Source Removal Action (SRA) Work Plan

Phase II Business Park
Site II-3, BCP Site No. C915198C
Lackawanna, New York

July 2018

0071-018-325

Prepared For:

Tecumseh Redevelopment Inc.
Richfield, Ohio

Prepared By:

TurnKey Environmental Restoration, LLC

In Association With:

Benchmark Environmental Engineering & Science, PLLC

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SOURCE REMOVAL ACTION WORK PLAN

PHASE II BUSINESS PARK, BCP SITE NO. C915198C
LACKAWANNA, NEW YORK

July 2018 0071-018-325

Prepared for:

Tecumseh Redevelopment, Inc.

Prepared By:

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

CERTIFICATION

I, Thomas H. Forbes, P.E., certify that I am currently a NYS registered professional engineer and this Source Removal Action (SRA) Work Plan for Phase II Business Park Site II-3 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).

Date: 7-5-18

SEAL:

SOURCE REMOVAL ACTION WORK PLAN
BCP Site No. C915198C (Site II-3)

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SOURCE REMOVAL ACTION WORK PLAN
BCP Site No. C915198C (Site II-3)

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APPENDICES

1.0 INTRODUCTION

This document presents the proposed scope of work for completion of an Source Removal Action (SRA) on Site II-3 (C915198C) of the Tecumseh Phase II Business Park Brownfield Cleanup Program (BCP) Site in Lackawanna, New York (see Figures 1 and 2).

The SRA work is being performed on behalf of Tecumseh Redevelopment Inc. (Tecumseh) through the New York State Department of Environmental Conservation (NYSDEC) BCP to address underground storage tanks (USTs) and potential petroleum-impacted fill near the USTs. Remediation under an SRA program will satisfy the intended goal of expediting cleanup of the associated impacts while facilitating redevelopment of the Site for commercial and/or industrial reuse.

1.1 Background

1.1.1 Prior Investigations

The approximately 144-acre Phase II Business Park formerly housed several facilities associated with the Bethlehem Steel Corporation's (BSC's) steel manufacturing processes. These included a pure oxygen generating station (known as South Linde Area); various mills; a structural shipping yard; a car repair shop; metal storage; and miscellaneous office production support buildings. Five historical SWMUs (i.e., P-38 through P-42) are present within the Phase II Business Park. 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 Business Park II Business Park.

The BCP application for the Phase II Business Park was submitted May 20, 2005 and approved January 9, 2007. The July 2009 Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan (Ref. 1) identified Site characterization requirements to be completed pursuant to the BCP and NYSDEC DER-10 guidance (Ref. 2). Remedial Investigation (RI) field activities were initiated in March 2010 and substantially completed in April 2010.

The RI/AA Report was submitted to NYSDEC in May 2011 and finalized in March 2012 (Ref. 3). The RI/AA Report recommended remediation of hotspot soil/fill with deferred

soil cover system placement during redevelopment as the final remedial measure for all areas of the Site.

1.1.2 Cleanup Approach

The Phase II Business Park, as well as other Tecumseh Business Parks (i.e., I, IA, and III), were so designated by Tecumseh based on the concept of voluntary remediation and subsequent selling or leasing the "shovel-ready" Business Park parcels to local developers or private businesses interested in redeveloping the land for commercial or industrial uses consistent with City zoning. Recognizing the sheer size of these parcels, the cost and short-term impacts associated with cleanup (particularly for cover placement, which would require clearing and covering each of the large Business Parks), and the limited western NY commercial/industrial real estate market demand, a sub-parcel cleanup approach was conceived by Tecumseh and agreed upon by the NYSDEC. Under this approach, hotspot soil/fill remediation and other remedial measures (except cover placement) would be performed by Tecumseh on a priority bases (i.e., parcels pending potential sale, lease, and/or redevelopment, or where remedial measures are required to address significant threats, will be completed first). Placement of the final cover would also progress on a site-by-site basis by the buyer or lessee concurrent with building construction and/or other site improvements, thereby allowing the cover to be integrated with roads, buildings, parking areas, etc. Certificate of Completion (COC) issuance by the NYSDEC would occur on a site-by-site basis following cover placement by the owner or developer (subject to provisions of a NYSDEC-approved Site Management Plan and Environmental Easement encompassing the entire Business Park).

Based on this approach, Tecumseh prepared sub-parcel delineation maps for each of the three larger Business Park Areas (I, II, and III). Business Park II was subdivided into 12 sub-parcels designated as Sites II-1 through II-12 (BCP Site Nos. C915198 through C915198L).

1.2 Purpose and Scope

This SRA Work Plan presents the planned approach for implementation of UST and petroleum-impacted fill removal on Site II-3. Completion of these remedial activities as an SRA will satisfy NYSDEC's requirements and further the remediation, making the Site more attractive to prospective buyers. The proposed scope of SRA activities includes:

- Excavation, cleaning and disposal of two 2,000-gallon USTs and tank residuals (tanks are assumed to be emptied of remaining product).
- Excavation of non-impacted overburden (estimated upper 4-5 feet) and petroleum-impacted fill. The petroleum-impacted fill will be transported to a constructed biopad for treatment. Final excavation dimensions will be based on field evidence of petroleum impact.
- Construction and operation of a temporary groundwater treatment system to dewater smear zone soils during excavation and prior to backfilling. The groundwater system will consist of a holding tank, dual-bag filters, and granular activated carbon (GAC).
- Introduction up to 500 pounds of ORC Advanced® into the excavation following removal of petroleum-impacted fill to address residual groundwater impacts.
- Backfilling excavation with stockpiled non-impacted overburden and imported BUD-approved steel slag. The backfill is required for safety reasons and to maintain access along the portion of Highway 5 that runs along the northern boundary of Site II-3. The final BUD-slag lift will be subject to radiation screening by a certified radiation testing firm as per the recent cover work on Sites I-1 and I-3.
- Construction of a treatment pad ("biopad") for biological remediation of the petroleum-impacted fill on Site II-3 if space is available or, alternatively, on adjacent Site II-1. The selected area will be cleared and grubbed followed by placement of an approximate 3- to 4-inch thick layer of wood chips as a base. The biopad will cover approximately 40,000 square feet (est. 150' x 150') and will be surrounded by silt sock (est. 600 linear feet) to control storm water runoff.

This SRA Work Plan has been prepared in accordance with Section 5.3b of NYSDEC's May 2010 DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2). As such, it provides the following items:

- Description of the impacts and remedial actions to be undertaken as part of the SRA and the basis for the actions (Section 2.0).
- Health and safety procedures (Section 2.2).
- Description of storm water management and dust/vapor monitoring required for minimizing potential releases of soil/fill outside the work zone during construction (Sections 2.3, 2.8 and 2.9).
- Site restoration plans (Section 2.11).
- Project documentation requirements (Section 3.0).

- Summary of drawings and information to be provided as part of the Construction Completion Report (Section 3.2).
- Anticipated project schedule (Section 4.0).
- Documents referenced herein (Section 5.0)

1.3 Project Organization and Responsibilities

TurnKey Environmental Restoration, LLC will implement and document the UST removal and excavation work on behalf of Tecumseh Redevelopment on a design-build basis. The NYSDEC Division of Environmental Remediation, in consultation with the NY State Department of Health (NYSDOH), will monitor the remedial actions to verify that the work is performed in accordance with the approved SRA Work Plan.

2.0 UST REMOVAL, EXCAVATION, AND BACKFILL

During RI activities on Business Park II, NYSDEC indicated further investigation and remediation was required near test pit BPA-2-TP-7 (see Figure 3) due to the observations of slight sheen and "fuel-type" odor at that location as well as evidence of two remaining 2,000-gallon petroleum USTs located between the former Tool House and Carpenter Shop buildings. At the time of the RI, the suspect USTs were not accessible due to the active NDS lumber yard business that previously occupied Site II-3 (lumber yard operations have since been relocated farther west onto Site III-1). It was agreed that remediation of the USTs and petroleum impacts would need be completed once the lumber yard relocated.

2.1 NYSDEC Notification of Work

The NYSDEC will be notified at least 10 days prior to UST system removal activities.

2.2 Health and Safety Plan Development

The July 2013 Site Health and Safety Plan (HASP) for BCP Sites (Appendix A), prepared in accordance with the requirements of 40 CFR 300.150 of the NCP and 29 CFR 1910.120 and previously approved by the NYSDEC for Business Park investigation work, will be used for the SRA activities described herein. TurnKey will be responsible for site control and for the health and safety of its authorized site workers. The HASP will be subject to revision, as necessary, based on new information that is discovered during the SRA.

2.3 Community Air Monitoring

Real-time community air monitoring will be performed by TurnKey during all intrusive SRA activities at the Site, including UST and product removal; excavation and re-grading; and tilling of biopad soils. A Community Air Monitoring Plan (CAMP) is included with TurnKey's HASP (see Appendix A). Particulate and vapor monitoring will be performed at a distance of approximately 100 feet downwind of the work area during excavation and re-grading activities involving subgrade disturbance. In addition, no visible dust will be allowed beyond the Site perimeter during these activities. The CAMP is consistent 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 (Ref. 2) Appendix

1A (NYSDOH's Generic CAMP) and Appendix 1B (Fugitive Dust and Particulate Monitoring), included as Appendix C of the HASP. NYSDOH and NYSDOH will be notified if there are any exceedances or changes to the approved CAMP.

2.4 Utility Clearance

TurnKey will contact an underground facilities protection organization (Dig Safely New York, Call 811) a minimum three business days in advance of the work and inform them of the intent to perform excavation work at the Site. Intrusive activities will not proceed until the work area has been cleared by UFPO. The 54-inch diameter industrial water (IWS) line that services the Tecumseh Redevelopment Site and several downstream users runs in a southwest-northeast direction parallel to Smokes Creek. The two valve houses will be used to mark out the alignment of the IWS. Excavation will not proceed closer than 10 feet of the IWS line.

2.5 UST Removal

Figure 3 shows the approximate location of the two 2,000-gallon USTs. Prior to excavation of the USTs, the top of each tank will be fully exposed using an excavator. The non-impacted overburden (if any) will be placed on plastic sheeting and used to backfill the excavation if it does not exhibit nuisance characteristics (e.g., odor, staining, elevated photoionization detector (PID) readings). Once uncovered, the tanks will be opened and inspected to determine proper handling of any residual contents. If residual contents are discovered, a properly licensed vacuum truck operator will be employed to remove the contents and clean the interior of the tanks. All tank contents and residual cleaning materials will be properly characterized and disposed off-site at a licensed disposal facility.

Once tank contents are removed, the USTs will be removed from the ground, cleaned of residual soil, and cut into manageable pieces or crushed, and transported off-site for scrap metal recycling.

2.6 Removal of Petroleum-Impacted Fill

Following removal of the USTs, soil and bedding materials identified as "impacted" with petroleum compounds will be removed. Consistent with other remedial activities on the Tecumseh BCP sites, petroleum impacts include odor, staining, free product, oily residue, and

elevated PID readings. Impacted fill will be direct-loaded into dump trucks or dump trailers, covered, and transported to the on-site biopad for treatment. Observations made by TurnKey personnel will be recorded on the Field Activity Daily Log or in the project field book. Lateral and vertical excavation will continue until impacted material is removed, the excavation has reached physical barriers (physical barriers may include underground utilities, subgrade piping, and/or concrete structures such as building foundations that are not planned for removal), or NYSDEC agrees that no further excavation is required or feasible. Sub-grade concrete encountered will either be removed to access impacted material or excavation will proceed around the concrete. If petroleum impacts are observed 10 feet from the IWS, ORC Advanced will be injected within the 10-foot buffer between the excavation and IWS piping.

2.7 Post-Excavation Confirmatory Sampling

Prior to receipt of confirmatory analytical data, open excavations will be blocked with reflective barricades and yellow flagging. Based on an assumed 100-foot by 100-foot excavation area, eight sidewall (1 per 50 linear feet) and four bottom (1 per 2,500 square feet) soil samples will be collected and analyzed for CP-51 List VOCs and SVOCs. The results will be compared to CP-51 Table 2 - Soil Cleanup Levels for Gasoline Contaminated Soil and Table 3 - Fuel Oil Contaminated Soil.

2.8 Temporary Dewatering and Treatment

Water removed from excavations and surface water run-in to excavations during the UST system and impacted fill removal will be treated prior to re-infiltration on-site. In general, water removed from the excavation will be stored/settled in a portable storage tank and pumped through a bag or cartridge filter, if necessary, prior to treatment using granular activated carbon (GAC). Water samples will be analyzed for CP-51 List VOCs and SVOCs prior to re-infiltration on-site.

Following completion of excavation work, settled solids remaining in the tank and spent filter bags will be sampled, profiled, and disposed off-site. Spent GAC will be characterized (TCLP VOC testing) and regenerated off-site or disposed at a permitted disposal facility in accordance with applicable federal and state regulations. The storage tank will be decontaminated via pressure washing.

2.9 Dust Suppression

Dust suppression will be an integral component of the excavation and re-grading activities. During excavation and re-grading work, water will be sprayed across the surface of the work area as necessary to mitigate airborne dust formation and migration and assure conformance with community air monitoring thresholds. Other dust suppression techniques that may be used to supplement the water spray include:

- Applying water on haul roads.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum and adhere to particulate emissions limits identified in the CAMP discussed in Section 2.3.

2.10 In-Situ Remediation of Residual Impact

To address potential residual groundwater impacts, up to 500 pounds ORC Advanced® (provided by Regenesis) will be applied to the excavation bottom and mixed into the non-impacted overburden prior to backfilling. ORC Advanced® is in pellet form so is easily spread across the excavation bottom. If impacts are observed 10 feet from the IWS line, ORC Advanced will be injected within the 10-foot buffer between the excavation and the IWS line. Appendix B contains the product data sheet and installation instructions.

2.11 Excavation Backfill

Following NYSDEC concurrence that the remedial excavation is complete, and the ORC has been applied, a demarcation layer (e.g., orange plastic snow fencing) will be placed between any remaining in-place soil/fill and the backfill material. The stockpiled non-impacted overburden (estimated upper 4-5 feet) will be placed into the excavation and compacted with the excavator/backhoe bucket in 2-foot lifts and supplemented with BUD-approved steel slag supplied by Iron City and previously approved for use as cover material on other BCP Sites within the Tecumseh Phase II and III Business Parks. The backfill is required for safety reasons and to maintain access along the portion of Highway 5 that runs along the northern boundary of Site II-3. Appendix C contains the BUD determination for the slag material.

2.11.1 Backfill Screening

The final BUD-slag lift will be subject to gamma radiation screening by a certified radiation testing firm in accordance with the monitoring plan outlined by NYSDEC in its October 27, 2017 letter approving use of the BUD material for cover.

2.12 Ex-Situ Biotreatment

2.12.1 Biotreatment Pad Preparation and Operation

Biotreatment or land farming involves the use of conventional farm and/or heavy construction earth-moving equipment to spread, fertilize, aerate, and control moisture in soil to promote and accelerate natural aerobic and facultative biological degradation of volatile and semi-volatile petroleum compounds by indigenous soil microbes. This provides a cost-effective alternative to off-site transportation and disposal in a commercial solid waste landfill.

As shown on Figure 3, the planned bioremediation pad will be located on Site II-3. The selected area will be cleared and grubbed followed by placement of an approximate 3- to 4-inch thick layer of wood chips as a base for tilling. The biopad will cover approximately 40,000 square feet (est. 150' x 150') and will be surrounded by a silt sock (est. 600 linear feet) to mitigate surface erosion from the materials.

Primary segregation of large debris will occur at the excavation location. Petroleum-impacted fill designated for bioremediation will be transported to the biotreatment pad in off-road dump trucks. As excavated materials are placed, graded, and tilled, secondary segregation will occur and debris not suitable for bioremediation or backfill will be disposed or scrapped. A visual inspection of loads handled at the biotreatment area will be performed and the approximate quantity of soil/fill will be determined by volume. Soil/fill will be placed and graded to a 12- to 18-inch lift thickness. Soil/fill designated as treated will remain within the treatment area until analytical results confirm the soil/fill has been adequately treated.

2.12.2 Monitoring and Sampling

At least once every two weeks, the soil/fill within the biotreatment area will be monitored to track system performance, with tilling, nutrient, and moisture addition occurring as needed to expedite bioremediation. Qualitative assessment of treatment performance will

be based on visual and olfactory conditions, with the goal of eliminating gross impacts. Once the soil/fill is considered treated and NYSDEC concurs that gross impacts have been addressed, a confirmatory sample will be collected at a frequency of no less than 1 per 1,000 cubic yards of treated soil/fill. The samples will be analyzed for NYSDEC CP-51 List VOCs and SVOCs. Appendix D includes a Field Operating Procedure for post-treatment sample collection. If the samples meet the lower of Part 375 protection of groundwater or commercial SCOs for VOCs and a total SVOC concentration of 500 mg/kg (i.e., Site-Specific Action Limit), the soil/fill will either be transported back into the original excavated area or spread near the biopad area to fill low spots prior to final cover (completed later as part of final remedial measures).

