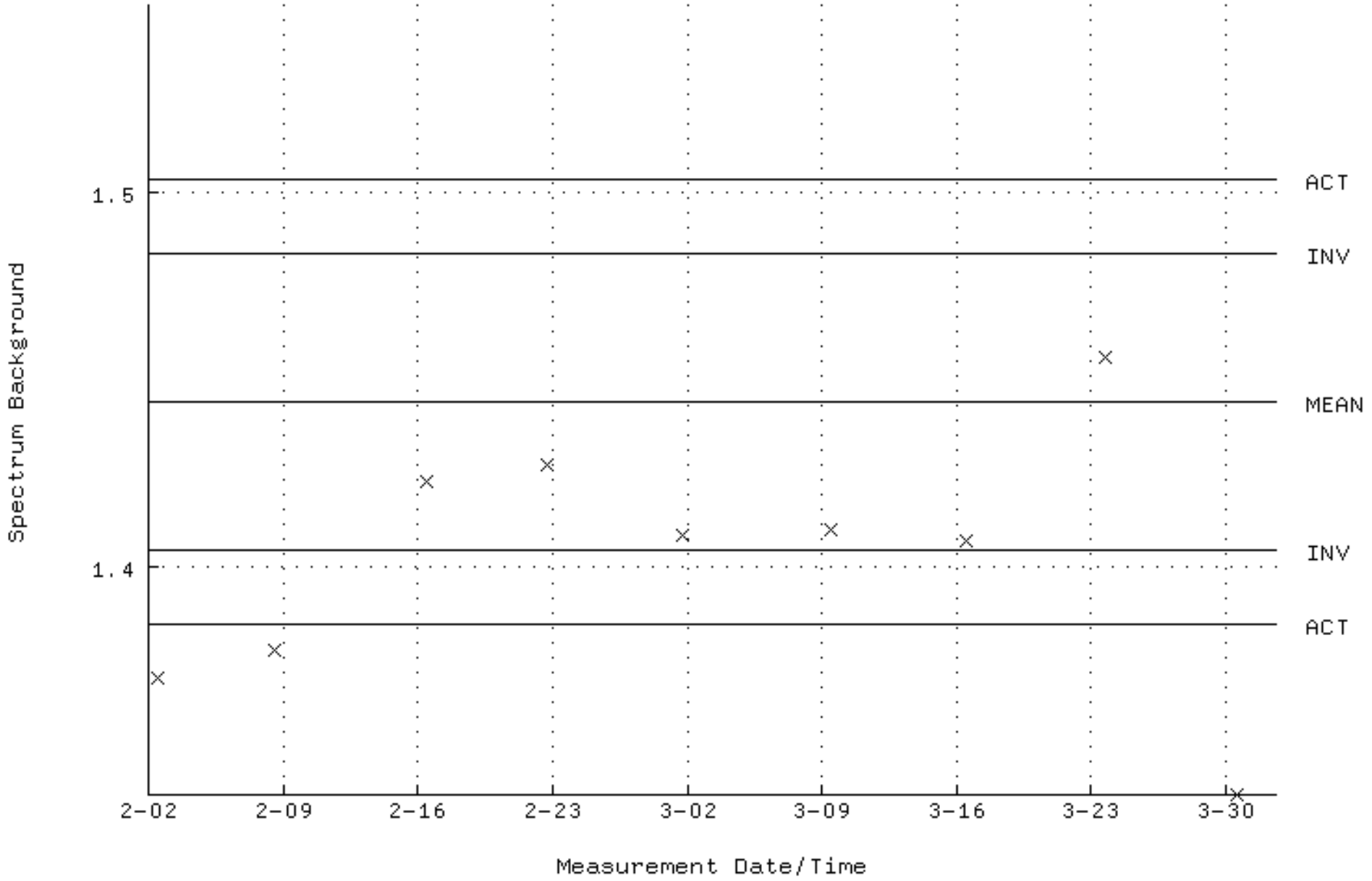
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:29:52 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.61458 +- 0.369176 (22.87 %)



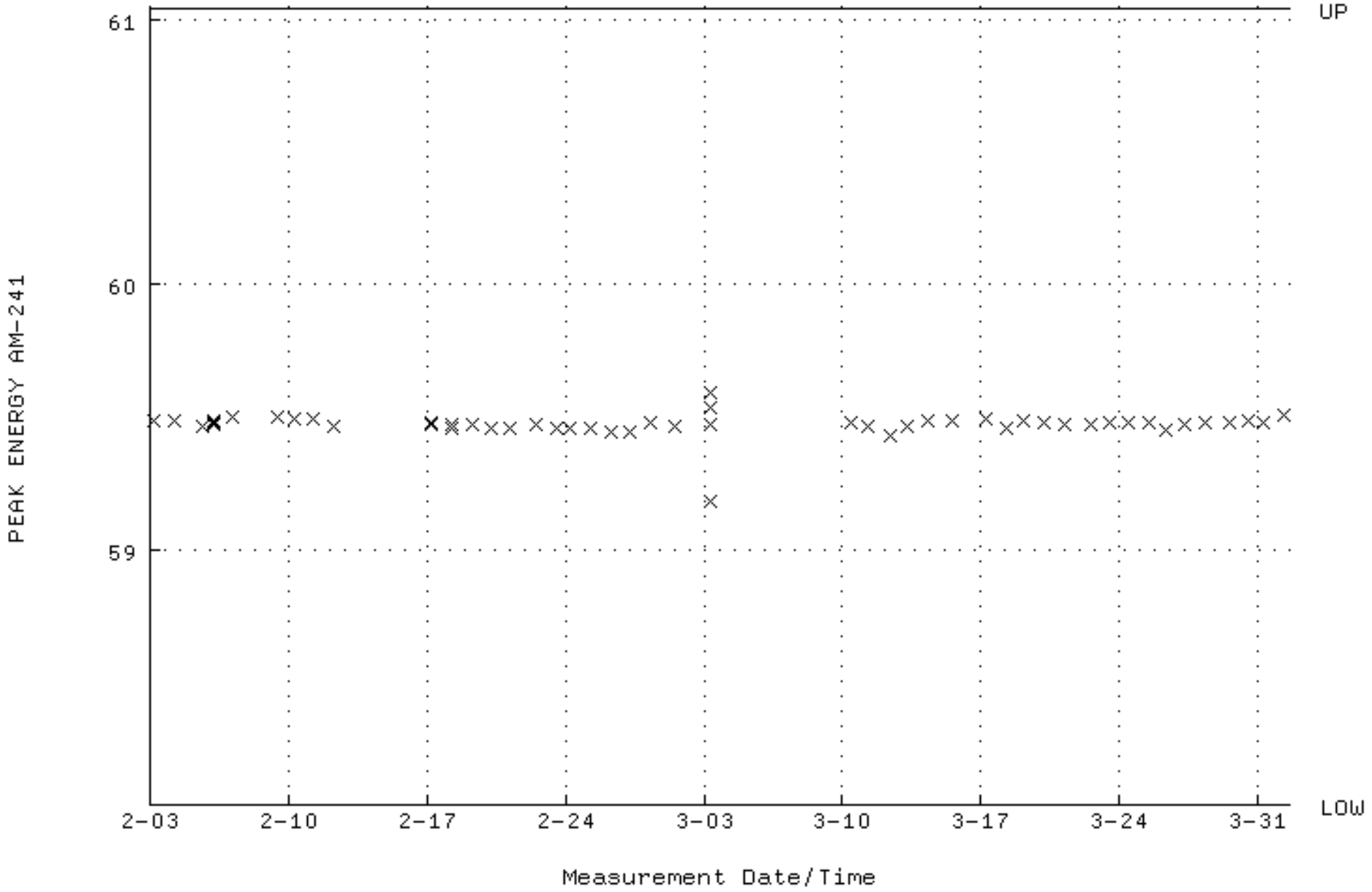
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:29:52 through 1-APR-2025 12:00:00
Mean +- Std Dev : 65732.7 +- 3437.16 (5.23 %)



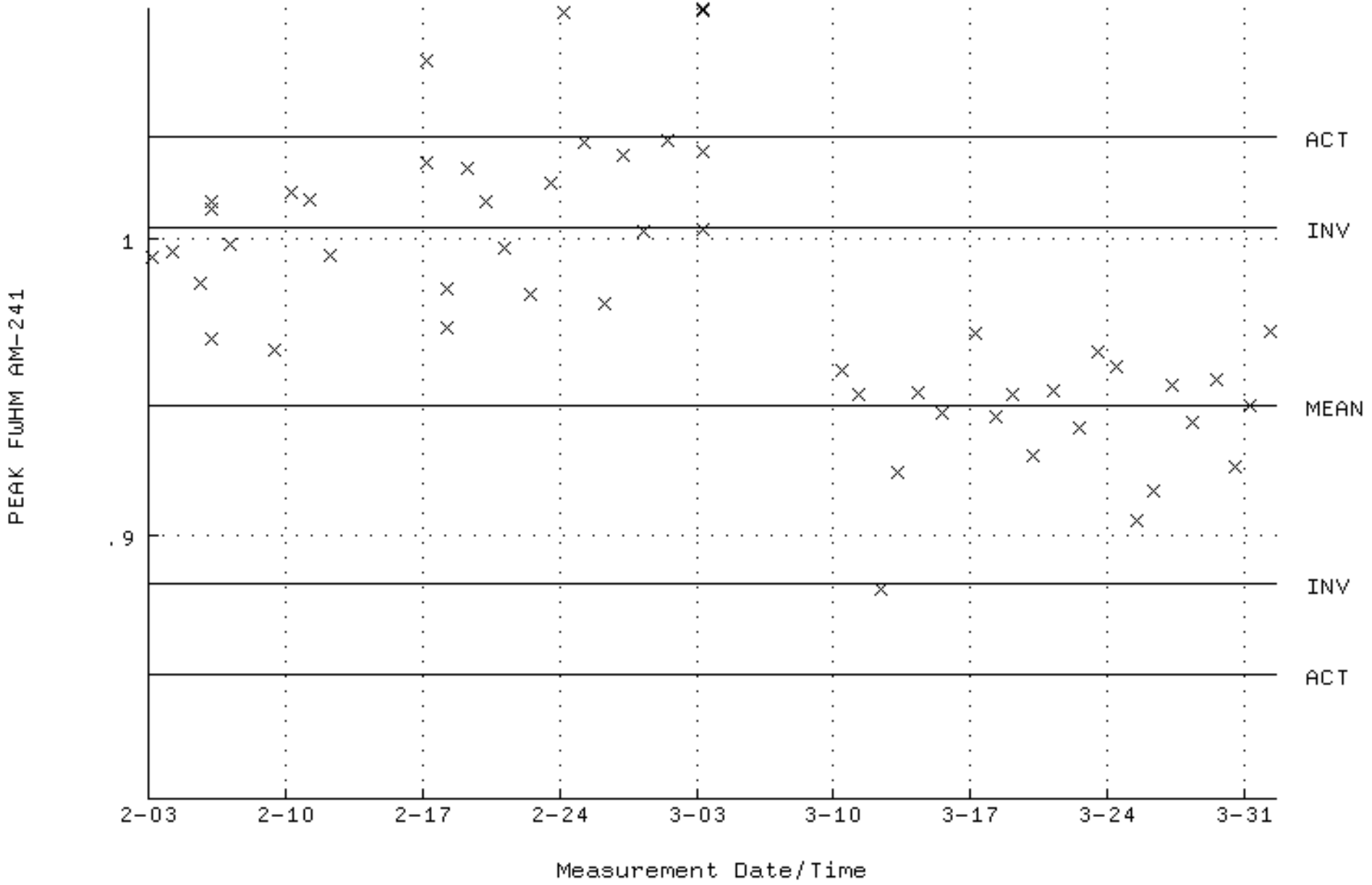
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM33.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:38:03 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.44424 +- 1.977634E-02 (1.37 %)



