Site Management Plan

NOCO #S-41 Site
BCP Site No. C915211
1055 Genesee Street
Buffalo, New York

December 2009

0112-010-300

Prepared For:

NOCO Energy Corporation

Prepared By:

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NOCO S-41 Site

ERIE COUNTY, NEW YORK

Site Management Plan

NYSDEC Site Number: C915211

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Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

DECEMBER 2009

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1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This document is required as an element of the remedial program at the NOCO S-41 Site (hereinafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP) , administered by New York State Department of Environmental Conservation (NYSDEC). The site was remediated in accordance with Brownfield Cleanup Agreement (BCA) Index #B9-0741-07-04, Site #C915211, which was executed on July 9, 2007.

1.1.1 General

NOCO Energy Corp. entered into a BCA with the NYSDEC to remediate an approximate 0.73-acre property located in the City of Buffalo, New York. This BCA, required the Remedial Party, NOCO Energy Corp., to investigate and remediate contaminated media at the Site. A figure showing the site location and boundaries of this approximate 0.73-acre "Site" is provided in Figures 1 and 2. The boundaries of the Site are more fully described in the metes and bounds site description that is part of the Environmental Easement.

After completion of the remedial work described in the Remedial Investigation/Alternatives Analysis Report/Interim Remedial Measures Work Plan, some contamination was left in the subsurface at this site, which is hereafter referred to as 'remaining contamination." This Site Management Plan (SMP) was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by Benchmark Environmental Engineering and Science, PLLC (Benchmark) on behalf of NOCO Energy Corp. (NOCO), in accordance with the

requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) that are required by the Environmental Easement for the site.

1.1.2 Purpose

The site contains contamination left after completion of the remedial action. Institutional Controls have been incorporated into the site remedy to control exposure to remaining contamination during the use of the site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Erie County Clerk, will require compliance with this SMP and all ICs placed on the site. The ICs place restrictions on site use, and mandate monitoring and reporting measures for all ICs. This SMP specifies the methods necessary ensure compliance with all ICs required by the Environmental Easement for contamination that remains at the site. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the site after completion of the Remedial Action, including: (1) implementation and management of all Institutional Controls; (2) media monitoring; and, (3) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports.

To address these needs, this SMP includes three plans: (1) an Institutional Control Plan for implementation and management of ICs; (2) a Monitoring Plan for implementation of Site Monitoring; and, (3) an Excavation Work Plan for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site.

This plan also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the environmental easement, which is grounds for revocation of the Certificate of Completion (COC);

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the BCA, (Index #B9-0741-07-04, Site #C915211) for the site, and thereby subject to applicable penalties.

1.1.3 Revisions

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

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The site is located in the City of Buffalo, County of Erie, New York and is identified as 1055 Genesee Street (SBL# 100.76-5-1) on the Erie County Tax Map. The site is an approximately 0.73-acre area bounded by Genesee Street to the north, a commercial property and Peterson Street to the south, one vacant parcel and residential property to the east, and Fillmore Avenue to the west (see Figure 2). The boundaries of the site are more fully described in the Environmental Easement (See Appendix A).

1.2.2 Site History

The site was used as a gasoline service station from approximately 1950 until 2007. Based on City of Buffalo permits and NYSDEC records reviewed, previous gas station owner/operators on-Site included Gulf Oil Corporation, Northeast Stations, Inc. and Cumberland Farms. NOCO has been site owner since approximately 1993. The Site is currently vacant and is improved with one building, which is the former convenience store building.

A Subsurface Investigation Report was completed by Sentinel Technologies, Inc. (Sentinel) in October 2004 to further investigate groundwater impacts previously identified in a tank field observation well. Ten soil borings were completed in the area of the underground storage tanks (USTs) and pump islands and in an area where impacted soil was biologically treated on-site. Groundwater samples were collected from three of the soil boring locations via temporary wells. The results of that study indicated that petroleum-related volatile organic compounds (VOCs) were present above NYSDEC Technical and

Administrative Guidance Memorandum (TAGM) 4046 Recommended Soil Cleanup Objectives (RSCOs) and groundwater quality standards (GWQS) on-site.

Benchmark completed a Supplemental Environmental Investigation on-Site in June 2006. A geophysical survey, thirteen test borings (SB-1 through SB-13) and three temporary monitoring wells (TPMW1-TPMW3) were completed in accessible areas of the subject property. No metallic objects were encountered in the area of geophysical anomalies. Soil samples detected the presence of VOCs in several soil boring locations across the site. Soil samples SB-1, SB-3, and SB-7 detected VOCs above NYSDEC RSCOs. Groundwater samples TPMW-1, TPMW-2, TPMW-3, OW-1, OW-2 and OW-3 detected VOCs above GWQS.

NOCO elected to pursue cleanup of the Site under the BCP, and executed a BCA with the NYSDEC in July 2007. A Remedial Investigation/Alternatives Analysis Report/Interim Remedial Measures (RI/AAR/IRM) Work Plan was approved in November 2007 and Benchmark performed RI/IRM activities on behalf of NOCO at the Site from February 2008 through June 2009. The IRM fieldwork, which was completed in February 2008, generally included: product dispenser island demolition; removal of UST's and product dispensers; petroleum-impacted soil excavation and off-Site disposal; groundwater extraction and treatment during soil excavation; and backfill/Site restoration. A RI was completed immediately following the IRM fieldwork to characterize the nature and extent of contamination at the Site. Remedial Investigation field activities included: soil borings; monitoring well installation; soil and groundwater sampling; and, soil gas sampling. Based on the Alternatives Analysis evaluation, it was concluded that the IRM, together with implementation of a Site Management Plan, satisfies the remedial action objectives and is protective of human health and the environment, and was selected as the final remedial approach for the NOCO #S-41 Site. The RI and IRM activities are discussed in greater detail in Sections 1.3 and 1.4.

1.2.3 Geologic/Hydrogeologic Conditions

Overburden

The U.S. Department of Agriculture Soil Conservation Service soil survey map of Erie County describes the general soil type at the Site as urban land, indicating level to gently sloping land with at least 80 percent of the soil surface covered by asphalt, concrete, buildings, or other impervious structures typical of an urban environment. The presence of overburden fill material is widespread and common throughout the City of Buffalo.

The geology at the Site is generally described as fill materials overlying dense brown/reddish-brown silty clay. The fill materials consist of silt, sand, and gravel with varying amounts of brick fragments at depths ranging from 1.5 to 8 feet below ground surface (fbgs). Much of the fill material appears to be former building materials that were left in-place prior to construction of the existing building and site features. Native materials consist of dense clay with varying amounts of sand and gravel to depths up to 20 fbgs.

Bedrock

Based on the bedrock geologic map of Erie County, the Site is situated over the Onondaga Formation of the Middle Devonian Series. The Onondaga Formation is comprised of a varying texture from coarse to very finely crystalline with a dark gray to tan color and chert and fossils within. The unit has an approximate thickness of 110 to 160 feet. Structurally, the bedrock formations strike in an east-west direction and exhibit a regional dip that approximates 40 feet per mile (3 to 5 degrees) toward the south and southwest. As a result of this dip, the older Onondaga limestone outcrops or subcrops north of the Hamilton Group. An intersecting, orthogonal patter of fractures and joint sets are common throughout the bedrock strata. The surficial geomorphology of the bedrock strata was modified by period subaerial erosion and continental glaciation. Bedrock was not encountered during RI soil boring advancement.

Hydrogeology

Groundwater within the shallow overburden zone varies in depth from 5.6 to 13.0 fbgs, as indicated by depth to water measurements recorded on June 20, 2009 from on-site monitoring wells (i.e., BCP MW-1 through BCP MW-7) and presented in Table 1. Shallow groundwater at the Site generally flows south/southeast. A groundwater flow figure is shown in Figure 3.

1.3 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

A Remedial Investigation (RI) was performed to characterize the nature and extent of contamination at the Site. The RI fieldwork was completed immediately following IRM fieldwork, which generally included: product dispenser island demolition, UST and product dispenser removal, petroleum-impacted soil excavation and off-Site disposal, groundwater

extraction and treatment during soil excavation and backfill (the IRM activities are further discussed in Section 1.4). The results of the RI are described in detail in the following report:

- Benchmark Environmental Engineering & Science, PLLC. *Remedial Investigation/Alternatives Analysis Report/Interim Remedial Measures (RI/AAR/IRM) Report, NOCO S-41 Site, Buffalo, New York*. Revised July 2009.

Remedial Investigation field activities included: soil borings, monitoring well installation; soil and groundwater sampling for VOCs, SVOCs, tetraethyl lead, metals, PCBs, pesticides, and/or herbicides; and, soil gas sampling for VOCs. Below is a summary of site conditions when the RI was performed in February 2008, and supplemented in October 2008 and June 2009. Figure 4 shows the RI sample locations. Tables 2, 3 and 4 summarize the soil, groundwater and soil gas concentrations, respectively, detected during the RI.

1.3.1 Soil

- Based on the soil data collected during the RI, concentrations of VOCs, metals, pesticides, and PCBs were below Part 375 commercial SCOs. Four SVOCs [i.e., benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene] were detected at concentrations slightly above their respective Part 375 commercial SCOs at sample location BCP MW-4 in the 0 to 4-foot interval. Based on the depth of the sample collected (i.e., 0-4 fbgs), the sample location (i.e., not in an area of historic petroleum storage), lack of elevated PID readings, as well as absence of any visual or olfactory evidence of contamination, the elevated SVOCs do not appear to be attributable to a petroleum release, but appear to be associated with the historic fill materials encountered in that sample location.

1.3.2 Site-Related Groundwater

- Based on the groundwater data collected in during the RI, residual concentrations of petroleum-related VOCs were detected in monitoring wells BCP MW-1, BCP MW-3, BCP MW-4, BCP MW-6 and BCP MW-7. One SVOC, naphthalene, was also detected in BCP MW-4 slightly above it GWQS. Metals detected at concentrations above GWQS are limited to naturally occurring minerals. The source of residual VOCs in BCP MW-6 is not known; this well is located on the northern property boundary hydraulically up-gradient of the source soils that were removed during the IRM. The petroleum-impacted soil/fill upgradient of wells BCP MW-1, BCP-MW-3, BCP MW-4 and BCP MW-7 was removed to residential SCOs as part of the IRM activities. It is noted that the residual groundwater concentrations in the wells with VOC concentrations above GWQS range from 18 ug/L to 210 ug/L total VOCs, which are significantly lower than historic concentrations of petroleum VOCs on-Site (i.e., up to 99,990 ug/L). The decrease in groundwater concentrations is attributable to the contaminant source removal (note- post-excavation confirmatory samples show excavation sidewalls and bottoms meet NYSDEC residential SCOs

for all sample locations and also meet unrestricted SCOs, with minor exceptions as shown on Table 5), and extraction and treatment of impacted groundwater during the IRM. As the on-Site UST system and petroleum-impacted source soils have been removed, these concentrations will continue to naturally attenuate over time. It is also noted that there were no detections of VOCs in groundwater above GWQS in BCP-MW-2, which is the hydraulically down-gradient monitoring well. Overall, the groundwater data indicates: a potential off-site source of on-Site petroleum VOCs in groundwater; a significant decrease of petroleum VOCs concentrations in the monitoring wells with the highest residual impacts (i.e., BCP MW-3, BCP MW-4 and BCP MW-6) from the February 2008 to the June 2009 sampling events; and, an overall decrease in dissolved-phase VOCs.

1.3.3 Site-Related Soil Vapor Intrusion

- Based on the soil vapor data collected during the RI, primary constituents of concern (COCs) detected in the soil vapor samples included benzene, ethylbenzene, toluene, and xylene (BTEX), MtBE and 1,3,5-trimethylbenzene. However, concentrations of COCs were also detected in the ambient air sample. One chlorinated VOC (PCE) was detected in SV-2, located on the northern property boundary, at a concentration of 23 ug/m^3, below the NYSDOH indoor air guideline of 100 ug/m^3. However, PCE was also detected in the ambient air sample. NYSDEC and NYSDOH do not currently have standards, criteria or guidance values for concentrations of petroleum compounds in soil vapor. The highest individual COC concentration was 90 ug/m^3 toluene. Published studies regarding transport of petroleum VOCs (e.g., Hers et al, 2006 (Ref. 7)) have shown that petroleum compounds subject to aerobic degradation, such as the Site COCs, have low soil gas to indoor air attenuation factors and are much less likely to cause indoor air concerns compared to chlorinated VOCs. Furthermore, the NYSDOH has indicated that, based on the low levels of VOCs in groundwater and soil gas samples, a subslab depressurization system is not required at the Site.

1.4 SUMMARY OF REMEDIAL ACTIONS

The site was remediated in accordance with the NYSDEC-approved Remedial Investigation/Alternatives Analysis Report/Interim Remedial Measures (RI/AAR/IRM) Work Plan dated November 2007. The following is a summary of the Remedial Actions performed at the site:

- Removal of three 8,000-gallon fiberglass-reinforced plastic gasoline USTs, four product dispensers and associated underground product piping, and demolition of the product dispenser canopy. Approximately 1,054-gallons of gasoline/water mixture was extracted from the USTs and disposed of at

Environmental Products and Services of Vermont, Inc. facility in Syracuse, New York. The area of the former UST System is shown on Figures 4 and 5.

- Excavation of approximately 1,212 tons of non-hazardous petroleum-impacted soil/fill followed by off-site transportation and disposal at Modern Landfill in Model City, New York. The excavation in the product dispenser island area was completed to approximately four fbgs and the excavation in the UST area was completed to approximately 12 fbgs. Fifteen post-excavation confirmation samples were collected and analyzed for NYSDEC STARS List VOCs, semi-volatile organic compounds (SVOCs), and lead; all post-excavation soil sample results were below 6NYCRR Part 375 Commercial Soil Cleanup Objectives (SCOs). The results of the post-excavation soil samples compared to the SCOs for the primary COCs and applicable land use for this site is provided in Table 5. The excavated area is shown on Figure 5.
- Extraction and treatment of approximately 17,790-gallons of groundwater from the excavation during remediation activities. The treated water was discharged to the City of Buffalo Municipal Sewer with permission from the Buffalo Sewer Authority.
- Placement and compaction of approximately 1,431 tons of 2" crusher run stone backfill from the Buffalo Crushed Stone, Inc. quarry in Lancaster, NY to pre-existing grade.
- Execution and recording of an Environmental Easement to restrict land use and prevent future exposure to any contamination remaining at the site.
- Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional Controls, (2) monitoring, (3) future excavations and (4) reporting;

Remedial activities were completed at the site February 2008 (excavation, soil removal, groundwater extraction and treatment, site restoration).

1.4.1 Site-Related Treatment Systems

No long-term treatment systems were installed as part of the site remedy.

1.4.2 Remaining Contamination

The contamination remaining at the Site includes certain SVOCs, xylene, certain pesticides and certain metals that exceed the Track 1 (unrestricted) SCOs as summarized in Table 6 and located within the approximate areas shown on Figure 6. The SVOC-impacted soil/fill observed in the area of BCP MW-4, which is representative of typical urban fill encountered throughout the City of Buffalo, is estimated to extend to a maximum depth of approximately 4.0 fbgs and is located beneath asphalt pavement. The other contaminants are also located within the upper approximately 5.0 fbgs and located beneath the existing pavement and clean imported gravel. Residual concentrations of petroleum VOCs in groundwater are summarized in Table 5.

2.0 INSTITUTIONAL CONTROL PLAN

2.1 INTRODUCTION

2.1.1 General

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

2.1.2 Purpose

This plan provides:

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

2.3 INSTITUTIONAL CONTROLS

A series of Institutional Controls is required to: (1) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (2) limit the use and development of the site to commercial uses only. Adherence to these Institutional Controls on the site is required by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns;
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

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

The site has a series of Institutional Controls in the form of site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The property may only be used for commercial use provided that the long-term Institutional Controls included in this SMP are employed.
- The property may not be used for a higher level of use, such as unrestricted or restricted residential use without additional remediation and amendment of the Environmental Easement, as approved by the NYSDEC;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- The use of the groundwater underlying the property is prohibited without treatment rendering it safe for intended use;
- Vegetable gardens and farming on the property are prohibited;

- The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

2.3.1 Excavation Work Plan

The site has been remediated for commercial use. Any future intrusive work that may encounter or disturb the remaining contamination will be performed in compliance with the Excavation Work Plan (EWP) that is in Section 3.0. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) (a sample HASP is attached as Appendix B to this SMP that is in current compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations) and Community Air Monitoring Plan (CAMP) (see Appendix B-1) prepared for the site. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP may need to be updated/modified in the future. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 6).

The site owner and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings).

2.4 INSPECTIONS AND NOTIFICATIONS

2.4.1 Inspections

Inspections of all remedial components installed at the site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- If Institutional Controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system;

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 4). The reporting requirements are outlined in the Periodic Review Reporting section of this plan (Section 6).

2.4.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 15-day advance notice of any proposed ground-intrusive activities pursuant to the Excavation Work Plan.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

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

2.5 CONTINGENCY PLAN

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions. These conditions are addressed in the Emergency Response Plan (ERP) included as Attachment B-1 to the HASP.

This Contingency Plan, a summary of the ERP, describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This Contingency Plan also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance the Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to the qualified environmental professional. These emergency contact lists must be maintained in an easily accessible location at the site.

Table 7: Emergency Contact Numbers

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

Table 8: Contact Numbers

Michael Lesakowski Qualified Environmental Professional	Work: (716) 856-0599 Mobile: (716) 818-3954
Bryan C. Hann Site Safety and Health Officer (SSHO)	Work: (716) 856-0635 Mobile: (716) 870-1165
Richard L. Dubisz Alternate SSHO	Work: (716) 856-0635 Mobile: (716) 998-4334

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

2.5.2 Map and Directions to Nearest Health Facility

Site Location: 1055 Genesee Street, Buffalo, New York

Nearest Hospital Name: Buffalo General Hospital

Hospital Location: 100 High Street, Buffalo, New York

Hospital Telephone: (716) 859-5600

Directions to the Hospital:

1. Go west on Genesee Street.
2. Bear right on High Street.
3. End at 100 High Street (hospital on right)

Total Distance: 1.3 miles

Total Estimated Time: 5 minutes

Figure 7 is a Hospital Route Map.

2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan (Table 7). The list will also be posted prominently at the site and made readily available to all personnel at all times.

3.0 EXCAVATION WORK PLAN

3.1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the Department. Currently, this notification will be made to:

Mr. Martin Doster, P.E.
Regional Hazardous Waste Remediation Engineer
NYSDEC – Region 9
270 Michigan Ave.
Buffalo, NY 14203-2999

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for site re-grading, intrusive elements or utilities to be installed, estimated volumes of contaminated soil (if any) to be excavated;
- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work,
- A summary of the applicable components of this EWP,
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120,
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the HASP provided in Appendix B of this document,
- Identification of disposal facilities for potential waste streams,
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

3.2 SOIL SCREENING METHOD

Visual, olfactory and instrument-based soil screening will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (remaining contamination). Soil screening will be

performed regardless of when the invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal, material that requires testing, material that can be returned to the subsurface, and material that can be used without restriction.

3.3 STOCKPILE METHODS

Material that requires testing and/or off-Site disposal will be placed on and covered with polyethylene sheeting to prevent infiltration of precipitation and wind erosion. If off-Site disposal of the material is planned, the stockpiled impacted material will be characterized per the requirements of a permitted disposal facility. Stockpiled impacted material will not remain on-site for more than 90 days. Upon obtaining an approved waste profile, the impacted material will be transported and disposed of off-Site.

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

3.4 MATERIALS EXCAVATION AND LOAD OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

3.5 MATERIALS TRANSPORTED OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

The truck transport route is as follows:

<u>To Model City Landfill, 4746 Model City Rd., Model City, NY</u>

- From the Site, go north on Fillmore Ave.
- Turn left (west) on Best Street.
- Merge onto NY-33/Kensington Expressway
- Merge onto NY-198W/Scajaquada Expressway
- Merge onto 190N toward Niagara Falls
- Take Exit 25A/RT 265.

- Turn left on RT 265.
- Turn right onto Upper Mountain Rd.
- Turn left onto Indian Hill Rd.
- End at 4746 Model City Rd.

All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and, (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site. Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance, when feasible. Due to limited available space at the Site, some off-site queuing of trucks may be necessary. The number and duration of trucks lined up outside the Site entrance will be minimized through efficient scheduling and staging at a remote location.

3.6 MATERIALS DISPOSED OFF-SITE

All soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

3.7 MATERIALS REUSE ON-SITE

"Reuse on-site" means reuse on-Site of material that originates at the Site and which does not leave the site during excavation. The criteria under which soil/fill originating on-Site may be used as on-Site are presented below.

- **Excavated, Non-Impacted On-Site Soil/Fill:** Non-impacted soil/fill (i.e., soil/fill that does not exhibit visible or olfactory evidence of contamination and does not exhibit PID readings that exceed 5 parts per million above background) that is excavated from the Site may be used on-site as backfill without special handling. The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site.
- **Excavated, Potentially Impacted On-Site Soil/Fill:** Potentially impacted soil/fill (i.e., soils that exhibit visible or olfactory evidence of contamination or with elevated PID readings) may not be used on-site unless tested and determined to meet the chemical criteria for commercial SCOs per Part 375. Excavated on-site material, including historic fill and contaminated soil, is acceptable for re-use on-site.
- **On-Site Demolition Material:** Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

3.8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including excavation dewatering, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, and monitoring well purge and development fluids will not be recharged back to the land surface or subsurface of the site without a written request to the Department seeking permission to discharge.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

3.9 BACKFILL FROM OFF-SITE SOURCE

The criteria under which off-site material may be used as subgrade backfill are presented below.

- **Off-Site Soil/Fill:** Off-site soil/fill may be used as subgrade backfill provided that it originates from known sources having no evidence of disposal or releases of hazardous substances; hazardous, toxic or radioactive wastes; or petroleum, and is tested and meet the criteria shown on Table 9. In addition, no off-site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2 (a) shall be used as backfill. The criteria presented in Table 9 represent the lesser of Commercial Soil Cleanup Objectives (SCOs) or levels protective of groundwater quality as published in 6NYCRR Part 375-6.8.
- **Other Off-Site Material:** Certain material may be imported, without chemical testingprovided it contains less than 10% (by weight) material that would pass through a size 200 sieve: 1) Rock or stone, consisting of virgin material from a permitted mine or quarry; 2) Recycled concrete, brick, or asphalt from a NYSDEC-registered or permitted C&D debris processing facility (as specified in Section 360-16.1 of 6 NYCRR Part 360) that conforms to Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2002). As stated in Section 360-16.4(b)(2), the facility may only accept recognizable, uncontaminated, non-pulverized C&D debris or C&D debris from other authorized C&D processing facilities. According to Section 360-16.2(c), "uncontaminated" means C&D debris that is not mixed or commingled with other solid waste at the point of generation, processing, or disposal, and that is not contaminated with spills of a petroleum product, hazardous waste, or industrial waste.

Off-site borrow soils shall be tested to assure conformance with the criteria identified on Table 9. If an off-site soil/fill borrow source is of unknown origin or originates from a commercial, industrial or urban site, then a tiered approach based on the volume of impacted soil/fill being excavated will be used to determine the frequency of characterization sampling. In such instances, a minimum of one sample will be collected for each 250 cubic yards (CY) up to 1,000 CY of material excavated. If more than 1,000 CY of soil/fill are excavated from the same general vicinity and all samples of the first 1,000 CY meet the criteria listed in Table 9, the sample collection frequency may be reduced to one sample for each additional 1,000 CY of soil/fill from the same general vicinity, up to 5,000 CY. For borrow sources greater than 5,000 CY, sampling frequency may be reduced to one sample per 5,000 CY, provided all earlier samples met Table 9 criteria.

For off-site soil borrow sources originating from known, virgin sources, a similar sampling frequency as described above will be employed but initial sampling will be at a frequency of one per 1,000 CY in lieu of one per 250 CY.

Grab samples will be collected for VOC analysis. For all other required analyses, a minimum of four grab samples will be collected to form a single composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (e.g., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed . The soil/fill samples will be analyzed for TCL VOCs, TCL SVOCs, pesticides, PCBs, RCRA metals, and cyanide in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory.

Analytical results must be maintained on file for review in support of the periodic institutional control certification required per the Environmental Easement.

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 9. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

3.10 STORMWATER POLLUTION PREVENTION

If construction activities disturb more than 1 acre of land, the Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. seq.) and the New York State

Environmental Conservation Law (Article 17, Titles 7 and 8, and Article 70) would apply. As the Site is less than one-acre in size, these regulations do not apply.

3.11 CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the periodic reports prepared pursuant to Section 6 of the SMP.

3.12 COMMUNITY AIR MONITORING PLAN

The New York State Department of Health's Generic Community Air Monitoring Plan requires monitoring for volatile organic compounds and particulates. As detailed in Appendix B-1, the following criteria shall also be adhered to for the protection of the nearby community.

Organic Vapor Community Air Monitoring:

Community air monitoring for organic vapors will be performed at the downwind perimeter of the exclusion zone on a continuous basis during intrusive activities performed outdoors that may be reasonably expected to potentially release organic vapors, or when sustained readings are detected in the work zone (i.e., proximate to the source of the intrusive activity). Otherwise, the monitoring will be performed on an hourly basis. A photoionization detector or other equipment will be suitable to the types of contaminants known or suspected to be present will be used, and will be capable of calculating 15-minute

running average concentrations. All air monitoring equipment will be calibrated at least daily and an upwind concentration will be taken at least daily to establish background conditions. The 15-minute average concentrations will be compared to the levels specified below.

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

  - All Emergency Response Contacts as listed in the HASP (Appendix B) and the Emergency Response Plan (Attachment B-1 to the HASP) will be advised.
  - The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.
  - Air monitoring will be continued at 1/2 the distance from the exclusion zone to the nearest receptor.

All readings will be recorded and will be available for NYSDEC and NYSDOH personnel to review.

Explosive Vapor Community Air Monitoring

Explosive vapor community air monitoring will be performed at the downwind perimeter of the site on a continuous basis whenever sustained atmospheric concentrations of greater than 10% of the LEL are recorded in the exclusion zone. If sustained atmospheric concentrations of greater than 10% LEL are recorded at the downwind site perimeter, the local Fire Department will be contacted (see Section 2.5.1 of the SMP for phone number).