No bioremediated soil/fill will be transported off-site unless deemed necessary due to poor treatment response or as necessary to expedite the overall cleanup and redevelopment schedule. Soil/fill that does not meet these criteria within an 18-month timeframe will be disposed, with NYSDEC approval, at a permitted solid waste disposal facility.

2.12.3 Biopad Decommissioning

Once the soil has been treated, the biopad will be decommissioned. The silt socks will be disposed off-site as solid waste. The wood chips will be intermingled with the final treated soil layer, tested, and used as subbase under the final cover.

3.0 DOCUMENTATION AND REPORTING

TurnKey will document SRA activities including reports of construction activities, community air monitoring results, and photographs and sketches, as necessary.

3.1 Construction Monitoring

Standard reporting procedures for Site activities will include preparation of a daily report and, when appropriate, problem identification and corrective measures reports. Appendix E contains sample project documentation forms. Information that may be included on the daily report form includes:

- Processes and locations of construction under way.
- Equipment and personnel working in the area, including subcontractors.
- A description of off-site materials received, including any quality verification (certification) documentation.

The completed reports will be available on-site and will be submitted to the NYSDEC as part of the Construction Completion Report (CCR).

Problem identification and corrective measures reports will be completed whenever major field problems are encountered and corrective measures are necessary. The NYSDEC will be promptly notified of problems requiring modifications to this Work Plan prior to proceeding or completion of the construction item. Changes or additions will be noted in the CCR.

Photo documentation of SRA activities will be prepared by TurnKey throughout the duration of the project as necessary to convey typical work activities and whenever changed conditions or special circumstances arise.

3.2 Construction Completion Report

Within 30 days of completion of the UST removal and excavation activities, TurnKey will prepare a Construction Closeout Report (CCR) documenting satisfactory removal and treatment of impacted materials and disposal of tank residuals for submittal to NYSDEC. The CCR will be prepared consistent with the requirements of Section 5.8 of DER-10 and will include:

- Text describing the excavation and backfill activities performed, any problems encountered, an explanation of corrective measures taken, deviations from the Work Plan, and other pertinent information necessary to document that the Site activities were carried out in accordance with this Work Plan.
- A Site or area planimetric map showing the property limits, key site features, UST system components removed, and lateral limits of excavation.
- Summaries of unit quantities including volume of soil excavated; volume of ground/surface water pumped and treated; disposition of excavated soil and collected ground/surface water; and volume of slag used as backfill.
- Copies of daily inspection reports and, if applicable, problem identification and corrective measure reports.
- Photographs of Site activities.
- A certification by a licensed NYS Professional Engineer in accordance with Section 1.5 of DER-10.

4.0 PROJECT SCHEDULE

It is anticipated that the SRA excavation activities will be completed within approximately four weeks of initiation barring significant weather delays. The NYSDEC Project Manager will be notified seven days in advance of the start of work.

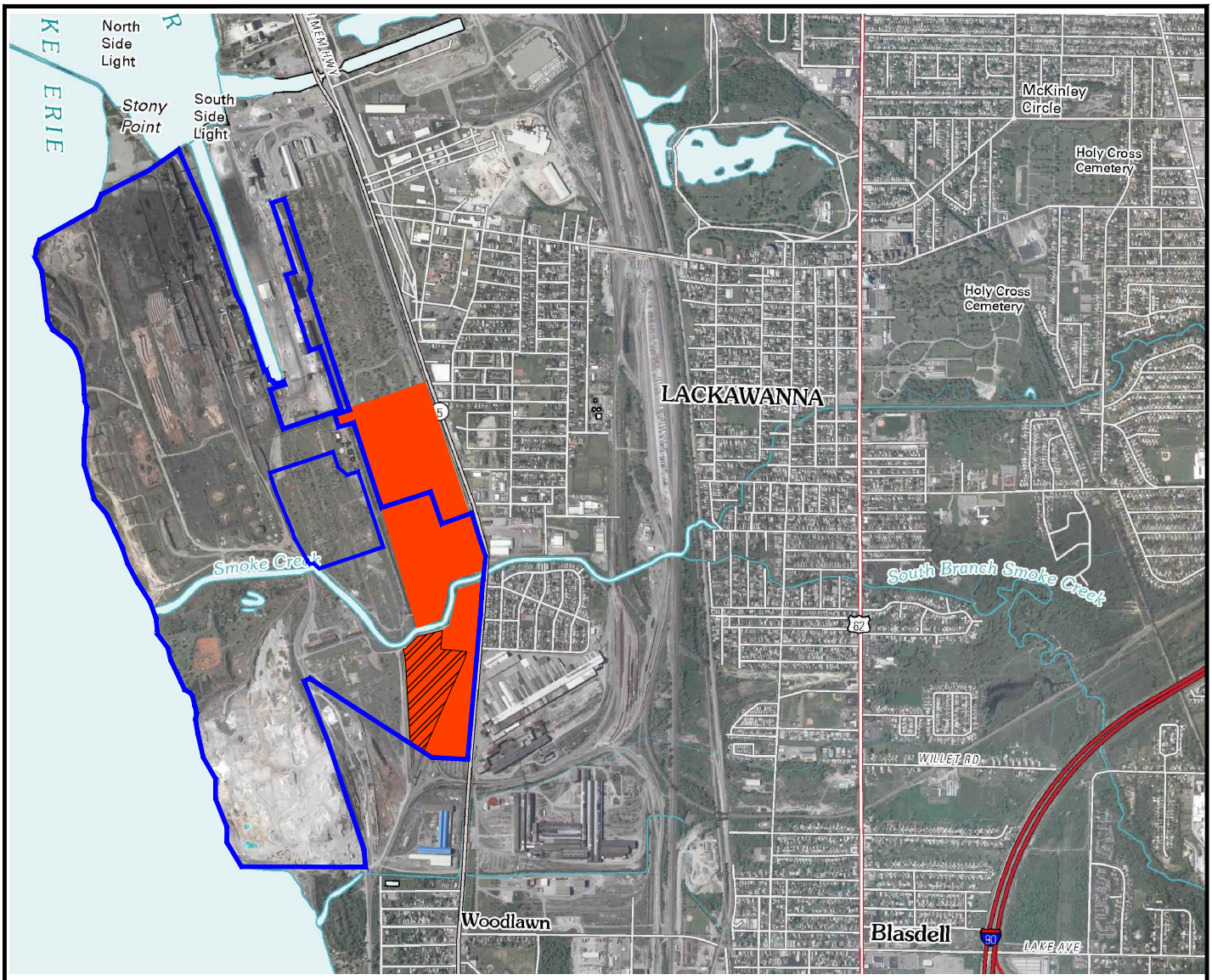
5.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) Work Plan for Phase II Business Park Area, Lackawanna, New York, BCP Site No. C915198*. November 2008, revised July 2009.
2. New York State Department of Environmental Conservation. *DER-10/ Technical Guidance for Site Investigation and Remediation.* May 3, 2010.
3. TurnKey Environmental Restoration, LLC. *Remedial Investigation/Alternatives Analysis Report (RI/AAR) for Phase II Business Park, Lackawanna, New York, BCP Site No. C915198*. May 2011, revised March 2012.

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Parcel II-3\2018 Work Plan\Figure 1; Site Location and Vicinity Map.dwg, DWG To PDF.pc3

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC

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SITE LOCATION AND VICINITY MAP

SOURCE REMOVAL ACTION (SRA) WORK PLAN

TECUMSEH BUSINESS PARK II
SITE II-3
LACKAWANNA, NEW YORK

PREPARED FOR

TECUMSEH REDEVELOPMENT INC.

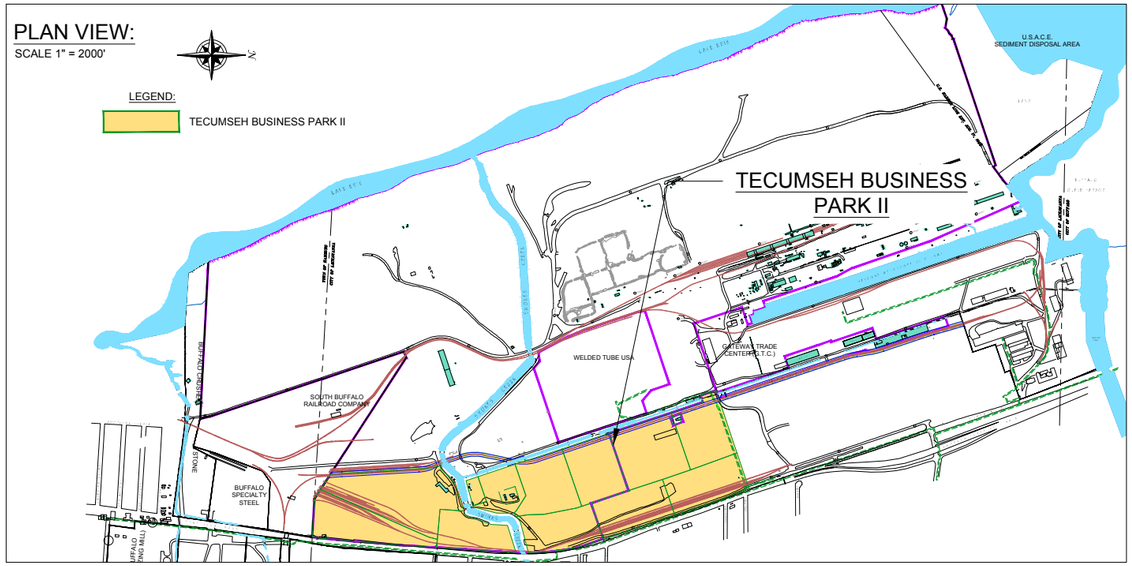
PROJECT NO.: 0071-018-325

DATE: JULY 2018

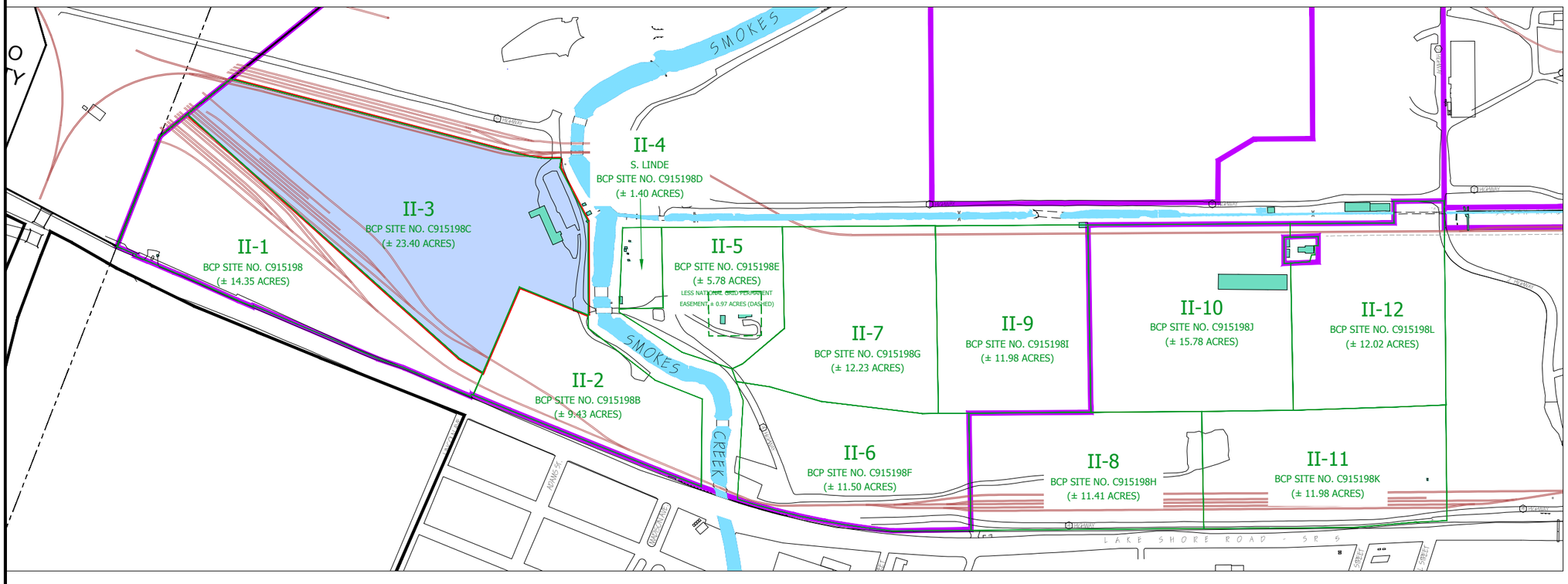
DRAFTED BY: RFL

PLAN VIEW:
SCALE 1" = 2000'

LEGEND:
TECUMSEH BUSINESS PARK II



LEGEND:
- TECUMSEH PROPERTY BOUNDARY
- SITE II-3
- EXISTING BUILDING / STRUCTURE
- TECUMSEH BUSINESS PARK II SITE BOUNDARIES
- RAILROAD TRACK



500' 0' 500' 1,000'

SCALE: 1 INCH = 1,000 FEET
SCALE IN FEET
(approximate)

DATE: JULY 2018
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
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JOB NO.: 0071-018-325

SITE DELINEATION MAP

SOURCE REMOVAL ACTION (SRA) WORK PLAN
TECUMSEH PHASE II BUSINESS PARK
BCP SITE NO. C915198C
LACKAWANNA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 2

F:\CAD\TurnKey\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Phase II Parcel\Parcel II-3\2018 Work Plan\Figure 3; Planned UST Removal and Area of Suspect Petroleum Impact.dwg, DWG To PDF.pc3

LEGEND:

- APPROXIMATE BUSINESS PARK BOUNDARY
- BUSINESS PARK SITE BOUNDARY
- EXISTING BUILDING / STRUCTURE
- IWS — IWS — INDUSTRIAL WATER LINE
- BPA 2-TP-7 — TEST PIT LOCATION
- PLANNED EXCAVATION AREA

II-3

BCP SITE NO. C915198C

(± 23.40 ACRES)

10-FOOT BUFFER ZONE BETWEEN EXCAVATION AND INDUSTRIAL WATER PIPELINE

SMOKES CREEK

VALVE HOUSES

FORMER TOOL HOUSE

BPA 2-TP-7

2,000 GAL. GASOLINE UST

2,000 GAL. FUEL OIL UST

FORMER CARPENTER SHOP

WELDING & STORAGE

5-FOOT BUFFER ZONE BETWEEN EXCAVATION AND VALVE HOUSE

PLANNED BIOPAD LOCATION

N

60' 0' 60' 120'

SCALE: 1 INCH = 60 FEET
SCALE IN FEET
(approximate)

DATE: JULY 2018
DRAFTED BY: RFL

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JOB NO.: 0071-018-325

PLANNED UST REMOVAL AND AREA OF SUSPECT PETROLEUM IMPACTS

SOURCE REMOVAL ACTION (SRA) WORK PLAN

TECUMSEH LACKAWANNA SITE
BCP SITE II-3 NO. C915198C
LACKAWANNA, NEW YORK

PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 3

APPENDIX A

HEALTH AND SAFETY PLAN

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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TECUMSEH REDEVELOPMENT BCP SITES
SITE-WIDE HEALTH AND SAFETY PLAN

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TECUMSEH REDEVELOPMENT BCP SITES
SITE-WIDE HEALTH AND SAFETY PLAN

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APPENDICES

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. Thomas H. Forbes, P.E.*** 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 ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 ppm above background for the 15-minute average, work activities will be halted and monitoring continued. If the total organic vapor level readily 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 total organic vapor levels at the downwind perimeter of the work area persist at levels greater than 5 ppm over background but less than 25 ppm, work activities must be halted, corrective actions taken, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case <20 feet), is below 5 ppm over background for the 15-minute average.
  - If the total organic vapor level is above 25 ppm at the perimeter of the work area, the SSHO must be notified and work activities shut down. The SSHO will determine when re-entry of the work area 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 15-miniute readings will be recorded and available for NYSDEC and NYSDOH personnel to review.