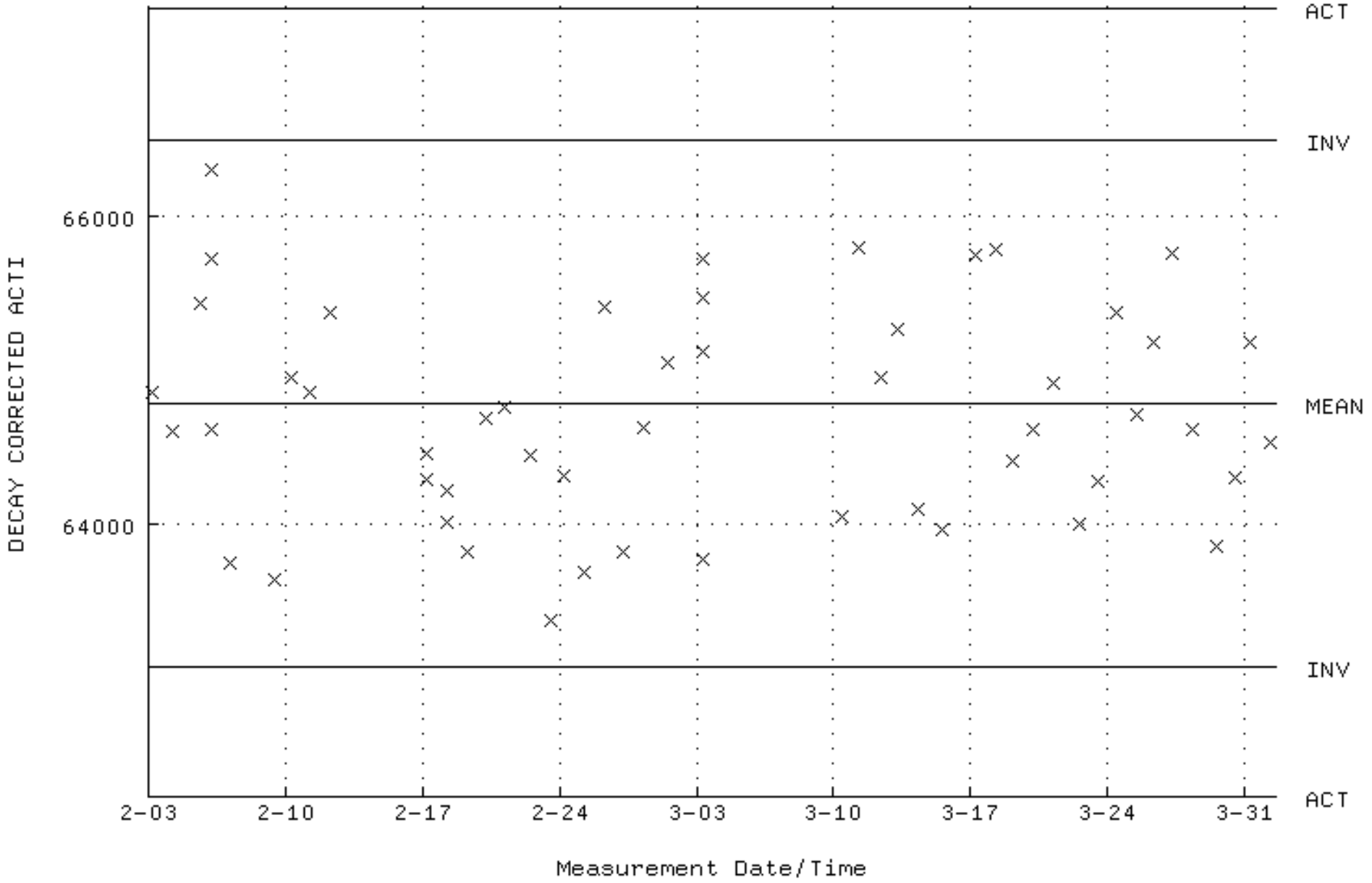
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM38_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:39 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



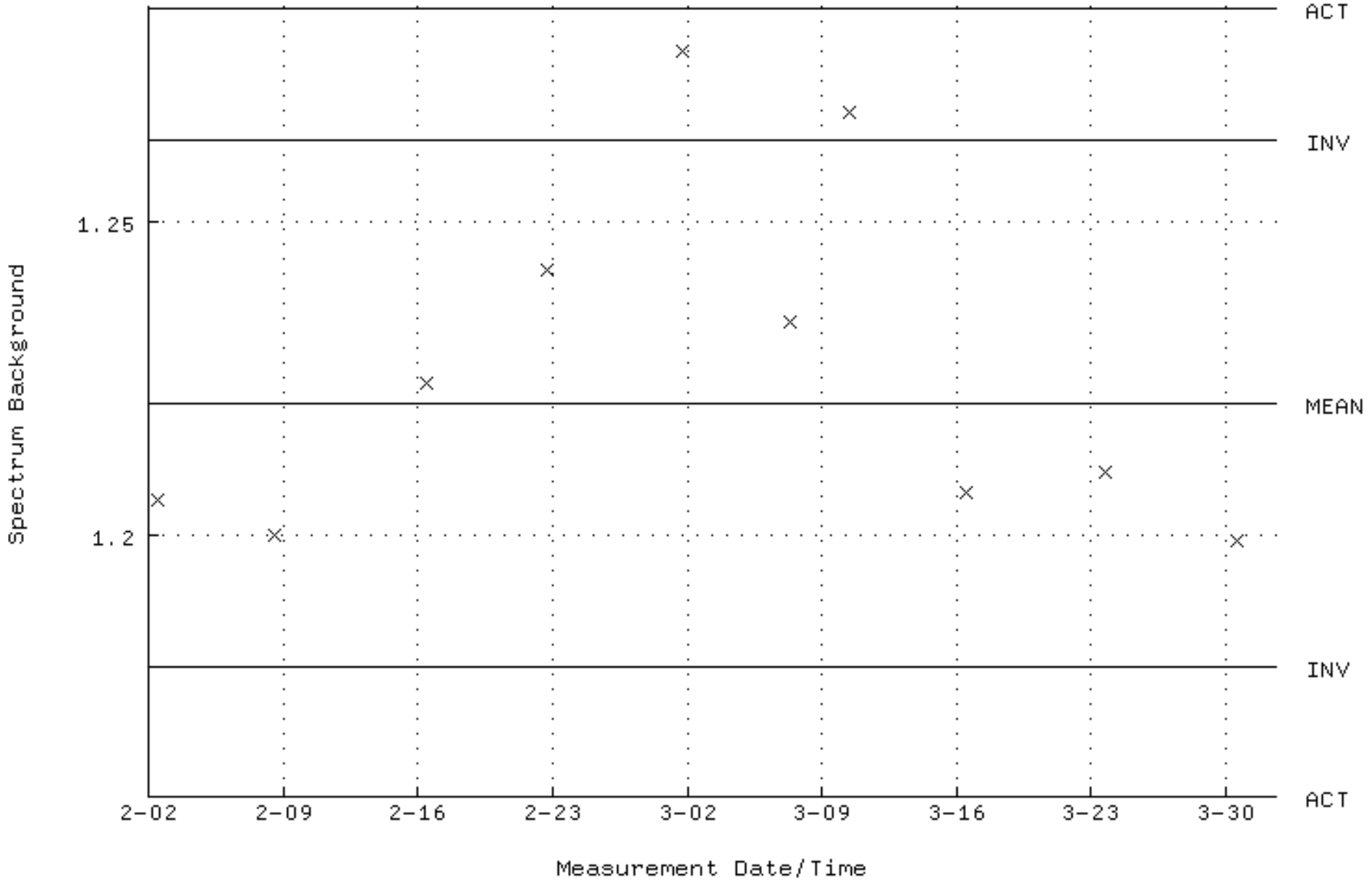
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM38_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:39 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.944191 +- 3.009748E-02 (3.19 %)



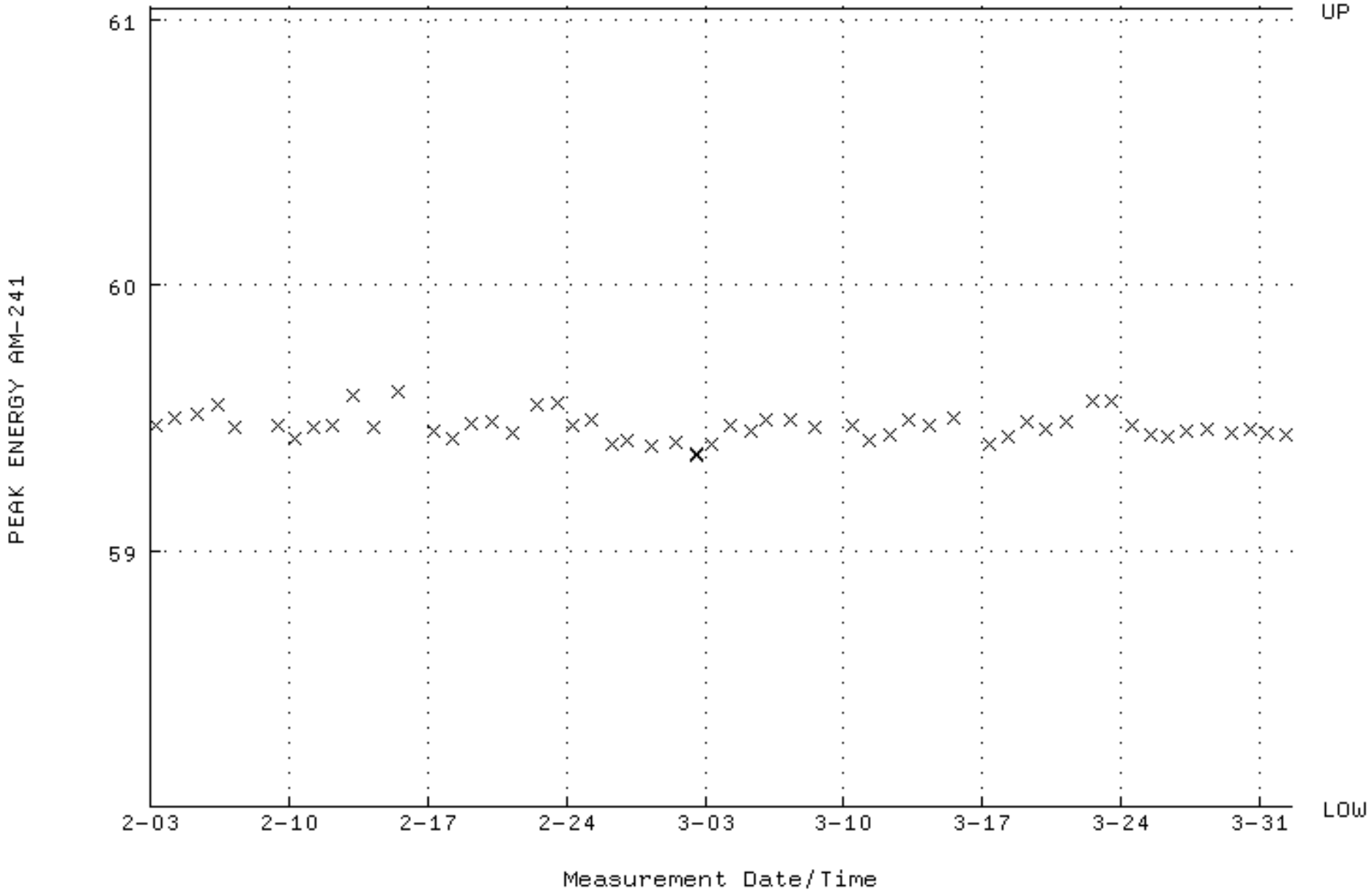
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM38_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:39 through 1-APR-2025 12:00:00
Mean +- Std Dev : 64791.4 +- 849.787 (1.31 %)



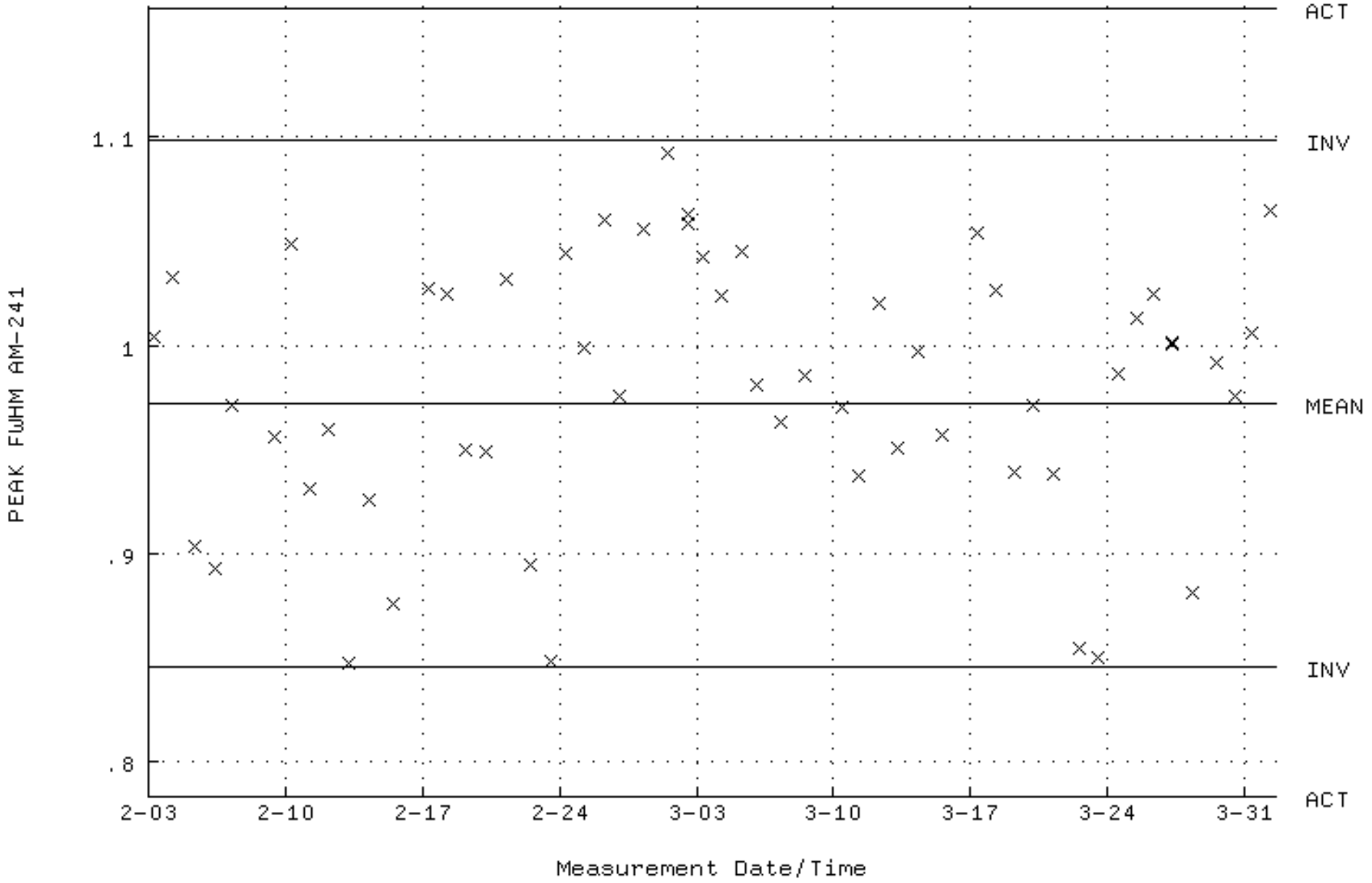
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM38.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:38:08 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.22112 +- 2.092609E-02 (1.71 %)