Airborne Particulate Community Air Monitoring

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be

performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in Figure 8. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and downwind monitoring station. One sensitive receptor, a residence, is located southeast of the site. Therefore, a fixed monitoring station will be located at the Site/adjacent property boundary during all intrusive activities regardless of the actual wind direction.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

3.13 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site. Specific odor control methods to be used on a routine basis are described below. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be

notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the property owner's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

3.14 DUST CONTROL PLAN

Particulate monitoring will be performed at the Site during subgrade excavation, grading, and handling activities in accordance with the NYSDOH Generic Community Monitoring Plan, as described above in Section 3.12, and NYSDEC Technical Assistance and Guidance Memorandum (TAGM) 4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (see Appendix B-2). Dust suppression techniques will be employed as necessary to mitigate fugitive dust from non-vegetated or disturbed soil/fill during post-remediation construction and redevelopment.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.

- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Covering or proof-rolling excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

3.15 OTHER NUISANCES

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances. At a minimum, this shall include limiting construction to typical daylight work hours.

4.0 SITE MONITORING PLAN

4.1 INTRODUCTION

4.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the site, and all affected site media identified below. This Monitoring Plan may only be revised with the approval of NYSDEC.

4.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance, particularly ambient groundwater standards;
- Assessing achievement of the remedial performance criteria.
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems (e.g., well logs);
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Semi-annual monitoring of the performance of the remedy and overall reduction in contamination on-site will be conducted for the first two years. The frequency thereafter will be determined by NYSDEC. Trends in contaminant levels in groundwater in the

affected areas, will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in Table 10 and outlined in detail in Sections 4.2 and 4.3 below.

Table 10: Monitoring/Inspection Schedule

Monitoring Program	Frequency*	Matrix	Analysis
Groundwater	Semi-annual	Groundwater	TCL plus NYSDEC STARS List VOCs

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

4.2 MEDIA MONITORING PROGRAM

4.2.1 Groundwater Monitoring

Groundwater monitoring will be performed on a periodic basis to assess the performance of the remedy. A network of monitoring wells has been installed to monitor site groundwater. Specifically, monitoring wells BCP MW-1 through BCP MW-7 will be sampled and analyzed on a semi-annual basis for 2 years (4 events). Samples will be collected and analyzed as discussed below. After 2 years of monitoring, a request to the NYSDEC can be made to reduce or eliminate the monitoring requirement, if groundwater concentrations fall to within one order of magnitude of the Class GA groundwater quality standards and guidance values (GWQS/GV) per NYSDEC Technical Operations and Guidance Series (TOGS) 1.1.1, and the data do not indicate an increasing trend in contaminant concentration. Table 1 summarizes well construction and water elevation measurements from the June 2009 sampling event. Figure 3 is a groundwater isopotential map showing the approximate direction of groundwater flow based on elevation data collected during the June 2009 sampling event and shows the locations of the monitoring wells to be sampled. Monitoring well construction logs are included in Appendix C.

The sampling frequency may be modified with the approval of NYSDEC. The SMP will be modified to reflect changes in sampling plans approved by NYSDEC.

Deliverables for the groundwater monitoring program are specified below.

4.2.1.1 Sampling Protocol

All monitoring well sampling activities will be recorded in a field book and a groundwater sampling log presented in Appendix D. Other observations (e.g., well integrity, etc.) will be noted on the well sampling log. The well sampling log will serve as the inspection form for the groundwater monitoring well network.

Each groundwater sample will be collected via standard low-flow purge and sample methods per the RI Work Plan and analyzed in the field for water quality parameters (i.e., pH, conductivity, temperature, turbidity, and dissolved oxygen) and in the laboratory for Target Compound List (TCL) plus NYSDEC STARS List VOCs via USEPA Method 8260B.

Laboratory samples will be transported under chain-of-custody command to an Environmental Laboratory Approval Program (ELAP)-certified laboratory. The laboratory data package will be a Category A deliverable, however, the NYSDEC may request, at any time, to upgrade the deliverables to Category B.

Benchmark's Field Operating Procedure (FOP) entitled "Low-Flow Groundwater Purging and Sampling Procedures," is provided in Appendix E. In the event well conditions do not allow for low-flow sampling (e.g., due to poor/slow well recovery), Benchmark will implement bailer purge and sample procedures in accordance with our FOP entitled "Groundwater Purging Procedures Prior to Sample Collection." Regardless of purge procedure, Benchmark's FOP entitled "Groundwater Sample Collection Procedures" will also be followed.

4.2.1.2 Monitoring Well Repairs, Replacement and Decommissioning

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent periodic report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because

they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

4.3 SITE-WIDE INSPECTION

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect monitoring devices. During these inspections, an inspection form will be completed (Appendix F). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and,
- Confirm that site records are up to date.

4.4 MONITORING QUALITY ASSURANCE/QUALITY CONTROL

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the RI/AAR/IRM Work Plan in November 2007 (see Appendix G). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
    - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
    - Sample holding times will be in accordance with the NYSDEC ASP requirements (analyses will be performed in accordance with USEPA SW-846 methodology).
    - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Custody;
- Calibration Procedures:
    - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.

  - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Preparation of a Data Usability Summary Report (DUSR), which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

4.5 MONITORING REPORTING REQUIREMENTS

Forms and any other information generated during regular monitoring events and inspections will be kept on file by the Site owner or its designated representative. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of this SMP.

All monitoring results will be reported to NYSDEC on a periodic basis in the Periodic Review Report. A letter report will also be prepared, if required by NYSDEC, subsequent to each sampling event. The reports will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (e.g., groundwater);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria, and trend analysis;
- A figure illustrating sample type and sampling locations;

- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether groundwater conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in Table 11 below.

Table 11: Schedule of Monitoring/Inspection Reports

Task	Reporting Frequency*
Groundwater Sampling	Semi-annually - 60 days following sampling event
Periodic Certification (PRR)	Annual

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC

5.0 OPERATION AND MAINTENANCE PLAN

5.1 INTRODUCTION

The site remedy does not rely on any mechanical systems, such as sub-slab depressurization systems or air sparge/ soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

6.0 INSPECTIONS, REPORTING AND CERTIFICATIONS

6.1 SITE INSPECTIONS

6.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedule provided in Section 4.0 Monitoring Plan. At a minimum, a site-wide inspection will be conducted annually. Inspections of remedial components will also be conducted when a breakdown of any treatment system component has occurred or whenever a severe condition has taken place, such as an erosion or flooding event, that may affect the existing monitoring wells.

6.1.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms for their respective system which are contained in Appendix D (Groundwater Monitoring Log). Additionally, a general site-wide inspection form will be completed during the site-wide inspection (see Appendix F). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format in the Periodic Review Report.

6.1.3 Evaluation of Records and Reporting

The results of the inspection and site monitoring data will be evaluated as part of the IC certification to confirm that the:

- ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- The site remedy continues to be protective of public health and the environment and is performing as designed in the RI/AAR/IRM Work Plan and FER.

6.2 CERTIFICATION OF INSTITUTIONAL CONTROLS

After the last inspection of the reporting period, a qualified environmental professional will prepare the following certification:

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

- The inspection of the site to confirm the effectiveness of the institutional controls required by the remedial program was performed under my direction;
- The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;
- Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- Use of the site is compliant with the environmental easement;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and
- The information presented in this report is accurate and complete.
- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative]
- No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and

Every five years the following certification will be added:

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

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

6.3 PERIODIC REVIEW REPORT

A Periodic Review Report will be submitted to the Department every year, beginning eighteen months after the Certificate of Completion is issued. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in Section 1.2.1. The report will be prepared in accordance with NYSDEC DER-10 and submitted within 45 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ICs required by the remedy for the site;
- Results of the required annual site inspections and severe condition inspections, if applicable;
- All applicable inspection forms and other records generated for the site during the reporting period in electronic format;
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- A site evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the site-specific RAWP, or Decision Document;

- The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
- Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
- Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
- The overall performance and effectiveness of the remedy.

The Periodic Review Report will be submitted, in hard-copy and electronic formats, to the Regional Office Department Project Manager.

6.4 CORRECTIVE MEASURES PLAN

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

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

GROUNDWATER ELEVATION MEASUREMENTS

Site Management Plan
NOCO S-41 Site

Monitoring Location	Grade Elevation [2]	TOR Elevation [2]	March 2008		May 2008		October 2008		June 2009	
			DTW	GWE	DTW	GWE	DTW	GWE	DTW	GWE
MW-1	100.42	99.98	10.35	89.63	10.30	89.68	9.96	90.02	9.33	90.65
MW-2	99.38	99.16	12.36	86.80	12.31	86.85	12.04	87.12	13.00	86.16
MW-3	99.74	99.36	8.80	90.56	8.76	90.60	8.49	90.87	7.80	91.56
MW-4	100.77	100.16	10.90	89.26	10.78	89.38	10.10	90.06	8.40	91.76
MW-5	100.81	100.35	8.90	91.45	8.88	91.47	8.45	91.90	8.28	92.07
MW-6	99.98	99.63	5.86	93.77	5.80	93.83	5.71	93.92	5.55	94.08
MW-7 [6, 7]	--	--	NA	NA	NA	NA	NA	NA	11.10	NA

Notes:

1. All wells were surveyed on 3/04/08 with a site specific datum of 100 feet.
2. All elevations are measured in feet; distance above mean sea level.
3. DTW = depth to water, measured in feet below top of riser
4. TOR = top of riser
5. GWE = calculated groundwater elevation, measured in feet above mean sea level
6. Monitoring location MW-7 was installed August 2008.
7. Monitoring location MW-7 was not surveyed.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2
SOIL BORING ANALYTICAL DATA SUMMARY
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

SITE MANAGEMENT PLAN
NOCO SITE #S-41
1055 GENESEE STREET
BUFFALO, NEW YORK

Parameter [1]	Boring Locations							Commercial SCOs [4] (ppm)	Unrestricted SCOs [4] (ppm)
	BCP MW-1 (0-5')	BCP MW-2 (0-2')	BCP MW-3 (0-4')	BCP MW-4 (0-4')	BCP MW-5 (0-4')	BCP MW-6 [2] (0-4')	DUP [3] (0-4')		
8260B Full List Volatile Organic Compounds (VOCs) - mg/kg [5]									
Acetone	0.007 J	ND	0.008 J	ND	0.009 J	ND	ND	**500**	**0.05**
n-Butylbenzene	ND	ND	ND	ND	0.001 J	ND	ND	**500**	**12**
Ethylbenzene	0.002 J	ND	ND	ND	ND	ND	ND	**390**	**1**
Methylene chloride	0.01	0.009	0.008	0.012	0.01	ND	ND	**500**	**0.05**
Toluene	0.003 J	ND	ND	ND	ND	ND	ND	**500**	**0.7**
1,2,4-Trimethylbenzene	0.007	ND	ND	ND	0.004 J	ND	ND	**190**	**3.6**
1,3,5-Trimethylbenzene	0.002 J	ND	ND	ND	0.001 J	ND	ND	**190**	**8.4**
Total Xylene	0.013 J	ND	ND	ND	ND	ND	ND	**500**	**0.26**
Total VOCs	0.044	0.009	0.016	0.012	0.025	0	0	**--**	**--**
TCL Semi-Volatile Organic Compounds (SVOCs) - mg/kg [5] ***(Base/Neutral Compounds)***									
Acenaphthene	ND	ND	NA	0.88 J	NA	NA	NA	**500**	**20**
Acenaphthylene	ND	ND	NA	0.28 J	NA	NA	NA	**500**	**100**
Anthracene	ND	0.1 J	NA	2.7 J	NA	NA	NA	**500**	**100**
Benzo(a)anthracene	**1.8 J**	0.52 J	NA	**8.2**	NA	NA	NA	**5.6**	**1**
Benzo(b)fluoranthene	ND	0.58 J	NA	**8.9**	NA	NA	NA	**5.6**	**1**
Benzo(k)fluoranthene	ND	0.23 J	NA	**3.5 J**	NA	NA	NA	**56**	**0.8**
Benzo(g,h,i)perylene	ND	0.38 J	NA	5.4	NA	NA	NA	**500**	**100**
Benzo(a)pyrene	ND	0.48 J	NA	**7.2**	NA	NA	NA	**1**	**1**
Carbazole	ND	0.05 J	NA	1.2 J	NA	NA	NA	**--**	**--**
Chrysene	ND	0.53 J	NA	**7.9**	NA	NA	NA	**56**	**1**
Dibenzo(a,h)anthracene	ND	0.1 J	NA	**1.5 J**	NA	NA	NA	**0.56**	**0.33**
Dibenzofuran	ND	ND	NA	0.73 J	NA	NA	NA	**--**	**--**
Fluoranthene	3.5 J	1.1	NA	20	NA	NA	NA	**500**	**100**
Fluorene	ND	ND	NA	1.4 J	NA	NA	NA	**500**	**30**
Indeno(1,2,3-cd)pyrene	ND	0.32 J	NA	**5**	NA	NA	NA	**5.6**	**0.5**
2-Methylnaphthalene	ND	ND	NA	ND	NA	NA	NA	**--**	**--**
Naphthalene	ND	ND	NA	ND	NA	NA	NA	**500**	**12**
Phenanthrene	2.1 J	0.74 J	NA	14	NA	NA	NA	**500**	**100**
Pyrene	2.4 J	0.9 J	NA	14	NA	NA	NA	**500**	**100**
Total SVOCs	9.8	6.0	0	103	0	0	0	**--**	**--**
PCBs/Pesticides- mg/kg [5]									
4,4'-DDD	**0.14 J**	ND	NA	ND	NA	NA	NA	**92**	**0.0033**
4,4'-DDE	**0.1 J**	ND	NA	ND	NA	NA	NA	**62**	**0.0033**
4,4'-DDT	**0.17 J**	ND	NA	**0.11 J**	NA	NA	NA	**47**	**0.0033**
Aroclor 1260	0.036 J	ND J	NA	ND J	NA	NA	NA	**--**	**0.1**

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2
SOIL BORING ANALYTICAL DATA SUMMARY
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

SITE MANAGEMENT PLAN
NOCO SITE #S-41
1055 GENESEE STREET
BUFFALO, NEW YORK

Parameter [1]	Boring Locations							Commercial SCOs [4] (ppm)	Unrestricted SCOs [4] (ppm)
	BCP MW-1 (0-5')	BCP MW-2 (0-2')	BCP MW-3 (0-4')	BCP MW-4 (0-4')	BCP MW-5 (0-4')	BCP MW-6 [2] (0-4')	DUP [3] (0-4')		
TAL Metals - mg/kg									
Aluminum	4680	10300	NA	4670	NA	NA	NA	--	--
Arsenic	3.8	6.5	NA	5.5	NA	NA	NA	**16**	**13**
Barium	70.4 N J	112 N J	NA	105 N J	NA	NA	NA	**400**	**350**
Beryllium	0.75	0.52	NA	0.27	NA	NA	NA	**590**	**7.2**
Cadmium	ND	ND	NA	0.87	NA	NA	NA	**9.3**	**2.5**
Calcium	192000 *	43600 E	NA	13800 E	NA	NA	NA	--	--
Chromium, trivalent	5.1	14.8	NA	10.4	NA	NA	NA	**1500**	**30**
Cobalt	1.8	7.3	NA	4.5	NA	NA	NA	--	--
Copper	8.7	36.2	NA	31.7	NA	NA	NA	**270**	**50**
Iron	5410 N*J	16600 N*J	NA	10600 N*J	NA	NA	NA	--	--
Lead	37.2 N J	**129 N J**	**66 N**	**337 N J**	**493 N**	**130**	**71.1**	**1000**	**63**
Magnesium	6860 N* J	16400 N* J	NA	4310 N* J	NA	NA	NA	--	--
Manganese	383 *	395 *	NA	190 *	NA	NA	NA	**10000**	**1600**
Mercury	ND	**0.231**	NA	**1.2**	NA	NA	NA	**2.8**	**0.18**
Nickel	6.5 E J	16.3 E J	NA	11.7 E J	NA	NA	NA	**310**	**30**
Potassium	696	2020	NA	790	NA	NA	NA	--	--
Sodium	596	179	NA	ND	NA	NA	NA	--	--
Vanadium	8.3	21.5	NA	10.8	NA	NA	NA	--	--
Zinc	23.8	**122**	NA	**351**	NA	NA	NA	**10000**	**109**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. BCP MW-6 was mislabeled on the chain-of-custody as BCP MW-8.
3. Blind duplicate collected from BCP MW-6.
4. Values per NYSDEC Part 375 Soil Cleanup Objectives (December 2006)
5. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparison to SCOs.

Definitions:

ND = Parameter not detected above laboratory detection limit.
NA = Sample not analyzed for parameter.
"--" = No SCO available.
B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.
* = Indicates the spike or duplicate analysis is not within the quality control limits.
N = Indicates spike sample recovery is not within the quality control limits.
E = Indicates value estimated or not reported due to the presence of interferences.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.

BOLD = Result exceeds Part 375 restricted-commercial SCO.

BOLD = Result exceeds Part 375 unrestricted SCO.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 3
GROUNDWATER ANALYTICAL DATA SUMMARY

SITE MANAGEMENT PLAN
NOCO SITE #S-41
1055 GENESEE STREET
BUFFALO, NEW YORK

Parameter [1]	Well Locations														Class GA GWQS [2]
	BCP MW-1		BCP MW-2		BCP MW-3		BCP MW-4		BCP MW-5		BCP MW-6		BCP MW-7		
	2/29/08	6/17/09	2/29/08	6/17/09	2/29/08	6/17/09	2/29/08	6/17/09	2/29/08	6/17/09	2/29/08	6/17/09	8/12/08	6/17/09	
Volatile Organic Compounds (VOCs) - ug/L															
Acetone	ND	ND	ND	ND	4 J	ND	ND	ND	ND	ND	ND	ND	ND	14	**50**
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**18 NJ**	ND	ND	**1.2**	**1**
2-Butanone (MEK)	ND	ND	ND	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	**50**
Carbon disulfide	5	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	**--**
Cyclohexane	ND	ND	ND	ND	0.8 J	ND	ND	ND	ND	ND	ND	ND	ND	0.61 J	**--**
Ethylbenzene	ND	ND	ND	ND	**25**	ND	**26**	ND	ND	ND	ND	ND	ND	ND	**5**
Isopropylbenzene (Cumene)	ND	ND	ND	ND	**8**	3.8	**9**	ND	ND	ND	ND	ND	ND	ND	**5**
Methylcyclohexane	ND	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	**--**
Methyl tert butyl ether (MTBE)	1	**13**	ND	ND	**11**	**130 D**	ND	**18**	6 J	3.2	**370**	**210**	ND	2.3	**10**
Toluene	ND	ND	ND	ND	**8**	ND	**14**	ND	ND	ND	**49**	ND	ND	ND	**5**
m/p-Xylenes	ND	ND	ND	ND	**69**	ND	**56**	ND	ND	ND	ND	ND	ND	ND	**5**
o-Xylenes	ND	ND	ND	ND	**35**	ND	**100**	ND	ND	ND	ND	ND	ND	ND	**5**
n-Butylbenzene	ND	ND	ND	ND	0	2.4	ND	ND	ND	ND	ND	ND	ND	ND	**5**
n-Propylbenzene	ND	ND	ND	ND	**14**	**5.3**	**10**	ND	ND	ND	ND	ND	ND	ND	**5**
p-Cymene (p-isopropyltoluene)	ND	ND	ND	ND	5	1.8	ND	ND	ND	ND	ND	ND	ND	ND	**5**
1,2,4-Trimethylbenzene	ND	ND	ND	ND	**120 D**	ND	**36**	ND	ND	ND	ND	ND	ND	ND	**5**
1,3,5-Trimethylbenzene	ND	ND	ND	ND	**42**	1.4	**40**	ND	ND	ND	ND	ND	ND	ND	**5**
sec-Butylbenzene	ND	ND	ND	ND	5	2.4	ND	ND	ND	ND	ND	ND	ND	ND	**5**
Total TCL plus STARS VOCs	6	13	0	0	361	147	291	18	6	3.2	437	210	0	18.1	
Semi-Volatile Organic Compounds (SVOCs) - ug/L															
Acenaphthene	ND	NA	NA	NA	NA	NA	1 J	NA	NA	NA	ND	NA	NA	NA	**20**
1,1'-Biphenyl	0.3 J	NA	NA	NA	NA	NA	4 J	NA	NA	NA	0.2 J	NA	NA	NA	**5**
Carbazole	0.2 J	NA	NA	NA	NA	NA	0.6 J	NA	NA	NA	ND	NA	NA	NA	**--**
Dibenzofuran	0.5 J	NA	NA	NA	NA	NA	0.8 J	NA	NA	NA	0.3 J	NA	NA	NA	**--**
Di-n-butylphthalate	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	**50**
Diethylphthalate	0.9 J	NA	NA	NA	NA	NA	0.3 J	NA	NA	NA	ND	NA	NA	NA	**50**
2,4-Dimethylphenol	ND	NA	NA	NA	NA	NA	7	NA	NA	NA	ND	NA	NA	NA	**50**
Fluorene	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	0.3 J	NA	NA	NA	**50**
2-Methylnaphthalene	0.7 J	NA	NA	NA	NA	NA	33 J	NA	NA	NA	ND	NA	NA	NA	**--**
2-Methylphenol (o-Cresol)	ND	NA	NA	NA	NA	NA	1 J	NA	NA	NA	1 J	NA	NA	NA	**--**
4-Methylphenol (p-Cresol)	ND	NA	NA	NA	NA	NA	0.6 J	NA	NA	NA	2 J	NA	NA	NA	**--**
Naphthalene	0.3 J	NA	NA	NA	NA	NA	**32**	NA	NA	NA	0.4 J	NA	NA	NA	**10**
Phenanthrene	2 J	NA	NA	NA	NA	NA	2 J	NA	NA	NA	2 J	NA	NA	NA	**50**
Total TCL SVOCs	4.9	NA	NA	NA	NA	NA	49.3	NA	NA	NA	6.2	NA	NA	NA	
TAL Metals - ug/L															
Aluminum	ND	NA	NA	NA	NA	NA	**212**	NA	NA	NA	ND	NA	NA	NA	**100**
Barium	34.4	NA	NA	NA	NA	NA	36.8	NA	NA	NA	189	NA	NA	NA	**1000**
Calcium	87000	NA	NA	NA	NA	NA	67300	NA	NA	NA	300000	NA	NA	NA	**--**
Iron	180	NA	NA	NA	NA	NA	234	NA	NA	NA	**529**	NA	NA	NA	**300**
Magnesium	**104000**	NA	NA	NA	NA	NA	**95600**	NA	NA	NA	**125000**	NA	NA	NA	**35000**
Manganese	159	NA	NA	NA	NA	NA	158	NA	NA	NA	288	NA	NA	NA	**300**
Potassium	3090ENJ	NA	NA	NA	NA	NA	2680ENJ	NA	NA	NA	31300ENJ	NA	NA	NA	**--**
Sodium	**96000**	NA	NA	NA	NA	NA	**68800**	NA	NA	NA	**777000**	NA	NA	NA	**20000**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in table; all other compounds reported as non-detect.

2. Regulatory limits are NYSDEC Class "GA" Groundwater Quality Standards (GWQS) as published in NYSDEC Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June 1998).