- **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**
  - If total organic vapor levels are greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential/commercial structure (whichever is less), work activities must be halted.
  - If, following the cessation of the work activities or as the result of an emergency, total organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential/ commercial structure 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 total 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

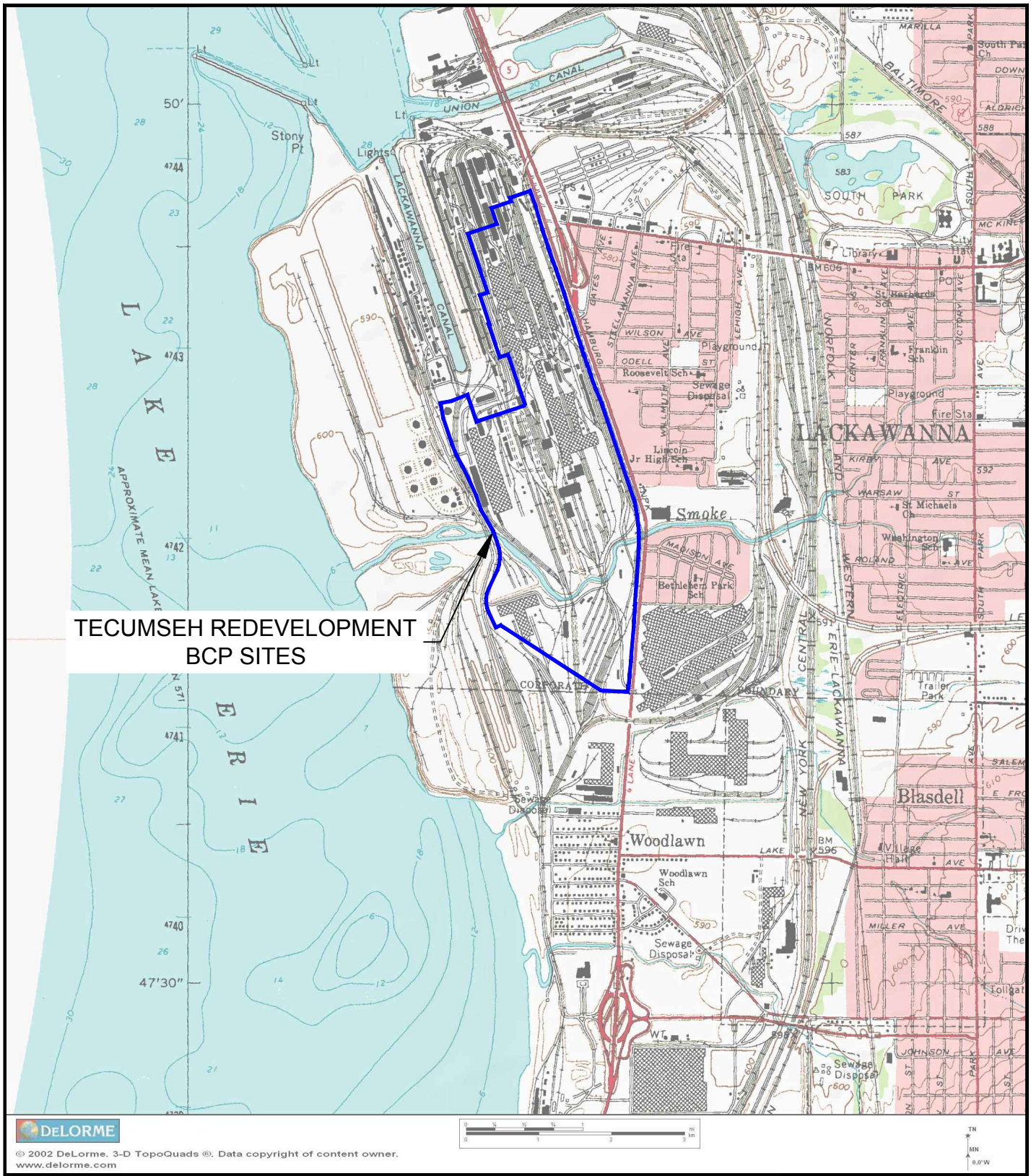
Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
1. Soil/Fill Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
2. Soil/Fill Documentation Sampling	Level D (upgrade to Level C if necessary)	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

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

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

GATEWAY METROPORT SHIP CANAL

SMOKES CREEK

TOWN OF HAMBURG
CITY OF LACKAWANNA

CITY OF LACKAWANNA
CITY OF BUFFALO

VILLAGE OF BLASDELL
CITY OF LACKAWANNA

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-□□ — 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-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: BLR
DATE: JULY 2013
CHECKED BY:
APPROVED BY:

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

TABLE OF CONTENTS

LIST OF FIGURES

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: ***Thomas H. Forbes, P.E.***
Work: (716) 856-0599
Mobile: (716) 864-1730

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.
2303 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.

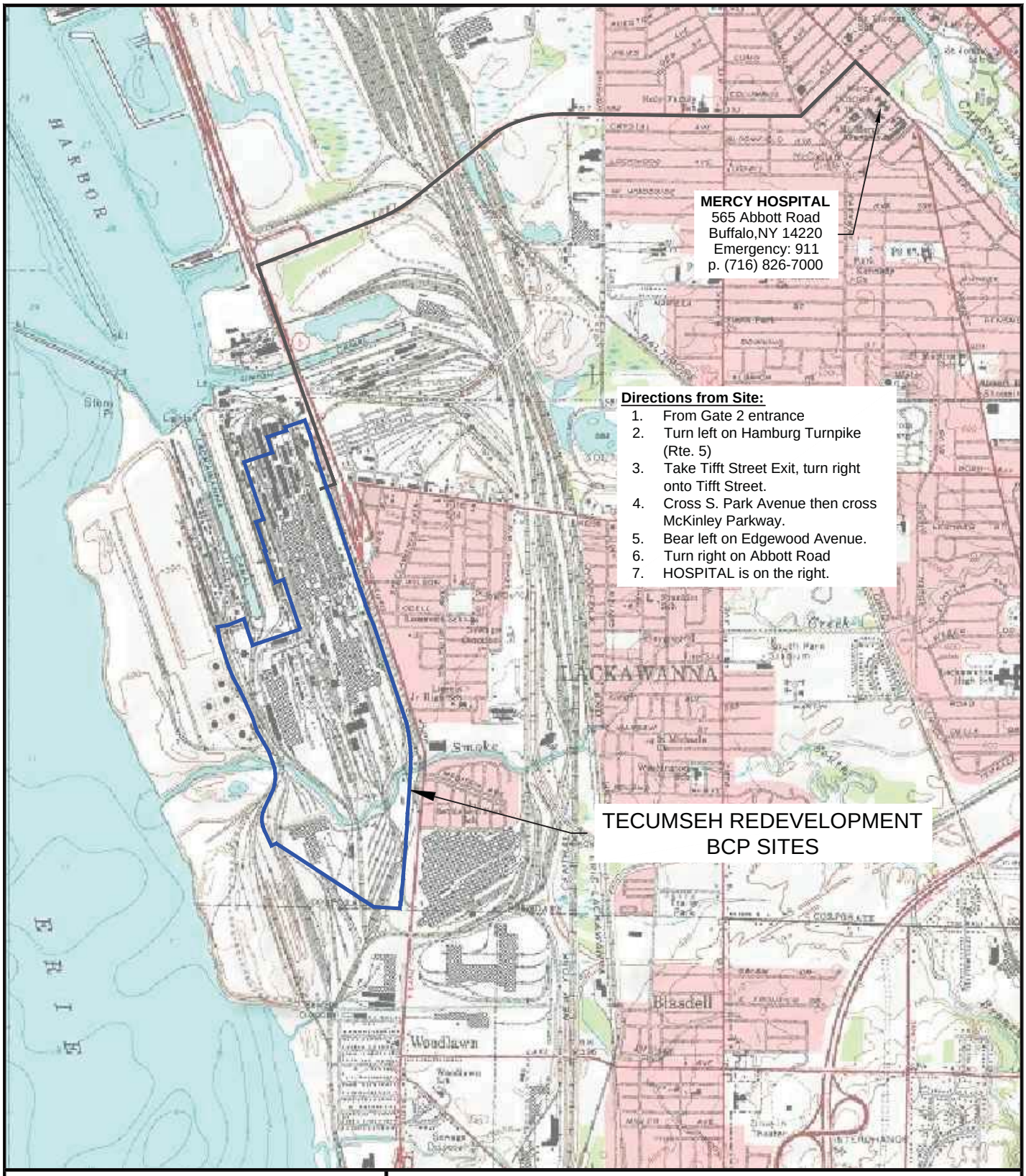
10.0 EMERGENCY RESPONSE TRAINING

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\Brownfield Cleanup 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 B

REGENESIS PRODUCT INFORMATION

ORC Advanced® Pellets Technical Specification

ORC Advanced Pellets are a dust-minimizing, dry application, pelletized form of the widely-used ORC Advanced controlled-release oxygen compound.

They are designed specifically for the treatment of dissolved-phase petroleum hydrocarbons through direct application into excavations, petroleum storage tank pits, trenches and backfill.

Oxygen is released from ORC Advanced for a period of 9 to 12 months *in situ*.

Example of ORC Advanced Pellets

$$CaO(OH)_2 + H_2O \rightarrow \tfrac{1}{2}O_2 + Ca(OH)_2 + H_2O$$

ORC Advanced is a formulation of calcium oxyhydroxide which, upon hydration, releases oxygen and forms simple calcium hydroxide and water.

For a list of treatable contaminants with the use of ORC Advanced, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Calcium Oxyhydroxide
- Calcium Hydroxide
- Monopotassium Phosphate
- Ammonium Phosphate Dibasic

Properties

- Pellet size: 3-10 mm
- Contains micro-nutrients such as nitrogen, phosphorous, and potassium (N,P,K) which can be beneficial to aerobic biodegradation processes

OXYGEN RELEASE COMPOUND

ORC Advanced® Pellets Technical Specification

Storage and Handling Guidelines

Storage
Store in a cool, dry place out of direct sunlight
Store in original tightly closed container
Store in a well-ventilated place
Do not store near combustible materials
Store away from incompatible materials
Provide appropriate exhaust ventilation in places where dust is formed

Handling
Minimize dust generation and accumulation
Keep away from heat
Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces
Observe good industrial hygiene practices
Take precaution to avoid mixing with combustibles
Keep away from clothing and other combustible materials
Avoid contact with water and moisture
Avoid contact with eyes, skin, and clothing
Avoid prolonged exposure
Wear appropriate personal protective equipment

Applications

- *In situ* or *ex situ* out of the bag
- Direct application into open excavations, petroleum storage tank pits and trenches
- Direct application to contaminated backfill or contaminated soils
- *Ex situ* biopile applications (requires a source of hydration)

Health and Safety

Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection.
Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: ORC Advanced SDS.

REGENESIS

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

REGENESIS ORC ADVANCED® PELLETS

Dust Minimizing Formulation for Excavations, Tank Pits and Trenches

PRODUCT APPLICATION INSTRUCTIONS

Introduction

The features and benefits of controlled-release, ORC Advanced are posted in other areas (product brochure, www.regenesis.com, and MSDS). From the field application standpoint, the benefits of ORC Advanced® Pellets (ORC-A Pellets) are in ease of handling and Health & Safety. Pelletized ORC Advanced is much easier to use because it eliminates the need for water and equipment associated with spray application and Health & Safety are dramatically improved by elimination of ORC Advanced dust and associated respiration issues. The later feature makes the material much easier to handle in open-air application approaches such as excavations and trenches.

Design Considerations

The new configuration of this material does not change the quantity estimated in the design process. The materials' available oxygen is up to 17% by weight and its physical attributes are designed to be easier to handle through the use of a pelletized version of the product and the elimination of the dust associated with dry application of ORC Advanced powder.

Application Methods

The pelletized form allows the user to simply and easily apply the ORC Advanced in a dry format using existing on-site operations or by manual methods. Some typical methods include:

- Application via the excavator bucket:
  - Simply insert a pre-determined quantity (unit - bucket or bag) of ORC-A Pellets into an excavator bucket and use the excavator to mix and distribute the ORC-A Pellets into previously backfilled soil
- Application via manual or mechanical broadcasting/spreaders:
  - Manually or mechanically broadcast/spread pelletized ORC-A Pellets into the excavation at a pre-determined rate per unit of backfill material or per soil lift (as the soil is being backfilled)
  - Follow the manual broadcast step with mechanically mixing the ORC-A Pellets directly into the backfill using the excavator equipment

Example Estimates:

Using an example unit weight of ORC-A Pellets (40 lb. bag)

For a 0.1% weight of ORC-Advanced to backfill:

- Each 100,000 lbs. of soil
- Apply 100 lbs. (4 buckets) ORC-A Pellets

PRODUCT APPLICATION INSTRUCTIONS

For a 0.2% weight of ORC-Advanced to backfill:

- Each 100,000 lbs. of soil
- Apply 200 lbs. (approx. 5 bags) ORC-A Pellets

Example Estimates (SI Units):

Using an example unit weight of ORC-A Pellets (18.1 kg bag)

For a 0.1% weight of ORC-A Pellets to backfill:

- Each 45 metric tons of soil
- Apply 45 kg (approx. 3 bags) ORC-A Pellets

For a 0.2% weight of ORC-A Pellets to backfill:

- Each 90 metric tons of soil
- Apply 90 kg (approx. 5 bags) ORC-A Pellets

ORC Advanced®

Compatibility with Underground Storage Structures and Pipes

The use of ORC Advanced in proximity to underground tanks and pipes is not a concern. Underground tanks and pipes are installed to meet the relatively corrosive conditions of wet soil. Also, the advent of Fiberglass Reinforced Plastics (FRPs) has greatly diminished the overall concerns in this area. Both metal and FRP installations are normally exposed to fairly wide ranges of pH, oxygen saturated water and even corrosive mineral contents. The biggest threat to system failure lies in poor installation and not in the presence of materials such as ORC Advanced.

Interactions with metals and plastics are an extremely complicated phenomenon that is dependent on time, temperature and concentrations. Given enough time, oxidizers and caustic solutions will slowly react with certain metals and plastics. ORC Advanced will produce oxic conditions, but oxygen levels are typically within the range of naturally aerobic groundwater, so the environment is not considered "highly oxidizing." In many cases, ORC Advanced simply restores oxygen levels in the aquifer that had been depleted as a result of contamination. ORC Advanced does has the potential to raise groundwater pH in aquifers with low buffering capacity, but the pH increase is generally localized within a few feet of the injection point. Furthermore, the pH increase is temporary and pH conditions will return to ambient levels once ORC Advanced is completely consumed. ORC Advanced will not affect most subsurface structures near the treatment zone. A detailed discussion of materials compatibility follows.

Metals

After ORC Advanced application, a pH increase is sometimes observed in monitoring wells located near the injection points. Theoretically, in beaker of unbuffered water, the pH of an ORC Advanced solution can reach a pH as high as 11. Whether or not the pH will actually increase in the field is highly dependent on the natural buffering capacity of the aquifer and dilution effects. Iron corrosion rates drop at high pH (10-12), so a high pH may actually inhibit iron corrosion. However, as pH increases, corrosion rates increase for aluminum and zinc. If the pH remains high for an extended period of time, this may have implications for buried electrical conduit which are frequently zinc coated iron or aluminum.

In order to summarize all the factors that may lead to metal corrosion, it is customary to use a grading system as an overall guide. In a corrosion index (Table 28-2) in the Chemical Engineer's Handbook (edited by Perry and Green), one category applies to ORC Advanced: alkaline solutions. This index is graded from 0-6 with a rating of 4-6 being good to excellent in terms of compatibility. A summary of the relevant information from this table is shown in Table 1 below. Materials rated a 4 or higher with alkaline solutions include cast iron, ductile iron, mild steel, stainless steel, Incoloy 825 nickel-iron-chromium alloy, hastelloy alloy C-276 and Inconel 600. Caustic conditions may cause problems with silicon iron, aluminum, aluminum brass, nickel-aluminum bronze, lead, titanium and zirconium.

Table 1. General Corrosion Properties of Some Metals and Alloys *(from Perry's Chemical Engineers Handbook, Table 28-2)*

Materials	*Alkaline Solutions* *Caustic and mild alkalies*
Cast iron	4
Ductile iron	4
Mild Steel	4
Ni-Resist corrosion cast iron	5
Stainless steel	4 – 5
14% Silicon iron	2
Incoloy 825 nickel-iron-chromium alloy	5
Hastelloy alloy C-276	5
Hastelloy alloy B-2	4
Inconel 600	6
Copper-nickel alloys up to 30% nickel	5
Monel 400 nickel-copper alloy	6
Nickel	6
Copper and silicon bronze	4
Aluminum brass	2
Nickel-aluminum bronze	2
Bronze	4
Aluminum and its alloys	0
Lead	2
Silver	6
Titanium	2
Zirconium	2

Plastics

A wide range of plastics and pipes or Fiberglass Reinforced Plastics (FRPs) may be used in underground service. Each type of plastic will have its own characteristic definition profile. These tanks and pipes are replacing metals due to their greater chemical resistance to corrosion. In many cases plastics can withstand significant concentrations of caustic chemicals. Overall, FRPs withstand a variety of harsh outdoor conditions where they are subjected to high temperatures, ozone and UV over long periods of time.

Reference

Perry's Chemical Engineer's Handbook, Seventh Edition. 1997. Editors: Perry, R. H.; D.W. Green, J.O. Maloney. McGraw-Hill Publishing.

APPENDIX C

BUD DETERMINATION

May 23, 2012

Ms. Sally Rowland
New York State Dept. of Environmental Conservation
Division of Materials Management
Bureau of Waste Reduction & Recycling, 9th Floor
625 Broadway, Albany, NY 12233-7253

Re: Tecumseh Redevelopment Inc.
BUD # 555-9-15 – Steel Blast Furnace Slag

Dear Ms. Rowland:

On behalf of ArcelorMittal Tecumseh Redevelopment and in accordance with the requirements of the above referenced BUD # 555-9-15, please be advised that Iron City Recovery has reported 42,642 tons of steel blast furnace slag has been used during the 2011 reporting period, for an approximate total through 2011 of 295,000-345,000 tons of slag. As we approached processing of the 300,000 tons of slag this past year, we obtained additional composite samples per the BUD requirements and have attached these analytical test results per the NYSDEC Sampling and Analysis Plan.