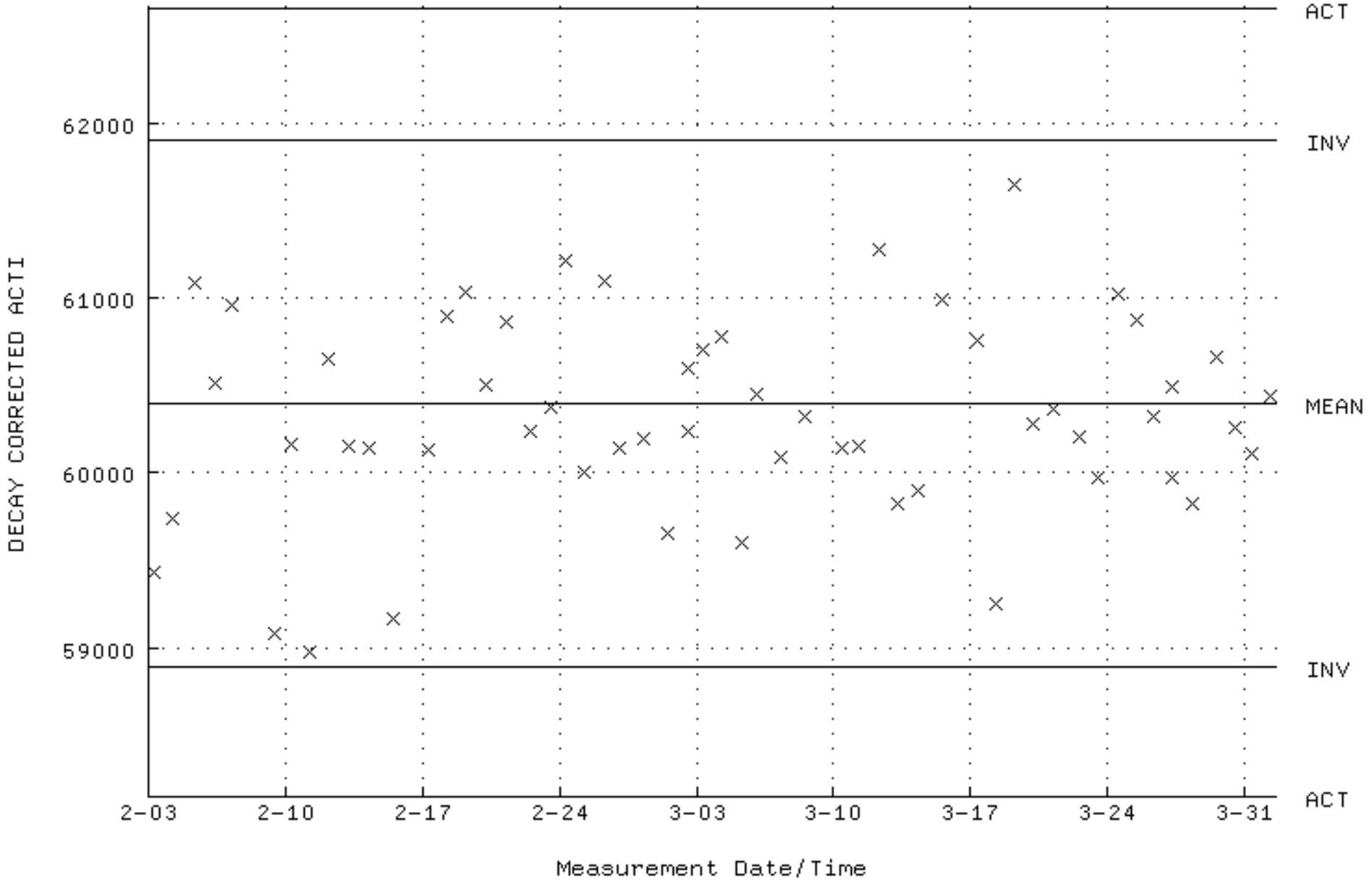
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM41_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 07:17:50 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



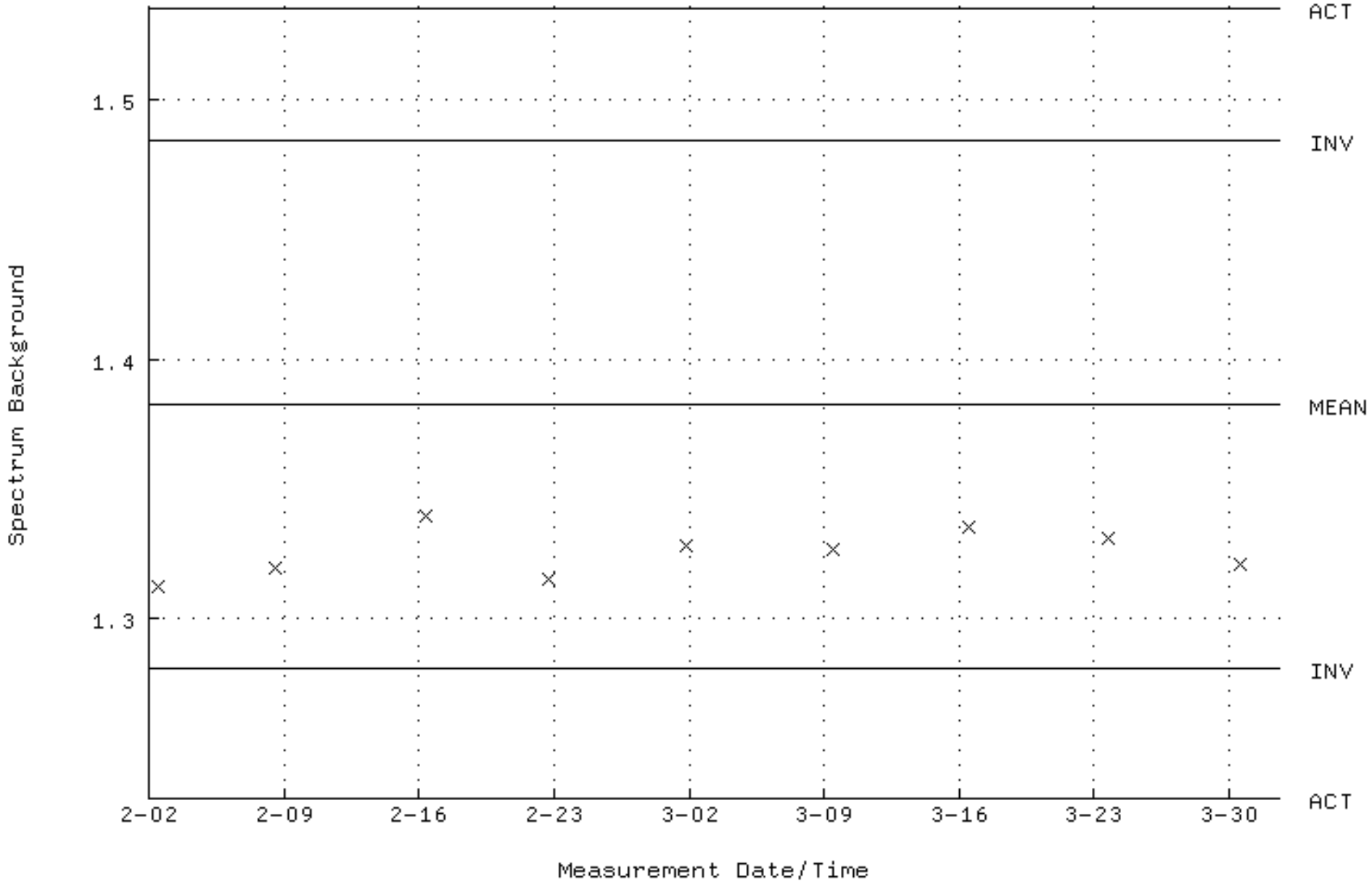
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM41_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 07:17:50 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.972535 +- 6.309706E-02 (6.49 %)



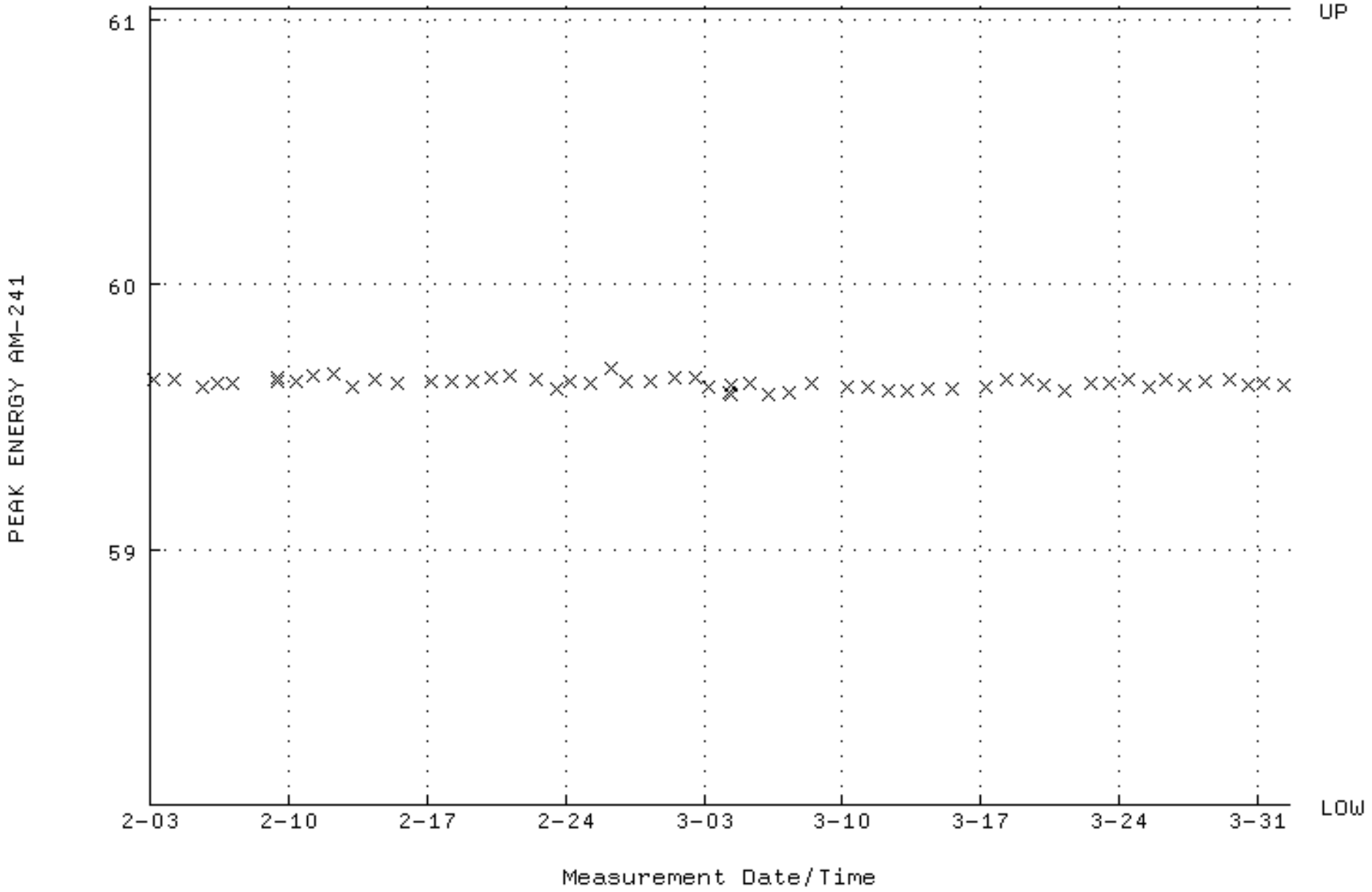
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM41_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 07:17:50 through 1-APR-2025 12:00:00
Mean +- Std Dev : 60401.1 +- 751.820 (1.24 %)