Definitions:

ND = Parameter not detected above laboratory detection limit.
NA = Sample not analyzed for parameter.
"--" = No guidance value available.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.
D = All compounds were identified in an analyisis at the secondary dilution factor.
N = Indicates spike sample recovery is not within the quality control limits.
E = Indicates value estimated or not reported due to the presence of interferences.
BOLD = Result exceeds NYSDEC Class GA Groundwater Quality Standard.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 4
SUMMARY OF SOIL VAPOR ANALYTICAL RESULTS

SITE MANAGEMENT PLAN
NOCO SITE #S-41
1055 GENESEE STREET
BUFFALO, NEW YORK

Parameter [1]	Sample Location				
	SV-1	SV-2	SV-3	DUP [2]	AMBIENT
TCL Volatile Organic Compounds (VOCs) - ug/m [3]					
Benzene	1.8	15	0.61 J	23 J	0.61
1,3-Butadiene	ND	0.93	ND	ND	ND
Chloroform	0.83	ND	ND	ND	ND
Cyclohexane	1.4	5.5	ND J	62 J	0.65
Ethylbenzene	ND	2.6	ND J	12 J	ND
4-Ethyltoluene	ND	2.7	ND J	2.7 J	ND
n-Heptane	1.6	6.1	ND J	70 J	1.1
n-Hexane	1.9	6.7	ND J	160 J	ND
Methyl tert-Butyl Ether	ND	1.8	ND	ND	ND
Tetrachloroethene	ND	23	ND	ND	1.4
Toluene	3.2	21	2.5 J	90 J	3.1
Trichlorofluoromethane	1.3	1.2	0.96 J	ND J	1.0
1,3,5-Trimethylbenzene	ND	1.3	ND	ND	ND
2,2,4-Trimethylpentane	1.5	3.8	1.4 J	47 J	1.7
Xylene (m,p)	2.1	7.8	ND J	28 J	1.9
Xylene (o)	0.83	3.0	ND J	19 J	ND
Xylene (total)	3.0	11	ND J	48 J	2.0

Notes:

1. Only those compounds detected above the laboratory reporting limit are presented in this table.
2. Duplicate of SV-3.

Definitions:

ND = Not detected above laboratory detection limits.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 5
POST-EXCAVATION SOIL ANALYTICAL DATA SUMMARY

SITE MANAGEMENT PLAN
NOCO SITE #S-41
1055 GENESEE STREET
BUFFALO, NEW YORK

Parameter [1]	Sample Locations															Commercial SCOs [3] (ppm)	Unrestricted SCOs [3] (ppm)
	UST Area					Pump Island Area							Product Piping				
	UST 1- S1	UST 1-S2	UST 1-S3	UST 1-S4 [2]	UST 1-F1	PI-S1	PI-S2	PI-S3	PI-S4	PI-S5	PI-F1	PI-F2	Pipe 1	Pipe 2	Pipe 3		
STARS List Volatile Organic Compounds (VOCs) - mg/kg [4]																	
Benzene	ND	0.001 J	ND	ND	ND	ND	0.059	ND	0.002 J	ND	ND	ND	0.014	0.02	0.008	**44**	**0.06**
Ethylbenzene	ND	0.028	ND	ND	ND	ND	0.31	ND	0.002 J	ND	ND	0.012	0.068	0.087 DJ	0.08	**390**	**1**
Isopropylbenzene (Cumene)	ND	0.004 J	ND	ND	ND	ND	0.14	ND	0.003 J	ND	ND	0.007	0.01	0.042	0.012	**--**	**--**
n-Butylbenzene	ND	0.014	ND	0.002 J	ND	ND	0.25	ND	0.001 J	ND	ND	0.016	0.016	0.08	0.018	**500**	**12**
n-Propylbenzene	ND	0.016	ND	ND	ND	ND	0.58	ND	0.006	ND	ND	0.035	0.044	0.19	0.045	**500**	**3.9**
p-Cymene (p-isopropyltoluene)	ND	ND	ND	ND	ND	ND	0.02 J	ND	ND	ND	ND	ND	0.001 J	0.006	0.003 J	**--**	**--**
sec-Butylbenzene	ND	0.003 J	ND	ND	ND	ND	0.055	ND	ND	ND	ND	0.009	0.004 J	0.018	0.004 J	**500**	**11**
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**500**	**5.9**
1,2,4-Trimethylbenzene	ND	0.12	0.003 J	0.005 J	ND	0.001 J	0.16 D	ND	0.026	ND	ND	0.044	0.14	0.35 D	0.15	**190**	**3.6**
1,3,5-Trimethylbenzene	ND	0.036	ND	0.001 J	ND	ND	0.38	ND	0.006	ND	ND	ND	0.035	0.12 DJ	0.048	**190**	**8.4**
Total Xylene	ND	0.07	ND	ND	ND	ND	0.42	ND	0.013 J	ND	ND	0.007 J	0.093	0.13 DJ	0.09	**500**	**0.26**
Methyl tert butyl ether (MTBE)	0.037	0.04	0.18	0.5 D	0.35 D	0.002 J	ND	ND	ND	ND	0.006	ND	0.012	0.12	0.028	**190**	**0.93**
Toluene	ND	ND	ND	ND	ND	0.001 J	0.009 J	ND	ND	ND	ND	0.003 J	0.003 J	0.004 J	0.002 J	**500**	**0.7**
Total VOCs	0.037	0.332	0.183	0.508	0.35	0.004	2.383	0	0.059	0	0.006	0.133	0.44	1.167	0.488	**--**	**--**
STARS List Semi-Volatile Organic Compounds (SVOCs) - mg/kg																	
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**500**	**100**
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J	ND	ND	ND	ND	ND	**500**	**20**
Anthracene	ND	ND	ND	ND	ND	0.04 J	ND	0.016 J	ND	0.095 J	ND	ND	ND	ND	ND	**500**	**100**
Benzo(a)anthracene	ND	ND	ND	ND	0.0064 J	0.11 J	0.022 J	0.076 J	0.13 J	0.5	0.0081 J	ND	ND	ND	ND	**5.6**	**1**
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	0.11 J	0.023 J	0.076 J	0.098 J	0.56	ND	ND	ND	ND	ND	**5.6**	**1**
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	0.028 J	0.011 J	0.026 J	ND	0.16 J	ND	ND	ND	ND	ND	**56**	**0.8**
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	0.058 J	0.02 J	0.046 J	0.06 J	0.34 J	ND	ND	ND	ND	ND	**500**	**100**
Benzo(a)pyrene	ND	ND	ND	ND	ND	0.085 J	0.02 J	0.064 J	0.092 J	0.45	ND	ND	ND	ND	ND	**1**	**1**
Chrysene	ND	ND	ND	ND	ND	0.098 J	0.021 J	0.065 J	0.11 J	0.42	ND	ND	ND	ND	ND	**56**	**1**
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	0.02 J	ND	0.011 J	ND	0.1 J	ND	ND	ND	ND	ND	**0.56**	**0.33**
Fluoranthene	ND	ND	ND	ND	ND	0.22	0.034 J	0.12 J	0.18 J	0.82	ND	ND	ND	ND	ND	**500**	**100**
Fluorene	ND	ND	ND	ND	ND	0.02 J	ND	ND	ND	0.021 J	ND	ND	ND	ND	ND	**500**	**30**
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	0.048 J	0.015 J	0.043 J	0.052 J	0.3 J	ND	ND	ND	ND	ND	**5.6**	**0.5**
Naphthalene	ND	0.012 J	ND	ND	ND	ND	0.012 J	0.0082 J	ND	0.04 J	ND	ND	0.074 J	0.13 J	0.036 J	**500**	**12**
Phenanthrene	ND	ND	0.0064 J	ND	0.0061 J	0.19 J	0.023 J	0.074 J	0.13 J	0.41	ND	ND	ND	ND	ND	**500**	**100**
Pyrene	ND	ND	ND	ND	ND	0.2 J	0.028 J	0.11 J	0.16 J	0.67	ND	ND	ND	ND	ND	**500**	**100**
Total SVOCs	0	0.012	0.0064	0	0.0125	1.227	0.229	0.7352	1.012	5.066	0.0081	0	0.074	0.13	0.036	**--**	**--**
Total Lead - mg/kg																	
Lead	13.2	14.7	12.5	11.3	11.3	275	25.3	32.5	198	94.3	15.3	20.7	23.4	12.6	14.5	**1000**	**63**

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Blind Duplicate was taken on UST 1-S4.
3. Values per NYSDEC Part 375 Soil Cleanup Objectives (December 2006).
4. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparison to SCOs.

Definitions:

ND = Parameter not detected above laboratory detection limit.
NA = Sample not analyzed for parameter.
"--" = No SCO available.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
D = All compounds were identified in an analyisis at the secondary dilution factor.
Exceeds NYSDEC Part 375 SCOs for Unrestricted standards

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 6
RI/IRM SOIL ANALYTICAL DATA SUMMARY
ANALYTES ABOVE NYSDEC PART 375 UNRESTRICTED SOIL CLEANUP OBJECTIVES

SITE MANAGEMENT PLAN
NOCO SITE #S-41
1055 GENESEE STREET
BUFFALO, NEW YORK

Parameter	Sample Locations										Unrestricted SCOs [1] (ppm)
	BCP MW-1 (0-5')	BCP MW-2 (0-2')	BCP MW-3 (0-4')	BCP MW-4 (0-4')	BCP MW-5 (0-4')	BCP MW-6 [2] (0-4')	PI-S1	PI-S2	PI-S4	PI-S5	
Volatile Organic Compounds (VOCs) - mg/kg											
Total Xylene	0.013 J	ND	ND	ND	ND	ND	ND	**0.42**	0.013 J	ND	**0.26**
Semi-Volatile Organic Compounds (SVOCs) - mg/kg											
Benzo(a)anthracene	**1.8 J**	0.52 J	NA	**8.2**	NA	NA	0.11 J	0.022 J	0.13 J	0.5	**1**
Benzo(b)fluoranthene	ND	0.58 J	NA	**8.9**	NA	NA	0.11 J	0.023 J	0.098 J	0.56	**1**
Benzo(k)fluoranthene	ND	0.23 J	NA	**3.5 J**	NA	NA	0.028 J	0.011 J	ND	0.16 J	**0.8**
Benzo(a)pyrene	ND	0.48 J	NA	**7.2**	NA	NA	0.058 J	0.02 J	0.06 J	0.34 J	**1**
Chrysene	ND	0.53 J	NA	**7.9**	NA	NA	0.098 J	0.021 J	0.11 J	0.42	**1**
Dibenzo(a,h)anthracene	ND	0.1 J	NA	**1.5 J**	NA	NA	0.02 J	ND	ND	0.1 J	**0.33**
Indeno(1,2,3-cd)pyrene	ND	0.32 J	NA	**5**	NA	NA	0.048 J	0.015 J	0.052 J	0.3 J	**0.5**
PCBs/Pesticides- mg/kg											
4,4'-DDD	**0.14 J**	ND	NA	ND	NA	NA	NA	NA	NA	NA	**0.0033**
4,4'-DDE	**0.1 J**	ND	NA	ND	NA	NA	NA	NA	NA	NA	**0.0033**
4,4'-DDT	**0.17 J**	ND	NA	**0.11 J**	NA	NA	NA	NA	NA	NA	**0.0033**
TAL Metals - mg/kg											
Lead	37.2 N J	**129 N J**	**66 N**	**337 N J**	**493 N**	**130**	**275**	**25.3**	**198**	**94.3**	**63**
Mercury	ND	**0.231**	NA	**1.2**	NA	NA	NA	NA	NA	NA	**0.18**
Zinc	23.8	**122**	NA	**351**	NA	NA	NA	NA	NA	NA	**109**

Notes:

1. Values per NYSDEC Part 375 Soil Cleanup Objectives (December 2006)

Definitions:

ND = Parameter not detected above laboratory detection limit.
NA = Sample not analyzed for parameter.
N = Indicates spike sample recovery is not within the quality control limits.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.

BOLD = Result exceeds Part 375 unrestricted SCO.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 9

CRITERIA FOR IMPORTED SOIL

NOCO S-41 Site
Buffalo, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 9

CRITERIA FOR IMPORTED SOIL

NOCO S-41 Site
Buffalo, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

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TABLE 9

CRITERIA FOR IMPORTED SOIL

NOCO S-41 Site
Buffalo, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[1]	19
Chromium, Trivalent[1]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.02
Beta-BHC	0.09
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102

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TABLE 9

CRITERIA FOR IMPORTED SOIL

NOCO S-41 Site
Buffalo, New York

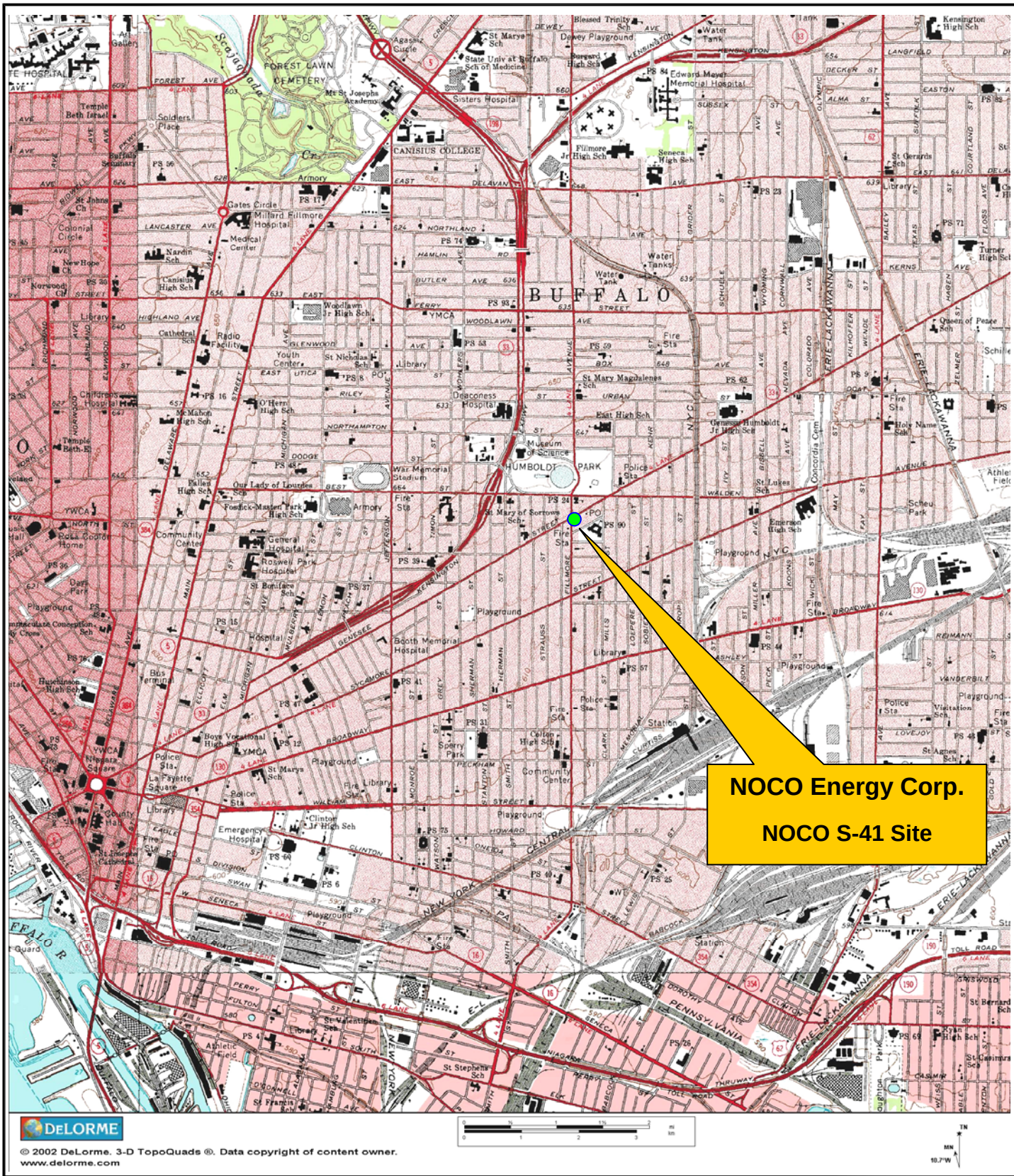
Parameter	Allowable Concentration of Imported Soil/Fill
PCBs/Pesticides (mg/kg)	
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Notes:

1. The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

FIGURE 1



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SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0112-010-300

DATE: JULY 2009

DRAFTED BY: NTM

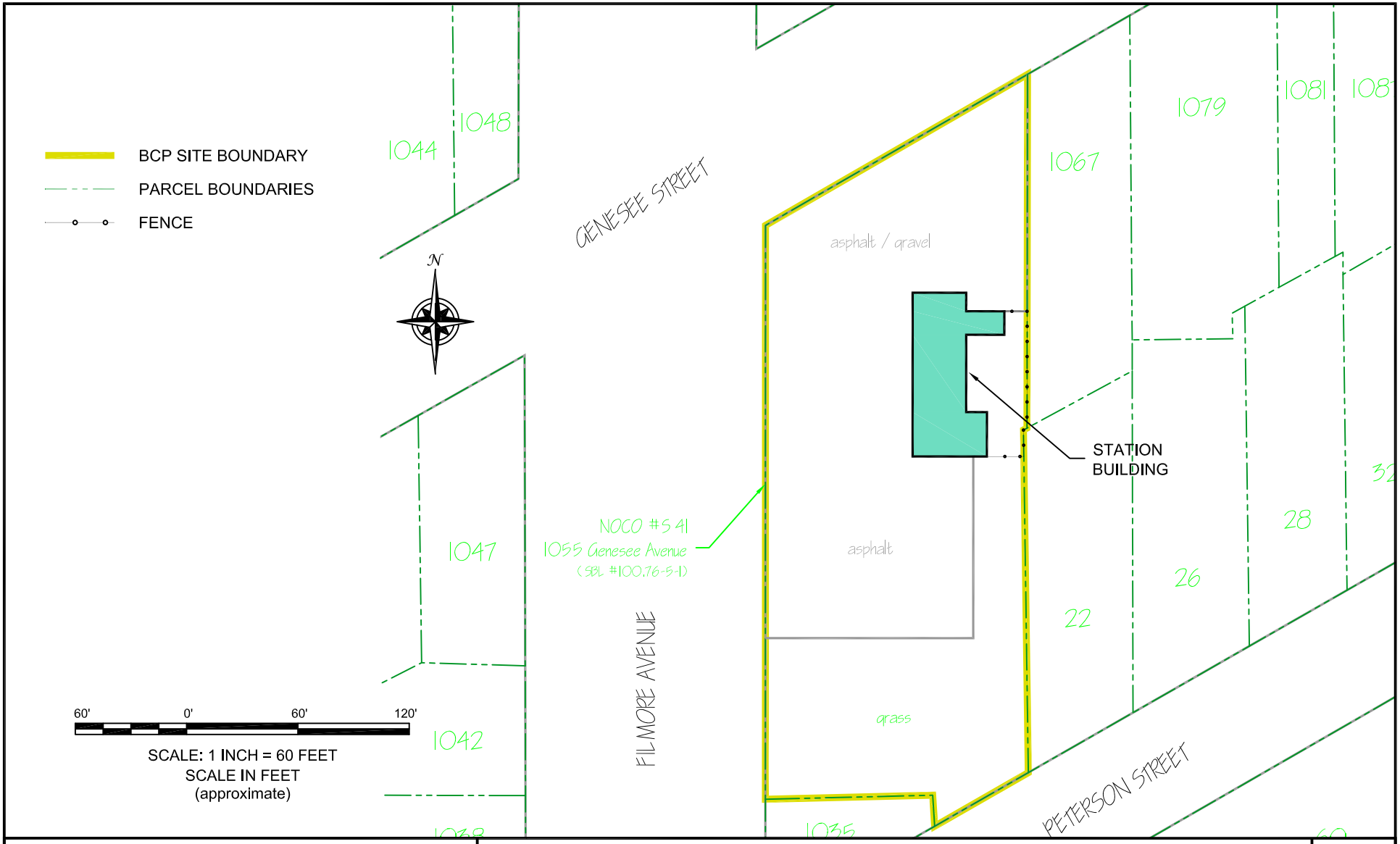
SITE LOCATION AND VICINITY MAP

SITE MANAGEMENT PLAN

NOCO S-41 SITE
BCP SITE No. C915211
BUFFALO, NEW YORK

PREPARED FOR

NOCO ENERGY CORPORATION



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SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0112-010-300

DATE: JULY 2009

DRAFTED BY: BCH/NTM

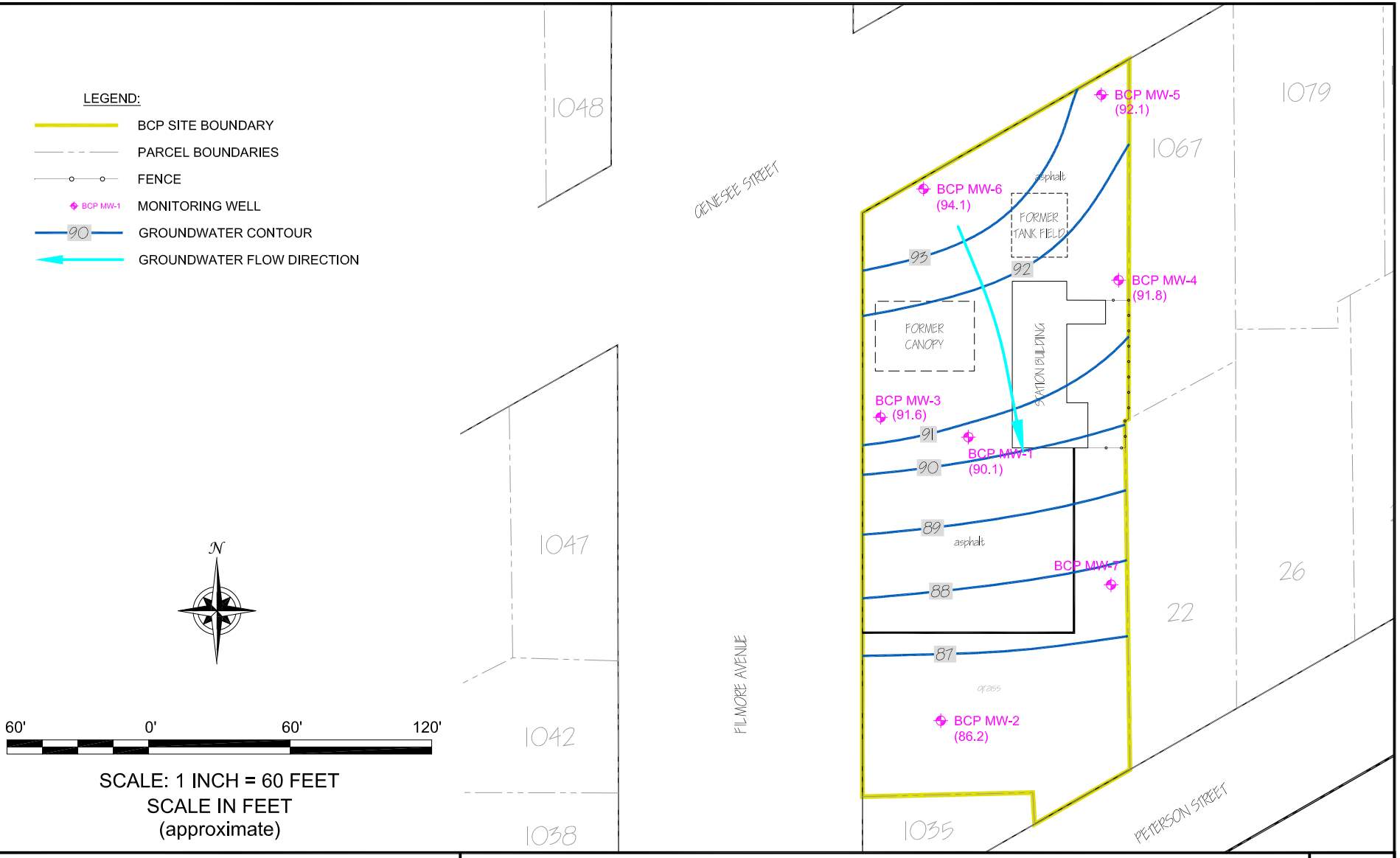
SITE PLAN

SITE MANAGEMENT PLAN

NOCO #S 41
BCP SITE No. C915211
BUFFALO, NEW YORK

PREPARED FOR
NOCO ENERGY CORPORATION

FIGURE 2



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DATE: JULY 2009

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GROUNDWATER ISOPOTENTIAL MAP

SITE MANAGEMENT PLAN

NOCO #S 41 SITE
BCP SITE No. C915211
BUFFALO, NEW YORK

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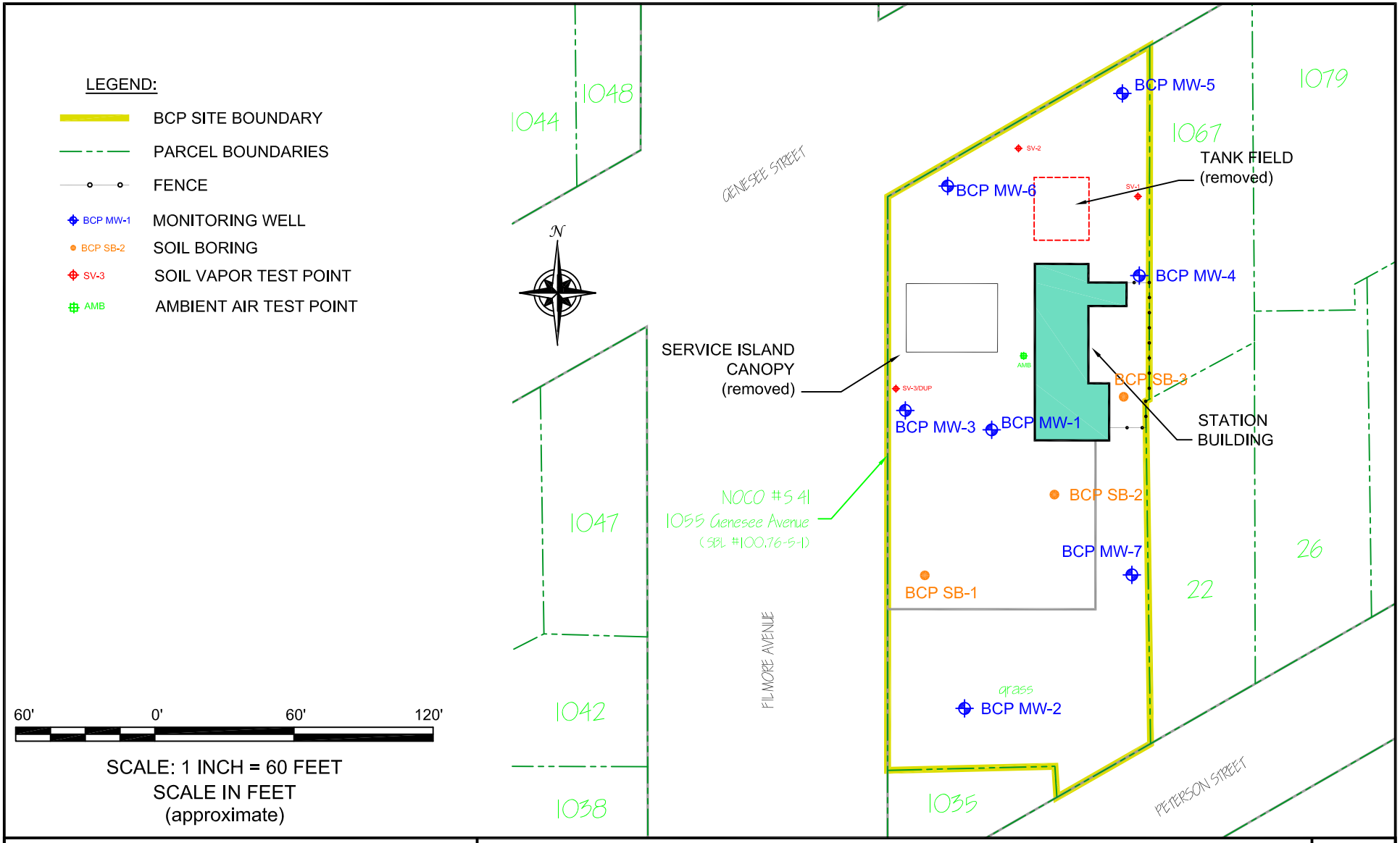
FIGURE 3