Sincerely,
TurnKey Environmental Restoration, LLC

John T. Deth

John T. Deth
Manager Construction Services

CC: K. Nagel, ArcelorMittal Tecumseh Redevelopment

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste, Reduction & Recycling, 9th Floor
625 Broadway, Albany, NY 12233-7253
Phone: (518) 402-8678 • **Fax:** (518) 402-9024
Website: www.dec.ny.gov

January 25, 2012

Mr. Paul Werthman, PE
President
Tecumseh Redevelopment c/o BEES
2558 Hamburg Turnpike, Suite 300
Lackawanna, NY 14218

Dear Mr. Werthman:

Re: Beneficial Use Determination No. 555-9-15

A Beneficial Use Determination (BUD) was granted to your company by the New York State Department of Environmental Conservation (Department). The Department is in the process of compiling data to estimate the quantity of solid waste beneficially used during calendar year **2011** (January 1, 2011 - December 31, 2011). For this purpose, the Department requests that the following table be completed and returned to the address on this letterhead by March 15, 2012. If you have already submitted this information to the Department, please disregard this request.

Quantity of Waste Beneficially Used During January 1, 2011 - December 31, 2011

BUD No. 555-9-15

Waste Type: STEEL / BLAST FURNACE SLAG

Beneficial Use: AGGREGATE, ROAD & SUB BASE

Contact Person: (please make corrections above) PAUL WERTHMAN

Telephone Number: 716-856-0599

Quantity: 42,642 Unit (ton (preferred) or yd^3 or gal): _____

***Please indicate an email address** where you would like this notice sent:

JDethe@BenchmarkTurnkey.com

Remarks: _____

NOTE: In addition to information listed above, please attach to this form all reporting information required by BUD No. 555-9-15.

I appreciate your continued cooperation in providing the above information. If you have any questions, please call Stephen Condon at 518-402-8706.

Sincerely,

Sally Rowland

Sally Rowland, PhD, P.E.
Chief, Organic Recycling & Beneficial Use Section

Beneficial Use Determination – Request for Renewal

OFFICIAL USE ONLY

DATE RECEIVED

PROJECT NUMBER

STAFF INITIALS

DATE

6 NYCRR Part 360 became effective on November 4, 2017. Paragraph 360.4(p) requires that any case-specific beneficial use determination (BUD) without an expiration date will expire within 180 days of the effective date of Part 360 (May 3, 2018), unless renewed. This renewal form is based on petition requirements in 360.12(d).

BUD Holder Information

Full Name: Werthman (*Last*) Paul (*First*) H (*M.I.*)

Affiliation: Tecumseh Redevelopment, Inc. c/o TurnKey Env. Rest. (*Company*) President (*Title*)

Primary Address: 2558 Hamburg Turnpike, Suite 300 (*Street Address*) Buffalo (*City/Town*)

Erie (*County*) 14218 (*Zip Code*)

Primary Phone: (716) 856-5990 **Primary Email:** pwerthman@benchmarkturnkey.com

Waste, Residual or By-Product Information

BUD Information: 555-9-15 (*Number*) July 2, 1998 (*Effective Date of Original BUD*) September 21, 2006 (*Date of Most Recent Modification or Renewal*)

Waste Information: steel/blast furnace slag (*Type of Waste, Residual or By-Product*) 4.5 Million tons (*Estimated Total Quantity (in tons or cubic yards)*)

Source or Generation Facility: Former Bethlehem Steel Facility (*Facility Name*) (*DEC Facility Authorization, if any (DEC registration; DEC permit; Out of State; Other)*)

2303 Hamburg Turnpike, Buffalo, NY 14218 (*Source Facility Location (Address, Town, County)*)

Details of Use: asphaltic concrete aggregate, railroad ballast, road base, anit-skid material. (*Brief Description of How Material is Being Used*) 5 years (*Requested renewal period (up to 5 years- can be renewed)*)

Location(s) of Use: Material is commercially available for uses described above. (*Location of use, if applicable (Name and Address)*) (*Quantity in tons or cubic yards at this location*)

NOTE: Attach additional sheets to list other sources of materials and locations of use, if applicable.

Renewal Request Attachments

Attached	N/A	
☒	☐	Physical description of waste, residual or by-product material proposed for beneficial use, including weight and volume annually See Attachment 1
☒	☐	Details concerning how the waste will be used as a substitute for a commercial product or raw material. Figures may be helpful; for example, a diagram or flowchart for a manufacturing process, or a plan drawing for use of a material at a construction site. See Attachment 1
☒	☐	Detailed description of source, process or treatment system from which the waste originates. Include any and all process chemicals added and their quantity. See Attachment 1
☒	☐	Representative physical/geotechnical testing results for the waste with comparison to industry or government standard(s) applicable to the proposed use. See Attachments 1 and 2
☒	☐	Analytical data concerning the chemical and physical characteristics of the waste. See Attachments 1, 2, & 3
☒	☐	Analytical data concerning the chemical and physical characteristics of each type of proposed product. See Attachment 1
☒	☐	Analytical data concerning the chemical and physical characteristics of any analogous raw material or commercial product for which the waste is proposed to be an effective substitute/ See Attachment 1
☒	☐	Justification that the waste functions as an effective substitute for the commercial product or raw material and that the use meets or exceeds government or industry standards or specifications. See Attachment 1
☒	☐	Demonstration of ongoing market (see 360.12(d)(2)(vi)). See Attachment 1
☒	☐	Comparison of chemical and physical characteristics of the waste to applicable or relevant and appropriate criteria for beneficial use. For materials placed on the land as fill or cover, note requirements of 360.12(d)(3)(vi). See Attachment 1
☒	☐	Describe any other potential adverse effects from use of the waste (including but not limited to odors, roots or seeds of invasive species). See Attachment 1
☒	☐	Waste Control Plan: See Attachment 4

1. Procedure for periodic testing of the waste, and if necessary the product(s).
2. Type of storage of waste and maximum anticipated storage volume. Note: Storage cannot exceed 365 days without Department approval.
3. Procedures for run-on and run-off control in storage areas.
4. What best management practices will be followed to minimize uncontrolled dispersion of the waste prior to and during beneficial use?

If Renewal Request Attachments are not applicable state why. Attach additional sheets as necessary.

Solid Waste Facility Permit Requirements

Yes (Permit may be required)	No	
☐	☑	Will the proposed material require decontamination, special handling or processing before beneficial use?
☑	☐	Will a fee be charged for use by any receiving site for acceptance and use of the material?

Certification

I hereby affirm under penalty of perjury that information provided on this form (including attached statements and exhibits) was prepared by me or under my supervision and direction and is true to the best of my knowledge and belief, and that I have authority or am authorized to sign this application pursuant to 6 NYCRR Part 360. I am aware that any false statement made herein is punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law and ECL Section 3-0301(2)(Q).

Signature	Print Name	Date
	Paul H. Werthman	5/1/18

Before you submit this application, please verify:

- ☑ All fields of the application are complete (indicate N/A (not applicable) if appropriate).
- ☑ You have signed and dated above.
- ☑ You have enclosed all supporting information.

Send this completed form and any supporting attachments to the **Materials Management Supervisor** in your DEC Region (for help, see http://www.dec.ny.gov/about/50230.html), with a copy to:

Kathleen Prather, P.E.
Bureau of Permitting and Planning
Division of Materials Management
NYSDEC
625 Broadway, 9th Floor
Albany, NY 12233-7260

Please contact Ms. Prather at (518) 402-8678 or benuse@dec.ny.gov if you have any questions about renewing a case-specific BUD.

ATTACHMENT 1
Steel Slag Beneficial Use Determination #555-9-15 Renewal Request

Physical Description of waste, residual or by product material proposed for beneficial use, including weight and volume.

The Beneficial Use Determination (BUD) material subject to this renewal request is steel slag located at the former Bethlehem Steel Plant, 2303 Hamburg Turnpike, City of Lackawanna, New York (see Figure 1 and 2). Steel slag is a by-product of the former steel making process and was produced during the separation of molten steel from impurities in the steel-making furnaces. The slag was generated as a by-product from decades of former Bethlehem Steel Company basic oxygen furnace (BOF) operations through the early 1980s when steel making ceased. Steel slag reclamation activities have been occurring primarily within SFA Zone 5 for the past decade.

The slag initially existed as a molten liquid melt that solidified upon cooling. During the steel making operations at the former Bethlehem Steel Plant, after generation, the molten liquid steel slag was transported to its current location via rail car, was dumped as a liquid and solidified in place. The slag has a gray, porous like appearance, and contains very little moisture. The location of the steel slag reclamation is known as Zone 5 (see Figure 2 and 3).

The steel slag is excavated and placed into a crusher and screen within the mining area (Zone 5) to further process the steel slag into a smaller aggregate and then stockpiled. The processed steel slag is stockpiled based on aggregate size for resale. This steel slag processing operation has been on-going since 2008 (BUD No. 555-9-15).

Over the past 4 years (2014 through 2017), on average, approximately 120,000 tons (estimated at 60,000 cubic yards) of steel slag aggregate was processed and sold for reuse. There has been very little variation in the steel slag processed and aggregate generated.

Details concerning how the waste will be used as a substitute for a commercial product or raw material.

The steel slag is excavated from where it was placed in molten liquid form and cooled. It is placed into a crusher with a screen within the mining area to be processed into a smaller aggregate and is stockpiled based on aggregate size produced for resale. This steel slag processing operation has been on-going since 2008. The existing BUD, as well and this BUD renewal request, has identified the steel slag for the following uses: fill material, asphaltic concrete aggregate, railroad ballast, road base, chip and seal aggregate, anti-skid material, acid mine drainage treatment material, and Portland cement amendment.

In the past 4 years of operation, on average approximately 120,000 tons of steel slag aggregate per year has sold for reuse. Currently, the products of steel slag aggregate available for

purchase and are as follows: 1-inch minus crusher run, 2-inch minus crusher run, ballast, 7-inch oversized crusher run, #1 clean crusher run, and #2 clean crusher run.

Detailed description of source, process, or treatment system from which the waste originates.

Steel slag is a by-product of the steel making process and is produced during the separation of molten steel from impurities in the steel-making furnaces. The slag initially existed as a molten liquid melt that solidified upon cooling. During the steel making operations at the former Bethlehem Steel Plant, after generation, the molten liquid steel slag was transported to its current location via rail car, was dumped as a liquid and solidified in place.

The steel slag is excavated and mechanically processed into smaller aggregate sizes for resale. There are no process chemicals used to treat the material associated with the production of aggregate steel slag.

Representative physical/geotechnical testing results for the steel slag with comparison to industry or government standard(s) applicable to the proposed use.

Gradations for the 1-inch minus crusher run, 2-inch minus crusher run, and ballast steel slag aggregate material are provided in Attachment 2.

Analytical data concerning the chemical and physical characteristics of the steel slag.

The existing BUD, requires steel slag sampling and analysis as outlined in the attached Waste Control Plan (see Attachment 4) and began in 2008 [The Contingency Sampling of the SAP has not been required based on the analytical data collected to date]. The analytical data collected to date is summarized on the two (2) summary tables in Attachment 3.

Analytical data concerning the chemical and physical characteristics of each type of proposed product.

The processed steel slag does not vary significantly in chemical and/or physical properties. The analytical sample results are summarized on the two (2) tables in Attachment 3 and the gradation for the size of the products produced are included in Attachment 2.

Analytical data concerning the chemical and physical characteristics of any analogous raw material or commercial product for which the waste is proposed to be an effective substitute.

The processed steel slag is a substitute for natural aggregate material which is mined from permitted sand and gravel pits and/or quarries. The chemical properties of the natural aggregate would be those of natural sands, gravels and processed bedrock. The physical properties of the natural aggregate material after processing and the processed steel slag would be very similar for the products produced (e.g., 1-inch minus crusher run, 2-inch minus crusher run, 7-inch oversized crusher run, #1, clean crusher run, and #2 clean crusher run).

Justification that the waste functions as an effective substitute for the commercial product or raw material and that the use meets or exceeds government or industry standards or specifications.

The processed steel slag is used for fill material, asphaltic concrete aggregate, railroad ballast, road base, chip and seal aggregate, anti-skid material, acid mine drainage treatment material, and Portland cement amendment. Since 2008, approximately 1,063,726 of steel slag has been processed and sold into commerce as a substitute for natural aggregate materials.

Demonstration of ongoing market (see 360.12(d)(2)(vi)).

Since 2008, approximately 1,063,726 tons of slag aggregate has been distributed, with a yearly average of approximately 120,000 tons looking at the past 4 years (2014 through 2017) of production/sales.

Comparison of chemical and physical characteristics of the waste to applicable or relevant and appropriate criteria for beneficial use. For materials placed on the land as fill or cover, note requirements of 360.12(d)(3)(vi).

The steel slag has been sampled in accordance with the BUD sampling and analysis since 2008. The analytical data has been included in summary tables included in Attachment 3.

The two (2) analytical methodologies are required by the existing BUD to assess the processed steel slag:

- Total metals via EPA Method 6010C and 7471B (mercury);
- Potential for precipitation leaching from the processed steel slag via Synthetic Precipitation Leaching Procedure (SPLP) EPA Method 1312 and analysis via EPA Method 6010C and 7471B (mercury).

Table 1 is a summary of the total metals results and Table 2 is a summary of the SPLP metal results. The total metal results were compared to the Part 375 Residential Soil Cleanup Objectives (RSCOs) as required by Part 360.12(d)(3)(vi). The SPLP metal results were compared to the Ambient Water Quality Class GA Groundwater Quality Standards/Guidance Values; NYSDEC June 1998 Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 (Class GA GWQS) as the analysis is performed on the leachate generated from water consistent with precipitation through the steel slag sample.

Two (2) analytes, chromium and manganese, were generally detected above their respective RSCOs based on the total metals analysis (see Table 1 in Attachment 3). However, the chromium concentration is below its Commercial SCO and the manganese concentration exceedance is a maximum capped value per the Development of Soil Cleanup Objectives Technical Support Document[1] which does not represent a known health-based concern value. Additionally, the metal analytes present in the steel slag material are bound to the material and do not readily leach or migrate from the material.

[1] New York State Brownfield Cleanup Program Development of soil Cleanup Objective Technical Support Document. Prepared by NYSDEC and NYSDOH. September 2006.

Table 2 in Attachment 3 is a summary of the SPLP metal results. This analysis simulates the material exposed to precipitation similar to a placed condition in the field. The SPLP results provided include the laboratory results and the laboratory results divided by a Dilution Attenuation Factor (DAF) of 100 for comparison to the compared to the Class GA GWQS. [Use of the DAF of 100 is discussed in the NYS Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document and consistent with the logic used by the EPA in its DAF approach for EP Toxicity and TCLP].

Results of both of the SPLP data and the data with the DAF applied are well below their respective Class GA GWQS.

Describe any other potential adverse effects from use of the waste (including but not limited to odors, roots, or seeds of invasive species).

No potential adverse effects from the use of the steel slag aggregate as a substitute for similar natural aggregate are known.

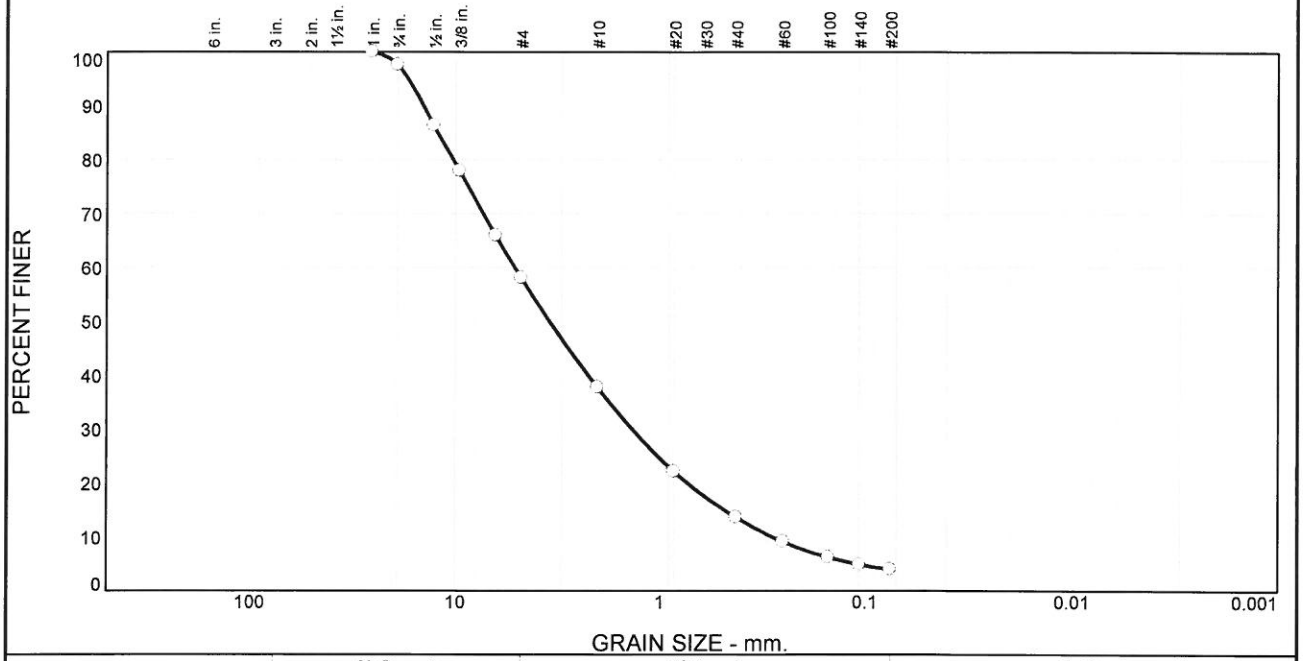
Waste Control Plan

A Waste Control Plan was prepared and included in Attachment 4.