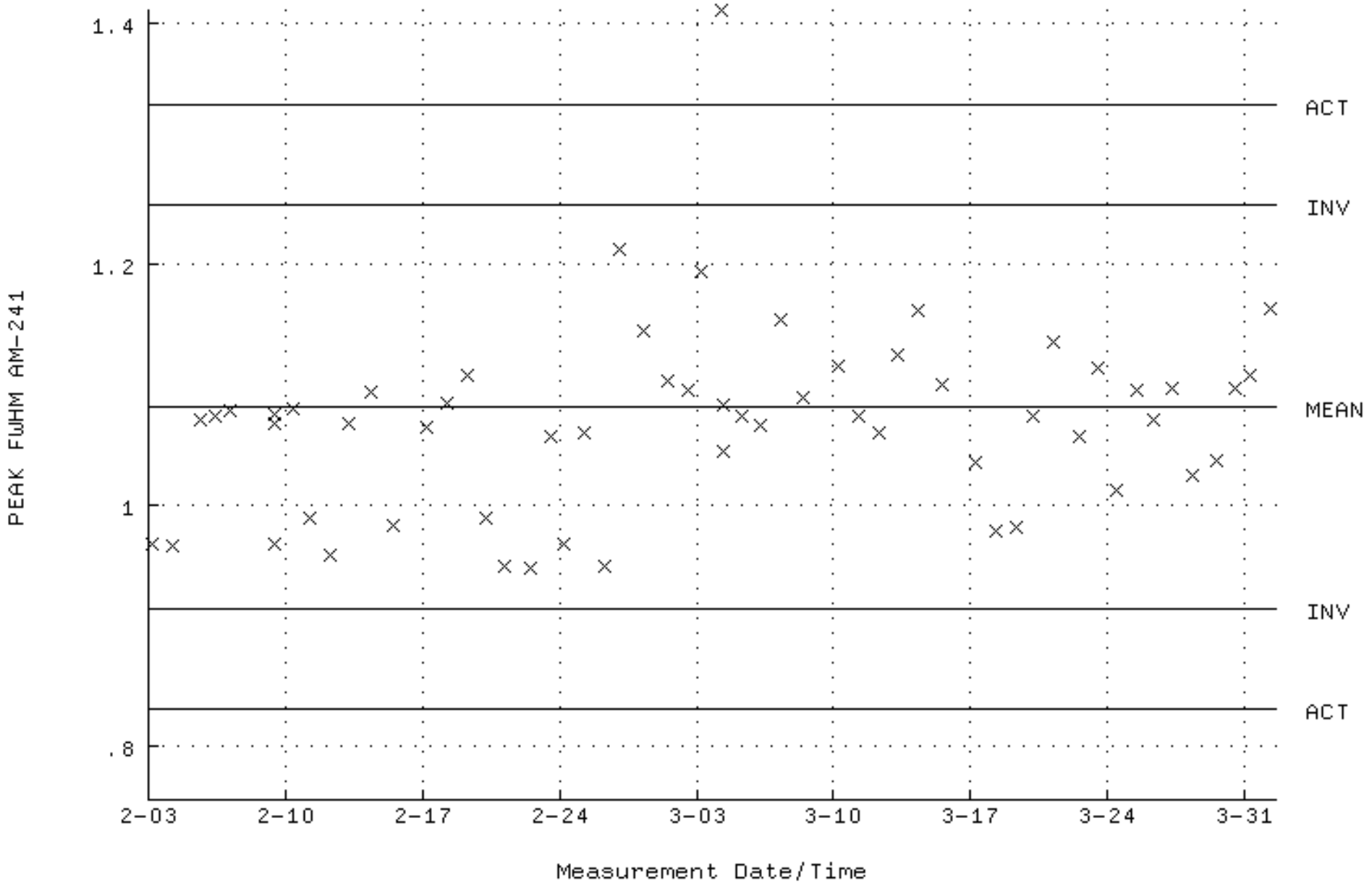
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM41.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:38:18 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.38296 +- 5.070877E-02 (3.67 %)



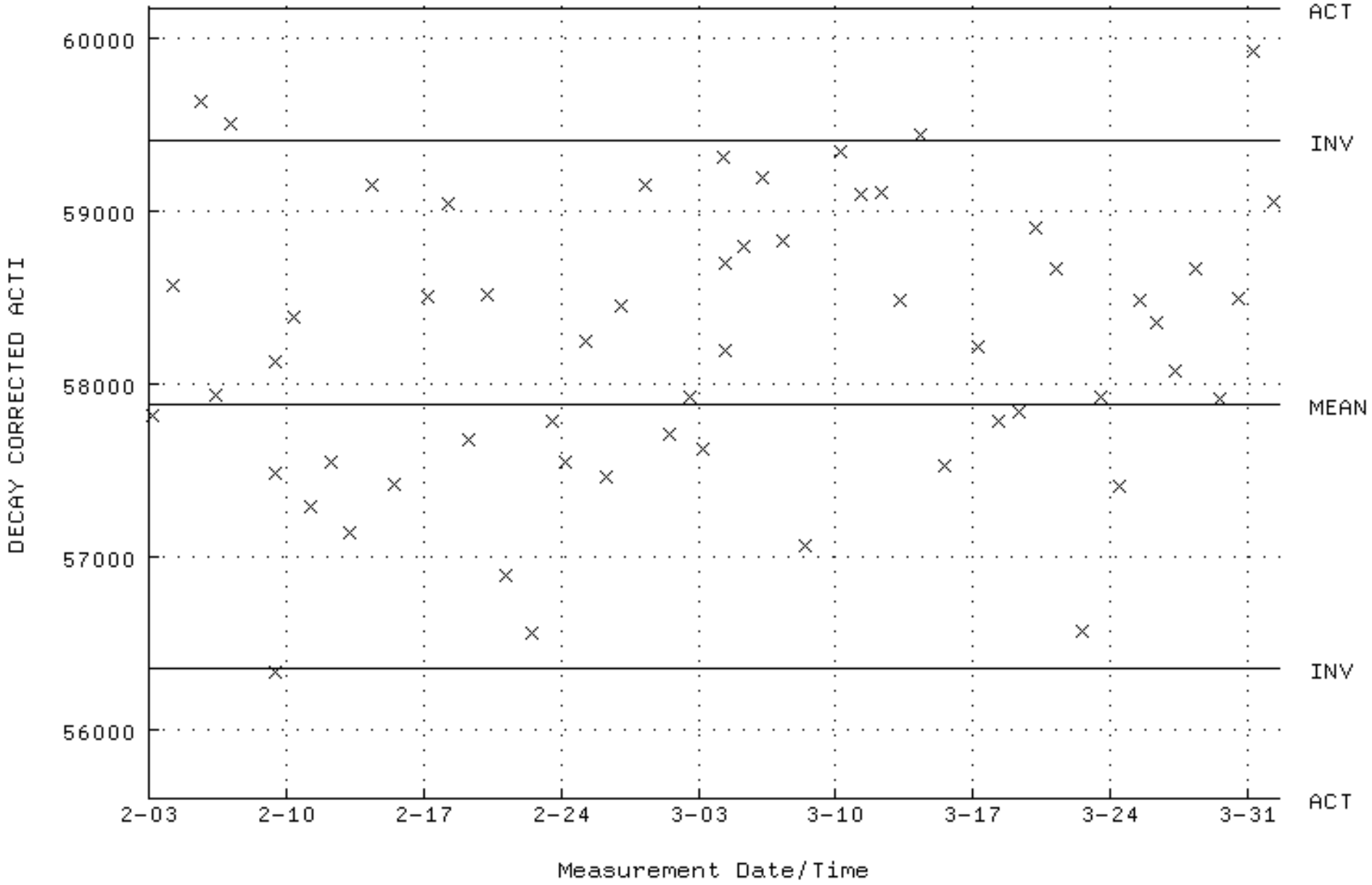
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM46_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:48 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



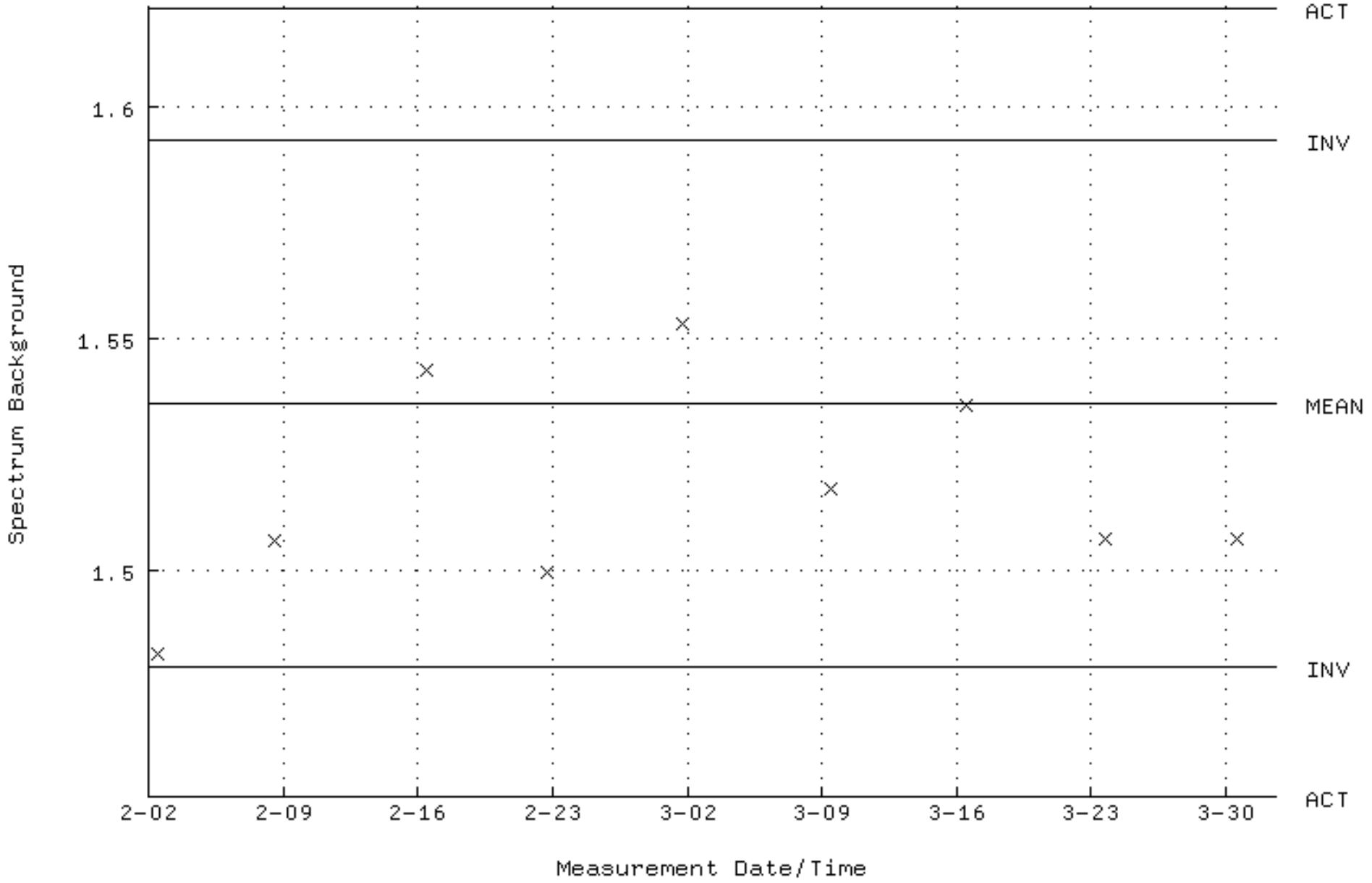
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM46_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:48 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.08202 +- 8.370177E-02 (7.74 %)



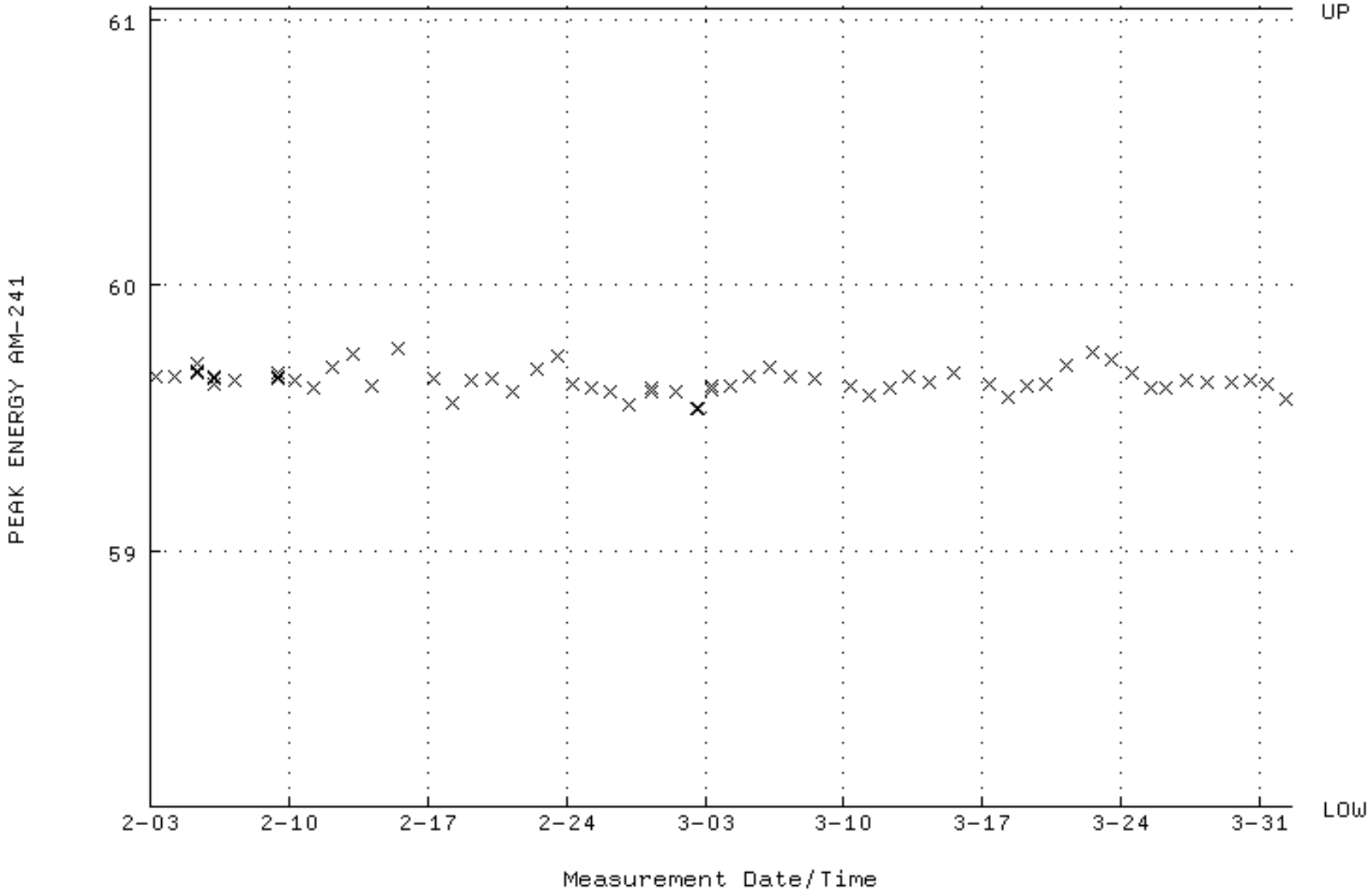
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM46_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:48 through 1-APR-2025 12:00:00
Mean +- Std Dev : 57886.0 +- 760.286 (1.31 %)