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REMEDIAL INVESTIGATION SAMPLE LOCATIONS

SITE MANAGEMENT PLAN

NOCO #S 41 SITE
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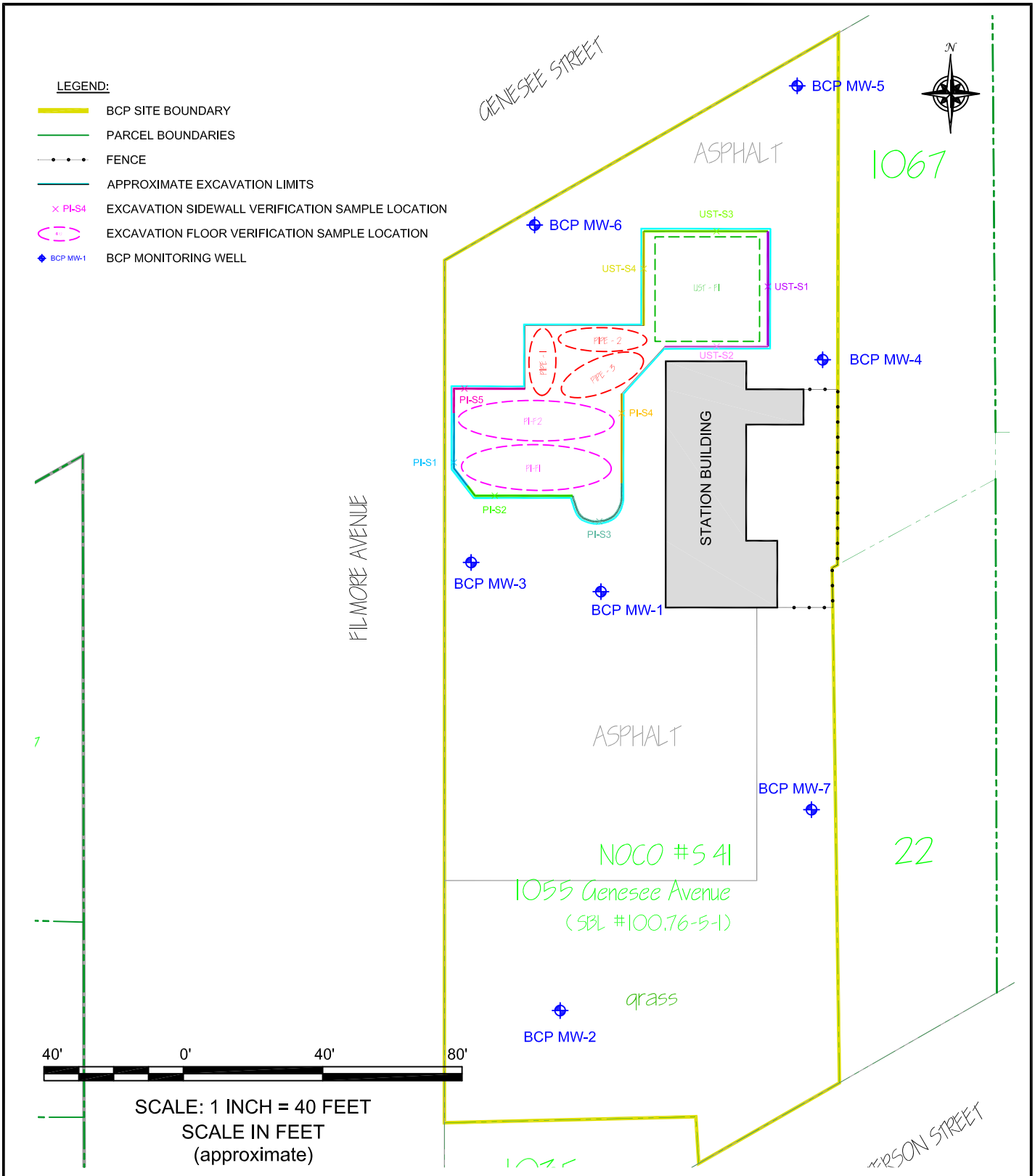
FIGURE 4

FIGURE 5



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PROJECT NO.: 0112-010-300

DATE: SEPTEMBER 2009

DRAFTED BY: NTM

SUMMARY OF REMEDIAL MEASURES

SITE MANAGEMENT PLAN

NOCO #S 41
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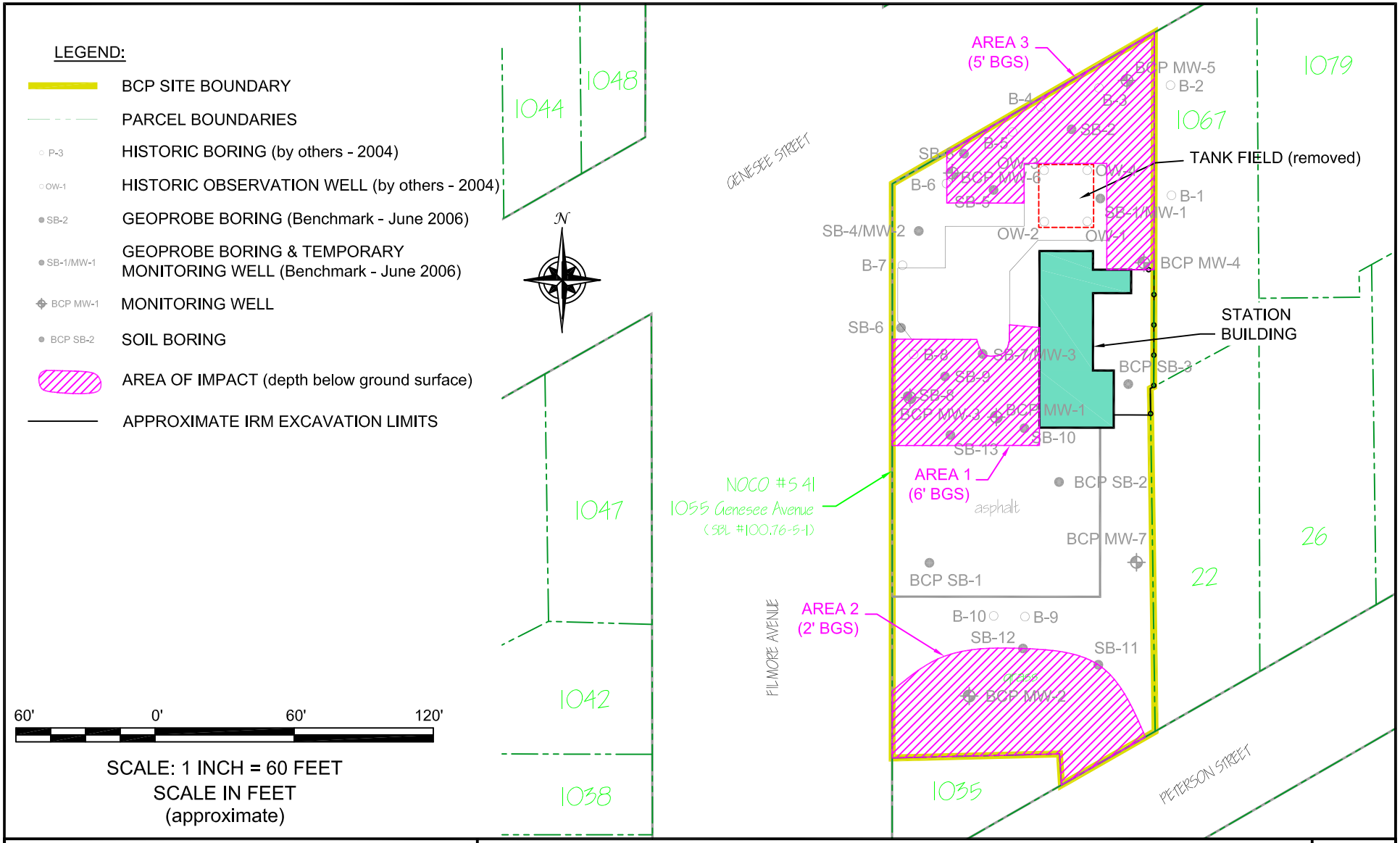

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PROJECT NO.: 0112-010-300

DATE: SEPTEMBER 2009

DRAFTED BY: AJZ

APPROXIMATE AREAS WITH CONSTITUENTS ABOVE UNRESTRICTED USE SCOs

SITE MANAGEMENT PLAN

NOCO #S 41 SITE
BCP SITE No. C915211
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FIGURE 6

BENCHMARK
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PROJECT NO.: 0112-010-300

DATE: JULY 2009

DRAFTED BY: NTM

HOSPITAL ROUTE MAP

SITE MANAGEMENT PLAN

NOCO S-41 SITE
BCP SITE No. C915211
BUFFALO, NEW YORK

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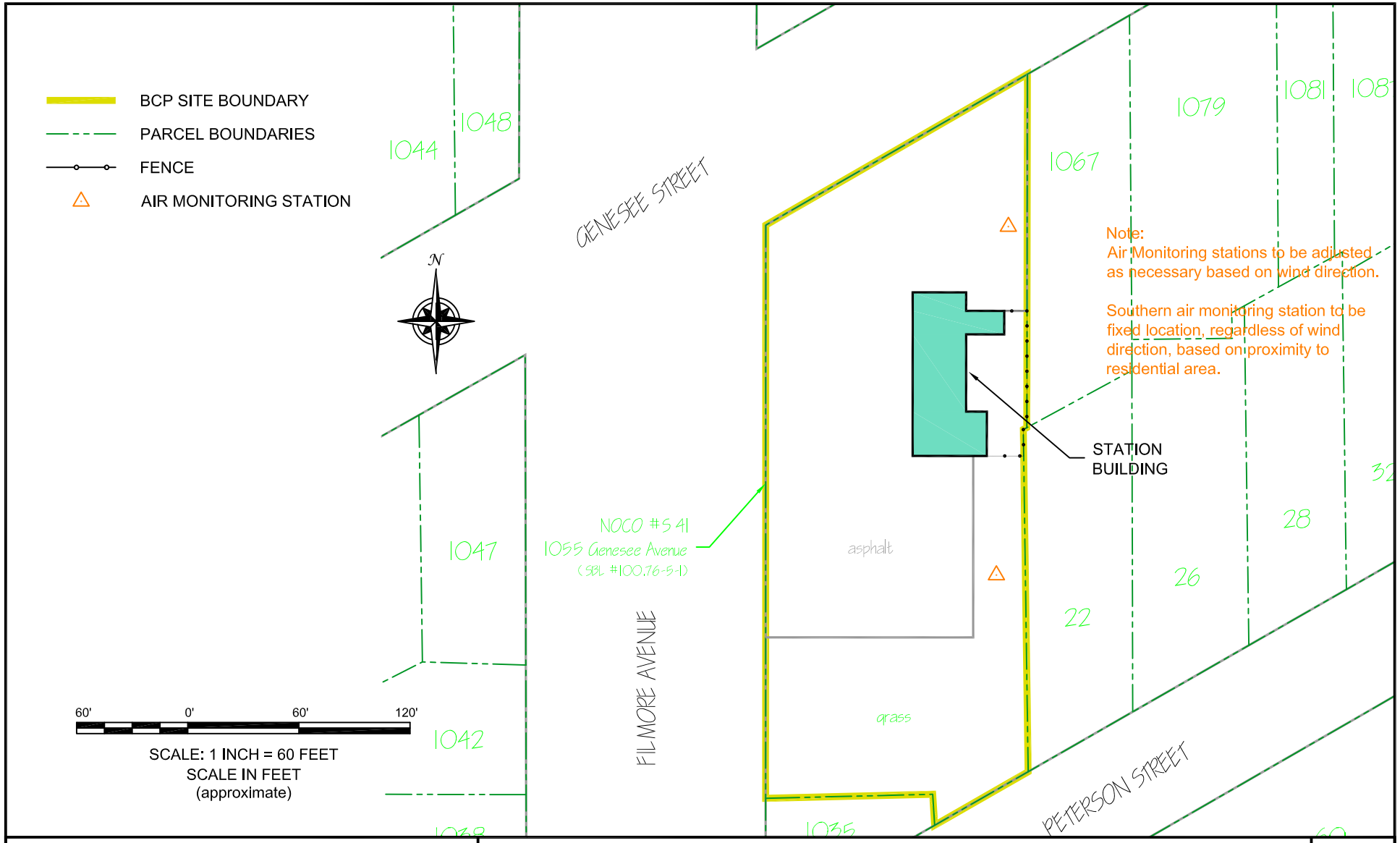
FIGURE 7



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BUFFALO, NY 14218
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PROJECT NO.: 0112-010-300
DATE: JULY 2009
DRAFTED BY: BCH/NTM

AIR MONITORING STATIONS

SITE MANAGEMENT PLAN

NOCO S-41
BCP SITE No. C915211
BUFFALO, NEW YORK
PREPARED FOR
NOCO ENERGY CORPORATION

FIGURE 8

APPENDIX A

ENVIRONMENTAL EASEMENT

APPENDIX B

EXAMPLE HEALTH AND SAFETY PLAN

EXAMPLE

SITE HEALTH AND SAFETY PLAN
for
BROWNFIELD CLEANUP PROGRAM ACTIVITIES

NOCO #S-41 SITE
1055 GENESEE STREET
BUFFALO, NEW YORK

July 2009 0112-010-300

NOCO #S-41 SITE
HEALTH AND SAFETY PLAN FOR BCP ACTIVITIES

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes, P.E.

Project Manager: Michael Lesakowski

Designated Site Safety and Health Officer: Bryan C. Hann

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

NOCO #S-41 SITE
HEALTH AND SAFETY PLAN FOR BCP ACTIVITIES

TABLE OF CONTENTS

NOCO #S-41 SITE
HEALTH AND SAFETY PLAN FOR BCP ACTIVITIES

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NOCO #S-41 SITE
HEALTH AND SAFETY PLAN FOR BCP ACTIVITIES

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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 Remedial Investigation (RI) and Interim Remedial Measures (IRM) activities at the NOCO #S-41 Site located at 1055 Genesee Street in the City of Buffalo, New York.. This HASP presents procedures for TurnKey-Benchmark employees who will be involved with RI/IRM 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 HASP 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

The Site is an approximate 0.75-acre parcel located on the southeast corner of Genesee Street and Fillmore Avenue. The Site is currently vacant but was historically used as a retail gasoline station and convenience store. The convenience store building remains, and there are currently three 8,000-gallon gasoline tanks and four product dispensers on-site (see Figure 2).

The Site has been used as a gasoline station since at least 1950. According to historical records, previous gas station owner/operators on-site include Gulf Oil Corporation, Northeast Stations, Inc., and Cumberland Farms. NOCO Motor Fuels, Inc. has been Site owner since approximately 1993.

In October 2004, a Subsurface Investigation Report (Ref. 1) was completed by Sentinel Technologies, Inc. (Sentinel) to further investigate impacts previously identified in a

tank field observation well. The results of that study indicated that petroleum-related volatile organic compounds (VOCs) were present in Site soils and groundwater.

In August 2006, a Supplemental Environmental Investigation was performed at the Site by Benchmark (Ref. 2). The results of this investigation identified additional on-site soil and groundwater impacts in the area of the current/historic USTs and pump islands.

1.3 Known and Suspected Environmental Conditions

A Subsurface Investigation Report was completed by Sentinel Technologies, Inc. (Sentinel) in October 2004 (Ref. 1) to further investigate groundwater impacts previously identified in a tank field observation well. Ten soil borings were completed in the area of the current USTs and pump islands and in an area where impacted soil was biologically treated on-site. Groundwater samples were collected from three of the soil boring locations via temporary wells. The results of that study indicated that petroleum-related VOCs were present above NYSDEC recommended soil cleanup objectives (RSCOs) and groundwater quality standards (GWQS) on-site. Characterization of one groundwater sample from the October 2004 Subsurface Investigation study was sent to Worldwide Geosciences, Inc. Laboratory (Worldwide), for purposes of analyzing and dating the product that was apparently released on-site. The results of Worldwide's analysis indicated that the product in the groundwater sample was a residual fraction of a highly weathered gasoline produced no later than 1985 (i.e., prior to NOCO's ownership).

Benchmark completed a Supplemental Environmental Investigation at 1055 Genesee Street in June 2006 (Ref. 2). A geophysical survey, 13 test borings, and three temporary monitoring wells were completed in accessible areas of the subject property. The geophysical survey identified metallic anomalies north of the current USTs and south of the building. The strength of the anomalies suggested that they could represent buried metallic objects. The northern anomaly was located in the area of a historic UST adjacent to the existing USTs. The southern anomaly was located approximately 110 feet south of the building. Based on the historic records reviewed, the southern anomaly was not located in a known area of historic USTs. Soil borings were advanced in the area of each of the anomalies. There were no metallic objects encountered in those borings. However, SB-2 in the area of the northern anomaly (i.e., historic UST area) encountered petroleum odors from 0 to 8 fbgs. VOCs were detected in Site soil at concentrations above applicable NYSDEC RSCOs

at several soil boring locations. VOCs were also detected in groundwater samples at concentrations above applicable GWQS. Tetraethyl lead was also detected at a concentration of 1,500 ug/L in one groundwater sample.

The RI will be performed in support of the BCP to determine the nature and extent of impacts from these known and suspect environmental conditions on this parcel. As part of the Remedial Investigation, an IRM will be completed to immediately address known environmental impacts related to past use of the Site as a gasoline station and automotive repair facility. The current UST system, including USTs, product dispensers and product piping will be removed. Impacted soil will be removed and impacted groundwater (if encountered) will be extracted and treated during the IRM.

1.4 Parameters of Interest

Based on the environmental investigation findings, constituents of potential concern (COPCs) at the Site include:

- **Volatile Organic Compounds (VOCs)** – Petroleum-related VOCs present in soil and groundwater at elevated concentration may include benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl tert-butyl ether (MTBE). These VOCs are typically associated with storage and handling of petroleum products such as gasoline.

1.5 Overview of RI/IRM Activities

TurnKey-Benchmark personnel will be on-site to observe and perform RI and IRM activities. The field activities to be completed as part of the RI and IRM are described below. Planned RI/IRM activities are more fully described in the RI/AAR/IRM Work Plan for the Site (Ref. 3).

Remedial Investigation Activities

1. **Subsurface Soil Sampling:** TurnKey-Benchmark will advance six soil borings and collect one subsurface soil sample from each boring for the purpose of determining the nature and extent of potential COPC impacts.

2. **Monitoring Well Installation/Development and Sampling:** TurnKey-Benchmark will observe the installation of six on-site groundwater monitoring wells, develop the

wells, and collect groundwater samples for the purpose of determining the nature and extent of potential COPC impacts.

Potential IRM Activities

1. **Removal of UST System:** The remediation contractor would remove the USTs, product dispensers, and product piping.

2. **Soil Excavation:** The remediation contractor would excavate impacted soil and coordinate off-site disposal.

3. **Backfilling:** The remediation contractor would coordinate and perform backfilling activities.

4. **Verification Sampling:** The remediation contractor would collect soil samples from the side-walls and bottom of the excavations using a backhoe to verify that cleanup objectives have been met.

5. **Groundwater and Surface Management:** The remediation contractor would direct groundwater/surface water collection during soil excavation activities and coordinate disposal of the collected water.

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 Site. 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 this Site.

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***. 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 this Site is ***Mr. Michael Lesakowski.*** 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. Bryan C. Hann***. The qualified alternate SSHO is ***Mr. Richard L. Dubisz.*** 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 Drilling 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 Site, 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, and through the inhalation of contaminated particles or vapors. Other points of exposure may include direct contact with groundwater. In addition, the use of drilling and/or medium to large-sized construction equipment (e.g., excavator) 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 have potentially resulted in impacts to Site soils and groundwater. Visual and olfactory observations, as well as elevated PID readings, indicate a potential VOC impact to Site soil and groundwater. Table 1 identifies maximum concentrations for COPCs detected during previous investigations at the Site. Table 2 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Provided below are brief descriptions of the toxicology of the prevalent petroleum-related COPCs, and related health and safety guidance and criteria.

- **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.

- **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.

- **Methyl Tert-Butyl Ether (MTBE) (CAS #1634-04-4)** is a volatile, flammable and colorless liquid that is highly soluble in water with a characteristic odor. MTBE was a gasoline additive, used as an oxygenate and to raise the octane number, and is a fossil fuel. MTBE can be absorbed into the body by inhalation and by ingestion. The substance is irritating to the skin. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. A harmful contamination of the air can be reached rather quickly 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 RI/IRM 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

RI/IRM field activities at the NOCO #S-41 Site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as backhoes, excavators and drilling equipment.
- 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 RI/IRM operations and sampling 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 RI/IRM activities at the Site (such as, but not limited to, equipment operators, general laborers, and drillers) 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 (e.g., 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, or 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 ADP Screening & Selection Services, an occupational health care provider under contract with TurnKey-Benchmark. ADP's local facility is Health Works WNY, Seneca Square Plaza, 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 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.

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.

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, drill rigs 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 United States Environmental Protection Agency (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 upon current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the 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 (Ref. 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.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, or other appropriate instrument(s), will be used by TurnKey-Benchmark personnel to monitor organic vapor concentrations as specified in this HASP. Combustible gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s). In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion (e.g., well/boring installation) 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 RI/IRM activities. 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 (e.g., wetting of excavated soils or tools at discretion of Site Health and Safety Officer).

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 TurnKey-Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume but more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, must be conducted.

  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

  - If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone, the Site Health and Safety Officer must be notified and work activities shut down. The Site Health and Safety Officer will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) personnel to review.

- **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**
  - If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-

site residential or commercial property, whichever is less, all work activities must be halted.

- If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).

- If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

o **MAJOR VAPOR EMISSION RESPONSE PLAN:**

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.

2. The local police authorities will immediately be contacted by the Site Health and Safety Officer 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 Site Health and Safety Officer.

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.

- **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 (ug/m^3) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.
- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

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 Reportable Quantity (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 Reportable Quantity (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 RI/IRM 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 in Attachment H2 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 (e.g., 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
- Environmental Products and Services, Inc.: (716) 447-4700
- Op-Tech: (716) 873-7680

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 Site Safety and Health Officer 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 areas, 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 Site Safety and Health Officer'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 and only 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. Deposit tape and gloves in waste disposal container.

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 a duration of 6 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
- Water wash 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 RI/IRM 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 National Fire Protection Association.

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 within Appendix A as Figure 1.

16.0 REFERENCES

1. SENTINEL Technologies, Inc. 2004. *Subsurface Investigation Report, NOCO Express, 1055 Genesee Street, Buffalo, NY. NYSDEC Spill# 0275425.* October.

2. Benchmark Environmental Engineering & Science, PLLC. 2006. *Supplemental Environmental Investigation Report. 1055 Genesee Street, Buffalo, NY.* August.

3. Benchmark Environmental Engineering & Science, PLLC. 2007. *Remedial Investigation/ Alternatives Analysis Report / Interim Remedial Measures Work Plan, NOCO #S-41 Site, 1055 Genesee Street, Buffalo, NY.* September.

4. New York State Department of Health. 2002. *Generic Community Air Monitoring Plan, Appendix 1A, Draft DER-10 Technical Guidance for Site Investigation and Remediation.* December.