ATTACHMENT 2
Steel Slag Beneficial Use Determination #555-9-15 Renewal Request

Steel Slag Gradations

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.4	39.5	20.4	24.1	9.7	3.9	

TEST RESULTS (ASTM D6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	97.6		
.5	86.3		
.375	77.9		
.25	65.9		
#4	58.1		
#10	37.7		
#20	22.1		
#40	13.6		
#60	9.1		
#100	6.2		
#140	4.8		
#200	3.9		

* (no specification provided)

Material Description

ID#11-743
Well-graded sand with slag

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW AASHTO (M 145)=

Coefficients

D_{90}= 14.2635 D_{85}= 12.1555 D_{60}= 5.1116
D_{50}= 3.4401 D_{30}= 1.3570 D_{15}= 0.4848
D_{10}= 0.2823 C_u= 18.10 C_c= 1.28

Remarks

Date Received: 11/4/11 **Date Tested:** 11/10/11
Tested By: RP
Checked By: JMA
Title: LM

Source of Sample: 11/4/11 **Date Sampled:**
Sample Number: 1" Minus Slag

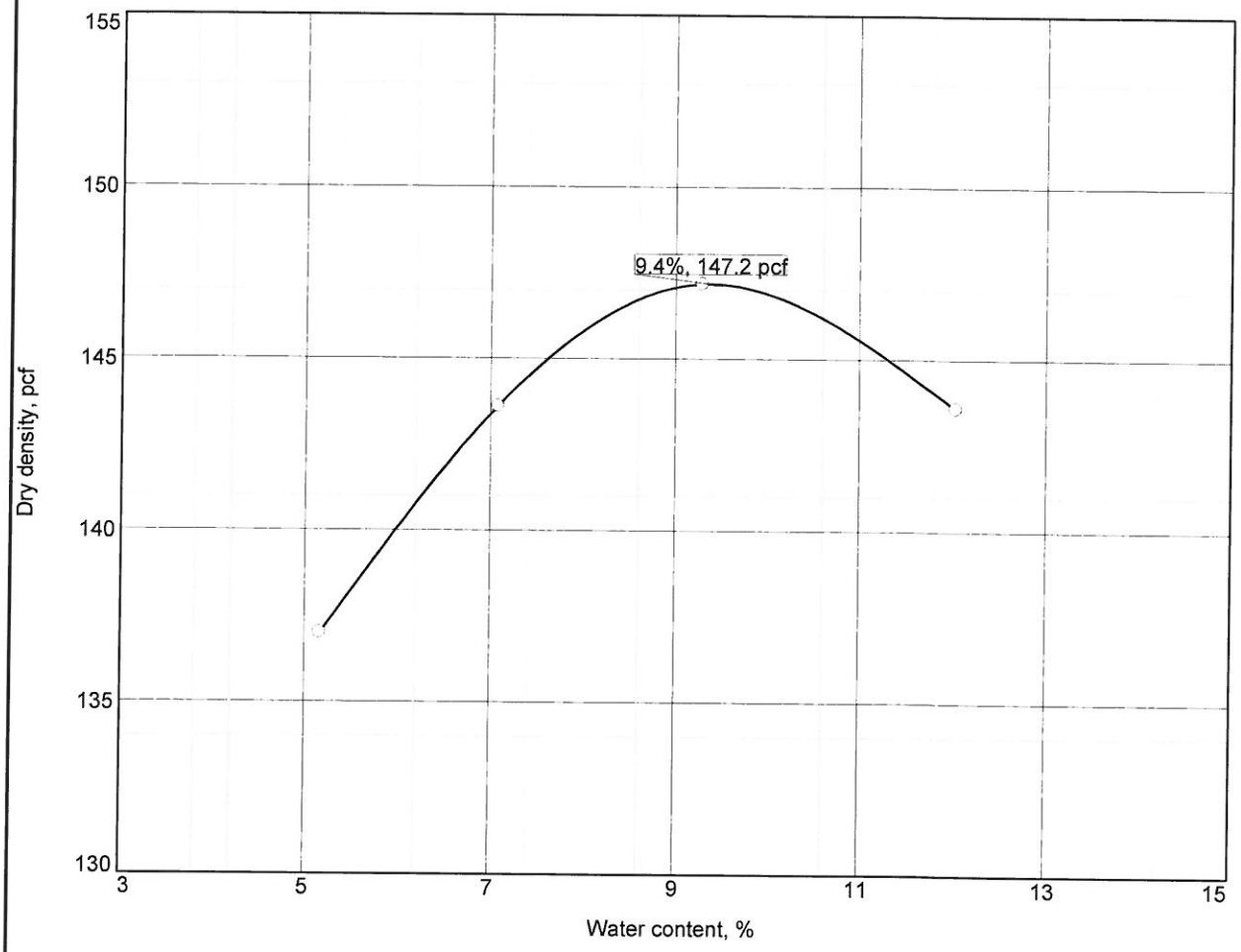
3rd Rock, LLC

East Aurora, NY

Client: Iron City
Project: Iron City

Project No: 11-040 **Figure**

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	SW						2.4	3.9

TEST RESULTS

Maximum dry density = 147.2 pcf

Optimum moisture = 9.4 %

MATERIAL DESCRIPTION

ID#11-743
Well-graded sand with slag

Project No. 11-040 **Client:** Iron City
Project: Iron City

Source of Sample: 11/4/11 **Sample Number:** 1" Minus Slag

3rd Rock, LLC

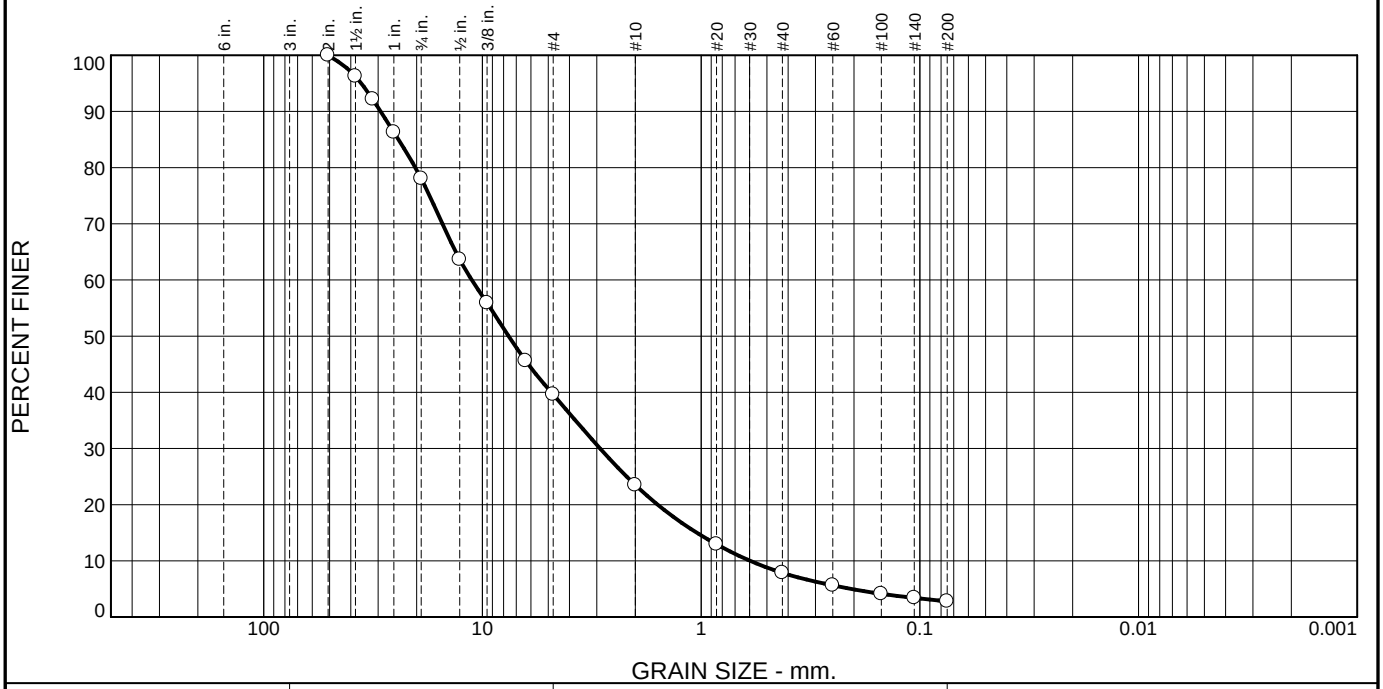
East Aurora, NY

Remarks:

Figure

Tested By: RP 11/9/11 **Checked By:** JMA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	22.0	38.4	16.1	15.6	5.1	2.8	

TEST RESULTS (C136/C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	96.3		
1.25"	92.2		
1	86.3		
3/4"	78.0		
.5	63.6		
3/8"	55.9		
.25	45.6		
#4	39.6		
#10	23.5		
#20	12.9		
#40	7.9		
#60	5.6		
#100	4.1		
#140	3.4		
#200	2.8		

* (no specification provided)

Material Description

ID# 15-080

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GW **AASHTO (M 145)=**

Coefficients

D_{90}= 29.2150 D_{85}= 24.2223 D_{60}= 11.1926
D_{50}= 7.5892 D_{30}= 2.8975 D_{15}= 1.0458
D_{10}= 0.5962 C_u= 18.77 C_c= 1.26

Remarks

Date Received: 4/23/15 **Date Tested:** 5/9/15

Tested By: ETC

Checked By: JMA

Title: LM

Source of Sample: Iron City **Date Sampled:**

Sample Number: 2"Minus Crushed Slag

3rd Rock, LLC

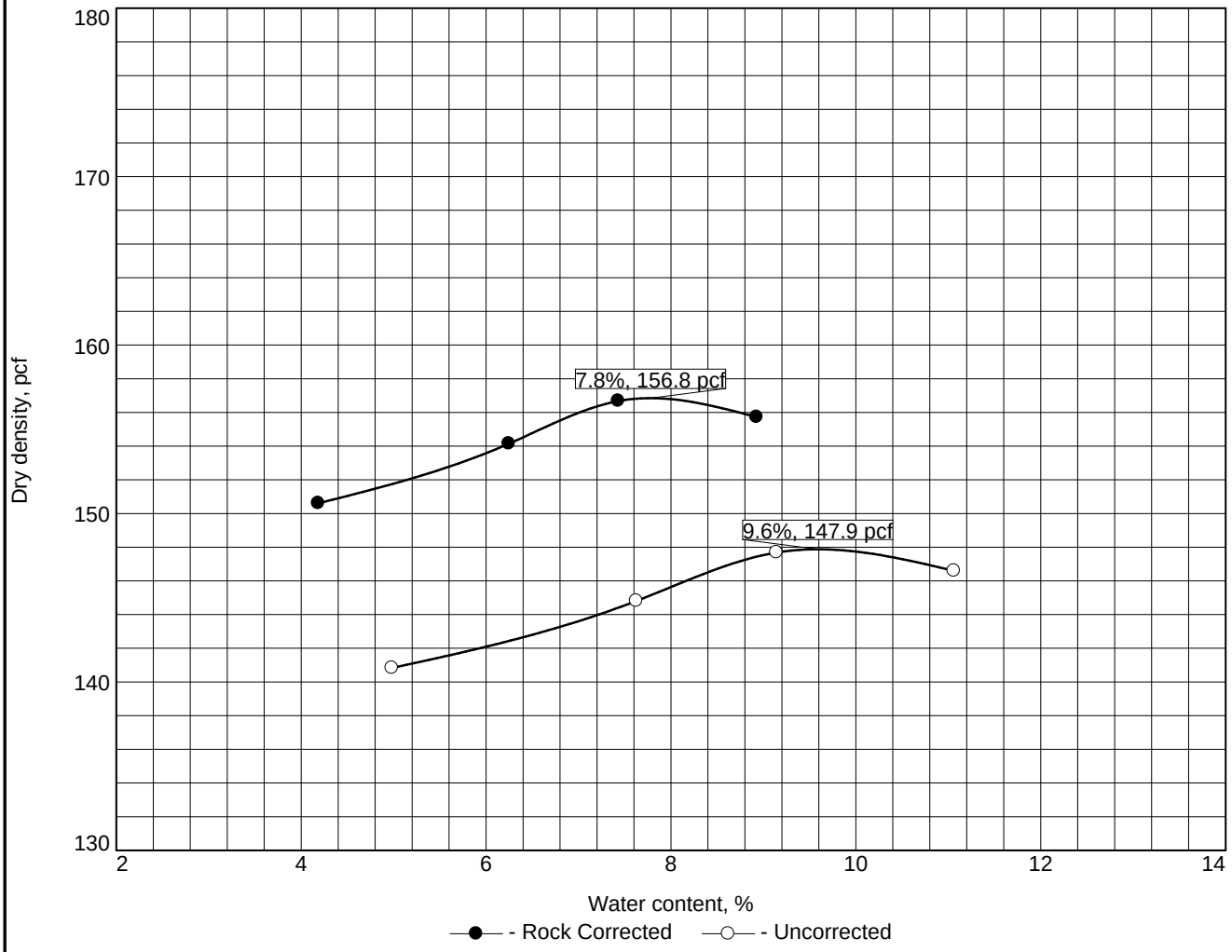
East Aurora, NY

Client: Zoladz Construction Co.

Project: Crushed Slag

Project No: 15-018 **Figure**

COMPACTION TEST REPORT



Test specification: ASTM D 1557-07 Method C Modified
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	GW						22.0	2.8

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 156.8 pcf	147.9 pcf	ID# 15-080
Optimum moisture = 7.8 %	9.6 %	

Project No. 15-018 **Client:** Zoladz Construction Co.
Project: Crushed Slag

○**Source of Sample:** Iron City **Sample Number:** 2"Minus Crushed Slag

3rd Rock, LLC

East Aurora, NY

Remarks:

Figure

Tested By: ETC 5/4/15 **Checked By:** JMA

CME Associates, Inc.

385 Sherman Street
Rochester, New York 14606
(585) 254-8740
(585) 254-1351 (Fax)
www.cmeassociates.com

LABORATORY TEST REPORT

PROJECT:	Miscellaneous Laboratory Testing Services – Rochester, NY	**REPORT NO.:**	37248L-01-1211
CLIENT:	Iron City Recovery	**SAMPLE NO.:**	RL9989
SAMPLE TYPE:	Ballast Material	**DATE DELIVERED:**	12/21/11
SOURCE:	Bethlehem Steel Stockpile		

1) Specific Gravity & Absorption (ASTM C-127):

Bulk Specific Gravity Dry:	2.98
Bulk Specific Gravity S.S.D.:	3.09
Bulk Specific Gravity Apparent:	3.34
Absorption (%):	3.7

2) Sieve Analysis (ASTM C-136, C-117):

Percent Passing by Weight*		**ASTM C-33 #57 Specification**
Sieve Size		
1 1/2"	100	100
1"	100	95-100
3/4"	86	-
1/2"	59	25-60
3/8"	38	-
1/4"	14	-
#4	0	0-10
#200 (0.75µm)Wash	0.1	

***Material less than 4.75mm and over 1" in diameter was removed to approximate an ASTM C-33 #57 aggregate size. All testing was performed on this material. Materials should be reviewed by the appropriate Project Engineer for acceptance.**

3) Unit Weight & Air Voids (ASTM C-29):

Unit Weight (by rodding):	109 pcf
Void Content	41%

4) Deleterious Substances:

	Test Results
Material Finer than #200 Sieve, ASTM C-117 (%)	0.1
Clay Lumps and Friable Particles ASTM C-142 (%)	0.0
Lightweight Particles ASTM C-123 (%)	0.0

5) L.A. Abrasion (ASTM C-131)

Grading	**Percent Loss**
B	20

6) Flat and Elongated Pieces (ASTM C125):

Flat or Elongated	**Percent**
To The Degree of 3:1	1
To The Degree of 5:1	0

CME Associates, Inc.

7) Soundness Testing (ASTM C-88): Coarse Aggregate

Soundness by use of Sodium Sulfate- 5 Cycle				
Sieve Size	**Original Grading (%)**	**Original Weight of Test Fraction (g)**	**Percent Passing Sieve After Loss**	**Weighted Percent of Loss**
1 ½" to 1"	-	-	-	-
1" to ¾"	18	517.8	5.8	1.1
3/4" to 3/8"	64	1000.5	3.4	2.2
3/8" to #4	18	300.8	8.3	1.5
Total	**100**			
			Total Weighted Percent of Loss	**5%**

8) 10 Cycle Soundness of Coarse Aggregates by use of Magnesium Sulfate (NYSDOT GTM-21b):

New York State Aggregate Size Number	Original Weight of Sample (g)	Weight After 10 Cycles (g)	Weight Loss (g)	Loss in Percent
2	2498	2478	20	**0.8**

Resistance to Freeze Thaw results from American Engineering Testing, Inc. are attached. Please feel free to contact our office should you have any questions.