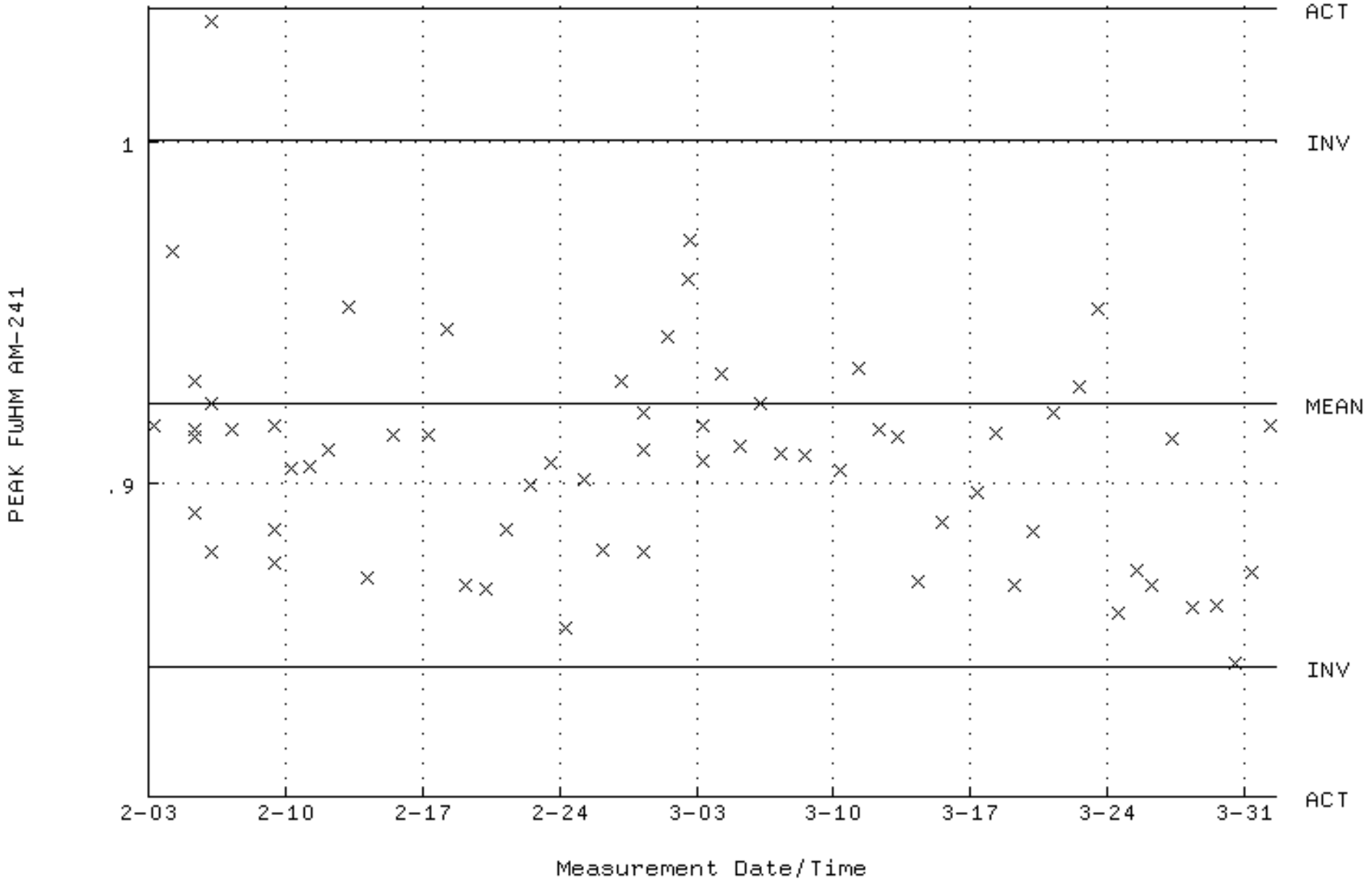
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM46.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:38:28 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.53619 +- 2.830773E-02 (1.84 %)



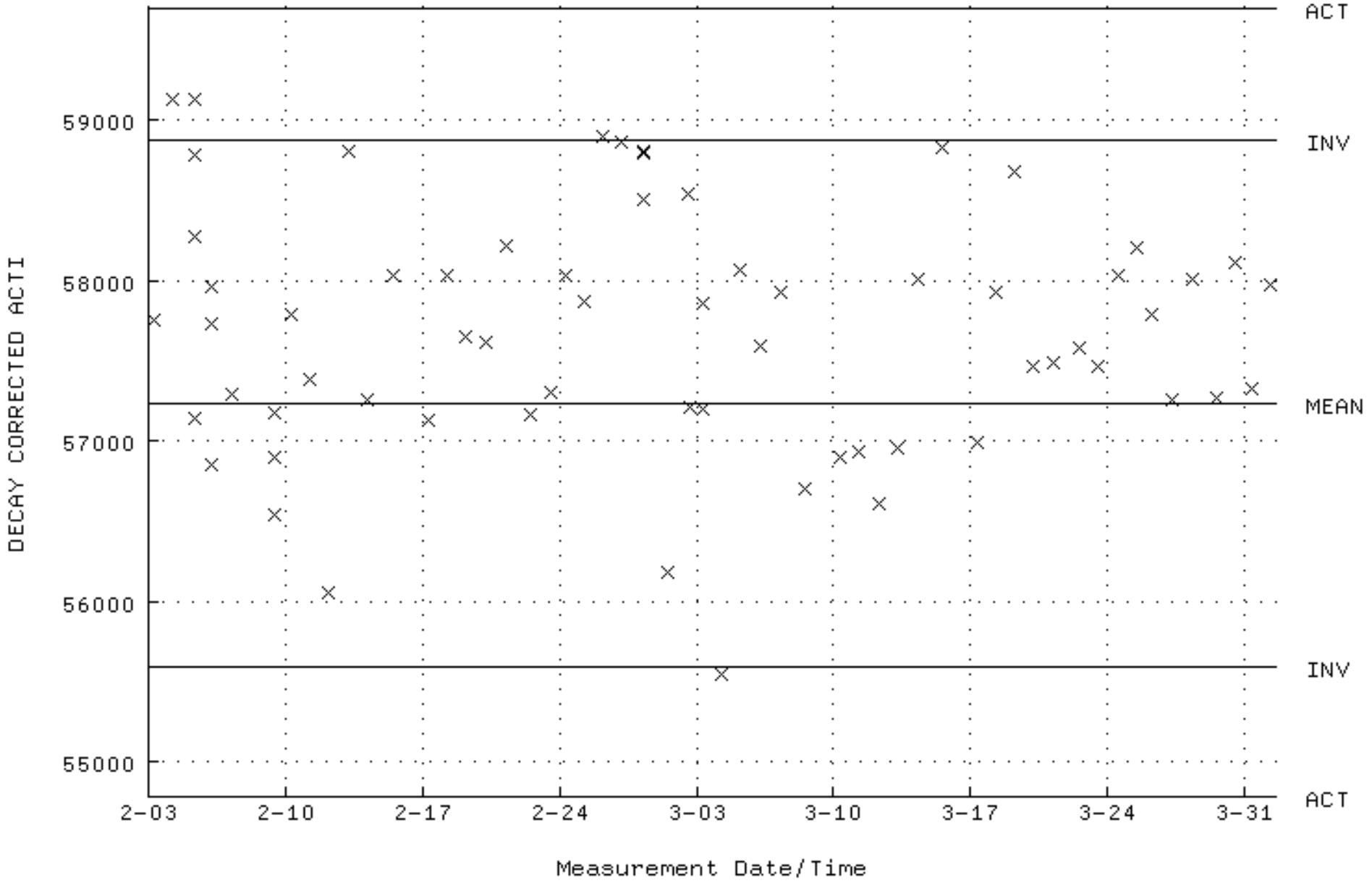
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM47_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 07:17:55 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



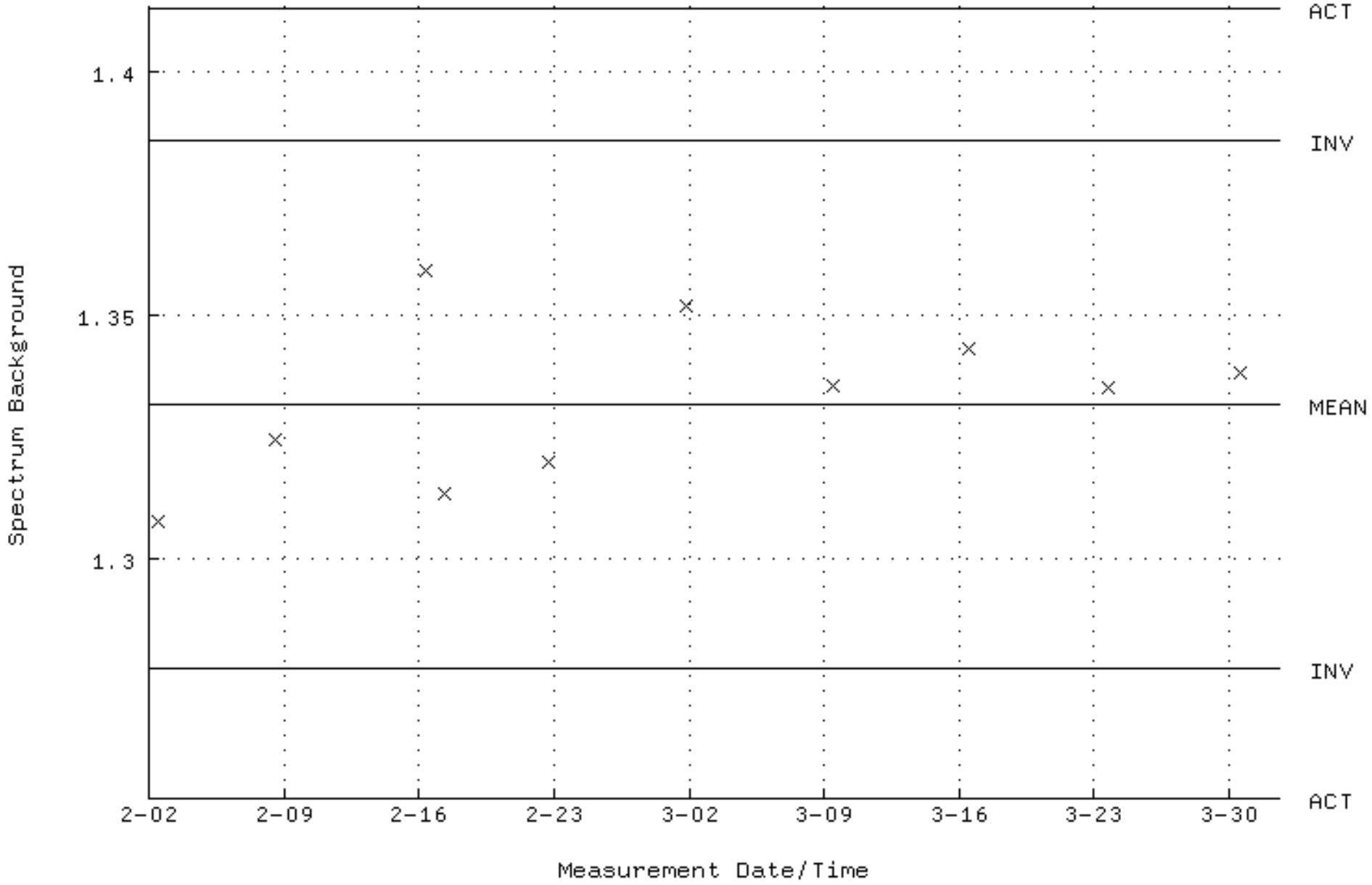
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM47_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 07:17:55 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.923654 +- 3.843296E-02 (4.16 %)