TABLES

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TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

NOCO # S-41 Site
1055 Genesee Street
Buffalo, New York

Parameter	CAS No.	Maximum Detected Concentration [1]	
		Groundwater (ug/L)	Soil/Fill (ug/kg)
Volatile Organic Compounds (VOCs):			
Benzene	71-43-2	7,700	150
Ethylbenzene	100-41-4	7,000	3,400
Toluene	108-88-3	1,100	710
Total Xylenes	1330-20-7	30,000	29,000
Isopropylbenzene	98-82-8	1,000	1,500
n-Propylbenzene	103-65-1	1,700	3,100
p-Cymene	99-87-6	200	260
1,2,4-Trimethylbenzene	95-63-6	14,000	31,000
1,3,5-Trimethylbenzene	108-67-8	8,400	9,300
n-Butylbenzene	104-51-8	860	1,900
sec-Butylbenzene	135-98-8	890	1,300
Methyl-Tert-Butyl-Ether (MTBE)	1634-04-4	28,000	75

Notes:

1. Supplemental Environmental Investigation, June 2006.

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TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

NOCO # S-41 Site
1055 Genesee Street
Buffalo, 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
Isopropylbenzene	Cumene	98-82-8	*none*	50	50	900
n-Propylbenzene		103-65-1	*none*	--	--	--
p-Cymene	1-Methyl-4-isopropylbenzene	99-87-6	*none*	--	--	--
1,2,4-Trimethylbenzene	Pseudocumene	95-63-6	*none*	--	25	--
1,3,5-Trimethylbenzene	Mesitylene	108-67-8	*none*	--	25	--
n-Butylbenzene		104-51-8	*none*	--	--	--
sec-Butylbenzene		135-98-8	*none*	--	--	--
Methy Tert-Butyl Ether	MTBE	1634-04-4	*none*	--	50	--

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. " -- " = 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); = max. exposure conc. allowable for 8 hr/day @ 40 hr/wk.
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.
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 max. exposure conconcentration allowable for 8 hr/day @ 40 hr/week

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TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN

NOCO # S-41 Site
1055 Genesee Street
Buffalo, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
Remedial Investigation Tasks			
1. Subsurface Soil Sampling	x	x	
2. Monitoring Well Installation/Development and Sampling	x	x	x
Interim Remedial Measures Tasks			
1. Removal of UST System	x	x	
2. Soil Excavation	x	x	
3. Backfilling	x	x	
4. Verification Sampling	x	x	
5. Groundwater and Surface Water Management	x		x

Notes:

1. Activity as described in Section 1.5 of the Health and Safety Plan.

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TABLE 4

REQUIRED LEVELS OF PROTECTION FOR RI/IRM TASKS

NOCO # S-41 Site
1055 Genesee Street
Buffalo, New York

Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2,3]	Other Required PPE/Modifications [2,4]
Remedial Investigation Tasks					
1. Subsurface Soil Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Monitoring Well Installation/Development and Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	SGSS
Interim Remedial Measures Tasks					
1. Removal of UST System	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Soil Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
3. Backfilling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
4. Verification Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
5. Groundwater and Surface Water Management	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	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

FILEPATH:\\cad\benchmark\noco\1055 genesee street bcp\ri-aar\figure 1site location and vicinity mapdwg

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PROJECT NO.: 0112-010-200

DATE: JULY 2007

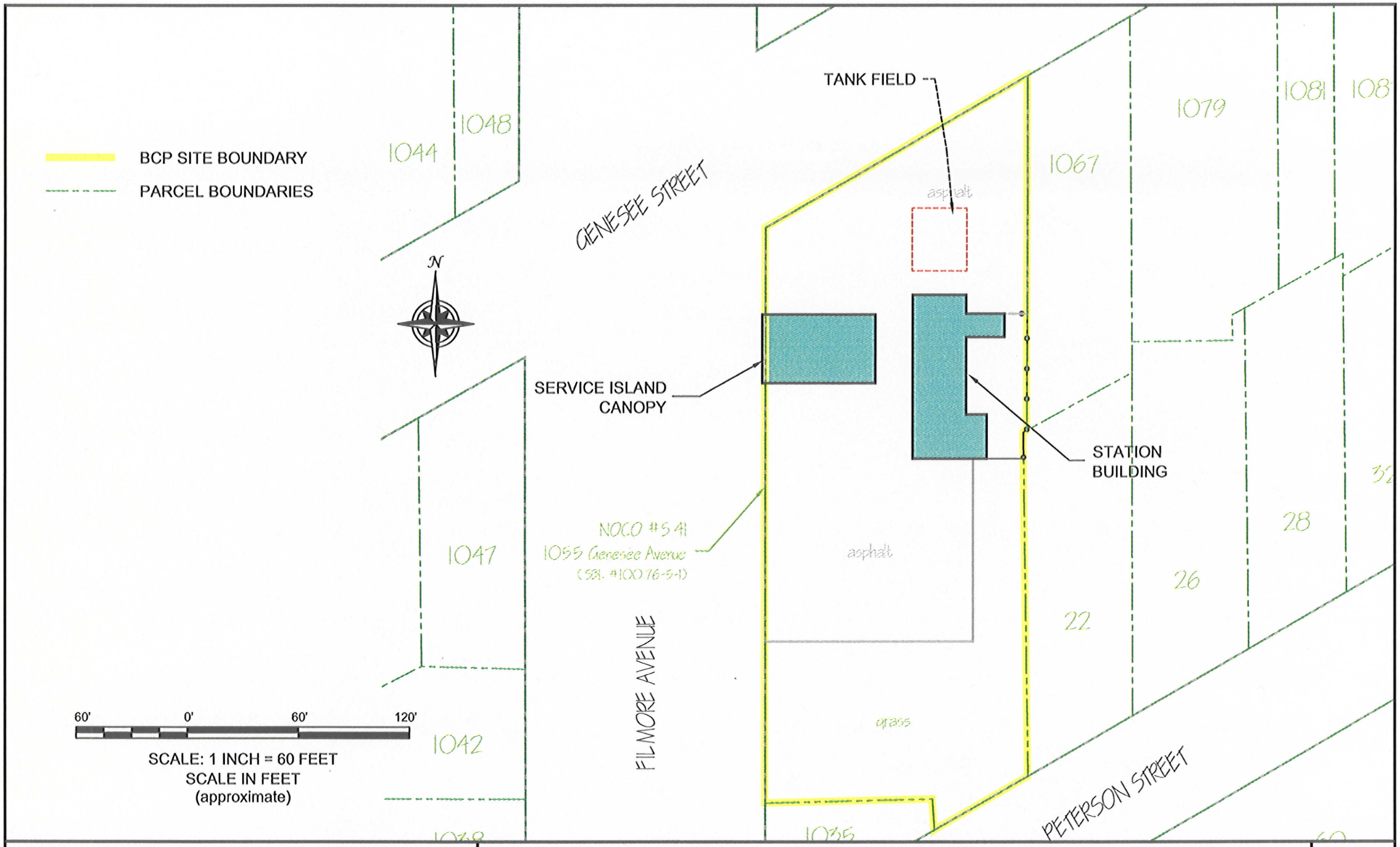
DRAFTED BY: NTM

SITE LOCATION AND VICINITY MAP

RI / AAR WORK PLAN

NOCO S-41 SITE
BUFFALO, NEW YORK

PREPARED FOR
NOCO ENERGY CORPORATION



BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0112-010-200

DATE: JULY 2007

DRAFTED BY: BCH/NTM

SITE PLAN

REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS WORK PLAN

NOCO S-41 SITE
BUFFALO, NEW YORK

PREPARED FOR
NOCO ENERGY CORPORATION

FIGURE 2

APPENDIX A

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM
RI/IRM ACTIVITIES

NOCO # S-41 SITE
1055 GENESEE STREET BUFFALO, NEW YORK

November 2007 0112-010-200

Prepared for:

NOCO Energy Corporation

NOCO # S-41 SITE
HEALTH AND SAFETY PLAN FOR RI/IRM ACTIVITIES
APPENDIX A: EMERGENCY RESPONSE PLAN

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LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site Health and Safety Plan (HASP) prepared for Remedial Investigation (RI) and Interim Remedial Measures (IRM) activities at the NOCO # S-41 Site located at 1055 Genesee Street in Buffalo, New York. This appendix of the 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, due to flammability of Kensol 61 product in subsurface

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
First Aid Kit	1	Site Vehicle
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 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-Benchmark personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: *Michael Lesakowski*
Work: (716) 856-0599
Mobile: (716) 818-3954

Corporate Health and Safety Director: *Thomas H. Forbes*
Work: (716) 856-0599
Mobile: (716) 864-1730

Site Safety and Health Officer (SSHO): *Bryan C. Hann*
Work: (716) 856-0635
Mobile: (716) 870-1165

Alternate SSHO: *Richard L. Dubisz*
Work: (716) 856-0635
Mobile: (716) 998-4334

BUFFALO GENERAL HOSPITAL (ER):	(716) 859-5600
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:
1055 Genesee Street
Buffalo, New York 14211
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 Site Health and Safety Officer 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 excavation.

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 Site Health and Safety Officer 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 (***Bryan Hann*** 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 Site Safety and Health Officer 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 (e.g., 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 Site Health and Safety Officer 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 Buffalo General Hospital (see Figure 1):

The following directions describe the best route from the Site to Buffalo General Hospital:

- Travel southwest on Genesee St. toward Wilson St.
- Make a slight right onto High St.
- Turn right into hospital at 100 High St. Follow signs to Emergency Room.

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

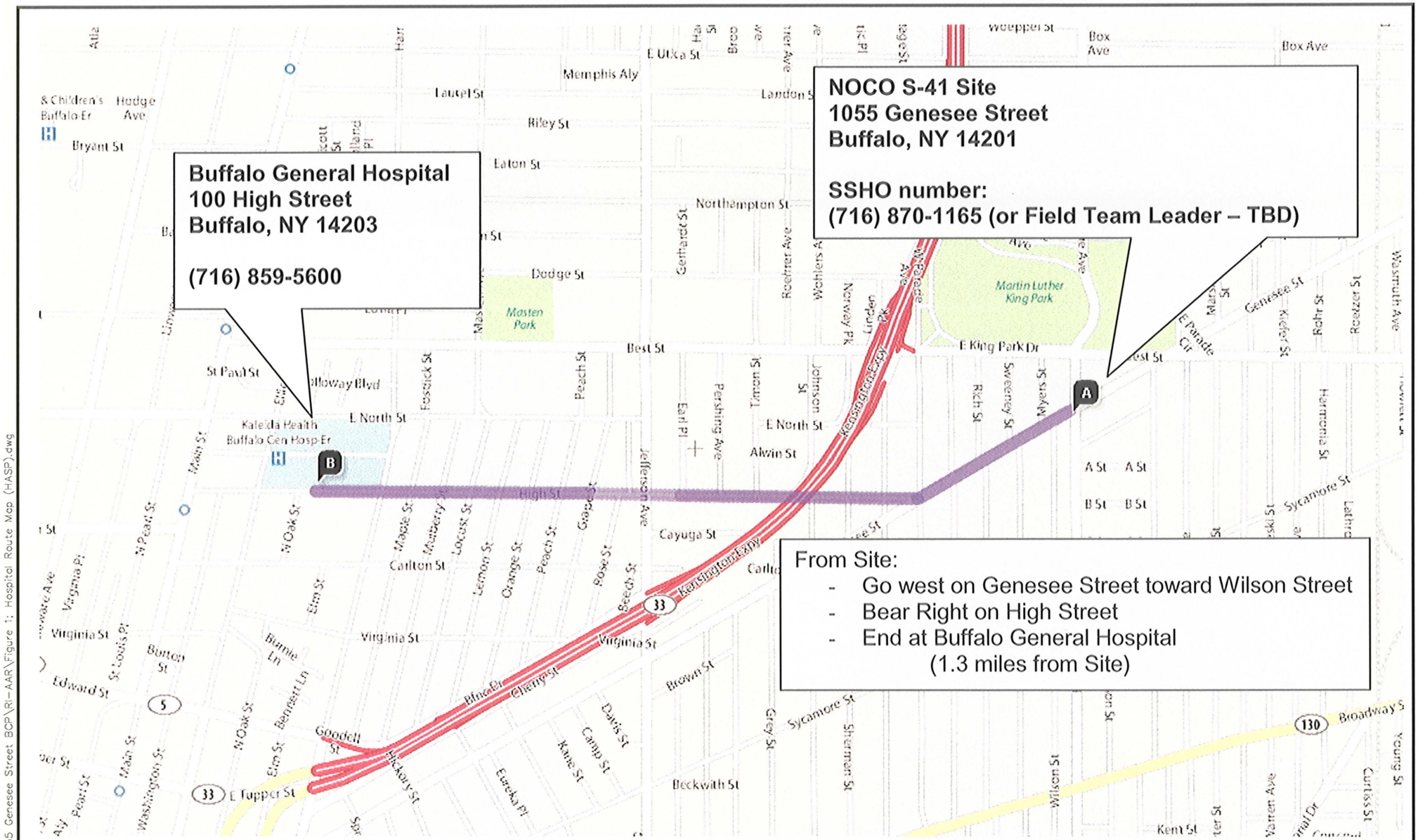
Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor 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



BENCHMARK
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BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0112-010-200
DATE: NOVEMBER 2007
DRAFTED BY: AJZ

HOSPITAL ROUTE MAP

EMERGENCY RESPONSE PLAN

NOCO S-41 SITE
BUFFALO, NEW YORK

PREPARED FOR
NOCO ENERGY CORPORATION

FIGURE 1

FILEPATH: F:\CAD\Benchmark\NOCO\1055 Genesee Street BCP\RI-AAR\Figure 1; Hospital Route Map (HASP).dwg

APPENDIX B

HOT WORK PERMIT FORM

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

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:

APPENDIX B-1

COMMUNITY AIR MONITORING PLAN

APPENDIX B-1

New York State Department of Health
Generic Community Air Monitoring Plan [1]

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 volatile organic compounds (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 NYSDEC/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.

[1] Taken from Appendix 1A of the Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

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. 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.

- 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.
- 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.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) 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.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) 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/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 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/m3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX B-2

TAGM #4031- FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4031

FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM -- FUGITIVE DUST SUPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

DATE: Oct 27, 1989

Michael J. O'Toole, Jr. (signed)

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other 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. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
   Temperature: 0 to 40°C
   Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation

shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

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 entity operating the equipment 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/m^3 over the integrated period not to exceed 15 minutes. 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/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 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/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

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 PM_{10} at or above the action level. Since this situation has the potential to migrate 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:

    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.
    3. Spraying water on buckets during excavation and dumping.
    4. Hauling materials in properly tarped or watertight containers.
    5. Restricting vehicle speeds to 10 mph.
    6. Covering excavated areas and material after excavation activity ceases.
    7. Reducing the excavation size and/or number of excavations.

    Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in

unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be 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 appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX C

MONITORING WELL/SOIL BORING CONSTRUCTION LOGS

Project No: 0112-010-300

Borehole Number: BCP MW-1

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

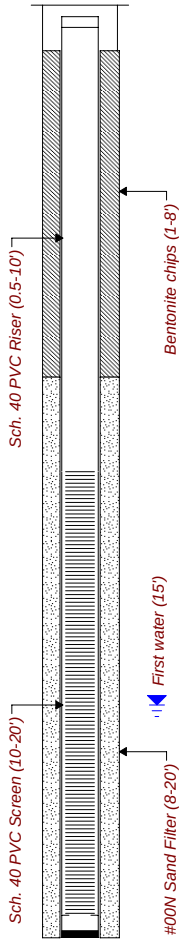
Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

Benchmark Environmental Engineering & Science, PLLC
726 Exchange Street, Suite 624
Buffalo, NY
(716) 856-0599

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs (ppm)	Lab Sample	Well Completion Details or Remarks
0.0	0.0	Ground Surface					0 25 50		
		ASPHALT Asphalt and subbase							
		FILL Black, dry, Fill with little Silt and Sand, some red brick and slag	S1	NA	0.5		0.0	BCP MW-1 (0-5')	
			S2	NA	0.5		0.0		
5.0	5.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay, medium plasticity, stiff, massive, with lite gray mottles along fractures	S3	NA	4.0		0.0		
			S4	NA	3.0		0.0		
10.0	10.0	***SILTY CLAY*** SAA, trace gravel	S5	NA	4.0		0.0		
			S6	NA	4.0		0.0		
15.0	15.0	***SILTY CLAY*** SAA, wet, medium to high plasticity, soft	S7	NA	3.0		0.0		
			S8	NA	2.5		0.0		
20.0	20.0	End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 2-20-08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP MW-2

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

Benchmark Environmental Engineering & Science, PLLC
726 Exchange Street, Suite 624
Buffalo, NY
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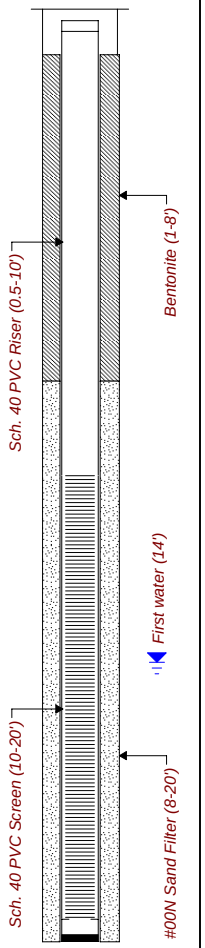
SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0	0.0	Ground Surface							
	0.0	***FILL*** Brown, moist, Silty Clay with trace small Gravel and trace glass, medium plasticity, stiff, trace glass							
	2.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S1	NA	3.0		0.0	BCP MW-2 (0-2')	
							0.0		
5.0			S2	NA	4.0		0.0		
							0.0		
10.0			S3	NA	4.0		0.0		
							0.0		
			S4	NA	4.0		0.0		
	14.0	***SILTY CLAY*** SAA, wet, medium to high plasticity, soft							
15.0			S5	NA	4.0		0.0		
			S6	NA	4.0		0.0		
			S7	NA	4.0		0.0		
20.0	20.0	End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 2-20-08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP MW-3

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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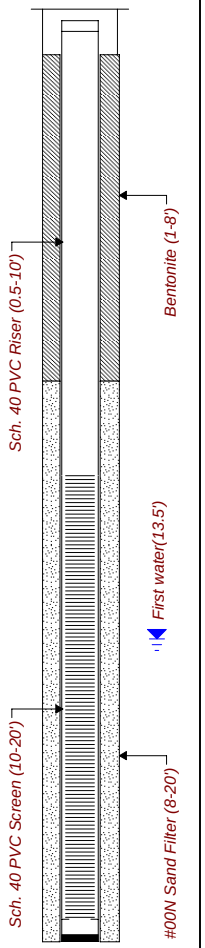
SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0	Ground Surface								
	0.0	***ASPHALT*** Asphalt and subbase							
		FILL Black, dry, Fill with little Silt and Sand, some brick and slag	S1	NA	2.0		0.0, 0.0	BCP MW-3 (0-4')	
	4.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S2	NA	4.0		0.0, 0.0		
5.0			S3	NA	4.0		0.0, 0.0		
10.0			S4	NA	3.0		0.0, 0.0		
	13.5	***SILTY CLAY*** SAA, wet, medium to high plasticity, soft	S5	NA	2.0		0.0, 0.0		
15.0			S6	NA	2.5		0.0		
20.0	20.0	End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 2-21-08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP MW-4

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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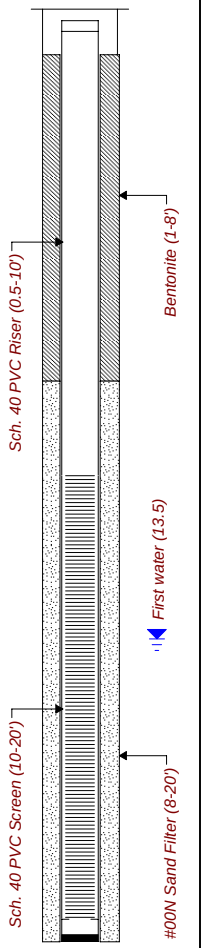
SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0	0.0	Ground Surface							
	0.0	***FILL*** Dark brown, moist, Silty Sand with trace Gravel and little Fill, little red brick and trace slag	S1	NA	2.7		0.0 / 0.0	BCP MW-4 (0-4')	
	3.2	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S2	NA	4.0		0.0 / 0.0		
5.0			S3	NA	3.8		0.0 / 0.0		
10.0			S4	NA	3.8		0.0 / 0.0		
	13.5	***SILTY CLAY*** SAA, wet, medium to high plasticity, soft	S5	NA	3.5		0.0		
15.0			S6	NA	3.2		0.0		
			S7	NA	2.8		0.0		
20.0	20.0	End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 2-22-08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP MW-5

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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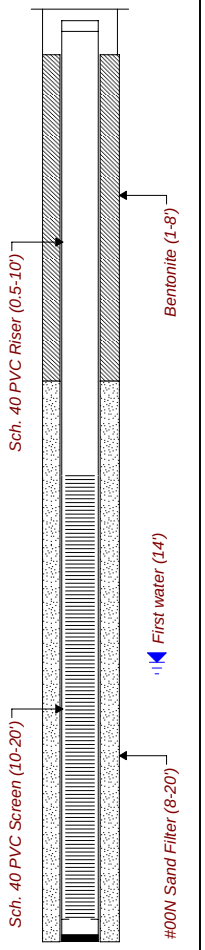
SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0	Ground Surface								
	0.0	***ASPHALT*** Asphalt and subbase							
		FILL Dark brown, moist, Silty Sand with trace Gravel and little Fill, little red brick and trace slag	S1	NA	1.8		6.2, 14.8	BCP MW-5 (0-4')	
	4.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S2	NA	3.8		0.0, 0.0		
5.0			S3	NA	3.8		0.0, 0.0		
10.0			S4	NA	3.2		0.0, 0.0		
	14.0	***SILTY CLAY*** SAA, wet, medium to high plasticity, soft	S5	NA	2.0		0.0		
15.0			S6	NA	2.0		0.0		
	18.0	***SILTY CLAY*** SAA, trace small Gravel	S7	NA	2.5		0.0		
20.0	20.0	End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 2-22-08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP MW-6

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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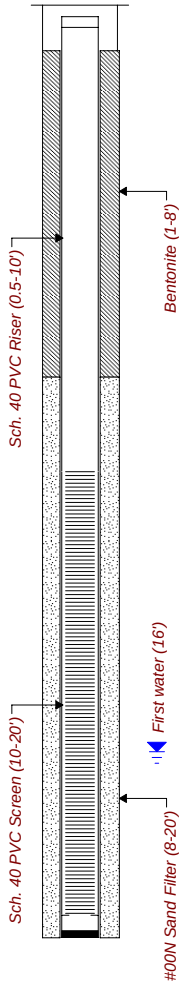
SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs (ppm)	Lab Sample	Well Completion Details or Remarks
0.0	0.0	Ground Surface					0 25 50		
	0.0	***ASPHALT*** Asphalt and subbase							
		FILL Dark brown, moist, Silty Sand with trace Gravel and little Fill, little red brick and trace slag and wood	S1	NA	1.8		2.0, 4.5	BCP MW-6 (0-4')	
5.0			S2	NA	3.8		4.1, 0.2		
	8.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S3	NA	3.8		0.0		
10.0			S4	NA	3.2		0.0, 0.0		
15.0			S5	NA	2.0		0.0		
	16.0	***SILTY CLAY*** SAA, wet, medium to high plasticity, soft	S6	NA	2.0		0.0		
			S7	NA	2.5		0.0		
20.0	20.0	End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 2-22-08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP MW-7

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: TAB

Site Location: 1055 Genesee Street

Checked By: BCH

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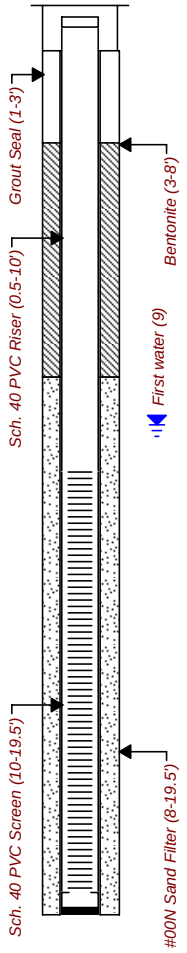
SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 12.5 / 25)	Lab Sample	Well Completion Details or Remarks
0.0		Ground Surface							
	0.0	***TOPSOIL*** Dark brown to brown, moist, silt with clay and few fine sand and trace coarse sand, medium plastic, medium soft, with roots.	S1	NA	1.9		0.5		
	4.0	***FILL*** Grey, moist to wet, silty clay with some sand and few coarse and fine gravel, with peices of concrete and asphalt and orange brick and plastic, with black discolored areas.	S2	NA	1.0		2.4		
5.0									
			S3	NA	1.3		4.8		
10.0									
	12.5	***SILTY CLAY*** Reddish brown, wet, silty clay with trace sand, firm, high placticity, with grey fine sand laminations.	S4	NA	1.3		2.6		
15.0									
	17.0	***SILTY CLAY*** Grey, wet, silty clay with little sand and trace coarse sand and fine gravel, firm.	S5	NA	1.4		1.1		
	19.5	***NOTES*** Upon pulling the augers it was noticed that chain link fencing became entangleg with lead auger, annulas is larger then standard annulas using 4.25-inch HSA.							
20.0		End of Borehole							
25.0									



Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling/Hollow stem auger drilling

Drill Date(s): 8/11/08

Hole Size: 8.0"
Stick-up: Flush-mount
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP SB-1

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs (ppm)	Lab Sample	Well Completion Details or Remarks
0.0	Ground Surface								
	0.0	***ASPHALT*** Asphalt and subbase							
	0.5	***FILL*** Brown, moist, Silty Clay with trace small Gravel and Fill, medium plasticity, stiff, trace red brick and wood	S1	NA	3.0		0.0		
							0.0		
	4.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures							
5.0			S2	NA	3.8		0.0		
							0.0		
			S3	NA	3.8		0.0		
10.0							0.0		
			S4	NA	2.8		0.0		
	14.0	***SILTY CLAY*** SAA, wet,Medium to high plasticity, soft							
15.0			S5	NA	1.2		0.0		
	16.0	End of Borehole							
20.0									

First water (14')

Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling

Drill Date(s): 2-25-08

Hole Size: 8.0"
Stick-up:
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP SB-2

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0	Ground Surface								
	0.0	***ASPHALT*** Asphalt and subbase					0.0		
	0.5	***FILL*** Brown, moist, Silty Clay with trace small Gravel and Fill, medium plasticity, stiff, trace red brick and wood	S1	NA	3.5		0.0		
	4.0	***SILT with CLAY*** Dark brown, moist, Silt with Clay, low plasticity, soft, massive					0.0		
5.0	5.3	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S2	NA	3.5		0.0		
			S3	NA	3.8		0.0		
10.0							0.0		
	12.0	***SILTY CLAY*** SAA, wet,Medium to high plasticity, soft	S4	NA	3.0		0.0		
15.0							0.0		
	16.0	End of Borehole							
20.0									

First water (12')

Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling

Drill Date(s): 2-25-08

Hole Size: 8.0"
Stick-up:
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

Project No: 0112-010-300

Borehole Number: BCP SB-3

Project: 1055 Genesee Street

Client: NOCO Energy Corporation

Logged By: BMG

Site Location: 1055 Genesee Street

Checked By: BCH

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SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0		Ground Surface							
	0.0	***FILL*** Gray, dry, Gravel with some silt and sand					0.0		
	1.0	***FILL*** Brown, moist, Silty Clay with trace small Gravel and Fill, medium plasticity, stiff, trace red brick and wood	S1	NA	2.0		0.0		
	4.0	***SILTY CLAY*** Reddish brown, moist, Silty Clay with trace Gravel, medium plasticity, stiff, massive, with lite gray mottles along fractures	S2	NA	3.8		0.0		
5.0							0.0		
			S3	NA	3.7		0.0		
10.0							0.0		
			S4	NA	3.2		0.0		First water (14')
	14.0	***SILTY CLAY*** SAA, wet,Medium to high plasticity, soft	S5	NA	3.5		0.0		
15.0									
	16.0	End of Borehole							
20.0									

Drilled By: TREC Environmental, Inc.
Drill Rig Type: GeoProbe 6620 DT (Hollow stem auger probe)
Drill Method: Macro Core sampling

Drill Date(s): 2-25-08

Hole Size: 8.0"
Stick-up:
Datum: Site Datum of 100 fmsl

Sheet: 1 of 1

APPENDIX D

GROUNDWATER SAMPLING LOG FORM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.			Diameter (inches):			Sample Date / Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			One Well Volume (gal):			Purpose: ☐ Development ☐ Sample ☐ Purge & Sample			
Total Depth (fbTOR):			Total Volume Purged (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:									
	S1								
	S2								

Well No.			Diameter (inches):			Sample Date / Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			One Well Volume (gal):			Purpose: ☐ Development ☐ Sample ☐ Purge & Sample			
Total Depth (fbTOR):			Total Volume Purged (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:									
	S1								
	S2								

REMARKS:

Note: All water level measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

PREPARED BY:

APPENDIX E

GROUNDWATER SAMPLING FIELD OPERATING PROCEDURES

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Groundwater Purging Procedures Prior to Sample Collection

FOP 023.0

GROUNDWATER PURGING PROCEDURES PRIOR TO SAMPLE COLLECTION

PURPOSE

This procedure describes the methods for monitoring well/piezometer purging prior to groundwater sample collection in order to collect representative groundwater samples. The goal of purging is to remove stagnant, non-representative groundwater from the well and/or prevent stagnant water from entering collected samples. Purging involves the removal of at least three to five volumes of water in wells with moderate yields and at least one well volume from wells with low yields (slow water level recovery).