Attachment: American Engineering Testing, Inc. Resistance to Freeze Thaw Test Results (1 page)

AMERICAN ENGINEERING TESTING, INC.

CONSULTANTS
• ENVIRONMENTAL
• GEOTECHNICAL
• MATERIALS
• FORENSICS

REPORT OF TEST OF COARSE AGGREGATE

PROJECT:
IRON CITY RECOVERY

REPORTED TO:
CME ASSOCIATES, INC.
385 SHERMAN STREET
ROCHESTER, NY 14606

ATTN: E. RANDALL HOLBROOK

AET PROJECT NO: 20-11070

DATE: MARCH 19, 2012

SAMPLE NUMBER: 1
SAMPLE LOCATION: Lab ID RL-9989
TYPE OF AGGREGATE: Basalt

RECEIVED
MAR 22 2012
CME Associates, Inc.
Rochester Office

Resistance to Freeze Thaw, NY 703-08 P, G

Aggregate Data	Aggregate Size	
	19.0 mm	12.5 mm
Original Mass of Sample, g	1499.0	1002.1
Mass After 25 Cycles, g	1326.1	907.5
Mass Loss, g	172.9	94.6
Mass Loss, %	11.5	9.4
Combined Original Mass, g	2501.1	
Combined Loss, g	267.4	
Total Loss, %	10.7	

REMARKS: Sample #1 was submitted to our laboratory on January 13, 2012 by E. Randall Holbrook of CME Associates, Inc. The sample was discarded after testing

Report Prepared By:
American Engineering Testing, Inc.

Adam A. Krieger
Aggregate Lab Coordinator
akrieger@amengtest.com

Report Reviewed By
American Engineering Testing, Inc.

David G. Wirth
Manager, Construction Services
dwirth@amengtest.com
651-659-1373

ATTACHMENT 3
Steel Slag Beneficial Use Determination #555-9-15 Renewal Request

Analytical Results Summary Tables

TABLE 1
SUMMARY OF TOTAL METALS ANALYTICAL RESULTS
NYSDEC STEEL SLAG BUD # 555-9-15
TECUMSEH REDEVELOPMENT SITE
LACKAWANA, NEW YORK

Parameter	Slag Composite Samples																		Residential SCOs [1] (ppm)
	SC-1	SC-2	SC-3	SC-4	SC-5	SC-6	SC-7	SC-8	SC-9	SC-10	SC-11	SC-12	SC-13	SC-14	SC-15	SC-16	SC-17	SC-18	
	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	9/5/2008	4/19/2011	4/19/2011	1/27/2016	1/27/2016	3/6/2017	3/6/2017	3/6/2017	
TAL Metals - mg/kg																			
Aluminum	5140	6000	5130	7930	8220	9760	5710	13100	4360	5850	6870	7670	6580	6700	6100	6100	4200	3900	--
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Arsenic	4.5	5.6	5.1	4.7	6.9	10.6	10.8	6.5	4.8	13.3	4.7	4.2	6.3	6.8	7	ND	ND	ND	**16**
Barium	38.5	44.5	39.1	46.6	39.2	72.8	58.3	81.6	42.7	37.3	54.2	118	89.7	45	44	70	40	57	**350**
Beryllium	0.46	0.62	0.69	0.56	0.48	0.52	0.68	1.9	0.46	0.49	0.58	0.81	0.79	0.14	ND	ND	ND	ND	**14**
Cadmium	0.43	0.26	ND	0.34	0.65	0.58	0.55	0.3	0.57	0.39	0.65	0.65	0.53	ND	ND	0.81 J	1.0	1.0	**2.5**
Calcium	234000	202000	215000	184000	216000	123000	194000	220000	210000	161000	200000	202000	244000	160000	130000	240000	210000	210000	--
Chromium	951	590	365	385	573	296	530	566	645	436	700	525	653	380	370	640	680	690	**36**
Cobalt	3.6	4.2	4.7	4.1	7	4.4	5.5	3.8	5	7	5.3	ND	5	4.3	4.3	0.72 J	0.98 J	1.2 J	--
Copper	29.5	34.8	38.9	1900	42.8	59.7	50.7	41.9	40.7	65.1	49.8	20.8	25.4	68	57	11	11	12	**270**
Iron	113000	144000	130000	113000	239000	104000	121000	111000	160000	128000	182000	156000	147000	180000	140000	120000	120000	130000	--
Lead	60.6	67.1	59.4	84.4	40.1	142	145	80.6	104	120	138	31.5	25.1	74	120	12	7.0	11	**400**
Magnesium	34600	34000	39900	28300	30000	21300	32000	34300	28300	29400	29100	30100	30600	18000	20000	20000	24000	23000	--
Manganese	32200	25800	27100	24600	26100	23000	22800	19800	22300	20600	26600	48900	36500	19000	16000	33000	27000	29000	**2000**
Mercury	0.047	0.039	0.041	0.028	0.051	0.13	0.078	0.14	0.1	0.064	0.11	0.024	ND	0.17	0.17	ND	0.03 J	ND	**0.81**
Nickel	12.4	14.3	27.2	23.5	12.8	21	25.6	15	19.2	35	19.5	9.4	16.3	25	24	2.2	2.6	2.3	**140**
Potassium	188	261	292	434	333	630	421	628	361	337	551	344	251	470	310	470	200	190 J	--
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.3	6	ND	ND	ND	ND	ND	**36**
Silver	1.2	1	1	1.3	1.1	1.1	1	0.88	1	0.95	1.1	2.9	1.7	2.3	2.3	3.5	2.9	3.2	**36**
Sodium	154	170	164	181	198	354	210	279	174	254	173	441	225	240	150	170	150 J	110 J	--
Thallium	ND	'ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18.5	8.8	ND	ND	7.8	5.6	6.1	--
Vanadium	859	489	504	438	564	351	412	359	487	364	438	609	528	280	280	490	520	530	--
Zinc	74.1	123	80	107	78	607	655	160	137	163	138	44.1	36.7	380	110	11	5.9	14	**2200**

Notes:
1. The sample results were compared to the Part 375 Residential Soil Cleanup Objectives.

Definitions:
ppm = parts per million
TAL = Target Analyte List
ND = Parameter not detected above laboratory detection limit.
J = estimated concentration
= concetration exceeded the Part 375 Residential SCO.

TABLE 2
SUMMARY OF SPLP METALS ANALYTICAL RESULTS
NYSDEC STEEL SLAG BUD # 555-9-15
TECUMSEH REDEVELOPMENT SITE
LACKAWANA, NEW YORK

Parameter	Slag Composite Samples [1, 2]																																			
	SC-1	SC-1 DAF	SC-2	SC-2 DAF	SC-3	SC-3 DAF	SC-4	SC-4 DAF	SC-5	SC-5 DAF	SC-6	SC-6 DAF	SC-7	SC-7 DAF	SC-8	SC-8 DAF	SC-9	SC-9 DAF	SC-10	SC-10 DAF	SC-11	SC-11 DAF	SC-12	SC-12 DAF	SC-13	SC-13 DAF	SC-14	SC-14 DAF	SC-15	SC-15 DAF	SC-16	SC-16 DAF	SC-17	SC-17 DAF	SC-18	SC-18 DAF	Class GA GWQS [3]
	9/5/2008																						4/19/2011				1/27/2016				3/6/2017						(mg/L)
SPLP Metals (TAL List) - mg/L																																					
Aluminum	0.29	0.0029	0.39	0.0039	0.32	0.0032	0.4	0.004	0.36	0.0036	0.63	0.0063	0.5	0.005	0.51	0.0051	0.45	0.0045	0.46	0.0046	0.27	0.0027	0.42	0.0042	0.53	0.0053	ND	ND	0.0432	0.00043	0.262	0.00262	0.384	0.00384	0.233	0.00233	--
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0326	0.00033	ND	ND	ND	ND	ND	ND	**0.003**
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.025**
Barium	0.0073	7.3E-05	0.013	0.00013	0.035	0.00035	0.023	0.00023	0.035	0.00035	0.026	0.00026	0.036	0.00036	0.037	0.00037	0.034	0.00034	0.044	0.00044	0.052	0.00052	0.052	0.00052	0.079	0.00079	0.0034	3.4E-05	0.0083	8.3E-05	0.023	0.00023	0.051	0.00051	0.076	0.00076	**1**
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.003**
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.005**
Calcium	91.7	0.917	145	1.45	348	3.48	246	2.46	343	3.43	268	2.68	336	3.36	319	3.19	352	3.52	416	4.16	506	5.06	111	1.11	208	2.08	13.7	0.137	48.1	0.481	223	2.23	405	4.05	517	5.17	--
Chromium	0.027	0.00027	0.023	0.00023	0.026	0.00026	0.023	0.00023	0.021	0.00021	0.03	0.0003	0.029	0.00029	0.032	0.00032	0.032	0.00032	0.026	0.00026	0.022	0.00022	0.033	0.00033	0.043	0.00043	0.0032	3.2E-05	0.011	0.00011	0.03	0.0003	0.03	0.0003	0.02	0.0002	**0.05**
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Copper	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0056	5.6E-05	ND	ND	0.002	0.00002	ND	ND	**0.2**
Iron	0.13	0.0013	0.086	0.00086	0.15	0.0015	0.12	0.0012	0.077	0.00077	0.076	0.00076	0.068	0.00068	0.11	0.0011	0.2	0.002	0.19	0.0019	0.24	0.0024	0.16	0.0016	0.034	0.00034	ND	ND	0.044	0.00044	ND	ND	ND	ND	ND	ND	**0.3**
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.018	0.00018	ND	ND	ND	ND	0.0066	6.6E-05	0.0072	7.2E-05	0.005	0.00005	ND	ND	ND	ND	ND	ND	ND	ND	0.002	0.00002	0.007	0.00007	0.002	0.00002	**0.025**
Magnesium	0.25	0.0025	ND	ND	0.27	0.0027	0.22	0.0022	ND	ND	ND	ND	ND	ND	ND	ND	0.3	0.003	0.26	0.0026	0.34	0.0034	0.21	0.0021	0.28	0.0028	5.69	0.0569	0.398	0.00398	0.028	0.00028	0.028	0.00028	0.023	0.00023	**35**
Manganese	0.025	0.00025	0.014	0.00014	0.038	0.00038	0.032	0.00032	0.019	0.00019	0.016	0.00016	0.013	0.00013	0.02	0.0002	0.036	0.00036	0.041	0.00041	0.003	0.00003	0.041	0.00041	0.085	0.00085	ND	ND	0.002	0.00002	ND	ND	ND	ND	ND	ND	**0.3**
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0007**
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	0.00007	ND	ND	ND	ND	**0.1**
Potassium	0.59	0.0059	ND	ND	ND	ND	ND	ND	ND	ND	1.7	0.017	1.6	0.016	1.2	0.012	0.76	0.0076	1.3	0.013	ND	ND	ND	ND	ND	ND	0.928	0.00928	1.25	0.0125	ND	ND	ND	ND	ND	ND	--
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005	0.00005	0.003	0.00003	**0.01**
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.1**
Sodium	9.4	0.094	6.7	0.067	5.8	0.058	7	0.07	6.2	0.062	7.3	0.073	6.2	0.062	6.9	0.069	6.5	0.065	7.3	0.073	6.2	0.062	7.3	0.073	3.8	0.038	2.5	0.025	2.32	0.0232	1.68	0.0168	0.746	0.00746	1.8	0.018	**20**
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006	0.00006	ND	ND	ND	ND	**0.0005**
Vanadium	0.043	0.00043	0.013	0.00013	ND	ND	0.005	0.00005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.043	0.00043	0.0091	9.1E-05	0.0854	0.00085	0.146	0.00146	0.006	0.00006	0.002	0.00002	0.001	0.00001	--
Zinc	0.1	0.001	0.014	0.00014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.021	0.00021	ND	ND	**5**

Notes:
1. Sample results were reported as provided by the laboratories in micrograms per liter (mg/l).
2. Sample designations noted with DAF - Dilution attenuation Faction were divided by a of 100 for comparison to GWQSs.
3. NYS Ambient Water Quality Class GA Groundwater Quality Standards/Guidance Values (GWQS); NYSDEC June 1998 Division of Water Technicaland Operational Guidance Series (TOGS) 1.1.1 were converted to micrograms per lieter for comparison to the sample results.

Definitions:
ND = Parameter not detected above laboratory detection limit.
TAL - Taget Analyte List
DAF = Dilution Attenuation Factor
GWQS = Ambient Water Quality Class GA Groundwater Quality Standards/Guidance Values
J = eastimated concentration

ATTACHMENT 4
Steel Slag Beneficial Use Determination #555-9-15 Renewal Request

Waste Control Plan

ATTACHMENT 4

Waste Control Plan

Background

Tecumseh Redevelopment, Inc. (Tecumseh) has licensed the reclaiming and processing steel slag present in Slag Fill Area (SFA) Zones 3, 4 & 5 on it's property in Lackawanna, New York (See Figure 3). Iron City Reclamation LLC currently operates the slag processing facilities and sells the reclaimed slag to public and private commercial and industrial customers for their use. SFA Zones 3, 4 & 5 encompass an area of approximately 184 acres along the Lake Erie Waterfront and contain millions of cubic yards of predominantly steel-making slag. The slag was generated as a by-product from decades of former Bethlehem Steel Company basic oxygen furnace (BOF) operations through the early 1980s when steel making ceased. Steel slag reclamation activities have been occurring primarily within SFA Zone 5 for the past decade.

In support of this Beneficial Use Determination (BUD) renewal application, New York State Department of Environmental Conservation (NYSDEC) requires a Waste Control Plan to assess and verify the suitability of the steel slag material for it's intended beneficial reuse. This Waste Control Plan is for steel slag materials, excavated, processed, and stockpiled on-Site for continued sale and beneficial reuse in the future. The initial BUD approval (#555-9-15) dated July 2, 1998 had five (5) conditions that applied (paraphrased below) and are incorporated in to this Waste Control Plan.

1. The BUD applies only as long as the reclaimed steel slag does not significantly deviate in physical and/or chemical characteristics described in the BUD petition. The reclaimed slag shall be sampled and analyzed per the Steel Slag Sampling and Analysis Plan (described below).

   Steel Slag Analysis[1]**:**

   - Initial Sampling: 10 composite samples for the first 100,000 tons (i.e., 1 per 10,000 tons) of slag processed. This sampling was completed in 2008. We note that 11 samples were actually collected.

   - Subsequent Sampling: 1 composite sample for each subsequent 200,000 tons of slag processed. Composite shall consist of 5 grab samples taken at 40,000 ton intervals.
     - 2 composite samples representing 400,000 tons – April 2011
     - 2 composite samples representing 400,000 tons – January 2016

[1] Composite sample analysis list includes Target Analyte List (TAL) metals for Total Metals via EPA Method 6010C and 7471B (mercury); and TAL metals via Synthetic Precipitation Leaching Procedure (SPLP) EPA Method 1312 and analysis via EPA Method 6010C and 7471B (mercury).

- 3 composite Samples representing 600,000 tons – March 2017

Sampling completed to date has characterized 1,500,000 tons of material.

Total distributed to date since baseline sampling in 2008 is 1,063,726 tons.

- Contingency Sampling: 1 composite per 10,000 tons of slag processed. The analytical testing to date nor the NYSDEC have required contingency sampling.

2. Any material that fails to meet the characteristics of the reclaimed steel slag described in the BUD petition should be properly managed as a solid waste per 6NYCRR Part 360 regulations.
3. Tecumseh is responsible for ensuring the quality of the finished product is consistent with the data submitted and it is adequate for the intended use.
4. Annual report must be submitted to NYSDEC Division of Materials Management offices in Region 9 and Albany no later than 60 days following the last day of the year.
5. NYSDEC reserves the right to modify, suspend, or revoke this BUD at any time, should conditions warrant such action.

Analytical Testing

No modifications to the current analytical testing program or described above are proposed. The Upcoming Steel Slag Analysis will likely occur in 2019 based on production rates for the past 4 year and that sampling completed to has characterized up to 1,500,000 tons. Based on last 4 years (2014 through 2017) the average rate of steel slag production is approximately 120,000 tons/year.

Radiological Assessment

In addition to the five (5) previous conditions described above, a radiologic assessment of the slag material processed must also be completed and be deemed acceptable prior to the processed material (currently stockpiled or future processed material) being distributed into commerce. The radiological screening is described below.

Routine Field Screening

It has been estimated that during peak processing periods, approximately 2,400 tons (1,200 cubic yards) of slag material can be processed daily which equates to approximately 12,000 tons per week, 48,000 tons per month, or 480,000 tons per year (assuming 10 months of operation with a winter shutdown). There is ample room within SFA Zone 5 to establish multiple 12,000 ton stockpiles (1 week of processing). The peak processing volumes are above

the average steel slag production for the past 4 years (120,000 tons/years) but were used for a conservative approach for the routine field screening. Actual production will be based on steel slag material demand but evaluated as described below.