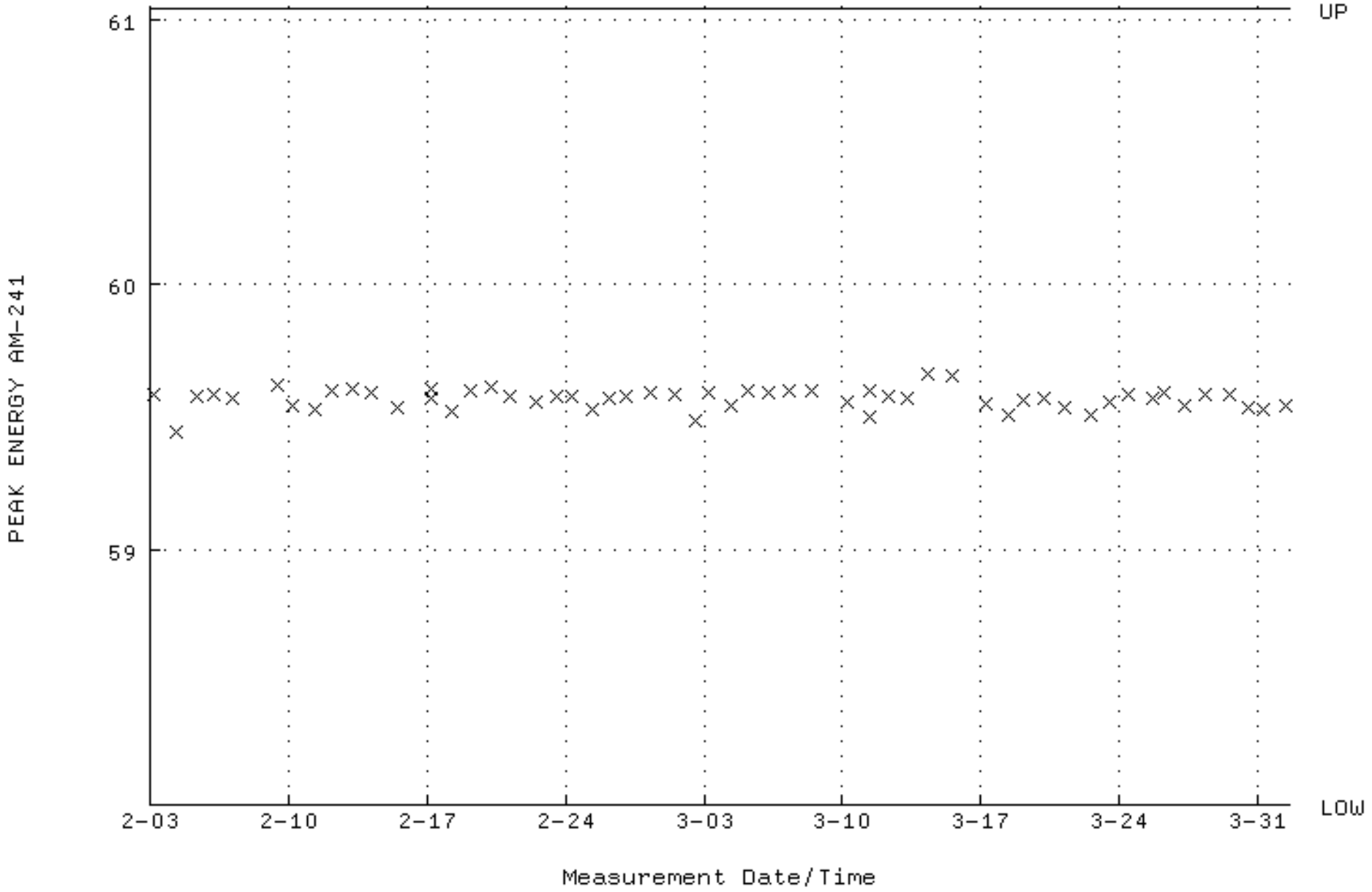
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM47_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 07:17:55 through 1-APR-2025 12:00:00
Mean +- Std Dev : 57239.7 +- 819.128 (1.43 %)



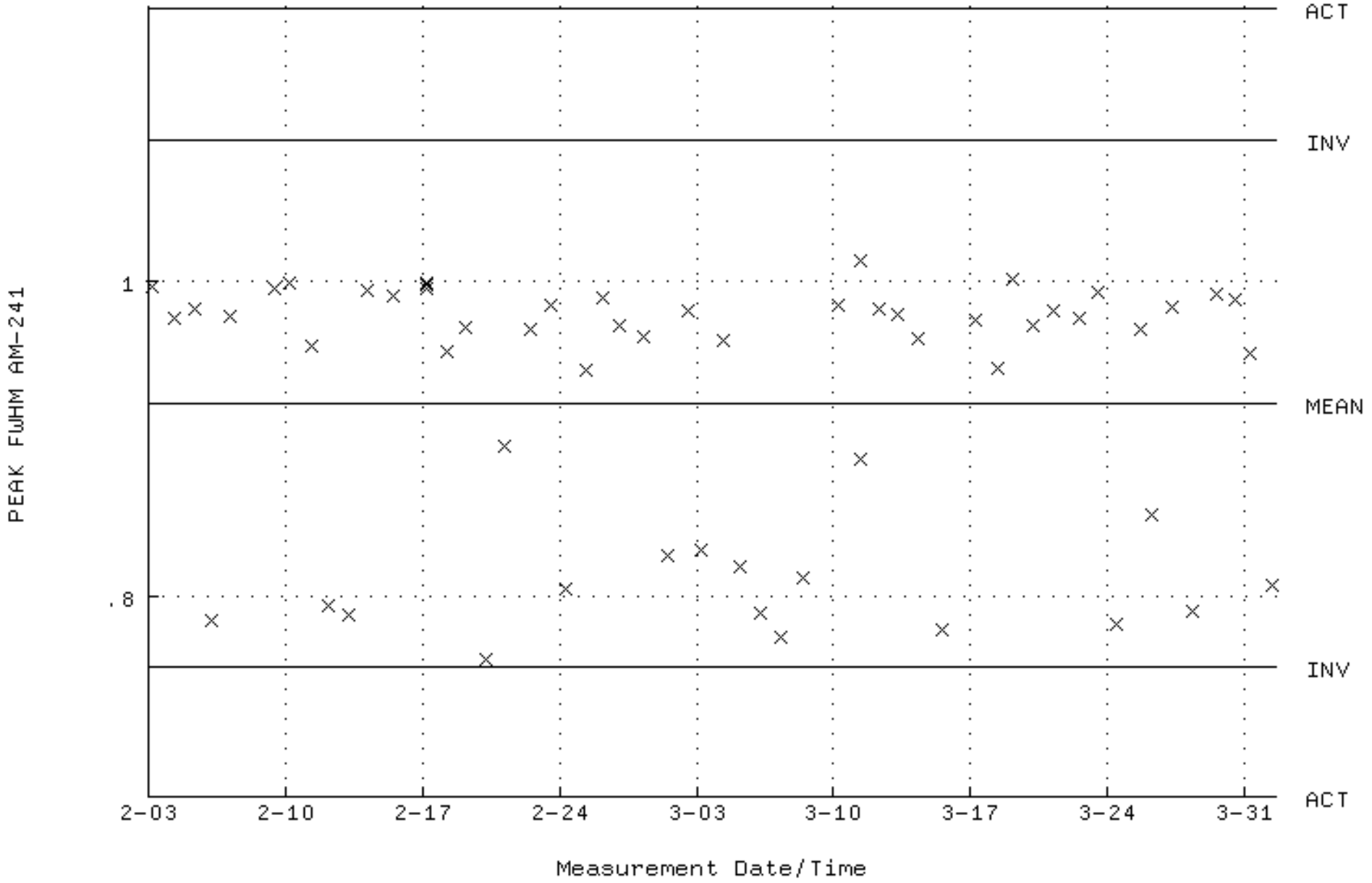
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM47.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:38:33 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.33200 +- 2.704578E-02 (2.03 %)



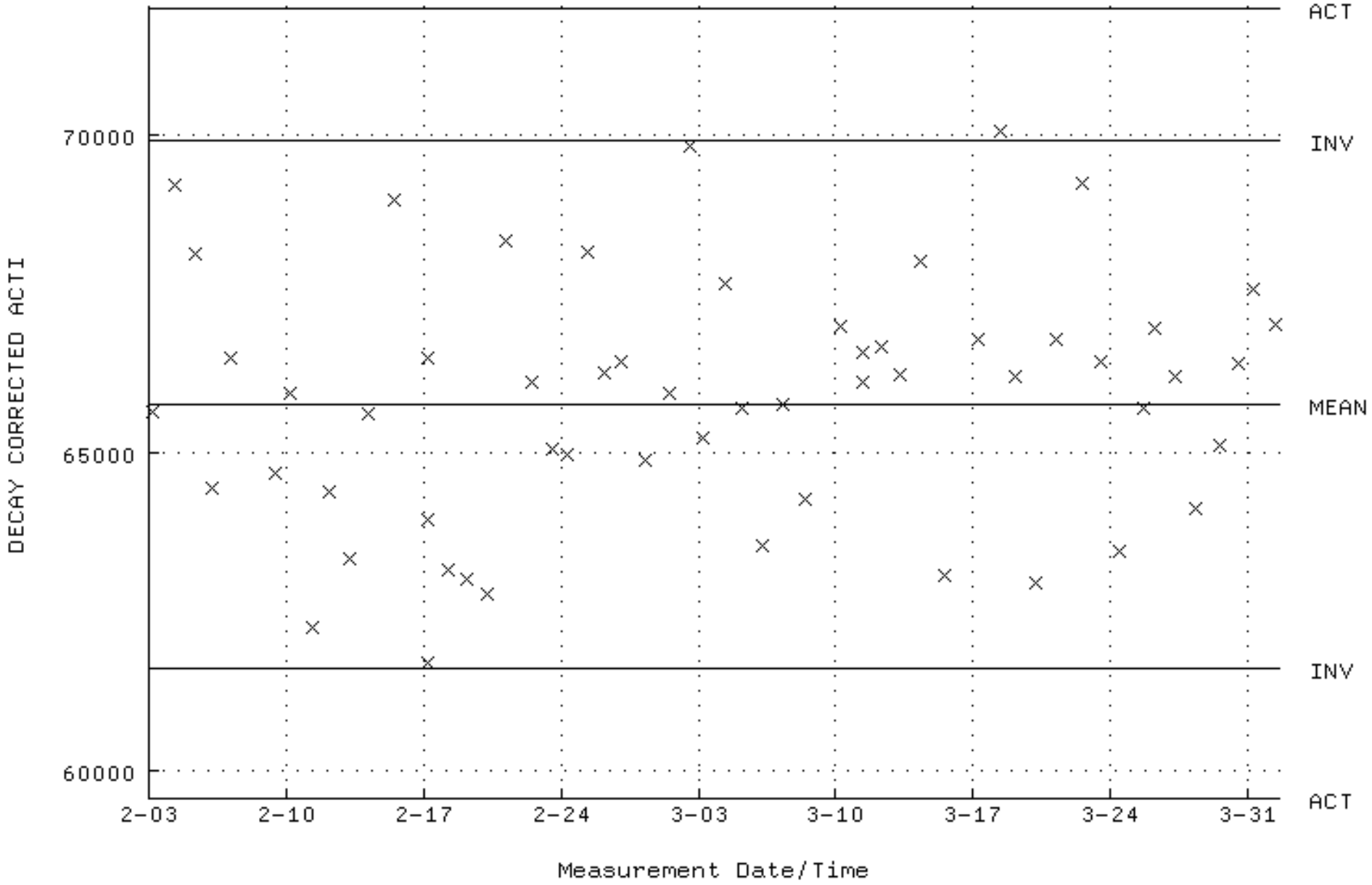
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM52_400JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 3-FEB-2025 05:00:53 through 1-APR-2025 12:00:00
Lower/Upper Lmts: 58.0400 through 61.0400



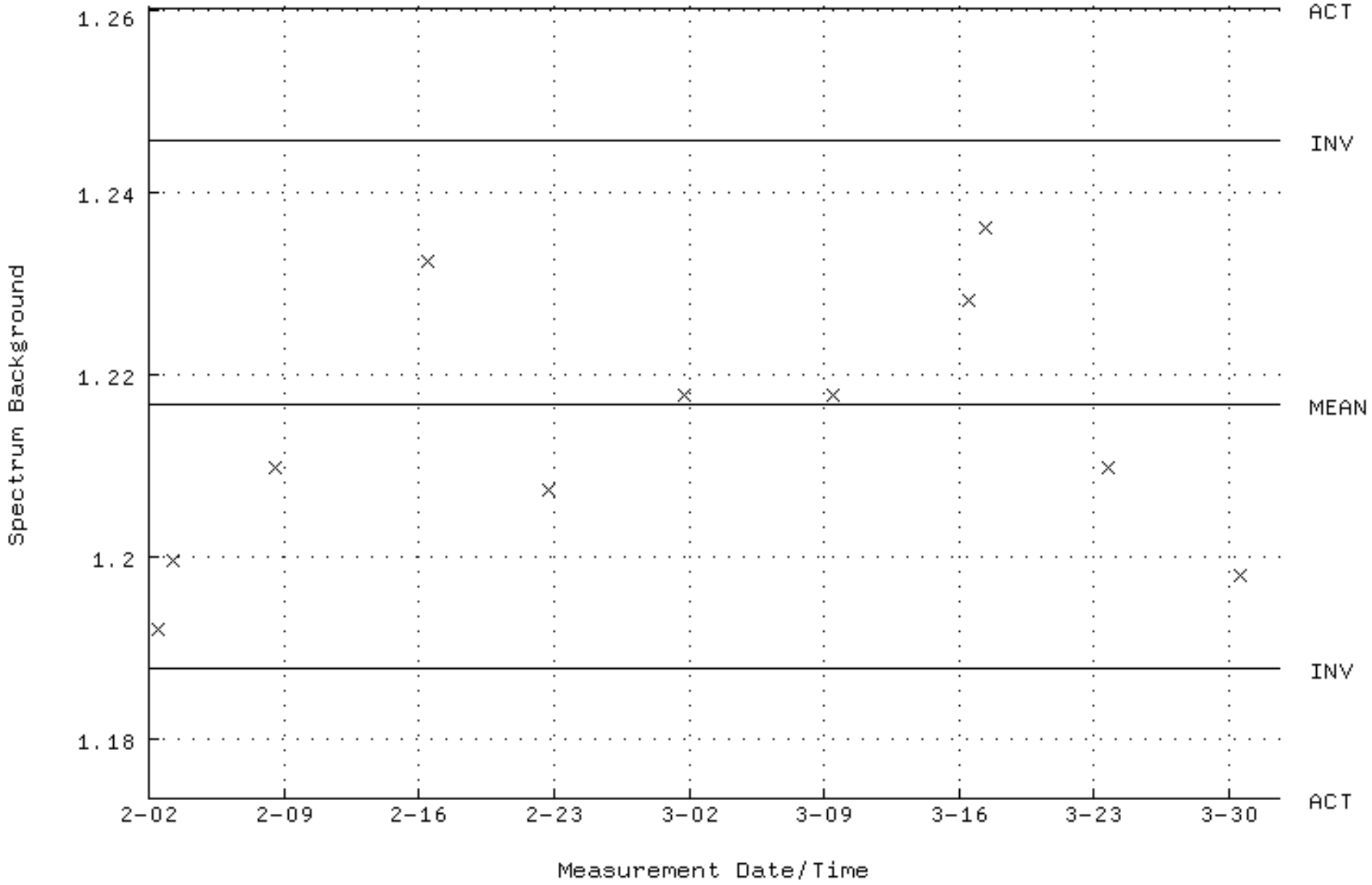
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM52_400JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 3-FEB-2025 05:00:53 through 1-APR-2025 12:00:00
Mean +- Std Dev : 0.923439 +- 8.336042E-02 (9.03 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM52_400JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 3-FEB-2025 05:00:53 through 1-APR-2025 12:00:00
Mean +- Std Dev : 65786.0 +- 2070.98 (3.15 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM52.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 2-FEB-2025 11:38:43 through 1-APR-2025 12:00:00
Mean +- Std Dev : 1.21684 +- 1.447294E-02 (1.19 %)