Purge and sample wells in order of least-to-most contaminated (this is not necessary if dedicated or disposable equipment is used). If you do not know this order, sample the upgradient wells first, then the furthest down-gradient or side-gradient wells, and finally the wells closest to, but down-gradient of the most contaminated area. Sampling should commence immediately following purging or as soon as the well has adequately recharged and not more than 24-hours following end time of evacuation.

PROCEDURE

1. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-disposable and Non-dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

2. Inspect the interior and exterior of the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Field Form and/or Groundwater Well Inspection Form (samples attached). Specifically, inspect

the integrity of the following: concrete surface seal, lock, protective casing and well cover, well riser and J-plug/cap. Report any irregular findings to the Project Manager.

3. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

4. Calibrate the photoionization detector (PID) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of Portable Photoionization Detector.

5. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

6. Lower the e-line probe slowly into the monitoring well and record the initial water level in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement.

7. Following static water level determinations, slowly lower the e-line to the bottom of the well/piezometer. Record the total depth to the nearest 0.01-foot and compare to the previous total depth measurement. If a significant discrepancy exists, re-measure the total depth. Continue with purging activities observing purge water to determine whether the well/piezometer had become silted due to inactivity or damaged (i.e., well sand within purge water). Upon confirmation of the new total depth and determination of the cause (i.e., siltation or damage), notify the Project Manager following field activities.

8. Calculate the volume of water in the well based on the water level below the top of riser and the total depth of the well using the following equation:

$$V = 0.0408[(B)^2 \times \{(A) - (C)\}]$$

Where,

A = Total Depth of Well (feet below measuring point)
B = Casing diameter (inches)
C = Static Water Level (feet below measuring point)

9. **For wells where the water level is 20 feet or less below the top of riser**, a peristaltic pump may be used to purge the well. Measure the purged volume using a calibrated container (i.e., graduated 5-gallon bucket) and record measurements on the attached Groundwater Well Development and Purge Log. Use new and dedicated tubing for each well. During the evacuation of shallow wells, the intake opening of the pump tubing should be positioned just below the surface of the water. As the water level drops, lower the tubing as needed to maintain flow. For higher yielding wells, the intake level should not be lowered past the top of the screen. Pumping from the top of the water column will ensure proper flushing of the well. Continue pumping until the required volumes are removed (typically three well volumes). For higher yielding wells, adjust the purging rate to maintain the water level above the screen. For lower yielding wells or wells where the screen straddles the water table, maintain purging at a rate that matches the rate of recovery of the well (well yield). If the well purges to dryness and is slow to recharge (greater than 15 minutes), terminate evacuation.

10. **For wells where the water level is initially below 20 feet,** or drawn down to this level because of slow recharge rate, conduct purging using one of three devices listed below:

- Bailer – A bottom filling dedicated polyethylene bailer attached to a length of dedicated hollow-braid polypropylene rope. Purging a well utilizing a bailer should be conducted smoothly and slowly as not to agitate the groundwater or damage the well.

- Well Wizard Purge Pump (or similar) – This pneumatic bladder pump uses compressed air to push water to the surface. Groundwater is not in contact with the drive air during the pumping process, therefore the pump may be used for sample collection.

- Waterra™ Pump – This manually operated pump uses dedicated polyethylene tubing and a check valve that can be used as an optional method for purging deeper wells. The pump utilizes positive pressure to evacuate the well, therefore the pump may be used for sample collection, and however over-agitation groundwater should be avoided.

Prior to use in a well, non-dedicated bailers, exterior pump bodies and pump tubing should be cleaned in accordance with the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination. Dedicated and/or disposable equipment should be contained within the sealed original manufacturers packaging and certified pre-cleaned by the manufacturer with a non-phosphate laboratory detergent and rinsed using de-ionized water.

8. Purging will continue until a predetermined volume of water has been removed (typically three well volumes) or to dryness. Measurements for pH, temperature, specific conductance, dissolved oxygen (optional), Eh (optional) and turbidity will be recorded following removal of each well volume. Purge the well to dryness or until the readings for indicator parameters listed above (or well-specific indicator parameters) stabilize within the following limits for each parameter measured:

Field Parameter	Stabilization Criteria
Dissolved Oxygen	± 0.3 mg/L
Turbidity	± 10 %
Specific Conductance	± 3 %
Eh	± 10 mV
PH	± 0.1 unit

Stabilization criteria presented within the project Work Plan will take precedence.

DOCUMENTATION AND SAMPLE COLLECTION

This section pertains to the documentation of collected field data during and following purging activities and sample collection.

1. Record all data including the final three stable readings for each indicator parameter on the attached Groundwater Well Purge & Sample Log.

2. Record, at a minimum, the "volume purged," "purging stop-time," "purged dry (Y/N)," "purged below sand pack (Y/N)," and any problems purging on the attached Groundwater Well Purge & Sample Log.

3. Collect groundwater samples in accordance with the Benchmark Field Operating Procedure for Groundwater Sample Collection. Record "sample flow rate" as an average, "time sample collected," and any other pertinent information related to the sampling event on the attached Groundwater Well Purge & Sample Log.

4. Restore the well to its capped/covered and locked condition.

ALTERNATIVE METHODS

Alternative purging and sampling methods and equipment, other than those described herein are acceptable if they provide representative groundwater samples. The purging and sampling method and equipment must not adversely affect sample integrity, chemistry, temperature and turbidity. In addition, alternative equipment must have minimal or no effect on groundwater geochemistry, aquifer permeability and well materials. Equipment materials must also minimize sorption and leaching. The field team is responsible for documenting

and describing any alternative equipment and procedures used to purge a well and collect samples.

ATTACHMENTS

Groundwater Field Form
Groundwater Well Inspection Form

REFERENCES

Benchmark FOPs:

011 *Calibration and Maintenance of Portable Photoionization Detector*
022 *Groundwater Level Measurement*
024 *Groundwater Sample Collection Procedures*
040 *Non-disposable and Non-dedicated Sampling Equipment Decontamination*

FOP 023.0

GROUNDWATER PURGING PROCEDURES PRIOR TO SAMPLE COLLECTION

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.			Diameter (inches):			Sample Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			Casing Volume:			Purpose: ☐ Development ☐ Sample			
Total Depth (fbTOR):			Purge Volume (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

Well No.			Diameter (inches):			Sample Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			Casing Volume:			Purpose: ☐ Development ☐ Sample			
Total Depth (fbTOR):			Purge Volume (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

REMARKS:

Note: All water level measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

PREPARED BY:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER WELL INSPECTION FORM

Project:	**WELL I.D.:**
Client:	
Job No.:	
Date:	
Time:	

EXTERIOR INSPECTION

Protective Casing:
Lock:
Hinge/Lid:
Concrete Surface Seal:
Bollards:
Label/I.D.:
Other:

INTERIOR INSPECTION

Well Riser:
Annular Space:
Well Cap:
Water Level (fbTOR):
Total Depth (fbTOR):
Other:

Comments/Corrective Actions:

PREPARED BY: DATE:

BENCHMARK
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FIELD OPERATING PROCEDURES

Groundwater Sample Collection Procedures

FOP 024.0

GROUNDWATER SAMPLE COLLECTION PROCEDURES

PURPOSE

This procedure describes the methods for collecting groundwater samples from monitoring wells and domestic supply wells following purging and sufficient recovery. This procedure also includes the preferred collection order in which water samples are collected based on the volatilization sensitivity or suite of analytical parameters required.

PROCEDURE

Allow approximately 3 to 10 days following well development before performing purge and sample activities at any well location. Conversely, perform sampling as soon as practical after sample purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. If the well takes longer than 24 hours to recharge, the Project Manager should be consulted. The following two procedures outline sample collection activities for monitoring and domestic type wells.

Monitoring Wells

1. Purge the monitoring well in accordance with the Benchmark FOPs for Groundwater Purging Procedures Prior to Sample Collection or Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures. Perform sampling as soon as practical after purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. Analyses will be prioritized in the order of the parameters volatilization sensitivity. After volatile organics have been collected, field parameters

must be measured from the next sample collected. If a well takes longer than 24 hours to recharge, the Project Manager should be consulted.

2. Sampling equipment that is not disposable or dedicated to the well will be decontaminated in accordance with the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination.

3. Calibrate all field meters (i.e., pH/Eh, turbidity, specific conductance, dissolved oxygen, PID etc.) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of the specific field meter.

4. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-disposable and Non-dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

5. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Field Form (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

6. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

7. Calibrate the photoionization detector (PID) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of Portable Photoionization Detector.

8. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging. Record PID measurements on a well-specific Groundwater Field Form (sample attached).

9. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Field Form (sample attached).

10. Groundwater samples will be collected directly from the sampling valve on the flow through cell (low-flow), discharge port of a standard pump assembly (peristaltic, pneumatic, submersible, or Waterra™ pump) or bailer (stainless steel, PVC or polyethylene) into appropriate laboratory provided containers. In low-yielding wells at which the flow through cell is not used, the samples may be collected using a disposable bailer.

11. If disposable polyethylene bailers are used, the bailer should be lowered *slowly* below the surface of the water to minimize agitation and volatilization. For wells that are known to produce turbid samples (values greater than 50 NTU), the bailer should be lowered and retrieved at a rate that limits surging of the well.

12. Sampling data will be recorded on a Groundwater Field Form (sample attached).

13. Pre-label all sample bottles in the field using a waterproof permanent marker in accordance with the Benchmark Sample Labeling, Storage and Shipment FOP. The following information, at a minimum, should be included on the label:

    - Project Number;
    - Sample identification code (as per project specifications);
    - Date of sample collection (mm, dd, yy);
    - Time of sample collection (military time only) (hh:mm);
    - Specify "grab" or "composite" sample type;
    - Sampler initials;
    - Preservative(s) (if applicable); and
    - Analytes for analysis (if practicable).

14. Collect a separate sample of approximately 200 ml into an appropriate container prior to collecting the first and following the last groundwater sample collected to measure the following field parameters:

Parameter	Units
Dissolved Oxygen	parts per million (ppm)

Specific Conductance	μmhos/cm or μS or mS
pH	pH units
Temperature	^{o}C or ^{o}F
Turbidity	NTU
Eh (*optional*)	mV
PID VOCs (*optional*)	ppm

Record all field measurements on a Groundwater Field Form (sample attached).

15. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

16. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Field Form (sample attached).

17. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

Domestic Supply Wells

1. Calculate or estimate the volume of water in the well. It is desirable to purge at least one casing volume before sampling. This is controlled, to some extent, by the depth of the well, well yield and the rate of the existing pump. If the volume of water in the well cannot be calculated, the well should be purged continuously for no less than 15 minutes.

2. Connect a sampling tap to an accessible fitting between the well and the pressure tank where practicable. A hose will be connected to the device and the hose discharge located 25 to 50 feet away. The well will be allowed to pump until the lines and one well volume is removed. Flow rate will be measured with a container of known volume and a stopwatch.

3. Place a clean piece of polyethylene or Teflon™ tubing on the sampling port and collect the samples in the order designated below and in the sample containers supplied by the laboratory for the specified analytes. ***DO NOT*** use standard garden hose to collect samples.

4. Sampling results and measurements will be recorded on a Groundwater Field Form (sample attached) as described in the previous section.

5. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

6. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

SAMPLE COLLECTION ORDER

All groundwater samples, from monitoring wells and domestic supply wells, will be collected in accordance with the following.

1. Samples will be collected preferentially in recognition of volatilization sensitivity. The preferred order of sampling if no free product is present is:

    - Field parameters
    - Volatile Organic Compounds (VOCs)
    - Purgeable organic carbons (POC)
    - Purgeable organic halogens (POH)
    - Total Organic Halogens (TOX)
    - Total Organic Carbon (TOC)
    - Extractable Organic Compounds (i.e., BNAs, SVOCs, etc.)
    - Total petroleum hydrocarbons (TPH) and oil and grease
    - PCBs and pesticides
    - Total metals (Dissolved Metals)
    - Total Phenolic Compounds

- Cyanide
- Sulfate and Chloride
- Turbidity
- Nitrate (as Nitrogen) and Ammonia
- Preserved inorganics
- Radionuclides
- Unpreserved inorganics
- Bacteria
- Field parameters

2. Document the sampling procedures and related information in the Project Field Book and on a Groundwater Field Form (sample attached).

DOCUMENTATION

The three words used to ensure adequate documentation for groundwater sampling are accountability, controllability, and traceability. Accountability is undertaken in the sampling plan and answers the questions who, what, where, when, and why to assure that the sampling effort meets its goals. Controllability refers to checks (including QA/QC) used to ensure that the procedures used are those specified in the sampling plan. Traceability is documentation of what was done, when it was done, how it was done, and by whom it was done, and is found in the field forms, Project Field Book, and chain-of-custody forms. At a minimum, adequate documentation of the sampling conducted in the field consists of an entry in the Project Field Book (with sewn binding), field data sheets for each well, and a chain-of-custody form.

As a general rule, if one is not sure whether the information is necessary, it should nevertheless be recorded, as it is impossible to over-document one's fieldwork. Years may go by before the documentation comes under close scrutiny, so the documentation must be

capable of defending the sampling effort without the assistance or translation of the sampling crew.

The minimum information to be recorded daily with an indelible pen in the Project Field Book and/or field data sheets includes date and time(s), name of the facility, name(s) of the sampling crew, site conditions, the wells sampled, a description of how the sample shipment was handled, and a QA/QC summary. After the last entry for the day in the Project Field Book, the Field Team Leader should sign the bottom of the page under the last entry and then draw a line across the page directly under the signature.

PRECAUTIONS/RECOMMENDATIONS

The following precautions should be adhered to prior to and during sample collection activities:

- Field vehicles should be parked downwind (to avoid potential sample contamination concerns) at a minimum of 15 feet from the well and the engine turned off prior to PID vapor analysis and VOC sample collection.

- Ambient odors, vehicle exhaust, precipitation, or windy/dusty conditions can potentially interfere with obtaining representative samples. These conditions should be minimized and should be recorded in the field notes. Shield sample bottles from strong winds, rain, and dust when being filled.

- The outlet from the sampling device should discharge below the top of the sample's air/water interface, when possible. The sampling plan should specify how the samples will be transferred from the sample collection device to the sample container to minimize sample alterations.

- The order of sampling should be from the least contaminated to the most contaminated well to reduce the potential for cross contamination of sampling equipment (see the Sampling Plan or Work Plan).

- Samples should not be transferred from one sampling container to another.

- Sampling equipment must not be placed on the ground, because the ground may be contaminated and soil contains trace metals. Equipment and supplies should be removed from the field vehicle only when needed.

- Smoking and eating should not be allowed until the well is sampled and hands are washed with soap and water, due to safety and possibly sample contamination concerns. These activities should be conducted beyond a 15-foot radius of the well.

- No heat-producing or electrical instruments should be within 15 feet of the well, unless they are intrinsically safe, prior to PID vapor analysis.

- Minimize the amount of time that the sample containers remain open.

- Do not touch the inside of sample bottles or the groundwater sample as it enters the bottle. Disposable gloves may be a source of phthalates, which could be introduced into groundwater samples if the gloves contact the sample.

- Sampling personnel should use a new pair of disposable gloves for each well sampled to reduce the potential for exposure of the sampling personnel to contaminants and to reduce sample cross contamination. In addition, sampling personnel should change disposable gloves between purging and sampling operations at the same well.

- Sampling personnel should not use perfume, insect repellent, hand lotion, etc., when taking groundwater samples. If insect repellent must be used, then sampling personnel should not allow samples or sampling equipment

to contact the repellent, and it should be noted in the documentation that insect repellent was used.

- Complete the documentation of the well. A completed assemblage of paperwork for a sampling event includes the completed field forms, entries in the Project Field Book (with a sewn binding), transportation documentation (if required), and possibly chain-of-custody forms.

ATTACHMENTS

Groundwater Field Form (sample)

REFERENCES

1. Wilson, Neal. *Soil Water and Ground Water Sampling*, 1995

Benchmark FOPs:

007 Calibration and Maintenance of Portable Dissolved Oxygen Meter
008 Calibration and Maintenance of Portable Field pH/Eh Meter
009 Calibration and Maintenance of Portable Field Turbidity Meter
011 Calibration and Maintenance of Portable Photoionization Detector
012 Calibration and Maintenance of Portable Specific Conductance Meter
022 Groundwater Level Measurement
023 Groundwater Purging Procedures Prior to Sample Collection (optional)
031 Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures (optional)
040 Non-Disposable and Non-Dedicated Sampling Equipment Decontamination
046 Sample Labeling, Storage and Shipment Procedures

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.			Diameter (inches):			Sample Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			Casing Volume:			Purpose: ☐ Development ☐ Sample			
Total Depth (fbTOR):			Purge Volume (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

Well No.			Diameter (inches):			Sample Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			Casing Volume:			Purpose: ☐ Development ☐ Sample			
Total Depth (fbTOR):			Purge Volume (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

REMARKS:

Note: All water level measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

PREPARED BY:

BENCHMARK
ENVIRONMENTAL
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SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Low-Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure

FOP 031.0

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

PURPOSE

This procedure describes the methods used for performing low flow (minimal drawdown) purging, also referred to as micro-purging, at a well prior to groundwater sampling to obtain a representative sample from the water-bearing zone. This method of purging is used to minimize the turbidity of the produced water. This may increase the representativeness of the groundwater samples by avoiding the necessity of filtering suspended solids in the field prior to preservation of the sample.

Well purging is typically performed immediately preceding groundwater sampling. The sample should be collected as soon as the parameters measured in the field (i.e., pH, specific conductance, dissolved oxygen, Eh, temperature, and turbidity) have stabilized.

PROCEDURE

1. Water samples should not be taken immediately following well development. Sufficient time should be allowed to stabilize the groundwater flow regime in the vicinity of the monitoring well. This lag time will depend on site conditions and methods of installation but may exceed one week.

2. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark's Groundwater Level Measurement FOP and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

3. Calibrate all sampling devices and monitoring equipment in accordance with manufacturer's recommendations, the site Quality Assurance Project Plan (QAPP) and/or Field Sampling Plan (FSP). Calibration of field

instrumentation should be followed as specified in Benchmark's Calibration and Maintenance FOP for each individual meter.

4. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Field Form (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

5. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

6. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

7. Lower the e-line probe slowly into the monitoring well and record the initial water level in accordance with the procedures referenced in Benchmark's Groundwater Level Measurement FOP. Refer to the construction diagram for the well to identify the screened depth.

8. Decontaminate all non-dedicated pump and tubing equipment following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP.

9. Lower the purge pump or tubing (i.e., low-flow electrical submersible, peristaltic, etc.) slowly into the well until the pump/tubing intake is approximately in the middle of the screened interval. Rapid insertion of the pump will increase the turbidity of well water, and can increase the required purge time. This step can be eliminated if dedicated tubing is already within the well.

   Placement of the pump close to the bottom of the well will cause increased entrainment of solids, which may have settled in the well over time. Low-flow purging has the advantage of minimizing mixing between the overlying

stagnant casing water and water within the screened interval. The objective of low-flow purging is to maintain a purging rate, which minimizes stress (drawdown) of the water level in the well. Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen.

10. Lower the e-line back down the well as water levels will be frequently monitored during purge and sample activities.

11. Begin pumping to purge the well. The pumping rate should be between 100 and 500 milliliters (ml) per minute (0.03 to 0.13 gallons per minute) depending on site hydrogeology. Periodically check the well water level with the e-line adjusting the flow rate as necessary to stabilize drawdown within the well. If possible, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 feet or less). If the water level exceeds 2 feet below static and declining, slow the purge rate until the water level generally stabilizes. Record each pumping rate and water level during the event.

    The low flow rate determined during purging will be maintained during the collection of analytical samples. At some sites where geologic heterogeneities are sufficiently different within the screened interval, high conductivity zones may be preferentially sampled.

12. Measure and record field parameters (pH, specific conductance, Eh, dissolved oxygen (DO), temperature, and turbidity) during purging activities. In lieu of measuring all of the parameters, a minimum subset could be limited to pH, specific conductance, and turbidity or DO.

    Water quality indicator parameters should be used to determine purging needs prior to sample collection in each well. Stabilization of indicator parameters should be used to determine when formation water is first encountered during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by Eh, DO and turbidity. Performance criteria for determination of stabilization should be based on water-level drawdown, pumping rate and equipment specifications for measuring indicator

parameters. An in-line flow through cell to continuously measure the above parameters may be used. The in-line device should be disconnected or bypassed during sample collection.

13. Purging will continue until parameters of water quality have stabilized. Record measurements for field indicator parameters (including water levels) at regular intervals during purging. The stability of these parameters with time can be used to guide the decision to discontinue purging. Proper adjustments must be made to stabilize the flow rate as soon as possible.

14. Record well purging and sampling data in the Project Field Book or on the attached Groundwater Well Purge & Sample Collection Log (sample attached). Measurements should be taken approximately every three to five minutes, or as merited given the rapidity of change.

15. Purging is complete when field indicator parameters stabilize. Stabilization is achieved after all field parameters have stabilized for three successive readings. Three successive readings should be within ± 0.1 units for pH, ± 3% for specific conductance, ± 10 mV for Eh, and ± 10% for turbidity and dissolved oxygen. These stabilization guidelines are provided for rough estimates only, actual site-specific knowledge may be used to adjust these requirements higher or lower.

    An in-line water quality measurement device (e.g., flow-through cell) should be used to establish the stabilization time for several field parameters on a well-specific basis. Data on pumping rate, drawdown and volume required for parameter stabilization can be used as a guide for conducting subsequent sampling activities.

16. Collect all project-required samples from the discharge tubing at the flow rate established during purging in accordance with Benchmark's Groundwater Sample Collection Procedures FOP. **If a peristaltic pump and dedicated tubing is used, collect all project-required samples from the discharge tubing as stated before, however volatile organic compounds should be collected in accordance with the procedure presented in the next**

section. Continue to maintain a constant flow rate such that the water level is not drawn down as described above. Fill sample containers with minimal turbulence by allowing the ground water to flow from the tubing along the inside walls of the container.

17. If field filtration is recommended as a result of increased turbidity, an in-line filter equipped with a 0.45-micron filter should be utilized.

18. Replace the dedicated tubing down the well taking care to avoid contact with the ground surface.

19. Restore the well to its capped/covered and locked condition.

20. Upon purge and sample collection completion, slowly lower the e-line to the bottom of the well/piezometer. Record the total depth to the nearest 0.01-foot and compare to the previous total depth measurement. If a significant discrepancy exists, re-measure the total depth. Record observations of purge water to determine whether the well/piezometer had become silted due to inactivity or damaged (i.e., well sand within purge water). Upon confirmation of the new total depth and determination of the cause (i.e., siltation or damage), notify the Project Manager following project field activities.

PERISTALTIC PUMP VOC SAMPLE COLLECTION PROCEDURE

The collection of VOCs from a peristaltic pump and dedicated tubing assembly shall be collected using the following procedure.

1. Once all other required sample containers have been filled, turn off the peristaltic pump. The negative pressure effects of the pump head have not altered groundwater remaining within the dedicated tubing assembly and as such, this groundwater can be collected for VOC analysis.

2. While maintaining the pressure on the flexible tubing within the pump head assembly, carefully remove and coil the polyethylene tubing from the well; taking care to prevent the tubing from coming in contact with the ground

surface and without allowing groundwater to escape or drain from the tubing intake.

3. Once the polyethylene tubing is removed, turn the variable speed control to zero and reverse the pump direction.

4. Slowly increase the pump rate allowing the groundwater within the polyethylene tubing to be "pushed" out of the intake end (i.e., positive displacement) making sure the groundwater within the tubing is not "pulled" through the original discharge end (i.e., negative displacement). Groundwater pulled through the pump head assembly CANNOT be collected for VOC analysis.

5. Slowly fill each VOC vial by holding the vial at a 45-degree angle and allowing the flowing groundwater to cascade down the side until the vial is filled with as minimal disturbance as possible. As the vial fills, slowly rotate the vial to vertical. **DO NOT OVERFILL THE VIAL, AS THE PRESERVATIVE WILL BE LOST.** The vial should be filled only enough so that the water creates a slight meniscus at the vial mouth.

6. Cap the VOC vials leaving no visible headspace (i.e., air-bubbles). Gently tap each vial against your hand checking for air bubbles.

7. If an air bubble is observed, slowly remove the cap and repeat Steps 5 and 6.

ATTACHMENTS

Groundwater Field Form (sample)

REFERENCES

United States Environmental Protection Agency, 540/S-95/504, 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.*

Benchmark FOPs:

007 *Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008 *Calibration and Maintenance of Portable Field pH/Eh Meter*
009 *Calibration and Maintenance of Portable Field Turbidity Meter*
011 *Calibration and Maintenance of Portable Photoionization Detector*
012 *Calibration and Maintenance of Portable Specific Conductance Meter*
022 *Groundwater Level Measurement*
024 *Groundwater Sample Collection Procedures*
040 *Non-Disposable and Non-Dedicated Sampling Equipment Decontamination*
046 *Sample Labeling, Storage and Shipment Procedures*

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.			Diameter (inches):			Sample Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			Casing Volume:			Purpose: ☐ Development ☐ Sample			
Total Depth (fbTOR):			Purge Volume (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

Well No.			Diameter (inches):			Sample Time:			
Product Depth (fbTOR):			Water Column (ft):			DTW when sampled:			
DTW (static) (fbTOR):			Casing Volume:			Purpose: ☐ Development ☐ Sample			
Total Depth (fbTOR):			Purge Volume (gal):			Purge Method:			
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

REMARKS:

Note: All water level measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

PREPARED BY:

APPENDIX F

SITE-WIDE INSPECTION FORMS

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. C915211

Site Name NOCO S-41 Site

Site Address: 1055 Genesee Street Zip Code:

City/Town: Buffalo

County: Erie

Current Use: Commercial

Intended Use: Commercial

Verification of Site Details **Box 2**

		YES	NO
1.	Are the Site Details above, correct?	☐	☐
	If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4.	Has a change-of-use occurred since the initial/last certification?	☐	☐
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
	If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C915211 **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems as required in the SMP:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C915211

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

Mr. William Murray
New York State Department of Environmental Conservation
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, New York 14203

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Environmental Inspection Form
Site Management Plan

Property Name:		Project No.:	
Client:			
Property Address:		City, State:	Zip Code:
Property ID: (Tax Assessment Map)	Section:	Block:	Lot(s):
Preparer's Name:		Date/Time:	

CERTIFICATION

The results of this inspection were discussed with the owner and/or owner's representative. Any corrective actions required have been identified and noted in this report, and a supplemental Corrective Action Form has been completed. Proper implementation of these corrective actions have been discussed with the owner, agreed upon, and scheduled.

Preparer / Inspector: **Date:**

Signature: _____

Next Scheduled Inspection Date: [ ]

Final Surface Cover / Vegetation

In accordance with the Soil/Fill Management Plan, the integrity of the vegetative soil cover or other surface coverage (e.g., asphalt, concrete) over the entire Site must be maintained. The following documents the condition of the above.

1. Final Cover is in Place and in good condition?	☐ yes	☐ no	☐ N/A
Cover consists of (mainly): _____			
2. Evidence of erosion?	☐ yes	☐ no	☐ N/A
3. Cracks visible in pavement?	☐ yes	☐ no	☐ N/A
4. Evidence of distressed vegetation/turf?	☐ yes	☐ no	☐ N/A
5. Evidence of unintended traffic and/or rutting?	☐ yes	☐ no	☐ N/A
6. Evidence of uneven settlement and/or ponding?	☐ yes	☐ no	☐ N/A
7. Damage to any surface coverage?	☐ yes	☐ no	☐ N/A

If yes to any question above, please provide more information below.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Environmental Inspection Form
Site Management Plan

Property Use Changes / Site Development

Has the property usage changed, or site been redeveloped since the last inspection?

☐ yes ☐ no ☐ N/A

If so, please list with date: _____

_____

_____

_____

Active Sub-Slab Depressurization (ASD) System

Is there an ASD present on-site?

yes no N/A

If yes, is it currently operating?

yes no N/A

Is the ASD annual inspection checklist completed and enclosed?

yes no N/A

Long-Term Ground Water Monitoring ☐ ☐ ☐

Is there a plan in place and currently being followed?

☐ yes ☐ no ☐ N/A

Are the wells currently intact and operational?

☐ yes ☐ no ☐ N/A

When was the most recent sampling event report and submittal? Date: _____

When is the next projected sampling event? Date: _____

New Information

Has any new information been brought to the owner/engineer's attention regarding any and/or all engineering and institutional controls and their operation and effectiveness?

☐ yes ☐ no ☐ N/A

Comments: _____

_____

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Environmental Inspection Form
Site Management Plan

This space for Notes and Comments

Please include the following Attachments:

1. Site Sketch
2. Photographs

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Corrective Action Certification
Site Management Plan

Property Name:		Project No.:	
Client:			
Property Address:		City, State:	Zip Code:
Property ID: (Tax Assessment Map)	Section:	Block:	Lot(s):
Preparer's Name:		Date/Time:	

Issue Addressed

The Environmental Inspection of the above property determined the need for corrective action. This form has been completed to document the required corrective action and it's implementation.

Description of Site Issue identified during Environmental Inspection (include sketch & photographs):

Corrective Action Taken

Date Completed:

Describe Action Taken (include sketch & photographs):

Certification of Implementation

The signatory hereby certifies that the corrective action as described in this form has been completed in accordance with all relevant requirements of the Soil/Fill Management Plan and other applicable documents.

Preparer / Inspector: **Date:**

Signature:

Please verify inclusion of the following Attachments:

1. Site Sketch
2. Photographs

APPENDIX G

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

NOCO #S-41 SITE
1055 GENESEE STREET
BUFFALO, NEW YORK
BCP SITE NO. 915211

July 2009 0112-010-300

Prepared for:

NOCO Energy Corporation

QUALITY ASSURANCE PROJECT PLAN (QAPP)
NOCO #S-41 Site, 1055 Genesee Street

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LIST OF TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is an appendix to the Site Management Plan (SMP), which is a required element of the remedial program at the NOCO S-41 Site (hereinafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP), administered by New York State Department of Environmental Conservation (NYSDEC). The site was remediated in accordance with Brownfield Cleanup Agreement (BCA) Index #B9-0741-07-04, Site #C915211, which was executed on July 9, 2007.

1.1 Site Location and Description

The site is located in the City of Buffalo, County of Erie, New York and is identified as 1055 Genesee Street (SBL# 100.76-5-1) on the Erie County Tax Map. The site is an approximately 0.73-acre area bounded by Genesee Street to the north, a commercial property and Peterson Street to the south, one vacant parcel and residential property to the east, and Fillmore Avenue to the west. The boundaries of the site are more fully described in the Environmental Easement (See Appendix A of the SMP).

1.2 Site History

The site was used as a gasoline service station from approximately 1950 until 2007. Based on City of Buffalo permits and NYSDEC records reviewed, previous gas station owner/operators on-Site included Gulf Oil Corporation, Northeast Stations, Inc. and Cumberland Farms. NOCO has been site owner since approximately 1993. The Site is currently vacant and is improved with one building, which is the former convenience store building.

A Subsurface Investigation Report was completed by Sentinel Technologies, Inc. (Sentinel) in October 2004 to further investigate groundwater impacts previously identified in a tank field observation well. Ten soil borings were completed in the area of the underground storage tanks (USTs) and pump islands and in an area where impacted soil was biologically treated on-site. Groundwater samples were collected from three of the soil boring locations via temporary wells. The results of that study indicated that petroleum-

related volatile organic compounds (VOCs) were present above NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 Recommended Soil Cleanup Objectives (RSCOs) and groundwater quality standards (GWQS) on-site.

Benchmark completed a Supplemental Environmental Investigation on-Site in June 2006. A geophysical survey, thirteen test borings (SB-1 through SB-13) and three temporary monitoring wells (TPMW1-TPMW3) were completed in accessible areas of the subject property. No metallic objects were encountered in the area of geophysical anomalies. Soil samples detected the presence of VOCs in several soil boring locations across the site. Soil samples SB-1, SB-3, and SB-7 detected VOCs above NYSDEC RSCOs. Groundwater samples TPMW-1, TPMW-2, TPMW-3, OW-1, OW-2 and OW-3 detected VOCs above GWQS.

NOCO elected to pursue cleanup of the Site under the BCP, and executed a BCA with the NYSDEC in July 2007. A Remedial Investigation/Alternatives Analysis Report/Interim Remedial Measures (RI/AAR/IRM) Work Plan was approved in November 2007 and Benchmark performed RI/IRM activities on behalf of NOCO at the Site from February 2008 through June 2009. The IRM fieldwork, which was completed in February 2008, generally included: product dispenser island demolition; removal of USTs and product dispensers; petroleum-impacted soil excavation and off-Site disposal; groundwater extraction and treatment during soil excavation; and backfill/Site restoration. A RI was completed immediately following the IRM fieldwork to characterize the nature and extent of contamination at the Site. Remedial Investigation field activities included: soil borings; monitoring well installation; soil and groundwater sampling; and, soil gas sampling. Based on the Alternatives Analysis evaluation, it was concluded that the IRM, together with implementation of a Site Management Plan, satisfies the remedial action objectives and is protective of human health and the environment, and was selected as the final remedial approach for the NOCO #S-41 Site.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The following section provides a generic organization for sampling activities, including roles, responsibilities, and required qualifications of these organizations.

2.1 NYSDEC and NYSDOH

It is the responsibility of the New York State Department of Environmental Conservation (NYSDEC), in conjunction with the New York State Department of Health, to review the project documents for completeness and conformance with the site-specific cleanup objectives and to make a decision to accept or reject these documents based on this review. The NYSDEC also has the responsibility and authority to review and approve all QA documentation collected during brownfield cleanup construction and to confirm that the QA Plan was followed.

2.2 Property Owner

The property owner (Owner), or holder of the certificate of completion (COC) will be responsible for complying with the QA requirements as specified herein and for monitoring and controlling the quality of the Brownfield cleanup acttivities either directly or through their designated environmental consultant and/or legal counsel. The Owner will also have the authority to select Contractor(s) to assist them in fulfilling these responsibilities. The Owner is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements.

2.3 Project Manager

The Project Manager has the responsibility for ensuring that the project meets the overall project objectives, reports directly to the Owner, coordinates with the NYSDEC/NYSDOH Project Coordinators, and is responsible for technical and project oversight. The PM will:

- Define project objectives and develop a detailed work plan schedule.
- Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task.

- Acquire and apply technical and corporate resources as needed to assure performance within budget and schedule constraints.
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- Review the work performed on each task to assure its quality, responsiveness, and timeliness.
- Review and analyze overall task performance with respect to planned requirements and authorizations.
- Review and approve all deliverables before their submission to NYSDEC.
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- Ultimately be responsible for the preparation and quality of interim and final reports.
- Represent the project team at meetings.

2.4 Field Team Leader:

The Field Team Leader (FTL) has the responsibility for implementation of specific project tasks identified at the Site, and is responsible for the supervision of project field personnel, subconsultants, and subcontractors. The FTL reports directly to the Project Manager. The FTL will:

- Define daily develop work activities.
- Orient field staff concerning the project's special considerations.
- Monitor and direct subcontractor personnel.
- Review the work performed on each task to ensure its quality, responsiveness, and timeliness.
- Assure that field activities, including sample collection and handling, are carried out in accordance with this QAPP.

2.5 Quality Assurance (QA) Officer

The QA Officer will have direct access to corporate executive staff as necessary, to resolve any QA dispute, and is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations and policies, and NYSDEC requirements. Specific function and duties include:

- Performing QA audits on various phases of the field operations.
- Reviewing and approving QA plans and procedures.
- Providing QA technical assistance to project staff.
- Reporting on the adequacy, status, and effectiveness of the QA program on a regular basis to the Project Manager for technical operations.
- Responsible for assuring third party data review of all sample results from the analytical laboratory.

2.6 Laboratory Responsibilities

Any environmental laboratory utilized for sample analysis for this Site must be an independent, NY State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified facility approved to perform the analyses prescribed herein.

- *Laboratory Director:*

  The Laboratory Director is a technical advisor and is responsible for summarizing and reporting overall unit performance. Responsibilities of the TestAmerica Laboratory Director include:

  - Provide technical, operational, and administrative leadership.
  - Allocation and management of personnel and equipment resources.
  - Quality performance of the facility.
  - Certification and accreditation activities.
  - Blind and reference sample analysis.

- *Quality Assurance Manager (QA Manager):*

  The QA Manager has the overall responsibility for data after it leaves the laboratory. The QA Manager will be independent of the laboratory but will communicate data issues through the Laboratory Director. In addition, the QA Manager will:

  - Oversee laboratory QA.
  - Oversee QA/QC documentation.
  - Conduct detailed data review.
  - Determine whether to implement laboratory corrective actions, if required.
  - Define appropriate laboratory QA procedures.
  - Prepare laboratory SOPs.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall objectives and criteria for assuring quality for this effort are discussed below. This QAPP addresses how the acquisition and handling of samples and the review and reporting of data will be documented. The objectives of this QAPP are to address the following:

- The procedures to be used to collect, preserve, package, and transport groundwater samples.
- Field data collection.
- Record keeping.
- Data management.
- Chain-of-custody procedures.
- Precision, accuracy, completeness, representativeness, for sample analysis and data management under EPA analytical methods.

Analytical methods and detection/reporting limits for chemical parameters that may be analyze are listed in Tables 1 and 2. In addition, water levels and select water quality parameters (i.e., pH, turbidity, specific conductance, and temperature) will be measured in the field as described in the FOPs located in the SMP

The goals for precision, accuracy, and completeness intended for use on this project are discussed in Sections 3.1 through 3.3 of this QAPP. All data will be reported completely. No data will be omitted unless an error occurred in the analyses or the run was invalidated because of QC sample recovery or poor precision.

3.1 Precision

Precision is a measurement of the degree to which two or more measurements are in agreement, which is quantitatively assessed based on the standard deviation. Precision in the laboratory is assessed through the calculation of relative percent difference (RPD) and relative calculation of relative standard deviations (RSD) for three or more replicate samples. General precision goals are provided in Table 3.

Laboratory precision will be assessed through the analysis of matrix spike/matrix spike duplicate (MS/MSD) and field duplicate samples for organic parameters. For inorganic parameters, precision will be assessed through the analysis of matrix spike/ duplicates field duplicate pairs. Precision for field parameters, including pH, turbidity, specific conductance, and temperature will be determined through duplicate analysis of 1 in every 20 samples. Precision control limits for field-measured parameters are provided in Table 4.

3.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference of true value. Accuracy in the field is assessed through the use of field blanks and trip blanks and through the adherence to all sample handling, preservation and holding times. One trip blank will accompany each batch of water matrix sample containers shipped to the laboratory for volatile organic chemical analysis. Laboratory accuracy is assessed through the analysis of a matrix spike/matrix spike duplicate (MS/MSD) (1 per 20 samples), standard reference materials (SRM), laboratory control samples (LCS), and surrogate compounds, and the determination of percent recoveries. The equation to be used for accuracy for this investigation is found in Section 10.1 of this QAPP. Accuracy control limits for the laboratory are given in Table 3.

3.3 Completeness

Data completeness is a measure of the amount of valid data obtained from a prescribed measurement system as compared with that expected and required to meet the project goals. Laboratory and field completeness will be addressed by applying data quality checks and assessments described in Section 3.1 and 3.2 and Section 7.0 to ensure that the data collected are valid and significant.

As shown on Table 3, the laboratory completeness objectives will be 90 percent or greater. A third party data validator will follow procedures described in Section 7.2 to assess the completeness and validity of laboratory data deliverables. For this investigation, 100 percent of all laboratory analytical results will undergo third party data review. The

completeness of an analysis will be documented by including in the report sufficient information to allow the data validator to assess the quality of the results.

Raw data such as chromatograms, spectra, calibration data, laboratory worksheets and notes, etc will not be produced with the analytical data reporting package but will be stored with the sample results in the laboratory and made available upon request, if necessary, to substantiate analytical results. The raw data will be archived for at least two years by the laboratory. The laboratory will retain all analytical information; regardless of whether Benchmark requests the substantiation of results.

3.4 Data Representativeness

Data representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. All proposed field-testing and measurement procedures were selected to maximize the degree to which the field data will represent the conditions at the Site, and the matrix being sampled or analyzed.

As described in Section 8.0, Performance System Audits and the proper execution of field activities are the main mechanism for ensuring data representativeness. Representativeness in the laboratory is ensured through the use of the proper analytical procedures, appropriate methods, meeting sample holding times, and analyzing and assessing field duplicate samples.

3.5 Level of QC Effort for Sample Parameters

Field blank, method blank, trip blank, field duplicate, laboratory duplicate, laboratory control, standard reference materials (SRM) and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. QC samples are discussed below.

- Field and trip blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field-sampling program. Field (equipment) blank samples are analyzed to check for procedural chemical constituents at the facility that may

cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage.

- Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures.

- Duplicate samples are analyzed to check for sampling and analytical reproducibility.

- MS/MSD and MS/Duplicate samples provide information about the effect of the sample matrix on the digestion and measurement methodology. Depending on site-specific circumstances, one MS/MSD or MS/Duplicate should be collected for every 20 or fewer investigative samples to be analyzed for organic and inorganic chemicals of a given matrix.

The general level of QC effort will be one field (blind) duplicate and one field blank (when non-dedicated equipment is used) for every 20 or fewer investigative samples of a given matrix. Additional sample volume will also be provided to the laboratory to allow one site-specific MS/MSD or MS/Duplicate for every 20 or fewer investigative samples of a given matrix. One trip blank consisting of distilled, deionized water will be included along with each sample delivery group of aqueous VOC samples.

4.0 CUSTODY PROCEDURES

Sample custody is controlled and maintained through the chain-of-custody procedures. Chain of custody is the means by which the possession and handling of samples will be tracked from the source (field) to their final disposition, the laboratory. A sample is considered to be in a person's custody if it is in the person's possession or it is in the person's view after being in his or her possession or it was in that person's possession and that person has locked it in a vehicle or room. Sample containers will be cleaned and preserved at the laboratory before shipment to the Site.

4.1 Field Custody Procedures

Field logbooks and appropriate field forms will provide the means of recording data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that persons going to the facility could reconstruct a particular situation without reliance on memory. Field logbooks will be bound field survey books or notebooks. Each logbook will be identified by the project-specific document number. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned.
- Logbook number.
- Project name.
- Project start date.
- End date

Entries into the logbook or appropriate field form will contain a variety of information. At the beginning of each logbook entry, the date, start time, weather, names of all sampling team members present, level of personal protection equipment being used, and the signature of the person making the entry will be entered. The names of visitors to the Site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook. Measurements made and samples collected will be recorded in the logbook and appropriate field form. All entries will be made in permanent ink, signed, and dated and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is signed and dated by the sampler. Whenever a sample location is surveyed, which includes compass and distance measurements or, latitude

and longitude information (e.g., obtained by using a global positioning system) the location information shall be recorded. In the event that photographs are taken to document field activities, the number and brief description of the photographs taken will also be recorded. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in this QAPP. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. Sample identification numbers will be assigned prior to sample collection. Field duplicate samples, which will receive a separate sample identification number, will be noted under sample description.

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact. The protocol for specific sample numbering and other sample designations are included in an FOP provided in Appendix A of this QAPP. Examples of field custody documents and instructions for completion are also presented in Appendix A of this QAPP.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. Field procedures have been designed such that as few people as possible will handle the samples.

- All bottles will be identified by the use of sample tags with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in the FOP.

- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the ballpoint pen would not function in freezing weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

Samples will be properly packaged and cooled to 4° C for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be locked and secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by the field team leader. The cooler will be strapped shut with strapping tape in at least two locations.

4.2 Laboratory Custody Procedures

4.2.1 Sample Receipt

A sample custodian is responsible for receiving samples, completing chain-of-custody records, determining and documenting the condition of samples received through the Cooler Receipt and Preservation Form, logging samples into the LIMS system based upon the order of log-in, and storing samples in appropriate limited-access storage areas. Chain-of-custody documentation is also maintained for the transfer of samples between the laboratory, and for shipment of samples to subcontracted laboratories.

Upon sample receipt, an inventory of shipment contents is compared with the chain-of-custody record, and any discrepancies, including broken containers, inappropriate container materials or preservatives, headspace in volatile organic samples, and incorrect or unclear sample identification, are documented and communicated to the appropriate project manager.

Each sample is given a unique laboratory code and an analytical request form is generated. The analytical request contains pertinent information for each sample, including:

- Client name
- Project number
- Task number
- Purchase order number
- Air bill number
- Chain-of-custody number
- Number of samples

- Sample descriptions
- Sample matrix type
- Date and time of sampling
- Analysis due dates
- Date and time of receipt by lab
- Client sample identification
- Any comments regarding special instructions or discrepancies

4.2.2 Sample Storage

Samples are stored in secure limited-access areas. Walk-in coolers or refrigerators are maintained at 4°C, ± 2°C, or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location if necessary.

4.2.3 Sample Custody

Sample custody is defined by this document as when any of the following occur:

- It is in someone's actual possession.
- It is in someone's view after being in his or her physical possession.
- It was in someone's possession and then locked, sealed, or secured in a manner that prevents unsuspected tampering.
- It is placed in a designated and secured area.

Samples are removed from storage areas by the sample custodian or analysts and transported to secure laboratory areas for analysis. Access to the laboratory and sample storage areas is restricted to laboratory personnel and escorted visitors only; all areas of the laboratory are therefore considered secure. If required by the applicable regulatory program, internal chain-of-custody is documented in a log by the person moving the samples between laboratory and storage areas.

Laboratory documentation used to establish Chain of Custody and sample identification may include the following:

- Field Chain of Custody forms or other paperwork that arrives with the sample.
- The laboratory Chain of Custody.
- Sample labels or tags are attached to each sample container.
- Sample custody seals.
- Sample preparation logs (i.e., extraction and digestion information) recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample analysis logs (e.g., metals, GC/MS, etc.) information recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample storage log (same as the laboratory Chain of Custody).
- Sample disposition log, which documents sample disposal by a contracted waste disposal company.

4.2.4 Sample Tracking

All samples are maintained in the appropriate coolers prior to and after analysis. The analysts remove and return their samples as needed. Samples that require internal Chain of Custody are relinquished to the analysts by the sample custodians. The analyst and sample custodian must sign the original Chain of Custody relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned, the analyst will sign the original Chain of Custody returning sample custody to the sample custodian. Sample extracts are relinquished to the instrumentation analysts by the preparatory analysts. Each preparation department tracks internal Chain of Custody through their logbooks/spreadsheets.

Any change in the sample during the time of custody will be noted on the Chain of Custody (e.g., sample breakage or depletion).

4.2.5 Sample Disposal

A minimum of 30 days following completion of the project, or after a period of time specified by any applicable project requirements, sample disposal is performed in compliance with federal, state, and local regulations. Alternatively, samples may be returned to the client by mutual agreement. All available data for each sample, including laboratory analysis results and any information provided by the client, are reviewed before sample disposal.

All samples are characterized according to hazardous/non-hazardous waste criteria and are segregated accordingly. All hazardous waste samples are disposed of according to formal procedures by the laboratory. It should be noted that all waste produced at the laboratory, including the laboratory's own various hazardous waste streams, is treated in accordance with all applicable local and Federal laws.

Complete Internal Chain of Custody documentation is maintained for some samples from initial receipt through final disposal. This ensures that an accurate history of the sample from "cradle to grave" is generated.

5.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

5.1 Field Instrument Calibration

Quantitative field data to be obtained during groundwater sampling include pH, turbidity, specific conductance, temperature, and depth to groundwater. Quantitative water level measurements will be obtained with an electronic sounder or steel tape, which require no calibration. Quantitative field data to be obtained during soil sampling include screening for the presence of volatile organic constituents using a photoionization detector (PID). Field instruments used to monitor for these parameters will be calibrated in accordance with their manufacturer's recommendations.

5.2 Laboratory Instrument Calibration

All equipment and instruments used at the laboratory will be operated, maintained and calibrated according to the manufacturer's guidelines and recommendations, as well as to criteria set forth in the applicable analytical methodology. Operation and calibration will be performed by personnel who have been properly trained in these procedures.

6.0 ANALYTICAL PROCEDURES

The SMP describes the laboratory methods to be employed for post-remedial groundwater sampling. Samples will be analyzed by a NYSDOH ELAP-certified laboratory employing the appropriate analytical protocols and quality assurance procedures for the respective NYSDEC or USEPA methods. Tables 1 and 2 list the constituents of primary concern (COPCs) for soil and groundwater and Table 6 is a summary of the sample containers, volume, preservatives and holding time requirements.

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

All data generated through field activities, or by the laboratory operation shall be reduced and validated (as required in the SMP) before reported.

7.1 Data Reduction

7.1.1 Field Data Reduction Procedures

Field measurements of pH, turbidity, temperature, specific conductance, water level and volatile organic vapor content (via the PID) are read directly in the units of final use, as discussed in this QAPP and listed in Table 5. Field personnel are responsible for monitoring the collection and reporting of field data. Field personnel will review field measurements at the time of measurement and will re-measure a parameter as necessary to assure quality and accuracy are maintained.

Field data will be recorded on appropriate field data record forms or the Project Field Book as they are collected and will be maintained in the project file. The Project QA Officer will review field procedures and compare field data to previous measurements to assess comparability and accuracy of the field data measurements.

7.1.2 Laboratory Data Reduction Procedures

Results of laboratory analyses will be reported in units of final use as listed in Table 5. Laboratory calculations will be performed as prescribed for a given analytical method or in conformance with acceptable laboratory standards at the time the calculation is performed.

The laboratory will retain quality assurance/quality control (QA/QC) records for at least five years. Original laboratory reports will be stored in the project files. Copies of raw data will be available for review at the laboratory. Copies of raw data also may be requested as part of the QA/QC review. A Data Usability Summary Report (DUSR), which follows NYSDEC's September 1997 DUSR guidelines and will be developed from complete USEPA SW-846 Equivalent Category B deliverable and completed an independent third party data validator .

7.2 Data Usability Evaluation

If requested by the NYSDEC, data evaluation will be performed by a third party data validator using the most current methods and quality control criteria from the USEPA's Contract Laboratory Program (CLP) *National Functional Guidelines for Organic Data Review*, and Contract Laboratory Program*, National Functional Guidelines for Inorganic Data Review*

7.3 Data Reporting

7.3.1 Field Data Reporting

All field documents will be accounted for when they are completed. Accountable documents include items such as field notebooks, sample logs, field data records, photographs, data packages, computer disks, and reports.

7.3.2 Laboratory Data Reporting

Analytical data will be summarized in tabular format with such information as sample identification, sample matrix description, parameters analyzed and their corresponding detected concentrations, and the detection limit. Analytical results will be incorporated into reports as data tables, maps showing sampling locations and analytical results, and supporting text.

8.0 PERFORMANCE SYSTEM AUDITS AND FREQUENCY

8.1 Field Performance and System Audits

8.1.1 Internal Field Audits

The QA Officer may conduct internal audits of field activities including sampling and field measurements. These audits will verify that all established procedures are being followed. Internal field audits will be conducted at least once at the beginning of the Site sample collection activities. Project duration may warrant subsequent audits on a monthly basis.

The audit program consists of the following:

- Observation of field activities to confirm that procedures are performed in accordance with project protocols and standard accepted methods.

- Review daily field records, monitoring well sampling records, and any other data collection sheets during and after field measurements.

8.1.2 External Field Audits

The NYSDEC Site Project Coordinator may conduct external field audits. External field audits may be conducted any time during the field operations. These audits may or may not be announced and are at the discretion of the NYSDEC.

8.2 Laboratory System Audits

The adequacy and implementation of a laboratory's quality assurance plan are assessed on a continual basis through systems and performance audits. Systems audits evaluate practice against established quality system objectives and requirements. Performance audits measure the comparability and accuracy of laboratory data through the analysis of reference materials for which the true value is unknown to the analyst. Audits may be performed by the laboratory (internal), or by clients, regulatory agencies, or accreditation bodies (external).

9.0 PREVENTATIVE MAINTENANCE

Each piece of field equipment is checked according to its routine maintenance schedule and before field activities begin. Field equipment that may be used at the Site includes:

- Photoionization detector (PID)
- Water quality meters (includes pH, turbidity, temperature, Eh, and specific conductance)
- Electric water level indicator

Field personnel will report all equipment maintenance and/or replacement needs to the Project QA Officer and will record the information on the daily field record.

10.0 DATA PRECISION, ACCURACY, AND COMPLETENESS EVALUATION

10.1 Accuracy Assessment

Data accuracy, which is assessed for laboratory data only, is based on recoveries, expressed as the percentage of the true (known) concentration, from laboratory spiked samples and QA/QC samples generated by the analytical laboratory.

Percent recovery (%R) for MS/MSD results is determined according to the following equation:

$$R\% = \frac{(A - B) \times 100}{T}$$

Where A = measured concentration after spiking
B = background concentration
T = known true value of spike

Percent recovery (%R) for LCS and surrogate compound results is determined according to the following equation:

$$R\% = \frac{\text{Experimental Concentration}}{\text{Known amount added}} \times 100$$

This information is reviewed periodically by the Project Manager or Project QA Officer. The goals for the recovery of any constituent in a spiked or QA/QC sample are presented in Table 3. For data generated in the field, the accuracy goals are summarized in Table 4.

10.2 Precision Assessment

For data generated by the laboratory, data precision is estimated by comparing analytical results from duplicate samples. The comparison is made by calculating the relative percent difference (RPD) given by:

$$RPD\% = \frac{2(S_1 - S_2)}{S1 + S2} \times 100$$

Where S_1 = sample result
S_2 = duplicate result

This information is calculated and reviewed periodically by the Project Manager and/or Project QA Officer. The goals for data precision for duplicate samples are presented in Table 3. For data generated in the field, the precision goals are summarized in Table 4.

10.3 Completeness Assessment

Data completeness will be evaluated by comparing the objectives of sampling efforts with the data obtained and determining whether there are any shortcomings in required information. Completeness is defined as the percentage of valid results according to the equation below:

$$\% \text{ completeness} = \frac{A}{B} \times 100$$

Where: A = number of valid results;
B = total number of possible results

The goals for data completeness for laboratory measurements were presented previously in Table 3. For data generated in the field, the completeness goals are summarized in Table 4.

10.4 Assessment of Data

To assess the integrity of the data generated during this investigation, the Project Manager and QA Officer will review the laboratory analytical data and field data in accordance with procedures and protocols outlined in this QAPP. An assessment will be made to determine if the project objectives have been achieved and meet objectives for data integrity.

11.0 CORRECTIVE ACTION

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out of quality control performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. All corrective action proposed and implemented should be documented in the regular quality assurance reports to management. Corrective action should be implemented only after approval by the Project Manager, or his/her designee. If immediate corrective action is required, approvals secured by telephone from the Project Manager should be documented in an additional memorandum.

11.1 Field Corrective Action

If errors in field procedures are discovered during the observation or review of field activities by the Project QA Officer or his/her designee, corrective action will be initiated. Nonconformance to the QA/QC requirements of the field operating procedures will be identified by field audits or immediately by project staff who know or suspect that a procedure is not being performed in accordance with the requirements. The Project QA Officer or his designee will be informed immediately upon discovery of all deficiencies. Timely action will be taken if corrective action is necessary.

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Work Plan, etc.) or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. In general, the Project Manager and QA Officer may identify the need for corrective action. The Project Manager will approve the corrective measure that will be implemented by the field team. It will be the responsibility of the Project Manager to ensure that corrective action has been implemented.

If the corrective action will supplement the existing sampling using existing and approved procedures in the QAPP, corrective action approved by the Project Manager will be documented. If the corrective actions result in less samples (or analytical fractions), alternate locations, etc., which may result in non-achievement of project QA objectives, it will be necessary that all levels of project management, including the NYSDEC Project Coordinator, concur with the proposed action.

Corrective actions will be implemented and documented in the project field record book. No staff member will initiate corrective action without prior communication of findings through the proper channels. If corrective actions are insufficient, work may be stopped by the NYSDEC Project Coordinator.

If at any time a corrective action issue is identified which directly impacts project data quality objectives, the NYSDEC Project Coordinator will be notified immediately.

11.2 Laboratory Corrective Action

Corrective actions may be initiated if the quality assurance goals are not achieved. The initial step in a corrective action is to instruct the analytical laboratory to examine its procedures to assess whether analytical or computational errors caused the anomalous result. If no error in laboratory procedures or sample collection and handling procedures can be identified, then the Project Manager will assess whether reanalysis or resampling is required or whether any protocol should be modified for future sampling events.

11.3 Data Validation & Assessment Corrective Action

The need for corrective action may be identified during the data validation or assessment processes. Potential types of corrective action may include resampling by the field team, or reinjection/reanalysis of samples by the laboratory.

These actions are dependent upon the ability to mobilize the field team, whether the data to be collected is necessary to meet the QA objectives (e.g., the holding time for samples is not exceeded, etc.). If the data validator identifies a corrective action situation, the Project Manager will be responsible for approving the corrective action implementation. All required corrective actions will be documented by the laboratory Quality Assurance Coordinator.

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Periodic reports summarizing certain field activities may be required at the Site. Those reports will be the responsibility of the Project Manager and will include the QA Officers input on the accuracy, precision, and completeness of the data, as well as the results of the performance and system audits, and any corrective action needed or taken during the project.

12.1 Contents of Project QA Reports

The progress reports will contain, on a routine basis, a QA section describing all results of field and laboratory audits, all information generated during the period of work activities reflecting on the achievement of specific DQOs, and a summary of corrective action that was implemented, and its immediate results on the project. The status of the project with respect to the Project Schedule included in this QAPP will be determined. Whenever necessary, updates on training provided, changes in key personnel, anticipated problems in the field or laboratory for the coming month that could bear on data quality along with proposed solutions, will be reported. All QA reports will be prepared in written, final format by the project manager or his designee. To the extent possible, assessment of the project should also be performed on the basis of available QC data and overall results in relation to originally targeted objectives.

In the event of an emergency, or in case it is essential to implement corrective action immediately, QA reports can be made by telephone to the appropriate individuals, as identified in the Project Organization and Corrective Action sections of this QAPP. However, these events, and their resolution will be addressed thoroughly in the next periodic progress report.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CONSTITUENTS OF PRIMARY CONCERN (COPCs)
FOR SOIL

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
STARS Volatile Organic Compounds: (15 compounds) (ug/kg)				
Benzene	*71-43-2*	8021B	1	0.11
n-Butylbenzene	*104-51-8*	8021B	1	1.00
sec-Butylbenzene	*135-98-8*	8021B	1	0.08
tert-Butylbenzene	*98-06-6*	8021B	1	0.12
p-Cymene	*99-87-6*	8021B	1	0.41
Ethylbenzene	*100-41-4*	8021B	1	0.07
Isopropylbenzene	*98-82-8*	8021B	1	0.08
Methyl tert butyl ether	*1634-04-4*	8021B	1	0.06
n-Propylbenzene	*103-65-1*	8021B	1	0.11
Toluene	*108-88-3*	8021B	1	0.04
1,2,4-Trimethylbenzene	*95-63-6*	8021B	1	0.40
1,3,5-Trimethylbenzene	*108-67-8*	8021B	1	0.84
o-Xylene	*95-47-6*	8021B	1	0.01
p-Xylene	*106-42-3*	8021B	1	0.04
m-Xylene	*108-38-3*	8021B	1	0.04
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/kg) ***[includes Base-Neutrals (black) and Acid Extractables (blue)]***				
Acenaphthene	*83-32-9*	8270C	330	11.00
Acenaphthylene	*208-96-8*	8270C	330	10.00
Anthracene	*120-12-7*	8270C	330	9.00
Benzo(a)anthracene	*56-55-3*	8270C	330	13.00
Benzo(a)pyrene	*50-32-8*	8270C	330	11.00
Benzo(b)fluoranthene	*205-99-2*	8270C	330	15.00
Benzo(g,h,i)perylene	*191-24-2*	8270C	330	10.00
Benzo(k)fluoranthene	*207-08-9*	8270C	330	17.00
Benzyl alcohol	*100-51-6*	8270C	330	14.00
bis(2-Chloroethoxy)methane	*111-91-1*	8270C	330	14.00
bis(2-Chloroethyl)ether	*111-44-4*	8270C	330	14.00
2,2'-oxybis(1-chloropropane); bis(2-chloroisopropyl)ether	*108-60-1*	8270C	330	14.00
bis(2-Ethylhexyl)phthalate	*117-81-7*	8270C	330	19.00
Butyl benzyl phthalate	*85-68-7*	8270C	330	17.00
4-Bromophenyl phenyl ether	*101-55-3*	8270C	330	11.00
4-Chloroaniline	*106-47-8*	8270C	330	18.00
4-Chloro-3-methylphenol	*59-50-7*	8270C	330	12.00
2-Chloronaphthalene	*91-58-7*	8270C	330	13.00
2-Chlorophenol	*95-57-8*	8270C	330	12.00
4-Chlorophenyl-phenylether	*7005-72-3*	8270C	330	12.00
Chrysene	*218-01-9*	8270C	330	10.00
Dibenzo(a,h)anthracene	*53-70-3*	8270C	330	13.00
Dibenzofuran	*132-64-9*	8270C	330	10.00
3,3'-Dichlorobenzidine	*91-94-1*	8270C	330	148.00
2,4-Dichlorophenol	*120-83-2*	8270C	330	15.00
1,2-Dichlorobenzene	*95-50-1*	8270C	330	15.00

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TABLE 1

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Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/kg) *[includes Base-Neutrals (black) and Acid Extractables (blue)]*				
1,3-Dichlorobenzene	*541-73-1*	8270C	330	14.00
1,4-Dichlorobenzene	*106-46-7*	8270C	330	13.00
Diethyl phthalate	*84-66-2*	8270C	330	9.00
2,4-Dimethylphenol	*105-67-9*	8270C	330	33.00
Dimethyl phthalate	*131-11-3*	8270C	330	10.00
Di-n-butyl phthalate	*84-74-2*	8270C	330	11.00
Di-n-octyl phthalate	*117-84-0*	8270C	330	31.00
4,6-Dinitro-2-methylphenol	*534-52-1*	8270C	1600	66.00
2,4-Dinitrophenol	*51-28-5*	8270C	1600	120.00
2,4-Dinitrotoluene	*121-14-2*	8270C	330	33.00
2,6-Dinitrotoluene	*606-20-2*	8270C	330	66.00
Fluoranthene	*206-44-0*	8270C	330	12.00
Fluorene	*86-73-7*	8270C	330	10.00
Hexachlorobenzene	*118-74-1*	8270C	330	11.00
Hexachlorobutadiene	*87-68-3*	8270C	330	13.00
Hexachlorocyclopentadiene	*77-47-4*	8270C	330	12.00
Hexachloroethane	*67-72-1*	8270C	330	14.00
Indeno(1,2,3-cd)pyrene	*193-39-5*	8270C	330	11.00
Isophorone	*78-59-1*	8270C	330	13.00
2-Methylnaphthalene	*91-57-6*	8270C	330	14.00
2-Methylphenol (o-Cresol)	*95-48-7*	8270C	330	33.00
4-Methylphenol (p-Cresol)	*106-44-5*	8270C	330	14.00
Naphthalene	*91-20-3*	8270C	330	14.00
2-Nitroaniline	*88-74-4*	8270C	1600	12.00
3-Nitroaniline	*99-09-2*	8270C	1600	17.00
4-Nitroaniline	*100-01-6*	8270C	1600	66.00
Nitrobenzene	*98-95-3*	8270C	330	12.00
2-Nitrophenol	*88-75-5*	8270C	330	66.00
4-Nitrophenol	*100-02-7*	8270C	1600	66.00
N-Nitrosodiphenylamine	*86-30-6*	8270C	330	29.00
N-Nitroso-di-n-propylamine	*621-64-7*	8270C	330	13.00
Pentachlorophenol	*87-86-5*	8270C	1600	50.00
Phenanthrene	*85-01-8*	8270C	330	11.00
Phenol	*108-95-2*	8270C	330	11.00
Pyrene	*129-00-0*	8270C	330	11.00
1,2,4-Trichlorobenzene	*120-82-1*	8270C	330	18.00
2,4,5-Trichlorophenol	*95-95-4*	8270C	800	14.00
2,4,6-Trichlorophenol	*88-06-2*	8270C	330	13.00
TAL Metals (modified): (12 compounds) (mg/L) *[site specific metals in blue]*				
Antimony	*7440-38-2*	6010B	15	0.69
Arsenic	*7440-38-2*	6010B	2	0.37
Barium	*7440-39-3*	6010B	0.5	0.05
Cadmium	*7440-43-9*	6010B	0.2	0.06
Chromium	*7440-47-3*	6010B	0.5	0.14
Lead	*7439-92-1*	6010B	1	0.19
Mercury	*7439-97-6*	7471A	0.02	0.0071
Nickel	*7440-02-0*	6010B	0.5	0.12
Potassium	*7440-09-7*	6010B	30	8.4
Selenium	*7782-49-2*	6010B	4	0.48
Silver	*7440-22-4*	6010B	0.5	0.15
Thallium	*7440-28-0*	6010B	6	0.66

Notes:

1. Analytes as per NYSDEC and USEPA list of parameters.
2. Analytical methods per USEPA publication, SW-846, "Test Methods for Evaluating Solid Waste", Third Edition.

Acronyms/Abbreviations:

CAS = Chemical Abstracts Service registry number.
MDL = Method Detection Limit provided by STL
PQL = Practical Quantitation Limit
mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

CONSTITUENTS OF PRIMARY CONCERN (COPCs)
FOR GROUNDWATER

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Analyte[1]	*CAS Number*	Analytical Method [2]	PQL	MDL
STARS Volatile Organic Compounds: (15 compounds) (ug/L)				
Benzene	*71-43-2*	8021B	0.2	0.02
n-Butylbenzene	*104-51-8*	8021B	0.4	0.03
sec-Butylbenzene	*135-98-8*	8021B	0.4	0.02
tert-Butylbenzene	*98-06-6*	8021B	0.4	0.03
p-Cymene	*99-87-6*	8021B	0.4	0.28
Ethylbenzene	*100-41-4*	8021B	0.2	0.03
Isopropylbenzene	*98-82-8*	8021B	0.2	0.03
Methyl tert butyl ether	*1634-04-4*	8021B	0.4	0.23
n-Propylbenzene	*103-65-1*	8021B	0.2	0.03
Toluene	*108-88-3*	8021B	0.2	0.04
1,2,4-Trimethylbenzene	*95-63-6*	8021B	0.2	0.03
1,3,5-Trimethylbenzene	*108-67-8*	8021B	0.2	0.17
o-Xylene	*95-47-6*	8021B	0.2	0.09
p-Xylene	*106-42-3*	8021B	0.4	0.25
m-Xylene	*108-38-3*	8021B	0.4	0.25
TCL Semi-Volatile Organic Compounds (full list): (69 compounds) (ug/L) ***(includes Base-Neutrals (black) and Acid Extractables (blue))***				
Acenaphthene	*83-32-9*	8270C	10	0.15
Acenaphthylene	*208-96-8*	8270C	10	0.09
Anthracene	*120-12-7*	8270C	10	0.10
Benzo(a)anthracene	*56-55-3*	8270C	10	0.16
Benzo(a)pyrene	*50-32-8*	8270C	10	0.09
Benzo(b)fluoranthene	*205-99-2*	8270C	10	0.17
Benzo(g,h,i)perylene	*191-24-2*	8270C	10	0.12
Benzo(k)fluoranthene	*207-08-9*	8270C	10	0.12
Benzyl alcohol	*100-51-6*	8270C	20	1.79
bis(2-Chloroethoxy)methane	*111-91-1*	8270C	10	2.10
bis(2-Chloroethyl)ether	*111-44-4*	8270C	10	2.44
2,2'-oxybis(1-chloropropane); bis(2-chloroisopropyl)ether	*108-60-1*	8270C	10	1.77
bis(2-Ethylhexyl)phthalate	*117-81-7*	8270C	10	2.80
Butyl benzyl phthalate	*85-68-7*	8270C	10	7.47
4-Bromophenyl phenyl ether	*101-55-3*	8270C	10	2.50
4-Chloroaniline	*106-47-8*	8270C	10	1.05
4-Chloro-3-methylphenol	*59-50-7*	8270C	10	2.73
2-Chloronaphthalene	*91-58-7*	8270C	10	1.94
2-Chlorophenol	*95-57-8*	8270C	10	1.00
4-Chlorophenyl-phenylether	*7005-72-3*	8270C	10	2.42
Chrysene	*218-01-9*	8270C	10	0.17
Dibenzo(a,h)anthracene	*53-70-3*	8270C	10	0.12
Dibenzofuran	*132-64-9*	8270C	10	0.12
3,3'-Dichlorobenzidine	*91-94-1*	8270C	20	7.43
2,4-Dichlorophenol	*120-83-2*	8270C	10	2.13
1,2-Dichlorobenzene	*95-50-1*	8270C	10	2.50
1,3-Dichlorobenzene	*541-73-1*	8270C	10	2.43
1,4-Dichlorobenzene	*106-46-7*	8270C	10	2.45
Diethyl phthalate	*84-66-2*	8270C	10	2.99
2,4-Dimethylphenol	*105-67-9*	8270C	10	1.60
Dimethyl phthalate	*131-11-3*	8270C	10	2.53
Di-n-butyl phthalate	*84-74-2*	8270C	10	6.64
Di-n-octyl phthalate	*117-84-0*	8270C	10	6.95
4,6-Dinitro-2-methylphenol	*534-52-1*	8270C	50	7.62
2,4-Dinitrophenol	*51-28-5*	8270C	50	10.51
2,4-Dinitrotoluene	*121-14-2*	8270C	10	3.52
2,6-Dinitrotoluene	*606-20-2*	8270C	10	2.67
Fluoranthene	*206-44-0*	8270C	10	0.14
Fluorene	*86-73-7*	8270C	10	0.10
Hexachlorobenzene	*118-74-1*	8270C	10	1.14
Hexachlorobutadiene	*87-68-3*	8270C	10	3.50
Hexachlorocyclopentadiene	*77-47-4*	8270C	45	23.67
Hexachloroethane	*67-72-1*	8270C	10	3.47
Indeno(1,2,3-cd)pyrene	*193-39-5*	8270C	10	0.13
Isophorone	*78-59-1*	8270C	10	2.51
2-Methylnaphthalene	*91-57-6*	8270C	10	0.09
2-Methylphenol (o-Cresol)	*95-48-7*	8270C	10	2.07
4-Methylphenol (p-Cresol)	*106-44-5*	8270C	10	1.09
Naphthalene	*91-20-3*	8270C	10	0.11
2-Nitroaniline	*88-74-4*	8270C	50	4.50
3-Nitroaniline	*99-09-2*	8270C	50	3.50
4-Nitroaniline	*100-01-6*	8270C	50	3.14
Nitrobenzene	*98-95-3*	8270C	10	2.27
2-Nitrophenol	*88-75-5*	8270C	10	2.00
4-Nitrophenol	*100-02-7*	8270C	50	15.00
N-Nitrosodiphenylamine	*86-30-6*	8270C	10	2.29
N-Nitroso-di-n-propylamine	*621-64-7*	8270C	10	1.66
Pentachlorophenol	*87-86-5*	8270C	50	9.54
Phenanthrene	*85-01-8*	8270C	10	0.14
Phenol	*108-95-2*	8270C	10	1.10
Pyrene	*129-00-0*	8270C	10	0.17
1,2,4-Trichlorobenzene	*120-82-1*	8270C	10	2.45
2,4,5-Trichlorophenol	*95-95-4*	8270C	10	3.21
2,4,6-Trichlorophenol	*88-06-2*	8270C	10	1.92

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TABLE 2

CONSTITUENTS OF PRIMARY CONCERN (COPCs)
FOR GROUNDWATER

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Analyte[1]	*CAS Number*	Analytical Method[2]	PQL	MDL
TAL Metals (modified): (12 compounds) (mg/L) ***[site specific metals in blue]***				
Antimony	*7440-38-2*	6010B	0.02	0.0055
Arsenic	*7440-38-2*	6010B	0.01	0.00338
Barium	*7440-39-3*	6010B	0.002	0.00017
Cadmium	*7440-43-9*	6010B	0.001	0.00034
Chromium	*7440-47-3*	6010B	0.004	0.0009
Lead	*7439-92-1*	6010B	0.005	0.0016
Mercury	*7439-97-6*	7470A	0.0002	0.00015
Nickel	*7440-02-0*	6010B	0.01	0.0011
Potassium	*7440-09-7*	6010B	0.5	0.039
Selenium	*7782-49-2*	6010B	0.015	0.0061
Silver	*7440-22-4*	6010B	0.003	0.0009
Thallium	*7440-28-0*	6010B	0.02	0.0066
Field Parameters: (5 compounds) (units as identified below)				
pH (units)	*NA*	field	NA	NA
Temperature (°C)	*NA*	field	NA	NA
Specific Conductance (uS/mS)	*NA*	field	NA	NA
Turbidity (NTU)	*NA*	field	NA	NA
Dissolved Oxygen	*NA*	field	NA	NA

Notes:

1. Analytes as per NYSDEC and USEPA list of parameters.
2. Analytical methods per USEPA publication, SW-846, "Test Methods for Evaluating Solid Waste", Third Edition.

Acronyms/Abbreviations:

CAS = Chemical Abstracts Service registry number.
MDL = Method Detection Limit provided by STL
mg/L = milligrams per liter
mS = milli-Siemans
ug/L = micrograms per liter
uS = micro-Siemans
NA = not applicable
NTU = nephelometric turbidity unit
PQL = Practical Quantitation Limit

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TABLE 3

PROJECT GOALS FOR PRECISION, ACCURACY & COMPLETENESS FOR LABORATORY MEASUREMENTS

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Analytical Method	Precision Goal [1] (RPD) [2]	Accuracy Goal (% R) [3]		Completeness Goal (%)
	Soil & Water	Soil	Water	
STARS 8021B or EPA 8260B	± 30	± 50	± 30	90
EPA 8270C	± 30	± 50	± 30	90
EPA 6010B and EPA 7470A/7471A	± 30	± 50	± 30	90
Water Quality Parameters	± 30	NA	± 30	90

Notes:

1. Precision goals vary depending on the compound being analyzed; the precision goals presented are general in nature.
2. RPD = Relative Percent Difference
3. %R = Percent Recovery

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TABLE 4

PROJECT GOALS FOR PRECISION, ACCURACY & COMPLETENESS FOR FIELD MEASUREMENTS

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Measurement	Units	Precision Goal	Accuracy Goal	Completeness Goal
pH	pH units	± 0.2 unit	± 0.2 unit	90%
Eh	milli-volts (mV)	± 1.0 mV	± 1.0 mV	90%
Temperature	degrees Celsius (^{o}C)	± 0.2 deg. C	± 0.4 deg. C	90%
Turbidity	NTU	± 0.05 NTU	± 0.05 NTU	90%
Specific Conductance	μS/cm at 25^{o}C mS/cm at 25oC	± 100 uS/cm ± 0.1 mS/cm	± 100 uS/cm ± 0.1 mS/cm	90%
Dissolved Oxygen	ppm	± 0.3 ppm	± 0.3 ppm	90%
Water Level	fbTOR	± 0.01 unit	± 0.01 unit	90%

Acronyms/Abbreviations:

fbTOR = feet below top of riser
mS = milli-Siemans
NTU = nephelometric turbidity unit
ug/L = micrograms per liter

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TABLE 5

DATA MEASUREMENT UNITS FOR
FIELD & LABORATORY PARAMETERS

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Parameter	Units
Water Level	feet below top of riser (fbTOR)
pH	pH units
Eh	milli-volts (mV)
Temperature	degrees Celsius (^{o}C)
Turbidity	Nephelometric Turbidity Unit (NTU)
Specific Conductance	microsiemens per centimeter at 25^{o}C (μS/cm) millisiemens per centimeter at 25^{o}C (mS/cm)
Dissolved Oxygen (DO)	parts per million (ppm)
Concentration of parameter in soil sample	micrograms per kilogram (μg/kg) organic milligrams per kilogram (mg/kg) inorganic
Concentration of parameter in groundwater sample	micrograms per liter (μg/L) organic milligrams per liter (mg/L) inorganic
Hydraulic Conductivity	centimeters per second (cm/sec)
Photoionization Detector (PID)	parts per million by volume (ppmv)

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TABLE 6

SAMPLE CONTAINER, VOLUME, PRESERVATION &
HOLDING TIME REQUIREMENTS

NOCO #S-41 Site
1055 Genesee Street
Buffalo, New York

Matrix	Parameter [1]	Method [1]	Container Type	Minimum Volume	Preservation (Cool to 2-4 °C for all samples)	Holding Time from Sample Date
Soil	STARS VOCs	8260B	WMG	16 oz.	Cool to 2-4 °C, Zero Headspace	14 days
	TCL SVOCs	8270C	WMG	16 oz.	Cool to 2-4 °C	14 days extrac./40 days
	TAL Metals	6010B	WMG	4 oz.	Cool to 2-4 °C	6 months/Hg 28 days
	TCLP Benzene	8260	WMG	8oz	Cool to 2-4 °C, Zero Headspace	14 days extrac./14 days
	TCLP Lead	6010	WMG	8oz	Cool to 2-4 °C	6 months extrac./6 months
	Ignitability	1010	WMG	8oz	Cool to 2-4 °C	6 months
Groundwater	STARS VOCs	8260B	glass vial	3 - 4 oz.	Cool to 2-4 °C, HCl to pH<2,Zero Headspace	14 days

References:

1. Test Methods for Evaluating Solid Wastes, USEPA SW-846, Update III, 1991.

Notes:

1. EPA-approved methods published in Reference 1 above may be used. The list of analytes, laboratory method and the method detection limit for each parameter are included in Tables 1 and 2 of the QAPP.

Acronyms:

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
TCLP = Toxicity Characteristic Leaching Procedure
TCL = Target Compound List
TAL = Target Analyte List
WMG = Wide Mouth Glass