Radiological screening of the processed slag will be complete on each approximate 12,000-ton stockpile generated. The radiological screening will be completed via a test pad (approximately 20 feet by 10 feet by 6-inches) constructed from material representative of the approximate 12,000-ton pile. The test pad will be constructed from steel-slag material from multiple locations (4 to 5) within the stockpile being evaluated to create the test pad.

The test pad location will be a pre-determined location which will be reused for consistency purposes during the radiological screening. The test pad location will be determined based on a gamma survey walk over of the area determined to be at or below background levels for the steel slag reclamation area (3,000 to 4,000 counts per minute (cpm)). The assessment for the test pad location will be performed with a goal of finding an unbiased location to complete the radiological screening assessment of the steel-slag material. The gamma survey walk over and test pad screening will be completed by an environmental technician, under the guidance of the Certified Health Physicist (CHP) using a calibrated Ludlum model #2221 gamma scintillator with a # 44-10 probe (2x2 meter) or equivalent.

Once the test pad location is determined and deemed acceptable to NYSDEC, three (3) 1-minute measurements will be collected from the north, middle, and south portion of the test pad area to determine the gamma radiation cpm. Steel plates will then be placed on the ground to serve as a base for the test pads. The use of the steel plates will prevent placed slag from being mixed or compacted into the ground surface of the testing area and prevent over-excavation of the testing area when the test pads are removed after screening. Again, three (3), 1-minute measurements will be collected from the north, middle, and south end of the steel plates (similar to the initial locations) to determine the gamma radiation cpm. The measurements will be recorded.

To assess the potential influence from the use of the steel plates, two (2) test pads will be constructed from homogenized steel-slag material, adjacent to each other within the identified test pad area. One (1) test pad will be constructed on the steel plates and the other will be constructed on the ground surface adjacent to the steel plate test pad. Each test pad will be divided into eight (8) sectors and 1-minute counts will be measured at the approximate middle of each sector and the result recorded along with the range of the walkover survey. The results of the measurements collected prior to the construction of the test pads (e.g., ground surface and on the steel plates) and the results from the adjacent test pad measurements will be provided to NYSDEC for review in determining a maximum field screening threshold value (MFSTV) for assessing the steel-slag material.

Once the MFSTV is established, test pads will be constructed, screened (as discussed below), and evaluated against the MFSTV. Measurements below the MFSTV will constitute stockpiled steel-slag material deemed acceptable for distribution. Measurements above the MFSTV will be further assessed via analytical sampling, as discussed below. [Based on a previous test pad assessment and NYSDEC-approval, the use of a MFSTV of 5,500 cpm was considered acceptable by the Department as the threshold for evaluating the same steel slag subject to this WCP as cover material over approximately 13-acres of BCP site footprint at the end of 2017.] This value will be considered but not necessarily adopted as the MFSTV.

Each test pad will be screened with the 2x2 meter (walkover survey) to verify uniformity across the pad. The test pad will be divided into eight (8) sectors and a one-minute count will be measured at approximate the middle of each sector and the result recorded along with the range of the walkover survey. If uniformity is not observed, the 1-minute measurements will be biased to locations where elevated readings were noted during the walkover survey with a total of eight (8), 1-minute measurements collected. If the results of the 1-minute measurements are less than MFSTV, the test pad and the material represented by the test pad are considered acceptable, on a radiation basis, for distribution.

If, during routine radiologic screening, the results of the 1-minute measurements are greater than the MFSTV, a sample will be collected from the location of the material measuring greater than MFSTV. If multiple measurements exceed MFSTV, the location of the highest measurement will be sampled. The sample will be sent for Gamma spectroscopy analysis via EPA 901.1M method. A full 21-day radon progeny in-growth for Ra-226 will be performed. The gamma spectroscopy identification library will be expanded to include Ac-228 to provide an estimate of Ra-228. Additionally, isotopic uranium and isotopic thorium analysis will be completed using HASL-300 method. The stockpile associated with the test pad with elevated measurements will be flagged and will not be distributed until the results are received from the laboratory, shared with the NYSDEC and deemed acceptable. Results are considered acceptable if they are consistent with the Site background study results from 2017 (see attached table).

Processed slag deemed to be unacceptable for distribution into commerce will be staged on-site, flagged for disposal off-site, at an out-of-state disposal facility in accordance 6NYCRR Part 380.

It is estimated that approximately 164,000 tons of processed steel slag are currently stockpiled in various locations in SFA Zone 5. A similar procedure will be used to evaluate the existing processed steel slag stockpiles at the Site. Existing stockpiles will be assessed at the rate of 1 test pad per 12,000 tons of material present within the stockpile (e.g., a 164,000 ton stockpile will be assessed with 14 test pads). The analytical results from the four (4) steel slag test pad samples summarized on the attached table are representative of the steel slag currently stockpiled. Therefore, no slag sample analysis is proposed for the existing stockpiled steel slag material.

Radiological Analyses

In addition to the field screening, one (1) analytical sample will be sent for radiologic laboratory analysis every 3 months from processed material deemed acceptable via radiological screening. The sample will be collected from the test pad at whichever of the eight locations exhibits the highest 1-minute count reading and sent for Gamma spectroscopy analysis via EPA 901.1M method. A full 21-day radon progeny in-growth for Ra-226 will be performed. The gamma spectroscopy identification library will be expanded to include Ac-228 to provide an estimate of Ra-228[2]. Additionally, isotopic uranium and isotopic thorium analysis will be completed using HASL-300 method.

Processed slag deemed to be unacceptable for distribution into commerce will be staged on-site, flagged for disposal off-site, at an out-of-state disposal facility in accordance 6NYCRR Part 380.

Reporting

The Annual Report, as required by Bullet #4 of the current BUD conditions will be submitted. The results of the radiological field screening of the stockpiles generated and the routine radiological analysis will also be provided to NYSDEC in the Annual Report.

If radiological screening results are above MFSTV, NYSDEC will be notified, and the analytical sampling (discussed above) will be completed. The analytical results will be provided to NYSDEC with the field screening results within 1 week of receipt from the laboratory. Results will be considered acceptable if they are consistent with the Site background study results from 2017.

[2] We understand this method for inferring Ra-228 concentration is acceptable to the Department considering the age of the slag materials and prior use at the nearby Riverbend site in Buffalo, NY.

SUMMARY OF RADIOLOGICAL SCREENING & ANALYTICAL RESULTS
FROM BACKGROUND & STEEL SLAG TEST PADS
TECUMSEH REDEVELOPMENT INC
LACKAWANNA, NEW YORK

BACKGROUND LOCATION - 2558 HAMBURG TURNPIKE TEST PAD								
Sample ID	**2558-B**		**2558-C**		**2558-E**		**2558-G**	
Field Screen (cpm)	7,507		7,322		6,933		7,219	
Parameter	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty
Radium 226	1.57	0.367	1.31	0.257	1.14	0.35	1.097	0.302
Radium 228	0.876	0.365	1.036	0.424	1.14	0.469	0.893	0.334
Thorium 228	0.725	0.245	1.13	0.345	0.745	0.263	0.758	0.263
Thorium 230	0.803	0.256	1.04	0.32	0.714	0.246	0.645	0.23
Thorium 232	0.352	0.155	0.993	0.31	0.819	0.268	0.543	0.205
Uranium 234	0.852	0.256	1.05	0.284	0.855	0.248	0.666	0.226
Uranium 235	0.134	0.101	0.018	0.063	0.1	0.085	0.075	0.079
Uranium 238	0.897	0.26	0.838	0.246	0.799	0.237	0.969	0.282

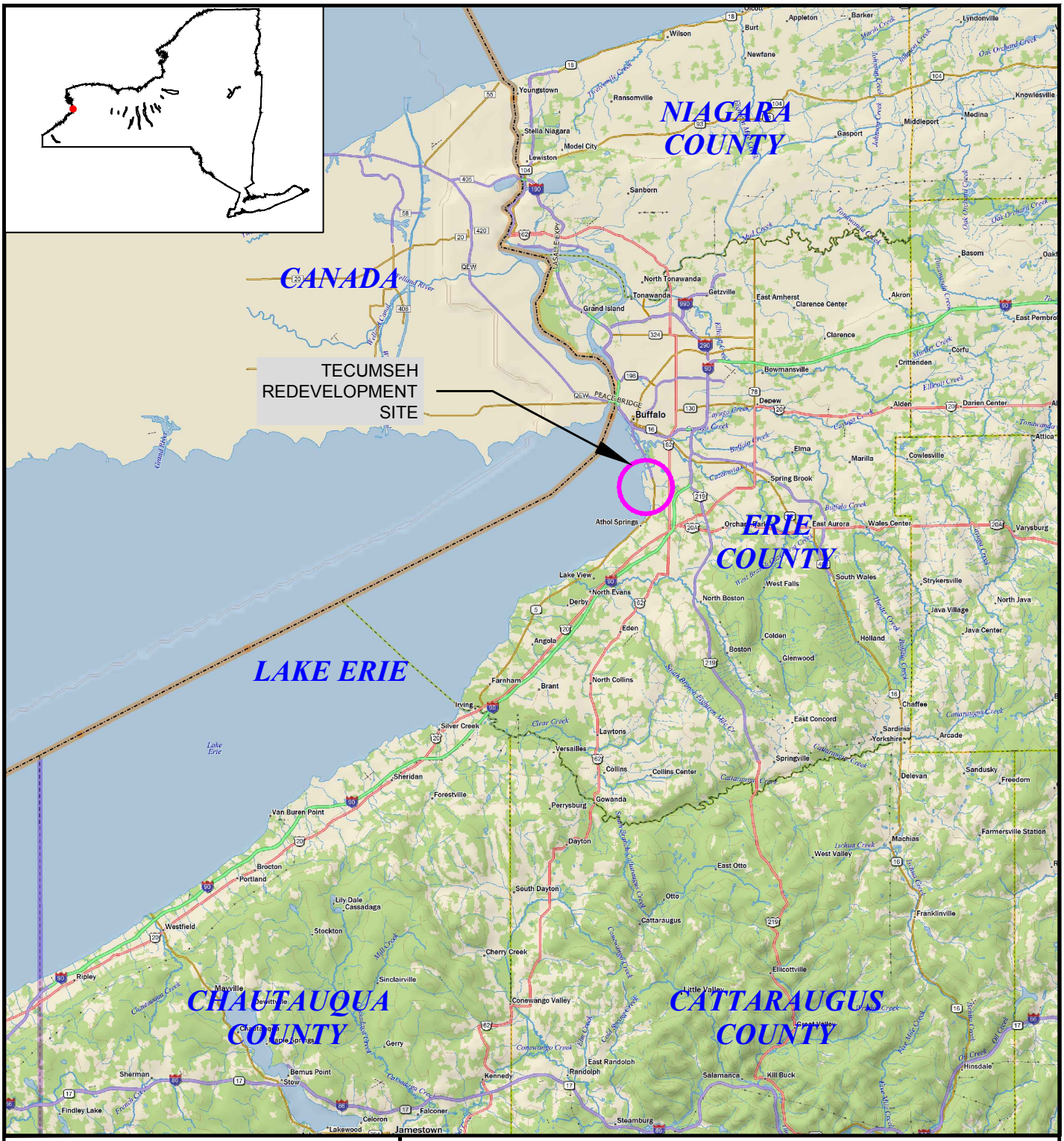
BACKGROUND LOCATION - 2424 HAMBURG TURNPIKE TEST PAD								
Sample ID	**2424-A**		**2424-B**		**2424-D**		**2424-G**	
Field Screen (cpm)	7,238		7,431		6,994		6,631	
Parameter	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty
Radium 226	1.494	0.399	1.275	0.358	1.552	0.373	1.813	0.452
Radium 228	2.23	0.644	1.634	0.455	1.685	0.431	1.657	0.602
Thorium 228	0.945	0.319	0.834	0.281	0.967	0.297	0.915	0.279
Thorium 230	1.11	0.328	1.08	0.322	1.2	0.334	0.914	0.272
Thorium 232	1.04	0.314	0.836	0.273	0.881	0.27	0.767	0.243
Uranium 234	1.15	0.315	0.884	0.259	0.899	0.25	0.979	0.261
Uranium 235	0.11	0.097	0.129	0.098	0.148	0.102	0.024	0.058
Uranium 238	0.989	0.285	1.16	0.308	0.956	0.257	1.01	0.267

STEEL SLAG AREA TEST PAD (FROM ZONE 5)								
Sample ID	**Steel Slag-A**		**Steel Slag-D**		**Steel Slag-E**		**Steel Slag-F**	
Field Screen (cpm)	3,664		3,668		3,579		3,345	
Parameter	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty
Radium 226	0.486	0.533	0.441	0.158	0.527	0.16	0.437	0.121
Radium 228	0.13	0.493	0.209	0.159	0.18	0.124	0.044	0.068
Thorium 228	0.138	0.437	0.104	0.116	0.198	0.137	0.215	0.144
Thorium 230	0.42	0.742	0.58	0.223	0.285	0.153	0.392	0.177
Thorium 232	0.037	0.383	0.105	0.09	0.099	0.085	0.049	0.064
Uranium 234	0.512	0.6	0.464	0.19	0.629	0.235	0.405	0.175
Uranium 235	0.015	0.129	0.049	0.081	0.121	0.108	0	0.077
Uranium 238	0.487	0.589	0.447	0.186	0.46	0.191	0.478	0.191

FIGURES

F:\CAD\TurnKey\Tecumseh Redevelopment\Slag BUD\BUD Renewal 2018\Figure 1; Regional Map.dwg, DWG To PDF.pc3

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0071-017-420

DATE: APRIL 2018

DRAFTED BY: RFL-CMC

SITE LOCATION AND VICINITY MAP
SFAs 3, 4, & 5

STEEL SLAG BUD RENEWAL APPLICATION

TECUMSEH REDEVELOPMENT SITE
LACKAWANNA, NEW YORK

PREPARED FOR

TECUSMEH REDEVELOPMENT INC.

F:\CAD\TurnKey\Tecumseh Redevelopment\Tenorm\Figure 2; Site Location and Vicinity Map April 2018.dwg, DWG To PDF.pc3

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- SLAG FILL AREA (SFAs) BOUNDARIES
- SLAG FILL AREAS (SFAs), ZONES 3, 4, & 5
- STEEL WINDS I & II PROPERTY

LAKE ERIE

STEEL WINDS II - NORTH
(1 existing BCP turbines)
± 1.79 ACRES WITH SOIL COVER

STEEL WINDS I
(8 existing BCP turbines)
± 29.01 ACRES WITH SOIL COVER

STEEL WINDS II - SOUTH
(4 existing BCP turbines)
± 11.9 ACRES WITH STONE COVER

SFA ZONE 1 SUB-AREA ±129.0 ACRES

SFA ZONE 2 SUBAREA ±81.71 ACRES

SFA ZONE 3 SUB-AREA ±73.0 ACRES

SFA ZONE 4 SUB-AREA ±73.1 ACRES

SFA ZONE 5 SUB-AREA ±41.8 ACRES

TANK FARM AREA ±67.58 ACRES

COAL/COKE/ORE STORAGE & COAL HANDLING SUB-AREA ±137.09 ACRES

COKE PLANT & BY-PRODUCTS FACILITIES ±45.33 ACRES

U.S.A.C.E. SEDIMENT DISPOSAL AREA

OPEN WATER

LAND

U.S. HARBOR LINE DEF. AUG. 11, 1933

BUFFALO OUTER HARBOR

TOWN OF HAMBURG / CITY OF LACKAWANNA

CITY OF LACKAWANNA / CITY OF BUFFALO

GATEWAY METROPARK SHIP CANAL

PHASE IA BPA
± 12.31 ACRES

PHASE I BPA
± 102.49 ACRES

PHASE II BPA
± 142.17 ACRES

PHASE III BPA
± 105.04 ACRES

WELDED TUBE USA
(BCP SITE NOs. C915199G & C915199H)
(± 45.15 AC)

ERIE COUNTY INDUSTRIAL DEVELOPMENT AGENCY (ECIDA)

SMOKES CREEK

N

1000' 0' 1000' 2000'

SCALE: 1 INCH = 1000 FEET
SCALE IN FEET
(approximate)