RAD Standards Traceability

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

1556

Standard Radionuclide Source

84680-278

100 mL Solid in Aluminum Can

Customer: GEL Labs
P.O. No.: 489884RD, Item 3
Reference Date: 01-Apr-2011 12:00 PM EST **Grams of Master Source:** 0.0066498

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	1.129E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	7.538E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.659E+05	1.103E+03	0.6	2.3	4.8	HPGe
Co-57	122.1	2.718E+02	8.949E+04	5.951E+02	0.6	2.0	4.2	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	8.292E+02	0.6	1.9	4.0	HPGe
Hg-203	279.2	4.661E+01	2.899E+05	1.928E+03	0.6	1.9	4.0	HPGe
Sn-113	391.7	1.151E+02	1.739E+05	1.156E+03	0.6	1.9	4.0	HPGe
Cs-137	661.7	1.098E+04	1.107E+05	7.361E+02	0.8	1.9	4.1	HPGe
Y-88	898.0	1.066E+02	4.246E+05	2.824E+03	0.6	1.9	4.0	HPGe
Zn-65	1115.6	2.441E+02	———	1.445E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.118E+05	1.408E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.118E+05	1.408E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.495E+05	2.989E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

RC-S-060-101

Corporate Office
2439 Avenue S Suite 207 Valeda, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

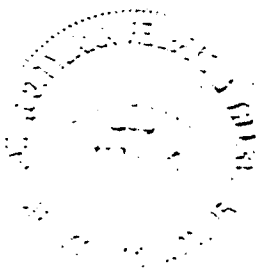
Page 2 of 2 GEL

This standard will expire one year after the reference date.

Source Prepared by: M Williford
M. Williford, Radiochemist

QA Approved:
J. D. McCorvey, QA Manager Alternate

Date: 6/27/11



ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

Standard Logbook

Serial ID:	1556	**Open/Reference Date:**	01-APR-11	**Aliquot :**	1 mL
Name:	Mixed Gamma LCS CAN	**Received:**	01-APR-11	**Density :**	Hand Calculated
Type:	Source Material	**Expires:**	01-APR-37	**Lot Number :**	84680-278
Employee:	Maggie Stamps	**Verified:**	14-JUL-11		
Supplier:	Eckert & Zeigler Analytics				

Description: 84680-278

Comments: None

Analyte	Concentration	Analyte	Concentration
Americium-241	125983.3 dpm/mL	Cesium-137	51898.9 dpm/mL
Cobalt-60	84496.9 dpm/mL		

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Pb-210	pCi/L
Mixed Gamma N1	722900
Mixed Gamma N2	752300
Mixed Gamma N3	692100

Isotopic Abundance: 0.0425
Certificate Value (dps): 1129

Mean Value (Counting) =	722433.33	pCi/L	100.622	**Pass**
Stdev =	30102.713	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	717965.0	pCi/L		
Lower Limit =	662227.9072	pCi/L		
Upper Limit =	782638.7594	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	60205.42611			
10 % of Mean =	72243.33333			
Rule 2 (Pass/Fail)	**Pass**			

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

mgH 7/20/11

H.Stamper 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Am-241	**pCi/L**
Mixed Gamma N1	58390
Mixed Gamma N2	60740
Mixed Gamma N3	57770

Isotopic Abundance: 0.359
Certificate Value (dps): 753.8

Mean Value (Counting) =	58966.67	pCi/L	**103.9074**	**Pass**
Stdev =	1566.727	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	56749.2	pCi/L		
Lower Limit =	55833.21277	pCi/L		
Upper Limit =	62100.12057	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	3133.453898			
10 % of Mean =	5896.666667			
Rule 2 (Pass/Fail)	**Pass**			

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

mgH 7/20/11
M. Stamps 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Cd-109**	**pCi/L**			
	Mixed Gamma N1	818400		Isotopic Abundance:	0.037
	Mixed Gamma N2	798000		Certificate Value (dps):	1103
	Mixed Gamma N3	764700			
Mean Value (Counting) =	793700.00	pCi/L	**98.51091**	**Pass**	
Stdev =	27107.010	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	805697.6	pCi/L			
Lower Limit =	739485.9797	pCi/L			
Upper Limit =	847914.0203	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	54214.02033				
10 % of Mean =	79370				
Rule 2 (Pass/Fail)	**Pass**				

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

mgh 7/20/11

MStamps 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Co-57**	**pCi/L**			
	Mixed Gamma N1	19090		Isotopic Abundance:	0.856
	Mixed Gamma N2	18820		Certificate Value (dps):	595.1
	Mixed Gamma N3	18830			
Mean Value (Counting) =	18913.33	pCi/L	**100.6592**	**Pass**	
Stdev =	153.080	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	18789.5	pCi/L			
Lower Limit =	18607.17433	pCi/L			
Upper Limit =	19219.49233	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	306.1590001				
10 % of Mean =	1891.333333				
Rule 2 (Pass/Fail)	**Pass**				

mgh 7/20/11

MStamper 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Ce-139**	**pCi/L**			
	Mixed Gamma N1	28740		Isotopic Abundance:	0.8
	Mixed Gamma N2	29410		Certificate Value (dps):	829.2
	Mixed Gamma N3	27560			
Mean Value (Counting) =	28570.00	pCi/L	**101.9865**	**Pass**	
Stdev =	936.643	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	28013.5	pCi/L			
Lower Limit =	26696.71412	pCi/L			
Upper Limit =	30443.28588	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	1873.285883				
10 % of Mean =	2857				
Rule 2 (Pass/Fail)	**Pass**				

mgH 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

pl Stamp 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Hg-203	**pCi/L**
Mixed Gamma N1	66300
Mixed Gamma N2	68180
Mixed Gamma N3	64480

Isotopic Abundance: 0.8156
Certificate Value (dps): 1928

Mean Value (Counting) =	66320.00	pCi/L	**103.8046**	**Pass**
Stdev =	1850.081	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	63889.3	pCi/L		
Lower Limit =	62619.83784	pCi/L		
Upper Limit =	70020.16216	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	3700.162159			
10 % of Mean =	6632			
Rule 2 (Pass/Fail)	**Pass**			

mgh 7/20/11

MStamper 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Sn-113	pCi/L
Mixed Gamma N1	49560
Mixed Gamma N2	49620
Mixed Gamma N3	48300

Isotopic Abundance: 0.6497
Certificate Value (dps): 1156

Mean Value (Counting) =	49160.00	pCi/L	**102.2277**	**Pass**
Stdev =	745.386	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	48088.7	pCi/L		
Lower Limit =	47669.22839	pCi/L		
Upper Limit =	50650.77161	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	1490.771612			
10 % of Mean =	4916			
Rule 2 (Pass/Fail)	**Pass**			

mgh 7/20/11

Hoffampt 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Cs-137**	**pCi/L**			
	Mixed Gamma N1	23710		Isotopic Abundance:	0.851
	Mixed Gamma N2	23950		Certificate Value (dps):	736.1
	Mixed Gamma N3	24040			
Mean Value (Counting) =	23900.00	pCi/L	**102.2333**	**Pass**	
Stdev =	170.587	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	23377.9	pCi/L			
Lower Limit =	23558.82556	pCi/L			
Upper Limit =	24241.17444	pCi/L			
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**			
Two sigma =	341.1744422				
10 % of Mean =	2390				
Rule 2 (Pass/Fail)	**Pass**				

7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Y-88 (898)**	**pCi/L**			
	Mixed Gamma N1	82690		Isotopic Abundance:	0.937
	Mixed Gamma N2	81320		Certificate Value (dps):	2824
	Mixed Gamma N3	80940			
Mean Value (Counting) =	81650.00	pCi/L	**100.2381**	**Pass**	
Stdev =	920.489	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	81456.1	pCi/L			
Lower Limit =	79809.022	pCi/L			
Upper Limit =	83490.978	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	1840.978001				
10 % of Mean =	8165				
Rule 2 (Pass/Fail)	**Pass**				

MJH 7/20/11

Mstamper 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Co-60 (1173)	pCi/L
Mixed Gamma N1	38910
Mixed Gamma N2	39750
Mixed Gamma N3	38840

Isotopic Abundance: 0.9985
Certificate Value (dps): 1408

Mean Value (Counting) =	39166.67	pCi/L	102.7694	Pass
Stdev =	506.392	pCi/L		Rule 3 (Pass/Fail)
Certificate Value =	38111.2	pCi/L		
Lower Limit =	38153.88173	pCi/L		
Upper Limit =	40179.45161	pCi/L		
Rule 1 Pass/Fail	Fail	*exception taken due to full recovery of standard		
Two sigma =	1012.784939			
10 % of Mean =	3916.666667			
Rule 2 (Pass/Fail)	Pass			

mgd 7/20/11

MStamper 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result			
Co-60 (1332.50)	**pCi/L**			
Mixed Gamma N1	38940		Isotopic Abundance:	0.9998
Mixed Gamma N2	40200		Certificate Value (dps):	1408
Mixed Gamma N3	39150			
Mean Value (Counting) =	39430.00	pCi/L	**103.595**	**Pass**
Stdev =	675.056	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	38061.7	pCi/L		
Lower Limit =	38079.88889	pCi/L		
Upper Limit =	40780.11111	pCi/L		
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**		
Two sigma =	1350.111107			
10 % of Mean =	3943			
Rule 2 (Pass/Fail)	**Pass**			

mgw 7/20/11

MStamps 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Y-88 (1836.1)	pCi/L
Mixed Gamma N1	82870
Mixed Gamma N2	83080
Mixed Gamma N3	84640

Isotopic Abundance: 0.992
Certificate Value (dps): 2989

Mean Value (Counting) =	83530.00	pCi/L	102.5723	**Pass**
Stdev =	967.006	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	81435.3	pCi/L		
Lower Limit =	81595.98862	pCi/L		
Upper Limit =	85464.01138	pCi/L		
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**		
Two sigma =	1934.011375			
10 % of Mean =	8353			
Rule 2 (Pass/Fail)	**Pass**			

mgh 7/20/11

MStamper 7/20/11

Verification Rules

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule 3 = The determined mean value shall be within 5% of the certificate value.

Standard Logbook

Serial ID:	1556	**Open/Reference Date:**	01-APR-11	**Aliquot :**	1 mL
Name:	Mixed Gamma LCS CAN	**Received:**	01-APR-11	**Density :**	Hand Calculated
Type:	Source Material	**Expires:**	01-APR-37	**Lot Number :**	84680-278
Employee:	Maggie Stamps	**Verified:**	14-JUL-11		
Supplier:	Eckert & Zeigler Analytics				

Description: 84680-278

Comments: None

Analyte	Concentration	Analyte	Concentration
Americium-241	125983.3 dpm/mL	Cesium-137	51898.9 dpm/mL
Cobalt-60	84496.9 dpm/mL		

Runlogs

Instrument Run Log

Instrument Type: GAMMA SPECTROMETER **Batch ID: 2767515**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
714507001	SAMPLE	MXR1	GAM29	APR-10-25 14:21:39	DONE	CAN	29-JUL-24 00:00
1206041222	DUP	MXR1	GAM01	APR-10-25 19:25:04	DONE	CAN	05-JUN-24 00:00
714507002	SAMPLE	MXR1	GAM04	APR-10-25 19:31:57	DONE	CAN	05-NOV-24 00:00
714507003	SAMPLE	MXR1	GAM38	APR-10-25 19:32:55	DONE	CAN	29-JUL-24 00:00
714507004	SAMPLE	MXR1	GAM41	APR-10-25 19:33:36	DONE	CAN	05-SEP-24 00:00
714507005	SAMPLE	MXR1	GAM52	APR-10-25 19:34:13	DONE	CAN	03-SEP-24 00:00
714507006	SAMPLE	MXR1	GAM46	APR-10-25 20:42:58	DONE	CAN	30-SEP-24 00:00
714507007	SAMPLE	MXR1	GAM47	APR-10-25 20:43:33	DONE	CAN	15-NOV-24 00:00
1206041223	LCS	MXR1	GAM02	APR-10-25 22:07:00	DONE	CAN	19-SEP-24 00:00
714507008	SAMPLE	MXR1	GAM01	APR-10-25 22:29:17	DONE	CAN	05-JUN-24 00:00
714507009	SAMPLE	MXR1	GAM04	APR-10-25 22:29:57	DONE	CAN	05-NOV-24 00:00
714507010	SAMPLE	MXR1	GAM06	APR-10-25 22:30:35	DONE	CAN	23-SEP-24 00:00
714507011	SAMPLE	MXR1	GAM07	APR-10-25 22:31:11	DONE	CAN	23-JUL-24 00:00
714507012	SAMPLE	MXR1	GAM19	APR-10-25 22:31:47	DONE	CAN	10-DEC-24 00:00
714507013	SAMPLE	MXR1	GAM21	APR-10-25 22:32:26	DONE	CAN	08-JUL-24 00:00
714507014	SAMPLE	MXR1	GAM23	APR-10-25 22:33:02	DONE	CAN	04-SEP-24 00:00
714507015	SAMPLE	MXR1	GAM24	APR-10-25 22:33:41	DONE	CAN	24-JUN-24 00:00
714507016	SAMPLE	MXR1	GAM27	APR-10-25 22:34:23	DONE	CAN	09-JUL-24 00:00
714507017	SAMPLE	MXR1	GAM28	APR-10-25 22:34:56	DONE	CAN	10-MAR-25 00:00
714507018	SAMPLE	MXR1	GAM31	APR-10-25 22:35:39	DONE	CAN	22-AUG-24 00:00
714507019	SAMPLE	MXR1	GAM32	APR-10-25 22:36:16	DONE	CAN	17-JUL-24 00:00
714507020	SAMPLE	MXR1	GAM33	APR-10-25 22:36:52	DONE	CAN	25-NOV-24 00:00
1206041221	MB	MXR1	GAM38	APR-10-25 22:37:37	DONE	CAN	29-JUL-24 00:00

Instrument Run Log

Instrument Type: GAMMA SPECTROMETER **Batch ID: 2767517**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
714507021	SAMPLE	MXR1	GAM01	APR-10-25 20:45:51	DONE	CAN	05-JUN-24 00:00
714507022	SAMPLE	MXR1	GAM04	APR-10-25 20:46:23	DONE	CAN	05-NOV-24 00:00
714507023	SAMPLE	MXR1	GAM38	APR-10-25 20:52:08	DONE	CAN	29-JUL-24 00:00
714507024	SAMPLE	MXR1	GAM41	APR-10-25 20:52:39	DONE	CAN	05-SEP-24 00:00
1206041224	MB	MXR1	GAM52	APR-10-25 20:53:33	DONE	CAN	03-SEP-24 00:00
1206041226	LCS	MXR1	GAM02	APR-10-25 20:56:05	DONE	CAN	19-SEP-24 00:00
1206041225	DUP	MXR1	GAM29	APR-10-25 22:03:39	DONE	CAN	29-JUL-24 00:00

Appendix 4

Contractors Health and Safety Plan

TO BE DEVELOPED

Appendix 5

Generic Community Air Monitoring Plan (CAMP)

Construction Specific CAMP to be submitted for NYSDEC for Review

TO BE DEVELOPED

The Construction Specific CAMP will include an air monitoring station placed between the shoreline trail and ground intrusive activities on C915197B(I-2), and C915198M (11-13). Additionally, please note that based on the occupancy of the building on C915198K (II-11) during implementation of this workplan, an additional CAMP location may be requested.

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 6

Storm Water Pollution Prevention Plan (SWPPP)

TO BE DEVELOPED

Appendix 7

Resumes

MICHAEL F. LYDLE, PE

Senior Project Manager

AZAR DESIGN CO

SHAPING TOMORROW TOGETHER



Years of Experience:

Total Years' Experience: 47

Years with Azar: 4

Education:

BS, Civil Engineering, State University of New York at Buffalo

AAS, Civil Technology, Erie County Community College

Registration:

Professional Engineer NYS, 1993, #070504

Certification:

OSHA 10 Hr. Certified

NYS DEC 4 Hour Erosion and sediment

Control Certification

Incident Command, ICS I, II, III and IV

Bridge Painting Inspections SSPC-FHA

Concrete plant and Project Inspections and Certifications-NYSDOT

Earthwork Inspections-NYSDOT Soil Mechanics Bureau

Asphalt Pavement Design and Inspections – New York Construction Materials Association. AASHTO

Roadside Design-FHA

Highway Design Manual Training-NYSDOT

DQAB

SPDES-Phase I and II Design Procedures - NYSDOT

Pavement Design- NYSDOT

Guiderail Design-NYSDOT

Conflict Resolution Training-NYSDOT

Project Management-NYSDOT

Role: Senior Project Manager-Site Civil & Engineering

Support and provide applicable technical and engineering services to ECIDA, participate in discussions, review all applicable reports., mapping and documentation of active utilities, conduct site review and inspections identifying environmental concerns, assist in SEQRA processes, cost estimates and analysis, preparation of Site Management Review reports.

Mr. Michael (Mike) Lydle brings over 47 years of experience and expertise as an Engineering Professional with a proven success record in Project management, Construction Management and Administration. Mike is highly organized with strong writing and outstanding communication skills with all levels of personnel, management , field staff, other consultants, and all clients, including ECIDA/ILDC, NYSOPR and NYSDEC.

Mike has held key positions in both public and private sectors that have required his interaction with public and government officials and department personnel to facilitate the development, tracking and management of multi-million-dollar projects involving local, state, and federal funding.

Renaissance Commerce Park Road B

ECIDA/ILDC, Lackawanna NY

- **Role:** Project Designer/Project and Construction Manager
- **Responsibilities:** Prepare detail designs and bid packages for construction of a new a road through a designated Brownfield, Prepared and coordinated with NYSDEC project SWPPP and environmental initiatives. Contract Administration, review submittals facilitate design changes prepare pay estimates in accordance with EDICA/ILDC procedures.

Dona Street Extension.

Erie County Department of Public Works-Highway. Lackawanna NY

- **Role:** Project Manager, Design QC/QA, Bid Analysis, Resident Engineer
- **Responsibilities:** Manage project design, bid analysis, and provide on-site construction management/resident engineering service responsible for all field decisions, design changes and project documentation. Project located in designated Brown field with RCRA involvement requiring significant coordination with NYSDEC.

Northland Corridor Development

Buffalo Urban Development Corporation.

- **Role:** Senior Engineer
- **Responsibilities:** Assist with formulation of redevelopment plan in a former industrial district within the East Delavan-Grider Brownfield Opportunity Area. Project included parking design with environmental initiatives, real estate/market analysis, SEQR documentation, Historical Preservation, Planning/transportation/infrastructure analysis, remediation cost estimating and community participation

AFP-59 Binghamton/Air Force Plant 59 Demo., Remediation & SWPPP Development

NorthStar Federal Services

- **Role:** Senior Project Engineer.
- **Responsibilities:** Obtain project air sampling and required information for preparation and processing the regulatory SWPPP along with providing environmental design initiatives, obtaining necessary permits, process final NOI, and provide engineering assistance for the demolition and remediation of a former military manufacturing facility. Ensuring monitoring of work was performed to conformed to USEPA and OSHA regulations.

Building Condition Assessment of Former King Sewing Manufacturer Complex and Former Houdaille Manufacturing Plant.

Buffalo Urban Development Corporation

- **Role:** Senior Engineer
- **Responsibilities:** Conduct onsite detailed and extensive inspection of both complexes assessing the structural integrity and possible repurposing capabilities.

Jon J. Williams

Qualified Environmental Professional (QEP)

Education

B.A., Geologic Sciences, Hobart College

Licenses

Professional Geologist #1040
State of Washington, June 2002

Professional Geologist #PG005054
State of Pennsylvania, May 2012

Certifications

OSHA 40 Hazwoper Certified

OSHA 10 Certified

OSHA Confined Space Entry Certified

First Aid and CPR

Publications

"Synthesis of Geophysical and Hydrogeological Data at the Hyde Park Landfill Site". 2001 GSA Annual Meeting, Paper No. 4-0

"Characterization of Discrete Flow Zones by Packer Testing, Hyde Park Landfill Site". 2002 NGWA Northeast Focus Conference

PROFESSIONAL PROFILE

Mr. Williams is an environmental scientist with over 25 years of extensive experience in scoping, budgeting, and managing environmental investigation and remediation projects. Responsibilities have included technical leadership and review, project execution, and personal supervision of environmental staff. He has conducted Phase I and Phase II Environmental Site Assessments (ESAs) for commercial and industrial sector clientele. Mr. Williams has demonstrated expertise in project management, technical writing, drilling oversight, well logging, aquifer testing, soil and bedrock classification and characterization, two and three-dimensional geologic mapping, and Health and Safety. He has also successfully managed field investigations that have included: soil and groundwater delineations for petroleum, metals, solvents, pesticides, PCBs, and radionuclides; monitoring, recovery, and re-injection well installations; well rehabilitation; existing Site bedrock re-characterization studies; and, bedrock characterization studies at new Sites.

EXPERIENCE

NYSDEC Standby Investigation and Remediation Contract: Environmental Scientist for standby investigation and remediation services for the NYSDEC. This contract involves investigating, controlling and removing any released contaminants to minimize and remove the potential for significant damage to public health and the environment. Projects have included landfill Remedial Investigations (including emerging contaminants), Source and impact investigations for PFOS/PFAS in a municipal groundwater supply system, industrial site investigations, site investigation and remediation of spill sites and drycleaner sites, remedial system decommissioning and residential vapor intrusion investigations.

Buffalo Urban Development Corporation (BUDC) – 683 Northland Avenue (Western New York Workforce Training Center) Site, Buffalo, NY: Project Scientist for the 683 Northland Avenue redevelopment project. The project consisted of the redevelopment of a 7.3-acre property including a 235,000 square foot building complex into the Western New York Workforce Training Center and manufacturing space. Specific project responsibilities included the development and implementation of a remedial investigation work plan, review of remedial investigation analytical results and preparation of a remedial investigation and alternatives analysis report, preparation and implementation of a remedial action work plan, preparation of a final engineering report following the completion of remedial activities, and preparation and implementation of a site management plan. All project work was coordinated with the NYSDEC under a Brownfield Cleanup Agreement (BCA).

Buffalo China Site Brownfield Cleanup Program, Senior Environmental Scientist: LiRo provided Site Inspection, Monitoring, Reporting, and continuing Remediation at the Buffalo China Brownfield Cleanup Program Site (C915209) in the City of Buffalo. Under Contract to the current Site owner, LiRo reviewed the existing SMP and developed a Site Health and Safety Plan. In addition, LiRo has conducted Site inspections, conducted required monitoring well sampling and provided Certification Reports for the institutional and engineering controls in place at the site in an annual Periodic Review Report. The Site inspection and certification work included a Corrective Action Plan for required maintenance of Site wells. The Periodic review report was submitted to and approved by NYSDEC. LiRo also prepared and implemented an ISCO Work Plan.

Monroe County Gloria Drive: LiRo contracted subsurface drilling surfaces for the subsurface investigation at the Gloria Drive Landfill in Rochester, NY. Work included collecting subsurface investigation requirements for the County and the investigating consulting firm, going to the driller for pricing and scope verification, overseeing the "one-call" utility stakeout, confirming no subsurface conflicts for boring locations, and location verification.

Jon J. Williams

Environmental Inspector

Hyde Park Landfill Site: Remedial Investigation/Remedial Design/Remediation - Niagara Falls, New York – United States Environmental Protection Agency (USEPA) Superfund Site

Niagara County Department of Economic Development – Phase I and Phase II Environmental Site Assessments at Priority Brownfield Sites in Niagara County, NY: Senior Environmental Scientist for the Niagara County Department of Economic Development (NCDED) projects in Niagara County, NY under a United States Environmental Protection Agency (USEPA) Brownfield grant program. LiRo-Hill has been contracted to perform Phase I and Phase II ESAs in support of NCDED brownfield programs in Niagara County, NY. Mr. Williams has provided Quality Assurance reviews for ESAs in accordance with ASTM, USEPA Brownfield Assessment Grant Program, and client-specific requirements/standards.

Niagara County Refuse Disposal District, NY: LiRo-Hill provided services to Niagara County for Landfill Groundwater Impact Assessment and Corrective Actions Feasibility Study at the Niagara County Refuse Disposal District. The Niagara County Refuse Disposal District owns three landfills at the foot of Richfield Street in the Town of Lockport, NY. All three landfills are closed and are located contiguously in the northeast corner of an active quarry, and are constructed in a previously mined area of the rock quarry. LiRo-Hill performed Data collection and Review; Work Plan; Subsurface Investigation; Well Sampling; and Groundwater Assessment Report.

New York Canal Corporation General Environmental Services: Serving as an Environmental Scientist for an on-call contract providing comprehensive environmental services to the New York Canal Corporation Mr. Williams has conducted numerous Phase II ESA projects throughout the State. The work under this contract has been completed at a wide range of sites throughout the State of New York. Currently LiRo has provided SPDES compliance monitoring, Phase II and Phase II Environmental Site Assessments as well as environmental Health and Safety (EH&S) oversight/monitoring of NYSCC projects throughout New York State.

New York State Office of General Services – Statewide Environmental Consulting Services, NY: Project Scientist for investigation, evaluation and remediation at New York State Office of General Services (NYSOGS) sites throughout New York State (NYS). Work has included Phase I ESAs and Phase II Site Investigations of firing ranges, underground storage tank (UST)/tank areas, buried waste areas at Department of Corrections and Community Supervision facilities, remedial design for lead-contaminated firing range soil, new firing range evaluations, and demolition design in support of NYSOGS client needs. The work has included coordinating with the NYSDEC on jurisdictional review issues, wetlands/permitting, and coordination of historical/archeological work.

City of Rochester Environmental Term Services: LiRo has been retained by the City of Rochester Department of Environmental Services to perform due diligence Phase I and Phase II site investigations of properties prior to acquisition, sale, condemnation, or foreclosure. Other services under this contract include remedial investigation, feasibility study, cost estimation, geotechnical investigation, work plan preparation, environmental engineering, site inspection, remedial services and pollution prevention and sustainability services.