DATE: AUGUST 2009
DRAFTED BY: BCH

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

TURNKEY ENVIRONMENTAL RESTORATION, LLC

JOB NO.: 0071-017-420

SITE LOCATION MAP
SFAs 3,4, & 5

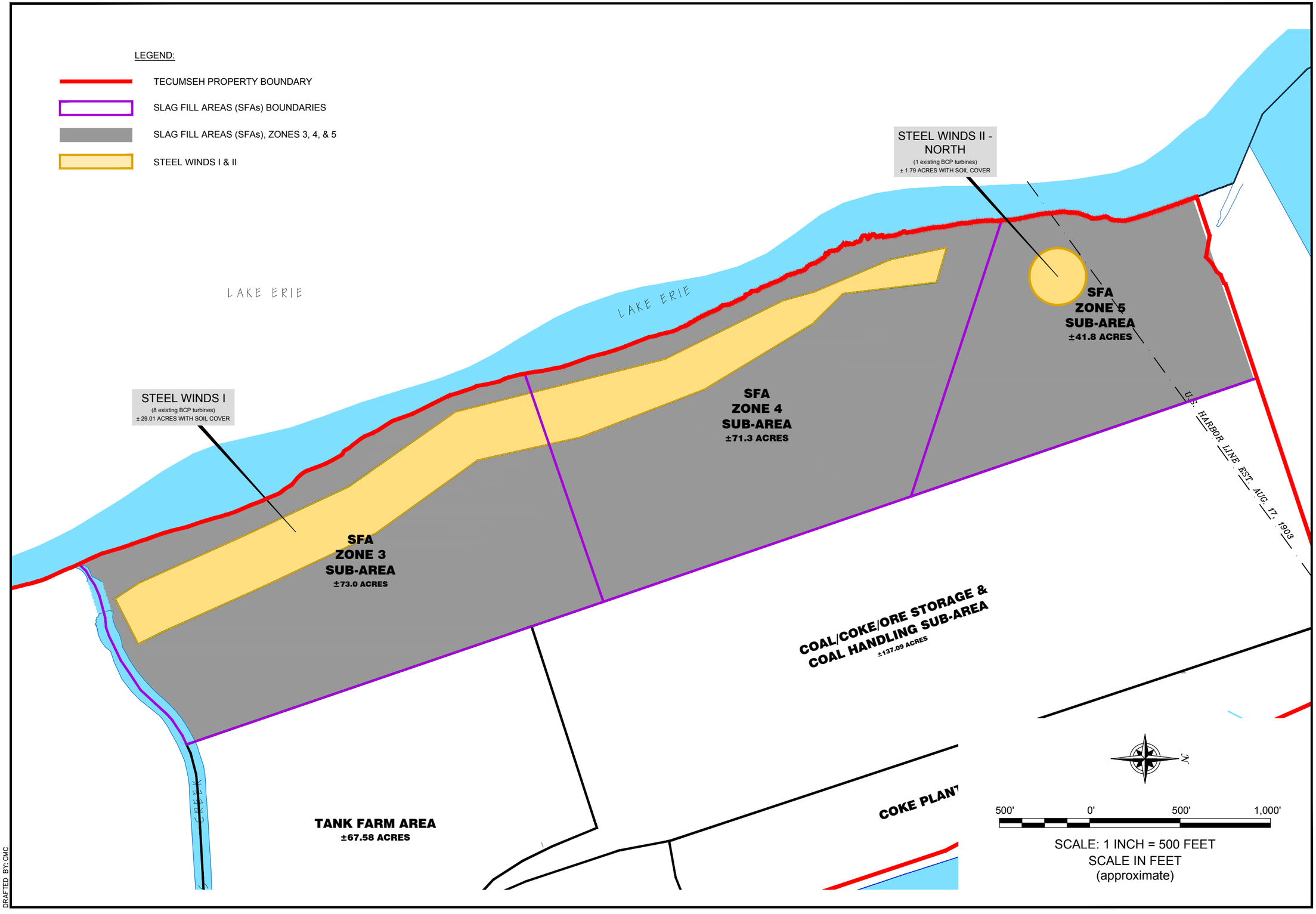
STEEL SLAG BUD RENEWAL APPLICATION

TECUMSEH REDEVELOPMENT SITE
LACKAWANNA, NEW YORK

PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 2

F:\CAD\TurnKey\Tecumseh Redevelopment\Slag BUD\BUD Renewal 2018\Figure 3 - SFAs 3,4, & 5 April 2018.dwg, DWG To PDF.pc3



DATE: APRIL 20018
DRAFTED BY: CMC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
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JOB NO.: 0071-017-420

SFAs 3, 4, & 5

STEEL SLAG BUD RENEWAL APPLICATION
TECUMSEH REDEVELOPMENT SITE
LACKAWANNA, NEW YORK

PREPARED FOR
TECUMSEH REDEVELOPMENT INC.

FIGURE 3

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 9
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October 27, 2017

Mr. Thomas Forbes, P.E.
Benchmark Environmental Engineering & Science, PLC.
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218

Dear Mr. Forbes:

Site #C915197
Tecumseh Remediation Sites
Steel Slag Use as Cover

Stockpiles of slag on the Tecumseh site were evaluated for the potential presence of Technologically-Enhanced Naturally Occurring Radioactive Material (TENORM), a regulated waste stream. The evaluation process involved creating laydown areas from two background areas and from the two types of slag (steel production and iron production) present on the site, and collecting composite samples from each of those laydown areas for analysis.

The steel slag on this site is unique in that, even though slag samples were biased high by collecting them at the areas of highest radiation readings in the laydown areas, the radiological concentrations appear to be below the average local background for Ra-226, as well as for other potentially significant NORM constituents. Background results average ~ 1.5 pCi/g for Ra-226. The steel slag averages ~ 0.5 pCi/g Ra-226, and the iron slag averages ~ 3 pCi/g. Not only does the Ra-226 results average a little more than twice the local background value for the iron slag, but three other NORM isotopes, Th-230, U-234 and U-238, also average more than twice background concentrations.

Based on this data, the steel production slag does not contain TENORM waste. Therefore, there are no limitations based on its' radiological content for use as fill on the Tecumseh property. Going forward, due to the large amount of slag and the potential for variability of radiological content, it should be screened at regular intervals to monitor for possible variability in its radiological content. As discussed, the following monitoring plan must be implemented if steel slag is to be used for cover, backfill, roads/roadbase, etc on the Tecumseh BCP or RCRA/Superfund sites.

- Gamma walk over scan of each 200x200 foot area to determine the area with highest readings.
- At the location of the highest readings in each 200x200 foot grid, a 1 minute reading shall be taken.

- If that one minute reading is below 5,500 cpm (which is approximately 1.5 times the average steel slag cpm determined from the initial test pads) then the 200x200 area is acceptable.

- If the reading is above 5,500 cpm then, based on 1 minute readings, the area exceeding 5,500 cpm will be delineated, sampled, sent to a lab to determine its radiological content (Ra-226 by 21-day in-growth) and removed into a discrete stockpile (to be assess later based on analytical data). The next highest area based on the walkover would then be checked with a 1 minute reading to verify it is below 5,500 cpm....and the process repeated.
- The monitoring must be performed by, or in the presence of, a certified radiological technician experienced in performing this type of monitoring.

Please be aware, due to the elevated radiological constituents found in the iron production slag, this slag will require further evaluation before any of it can be approved for use as fill either on the Tecumseh site or elsewhere.

If you have any questions, please feel free to give me a call at (716) 851-7220. Also, please keep Ken Martin and Maurice Moore of this office informed as this project moves forward.

Sincerely,

Chad Staniszewski, P.E.
Regional Remediation Engineer

CS/tm

cc. Michael Cruden, NYSDEC
James Strickland, NYSDEC
Eric Obrecht, NYSDEC
Timothy Rice, NYSDEC
Thomas Papura, NYSDEC
Kenneth Martin, NYSDEC
Maurice Moore, NYSDEC
Paul Werthman, Benchmark

APPENDIX D

FIELD OPERATING PROCEDURES

TurnKey Environmental Restoration, LLC

FIELD OPERATING PROCEDURES

Stockpile & Borrow Source Sampling Procedures for Physical Analysis

FOP 080.0

STOCKPILE & BORROW SOURCE SAMPLING PROCEDURES FOR PHYSICAL ANALYSIS

PURPOSE

This guideline presents a method for collecting representative soil samples from stockpiled borrow source material for physical analysis.

GENERAL

Generally, one of two methods will be utilized to collect soil samples for analysis. One method is to collect the samples by digging a series of representative test pits at the borrow source area and obtaining samples from those test pits. The other method involves collecting samples from representative stockpiles (normally after the material has been mechanically screened). Both procedures are discussed within this method.

Sample collection equipment will include stainless steel mixing bowls, stainless steel mixing spoons, and a stainless steel hand auger with extension rods or a stainless steel spade or equivalent. It may be necessary to use a backhoe or drilling rig to facilitate sample collection.

STOCKPILED SOIL SAMPLING METHOD

As shown in the attached Figure 1, twelve (12) samples of approximate equal volume should be collected from the top, middle and bottom of each 1000 CY stockpile by CQA personnel and composited in the field to give one representative aliquot per 1000 CY.

Stockpile Sampling Procedure

1. Using a shovel or backhoe, penetrate the pile to a depth of about two to three feet.
2. Collect a sample using the shovel.

3. Transfer the sample to a specially prepared mixing area.
4. Repeat Steps 1 through 3 at each 1,000 CY stockpile.
5. Mix subsamples using shovel into one homogenous mass and place in a properly labeled 5-gallon bucket. Fill each bucket completely and cover.
6. Attach a label to each container and record location referencing the stockpile identification number. The label may be made with permanent marker on the side (not top) of the container or using adhesive-back paper labels affixed to the side of the container. At a minimum, the labels should be identified with the following information:
    - Project Name
    - Sample number.
    - Initials of CQA inspector or sample collection personnel.
    - Date of collection.
    - Location of collection (i.e. stockpile I.D.)
7. Return remaining contents of composite sample to stockpile.
8. Deliver the samples to the laboratory for analysis as soon as possible.
9. All information pertinent to each sampling event should be recorded by sampling personnel in the field at the time of sample collection. Each report should correspond to each stockpile and will contain the following information:
    - Project Name
    - Sample number or numbers collected
    - Field observations.
    - Climatologic conditions.
    - Date and time of collection.
    - Approximate location of test pit.
    - Name of person who collected sample.

BORROW AREA TEST PIT SAMPLING METHOD

Prior to obtaining representative soil samples, test holes should be excavated at the borrow area to determine the actual depth and lateral extent of the borrow source soil material. A base line should then be established and a grid system staked in the field. Five samples

should be collected at equidistant locations for each 5000 cubic yards (CY) of soil designated for use in the borrow areas (at approximately mid-depth).

Borrow Area Sampling Procedure

1. Using a shovel, collect a representative sample at approximately mid-depth at each of the sampling locations representing 1000 CY of the proposed excavation area.
2. Transfer each sample into a labeled separate 5-gallon bucket. Fill each bucket completely and cover.
3. Attach a label to each container and record location referencing the established grid system in the borrow area. The label may be made with permanent marker on the side (not top) of the container or using adhesive-back paper labels affixed to the side of the container. At a minimum, the labels should be identified with the following information:
    - Project Name
    - Sample number.
    - Initials of CQA inspector or sample collection personnel.
    - Date of collection.
    - Location of collection (i.e. location of borrow area grid system location)
4. Deliver the samples to the laboratory for analysis as soon as possible.
5. All information pertinent to each sampling event should be recorded by sampling personnel in the field at the time of sample collection. Each report should correspond to each test pit and will contain the following information:
    - Project Name
    - Sample number or numbers collected
    - Field observations.
    - Climatologic conditions.
    - Date and time of collection.
    - Approximate location of test pit.
    - Name of person who collected sample.

ATTACHMENTS

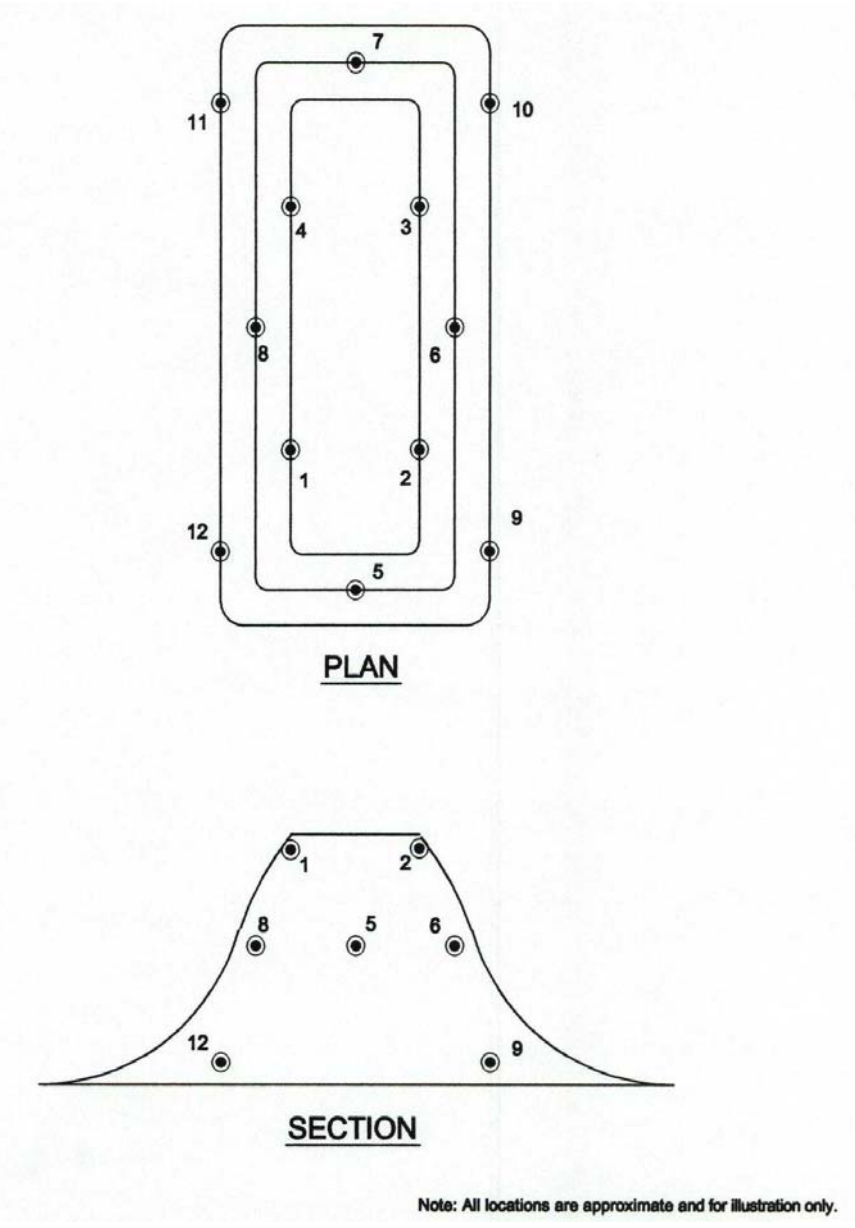
Figure 1; Stockpile Sampling Methodology

REFERENCES

None

FIGURE 4

1,000 CY STOCKPILE SAMPLING METHODOLOGY



APPENDIX E

PROJECT DOCUMENTATION FORMS

TURNKEY ENVIRONMENTAL RESTORATION, LLC

DAILY LOG	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

PROJECT NAME:	PROJECT NO.
PROJECT LOCATION:	CLIENT:
FIELD ACTIVITY:	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
A.M.:	
P.M.:	

PERSONNEL ON SITE:

SIGNATURE DATE:

(CONTINUED)

DAILY LOG	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

PROJECT NAME:	PROJECT NO.

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

SIGNATURE	DATE:

(CONTINUED)

PROJECT NAME:	PROJECT NO.

DAILY LOG				
	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

REFERENCED PROJECT FIELD FORMS:

☐ Aquifer Test Data Sheet	☐ Impacted Soil Excavation Log	☐ Soil Gas Survey Log
☐ Chain-of-Custody Form	☐ Impacted Soil Transportation Log	☐ Step-Drawdown Test Data Sheet
☐ Construction Sample Summary Log	☐ Monitoring Well Inspection Form	☐ Survey Elevation Log
☐ Corrective Measures Report	☐ Nuclear Densitometer Field Log	☐ Tailgate Safety Meeting Form
☐ Daily Drilling Report	☐ Photographic Log	☐ Test Pit Excavation Log
☐ Drilling Safety Checklist	☐ Pipe Leakage Testing Log	☐ Underground/Overhead Utility Checklist
☐ Equipment Calibration Log	☐ Post-Closure Field Inspection Report	☐ Variance Log
☐ Field Borehole Log	☐ Pressure Packer Testing Log	☐ Water Level Monitoring Record
☐ Field Borehole/Monitoring Well Installation Log	☐ Problem Identification Report	☐ Water Quality Field Collection Log
☐ Field Investigation Report	☐ Real-Time Air Monitoring Log	☐ Water Sample Collection Log
☐ Field Slug Test Log	☐ Record of Telecom Meeting	☐ Well Abandonment/Decomm. Log
☐ Groundwater Elevation Log	☐ Sample Summary Collection Log	☐ Well Completion Detail
☐ GW Well Development and Purge Log	☐ Sediment Sample Collection Log	☐
☐ Hot Work Permit	☐ Seep Sample Collection Log	☐
☐ IDW Container Log	☐ Seepage Meter Sample Collection Log	☐

SIGNATURE DATE:

DAILY LOG				
	DATE			
	REPORT NO.			
	PAGE	OF		

PROBLEM IDENTIFICATION REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

Linked to Corrective Measures Report No. *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

CORRECTIVE MEASURES REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative