

Interim Remedial Measure Work Plan

Fort Edward, NY (Canal Street) Former MGP Site Fort Edward, Washington County, New York Site #V00472

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April 2009

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- Section 01010 Summary of Work
- Section 01025 Measurement and Payment
- Section 01300 Contractor Submittals
- Section 01560 Temporary Environmental Controls
- Section 02100 Site Preparation
- Section 02140 Dewatering
- Section 02141 Collection and Disposal of Waste
- Section 02200 Earthwork
- Section 02270 Site Restoration
- Bid Schedule National Grid Ft. Edward Interim Remedial Measures

ACRONYM LIST

Below Detection Limit
Below Ground Surface
New York State Department of Environmental Conservation, Division
of Environmental Remediation (DER) technical guidance document for
site investigation and remediation.
Health and Safety Plan
Monitoring Well
New York State Department of Environmental Conservation
New York Code of Rules and Regulations
Polynuclear Aromatic Hydrocarbons
parts per million
Quality Assurance Project Plan
Remedial Action Objective
Standards, Criteria and Guidance values
Site Management Plan
Semivolatile Organic Compounds (PAHs)
Volatile Organic Compounds

1.0 INTRODUCTION

1.1 BACKGROUND

National Grid (formerly Niagara Mohawk) and the New York State Department of Environmental Conservation (NYSDEC) entered into a Voluntary Cleanup Order (the VCO) (Index Number DO-0001-0011) in July 2001 to investigate and, as necessary, remediate, 24 locations that may at one time have been former manufactured gas plant (MGP) sites. The Fort Edward (Canal Street) site ("the Site") was identified as one of these former MGP sites. National Grid has completed a series of site investigations and remedial measure evaluations at the Canal Street Site in order to comply with the VCO. These activities are documented in the *Site Characterization/IRM Study (SC/IRM Study)* submitted in final form to the NYSDEC in June 2007 and the *Interim Remedial Measure (IRM) Pre-Design Report* submitted in final form to the NYSDEC in October 2008.

1.2 SITE LOCATION

The Site is located at 22 Canal Street, in the Village of Fort Edward, Washington County, New York (**Figure 1**, Site Location Map). This 1.6 acre parcel, identified as Tax Map 171.6-3-30.2, is zoned for residential use. It is on the east side of Canal Street, south of Notre Dame Street.

1.3 SITE DESCRIPTION

Currently, there are no buildings or sheds on the Site. The western side of the property, along Canal Street, is a level strip approximately 40-feet wide. The eastern end of the property is approximately 6-feet lower than street level. The northern side of the property slopes gently to the east, while a steeper embankment is located on the southern side. Four mature deciduous trees have grown in the vicinity of the embankment, and dense brush, about 4-foot high, lies along the southern property boundary and the eastern end of the property. Otherwise, short grass and low-lying weeds cover the ground surface of the Site.

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A ring of concrete pavers is set in the vicinity of the former swimming pool with additional poured concrete slabs northeast of this ring. Dirt and ground cover overlay the perimeter of the poured concrete slabs.

Fill materials exist in the western portion of the Site adjacent to, and south of, the former gas building. The fill material consists of silty sand with some brick, ash and slag. The fill is underlain by brown silty sand which is approximately 2 to 6 feet in thickness where undisturbed. The silty sand is underlain by fine brown gray sand. The fine brown gray sand, in turn, is underlain by a gray-green medium to coarse sand with some rounded gravel. The gray-green sand grades to silty clay and clay at 25 to 28 ft bgs. The clay has a high plasticity and some fine sand lenses were observed in the top of the clay.

Groundwater flows across the Site to the south towards Bond Creek. Groundwater was encountered at 5 to 7 ft bgs. A clay aquitard confines the aquifer at approximately 25 to 28 ft bgs.

1.4 SITE HISTORY

United Gas & Electric Light Co. conducted MGP activities at the Site between about 1900 and 1924. A 1900 Sanborn Fire Insurance (Sanborn) map shows a 33,000 cubic foot (ft³) gasometer (gas holder) and a gas building present on site. The 1924 Sanborn map indicated that the gasometer still existed and the gas building was used for "storage." The 1932 Sanborn map indicated that the gasometer was no longer present and the gas building was vacant.

Prior to 2001, the gas building on-site was used as a private residence. It is unknown when the gas building was first used as a residence. Past residents of the property installed an in-ground swimming pool east of the building, inset within the foundation of the former gasometer. Former residents also had a burn pit in their yard, southeast of the swimming pool

In October 2001, National Grid purchased the Site. In 2004, National Grid demolished the gas building and closed the swimming pool in place. National Grid

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discovered an underground cylindrical brick structure southeast of the swimming pool at this time. An underground steel pipe ran between the underground cylindrical brick structure and the former gas building. The pipe was found to be empty, did not contain MGP residual materials, and showed no evidence of having carried or released any MGP related residual materials. The cylindrical structure has been closed by backfilling it with clean fill.

Bluish soils, a clay tile pipe connected to a steel tank that contained stiff coal tar, and soils containing PAHs have been delineated in the western portion of the Site (i.e. the fill slope south of the former gas building). These are MGP artifacts.

1.5 SUMMARY OF PREVIOUS INVESTIGATIONS

The SC/IRM Study (2007) consisted of the following tasks and resultant findings:

Surface Soil Sampling: Site surface soils were sampled for semivolatile organic compounds (SVOCs) and metals. Primarily polycyclic aromatic hydrocarbons (PAHs) were found to range from below detectable limits (BDL) to 1.84 milligrams per kilogram (mg/kg) in these samples. A sample collected from the edge of the burn pit had a higher concentration. No potentially carcinogenic PAHs (cPAHs) were identified in surface soil samples, with the exception of the sample collected from the edge of the burn pit. That sample exceeded the NYSDEC/NYSDOH one part per million benzo(a)pyrene B(a)P toxicity equivalency quotient (TEQ) for cPAHs.

Test Pit Installation: Four test pits were excavated at the Site in 2003 and four additional test pits were excavated in 2005. Soil samples collected to characterize fill materials were analyzed for PAHs. Sample results were compared to applicable SCGs set forth in Appendix 7A of Draft DER-10 Technical Guidance Site Investigation and Remediation. PAHs in samples collected from subsurface soils in the fill slope south of the former gas building exceeded the SCOs. Small chunks, or "patties," of dried tar were observed in shallow soils in this area. The total PAHs in these samples ranged from BDL to 78 mg/kg. Potential MGP residual material was observed during these activities.

Soil Boring/Monitoring Well Installation: Eleven soil borings were advanced, and four of these were completed as 2-inch groundwater monitoring wells. The wells (MW-1 to MW-4) were installed to depths of 30 ft bgs.

Subsurface Soil Sampling: No VOCs were detected in excess of the applicable SCGs set forth in Appendix 7A of Draft DER-10 Technical Guidance Site Investigation and Remediation in any of the subsurface soil samples collected. These samples were collected at depths ranging from 12 to 22 ft bgs.

Of these 11 soil borings, samples collected from two borings contained one or more PAHs at concentrations slightly exceeding their respective SCOs. The concentrations of TAL metals detected in subsurface soil samples were within typical background levels, except for iron, which was present in all samples at concentrations higher than the typical background levels published in applicable SCGs set forth in Appendix 7A of Draft DER-10 Technical Guidance Site Investigation and Remediation. The highest concentrations of iron were detected in samples collected from the deepest soil depths (i.e. undisturbed soils from 26 to 32 ft bgs), suggesting that these levels of iron are naturally occurring.

Groundwater Sampling: Groundwater samples were analyzed for VOCs, SVOCs, TAL metals, and natural attenuation parameters. Groundwater quality at the Site showed no significant residual impacts from the former MGP operation. No VOCs or SVOCs were detected in samples collected from any of the monitoring wells with the exception of phenol. Phenol was detected up to 7.6 micrograms per liter (ug/L); nominally exceeding the New York State Codes, Rules and Regulations (NYCRR) Part 703.5 Groundwater Standard of 1 ug/L. Aluminum, iron, manganese, and sodium were detected above the Groundwater Standard. Since these metals were detected in subsurface soil, these analytes reflect naturally occurring conditions, and are not attributable to MGP operations at the Site.

Survey of the Study Area: At the completion of the SC/IRM field investigation activities, a New York State licensed surveyor surveyed the coordinates and grade elevations at all the soil boring, monitoring well, test pit, and surface soil sampling

locations. Top of casing elevations were also collected at each of the monitoring well locations.

The IRM Pre-Design Report (2008) contained the following field tasks and results:

Test Pit Installation: During the IRM Pre-Design Investigation, additional test pits were completed at the Site beyond the limits of the test pits previously completed during the SC/IRM Study, and were extended to a maximum depth of 12 feet below grade. The intent of these test pits was to reach the vertical and horizontal limits of materials with observable MGP impacts. During the completion of these additional test pits, soils with a bluish color and potentially impacted by MGP residuals were observed. While excavating to evaluate the extent of these soils north of this juncture point, a clay tile pipe connected to a steel tank below ground that contained stiff coal tar was discovered. An additional location of bluish-colored soils was observed in one additional test pit and the presence of ash was observed in several test pits along the southwestern side of the Site. A steel pipe was unearthed between the former gas building and the former location of a cylindrical underground brick structure which was closed in place in June 2003 by backfilling with clean fill. The steel pipe was found to be empty, did not contain MGP residual, and showed no evidence of having carried or released any MGP related residuals.

Soil Boring Installation: Twenty-two soil borings were installed based on the results of the additional test pit activities to evaluate the limits of the impacted material observed during those activities. Soil samples were continuously collected from these borings. Ten of the 22 soil borings were installed to a shallow depth (i.e. 6 ft bgs) to investigate the extent of the relatively shallow ash fill material that was observed at the Site while completing the test pitting activities. The 12 remaining soil borings were installed to a maximum depth of 14 ft bgs. Soil samples were collected every two feet from ground surface to the bottom of the boring.

Soil Sampling: Subsurface soil samples were collected to investigate and determine the extent of the potential MGP material observed during the completion of test pits. A total of 77 soil samples were collected from 22 soil borings and were

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analyzed for TAL metals, PAHs, and total cyanide. The concentrations of the TAL metal analytes were within typical background levels, except for one sample which contained a concentration of lead that exceeded the Residential SCO under the NYSDEC Environmental Remediation Program (6NYCRR Part 375-6.8(b), effective December 2006. Total cyanide was detected in 68 of the 77 samples. Of these 68 detections, only one sample collected at 8 to 10 ft. bgs exceeded the NYSDEC Part 375-6.8(b) Residential SCO of 27 mg/kg. Free cyanide was only detected in one sample (from 4 to 6 ft bgs.) at 0.095 mg/kg. Analyses of the 77 soil samples collected detected one or more PAHs in 52 of the samples. Of the samples for which detectable PAHs were reported, 24 of the samples had at least one compound that exceeded the NYSDEC Part 375-6.8(b) Residential SCOs were concentrated in the 0 to 2 ft bgs soil interval. Fewer samples exceed SCOs with depth:

- Sixteen of the 22 samples collected from 0 to 2 ft. bgs contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- One of the seven samples collected from 2 to 4 ft. bgs contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCO.
- Four of the 19 samples collected from 4 to 6 ft. bgs contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- None of the nine samples collected from the 6 to 8 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- Three of the 11 samples collected from the 8 to 10 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- None of the eight samples collected from the 10 to 12 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.

 Only one sample was collected from 12 to 14 ft. bgs, and this sample did not contain detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.

Site Survey: At the completion of the IRM Pre-Design field investigation activities, a New York State licensed surveyor surveyed the coordinates and grade elevations at all the soil boring, corners of the test pits, and at the buried tank identified during the test pit activities.

During the SC/IRM study it was determined that the areas of contamination did not have an adverse affect on fish and wildlife resources and the remediation is directed toward a specific discharge or spill event that does not adversely impact fish and wildlife resources. Therefore, according to both paragraph 3.10.1(b)3 and Appendix 3C of NYSDEC DER-10, the contaminant locations and remedial measures do not warrant a Fish and Wildlife Impact Analysis (FWIA).

1.6 INFRASTRUCTURE AND SURROUNDING LAND USE

The site has no access roads. Canal Street is one-lane wide, asphalt paved, and a dead end. Water and sewer lines run below ground along Canal Street. Overhead power lines are present on the western side of Canal Street, and cross to the eastern side of Canal Street and enter a pole-mounted transformer at the southwest corner of the Site. There are no running water, electrical, or sanitary facilities currently available at the Site.

The surrounding area is primarily residential, although the State Street Burial Ground, a historical cemetery, is present across Canal Street from the Site. An active Amtrak rail line lies approximately 0.3 miles north of the Site, with the station approximately 0.6 miles northeast of the Site. A commercial corridor is present along Route 4, approximately 0.2 miles west of the Site. The Hudson River and Rogers Island are approximately 0.2-miles west of the site. The Champlain Canal is approximately 0.4 miles east of the Site. The Hudson River and the Champlain Canal come together approximately 0.6 miles south of the Site.

2.0 OBJECTIVES AND RATIONALE

2.1 OBJECTIVE

The goal of this IRM is to eliminate or mitigate all significant threats to public health and the environment presented by the contaminants identified at the site through the proper application of scientific and engineering principles to meet the Remedial Action Objectives (RAOs) outlined for surface and subsurface soils. The RAOs satisfy the requirements of the July 3, 2001 Consent Order issued for the Site and are described along with the remedial actions in Section 3.0. The remedial actions have been developed in accordance with the following documents:

 The NYSDEC Division of Environmental Remediation's "Draft DER-10 Technical Guidance for Site Investigation and Remediation" from December 2002.

It is National Grid's expectation that the site will be given a No Further Action (NFA) designation as a result of these RAOs. RAOs have been developed in consideration of the following criteria mandated in the Draft DER-10 Technical Guidance:

- 1. Overall Protection of Public Health
- 2. Compliance with Standards, Criteria, and Guidance (SCGs)
- 3. Long-Term Effectiveness and Permanence
- 4. Reduction of Toxicity, Mobility, or Volume with Treatment
- 5. Short-Term Effectiveness
- 6. Implementability
- 7. Cost
- 8. Community Acceptance

2.2 RATIONALE

The IRM has been developed with the intent of restricted-residential reuse of the Site, consistent with the NYSDEC's directive in their letter of May 29, 2007. Restricted-residential uses, as defined under the NYSDEC Environmental Remediation Program, 6NYCRR Part 375-1.8 (g)(2)(ii)) include active recreational uses, which are public uses with a potential for soil contact.

The IRM follows the hierarchy of removal and control measures described at 6NYCRR Part 375-1.8 (b) and (c), and includes the removal of the tar tank, tar patties and shallow soil containing residual MGP material encountered in the western portion of the Site south of the former gas building. Engineering controls would also be adopted to restrict potential exposures to deeper soils remaining at the Site, and an environmental easement will be recorded to manage development. The IRM and subsequent administrative controls are consistent with restricted-residential use of the Site, as defined at 375-1.8 (g)(2)(ii), and require a zoning modification from the Village of Ft. Edward.

DER-10, Section 6, outlines requirements for operation, maintenance, monitoring and closeout of remedial action sites. Upon completion of remedial activities, a Site Management Plan (SMP) will be instituted for the site that will satisfy these regulatory requirements.

3.0 REMEDIAL MEASURES

The NYSDEC, in consultation with the NYSDOH, have accepted the remedial measures outlined in National Grid's October 2008 Interim Remedial Measure Pre-Design Report. A description of applicable Standards, Criteria, and Guidance (SCGs) for surface and subsurface soils, along with the agreed remedial measures, is contained herein. The specification package, with additional details regarding the remedial measures, is attached to this Work Plan.

3.1 STANDARDS, CRITERIA AND GUIDANCE (SCGS) AND REMEDIAL ACTION FOR SURFACE SOILS

3.1.1 SCGs Applicable to Surface Soils

Fill materials, including surface soils, exist in the western portion of the Site adjacent to, and south of, the former gas building. The fill material consists of silty sand with some brick, ash and slag. Dried tar-patties were observed in the surface soil in the western portion of the site during IRM pre-design activities. A ring of concrete pavers is set in the vicinity of the former swimming pool with additional poured concrete slabs northeast of this ring. Dirt and ground cover overlay the perimeter of the poured concrete slabs. A residential burn pit is located on the western portion of the former swimming pool. See **Figure 2**.

Surface soil samples collected during June 2003, were analyzed for semivolatile organic compounds (SVOCs) and metals. The total concentrations of SVOCs (primarily polycyclic aromatic hydrocarbons, or PAHs) detected in surface soil samples ranged from below detectable limits (BDL) (four samples) to 1.84 mg/kg, with the exception of one sample collected adjacent to the former burn pit. The total concentration of PAHs that the NYSDEC and NYSDOH recognize as being potentially carcinogenic PAHs (cPAHs) in surface soil ranged from BDL to less than 0.4 mg/kg. All metals were within typical New York State average background concentrations as defined in NYSDEC Technical Administrative Guidance

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Memorandum (TAGM) 4046, **Appendix A**, Table 4. No individual soil sample exhibited an elevated concentration of any of the metals reported.

Two locations were identified in which chemical constituents detected during the site investigations exceeded SCGs for surface soils:

- TP-4 IRM Test Pit: SCGs were exceeded due to the presence of hardened tar patties.
- SS-06 Former Residential Burn Pit: SCGs were exceeded for cPAHs.

3.1.2 Remedial Action for Surface Soils

Potential exposure pathways for surface soils include direct contact with chemical constituents in soil, and ingestion of soils.

Consistent with the intended restricted residential usage of the Site, the Remedial Action Objective (RAO) for dried tar-patties in the surface soil is to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent inhalation of or exposure to soil contaminants in airborne particulates. To achieve the RAOs, National Grid proposes removal as part of the selected remedial action for PAH-impacted surface soils on the western portion of the site (See **Figure 3**). The remedial action comprises removal and replacement of soil, including surface soils, from ground surface to 2-ft bgs. These soils are comprised largely of fill including sand, brick, ash, and slag. Following the removal of soils in this location, clean stone and topsoil will be imported, and disturbed areas will be re-seeded to create a uniform vegetative cover.

Consistent with the intended restricted residential usage of the Site, the RAO for surface soil in the vicinity of the burn pit is to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent inhalation of or exposure to soil contaminants in airborne particulates. In order to meet these RAOs, National Grid proposes removal and replacement with clean imported fill. Approximately four cubic yards of shallow soils at the former residential burn pit, although not MGP in origin, will be removed to

about one foot below ground surface (bgs). Once soils have been removed in this location, geotextile fabric and fabric demarcation will be placed atop of the excavated area. Following the installation of a geotextile barrier, clean topsoil will be imported, and disturbed areas will be re-seeded to create a uniform vegetative cover.

The elements of the remedial action as they relate to surface soils are summarized below:

- Surface soils and hardened tar patties over shallow PAH-impacted soils on western portion of the site: Surface soil removal during excavation of shallow soils, replacement with clean imported top soil, and establishment of vegetative cover.
- SS-06 Former Residential Burn Pit: Surface soil removal to 1 ft bgs, replacement with clean imported top soil, and establishment of vegetative cover.

These remedial action objectives eliminate potential future exposure pathways including direct contact with chemical constituents in soil, ingestion of soils, and inhalation or exposure to soil contaminants in airborne particulates.

3.2 STANDARDS, CRITERIA AND GUIDANCE (SCGS) AND REMEDIAL ACTION FOR SUBSURFACE SOILS

3.2.1 SCGs Applicable to Subsurface Soils

Soil boring and test pit observations indicate that fill material consisting of silty sand with some brick, ash and slag exists in the western portion of the Site adjacent to, and south of, the location of the former gas building, but not across the entire Site. The fill is underlain by brown silty sand which is approximately 2 to 6 feet in thickness, where undisturbed. The silty sand is underlain by fine brown gray sand which is underlain by a gray-green medium to coarse sand with some rounded gravel. From previous investigations, it was determined that the gray-green sand

grades to silty clay and to clay at 25 to 28 ft bgs. The clay has a high plasticity and some fine sand lenses were observed in the top of the clay.

During the IRM Pre-Design Investigation, test pits were completed at the Site beyond the limits of previously completed test pits, and were extended to a maximum depth of twelve feet below grade. The intent of these test pits was to reach the vertical and horizontal limits of materials with observable MGP impacts.

During the completion of these additional test pits, soils with a bluish color and potentially impacted by MGP residuals were observed in some soils. While excavating to evaluate the extent of these soils north of this juncture point, a clay tile pipe connected to a steel tank (See **Figure 2**). Upon further inspection, the tank was determined to contain a weathered, hardened coal tar material.

A steel pipe was unearthed between the former gas building and the former underground cylindrical brick structure. The steel pipe was found to be empty, did not contain MGP residual, and showed no evidence of having carried or released any MGP related residuals. This structure was closed in place by backfilling it with clean fill.

Subsurface soil samples were collected in April 2008 to investigate and evaluate the extent of the potential MGP material observed during the completion of test pits. A total of 77 soil samples were collected from 22 soil borings. Subsurface soil samples were analyzed for TAL metals, PAHs, and total cyanide.

Generally, the concentrations of metals were within typical background levels. One of these samples (SB-09 from 4 to 6 ft. bgs.) contained a concentration of lead (1,260 mg/kg) that exceeded the Residential SCO under the NYSDEC Environmental Remediation Program (6NYCRR Part 375-6.8(b), effective December 2006).

Total cyanide was detected in 68 of the 77 samples collected. These detections ranged from 0.27 mg/kg to 30.6 mg/kg. Of these 68 detections, only the sample collected at SB-13 from 8 to 10 ft. bgs exceeded the NYSDEC Part 375-6.8(b)

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Residential SCO of 27 mg/kg. Of the 77 samples collected, free cyanide was only detected in one sample (SB-09 from 4 to 6 ft bgs.) at 0.095 mg/kg.

Analyses of the 77 soil samples collected detected one or more PAHs in 52 of the samples. These detections ranged from 0.01 mg/kg to 271 mg/kg for a single compound. The summed or totaled concentrations of all PAHs detected in individual samples ranged from 0.015 mg/kg to 1,368.43 mg/kg. Of the samples for which detectable PAHs were reported, 24 of the samples had at least one compound that exceeded the NYSDEC Part 375-6.8(b) Residential SCOs.

Samples exceeding the SCOs were concentrated in the 0 to 2 ft bgs soil interval. Fewer samples exceed SCOs as deeper soils were analyzed:

- Sixteen of the 22 samples collected from the 0 to 2 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- One sample of the seven collected from the 2 to 4 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCO.
- Four of the 19 samples collected from the 4 to 6 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCO).
- None of the nine samples collected from the 6 to 8 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- Three of the 11 samples collected from the 8 to 10 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- None of the eight samples collected from the 10 to 12 ft. bgs interval contained detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.
- Only one sample was collected from 12 to 14 ft. bgs, and this sample did not contain detectable PAHs that exceeded the Part 375-6.8(b) Residential SCOs.

Areas in which chemical constituents detected during the site investigations exceeded SCGs for subsurface soils included:

- Tank and Piping: SCGs were exceeded due to the presence of free product in the form of hardened coal tar, and soil in a nearby boring exceeded SCGs for PAHs.
- Shallow Soils (0-2 feet bgs) in western portion of site: SCGs were exceeded for PAHs across an area of approximately 8,845 ft².
- Medium Depth Soils (2-6 feet bgs) in western portion of site: SCGs were exceeded for PAHs across an area of approximately 1,360 ft².
- Deep Soils (>6 feet bgs) in western portion of site: Three soil samples exceeded SCGs for PAHs at depths between 8 and 10 feet bgs. No soil samples exceeded SCGs for PAHs at greater than 10 feet bgs.

PAHs and cyanide in soils are presented in Figure 5.

3.2.2 Remedial Action for Subsurface Soils

Consistent with the intended restricted residential usage of the Site, the Remedial Action Objective (RAO) for the tank containing coal tar, adjacent soils containing coal tar, and the clay tile pipe formerly connected to the tank is to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent inhalation of or exposure to soil contaminants in airborne particulates. In order to meet these RAOs, National Grid proposes excavation and removal (see **Figure 3**). The location of these structures is identified on **Figure 3**. These materials will be sent for off-site thermal treatment at Environmental Soils Management Inc. (ESMI) of Ft. Edward, NY. Following the removal of the tank, piping, and impacted subsurface soils in this location, clean crushed stone will be imported and the excavation will be backfilled. The area of this excavation will be covered with a geotextile fabric under engineering controls described in Section 3.3 prior to placement of backfill.

Consistent with the intended restricted residential usage of the Site, the Remedial Action Objective (RAO) for the soils from 0 - 2 ft bgs in the western portion of the Site that were found to contain PAHs at concentrations exceeding the NYSDEC SCOs is to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent inhalation of or exposure to soil contaminants in airborne particulates. In order to meet these RAOs, National Grid proposes excavation from grade to a depth of 2 ft bgs. The area from which these soils will be excavated is depicted on **Figure 3**. Approximately 650 cubic yards (yd³) of soil will be excavated. The excavated site soils will be transported off-site for disposal or thermal treatment. Clean soils that meet the cleanup objectives for restricted-residential land use will be imported to replace the excavated soils as necessary to achieve site redevelopment. The area of this excavation will be covered with a geotextile fabric under engineering controls described in Section 3.3 prior to placement of backfill.

Consistent with the intended restricted residential usage of the Site, the Remedial Action Objective (RAO) for the soils from 2 – 6 ft bgs in the western portion of the Site that were found to contain PAHs at concentrations exceeding the NYSDEC SCOs is to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent inhalation of or exposure to soil contaminants in airborne particulates. In order to meet these RAOs, National Grid proposes excavation from a depth of 2 ft bgs to a depth of 6 feet bgs. The area from which these soils will be excavated is depicted on **Figure 3**. Approximately 200 cubic yards (yd³) of soil will be excavated. The excavated site soils will be transported off-site for disposal or thermal treatment. Clean soils that meet the cleanup objectives for restricted-residential land use will be imported to replace the excavated soils as necessary to achieve site redevelopment. The area of this excavation will be covered with a geotextile fabric under engineering controls described in Section 3.3.

Consistent with the intended restricted residential usage of the Site, the Remedial Action Objective (RAO) for the soils from 6 – 10 ft bgs in the western portion of the Site that were found to contain PAHs at concentrations exceeding the NYSDEC SCOs is to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent

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inhalation of or exposure to soil contaminants in airborne particulates.. In order to meet these RAOs, National Grid proposes the use of engineering and administrative controls. Exposure will be minimized by covering residual soils with a geotextile fabric under engineering controls, described in Section 3.3 and implementation of institutional controls described in Section 3.6.

The elements of the remedial action as they relate to subsurface soils are summarized below:

- Tank containing coal tar, adjacent soils containing coal tar, and the clay tile pipe formerly connected to the tank in the western portion of the site: Excavation and removal. Replacement with clean imported stone.
- Soils from 0-2 feet bgs in the western portion of the site: Excavation and removal. A geotextile fabric will be installed at the base of this excavation area. Placement of clean imported stone and topsoil over the geotextile and establishment of vegetative cover.
- Soils 2-6 feet bgs in the western portion of the site: Excavation and removal.
 Clean imported soil will be placed in the excavation. A geotextile fabric will be installed over the excavation after backfilling.
- Soils from 6-10 feet bgs: Clean imported fill and a geotextile fabric will be installed over areas where deep soils were found to contain PAHs at concentrations exceeding the NYSDEC SCOs.

These remedial action objectives eliminate potential future exposure pathways including direct contact with chemical constituents in soil, ingestion of soils, and inhalation or exposure to soil contaminants in airborne particulates.

3.3 ENGINEERING CONTROLS

Engineering controls will be adopted to restrict potential future site occupant exposures to remaining soils at 6 feet bgs and below in the western portion of the Site where three soil samples were found to contain PAHs at concentrations exceeding the NYSDEC SCOs. Approximately 10,800 ft² of geotextile fabric will be installed over the excavations prior to placing clean fill in the area shown on **Figure 3**. Clean fill placed above the geotextile fabric will meet, at a minimum, the applicable soil cleanup objectives for the use of the site, which, in this case, will be restricted-residential. The Site will then be restored with vegetation and landscaping to prevent erosion. A Professional Engineer will inspect the system on an annual basis and certify the condition of the soil/membrane cover system.

3.4 ENVIRONMENTAL CONTROLS

3.4.1 Stormwater Management, Sediment and Erosion Control

In accordance with NYSDEC General Permit GP-02-01, a notice of intent will not be required for the construction operations described in this plan because those activities will disturb less than one acre. Specific provisions for sediment and erosion control have been included in the design, however, to comply with the requirements in DER–10. **Figure 3** shows the boundaries of the excavation activities and specific details regarding installation of the sediment and erosion control measures that are to be implemented. **Figure 3** identifies placement of sediment and erosion control measures during grading and installation of geofabric and backfill. The following sediment and erosion control measures have been specified for these activities:

- Installation of a silt fence downgradient from the excavation area as shown on
 Figure 3. The silt fences will be embedded eight inches into the soil, as specified by the PE for this project.
- Soils may need to be stockpiled on site. The soil stockpile and associated sediment control measures will be inspected and maintained daily during active site remediation and restoration. The stockpile will be covered if there is precipitation, or if the stockpile is present on-site overnight, or if sediment migration is observed. In either of these events, adequately secured tarps will

be used to eliminate contact with precipitation that could result in contamination of run-off.

3.4.2 Noise Monitoring

Noise monitoring will be performed periodically at alternating perimeter boundaries. Noise levels are monitored in the field with either a Type I or Type II Sound Level Meter (SLM). If noise levels at the site perimeter exceed 85 dB(A), appropriate sound attenuation measures or alternative work activities will be implemented to reduce noise levels.

3.4.3 Odor Control

Perimeter boundaries will be periodically monitored for nuisance odors, specifically coal-tar odors. If the Owner's Resident Engineer deems perimeter odors to be at nuisance levels, odor mitigation measures will be implemented. Such measures may include cover of stockpiled soils with clean soils, covering containers with tarps, or application of liquid vapor suppression mixtures.

3.5 DOCUMENTATION SAMPLES

Documentation samples will be collected from soils left in place after the excavation is completed. Sampling protocols will be in accordance with Section 5.5 of DER-10.

 0 to 1-foot excavation area – These are soils at the former residential burn pit. An excavation perimeter of approximately 40 linear feet is anticipated. A grab soil sample from the floor of the excavation will be collected. No sidewall samples will be collected from this area. The anticipated samples for this excavation are as follows:

1 – Soil grab sample from bottom of excavation

 0 to 2-foot excavation area – These are soils in the western portion of the site that contain PAHs at concentrations exceeding the NYSDEC SCOs. An excavation perimeter of approximately 400 linear feet is anticipated. Documentation sampling will include grab samples from the sidewalls and from the floor of the excavation. The anticipated samples for this excavation are as follows:

8 – Soil grab samples from bottom of excavation

13 - Soil grab samples from the excavation sidewalls

- 2 to 6-foot excavation area The soils in the tank and clay piping removal area will be excavated down to 6 feet bgs. The perimeter of this excavation will be approximately 185 linear feet. Documentation sampling will include grab samples from the sidewalls and from the floor of the excavation. The anticipated samples for this excavation are as follows:
 - 2 Soil grab samples from bottom of excavation
 - 6 Soil grab samples from the excavation sidewalls

All samples will be analyzed for PAHs, in accordance with the Quality Assurance Project Plan (QAPP).

The NYSDEC will be notified in advance of the excavation and removal schedule. The results of all documentation samples will be reported in a Final Engineering Report (FER). Backfilling the excavation is not contingent upon documentation sample results.

Documentation samples will be collected from clean fill imported to the site for backfill and restoration and from any clean soils excavated on-site and retained for backfill purposes. The soils are expected to meet the criteria for restricted residential use. One sample will be collected from every 100 cubic yard of fill placed, or as described below:

0 to 1 foot excavation area

Anticipated fill volume = 3.7 cy

Number of samples = 1

0 to 2 foot excavation area

Anticipated fill volume = 655 cy

Number of samples = 6

2 to 6 foot excavation area

Anticipated fill volume = 200 cy

Number of samples = 2

Groundwater at the Canal Street Site is present from 5 to 7 ft bgs. The deepest excavations at the site will go to approximately 6 ft bgs. In the event that groundwater is encountered, representative grab samples will be collected, as needed, and analyzed to facilitate disposal.

3.6 DECOMMISSION GROUNDWATER MONITORING WELLS

Each of the four groundwater monitoring wells on-site will be decommissioned in accordance with the procedures outlined in the NYSDEC Division of Environmental Remediation document Groundwater Monitoring Well Decommissioning Procedures, dated October 1996. The decommissioning procedure for the groundwater monitoring wells involves filling the interstitial space of the existing wells with grout to 5-ft bgs. From 5 to 0 feet bgs, the space is to be backfilled with clean fill that meets the restricted-residential standard. From 5 feet bgs to the Top of Casing, the well casing will be removed.

3.7 SITE RESTORATION

Site restoration will be performed in accordance with Paragraph 5.4(c) of DER-10. Site features and vegetation will be returned to pre-project grades and conditions, or improved to prevent erosion and to protect and enhance the vegetative cover as an integral component of the remedy. Plans and details for site restoration are shown on **Figure 4**. The site restoration plan calls for backfilling with clean fill, grading the site surface, and restoration of vegetative cover. Documentation of off-site fill sources will be included in the Final Engineering Report. Once excavations have been filled, soil surfaces will be graded to provide effective, controlled precipitation runoff and eliminate ponding. After final grading, the soils will be seeded and covered with straw mulch. Silt fence and catch basin inlet protection will be maintained until adequate vegetation has been established. Specific restoration details are as follows:

- 0 to 2 foot excavation area Once these soils have been removed, the excavation will be covered with a geotextile fabric, followed by 18 inches of clean stone of size and gradation specified, placed in two lifts and compacted to 90% maximum dry density. Six inches of clean top soil will be placed and graded to eliminate ponding of precipitation and promote positive drainage.
- 2 to 6 foot excavation area Once these soils have been removed, the excavation will be backfilled in two, two-foot lifts with clean stone of size and gradation specified and compacted to 90% maximum dry density. Backfilling will match final elevation of the bottom of the 0 to 2 foot excavation area and be graded to promote positive drainage and a uniform base for the geotextile fabric.
- 0 to 1 foot excavation area Once these soils have been removed, the area will be backfilled with clean topsoil and graded to conform to adjacent elevations and promote positive drainage.
- Removed concrete octagonal ring Once this concrete has been removed, the area will be backfilled with clean topsoil and graded to conform to adjacent elevations and promote positive drainage.
- Vegetative Cover Seed, fertilizer and mulch will be applied to all vegetated areas disturbed by construction. Seed will be K-31 fescue and will be sown at a rate of 4 pounds per 1000 square ft. Fertilizer will be 12-12-12 (NPK)

analysis and be applied at rate of 20 pounds per 1000 square ft. Mulch will consist of straw mulch applied at a rate of 90 pounds per 1000 square ft. Work will be completed in accordance with Method 1 of Section 610-3.02 of the NYSDOT 1995 Standard Specifications. Landscape shrubbery will be placed along the western boundary of the site to discourage vehicular access.

 Gravel Parking – A compacted gravel parking area measuring approximately 400 ft² will be constructed adjacent to Canal Street along the western boundary to facilitate parking for site maintenance and inspection activities.

4.0 USE LIMITATIONS

After the remediation of MGP residual artifacts and impacted soil at the Site is completed in accordance with this IRM, residual by-products from historic activities at the Site may remain at several locations in soils >6 feet bgs, including soils where three samples were found to contain PAHs at concentrations exceeding the NYSDEC SCOs. National Grid has therefore concluded that Administrative Use Limitation (AULs) which restrict the use of the Site are appropriate as part of the remediation of the Site, and to protect human health and the environment. The technical content of these restrictions (or institutional controls) are itemized below and will be documented in an environmental easement based upon the NYSDEC Environmental Easement latest template. This easement will be recorded pursuant to Real Property Law Section 291, and will run with the land in perpetuity.

- Because the Site will have been remediated as described in this IRM Work Plan in a manner adequate to protect human health and the environment to a level consistent with the intended restricted residential usage of the Site, the environmental easement for the Site will note that additional environmental remedial work to the Site pursuant to a plan approved by NYSDEC would be required prior to any future change in its use.
- The restrictions set forth in the environmental easement will run with the land; and are imposed upon the entire Site. These restrictions bind all owners of the Site, and assignees and all successive owners of the Site. The property deed and all subsequent instruments of conveyance relating to the controlled property will be modified to state "This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant of Title 36 to Article 71 of the Environmental Conservation Law."
- The Site shall not be used for any future unrestricted residential use, hospitals and medical care uses, day care for adults and children, or as a public or private school without the completion of such additional environmental

remedial work as deemed necessary by the NYSDEC for these contemplated re-uses. Neither shall the Site be used for the raising of animals or growing of crops for human consumption, or for drilling for drinking water, oil, or gas without prior written approval by the NYSDEC. The Site and any part thereof shall not be used for individual water supply systems or extraction of groundwater by any means or for any purpose, except as required as part of a Remedial Action approved by NYSDEC, nor shall there be any use of the groundwater for potable uses, i.e. drinking, washing, irrigation, or showering. In no areas of the Site are activities including excavating, drilling or subsurface disturbance below the existing grade of the land of the Site or any part thereof to be performed, except as allowed under the Site Management Plan, or as required as part of a Remedial Action approved by NYSDEC.

- No activities shall be undertaken that will disturb the soil on the Site without consulting the Site Management Plan developed in conjunction with this IRM Work Plan and an understanding of the location and depth of the geotextile fabric engineering controls. Any impacted soils brought to the surface by grading, excavation, trenching or backfilling shall be managed in accordance with the requirements of the NYSDEC and all applicable provisions of state and federal law.
- Upon review and approval by NYSDEC of the institutional controls described above, set out in such form to be recordable pursuant to Real Property Law Section 291, a certified letter will be sent to adjoining property owners, the New York State Department of Health, and the Washington County clerk notifying these persons of the type and extent of contamination to be addressed by the institutional control, the proposed remedial action and its proposed duration, and the limitation on site use that will be necessary based on the contamination present and the proposed remedial action, as specified in DER-10.

To achieve this IRM, National Grid will pursue rezoning the parcel from its current designation of single-family residential use to a new designation that corresponds to restricted residential use.

5.0 QUALITY ASSURANCE PROJECT PLAN

5.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is an integral component of the Work Plan to complete the remediation of impacted soils at the Canal Street Site. The objective of this QAPP is to identify procedures for sampling, chain of custody, laboratory analysis, instrument calibration, data reduction and reporting, internal quality control, audits, preventive maintenance, and corrective action. It presents the field and laboratory quality assurance/quality control (QA/QC) policies and procedures that will be followed during the implementation of the project. Key personnel are listed below.

Project Manager (PM):	Andrea Simmons
Quality Assurance Officer (QAO):	Richard Malcolm
Project Chemist:	Brigid Brooks Zvirbulis

5.2 SAMPLE LABELING, HANDLING, AND SHIPPING

Sample containers will be labeled prior to sample collection. A non-removable label on which the following information is recorded will be affixed to each sample container for shipment to the laboratory:

- project name/location;
- sample identification code;
- date and time the sample was collected;
- sample type (soil or aqueous); and
- analysis requested.

All samples will be assigned a unique identification number. Examples of the codes used for each sample type are described below.

5.2.1 Soil Samples

Soil samples may be either a Grab Sample (GS) or a Composite Sample (CS).

Example	NG-GS-E-2.5-1					
	NG	GS	Е	Depth	#	
	National Grid	Sample type	Sample Location	Feet bgs	Sample No.	

5.2.2 Groundwater Samples

Grab samples of groundwater will be given the following sample identification number.

Example	NG-GW-1				
	NG	GW	#		
	National Grid	Groundwater	Sample No.		

5.3 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Matrix Spike/Matrix Spike Duplicate Samples

QA/QC samples will include a matrix spike (MS) and matrix spike duplicate (MSD) sample at a frequency not less than 5% (one MS/MSD pair per every 20 samples collected) for each matrix. These samples will have the same sample identification number, with an "MS/MSD" added to it.

Blind Field Duplicate Samples

Field duplicate samples are sent blind to the laboratory. They will be given a "D" before the sample number, as shown below:

Example	NG-GS-E-2.5-D1					
	NG	GS	Е	Depth	D#	
	National Grid	Sample type	Sample Location	Feet bgs	Sample No.	

The sample location where a blind field duplicate is collected will be marked in the field notebook and on the chain of custody record using the sample number, as described above. A blind field duplicate sample will be collected at a frequency of one per every 10 samples for each matrix.

Equipment Blanks

Equipment blanks are not required when dedicated sampling equipment is used. If non-dedicated sampling equipment is used in the soil sampling program, equipment blanks will be analyzed at a frequency of not less than 5% (one equipment blank per every 20 samples collected). In either case, equipment blanks receive the following code:

Example **EB-mm/dd-#** where *mm/dd* represents the date [two-digit month and the two-digit day] the equipment blank was collected and # represents the order collected.

The collection of an equipment blank will be marked both in the field notebook and on the chain of custody.

Trip Blanks

Trip blanks are used to monitor potential volatile organic contamination of aqueous samples during shipment to and from the laboratory. The contaminants of concern at

the Site, PAHs and cyanide, do not volatilize. Therefore, no trip blanks will be included with the sample sets.

5.4 CONTAINERS, PRESERVATION, AND HOLDING TIMES

All sample containers used will be purchased and supplied by the laboratory. The selection of sample containers used to collect the samples is based on the following considerations:

- sample matrix;
- analytical methods;
- potential contaminants of concern;
- reactivity of container material with sample; and
- QA/QC requirements.

The required containers, preservatives, and holding times will conform to the NYSDEC Analytical Services Protocol (10/95). No chemical preservatives are required for soil samples, the samples will be kept on ice in a cooler at a temperature of 4° C (±2°C). The soil samples collected for cyanide analysis will be analyzed within the laboratory holding time of 14 days. The soil samples collected total and carcinogenic PAH analysis will be analyzed within the holding time of 14 days prior to laboratory extraction and 40 days after extraction.

5.5 CHAIN-OF-CUSTODY PROTOCOL AND SHIPPING REQUIREMENTS

A chain of custody record will be initiated by MWH personnel upon sample collection and by the laboratory providing the sample containers. The laboratory record traces the path of the sample bottles and preservation at the laboratory to the field for sample collection. The MWH chain of custody is initiated at the point of sample collection and documents the custody of the samples throughout the sampling and analysis process.
The MWH Project Manager or designated representative will notify the laboratory of the anticipated schedule of upcoming field sampling activities. This notification will include information concerning the number and type of samples, as well as the anticipated date(s) of sample shipment to the laboratory. The laboratory will be responsible for supplying insulated containers (typically coolers) for storing and shipping the samples. Field personnel receiving the sample containers will check each cooler and inspect the contents upon receipt. All sample bottles within each shipping container will be individually labeled by the laboratory.

Once the sample containers are filled, they are immediately placed in the cooler with sealed bags of ice to maintain the samples at 4°C (±2°C). Following sample collection, field personnel completes the chain of custody. The chain of custody forms are signed and placed in a sealed plastic Ziploc bag in the cooler. The shipping containers are then closed and properly sealed and the cooler is shipped to the laboratory via an overnight courier, or hand delivered, under appropriate chain of custody procedures. Samples will be shipped the same day as sample collection whenever possible. Upon receipt of the coolers at the laboratory, the cooler's contents will be inspected and the chain of custody signed, thus accepting custody of the samples. The signed chain-of-custody and a sample receipt form will be provided by the laboratory to the project manager upon completion of the logging in of samples by the laboratory.

5.6 CLEANING SAMPLING EQUIPMENT

All non-dedicated equipment and tools used to collect samples for chemical analyses (including trowels, spatulas, spoons, scoops, or hand augers) will be decontaminated using the following procedures:

- Non-phosphate detergent wash;
- Tap water rinse; and
- Distilled/deionized water rinse.

If equipment is to be stored for future use, allow it to air dry, and then wrap it in aluminum foil (reflective-side out) or seal in plastic bags.

5.7 ANALYTICAL LABORATORY/ANALYTICAL METHODS

The analytical laboratory selected to perform the sample analyses to support this investigation will be a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory holding the Analytical Services Protocol (ASP) certification for those analyses that are part of this project. Samples will be analyzed in accordance with the specified methods in **Test Methods for Evaluating Solid Waste, SW-846 (Third Edition)** and the NYSDEC Analytical Services Protocol (ASP, 06/00) quality control criteria. The Quality Assurance Plans (QAP) for the laboratory is available upon request.

5.8 DATA QUALITY REQUIREMENTS

5.8.1 Data Quality Objectives

Data quality objectives (DQOs) for data measurement are generally defined in terms of five parameters: precision, accuracy, representativeness, comparability, and completeness (PARCC). The following DQOs have been established to ensure that the data collected as part of this program are sufficient and of adequate quality for their intended uses. Data collected and analyzed in conformance with the DQO process described in this QAPP are used to assess the uncertainty associated with decisions related to the Site.

5.8.2 Precision

Precision measures the reproducibility of measurements under a given set of conditions. To maximize precision, established sampling and analytical procedures are consistently followed. Analytical precision is monitored through analysis of matrix spike duplicates and field duplicates. Matrix spike duplicates for organic compounds are analyzed at a frequency of once for every 20 samples as specified by the ASP. Precision is expressed as the relative percent difference (RPD):

$RPD = 100 \times 2[(X1 - X2)/(X1 + X2)]$

Where X1 and X2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values. The equation is taken from "Data Quality Objectives for Remedial Response Activities" (EPA/540/G-87/003, March 1987).

5.8.3 Accuracy

Accuracy measures the bias in a measurement system. Laboratory accuracy is assessed through use of laboratory internal QC samples, matrix spikes, and surrogate recovery. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on similar samples. A matrix spike and a blank spike are analyzed once for every twenty samples, as specified in the ASP.

Accuracy values can be presented in a variety of ways. Average error is one way of presenting this information; however, more commonly, accuracy is presented as percent bias or percent recovery. Percent bias is a standardized average error (the average error divided by the actual or spiked concentration and converted to a percentage). Percent bias is unit-less and allows accuracy of analytical procedures to be compared easily. Percent recovery provides the same information as percent bias. Routine organic analytical protocols require a surrogate spike in each sample. Percent recovery is defined as:

% Recovery	=	(R/S) x 100
Where: R	=	reported concentration
S	=	spike concentration
% Bias	=	% Recovery - 100

This equation is taken from "Data Quality Objectives for Remedial Response Activities" (EPA/540/G-87/003, March 1987). Percent recovery criteria published by the NYSDEC as part of the NYSDEC ASP (06/00) and those determined from laboratory performance data are used to evaluate accuracy in matrix spike and blank spike quality control samples.

5.8.4 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which sample data accurately and precisely represent actual conditions. In the field, the representativeness of the data depends on selection of appropriate sampling locations, collection of an adequate number of samples, and use of consistent sampling procedures. The sampling procedures, as described in the FSP, are designed to obtain representative samples for each of the different matrices.

In the analytical laboratory, the representativeness of the analytical data is a function of the procedures used in processing the samples. The objective for representativeness is to provide data of the same high quality as other analyses of similar samples using the same methods during the same time period within the laboratory. Representativeness is determined by comparing the quality control data for these samples against other data for similar samples analyzed at the same time.

5.8.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Analytical results are comparable to results of other laboratories with the use of the following procedures/programs: Instrument standards traceable to National Institute of Standards and Testing (NIST), Environmental Protection Agency (EPA) or NYSDEC sources; the use of standard methodology; reporting results from similar matrices in consistent units; applying appropriate levels of quality control within the context of the laboratory quality assurance program; and participation in inter-laboratory studies to document laboratory performance. By using traceable standards and standard methods, the

analytical results can be compared to other laboratories operating similarly. The QA program documents internal performance, and the inter-laboratory studies, document performance compared to other laboratories. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance.

5.8.6 Completeness

Completeness is the percentage of measurements made that are judged valid measurements. The completeness goal is to generate the maximum amount possible of useable data (i.e., 90% usable data). Data is considered usable unless "R"-flagged during validation as rejected.

5.8.7 Reporting Limits

The estimated reporting limits or practical quantification limits that are desired for each analysis are the Contract Required Detection Limits specified in the NYSDEC ASP (10/95). All such limits are dependent upon matrix interferences and reporting limits may vary as a result of dilution.

5.9 FIELD QUALITY ASSURANCE SAMPLES

5.9.1 Blind Field Duplicate Samples

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. Field duplicate samples are defined as a second sample collected from the same location, at the same time, in the exact same manner as the first and placed into a separate container with no prior mixing. Field duplicate samples are collected at a frequency of one per every ten (10) samples per matrix. Each duplicate sample is analyzed for the same parameters as the parent samples. Thus, both field and laboratory variability are evaluated. Acceptance and control limits for the laboratory follow NYSDEC ASP guidelines for organic analyses. However, deviations in the data with respect to the limits will be discussed in the report. Although there are no

established QC limits for field duplicate RPD data, MWH considers RPD values of 70% or less for aqueous samples and 50% or less for soil samples an indication of acceptable sampling and analytical precision. An RPD may be evaluated when the analyte of concern is detected above the reporting limit in either the parent or the field duplicate samples.

5.9.2 Split Samples

Split samples are usually used for performance audits or inter-laboratory comparability of data. The collection of split samples is not anticipated during the course of this project. However, if the NYSDEC or other appropriate agency requests split samples to be collected, then the following applies: A split sample is defined as two separate samples taken from a single aliquot that has been thoroughly mixed or homogenized prior to the formation of the two separate samples.

5.9.3 Equipment Blanks

Equipment blanks are not required when dedicated sampling equipment is used. If non-dedicated sampling equipment is used for the soil sampling program, equipment rinse blanks will be analyzed at a frequency of not less than 5% (i.e., one equipment rinse blank per every 20 samples collected).

5.10 LABORATORY QUALITY ASSURANCE SAMPLES

5.10.1 Method Blanks

Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instrument as the sample is prepared and analyzed in the laboratory. A method blank is defined as an aliquot of laboratory deionized water on which every step of the method is performed and analyzed along with the samples. Method blanks are analyzed at a frequency of one (1) for every 20 samples analyzed, or every analytical batch, whichever is more frequent.

5.10.2 Spiked Samples

Two types of spiked samples are analyzed as part of the analytical QA/QC program, and include matrix spike (MS), matrix spike duplicate (MSD), and blank spike samples, also known as laboratory control samples (LCS). Matrix spike samples are analyzed to evaluate instrument and method performance on samples of similar matrix. Matrix spike duplicate samples are analyzed to determine the precision of the method and instrument. Blank spike samples are analyzed to evaluate instrument and method performance in the absence of matrix effects. These samples are analyzed and the percent recovery is determined to assess matrix interferences affects on the methods. One MS/MSD sample pair will be analyzed for every 20 samples. Blank spike samples are analyzed at a frequency of one (1) for every 20 samples analyzed, or every analytical batch, whichever is more frequent.

5.11 EQUIPMENT CALIBRATION AND MAINTENANCE

5.11.1 Calibration

Field equipment that may be used during the implementation of this Remediation Plan includes a Photovac 2020 (or equivalent) photoionization detector (PID) equipped with a minimum 10.2 electron volt (eV) lamp. This instrument is calibrated according to the manufacturer's instructions at the beginning of the day and at the discretion of the Site Safety Officer (SSO).

5.11.2 Maintenance

Prior to field sampling events, each piece of field equipment is inspected to ensure it is operational. If necessary, the equipment is serviced. Meters that require charged batteries are fully charged or have fresh batteries. Significant downtime should not occur due to the ability to obtain equipment quickly and the field personnel carrying basic spare parts in the field.

5.11.3 Laboratory Equipment

All laboratory equipment is calibrated according to the requirements of the

respective NYSDEC ASP (06/00) method for each analysis, USEPA SW-846 and/or in accordance with the manufacturer's specifications. In general, preventative maintenance of laboratory equipment follows the guidelines recommended by the manufacturer. Generally, a malfunctioning instrument that cannot be repaired directly by laboratory personnel is repaired following a service call to the manufacturer.

5.12 DATA DOCUMENTATION

5.12.1 Field Notebook

Field notes will be initiated at the start of on-site work. All original forms and notebooks used during field activities will become part of the permanent project file. Field notes will include the following daily information, where applicable:

- date;
- weather conditions;
- crew members;
- brief description of proposed field activities for that day;
- locations where work is performed;
- problems and corrective actions taken;
- records of all field measurements;
- a description of all modifications to the work plan;
- a record of all field data sampling point locations;
- pertinent sample collection information;
- chain of custody information; and

• documentation of the calibration of field instrumentation used.

5.13 CORRECTIVE ACTIONS

Corrective actions are required when a problem arises that impedes the progress of the investigation as detailed in the project plans, or when field or analytical data are not within the objectives specified in the Work Plan or QAPP. Corrective actions include those actions implemented to promptly identify, document, and evaluate the problem and its source, as well as those actions taken to correct the problem. These corrective actions are documented in the project file. Prior to implementing any deviations from the approved procedures contained in the QAPP, the Project Manager must be notified.

5.13.1 Field Procedures

Project personnel continuously monitor work performance as part of their daily responsibilities. If a condition is observed that would have an adverse impact on data quality, corrective actions are taken. Situations that require corrective action include the following:

- standard operating procedures and or protocols identified in the projectspecific work plan or QAPP have not been followed;
- equipment is not calibrated properly or in proper working order;
- QC requirements have not been met; and
- performance or system audits identify issues of concern.

The problem, its cause, and the corrective action implemented are documented. The Project Manager is responsible for initiating and approving corrective actions.

5.13.2 Laboratory Procedures

During all investigations/studies, instrument and method performance and data validity are monitored by the analytical laboratory performing the analyses. The

laboratory calibrates its instruments and documents the calibration data. Laboratory personnel continuously monitor the performance of its instruments to ensure that performance data fall within acceptable limits. If instrument performance or data fall outside acceptable limits, or when any condition is noted that has an adverse effect on data quality, then the laboratory implements appropriate corrective actions. Situations that require corrective action include the following:

- protocols defined by the project-specific QAPP have not been followed;
- identified data acceptance standards are not obtained;
- equipment is not calibrated properly or in proper working order;
- sample and test results are not completely traceable;
- QC requirements have not been met; and
- performance or system audits identify issues of concern.

The laboratory QA Officer (QAO) is responsible for initiating and approving corrective actions. In the event that corrective actions affect the project samples, the QAO will notify MWH's Project Manager. The corrective actions may include one or more of the following:

- re-calibration or standardization of instruments;
- acquiring new standards;
- repairing equipment; and
- reanalyzing samples or repeating portions of work.

System audits and calibration procedures with data review are conducted by the laboratory routinely so errors and problems are detected early, thus avoiding the prospect of redoing large segments of work. MWH provides independent data validation and/or data review and summary, and the laboratory is notified as soon as

possible of any situation that requires corrective action so that the corrective action may be implemented in a timely manner.

5.14 DATA REDUCTION, REVIEW AND REPORTING

5.14.1 Laboratory Data

The laboratory is required to meet all applicable documentation, data reduction, and reporting protocols as specified in the NYSDEC ASP (06/00) CLP deliverable format. Calculations of sample concentrations are performed using the appropriate regression analysis program, response factors, and dilution factors, where applicable. The laboratory, through its assigned QAO, conducts its own internal review of the analytical data generated for a specific project prior to sending the data to MWH. Deficiencies discovered during the laboratory internal data validation, as well as the corrective actions used to correct the deficiency, are documented in the laboratory Case Narrative submitted with each data package.

The laboratory reports the data in tabular form by method and sample. The laboratory is required to submit analytical results that are supported by a complete NYSDEC ASP Category B data package to enable the quality of the data to be determined. This standard backup data includes supporting documentation (chromatograms, raw data, etc.), sample preparation information, and sample handling information (i.e., chain of custody documentation).

5.14.2 Data Review

In addition to the laboratory's in-house review of the data, the MWH Project Chemist will review the analytical data prior to its incorporation into a final report. Although data validation will not be performed, the Project Chemist will conduct a systematic review of the data with respect to the data quality criteria defined in the project-specific QAPP, the laboratory quality assurance plan and quality control programs, and the analytical methods.

Upon receipt of the laboratory data analytical package, the data reviewer:

- <u>Reviews the data package to determine completeness</u>. It must contain all sample chain of custody forms, case narratives including sample/analysis summary forms, QA/QC summaries with supporting documentation, relevant calibration data, instrument and method performance data, documentation of the laboratories ability to attain the method detection limits for target analytes in required matrices, data report forms with examples of calculations, and raw data. The laboratory is promptly notified of any deficiencies, and must produce the documentation necessary to correct the deficiencies within 10 calendar days.
- 2. <u>Reviews the data package to determine compliance with the applicable portions of the work plan</u>. The data reviewer confirms that the data is produced and reported consistent with the QAPP and laboratory quality control program and that protocol-required QA/QC criteria are met, and problems encountered during the analytical process and actions taken to correct the problems are reported.
- 3. <u>Prepares a tabular summary of the reported data</u>. The data reviewer summarizes the data in a tabular format to provide the data in more accessible format.

5.14.3 Field/Engineering Data

Field data (i.e., information collected in the field through observation, manual measurement, and/or field instrumentation) is recorded in a dedicated project field notebook, on the appropriate field data sheets, and/or on the appropriate field data forms. This data is reviewed by the Project Geologist and the Project Manager for adherence to the work plan and QAPP requirements. The final reporting of the data is reviewed by the project field personnel, who also participate in data reduction and evaluation.

Field documentation, data calculations, transfers, and interpretations are conducted by field personnel, and reviewed for accuracy by the project manager and/or his

designee for:

- general completeness;
- readability;
- usage of appropriate procedures;
- appropriate instrument calibration and maintenance;
- reasonableness in comparison to present and past data collected;
- correct sample locations; and
- correct calculation and interpretations.

Approximately 5% of all calculations are checked through recalculation. If appropriate, field data forms and/or calculations are included in project report appendices. All of the original field notebooks, logs, forms and documents are kept in the project file.

5.15 QUALITY ASSURANCE CONTROLS

The Project Manager is responsible for ensuring that quality QA/QC records such as chain of custody forms, field notebooks, and data summaries are being properly prepared. The Project Manager is responsible for ensuring that all records are properly filed. Information received from outside sources, such as laboratory analytical reports, is retained at MWH, and access to working project files is restricted to project personnel.

5.15.1 Field Audits

The Project Manager is responsible for ensuring the field investigations are performed in accordance with the requirements and specifications outlined in this QAPP. As part of MWH's field QA/QC program, a field audit is performed by a designated MWH representative on projects where sampling activities extend for more than two weeks. The primary purpose of the field audit is to monitor projectsampling practices. The QA/QC field audit is performed during sampling to evaluate the performance of work during the collection of samples for laboratory analysis.

For projects of relatively short duration (i.e., continuous fieldwork less than two weeks), a formal audit of field activities is not performed. The field team leader or appropriate task manager monitor field performance and document all work performed in field notes, a narrative, and/or a checklist of tasks, as appropriate. The Project Manager reviews this documentation to ensure the necessary information has been recorded and conduct discussions with field team members to verify that field activities were performed according to the project Work Plan, QAPP and Health and Safety Plan (HASP). The Project Manager communicates any concerns to the field team as appropriate. A formal field audit may not be performed in conjunction with this project.

5.15.2 Meetings

Periodic meetings between the Project Manager and the field team will be held to review quality assurance procedures, fieldwork, laboratory performance and data documentation and review. Any potential problems identified during the review are documented and addressed. If necessary, they are reported to management for review and appropriate corrective action.

6.0 HEALTH AND SAFETY PLAN

6.1 SAFETY AND HEALTH RISK ANALYSIS

This section establishes the health and safety procedures for the filed activities that will minimize potential risk to personnel who will be performing on-site work and can be considered as the site-specific Site Safety Plan (SSP).

This SSP applies to all employees who will potentially be exposed to safety and/or health hazards associated with the proposed filed activities. Subcontractors are required to provide their own SSP which, at a minimum, must comply with the requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operation and Emergency Response Standard (29 CFR 1910.120) and other applicable OSHA regulations. If they choose, subcontractors can review, evaluate for thoroughness and adopt as they see fit applicable portions MWH's SSP for this project. The adoption is an independent action on the part of the subcontractor working for MWH and should be provided in writing to the project manager for the site.

The SSP has been prepared in compliance with the requirements of the OSHA Hazardous Waste Operation and Emergency Response Standard (29 CFR 1910.120) and other applicable OSHA regulations. The site-specific SSP has been developed based on limited knowledge regarding the specific chemical hazards and anticipated potential physical hazards associated with the proposed site characterization activities. Actual working conditions may require modification of this site-specific SSP. Except in emergency situations, the MWH Health and Safety Director or the Certified Industrial Hygienist that approved this plan and the Health and Safety Coordinator (HSC) must approve any modifications before they can be implemented. Written documentation of the change must be attached as additional addenda to the SSP. A "Field Change Request" form is included as Attachment A of this site-specific SSP.

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6.1.1 Chemical Toxicity Hazard

The potential toxic exposure hazard to site personnel associated with chemical contaminants which may be present at the areas described in Section 2.2 can be expressed in Threshold Limit Values-Time Weighted Averages (TLVs-TWAs), Permissible Exposure Limits (PELs), Recommended Exposure Limits (RELs), and/or Immediately Dangerous to Life or Health (IDLH) values, as established by the American Conference of Governmental Industrial Hygienists (ACGIH), OSHA, and/or the National Institute for Occupational Safety and Health (NIOSH). Appropriate definitions for these health-based values are as follows:

<u>TLV-TWA</u>: The TWA airborne concentration of a substance for a normal 8-hour work day and 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.

<u>PEL</u>: The TWA airborne concentration of a substance for a normal 8-hour work day and a 40-hour work week, to which workers may be exposed, day after day. PELs are OSHA-promulgated exposure standards (29 CFR 1910.100).

<u>REL</u>: The TWA airborne concentration of a substance for a 10-hour exposure period (unless otherwise noted) during a 40-hour workweek. RELs are established by NIOSH to reduce or eliminate adverse occupational health effects.

<u>IDLH</u>: The maximum airborne concentration of a substance which one could escape within 30 minutes without escape-impairing symptoms or any irreversible effects.

<u>STEL</u>: A 15-minute TWA exposure, which should not be exceeded at any time during a workday.

Available information regarding exposure levels and occupational exposure limits for potential contaminants, including TWA and IDLH values and ionization potentials, is presented in below.

TOXICITY INFORMATION AND OCCUPATIONAL HEALTH GUIDELINES

Chemical Compound	ACGIH TLV TWA (ppm/mg/m ³)	NIOSH-TWA (ppm/[mg/m³])	NIOSH IDLH (for air) (ppm/[mg/m ³])	Ionization Potential
Base/Neutral Fraction				
Acenaphthylene Acenaphthene	-	-/- -/-	-/- -/-	-
Anthracene	-	-/0.2	-/-	-
Benzo(a)anthracene	Exposure by all routes should be carefully controlled to levels as low as possible	-/-	-/-	-
Benzo(b)fluoranthene	- '	-/-	-/-	-
Benzo(k)fluoranthene	Exposure by all routes should be carefully controlled to levels as low as possible	-/-	-/-	-
Benzo(g,h,i)perylene	- '	-/-	-/-	-
Benzo(a)pyrene	Exposure by all routes should be carefully controlled to levels as low as possible	-/0.2	-/-	-
Chrysene		-/0.2	-/-	-
Dibenzo(a,h)anthracene	-	-/-	-/-	-
Dibenzofuran	-	-/0.5	-/-	-
Fluoranthene	-	-/-	-/-	-
Fluorene (is this fluorine?)	-	-/-	-/-	-
Indeno(1,2,3-cd)pyrene	-	-/-	-/-	-
2-Methylnaphthalene	-	-/-	-/-	-
Naphthalene	10 (15 STEL)-	10/50	250/-	8.12
Phenanthrene Pyrene	-	-/0.02 -/0.2	-/- -/-	-

NOTE: All semi-volatile compounds exposures by all routes should be controlled to as low as possible.

Abbreviations:

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- = Indicates no information available.
- C = Ceiling limit.
- Ca = Potential carcinogen.
- mg/m^3 = Milligrams per cubic meter.
- NA = Not applicable.
- NE = No evidence to indicate upper limit applicable.
- ppm = Parts per million.
- ACGIH = American Conference of Governmental Industrial Hygienists
- IDLH = Immediately Dangerous to Life or Health
- NIOSH = National Institute for Occupational Safety and Health
- TWA = Time Weighted Average

References:

2007 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Limits Agents.
NIOSH Pocket Guide to Chemical Hazards.
Photovac Incorporated Technical Bulletin No. 11.
Personnel Protection and Safety, EPA Course 165.2 (manual).
The Condensed Chemical Dictionary, 10th Ed., 1981.
Sax's Dangerous Properties of Industrial Materials, 8th Ed.

Due to the nature of this fieldwork, the types and concentrations of these potential hazards remain unknown. Therefore, proper monitoring during intrusive field activities is a necessity. Specific monitoring and hazard assessment will be covered in Section 6.8 of this site-specific SSP.

6.1.2 Physical Hazards

Physical hazards anticipated during the fieldwork include heavy equipment including drilling equipment; potential underground and overhead utility lines; fire or explosion; noise; heat and/or cold stress; electrical hazards; vehicle traffic hazards; pinch hazards; and slip, trip, and fall hazards. To prevent potential traffic hazards when working near active roadways, traffic barricades will be used. Reflective safety vests will also be required when working near roadways. All utilities will be located and marked prior to initiating field activities. MWH will contact and work with local utilities and National Grid personnel to ensure, to the extent possible, that all underground utilities are identified and adequately marked. Generally, the preferred distance from equipment to aboveground electrical lines is 20 feet or greater. If insulated barriers are installed to prevent contact with lines, clearance may be reduced to a distance within the designed working dimensions of the insulating barrier. The insulating barriers must be rated for the voltage of the lines being guarded and not be a part of, or an attachment to, the vehicle or its raised structure. Minimum distances from equipment to overhead electrical lines based on known voltage, without insulators, are as follows:

Nominal Power Line System (kV)	Minimum Required Clearance (feet)
0-50	10
51-100	12
101-200	15
201-300	20
301-500	25
501-750	35
751-1,000	45

6.1.3 Levels of Personal Protection

Work will be performed in Level D personal protective equipment (PPE), as described in Section 6. However, due to the potential for adverse employee exposure, the contingency to upgrade to Level C protection is included. The upgrade will occur in the event that dust and/or atmospheric concentrations monitored during specific site activities meet or exceed predetermined levels of dust and/or toxic air contaminants established for upgrading protective equipment. Further explanation and criteria for upgrading the level of protection are provided in Section 6.6.

If monitoring indicates that an upgrade to Level C protection is warranted, it will be the responsibility of the MWH On-Site Safety Officer (OSO) to stop field activities until air-purifying respirators equipped with appropriate filters are donned by MWH personnel working in the exclusion zone.

6.2 ACTIVITY HAZARD ANALYSIS

6.2.1 Excavating and Drilling Related Activities

Hazards associated with soil excavating and drilling activities including well abandonment include equipment dangers; vehicle traffic; soil collapse; pinch, slip, trip, and fall hazards; potential exposure to gas vapors and chemicals of concern; utility contact; heat/cold stress; and noise. During these activities drilling safety and excavation safety procedures will be observed and maintained. Standard drilling safety procedures are included in, "Drilling Safety Guide". Standard excavation safety procedures are included in, "Excavation Safety Guide" of **Appendix A**.

Field personnel will be required to wear at a minimum, long sleeve shirts, full-length pants, hearing and eye protection, steel-toed boots, hard hats, and 4-mil inner and outer nitrile gloves. Abrasion resistant outer gloves may also be used, as necessary, based upon activity being performed (i.e., drill rig/probe hole equipment operation). When working near active roadways, reflective safety vests shall be worn. Reflective safety vests should also be worn when working in the vicinity of heavy equipment. In addition, appropriate traffic control equipment is required including rotating yellow light when working in an active roadway. This should include the use of barricades and coordination with the village of Fort Edward municipal or police department personnel. Tyvek[®] outer protective clothing is also recommended during boring activities. During activities where contaminated liquids may be encountered, polycoated or SARANEX[®]-laminated Tyvek[®] will be used. If free phase is encountered, 4-mil inner and 22-mil outer nitrile gloves will be used.

Monitoring for dust conditions and the potential gases listed in previously will be conducted to minimize exposure by early detection. If necessary, based on visual and instrumentation monitoring, the site will be upgraded to Level C, or personnel will move away from the site until levels drop to acceptable working levels. Heat/cold stress will be monitored depending upon ambient conditions.

Additionally, the following heavy equipment operation procedures will be followed:

 Before operating equipment in the vicinity of electrical power lines, the equipment operator will walk completely around the equipment to be used to determine the distance from the equipment to the nearest power line. Generally, the distance should be greater than 20 feet.

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- Before conducting intrusive activity, the location will be adequately cleaned and leveled to accommodate the equipment to be used, as appropriate.
- Suitable storage for all tools, materials, and supplies will be provided.
- Work areas and equipment platforms will be kept free of materials, obstructions, and substances that could cause a surface to become slick or otherwise hazardous.
- All unnecessary personnel will be cleared from the area.
- No piece of heavy equipment will be left running and unattended.
- All heavy equipment scheduled for use at the site will be inspected by the operator prior to use and determined to be in safe operating condition.
- Workers on the ground shall not approach a piece of equipment without the operators making eye contact with the person and physically waving permission to enter the area.
- Drill rigs and heavy equipment shall be setup on stable, level ground to be predetermined by the driller.

6.2.2 Documentation Sampling/Field Screening

The same potential hazards exist for soil sampling as described for boring, hand auguring, and abandonment activities. At a minimum, a long sleeve shirt, full-length pants, hearing (when working near drilling/probe hole equipment) and eye protection, steel-toed boots, hard hats, and 4-mil inner and outer nitrile gloves will be worn. Reflective safety outer vests are required during sampling operations when working near active roadways. In addition, appropriate traffic control equipment is required. Tyvek[®] outer protective clothing is recommended during soil sampling activities conducted on site where contact with contaminated soils is anticipated. If free phase liquid is encountered or if liquid impacted with chemicals and the worker

will get wet from the operations, polycoated or SARANEX[®]-laminated Tyvek[®] and 4mil inner and 22-mil outer nitrile gloves will be used.

6.2.3 Monitoring Well Abandonment

The same potential hazards exist for monitoring well construction, development, and abandonment activities as described for soil sampling/field screening activities. At a minimum, a long sleeve shirt, full-length pants, eye protection, hard hats, steel-toed boots, hearing protection and 4-mil inner and outer nitrile will be required. If free phase liquid is encountered or if liquid impacted with chemicals and the worker will get wet from the operations, polycoated or SARANEX[®]-laminated Tyvek[®] outer protective clothing, and 4-mil inner and 22-mil outer nitrile gloves will be used. Reflective safety vests will be worn when working near active roadways.

6.2.4 Groundwater Sampling

The same potential hazards exist for groundwater gauging and sampling activities as described for soil sampling/field screening activities, except equipment dangers and noise hazards. At a minimum, a long sleeve shirt, full-length pants, eye protection, steel-toed boots, and 4-mil inner and outer nitrile will be required. Polycoated Tyvek[®] outer protective clothing is also recommended while conducting these activities. If free phase liquid is encountered, or if liquid impacted with chemicals and the worker will get wet from the operations, polycoated or SARANEX[®]-laminated Tyvek[®] outer protective clothing and 4-mil inner and 22-mil outer nitrile gloves will be used. Reflective safety vests will be worn when working near active roadways.

6.2.5 Mapping and Surveying

Hazards associated with this field activity include traffic hazards; and pinch, slip, trip, and fall hazards. At a minimum, field personnel will wear long sleeve shirts, fulllength pants, eye protection and steel-toed boots. Reflective safety outer vests are required while conducting these activities near active roadways. Workers will not survey on active roadways without permission from the Health and Safety Director or Certified Industrial Hygienist.

6.3 EMERGENCY CONTACTS

EMERGENCY PHONE NUMBERS

In the event of any emergency, contact the project manager or one of the health and safety representatives listed below.

Ambulance	911	
Fire	911	
Police	911	
Hospital Name	Glens Falls Hospital, 12 W Falls, NY	/arren Street, Glens
Hospital Phone Number	(518) 926-7077	
Project Manager	Andrea Simmons	518- 640-6007 (office) 518-428-5270 (cell)
Health and Safety	Rick Shassetz, CIH	303-410- 4127 (office)
Representatives	Director of H&S	720-224-3515 (cell)
	Joe Frydenger	312-831-3188 (office)
	Eastern Region H&S	312-286 2326 (cell)
	Priscilla Seaburg Albany H&S	518-640-6018 (office) 518-852-2251 (cell)
Client Contact	Steven Stucker	315-428-5652 (office)
		315-247-6490 (cell)
Poison Control (Nationwide)	800-222-1222	
State Agency (NYSDEC)	Scott Deyette	518-402-9662 (office)
		518-461-3721 (cell)
State Agency (NYSDOH)	Deanna Ripstein	518-402 -7870

UTILITY MARKER EMERGENCY TELEPHONE NUMBERS

Utility	Color Code	Telephone Number
Water	Blue	
Gas	Yellow	
Electric	Red	Call Dig Safely NY
Telephone/Cable	Orange	
Sewer	Green	
Dig Safely NY Telephone Number:	800-962-7962	

6.3.1 Project Manager (PM)

The PM is primarily responsible for safe performance of the project and is the central point of contact with the National Grid Project Manager. Should a health and safety issue develop in the performance of the field activities, the PM will contact the National Grid Project Manager assigned to the project and the MWH HSC.

6.3.2 Health and Safety Coordinator (HSC)

The HSC is responsible for preparation of the site-specific SSP. The HSC will ensure that the site-specific SSP complies with OSHA standards and site-specific health and safety requirements based on known or anticipated health and safety concerns. If necessary, the OSO can modify the site-specific SSP to accommodate on-site changes that may affect safety. The OSO will confer with the HSC on all modifications to the site-specific SSP. The HSC will be available for consultation when required. The HSC may visit the site during field activities to perform a site safety audit, but will not remain on site throughout the investigation. A copy of the Site Safety Checklist is included in **Appendix A**.

6.3.3 On-Site Safety Officer (OSO)

The OSO is responsible for working with the field team to implement the site-specific SSP. The OSO has the responsibility and authority to halt or modify any work condition or to remove personnel from the site if he considers conditions to be unsafe. The OSO will be the main contact in any on-site emergency situation and will direct all field activities. The OSO will ensure that all on-site MWH personnel understand and comply with site safety requirements. If the OSO observes MWH or contractor personnel deviating from standard health and safety practices, an "Incident Report" will be completed. A copy of the report will be submitted to the HSC and, if applicable, the contractor's company. Except for minor changes or emergencies, the OSO can modify the site-specific SSP requirements only after consultation with and approval by the HSC. The OSO or an assigned designee will

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be on site at all times during field activities to observe and audit the various fieldwork zones throughout the investigation.

6.3.4 Field Staff

MWH field staff is responsible for understanding and complying with all requirements of the site-specific SSP. Every morning before the start of field activities, a tailgate safety meeting will be conducted to instruct MWH field staff on site-specific SSP requirements. Subcontractors and on-site National Grid personnel are encouraged to attend these daily tailgate safety meetings. During these meetings, site safety concerns associated with the days planned activities, as well as previously identified issues, will be discussed. Questions pertaining to health and safety issues can also be directed to the OSO by field staff, subcontractors and National Grid personnel during these meetings. Each worker assigned to the project must sign and date a "Personal Acknowledgment" form (**Appendix A**) stating he/she has read and understands the contents of the site-specific SSP.

6.3.5 Notification Requirements

Unanticipated field conditions will occasionally require modifications to the sitespecific SSP. Notification and/or approval procedures will be dependent on actual field conditions. Conditions which require an upgrade of in the level of protection should be reported to the HSC and recorded on the "Tailgate Safety Meeting Form" (**Appendix A**). Minor changes not affecting the degree of protection can be implemented by the OSO. These changes will be documented and sufficiently justified in the field logbook.

The OSO will stop all field activities and contact the HSC under the following conditions:

- 1. Any activity requiring an upgrade to Level B protection.
- 2. Any IDLH activity, as defined by NIOSH.

- 3. Entry by MWH personnel into a confined space where such an entry was not covered in the SSP prepared for the Site.
- 4. Any identified hazard where an exposure under reasonable circumstances could lead to possible permanent injury or death.
- 5. If a subcontractor fails to follow safe working practices after being notified/warned of an unsafe working practice.

6.4 MEDICAL SURVEILLANCE AND TRAINING

6.4.1 General Health & Safety Training

Health and safety training is an integral part of the total project health and safety program. The objectives of such training are to educate workers about the potential health and safety hazards associated with working at the project site. The Project Manager is expected to instruct employees about the hazards of the project and site before allowing them to perform work on site. The site orientation should include an overview of this HASP, emergency information, and other relevant information that would provide the worker with safety and health information prior to entering the project site.

Examples of health and safety training that applies to work activities, as applicable:

- First Aid and CPR
- OSHA HAZWOPER
- Confined Space
- Slip, Trip, and Fall Hazard Awareness

This is not an all-inclusive list of training requirements; as work scope changes and new training requirements are identified, they will be incorporated into the program.

Employees and Subcontractors are required to verify that their employees have received the necessary training and that documentation is available.

Prior to commencement of site activities, the H&S Representative will ensure that all employees and Subcontractor's employees engaged in a work activity are informed of the nature and degree of exposure to chemical and physical hazards that are likely to result from performance of work.

All MWHA employees must also complete any other training that may be required for the National Grid project and by OSHA-specific standards or other applicable standards before initiating work requiring specific training.

6.4.2 Medical Surveillance

If the site is upgraded and level "C" PPE is determined to be needed in accordance with the requirements of 29 CFR 1926.65 (f) the site personnel entering the exclusion zone (EZ) or contaminant reduction zone (CRZ) will be medical qualified to work on a hazardous waste site and to wear respiratory protection. Prior to commencing work, which requires respiratory protection or potential exposure to hazardous materials, employers will provide MWH with documentary evidence verifying project personnel current medical status. Personnel not obtaining medical certification will not perform work within the CRZ and EZ.

Medical Surveillance Requirements

The medical surveillance program will be instituted to include the following personnel:

 Personnel who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

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- Personnel who wear a respirator for 30 days or more a year or as required by 1926.103; and
- All personnel who are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

Frequency of Medical Examinations and Consultations

Medical examinations and consultations will be made available to each person entering the EZ or CRZ on the following schedules:

- Prior to assignment;
- At least once every twelve months for each person covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;
- At termination of employment or reassignment to an area where the person would not be covered if the person has not had an examination within the last six months;
- As soon as possible upon notification by a person that they have developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the person has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation;

At more frequent times, if the examining physician determines

6.4.3 Emergency Medical Assistance and First Aid Equipment

Prior to work start up, the OSO will discuss the emergency medical assistance network, which has been established for the Fort Edward Canal Street MGP site with all personnel assigned to the site. Locations of phones, fire extinguishers, first-aid

kits, and emergency telephone numbers are identified in the "Emergency Assistance Information" form (**Appendix A**). A map showing directions to the nearest hospital location will be provided to all field personnel. A map to the hospital is included below



Nearest Hospital

<u>Address</u>

Glens Falls Hospital 12 Warren Street Glens Falls, NY 12801 (518) 926-7077

Directions to Hospital*

Exit site north on Canal Street Turn left on East Street (0.1 mile) Turn right on Broadway (0.6 mile) Continue on Broadway/Upper Broadway (0.6 mile) Continue on Lower Main Street (0.5 mile) Continue on Main Street (0.7 mile) Continue on River Street (1.4 mile) Continue on Lower Warren Street (0.6 mile) Continue on NY Route 32 (1.2 mile) The Emergency Assistance Information (**Appendix A**) form and the emergency route map will be clearly posted at each work site. A designated safety vehicle will be on site and available at all times for a medical or safety emergency. The OSO or his designee will be responsible for the availability and use of the safety vehicle.

The OSO and key field staff will be certified to render first aid and cardiopulmonary resuscitation (CPR) prior to the initiation of field activities. A first-aid kit will be available at the site for use by trained personnel. An adequate supply of fresh water for hand and face washing and portable emergency eyewash kit will be available at the work site. At least two fire extinguishers will also be available on-site.

6.5 SITE CONTROL

Site control requires the establishment of a regulated area, designated work zones, evacuation protocol, and site security. Exclusion zones will be established at each work area. All work areas will be limited to qualified personnel and have a designated entrance and exit point. At times when the site is unattended, access to the exclusion zone will be restricted by locking gates, or placing caution tape or plastic fencing across the access point. Only persons with the required appropriate health and safety training and an active role in the site characterization activities will be allowed in the exclusion zones. The OSO or his/her designee will monitor access to the exclusion zones.

The Site perimeter will be fenced with visible construction fencing and off-hours security monitoring will be initiated any time open excavations are present.

Some of the proposed soil and groundwater sampling locations are located within public areas; therefore, it will be necessary to adequately mark and identify work areas. Onlookers and the general public will not be allowed within the marked work areas. Work areas will be marked with traffic cones, caution tape, or temporary fence.

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6.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE will be required during the course of the work at the Fort Edward Canal Street MGP site. PPE selection will be based primarily on hazard assessment data and work task requirements.

The PID will be calibrated with the appropriate calibration span gas (100 ppm isobutylene and zero air), according to manufacturer instructions, at the beginning of each workday. Following calibration, readings will be recorded using upwind background measurements. At the end of each workday, readings will be taken using upwind background measurements to determine calibration variations. All calibration information will be recorded on an "Equipment Calibration" form (**Appendix A**).

An aerosol monitor will be utilized during all intrusive activities at the site to monitor levels of airborne dust. All readings will be documented in the field logbook and appropriate measures will be taken if dust levels exceed established action levels. MWH personnel will also visually monitor dust conditions. Should soils on-site be dry and activities cause airborne dust, water may be applied to the appropriate area(s) to reduce airborne dust levels.

Based on the site history and planned field activities, the initial level of protection for all field activities will be Level D.

6.6.1 Level D PPE

MWH personnel working in the exclusion zone shall wear, unless otherwise specified in Section 2, of this SSP the following:

- Full-length pants.
- Gloves (outer): chemical-resistant, 4-mil, nitrile. When contact with free product or liquid is anticipated, chemical-resistant, 22-mil, nitrile gloves will be worn.

- Gloves (inner): chemical-resistant, 4-mil, nitrile.
- Boots: leather or chemical-resistant; steel-toed (all field activities).
- Hard hat (all field activities).
- Reflective safety vests when working near heavy equipment or roadways.
- Hearing protection when near heavy equipment.
- Safety glasses or goggles.

6.6.2 Level C PPE

If and when air-monitoring data, dust conditions, or previously obtained site information dictates that a particular site be upgraded to a Level C, MWH personnel shall wear, at a minimum:

- Full-face or half-face air-purifying respirator equipped with Mine Safety and Health Administration (MSHA)-approved organic vapor (OV) cartridges if organic vapors are encountered. High efficiency particulate air (HEPA/P100) cartridges (MSHA approved) will be used in conjunction with the respirators if irritating dust levels are encountered. Safety glasses or goggles will be worn during all field activities when half-face respirators are used.
- Coveralls made of cotton or disposable, chemical-resistant Tyvek®. Polycoated or SARANEX®-laminated Tyvek® coveralls will be worn where the potential for contact with contaminated liquids exists (seams, arm, and leg openings will be secured with duct tape). Protective aprons may be allowed for sampling purposes once sufficient sampling has occurred to evaluate the potential for contaminant exposure. The HSC should be consulted before implementing the use of aprons for sampling.

- Gloves (outer): chemical-resistant, 4-mil, nitrile. When contact with free product or liquid is anticipated, chemical-resistant, 22-mil, nitrile gloves will be worn.
- Gloves (inner): chemical-resistant, 4-mil, nitrile.
- Boots: chemical-resistant, steel-toed covers (all field activities).
- Hard hat (all field activities).
- Hearing protection when near heavy equipment.
- Safety glasses or goggles if half-face respirator is used.

6.7 RESPIRATOR SELECTION AND FIT TEST

The OSO is responsible for verifying that all on-site MWH field personnel have been fit-tested for the applicable respirators prior to working in Level C protection at the Fort Edward Canal Street MGP site. The OSO or HSC will maintain a record documenting the date, size, brand, and model number of the air-purifying respirator for each site worker. Contact lenses can be worn when using a full-face respirator in the exclusion zone if they are gas permeable or soft lenses. Site workers who wear spectacles and are working in Level C PPE in the exclusion zone will be supplied with spectacles specially designed for respirators by their employers.

6.8 HAZARD ASSESSMENT

Hazard assessment is essential in determining the hazard control measures that need to be implemented during site activities. Hazard assessment is an ongoing process and involves characterization of the chemical, physical, biological, and other safety hazards at the Site. It is the responsibility of each site worker to continuously look for potential hazardous site conditions that arise during the normal course of completing site activities. Once identified, the necessary steps to correct these conditions will be taken. Potentially hazardous site conditions that are identified should be corrected immediately and brought to the attention of the OSO or HSC.

6.8.1 Site Survey

Prior to initiation of work activities, the OSO shall conduct a site survey to identify safety hazards and determine appropriate control measures. Hazards may include, but are not limited to, underground utilities, traffic, overhead power lines, and current weather conditions, such as excessive heat or cold conditions, lightning, etc. Site specific hazards for the Fort Edward Canal Street MGP site include: the chemicals of concern, under- and aboveground utilities, automobile traffic, equipment dangers, the slip, trip pinch and fall, and heat and cold stress. Particular attention will be paid to underground utilities based on historical observations of a 10 inch gas main during test pit activities and the area being primarily residential.

6.8.2 Noise Monitoring

Noise monitoring must be performed in accordance with MWH practices. Noise levels are monitored in the field with either a Type I or Type II Sound Level Meter (SLM). Noise dosimeter readings can also be obtained to determine the percent (%) noise dose. Noise levels and % dose measured are then compared to limits listed in OSHA standard 29 CFR 1910.95, Hearing Conservation.

Noise monitoring equipment must be calibrated prior to use each shift and checked at the end of the shift to determine accuracy. Noise readings must be recorded on the Noise Monitoring Form in **Appendix A**. Selection of hearing protection must match the employee's needs and the ability to attenuate noise below) 90dB(A). Each hearing protection device (muff or plugs) has a Noise Reduction Rating (NRR) assigned by the Environmental Protection Agency (EPA). To calculate the hearing protector's' effectiveness, use the following formula:

Noise Reading dB(A) - (NRR - 7dB) < 90dB(A)

Action levels listed in the table below will trigger upgrade in PPE to include appropriate bearing protectors (muffs or plugs) or initiate possible noise control engineering.

Instrument	Measurement	Action	
Type I or Type II SLM - Calibrate Before Use			
Noise monitoring is conducted when high noise levels are perceived to be	>80 dB(A) → 85 dB(A)	Hearing protection recommended. Limit work duration to 8-hour shifts.	
are required to work and in work areas where designated as "High Noise".	>85 dB(A) → 90 dB(A)	Hearing protection required. Limit work duration to 8-hour shifts. Post signs.	
	>90 dB(A) → 115 dB(A)	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8-hour shifts. Post signs.	
	>115 dB(A)	Stop work. Contact HSR and PM.	

Table 1 Noise Monitoring

6.8.3 Air Monitoring

The main objective of atmospheric monitoring is to assess the inhalation hazards presented to site personnel. During site activities, air monitoring will be conducted using a PID, detector tubes, and an aerosol dust monitor. Air monitoring results must be recorded on the Air Monitoring Form in **Appendix A**.

6.8.3.1 Dust

Based on site surface conditions and the intrusive field activities planned during implementation of the site characterization, significant dust conditions are not anticipated. However, steps to minimize the potential for generation of dust will be taken during intrusive activities. In addition, dust monitoring will be performed during all intrusive activities utilizing an aerosol monitor (MIE pDR-1000 or equivalent). Background readings will be collected prior to the start of each workday. Site perimeter readings should be collected at a minimum of twice per workday to ensure off site parties are not affected by dust generated during this scope of work.

Additional readings will be recorded at the site perimeter in accordance with the requirements of the Community Air Monitoring Program (Section 8).

6.8.3.2 PID

During tank removal excavation activities, the work site shall be monitored for organic vapors using a PID equipped with a 10.6, 11.0, or 11.7 eV lamp as described below. The PID will be checked daily and operated in the 0- to 20-parts per million (ppm) range. Organic vapor levels will be measured upwind of the work zone to determine a background reading on a daily basis. Readings will be taken periodically but in no case less frequent than every 30 minutes during intrusive activities. More frequent monitoring will be conducted if elevated readings are recorded.

The PID will be calibrated with the appropriate calibration span gas (100 ppm isobutylene and zero air), according to manufacturer instructions, at the beginning of each workday. Following calibration, readings will be recorded using upwind background measurements. At the end of each workday, readings will be taken using upwind background measurements to determine calibration variations. All calibration information will be recorded on an "Equipment Calibration" form (**Appendix A**).

WORK AREA ACTION LEVELS				
Contaminant	Frequency	Action Level (TWA)	SSHC Action/Response	
VOLATILE ORGANIC VAPORS (VOCs) (PID with 10.6 eV lamp)	Continuously in work areas during intrusive activities (excavating) Prior to and continuous during confined space entry (i.e., excavations >4 ft. and tanks). NOTE : a trench or pit with limited	5 ppm	 Increase to Level C PPE (half or full- face respirator with qualitative or quantitative fit test) or use controls to reduce VOC concentrations below 5 ppm. Observe VOC results on PID located downwind of the Exclusion Zone and implement Community Air Monitoring 	

6.8.3.3 Work Area Action Levels
WORK AREA ACTION LEVELS					
Contaminant	Frequency	Action Level (TWA)	SSHC Action/Response		
	 access over 4' will be considered a confined space. 1. Periodically during intrusive work activities 2. When odors are 	>5 ppm	Program (CAMP) Response Actions if CAMP action levels are exceeded. Continue to observe downwind VOC levels until work area levels are <5 ppm.		
	encountered or changing site conditions affect hazards.		 Increase to Level B PPE or Level C PPE (full-face respirator with quantitative fit test) or 		
	3. Prior to and continuous during confined space entry		 Implement additional controls to reduce VOC concentrations below 50 ppm. 		
	(i.e., excavations >4 ft. and tanks).	250 ppm	 Continue to observe VOC results on PID located downwind of the Exclusion Zone. Continue to observe downwind VOC levels until work area levels are <5 ppm. 		
			1. STOP work and use ventilation, covers, vapor suppressants or other controls to reduce VOC levels.		
			 Continue to observe VOC results on PID located downwind of the Exclusion Zone. Continue to observe downwind VOC levels until work area levels are <5 ppm. Contact HSR and PM. 		
DUST SSHC Observations and	Periodically in Intrusive Work Zones during intrusive activities (excavating and Staging) using a "roving" dust monitor	<5 mg/m ³	Use dust suppression techniques outlined in the "Dust & Odor Suppression" section of this Work Plan. Prevent visible dust emissions to public areas.		
Dust Meter (Dust Trak or MiniRam)	roving aust monitor.	5 mg/m ³	 STOP Work. Review, evaluate, and implement additional techniques or controls or slow work production to reduce work area nuisance dust levels 		

WORK AREA ACTION LEVELS				
Contaminant	ontaminant Frequency Action Level (TWA) SSHC Action		SSHC Action/Response	
			below 1 mg/m ³ .	
			3. Contact HSR and PM.	
* Dust and VOC (TWAs) above I Work Areas.	Caction levels are based background. Background	l on running 1 d readings are	5 minute Time-Weighted Averages taken at upwind locations relative to	

6.8.3.4 Action Levels for "Stop Work"

Situations that require "Stop Work" are:

- Aerosol readings exceeding 10 mg/m³ (15 minutes sustained), the designated work zone (exclusion zone) shall be evacuated until the dust levels have subsided.
- When the PID indicates sustained (15 minutes) breathing zone organic vapor concentrations exceeding 100 ppm, the designated work zone (exclusion zone) shall be evacuated until the vapor levels have subsided.

6.9 EVACUATION PROCEDURES

Prior to beginning work, the OSO will brief all MWH and subcontractor employees on what the evacuation signal should be. It may be a verbal command or it may be an audible alarm such as a bell or car horn.

Prior to work, the OSO will determine a meeting place if evacuation is necessary. Preferably, the meeting place should be upwind of the work activities and at a safe distance. All MWH and subcontractor employees should be informed of the meeting location.

If evacuation is necessary, everyone should go directly to the meeting area. The OSO should ensure all personnel (MWH and subcontractor) are accounted for. This will mean checking the sign-off documentation on the SSP or the daily sign-in roster.

The local on-scene project manager, different than the OSO, should immediately be notified of any missing personnel as well as their last known whereabouts.

6.9.1 Site Evacuation

If an evacuation of the site is necessary, certain rules must be strictly followed:

- Employees in the vicinity should immediately shut down all equipment and disconnect electrical or flammable power sources to machinery.
- Immediately after personnel are alerted, they will evacuate the facility via the nearest escape route.
- All evacuated personnel will assemble at the predetermined meeting place.
- Employees should not wait for friends; the on-site OSO will ensure all personnel have evacuated before departing.
- Employees should move quickly and calmly without panic.
- Employees should not smoke.
- Once assembled, employees should remain calm and quiet while the OSO takes roll call and assesses the situation. Each employee must report to the OSO until everyone is accounted for and evacuation is complete.

6.9.2 Off-Site Evacuation

If an incident is large enough, off-site personnel may also need evacuation. If off-site evacuation is necessary, follow the appropriate local notification procedures, generally through the fire department. MWH personnel should not attempt to evacuate off-site personnel but should leave that task to the local authorities. All MWH employees should follow the evacuation directions given by the local authorities. The OSO should offer to remain at the command post to supply information. If told to leave, the OSO should leave.

Local authorities will have an on-scene commander. The on-scene commander will direct emergency operations and will have assistance from the local fire department, police department, and emergency government.

After evacuating to a safe area, the Project Manager should be contacted or, in the Project Manager's absence, the Office Supervisor or Corporation Health and Safety Manager.

6.10 GENERAL SITE SAFETY REQUIREMENTS

The following practices are expressly forbidden during on-site activities:

- Smoking, eating, drinking, or chewing gum or tobacco while in the work zone or any potentially contaminated area.
- Ignition of flammable materials in the work zone; equipment shall be bonded and grounded, spark proof and explosion resistant, as appropriate.
- Contact with potentially contaminated substances. Walking through puddles or pools of liquid; kneeling on the ground; or leaning, sitting, or placing equipment on the contaminated soil shall be avoided.
- Performance of tasks in the exclusion zone individually; personnel shall work using the "buddy system" at all times.

Personnel should keep the following rules in mind when working in the exclusion zone:

- Hazard assessment is a continual process; personnel must be aware of their surroundings and constantly be aware of the chemical/physical hazards that are present and the limitations of PPE.
- Personnel in the exclusion zone shall be the minimum number necessary to perform work tasks in a safe and efficient manner.

- Team members will be familiar with the physical characteristics of each investigation site, including wind direction, site access, location of communication devices, and safety equipment.
- Prior to initiating intrusive activities, the location of overhead power lines and underground utilities must be established.

Team members will be familiar with the emergency hand signals specified in the table below.

Emergency Hand Signals

SIGNAL	INDICATION
Thumbs up	OK, I'm all right, I understand
Thumbs down	No, negative

Material Safety Data Sheets (MSDS) shall be maintained on-site for any chemical brought on-site for use during the site characterization.

7.0 REPORTING AND SCHEDULE

7.1 ENGINEERING SCHEDULE

A preliminary engineering schedule has been developed in accordance with Section 5.7 of DER-10. The dates on the schedule are dependent upon NYSDEC's review of this Work Plan and the final report, and any edits which may be required to obtain approval of the proposed remedial action. The schedule provides a framework for meeting project milestones. Periodic progress reports will be submitted as required by DER. The progress reports will be formatted as specified in DER-10 section 5.7-b and will contain at minimum:

- Specification of all remedial actions accomplished during the reporting period.
- Proposal of any deviations or modifications to the RAP prior to implementation.
- Reporting of any problems or delays in the implementation of the RAP.
- A running list of the types and quantities of waste generated by the remedial action.

The preliminary engineering schedule has been included as Figure 6.

8.0 COMMUNITY AIR MONITORING PROGRAM

This community air monitoring (CAMP) plan was developed using DER-10, Appendix 1A. Response levels and actions were not modified from those prescribed in DER-10. This CAMP was prepared for use during the construction phase of the remedial action. The number of monitoring points, however, will be augmented to account for site population and activities rather than based strictly on wind direction.

The property is in a residential area. For this reason, continuous monitoring will be implemented along the north, south and west perimeter of the site regardless of wind direction. Additional monitoring points will be established based on upwind and downwind requirements as dictated in DER-10. Continuous monitoring for VOCs and particulates will be conducted during excavation and site redevelopment, when there is heavy equipment at the site. Periodic monitoring as described in DER-10 will be implemented during backfill and cover installation operations.

8.1 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the immediate work area, and along the north, south, and west Site boundary at temporary particulate monitoring stations. The particulate monitoring will be performed using miniature real time aerosol monitoring instrument capable of measuring particulate matter less than 10 micrometers per cubic meter (mcg/m³) 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 microgram per cubic meter (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 including the use of water spray on dust containing surfaces 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 (NYSDEC and NYSDOH) personnel to review upon request.

8.2 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) and along the northern, southern, and eastern Site boundaries 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 perimeters of the work area or exclusion zone exceeds 5 parts per million (ppm) above upwind 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 perimeters of the work area or exclusion zone persist at levels in excess of 5 ppm over upwind 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 at half the distance to the nearest potential receptor or perimeter boundary, 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 upon request. Instantaneous readings, if any, used for decision purposes will also be recorded.







koJECTS/Niagara Mohawk/Mapping/2111659/2111659.



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FIELD CHANGE REQUEST

Client:	D	ate:
Job Location:	N	umber:
Project:	Jo	bb/File No.:
Prepared By:	Ti	tle:
Contract Requirements:		
Proposed Change:		
Reason for Change:		
Anticipated Impacts:		
Field Team Leader	Health & Safety Office	er Project Manager

MW050194

908 DRILLING SAFETY

I. <u>PURPOSE</u>

The purpose of this policy is to provide Montgomery Watson personnel with safety information about the hazards of drilling. Montgomery Watson does not operate drilling equipment. However, Montgomery Watson personnel routinely conduct activities around drilling equipment, such as but not limited to:

- geological support
- lithologic logging
- soil sample collection for geotechnical and/or hazardous material testing
- well installation for groundwater monitoring/sampling, injection or extraction
- oversight of other contractors conducting drilling activities

The types of drilling equipment that may be encountered include, but are not limited to, the following:

- hollow-stem and solid-stem auger drilling;
- limited-access rig drilling;
- mud rotary drilling;
- air rotary drilling;
- cone penetrometer testing (CPT); and
- direct-push soil gas/soil/groundwater sampling (a.k.a., "STRATAPROBE", "Hydropunch").

This policy focuses on the physical hazards at a typical drilling site. Chemical exposure hazards and procedures to mitigate them are addressed in OSHA Hazardous Waste Operations Training.

Topics covered in this policy include:

- conducting an initial cursory safety inspection of the drilling site;
- conducting a Health and Safety Tailgate Meeting;
- communicating potential safety hazards to other Montgomery personnel and to subcontractors;
- maintaining a safe work environment throughout typical drilling activities; and
- responding to emergencies on site.

II. <u>REFERENCES</u>

- A. ATEC Associates, Inc. <u>Drilling Safety: Working in the Danger Zone.</u> ATEC, 1991.
- B. Diamond Core Drill Manufacturers Association (DCDMA) and the National Drilling

Contractors Association (NDCA). <u>Drilling Safety Guide.</u> National Drilling Federation.

- C. Driscoll, Fletcher. <u>Groundwater and Wells.</u> 1989.
- D. West Hazmat Drilling. Workplace Injury & Illness Prevention Program. 1991

III. <u>DISCUSSION</u>

Across Montgomery Watson service areas (e.g., water resources, wastewater disposal, and hazardous waste operations), drilling sites seem to be a common workplace. Drilling equipment is hazardous and the sites where drill rigs are used are often hazardous. For this reason, it is important for Montgomery Watson employees to have a good understanding of the safety hazards associated with drilling equipment and drilling sites.

One of the most potentially hazardous situations Montgomery Watson field personnel encounter on a regular basis is the drilling site. At a typical drilling site, many activities occur simultaneously: for example, drilling, soil logging, air monitoring, sample packaging, and drumming of cuttings. A minimum of three personnel are present at a drilling site (the driller, the helper, and the Montgomery Watson field technician), but field crews consisting of six or more persons are not uncommon. Several types of heavy field equipment may be used at a drilling site, such as: drill rig or direct-push rig; concrete corer; service trucks; water trucks; large air compressors; generators; mud pumps and mud pans (for circulating drilling fluid and settling cuttings during mud rotary drilling); and "cyclones" (for collecting cuttings during air rotary drilling).

This combination of many simultaneous activities, numerous subcontractors and associates on site, and heavy field equipment can render a drilling site hazardous to the physical safety of site workers. It is imperative, therefore, that Montgomery field personnel understand the potential hazards of a drilling site before they arrive at the site; that they conduct at least a cursory safety inspection of the site before proceeding with work; that they maintain a continuous awareness of site safety conditions and communicate these between associates and subcontractors; and that they respond quickly and appropriately during site emergencies.

IV. <u>DEFINITIONS</u>

<u>Annulus</u>

The space between the drill string (length of connected drill pipe) or casing and the wall of the borehole or outer casing.

Auger Drilling

A general type of drilling in which the borehole is drilled by rotating augers (either hollow-stem or solid-stem), and cuttings are removed by being pushed up the "flights" (corkscrew-like flanges) of the augers. (Note: the term "flight" is often used to indicate the lengths of hollow-stem or solid-stem augers, as well as the flanges on the augers.)

Hollow-stem augers allow drillers to send split-spoon samplers down through the center of the augers, thereby eliminating the need to pull out the augers first. Solid-stem augers are used for smaller-diameter holes and for drilling through formations where more concentrated downward force is necessary.

<u>Bit</u>

The cutting tool attached to the bottom of the drill string. Used in rotary drilling.

Blowout

An uncontrolled escape of drilling fluid, gas, oil, or water from the well caused by the formation pressure being greater than the hydrostatic head of the fluid in the borehole. Also, an uncontrolled escape of grout from the borehole or well caused by malfunctioning pressure grouting apparatus.

Cone Penetrometer Testing

This was originally a method of performing geotechnical evaluations of subsurface soils, now additionally used to obtain rough estimates of aquifer properties. The cone penetrometer testing (CPT) rig uses a direct-push method to advance a cone equipped with electronic sensors. As the cone is pushed downward, measurements are collected by the sensor and are recorded on the CPT aboveground equipment. Some CPT rigs are also capable of collecting soil gas, soil and groundwater samples at shallow depths (usually less than 50 feet).

Cuttings

Formation particles obtained from a borehole during the drilling process.

Direct-Push Soil Gas/Soil/Groundwater Sampling

A method of sampling either soil gas, soil, or groundwater by advancing a small sampling probe. The probe is hydraulically pushed downward, generating virtually no cuttings and eliminating waste disposal concerns. Direct-push sampling is applicable where no permanent wells are desired, and/or where sampling is required at relatively shallow depths (usually less than 50 feet). Direct-push equipment may be truck-mounted (on a vehicle), or mounted on a modified hand truck.

Drill Collar

A length of extremely heavy steel tube. It is placed in the drill string immediately above the bit to minimize bending caused by the weight of the drill pipe.

Drill Pipe

Special pipe used to transmit rotation from the rotating mechanism to the bit. The pipe also transmits weight to the bit and conveys air or fluid, which removes cuttings from the borehole and cools the bit.

Drilling Fluid or Mud

A water-based or air-based fluid used in the well drilling operation to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drill string and the sides of the borehole, and to seal the borehole.

Grouting

The operation by which grout is placed between the casing and the sides of the borehole to a predetermined height above the bottom of the well. This secures the casing in place and excludes water and other fluids from the borehole. A pressure grouting operation injects grout from the surface under high pressure, in order to move grout laterally in the subsurface and ensure an adequate seal.

<u>Kelly</u>

A hollow steel bar or pipe that is the main section of drill string to which the power is directly transmitted from the rotary table to rotate the drill pipe and bit. The cross section of the kelly is either square, hexagonal, or grooved. The kelly works up and down through drive bushings in the rotary table.

Limited Access Drill Rig

A type of drill rig, usually equipped with solid-stem augers, which allows drilling in tight spaces or in areas with low overhead clearance (less than 12 feet). Limited access drill rigs may be mounted on a small lawnmower-like vehicle, or on a modified hand truck.

Rotary Drilling

A general type of drilling in which the borehole is drilled by rotating a bit, and cuttings are removed by continuous circulation of a drilling fluid (e.g., mud, water, air, foam) as the bit penetrates the formation. The bit is attached to the lower end of a string of drill pipe, which transmits the rotating action from the rig to the bit.

Rotary Table

A mechanical or hydraulic assembly that transmits rotational torque to the kelly, which is connected to the drill pipe and the bit. The rotary table has a hole in the center through which the kelly passes.

Split-Spoon Sampler

A thick-walled steel tube split lengthwise used to collect soil samples. The sampler is commonly lined with metal sample sleeves and is pounded or pushed downhole by the drill rig to collect samples.

V. <u>PROCEDURES</u>

A. Initial Safety Inspection

Remember, as the On-Site Safety Officer, you are in charge of the health and safety of all personnel working on site. Before beginning each day's work at the site, conduct an initial safety inspection of the site. A good mnemonic for organizing this inspection is to "Look up, down, and all around."

"Look Up": If drilling must be conducted at a horizontal distance closer than an average of 20 feet from an active power line, the local electric company must be notified, and must deactivate ("kill") the line while work is being conducted at the site. This requires advance notification and often requires payment of a deactivation fee. (Even if drilling is conducted further than the required distance from any power line,

ideally all of the closest overhead power lines surrounding a drill rig should be deactivated during drilling.) Observe the overhead power line clearance around the drill rig. Verify that the rig is at least the required horizontal distance from any active power line. If this is not the case, contact the project manager and either relocate the drilling location or wait until the line is deactivated. A chart outlining the voltages of power lines and the required horizontal clearance for each is provided in the Industrial/Hazardous Waste Operations Health and Safety Procedure No. 630.19.

Note the fall radius of the drill rig tower. The typical rig tower could conceivably fall in any direction, to a distance at least its own length (plus the height of the rig if it falls sideways or backward with the rig). Place field personnel outside this fall radius, and orient field vehicles either outside the fall radius or facing a direction that allows quick escape from the work site, should the rig give indication that the tower may fall.

Check the weather. Does it look like a storm? If so, beware of lightning and be prepared to stop work (this is an absolute MUST to avoid a lightning strike of the rig tower and electrocution of field personnel!) If rain appears imminent, cover all supplies such as bentonite, don rain gear and prepare to mitigate slippery work areas should the rain muddy the drilling location. If extreme hot or cold temperatures are affecting the site, apply the appropriate heat or cold stress remedial measures throughout the course of field work.

"Look Down": All drilling work must be cleared in advance with the local branch of the national underground line alert service. The service is free, but must be activated several days prior to field work, and must be accompanied by paint or other field markings of drilling locations. The relevant agencies, utility companies, oil companies, cable companies, and other parties are notified by the service, and will demarcate their lines on the site if they run through the site. Scan the work site for indications of underground pipelines or utility lines (for example: breaker boxes, fire hydrants in a line. aboveground pumps). Look for paint markings from the notified agencies/companies/other parties demarcating their lines, and determine whether any lines are within 5 feet of proposed drilling locations. If any lines are too close, contact the project manager and relocate the drilling locations appropriately. A detailed description of the nationwide underground line alert service is provided in the Industrial/Hazardous Waste Operations Health and Safety Procedure No. 630.19.

"Look All Around": Inspect the drill rig. Look for signs of poor maintenance/condition such as: flat or bald tires; missing or nonfunctioning jacks; broken or loose hammer; broken or loose cathead; broken, loose, or worn hydraulic lines; frayed cables or ropes; broken or loose hoists or shivs; a disabled emergency kill system. If any of these items are present, speak with the driller and stop work until the conditions are repaired and rendered satisfactory to you. Remember, it is the driller's responsibility to provide safe, functioning equipment to perform the work. You have the right to request that the equipment meet these basic expectations.

Inspect the subcontractor personnel, as well as Montgomery personnel. Make sure that all field personnel are wearing the designated personal protective equipment (PPE). At a minimum, all personnel are required to wear Level D gear, which includes hard hats,

safety glasses or goggles, ear plugs, long-sleeved shirts and long pants, work gloves and steel toe boots. Stop work until all personnel are wearing the appropriate PPE.

Observe the work area. Do not allow tools or equipment to be scattered throughout the area, as this could lead to slip/trip/fall accidents. Make sure that Montgomery personnel are placed away from heavy work areas, such as the path of the driller's helper (who often carries drill pipe, augers, and heavy sacks of supplies back and forth). Allow adequate pathways for personnel to move and conduct their work.

B. Health and Safety Tailgate Meeting

A health and safety tailgate meeting is also required prior to the beginning of each day's field work. This is critical, because personnel may need to be reminded of existing hazards on site, and because personnel and site hazards may change through the course of field work.

Gather all field personnel together. Begin the meeting by introducing yourself as the On-Site Safety Officer in charge of the overall health and safety of the field crew, working in tandem with the leader of the subcontractor's crew. Briefly explaining the history of the site and the purpose of the field work, if not confidential. Discuss the potential chemical and physical hazards on site, and the steps to mitigate those hazards during field work (e.g., PPE, air monitoring, leaving work site free of clutter, field communication during emergencies). Show the field personnel a map with the route from the work site to the nearest hospital, and keep the map in a readily accessible location (e.g., your field vehicle). Note the locations of the nearest telephone and the relevant emergency phone numbers. Find out which field personnel have First Aid and CPR training. A minimum of two field personnel (ideally, at least one from Montgomery and one from each subcontractor) should have this training. Discuss a general emergency response plan for personnel medical emergencies and for any other possible emergencies unique to the project.

Have all field personnel sign the meeting attendance form, and answer any health and safety questions they may have concerning the site. If you are unable to answer certain questions, contact the Project Health and Safety Officer for help. A health and safety tailgate meeting topics checklist is provided in the Industrial/Hazardous Waste Operations Health and Safety Procedure No. 630.07.

C. Communicating Potential Safety Hazards

The daily health and safety tailgate meeting not only informs the field crew of the health and safety concerns on site, but also establishes the tone of the field effort, a level of trust among the field crew, and a straightforward line of communication throughout the field effort.

The Montgomery field personnel should report any health and safety concerns to you immediately. Ideally, the subcontractor's crew should do the same, but in many cases, their personnel report to their leader instead. It is important to establish that, whichever path the communication takes within the subcontractor's field crew, that any health and

safety concerns are **reported to you promptly**, so that the site is kept under control and appropriate remedial actions are taken.

During the daily health and safety tailgate meeting, you have established that you are ultimately responsible for the health and safety of all field personnel on site. Furthermore, all field personnel have signed the health and safety tailgate meeting attendance form and have agreed to follow site health and safety procedures. Therefore, do not be afraid or embarrassed to remind (or even reprimand) Montgomery or subcontractor personnel if they are not following proper health and safety procedures. You have the right to stop work if they do not comply with these procedures. Be sure to report any work stoppages to your Project Manager. If the work stoppages are caused by lack of cooperation between Montgomery personnel and subcontractor personnel, it will be the responsibility of the Montgomery Project Manager and the subcontractor's Office Manager to agree on payment for the additional work time caused by the work stoppages.

D. Maintaining a Safe Work Environment

It is easy to overlook health and safety monitoring during field work when you are faced with a multitude of simultaneous duties. Try not to focus on your scope of work only, and **do not rush** if there is any chance of creating a hazard.

Maintain an awareness of your surroundings during field work. Stop and look around every few minutes. Make sure all personnel are accounted for.

Following are some common situations which occur during field work and should be avoided or mitigated immediately:

- Moving drill rig closer to active overhead power lines
- Moving drill rig closer to marked or suspected underground lines
- Moving drill rig to severely sloping/uneven/unstable ground
- Field personnel eating in the work area
- Field personnel removing required PPE
- Field personnel showing signs of heat or cold stress
- Field personnel showing signs of chemical exposure
- Montgomery personnel approaching borehole too closely during drilling. There
 have been cases where other field geologists and engineers have been caught in
 the augers or the drill stem and have been killed. Also, during air rotary drilling
 small bits of rock can explode from the borehole as it is being "cleaned out" (i.e.,
 drill bit worked up and down the borehole) and can injure nearby personnel
- Drillers not operating the cathead smoothly during split-spoon sampling (the driller's feet or legs can get caught on the cathead rope and the driller can be lifted and crushed on the cathead or along the rig tower)
- Encountering hazardous substances/hazardous atmospheres during drilling, and the associated potential exposure to field personnel
- Accumulating tools and equipment scattered across the work area

- Field personnel suffering from fatigue and becoming susceptible to physical hazards (e.g., driller's helper too weak to lift heavy sacks of supplies, possibly wrenching back)
- Field personnel approaching borehole too closely during pressure grouting. Borehole pressures can achieve hundreds of pounds per square inch, and personnel must ensure that the surface pressure grouting apparatus is securely in place and functioning properly, and should keep a safe distance (at least several yards) and take shelter behind or in field vehicles to avoid injury if the pressure apparatus should fail catastrophically

E. Responding to Emergencies

Even with the most careful planning and health and safety monitoring, emergencies do occur during field work. An emergency response plan should be a part of the health and safety tailgate meeting, and should be implemented by you promptly should an emergency arise.

When an emergency occurs, **do not panic!** Remember, you are the leader in charge of health and safety. Responding quickly but calmly will greatly improve the effectiveness of your remedial efforts.

The first rule of thumb: survey the scene. Determine what the most immediate lifethreatening dangers are, and remove personnel from them as quickly as possible. If the dangers can be deactivated safely, do so.

Rule number two: Identify any victims-injured field personnel. Use proper first aid procedures for notifying emergency response personnel (call 911), checking the victims' condition, and taking steps to mitigate injury or maintain life support (e.g., CPR/rescue breathing).

Rule number three: Remember the scene even as it is occurring. Review it at a later date, when it is safe to do so. Determine what mistakes, if any, were made during field work which may have caused the emergency, and learn from them. Unfortunately, time and experience in dealing with field emergencies is often the best teacher.

Excavation & Trenching Safety Procedures

Evaluation: conducted by Competent Person 29CFR 1926

- Two soil classifications must be completed to determine the sloping/shoring requirements.
- Conduct daily inspections of all open excavations prior to entry.

Egress: Excavation areas 4 feet (1.22 meters) or more deep

• Ladders must be spaced no more than 25 feet (7.62 meters) apart so that a person in the trench is always within 25 feet (7.62 meters) of a ladder for egress.

Shoring: Excavation areas 5 feet (1.52 meters) or more deep

- Excavations must be sloped or shored if personnel will be entering the excavation.
- Soil classification may be done only by a competent person using both a visual and manual test.

Warning: One soil classification may not be enough. Outside disturbances during excavation may change even the best classification.

Inspect the soil after any condition change.

Storage: All excavations

- Spoils and heavy equipment must be stored a minimum of 2 feet (0.61 meters) from the edge of the excavation.
- Store spoils on the downhill side.

Maximum allowable slopes

Soil or Rock type	Maximum allowable slopes $(H:V)^1$ for excavations less than 20 feet (6.10 meters) deep ²
Stable Rock ³	Vertical (90 degrees)
Type A – highly cohesive soil	¾: 1 (53 degrees)
Type B – cohesive soil with some	1:1 (45 degrees)
sand	1 ½:1 (34 degrees)
Type C – loose, wet, or sandy soil or previously disturbed	

Notes:

- 1 Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from horizontal. Angles have been rounded.
- 2 Sloping or benching for excavations greater than 20 feet (6.10 meters) deep shall be designed by a registered or professional engineer.
- 3 A short-term maximum allowable slope of ½ H:1V (63 degrees) is allowed in excavations in Type A soil that is 12 feet (3.67 meters) or less in depth. Short term maximum allowable slopes for excavations greater than 12 feet (3.67 meters) in depth shall be ¾ H:1V (53 degrees).

Excavating and trenching operations shall be performed in such a manner as to protected personnel form the dangers associated with trenching and excavating such as cave-ins, and to prevent damage to underground utilities. All excavating subcontractors are responsible for compliance with OSHA 29 CFR 1926 subpart P.

Each subcontractor must have a competent person on site to evaluate each trench or excavation and determine the necessary precautions to take. The competent person's name and qualifications must be submitted to the MWH SHSO.

General Requirements

- At least 48 hours before digging the subcontractor shall locate underground service and mark underground utilities.
- Conduct a visual survey of the area to identify any utilities or electrical lines that were not marked during the utility markout. Pay particular attention to facility equipment and private electrical and water lines which may not be identified during a utility markout.
- Sufficient room (minimum 10 feet call utility company to determine safe line clearance) must be maintained from overhead power and communication lines.
- If underground utilities not previously identified are encountered, the subcontractor will cease work immediately and consult with the MWH Project Manager or SHSO before proceeding with the work.
- Protective system(s) to prevent cave-in shall be used when workers enter excavations 5 feet or greater in depth (except in Solid Rock), or if the competent person determines it is necessary at shallower depths. Protective system(s) must be complaint with OSHA requirements.
- Where alternative protective systems are used, such as trench boxes, hydraulic shoring, etc., they shall be used in accordance with the manufacture's specifications and limitations. The manufacture's tabulated data for these systems will be maintained on site.
- A competent person must inspect excavations, the adjacent hazards, and protective systems for evidence of possible cave-in/failure, hazardous atmosphere, and other hazardous conditions before they are entered, and during work.
- At a minimum, the toe of the spoil pile shall be at least 3 feet away from the edge of the excavation. The spoils pile should be moved farther back in proportion to the depth of the excavation. The spoil pile height should not exceed the depth of the excavation and must be sloped to prevent the soil and rocks from sliding into the excavation.

• When employees are required to enter a trench or excavation over 4-feet deep, an adequate means of exit, such as a ladder, steps or ramp will be provided and located so as to require no more than 10 feet of lateral travel. Ladders will extent at least 36 inches above the edge of the trench.

Trench Safety Daily Field Report

Date: _____ Project Name: Weather Conditions:

I hereby attest that the following conditions existed and that the following items were checked or reviewed during this inspection: (circle appropriate response – circling a boldface letter requires additional comment).

Inspection Item	Yes	No	NA
All open trenches were inspected			
Were any tension cracks observed along top of any slopes?			
Was any water seepage noted on trench walls or trench bottom?			
Was bracing system installed in accordance with design?			
Type of shoring system being utilized:			
Is shoring secure?			
Was there evidence of shrinkage cracks in trench walls?			
Was there any evidence of caving since the last field inspection?			
Trench box(s) certified with tabulated data?			
Traffic in area adequately away from trenching operations with barricades?			
Surface encumbrances and other hazards in area accounted for?			
Protective measures taken for standing water in trench?			
All site personnel wearing reflective vest?			
Atmospheric testing conducted in trenches > 4 feet in depth?			
Vibrations from equipment or traffic too close to trenching operation?			

Observations:

Competent Person signature: _____

Competent Person name (print):

HEALTH AND SAFETY ASSESSMENT CHECKLISTS

INDEX

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HSCL 26	Crawler Tractors - Dozers
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HSCL 28	Portable Air Compressors
HSCL 29	Portable Electric Hand Tools
HSCL 30	Personal Protective Equipment

HSCL 01 - PROJECT PERSONNEL HEALTH AND SAFETY				N/A
1.	Personnel assigned to the project have completed the required training to include OSHA HAZWOPER that includes a) 24 or 40-hour initial training, b) 8-hour Refresher, c) 8-hour Supervisor. (29CRR1926.65)			
2.	Field personnel required to wear respirators have received respirator training and have a current (within one year) fittest? (29CFR1910.134)			
3.	Field personnel (minimum 2) assigned to the project have current CPR/First Aid training. (29CFR1926.50(c)			
4.	Personnel assigned to the project have completed OSHA Bloodborne Pathogen training. (29CFR1910.1030)			
5.	Based on the scope of the work, personnel assigned to the project have completed OSHA Lockout/Tagout training. (29CFR1926.417)			
6.	Based on the scope of work, personnel assigned to the project have completed OSHA Excavation/Trenching training and a competent person has been designated. (29CFR1926.650)			
7.	Based on the scope of work, personnel assigned to the project have completed site-specific fall protection training. (29CFR1926 Subpart M)			
8.	Personnel assigned to project vehicles have received driver training?			
9.	Based on the scope of work, personnel assigned to the project have completed OSHA Confined Space Entry training. (29CFR1910)			
Re	emarks:			
H	SCL 02 - HEALTH AND SAFETY PLAN (29CFR1926.65(h))	Yes	No	N/A
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1.	Project HASP is readily available for review and use by project personnel.			
2.	HASP contains an assessment of site conditions and hazards based upon the scope of work.			
3.	HASP contains an air and personal monitoring strategies based upon the contaminants of concern and the tasks that are to be conducted where employees could be exposed to hazardous atmospheres.			
4.	HASP contains noise monitoring strategy based on tasks and equipment that are expected to generate noise above 85 dB (A) to determine levels of personnel exposure.			
5.	HASP contains an assessment of PPE required base upon the hazards anticipated to be on site.			
6.	HASP identifies, when required, specific hazards and the associated work practices for programs such as: Lockout/Tagout; Confined Space entry; Excavation/Trenching; Hot Work.			
7.	HASP has been amended to reflect the current site conditions?			
8.	Is air monitoring being conducted as required by the HASP?			
9.	Are air monitoring instruments calibrated daily?			
10	. Is the air monitoring documented and up to date?			
11	. Are user manuals available?			
12	Are instruments clean and charged?			
13	. Have all personnel signed the HASP acknowledgement form?			
14	. HASP has the required MSDS and/or chemical information based on hazardous chemicals of concern.			
Re	emarks:			
L				
<u> </u>				

HSCL 03 - MEDICAL, FIRST AID , AND SANITATION	Yes	No	N/A	
(29CFR1926.50-51)				
 Are First Aid Kits accessible and identified? 				
2. Are emergency eye wash and safety showers available?				
Are first aid kits inspected weekly?				
 Are all outlets dispensing non-potable water posted "CAUTION – WATER UNFIT FOR DRINKING, WASHING, OR COOKING"? 				
5. Are paper cups dispensed from a sanitary container?				
6. Are waste containers provided for used cups at each drinking fountain?				
 Is each washroom/toilet (portajohn) maintained in a sanitary condition and provided with water, soap, and individual means of drying? 				
8. Toilets for each sex are provided as per the following:				
a. 20 or less – 1				
b. 21 to 199 - one toilet seat and one urinal for every 40 workers				
c. 200 or more - one toilet seat and one urinal for every 50 workers				
Remarks:				

HS	SCL 04 - HAZARD COMMUNICATION (29CFR1926.59, EM 385-1-	Ye	No	N/A	
1 \$	Section 6.B, IT HS060)	S			
1.	Is there a written program on-site?				
2.	Is there an MSDS for each chemical present on-site?				
3.	Are containers properly labeled as to content and hazards?				
4.	Have employees been trained on chemical hazards?				
5.	Are employees trained on chemical hazards while doing non- routine tasks?				
6.	Do employees (including subcontractors) know and understand				
	the acute and chemical effects of exposure from chemicals on-				
	site?				
7.	Chemicals for the project are stored in the proper containers or cabinets.				
8.	Stored chemicals are segregated according to compatibility and				
	hazard class.				
Re	emarks:				

HSCL 05 - JOB SAFETY ANALYSIS (ACTIVITY HAZARD ANALYSIS)/(29CFR1926.65 (b)(1)(ii)(G))	Yes	No	N/A
 Have site specific JSA's been completed for primary/specialty tasks? 			
2. Has JSA been reviewed and approved by site supervisor and safety officer?			
3. Have the JSA's been reviewed with all crew members assigned to the task and documented?			
4. Is there a written work plan to complement the AHA/JSA?			
5. Do AHA's include a section for equipment utilized, inspection			
requirements, and training requirements?			
Remarks:			

HSCL 06 - EMERGENCY PLANS (29CFR1926.65(I)	Yes	No	N/A
1. Are emergency telephone numbers posted?			
2. Have emergency escape routes been designated?			
3. Are employees familiar with the emergency signal?			
4. Has an assembly point been established for emergency evacuation?			
5. Has the emergency route to the hospital been established, checked out, and posted?			
Remarks:			

HSCL 07 - SITE POSTERS (29CFR1903.2(a))	Yes	No	N/A
1. Are the following documents posted in a prominent and accessible area?			
a. Minimum wage			
b. OSHA Health Safety			
c. Equal Employment Opportunity			
d. Applicable State Posters			
Remarks:			

HSCL 08 - PASSAGEWAYS AND ACCESS FACILITIES	Yes	No	N/A
1. Are offices, workrooms, stairways, corridors and passageways adequately lighted?			
Does every flight of stairs having four or more risers also have a standard handrail?			
3. Are all accessways kept clear of operating materials or debris that would obstruct passage or cause a tripping hazard?			
4. Are filing cabinet and desk drawers kept closed when not in actual use and then only one drawer opened at a time?			
5. Are carpets or rugs maintained to provide good protection against slips trips and falls?			
6. Are stepoffs from one level to another marked and guarded with a railing and adequately lighted?			
Are all telephone and electrical wires secured in a manner to prevent falls?			
8. Have fire evacuation routes been posted for each work area and the routes clearly marked with the proper "EXIT" signs?			
9. Are office machines placed away from the edge of tables and desks on which they are used?			
10. Are files, bookcases, etc., placed so that they cannot be tipped over?			
11. Are proper stools provided to eliminate the necessity of using chairs or stools with casters for gaining extra height to retrieve items from high shelves, etc.?			
12. Are heavy or bulky materials stored at lower levels than lighter, easy to handle items?			
13. Are all office fans guarded, front and back, with not over ½ inch mesh to prevent fingers getting inside guard?			
14. Are chairs inspected regularly and broken ones removed from service?			
Remarks:			

HSCL 09 - SAFETY INCENTIVE AWARD PROGRAM , MANAGEMENT SAFETY REVIEWS, SAFETY COUNCILS	Yes	No	N/A	
 Does the project have an established Safety Incentive Award Program? 				
2. Have established award levels been achieved, and if so have awards been distributed to qualifying personnel?				
3. Have Management Safety Inspections been completed?				
4. Have inspection reports been forwarded to the respective Business Line Health and Safety Representative?				
5. Have noted deficiencies been corrected?				
6. Does the project have a safety council?				
7. Have safety council minutes been forwarded to the next level safety council?				
Remarks:				

HS	SCL 10 - SUBCONTRACTOR OVERSIGHT	Yes	No	N/A
1.	Have subcontractors been pre-qualified?			
2.	Is a copy of the General Site Safety Rules for Contractors Receipt maintained in the procurement file for each subcontractor?			
3.	Do on-site subcontractors meet appropriate training requirements?			
4.	Do on-site subcontractors have a HAZCOM program as per 29CFR1926.59?			
5.	Have on-site subcontractor(s) relayed information on chemicals they will be using on-site to MWH site management or health and safety?			
6.	Have subcontractors completed JSA's for primary tasks?			
Re	marks:			

HS	CL 11 - INCIDENT REPORTING	Yes	No	N/A
1.	Have safety incidents associated with the project been reported through the proper channels as per MWH IR-402?			
2.	Have personal injuries been reported to the responsible health and safety representative?			
3.	Has The Hartford been notified of any incidents requiring medical attention?			
4.	Has The Hartford been provided with a signed "Authorization for Treatment, Release of Medical Information, and Return to Work" form for any case requiring medical attention?			
5.	Have the required reports been forwarded to the business line health and safety lead and corporate health and safety?			
6.	Has The Hartford (rental vehicles) or CitiCapital Fleet (fleet vehicles) been notified of any vehicle incidents?			
Rer	narks:			

HSCL 12 - ELECTRICAL AND TEMPORARY WIRING (29 CFR	Yes	No	N/A
1920, Subpart R, 29 CFR 1910.304)			
1. Is electrical equipment and wring property guarded?			
2. Are electrical lines, extension cords, and cables guarded and			
maintained in good condition?			
3. Are extension cords kept out of wet areas?			
4. Are extension cords not being used as permanent wiring?			
5. Are extension cords of the type listed by Underwriters			
Laboratories, Inc., for the purpose in which they are used?			
6. Are GFCT's used with 110/120V portable hand tools?			
7. Are the ground plugs on plugs sound and intact?			
8. Are electrical enclosures such as switches, receptacles, etc.			
closed with proper covers, plug and/or plates?			
9. Are electrical outlet boxes/panels protected or covered?			
10. Is the circuit breaker panel schedule complete to indicate the			
equipment served?			
11. Are all switch boxes, receptacle boxes, metal cabinets, and			
voltage?			
12. Are all circuits protected against overload?			
13. Does each fuse cabinet have close fitting doors that can be			
locked?			
14. Are disconnect boxes securely fastened to a surface and fitted			
with a cover?			
15. Is the incoming service or supply circuit readily available?			
16. Are all circuit breakers, switches, fuses marked or labeled			
identifying the circuits or equipment supplied through them?			
17. Are all switches, circuit breakers, fuse panels, or motor controllers			
that are located out of doors or in wet locations in a			
weatherproofed enclosure or cabinet?			
18. Are all circuits grounded?			
19. Do electrical plugs and receptacles have the proper configuration			
for the circuit voltage and current?			
20. Aluminum conductors should not be connected to copper			
terminals. Are all connections tight and proper?			
21. Are adequate outlet receptacles provided so that there is no need			
for multiple outlet fixtures of extension cords?			
22. Are all wires properly insulated with no bare wires visible?			
23. Has a sketch been submitted and accepted for the proposed			
temporary power distribution system?			
24. Is the vertical clearance above walkways 10 feet or more for			
circuits carrying 600 volts or less?			
25. Do outlet boxes/panels have 36-inch clearance?			
26. Do temporary light strings have lamp sockets and connections			
permanently molded to the hard service cord insulation?			
27. Are all wires insulated from their supports?			
28. Are guards provided for bulbs on temporary lighting strings and			
extension cords?			
29. Are exposed empty light sockets or broken bulbs present?			
30. Is portable electric lighting used in confined wet and/or hazardous			
locations operated at a maximum of 12 volts?			

HSCL 12 - ELECTRICAL AND TEMPORARY WIRING (29 CFR 1926, Subpart K, 29 CFR 1910.304)	Yes	No	N/A
31. Is a plainly marked switch provided at the entrance to tanks or			
confined spaces where wiring is used?			
32. Is any floating plant or equipment situated within 20 feet of an overhead transmission line?			
33. Is damaged electrical equipment tagged and taken out of service?			
34. Have underground electrical equipment lines and utilities been identified by proper authorities?			
35. Are warning signs exhibited on high voltage equipment (250V or greater)?			
36. Has positive lockout system been established by a certified project electrician?			
37. Are lockout/tagout supplies (i.e. lockout devices, tags etc.) available?			
38. Are lockout/tagout supplies for valve work available? (i.e. cover devices for spigot handles, gate valves)			
39. Have lockout/tagout locations been identified in the HASP and/or site specific JSA?			
Remarks:			

HSCL 13 - FIRE PREVENTION AND PROTECTION (29CFR1926 Subpart F/ EM 385-1-1 9)	Yes	No	N/A
1. Are no smoking signs posted and observed in all areas where flammable or combustible materials are stored?			
2. Is smoking prohibited in flammable storage areas?			
3. Is a fire extinguisher placed within 25 to 75 feet of the flammable storage area?			
4. Are flammable dispensing systems grounded and bonded?			
Are approved safety cans available for storage of flammable liquids?			
6. Flammable materials are stored away from sources of energy, such as electrical panels, generators, etc.			
Are all employees aware of the locations of all fire extinguishers and their proper use?			
 Has the local fire department been contacted (29CFR1926.65(d)(3))? 			
9. Are portable fire extinguishers available near refueling areas?			
10. Have fire evacuation routes been posted for each working area and the routes clearly marked with proper "EXIT" sign?			
11. Has a fire alarm been established?			
12. Are portable fire extinguisher locations marked for quick identification?			
13. Have portable fire extinguishers been annually tested by a licensed vendor and routinely inspected?			
Remarks:			

HSCL 14 - DECONTAMINATION (29 CFR 1926.65 (k))	Yes	No	N/A
1. Are decontamination stations set up on site?			
2. Are waste receptacles available for contaminated clothing?			
3. Have steps been taken to contain liquids used for			
decontamination?			
4. Have decontamination steps and procedures been covered by th	е		
site supervisor or safety official?			
5. Is all personal protective equipment and respiratory equipment			
being cleaned on a daily basis?			
6. Has equipment decontamination been established?			
7. Is contamination wash water properly disposed of?			
8. Are all pieces of equipment inspected for proper decontamination	1		
before leaving the site?			
Remarks:			

HSCL 15 - GENERATORS FIXED AND PORTABLE (29 CFR	Yes	No	N/A
1910.269)			
1. Is temporary wiring guarded, isolated by elevation, or buried so as to prevent accidental contact?			
2. Are extension cords of the type listed by Underwriters			
Laboratories, Inc., for the purpose in which they are used			
3. Are all switch boxes, receptacle boxes, metal cabinets, and			
temporary power lines marked to indicate the maximum operating voltage?			
4. Are all circuits protected against overload?			
5. Does each fuse cabinet have close fitting doors that can be locked?			
6. Are disconnect boxes securely fastened to a surface and fitted with a cover?			
7. Is the incoming service or supply circuit readily available?			
8. Are all circuit breakers, switches, fuses marked or labeled			
identifying the circuits or equipment supplied through them?			
9. Are all switches, circuit breakers, fuse panels, or motor controllers			
that are located out of doors or in wet locations in a			
weatherproofed enclosure or cabinet?			
10. Are all circuits grounded?			
11. Has a sketch been submitted and accepted for the proposed			
temporary power distribution system?			
12. Is the vertical clearance above walkways 10 feet or more for			
circuits carrying 600 volts or less?			
13. Are all wires insulated from their supports?			
14. Are records of operational checks available?			
15. Is the unit shut down for servicing?			
16. Are exhaust discharges from equipment so directed that they do			
not endanger persons from exhaust fumes?			
17. Are fuel tanks located in a manner to prevent spills or overflows			
from running onto engine, exhaust, or electrical equipment?			
18. Are exhaust systems protected from contact?			
19. Is there an operating manual for the generator on-site?			
Remarks:			

HSCL 16 - WORK ZONES (29 CFR 1926.65(d))	Yes	No	N/A
1. Are work zones clearly defined?			
2. Are support trailers located to minimize exposure from a potential			
release?			
3. Are project trailers securely anchored?			
4. Are stairways to site trailers attached to trailer entrance and have			
5 Is potable drinking water available?			
6. Have provisions for personal hygiene been obtained and are			
available for employee use?			
7. Are first aid kits/bloodborne pathogen kits available in the project trailer?			
8. Are fire extinguishers available, inspected monthly and clearly marked?			
9. Has the OSHA 200 log for project site injury/illness been obtained			
and is on file? Is the MWH 200 log properly posted from February			
1-March 31?			
10. Are support trailers accessible for approach by emergency vehicles?			
11. Is the site properly secured during and after work hours?			
12. Is the site left unattended or overnight, secured by one of the			
following or the equivalent: Surround perimeter with construction fence			
Place 8 ft long flashing barricades end to end			
Utilize temporary curbing or concrete "jersey"			
curbs			
13. Is housekeeping well maintained?			
14. Do employees wear traffic safety vests and hardhats when a			
vehicle hazard exists on or adjacent to the property where work is			
performed?			
Remarks:			

HSCL 17 - MOTOR VEHICLES	Yes	No	N/A
1. Are vehicles inspected daily?			
2. Are personnel licensed for the equipment they operate?			
3. Are unsafe vehicles tagged and reported to supervision?			
4. Are vehicles shut down before fueling?			
5. When backing vehicles, are spotters provided?			
Is safety equipment (first aid kits, fire extinguishers, bloodborne pathogen kits) on vehicles?			
7. Are loads secured on vehicles?			
8. Are vehicle occupants using safety belts if provided?			
9. Do vehicles have MSDS's for any hazardous materials carried in the vehicle that exceed the "Materials of Trade" provisions?			
10. Are dump trucks and other heavy equipment inspected before they are placed in service?			
11. Are all vehicles inspected on a scheduled maintenance program?			
12. Are all motor vehicles equipped with a speedometer, fuel gauge,			
horn, windshield wipers, rear view mirrors, cabs, non-slip surfaces on steps and a power-operated starting device?			
13. Are all towing devices structurally adequate for the weight drawn and properly mounted?			
14. Are all trailers coupled with safety chains or cables to the tow vehicle?			
15. Do trailers equipped with power brakes have a breakaway device			
which effectively locks-up the brakes in the event the trailer			
separates from the towing vehicle?			
Remarks:			

HSCL 18 - WORKING SURACES - LADDERS (29 CFR 1910 Subpart D)	Yes	No	N/A
1. Are ladders Type IA or Type I?			
2. Are access ways, stairways, ramps and ladders clean of ice, mud,			
snow, or debris?			
3. Are ladders being used in a safe manner?			
4. Are ladders kept out of passageways, doors or driveways?			
5. Are broken or damaged ladders tagged and taken out of service?			
6. Are metal ladders prohibited in electrical service?			
7. Are stairways and floor openings guarded?			
8. Are safety feet installed on straight and extension ladders?			
9. Is general housekeeping up to MWH standards?			
10. Are ladders tied off or footed by a spotter?			
11. Are ladder rungs sturdy and free of cracks?			
12. Are personnel carrying any object or load that could cause a loss			
of balance or fall?			
13. Do ladders used to access and upper landing surface extend at			
least tree (3) feet above the upper landing surface?			
14. Are pitch extension ladders at a 4:1 ratio?			
15. Are ladders used for access to air stripper towers?			
Remarks:			

HSCL 19 - SCAFFOLDING/WORK PLATFORMS (29 CFR 1926.45)	Yes	No	N/A
1. Is scaffolding placed on a flat, firm surface?			
2. Are scaffolding planks free of mud, mud, ice grease, etc.?			
3. Is scaffolding inspected before each use?			
4. Are defective scaffold parts taken out of service?			
5. Does mobile scaffold height exceed 4 times the width or base dimension?			
6. Does scaffold planking overlap a minimum of 12 inches?			
7. Does scaffold planking extend over the end supports between 6 to 18 inches?			
8. Are employees prohibited from working on scaffolding during storms and high winds?			
9. Are all pins in place and wheels locked?			
10. Is perimeter guarding (top rail, mid rail and toe board) present?			
11. Are manufactured work platforms erected, used, inspected, tested and maintained in accordance with the manufactures' recommendations as outlined in the operating manual?			
12. Is the operating manual for each type scaffold utilized on-site and has the manual been reviewed with all affected site personnel?			
13. Are work platforms NOT erected or used in the immediate vicinity of power lines, or electrical conductors until they are insulated, deenergized or otherwise rendered safe?			
14. Where persons are required to work or pass under a working platform, is a screen-consisting of No. 18 gauge US Standard wire 12.5mm(0.5 in) mesh or the equivalent provided between the toe board and the guardrail and extending over the entire opening?			
15. Are scaffolds and their components capable of supporting without failure at least 4 times the maximum anticipated load?			
16. Are scaffold system components which are subjected to a bending moment (such as outrigger beams with suspended scaffold and counterweights) capable of providing a resisting moment of at least 4 times the tipping moment?			
17. Are all factory-fabricated scaffolds designed and fabricated in accordance with all applicable ANSI standards?			
18. Is the scaffold plumb and level?			
19. Are scaffolds with heights that are in excess of four times the minimum scaffold base dimension secured to the wall or structure?			
Remarks:			

HS	SCL 20 - FALL PROTECTION (29CFR1926 Subpart M)	Yes	No	N/A
1.	Have all walking/working surfaces employees are utilizing been			
	determined to be structurally sound?			
2.	Are all sides and edges 6 feet or more above a lower level			
	foll errest system?			
3	Tall affest systems?			
Δ	Controlled Access Zone (CAZ)			
1	Has a CA7 been established where quardrails or structures have			
1.	been removed?			
2.	Are control lines flagged or clearly marked at a minimum of 6'			
	intervals with high visibility material?			
3.	Are control lines rigged and supported, including slag, between			
	39-45 inches from the walking/working surface?			
4.	Are control lines strong enough to sustain a stress of not less than			
	200 pounds of force?			
5.	Are control lines connected on each side to a wall or guardrail system?			
6.	CAZ is established not less than 6 feet nor more than 25 feet from			
	the unprotected edge?			
В.	Warning Line Systems (Roofing Work Only)			
1.	Are warning lines not less than 6 feet from edge around all sides			
	(10 feet when edge is perpendicular to mechanical equipment?			
2.	Are warning lines 34 - 39 inches high?			
3.	Do warning lines have least a 16-pound tripping force?			
4.	Excavations			
5.	Are excavations 6 feet or greater in depth protected by a guardrail			
	system, fence, barricades, or covers?			
C.	Guardrail Systems			
1.	Are top rails between 39-45 inches?			
2.	Are midrails installed midway between the top rail and the working level?			
3	Is the quardrail system capable of withstanding 200 pounds of			
0.	force applied outward or downward within 2 inches of the top edge			
	of the guardrail at any point (Midrails must have 150 pound			
	capacity)?			
4.	Are guardrail systems constructed to prevent puncture or			
	laceration to personnel or equipment, or snagging of clothing?			
5.	Are toeboards installed where personnel are working above other			
	people to prevent tools or debris from being kicked out, falling,			
	and striking the people below?			
D.	Personal Fall Arrest Systems			
1.	Are lines established for each individual?			
2.	Are anchorage points and lanyards rated at a minimum of 5000			
	pounds?			
3.	Are personnel utilizing full body harnesses?			
4.	Do lanyards have locking snap hooks?			
5.	Are fall arrest systems free of debris, rust, and corrosion?			
6.	Do positioning devices limit free fall to 2 feet?			

HSCL 20 - FALL PROTECTION (29CFR1926 Subpart M)	Yes	No	N/A
D. Covers			
1. Are holes that could permit personnel or objects to fall covered?			
2. Are covers capable of supporting at least twice the axle load of the largest vehicle expected to drive over the cover?			
 Are covers capable of supporting at least twice the height of employees expected to walk over the cover 			
4. Are covers secured to prevent displacement by wind, equipment, or employees?			
Are covers marked with signs or other hazard warnings such as "Do not remove - Open Hole"?			
E. Nets			
6. Are nets positioned so that the maximum fall height is 30 feet?			
 Does the maximum required horizontal distance of the outer edge of the net from the edge of the working surface follow the 8", 10', 13' rule? 			
8. Are drop tests of the nets been conducted (initially and every 6 months unless impractical where inspection is required)?			
9. Are nets inspected at least weekly?			
10. Are materials, scrap, equipment, and tool removed from the netting before the next shift?			
Remarks:			

HSCL 21 - COMPRESSED GAS CYLINDERS (29 CFR 1910.120)	Yes	No	N/A
1. Are breathing air cylinders charged only to prescribed pressures?			
2. Is there a certificate on site that the breathing air is grade D?			
3. Are like cylinders segregated in well-ventilated areas?			
4. Is smoking prohibited in cylinder storage areas?			
5. Are cylinders stored secure and upright?			
6. Are cylinder caps in place before cylinders are moved?			
7. Are fuel gas and cylinders stored at a minimum of 20 feet apart?			
8. Are propane cylinders stored and used outside the structure?			
9. Are all safety valves constructed, installed, tested and maintained			
in accordance with the ASME Code for Unfired Pressure Vessels?			
10. Are air hoses, pipes, valves, filters and other fittings pressure			
rated by the manufacturer and the pressure not exceeded?			
Remarks:			

HSC	L 22 - WELDING AND CUTTING (29CFR1926 Subpart J)	Yes	No	N/A
1.	Are only trained personnel allowed to operate welding and cutting equipment?			
2.	Does the welding unit have a compatible fire extinguisher present at the welding/cutting operation?			
3.	Are Hot Work permits available and properly completed?			
4.	Is the welding equipment inspected daily?			
5.	Are combustible materials screened from slag, heat and sparks?			
6.	Are workers and the public shielded from rays, flashes, sparks, molten metal and slag?			
7.	Are passageways, ladders, steps, etc. kept clear of hoses or cables?			
8.	Is the electric welding unit shutdown when leads are unattended?			
9.	Are non-current carrying parts of electric powered welders grounded?			
10	Are splices, repaired insulation, etc., within 10 feet of the rod holder?			
11	Are leads found in contact with metal parts supporting suspended scaffolds?			
12	Are leads placed near high tension wires?			
13	Are all torch valves and gas supply shut off when work is suspended?			
14	When work is suspended, are hoses, torch, etc., removed from confined spaces?			
15	When stored, in transit, or regulator is not in place; is the valve protected with cap?			
16	Are all compressed gas cylinders kept upright at all times, except when being hoisted?			
17	Are upright cylinders secured against falling?			
18	Is the valve wrench or wheel in operating position when cylinder is in use?			
19	Are cylinders stored in well-ventilated locations?			
20	Are oxygen cylinders in storage and fuel gases separated by a fire resistive wall or by a distance of 20 feet?			
21	Is oxygen used to blow dust out of clothes, hair, or to cool off			

HSC	L 22 - WELDING AND CUTTING (29CFR1926 Subpart J)	Yes	No	N/A			
	with?						
22	Are "No Smoking" signs posted around cylinder storage area?						
23	Is the pressure on the working side of the acetylene regulator greater than 15 psig?						
24	Are proper measures being taken for fire control?						
25	Are compressed gas cylinders separated from flammable or combustible material by at least 40 feet?						
26	Is all oxygen-fuel gas cutting or welding equipped with reverse- flow check valves between torch & hoses?						
27	Are proper helmets, goggles, aprons, and gloves available for welding and cutting operations?						
28	Are all pressure gauges and regulators in proper working order?						
Ren	narks:						

1. Have employees been trained in the hazards of confined spaces? 2. Has confined space inventory been conducted for the project and is it reevaluated at least annually? 3. Are confined space permits available on the project? 4. Are permits posted at the confined space entry location? 5. Is a copy of MWH procedure 805 available at the project site? 6. Do permits have emergency services identified with the telephone numbers?
 2. Has confined space inventory been conducted for the project and is it reevaluated at least annually? 3. Are confined space permits available on the project? 4. Are permits posted at the confined space entry location? 5. Is a copy of MWH procedure 805 available at the project site? 6. Do permits have emergency services identified with the telephone numbers?
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6. Do permits have emergency services identified with the telephone
7. Has a Rescue Service Evaluation been completed?
8. Has a confined space rescue drill been performed and documented?
9. Has air monitoring been documented with times and findings indicated?
10. Do the permits have signatures/dates for supervisor, attendant and entrant(s)?
11. Have subcontractors engaged in the confined space entry activity been briefed in MWH's procedure?
12. Are all permit required confined spaces posted with a "DANGER- PERMIT REQUIRED CONFINED SPACE. DO NOT ENTER"?
13. Have body harnesses and lanyards been inspected and are in service?
14. Is there a manual for the TRI-pod and has it received and annual inspection?
15. Do D-rings, snap hooks and other connectors have a minimum tensile strength of 5,400 lbs.
16. Is at least one member of the emergency rescue team certified in CPR and First Aid?
Remarks:

HSCL 24 - EXCAVATION (29 CFR 1926.Subpart P)	Yes	No	N/A
1. Are adequate guard rails, barricades, lights and warnings			
provided as well as safe access?			
2. Where vehicle or haulage traffic is near the excavation, are			
adequate stop logs provided to prevent equipment from falling into			
the excavation?			
3. When operations are near highways; are danger, caution, traffic			
control signs and/or signal lights provided?			
4. Are signal persons in reflector vests provided to direct operations?			
5. Are adequate haul roads provided to direct operations?			
6. Is there an adequate means of dust control?			
7. Does all moving equipment being operated at night have			
adequate head and taillights?			
8. Are adequate brakes provided on mobile equipment?			
9. Do hauling units have emergency braking systems, operated from			
the operator's position, which works automatically when the			
regular brakes fail?			
10. Does maintenance or slow moving equipment have flashing lights			
to warn other traffic?			
11. Is safe access into the excavation provided? NOTE: Ramps,			
stairs or mechanical man hoists shall be used for depths over 20			
ft. Properly placed and constructed ladders as well as ramps,			
stairs or mechanical hoists may be used up to 20 ft.			
12. Where traffic or personnel cross pits or excavations, do bridges			
have adequate guardrails?			
13. Have all stumps, boulders or other materials that might slide or roll			
into an excavation been removed or barricaded?			
14. Is wire netting, rock bolts, fencing, etc. used to prevent rock falls?			
15. Is excavated material stored and retained at least 2 ft. from the			
edge of the excavation? Is it placed at a safe distance to prevent			
overloading on the face of the excavation?			
16. Are sides of the excavation shored up or cut to angle or repose?			
17. Is ground water and surface water adequately controlled to			
prevent its entering the excavation?			
18. Are bracing, shoring, cribbing inspected daily and after rains?			<u> </u>
19. Is emergency rescue equipment readily available? This should			
include breathing apparatus, safety lines and harnesses, basket			
stretchers, blankets, communications.			ļ
20. Are at least two means of exit provided workers in excavations?			ļ
21. Has a "competent person" been designated to supervise the			
excavation activities?			
22. Have all utility companies been advised of the excavation			
activities?			ļ
23. Prior to opening the excavation, are utility lines identified and			
marked?			
24. Has a protessional engineer evaluated all excavations over 20			
reet deep?			
25. Are excavations greater than 4-feet deep monitored for hazardous			
atmospheres? (i.e. LEL/O2 deficiency)			
26. Are ladders used in excavations over 4-feet deep and present			
every 25 teet?		1	

HSCL 24 - EXCAVATION (29 CFR 1926.Subpart P)	Yes	No	N/A
27. Is the excavation inspected daily by the competent person and documented?			
28. Were two methods of soil classification conducted and documented?			
29. Has as Activity Hazard Analysis been completed for the excavation activities and been reviewed by all personnel?			
Dement			
Remarks:			

HSCL 25 - Crawler Mounted Backhoes, Power Shovels,	Yes	No	N/A
Excavators, Front-end Loaders (29 CFR 1926.Subpart O)			
1. Are equipment inspections performed in accordance with			
manufacturers' requirements and are records kept available as			
part of the project files?			
2. Has equipment been inspected and certified mechanically safe by			
a qualified person before being placed in use?			
3. Is defective equipment taken out of service?			
4. Are only designated qualified operators assigned to operate			
mechanized equipment?			
5. Are sufficient lights provided for night operations?			
6. Is the unit shut down before fueling?			
7. Does the unit have a suitable fire extinguisher – 5 lb BC			
minimum?			
8. Is there an effective, working, reverse alarm?			
9. Are moving parts, shafts, sprockets, belts, etc., guarded?			
10. Is protection against contact with hot surfaces, exhaust, etc.,			
provided?			
11. Are all fuel tanks located in a manner to prevent spills or overflows			
from running onto engine exhaust or electrical equipment?			
12. Are exhaust discharges from equipment so directed that they do			
not endanger persons or obstruct the view of the operator?			
13. Are seat belts provided and used?			
14. Is a safe means of access to the cab provided (steps, grab bars,			
non-slip surfaces)?			
15. Is the operator protected against weather, falling or flying objects?			
16. Is adequate roll over protection provided?			
17. Are project roads and structures inspected for load capacities and			
proper clearances?			
18. Are riders prohibited on heavy equipment?			
19. Have brakes been tested and found satisfactory?			
20. Does the unit have an emergency brake system?			
21. Can the emergency system be activated from the cab?			
22. Have air tanks been tested and certified?			
23. Is an air pressure gauge in working condition installed on the unit?			
24. Does the air tank have an accessible drain valve?			
25. Are the units equipped with windshield wipers, defrosting and			
defogging equipment that is in good operating condition?			
26. Are pressurized cylinders, actuating booms, outriggers, etc.,			
equipped with pilot check valves?			
Remarks:			

HSCL 26 - Crawler Tractors-Dozers (29 CFR 1926.Subpart O)	Yes	No	N/A
1. Are equipment inspections performed in accordance with manufacturers' requirements and are records kept available as			
part of the project files?			
2. Has equipment been inspected and tested by a competent person			
and certified safe?			
3. Is defective equipment taken out of service?	ļ		
4. Are only designated qualified operators assigned to operate mechanized equipment?			
5. Are sufficient lights provided for night operations?			
6. Is the unit shut down before fueling?			
7. Does the unit have a suitable fire extinguisher – 5 lb BC minimum?			
8. Is there an effective, working, reverse alarm?			
9. Are moving parts, shafts, sprockets, belts, etc., guarded?			
10. Is protection against contact with hot surfaces, exhaust, etc., provided?			
11. Are all fuel tanks located in a manner to prevent spills or overflows from running onto engine exhaust or electrical equipment?			
12. Are exhaust discharges from equipment so directed that they do			
not endanger persons or obstruct the view of the operator?			
13. Are seat belts provided and used?			
14. Is protection (grills, canopies, screens) provided to shield operator from falling or flying objects?			
15. Is adequate roll over protection provided?			
16. Are project roads and structures inspected for load capacities and proper clearances?			
17. Are riders prohibited on heavy equipment?			
Remarks:			

HSCL 27 - Cranes/Derricks and Rigging (29 CFR 1926.550, EM 385-1-1 16.C, IT HS822)	Yes	No	N/A
1. Is the operating manual from the manufacture of the specific crane being used available?			
 Has the operating manual for the specific crane been reviewed by the crane operator(s)? 			
 Does the load rating chart for the crane include: the crane make and model, serial number and year of manufacturer; load ratings for all crane operating configurations; wire rope type, size and reeving (line pull, line speed and drum capacity) and operating limits in windy or cold conditions? 			
4. Is the crane inspected daily by the operator?5. Is there a crane log book that shows operating hours, inspections.			
tests, maintenance and repair?			
6. Does operator have certification that he/she meets operator qualification and training?			
7. Has a hazard analysis been completed and reviewed for the set- up and set-down procedures (mobilization, assembly, dismantling, etc.)?			
8. Are adequate clearances provided from electrical sources, fixed objects and swing radius?			
9. Have personnel reviewed hand signals?			
10. Has a performance load test been given: before initial use of cranes in which load bearing or load controlling part or component, brake, travel component or clutch have been altered, replaced or repaired; every time the crane is reconfigured or reassembled after disassembly and every four years?			
11. Are tag lines used to control loads?			
12. 12. Has a critical lift plan been designed for all lifts with a load weight of 75% of the rated capacity of the crane; lifts which require the load will be lifted, swung, or placed out of the operators view; lifts made with more than one crane; lifts involving non-routine or technically difficult rigging arrangement; hoisting personnel with crane or derrick; or any lift which the lift or crane operator believes should be considered critical?			
13. Is the crane equipped with boom angle indicator, load indicating device, means to visually determine levelness and anti-two block devices?			
14. Are cable supported booms equipped with boom stops?			
15. Are all moving parts (gears, drums, shafts, belts, etc.) and all hot surfaces, lines, pipes, etc.) guarded?			
16. Does the unit a minimum of a 5 lb BC fire extinguisher?			
17. Is all rigging equipment tagged with an identification number and rated capacity?			
18. Is rigging equipment inspection documented?			
19. Are slings, chains, and rigging inspected before each use?			
20. Are damaged slings, chains, and rigging tagged and taken out of service?			
21. Are slings padded or protected from sharp corners?		1	
22. Are employees kept clear of suspended loads?			
23. Are employees in lift areas wearing hard hats, safety glasses, and			

HSCL 27 - Cranes/Derricks and Rigging (29 CFR 1926.550, EM 385-1-1 16.C. IT HS822)	Yes	No	N/A
steel-toed boots?			
24. Are floating cranes and derricks constructed to meet all stresses under normal operating conditions when installed and when handling loads not exceeding manufacturer's load ratings with recommended rigging?			
Remarks:			

HSCL 28 - PORTABLE AIR COMPRESSORS (29 CFR	Yes	No	N/A
1910.94(a)(6)			
1. Has inspection and performance test been completed?			
2. Have air tanks been tested and certified?			
3. Are records of inspection and test available?			
4. Does discharge from any valve create a hazard?			
5. Is the air pressure gauge in working order?			
6. Is the tank equipped with a safety relief valve?			
7. Is equipment that is subject to whipping or rotation if released			
provided with an automatic shut-off?			
8. Are safety lashings provided at connections to tools and hose and			
all quick make-up connections of hose?			
9. Will the compressor automatically shut off before discharge			
pressure exceeds the maximum working pressure?			
10. Is the compressor located so that flammable, toxic vapors, gases,			
or dust will not be drawn into the intakes?			
11. No valve shall be installed on the air intake pipe of a compressor			
with an atmospheric intake?			
12. Is the discharge piping from the compressor to the receiver as			
large as the discharge opening on the compressor?			
13. Is there a convenient stop valve between the air tank and each			
stationary piece of equipment?			
14. Are air receivers properly installed and in the proper locations?			
15. Does the air tank have an accessible drain valve?			
Remarks:			

HSCL 29 - Portable Electrical Hand Tools (29CFR1926 Subpart I)	Yes	No	N/A
1. Are flexible cords approved for that location?			
2. Are flexible cords in continuous lengths without splices?			
3. Are tools grounded with multi-contact plug and receptacle?			
4. Are portable and semi-portable electrical tools and equipment			
grounded by multi-conductor and cord and receptacle?			
5. Are GFCIs provided for all circuits using electrical tools?			
6. Are powered hand tools inspected and tested?			
7. Are tools designed to accommodate guards supplied with them?			
8. Are guards and safety devices in place on the power tools?			
Are safety guards provided for all machines using an abrasive wheel?			
10. Has a ring test been done on abrasive wheels before mounting?			
11. Are non-sparking tools available?			
12. Are non-sparking tools used in locations where sources of ignition			
may cause a fire or explosion?			
13. When overhead work is being done, are means provided to			
prevent tools from falling?			
14. Are circular saws equipped with guards that automatically enclose the blade?			
15. Is protective equipment provided for eyes, hands, etc., and their use enforced?			
16. Are defective hand and power tools tagged and taken out service?			
17. Are safety/operations manuals available for all the hand power tools?			
Remarks:			

HSCL 30 - PERSONAL PROTECTIVE EQUIPMENT (29CFR1926 Subpart E & Part 65/29CFR1910.134)	Yes	No	N/A
1. Project employees wear Level D PPE that includes: a) Hardhat			
(ANSI Z89.1 -1986), b) Eye Protection (ANSI Z87.1 - 1989), c)			
Foot Protection (ANSI Z41 - 1991).			
2. PPE for wet weather conditions are provided to employees?			
3. Reusable PPE is decontaminated cleaned and stored in a sanitary manner?			
4. Employees with prescription lenses wear ANSI -Z87 approved			
industrial grade safety glasses with permanently attached side shields.			
5. Safety "splash" goggles are available for use with tasks involving liquid or airborne particulate handling?			
6. Face-shields with hard hat attachments are available for task work as required (pressure washing, road cut saw).			
7. Hearing protection devices are provided for employees working in high noise areas?			
8. Signs are posted for high noise areas (> 85 dBA).			
9. Have levels of protection been established?			
10. Do all employees know their level of protection?			
11. Is defective PPE taken out of service and tagged?			
12. Are there sufficient quantities of safety equipment?			
13. Are respirators used, decontaminated, inspected, and stored according to standard procedures?			
14. Is task specific PPE available (high pressure washing, welding, etc.)?			
15. Does compressed breathing air meet CGA Grade D and is documentation present?			
Remarks:	<u> </u>		

PERSONAL ACKNOWLEDGEMENT

As a component of the Site Safety Plan (SSP) designed to provide personnel safety during site activities at the Niagara Mohawk former Manufactured Gas Plant Site in Fort Edward (Canal Street) you are required to read and understand the site-specific SSP. When you have fulfilled this requirement, please sign and date this "Personal Acknowledgement." Also, provide the requested information pertaining to use of Level C respiratory protection.

Model/Type of Level C Respirator:

Date Fit Tested:

Signature

Name (Printed)

Date

SAFETY MEETING RECORD			DATE:	
PROJECT NAME:			JOB NO.:	
NUMBER PRESENT:	NUMBER ABSENT:	MEETING CONDUCTED BY:		
	DISCUSSION OF SAFE PRECAUTIONS, HAZARD	/UNSAFE WORK PRACTICES S, EQUIPMENT FAMILIARIZATI	, MATERIALS, JOB ON, ETC.	
PRESENTATION				
	COMMENTS, QUESTION	COMMENTS, QUESTIONS, COMPLAINTS, ETC.		
EMPLOYEE				
TEEDDAOR				
CORRECTIVE ACTION	KNOW PLANS FOR CORRECTION, PARTS ON ORDER, ITEMS TO BE DISCUSSED WITH PROJECT MANAGER AND CORRECTION OF ITEMS PREVIOUSLY SUBMITTED			
SUPERVISOR		PROJECT MANAGER		
HEALTH & SAFETY SUPERVISOR		Have Employees attending sign Forward a copy to the local Safe	on reverse side. ety Dept.	

SAFETY MEETING RECORD (Continued)

TO BE SIGNED BY ALL EMPLOYEES ATTENDING MEETING		
LIST ALL EMPLOYEES A	BSENT FROM MEETING	

EMERGENCY ASSISTANCE INFORMATION

Niagara Mohawk Former MGP, Canal Street Fort Edward, New York

Nearest Hospital	Address			
	Glens Falls Hospital 12 Warren Street Glens Falls, NY 12801 (518) 926-7077			
	Directions to Hospital*			
	Exit site north on Canal Street Turn left on East Street (0.1 mile) Turn right on Broadway (0.6 mile) Continue on Broadway/Upper Broadway (0.6 mile) Continue on Lower Main Street (0.5 mile) Continue on Main Street (0.7 mile) Continue on River Street (0.7 mile) Continue on River Street (1.4 mile) Continue on Lower Warren Street (0.6 mile) Continue on NY Route 32 (1.2 mile)			
	* See Emergency Route Map supplied with SSP Addendum (Figure 2).			
Nearest Telephone	MWH Americas, Inc. Field Vehicle			
Ambulance, Fire, Police, & Sheriff	Telephone 911			
First-Aid Kit, Fire Extinguishers, & Emergency Eye Lavages	MWH Americas, Inc. Field Vehicle			
Poison Control	(800) 272-6477			
Project Contacts	MWH Americas, Inc.			
	Priscilla Seaburg •	Andrea Simmons Project Manger (518) 640-6007 (8:00 - 5:00) (518) 428-5275 (after hours)		
	Client Contact			
	Steve Stucker Niagara Mohawk Project Manager (315) 428-5652 (Office) (315) 247-6490 (Cell)			
Regulatory Notification	NYSDEC Contact: Doug MacNeal (518) 402-9662 EPA Spill Response (913) 281-0991			
Utilities	Dig Safely New York			

Instrument Calibration Log Niagara Mohawk Former MGP, Fort Edward (Canal Street) Preliminary Site Assessment

Date	Time	Operator Initials	Instrument Type or Model	Parameter (VOCs, Benzene, O2, LEL etc.)	Calibration Gas Type and Concentration (PPM)	Recorded Concentration (PPM)

Noise Monitoring Form						
Project Na	ame:					
Project Nu	ımber:					
Noise Equ	Noise Equipment Used: (Type/Model)					
Date	Task	Location/Employee	Noise Reading dB(A)	Initials		

Air Monitoring Form

Project Name:

Date	Time	Operator Initials	Location	Instrument Type or Model	Reading	Activity	Comments

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The WORK to be performed under this Contract shall consist of furnishing plant, tools, equipment, materials, supplies, and manufactured articles, and furnishing all properly licensed labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The WORK shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The WORK of this Contract comprises the excavation of an identified underground coal tar tank, appurtenances and MGP-impacted soils, management of water, the decommissioning of groundwater monitoring wells, the placement of clean fill, installation of geotextile fabric, and restoration of the site as appropriate.
- B. The WORK is located at the OWNER's former manufactured gas plant facility in the Village of Fort Edward, New York.
- C. The following documents are considered as part of the Contract Documents:
 - 1. These specifications including Sections 01010, 01025, 01300, 01560, 02100, 02140, 02141, 02200, and 02270.
 - Drawings: Figure 2 Site Plan, Figure 3 Remedial Activities, Figure 4 Site Grading, Figures 5-1 to 5-7 – PAHs and Cyanide in Soils
 - 3. National Grid USA and Affiliated Companies Terms and Conditions for Construction Purchase Orders, Document No. 00700.
 - 4. Supplemental Conditions to National Grid Remedial Construction Purchase Orders
- 1.3 CONTRACTOR USE OF SITE
 - A. The CONTRACTOR's use of the Site shall be limited to its construction operations, including on-Site storage of materials, on-Site fabrication facilities, and field offices.
- 1.4 PROJECT MEETINGS
 - A. Preconstruction Conference
 - Prior to the commencement of WORK at the Site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by the CONTRACTOR'S Project Manager, its superintendent, and its subcontractors as the CONTRACTOR deems appropriate. Other attendees will be:

SECTION 01010 - SUMMARY OF WORK

- a. ENGINEER or the Resident Project Representative.
- b. Governmental representatives as appropriate.
- c. Others as requested by CONTRACTOR, OWNER, or ENGINEER.
- 2. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. However, the CONTRACTOR should be prepared to discuss all of the items listed below.
 - a. CONTRACTOR's tentative schedules.
 - b. Maintaining record documents.
 - c. Critical work sequencing.
 - d. Field decisions and Change Orders.
 - e. Use of Site, office and storage areas, security, housekeeping, and OWNER's needs.
 - f. CONTRACTOR's assignments for safety and first aid.
- B. Progress Meetings
 - The ENGINEER will schedule and hold on-Site progress meetings as requested by OWNER, REGULATORY AGENCY, CONTRACTOR or as required by progress of the WORK. The CONTRACTOR, ENGINEER, and all subcontractors active on the Site shall attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION -

PART 1 -- GENERAL

1.1 SCOPE

- A. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of work.
- B. If the measured quantities for items paid under unit pricing vary by +/- 20% from the estimated quantities in the bid schedule, a new unit price will be negotiated.

1.2 MOBILIZATION ALLOWANCE (Bid Item No. 1)

- A. No measurement shall be made for this item. Mobilization shall not exceed 15% of total project cost.
- B. Payment for mobilization will be made at the lump-sum price named in the Bid Schedule under Item No. 1, which price shall constitute full compensation for all activities associated with the mobilization of construction including, but not limited to, obtaining all permits, establishing staging areas for construction, establishing and maintaining sediment and erosion control measures, moving equipment and materials onto site, submitting preliminary construction schedule, an delivery of pre-construction submittals all as required for proper performance and completion of the work.

1.3 SITE SECURITY (Bid Item No. 1a)

- A. No measurement shall be made for this item.
- B. Payment for site security will be made at the unit price per day named in the Bid Schedule under Item No. 1a, which price shall constitute full compensation for all activities associated with providing site security by a certified subcontractor during non-work hours as directed by OWNER.

1.4 REMOVAL AND DISPOSAL OF STRUCTURES – Coal Tar Tank (Bid Item No. 2a)

- A. No measurement shall be made for this item. Certification of destruction/disposal for all waste materials generated including the tank shall be submitted prior to, or with invoice for this line item.
- B. Payment for the removal and disposal of the coal tar tank will be made at the lump sum price named in the Bid Schedule under Item No. 2a, which price shall constitute full compensation for all activities associated with removal of the coal tar tank including, but not limited to, utility surveys prior to invasive activities, excavation and disposal of soils
surrounding structures, removal, cleaning, and proper disposal of one coal tar tank estimated to be 300 – 1000 gallon volume and disposal of debris and cleaning water generated.

1.5 REMOVAL AND DISPOSAL OF STRUCTURES – Clay Tile Piping (Bid Item No. 2b)

- A. Measurement for payment of removal and disposal of the clay tile piping will be based upon the number of linear feet of piping removed and disposed as listed in the Bid Schedule under Item No. 2b. Certification of destruction/disposal for all waste materials generated shall be submitted prior to, or with invoice for this line item.
- B. Payment for the removal and disposal of the clay tile piping will be made at the unit price per linear foot named in the Bid Schedule under Item No. 2b, which price shall constitute full compensation for all activities associated with removal of the piping including, but not limited to, utility surveys prior to invasive activities, excavation and disposal of soils surrounding structures, removal and proper disposal of piping, and disposal of debris generated.
- 1.6 REMOVAL AND DISPOSAL OF STRUCTURES Concrete Former Gasometer Foundation Ring (Bid Item No. 2c)
- A. Measurement for payment of removal and disposal of the concrete former gasometer foundation ring will be based upon the number of linear feet of concrete removed and disposed as listed in the Bid Schedule under Item No. 2c. Certification of destruction/disposal for all waste materials generated shall be submitted prior to, or with invoice for this line item.
- B. Payment for the removal and disposal of the concrete former gasometer foundation ring will be made at the unit price per linear foot named in the Bid Schedule under Item No. 2c, which price shall constitute full compensation for all activities associated with removal of the concrete including, but not limited to, utility surveys prior to invasive activities, excavation and disposal of soils surrounding structures, and removal and proper disposal of concrete.

1.7 EXCAVATION AND DISPOSAL OF SOIL – Excavation (Bid Item No. 3a)

- A. Measurement for payment for excavation of soil will be based upon the number of cubic yards of soil excavated as calculated by field measurements of the excavation volume. Field measurements shall be performed by the ENGINEER.
- B. Payment for the excavation of soil will be made at the unit price per cubic yard, named in the Bid Schedule under Item No. 3a, which price shall constitute full payment for all activities associated with excavation including, but not limited to, excavation, sloping or benching, surveying, removal of obstructions, and stockpiling as necessary. Limits of excavation will be determined in the field based upon contract drawings prior to excavation. Excavation limits will not be modified based upon results of documentation sampling.
- 1.8 EXCAVATION AND DISPOSAL OF SOIL Transportation and Disposal (Bid Item No. 3b)
- A. Measurement for payment for transportation and disposal of soil will be based upon the number of tons of soil disposed as calculated by sum of disposal facility manifests and/or

certificates of destruction. Certification of destruction/disposal for all waste materials generated shall be submitted prior to, or with invoice for this line item. Estimated quantities in the bid schedule were estimated using a conversion of 1.5 tons per cubic yard. This conversion factor will be used for any field estimates.

- B. Payment for the transportation and disposal of soil will be made at the unit price per ton, named in the Bid Schedule under Item No. 3b, which price shall constitute full payment for all activities associated with excavation and disposal including, but not limited to, characterization sampling procedures, transportation, and off-site disposal of soils.
- 1.9 MANAGEMENT OF WATER Run-on control, dewatering, collection, disposal. (Bid Item No. 3c)
- A. No measurement shall be made for this item. Daily field logs shall record equipment utilized, operation time, and transportation and disposal volumes.
- B. Payment for management of water will be made at the unit price per week named in the Bid Schedule under Item No. 3c, which price shall constitute full payment for all activities associated with management of water on site including run-on control, dewatering in accordance with 02140, and disposal of water collected from dewatering, tank cleaning, and equipment decontamination. The weekly rate shall include all equipment, materials, labor, incidentals, permit fees, and transportation and disposal costs.
- 1.10 SITE RESTORATION Placement of Backfill (Bid Item No. 4a)
- A. Measurement for payment for placement of backfill will be based upon the total number of cubic yards compacted in place as calculated by determining the volume to be filled upon completion of excavation.
- B. Payment for placement of backfill will be made at the unit price per in place cubic yard named in the Bid Schedule under Item No. 4a, which price shall constitute full compensation for all activities associated with placement of backfill including, but not limited to purchase of clean backfill, dewatering as required, placement of backfill, and compaction to specified density. Compaction density will be measured by others.
- 1.11 SITE RESTORATION Placement of Geotextile Fabric and Construction Fence (Bid Item No. 4b)
- A. Measurement for payment for placement of geotextile fabric and construction fence will be based upon the total number of square yards of geotextile fabric placed in the excavation and overlain by orange plastic construction fence as indicated in the Bid Schedule(s) under Item No. 4b.
- B. Payment for for placement of geotextile fabric and construction fence will be made at the unit price per square yard named in the Bid Schedule(s) under Item No. 4b, which price shall constitute full compensation for all activities associated with for placement of geotextile fabric and construction fence including, but not limited to purchase of approved geotextile fabric and construction fence materials, placement of geotextile in accordance with manufacturer's instructions, and placement of construction fence over geotextile.

- 1.12 SITE RESTORATION Placement of Topsoil (Bid Item No. 4c)
- A. Measurement for payment for placement of topsoil will be based upon the total number of cubic yards compacted in place as calculated by determining the volume to be filled upon completion of excavation.
- B. Payment for placement of topsoil will be made at the unit price per in place cubic yard named in the Bid Schedule under Item No. 4c, which price shall constitute full compensation for all activities associated with placement of topsoil including, but not limited to purchase of clean topsoil, placement of topsoil, and compaction to specified density. Compaction density will be measured by others.
- 1.13 SITE RESTORATION Seeding (Bid Item No. 4d)
- A. Measurement for payment for seeding will be based upon the total number of square yards seeded as calculated by determining the area to be seeded upon completion of backfilling.
- B. Payment for seeding will be made at the unit price per square yard named in the Bid Schedule under Item No. 4d, which price shall constitute full compensation for all activities associated with seeding including, but not limited to purchase of seed, fertilizer, and mulch, preparation of soil prior to seeding, broadcasting seed, fertilizer, and mulch, watering, and maintenance until final acceptance.
- 1.14 SITE RESTORATION Placement of Boulders (Bid Item No. 4e)
- A. No measurement shall be made for this item. Inspection of installation shall be made at final acceptance.
- B. Payment for placement of boulders will be made at the lump sum price named in the Bid Schedule under Item No. 4e, which price shall constitute full compensation for all activities associated with placement of boulders including, but not limited to purchase of boulders, preparation of subgrade prior to placement, transportation and unloading at site, and placement at recommended spacing and as indicated,.
- 1.15 SITE RESTORATION Parking Area (Bid Item No. 4f)
- A. Measurement for payment for installation of the parking area will be based upon the total number of cubic yards of type B stone, compacted in place as calculated by determining the volume to be filled upon completion of excavation and field determination of parking area boundaries.
- B. Payment for installation of the parking area will be made at the unit price per in place cubic yard named in the Bid Schedule under Item No. 4f, which price shall constitute full compensation for all activities associated with installation of the parking area including, but not limited to purchase of clean backfill, placement of backfill, and compaction to specified density. Compaction density will be measured by others.
- 1.16 DECOMMISSIONING OF GROUNDWATER WELLS (Bid Item No. 5)
- A. No measurement shall be made for this item. A certification statement for each well stating it was closed in accordance with NYSDEC guidance and ASTM standard D5299-99 shall be submitted prior to, or with invoice for this line item.

- B. Payment for abandonment of groundwater wells shall be made at the lump-sum price named in the Bid Schedule under Item No. 5, which price shall constitute full compensation for all activities associated with the abandonment of wells in accordance with NYSDEC guidance and ASTM D5299-99 including, but not limited to, removal of casing, overdrilling wells, filling with grout, and construction completion reporting.
- 1.17 CLOSEOUT AND DEMOBILIZATION ALLOWANCE (Bid Item No. 6)
- A. No measurement shall be made for this item.
- B. Payment for demobilization will be made at the lump-sum price named in the Bid Schedule(s) under Item No. 7, which price shall constitute full compensation for all activities associated with the demobilization of construction including, but not limited to, restoration of staging areas, removal of materials and equipment, as-built drawings, and construction completion reporting.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 RETAINAGE

A. In accordance with paragraph 11.3 of the National Grid USA and Affiliated Companies Terms and Conditions of Construction Purchase Orders, ten percent (10%) of each invoice shall be retained by the Owner until Final Acceptance by the Owner.

3.2 PAYMENT WITHOLDING

- A. In accordance with paragraph 12.0 of the National Grid USA and Affiliated Companies Terms and Conditions of Construction Purchase Orders, prior to Final Acceptance of the Work, the Owner may withhold or nullify the whole or part of any payment to such extent as may be necessary to protect itself from loss.
- 3.3 FIELD MEASUREMENTS
- A. Measurement for payment for unit price line items shall be accomplished by the ENGINEER. A licensed surveyor will not be used to measure excavation volumes.

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1.1 GENERAL

- A. Wherever submittals are required in the Contract Documents, submit them to the ENGINEER.
- B. The following are itemized submittals required by the following Sections of the Specification Documents:

Section	Submittal			
01010 Summary of Work	Work Plan and Sequence of Work – including proposed methodology, equipment, haul routes, staging, monitoring, and quality assurance			
01010 - Summary of Work	Health and Safety Plan – including PPE, work area monitoring, decontamination, and emergency action plan Construction Schedule			
01025 - Measurement and Payment	Certification for Well Decommissioning			
	Licenses of Security Officers			
	Sign In/Out Logs			
01560 - Temporary Environmental Controls	Dust Abatement Measures Plan			
	Erosion and Sediment Control Plan			
	Off-Site Disposal Locations			
	Sanitary and Other Organic Waste Collection Plan and Schedule			
	Chemical MS/DS Sheets			
02100 - Site Preparation	Notification of Marked Utilities			
02140 - Dewatering	Permits as necessary			
	Dewatering Plan			
	Disposal Facility Names, Locations and Licenses			
02111 Collection and	Disposal Applications and Profiles			
Disposal of Waste	Disposal and Transportation Manifests			
	Laboratory Waste Characterization Results and Reports			
	Disposal Log			
	Source, Type, Analytical Testing and Sample of Fill Materials			
02200 - Earthwork	Sample of Geotextile Material			
	Notification of Marked Excavation Boundaries			
	Tree Support Plan for Construction			
	Seed Samples			
02270 - Site Restoration	Seed Supplier Guaranteed Germination			
	Boulder Location and Material Specification			
	Plan for Fertilization, Seeding and Mulching			

- C. Within 7 business days after the date of commencement as stated in the Notice to Proceed, the CONTRACTOR shall submit the following items for review:
 - 1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitutes ("Or-Equal") submittals.
 - 2. A list of permits and licenses the CONTRACTOR shall obtain, indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.
 - 3. Licenses for electrical, mechanical, or other applicable trades granted by the appropriate jurisdiction for Fort Edward, NY.
 - 4. A plan of operation or construction schedule.

1.2 SHOP DRAWINGS

- A. Wherever called for in the Contract Documents or where required by the ENGINEER, the CONTRACTOR shall furnish three copies of each Shop Drawing submittal. Shop Drawings may include, lists, graphs, catalog sheets, data sheets, and similar items.
- B. Organization
 - 1. A single submittal transmittal form shall be used for each technical specification section or item or class of material or equipment for which a submittal is required. On the transmittal form, index the components of the submittal and insert tabs in the submittal to match the components. Relate the submittal components to specification paragraph and subparagraph, drawing number, detail number, or schedule title, as applicable.
 - 2. Unless indicated otherwise, terminology and equipment names and numbers used in submittals shall match those used in the Contract Documents.
- C. Format
 - 1. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with complete pertinent data capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Sufficient level of detail shall be presented for assessment of compliance with the Contract Documents.
 - 2. Each submittal shall be assigned a unique number. Submittals shall be numbered sequentially, and the submittal numbers shall be clearly noted on the transmittal.
- D. Disorganized submittals that do not meet the requirements of the Contract Documents will be returned without review.

- E. Except as may otherwise be indicated, the ENGINEER will return one copy of each submittal to the CONTRACTOR with comments noted thereon, within 5 business days following receipt by the ENGINEER.
- F. If a submittal is returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and resubmission will not be required.
- G. If a submittal is returned marked "MAKE CORRECTIONS NOTED," CONTRACTOR shall make the corrections on the submittal, but formal revision and resubmission will not be required.
- H. If a submittal is returned marked "AMEND-RESUBMIT," the CONTRACTOR shall revise it and shall resubmit the required number of copies.
- I. If a submittal is returned marked "REJECTED-RESUBMIT," it shall mean either that the proposed material or product does not satisfy the specification, or the submittal is so incomplete that it cannot be reviewed.
- J. Corrections or comments made on the CONTRACTOR's Shop Drawings during review do not relieve the CONTRACTOR from compliance with Contract Drawings and Specifications. Review is for conformance to the design concept and general compliance with the Contract Documents only. The CONTRACTOR is responsible for confirming and correlating quantities and dimensions, fabrication processes and techniques, coordinating WORK with the trades, and satisfactory and safe performance of the WORK.
- 1.3 SAMPLES
 - A. The CONTRACTOR shall submit the number of samples indicated by the Specifications. If the number is not indicated, submit not less than 3 samples. Where the amount of each sample is not indicated, submit such amount as necessary for proper examination and testing by the methods indicated.
 - B. Samples shall be individually and indelibly labeled or tagged, indicating the salient physical characteristics and manufacturer's name. Upon acceptance by the ENGINEER, one set of the samples will be stamped and dated by the ENGINEER and returned to the CONTRACTOR, and two sets of samples will be retained by the ENGINEER.

1.4 RECORD DRAWINGS

A. The CONTRACTOR shall maintain one set of Drawings at the Site for the preparation of record drawings. On these, it shall mark every project condition, location, configuration, and any other change or deviation which may differ from the Contract Drawings at the time of award, including buried or concealed construction and utility features that are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of buried utilities that differ from the locations indicated, or that were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or as CONTRACTOR is

SECTION 01300 - CONTRACTOR SUBMITTALS

directed, to fully indicate the WORK as actually constructed. These record drawings are the CONTRACTOR's representation of as-built conditions, shall include revisions made by addenda and change orders, and shall be maintained up-to-date during the progress of the WORK. Red ink shall be used for alterations and notes. Notes shall identify relevant Change Orders by number and date.

- B. Record drawings shall be accessible to the ENGINEER during the construction period.
- C. Final payment will not be acted upon until the record drawings have been completed and delivered to the ENGINEER. Said up-to-date record drawings shall be in the form of a set of prints with carefully plotted information overlaid.
- D. Information submitted by the CONTRACTOR will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information
- 1.5 QUALITY CONTROL (QC) SUBMITTALS
 - A. Quality control submittals are defined as those required by the Specifications to present documentary evidence to the ENGINEER that the CONTRACTOR has satisfied certain requirements of the Contract Documents.
 - B. Unless otherwise indicated, QC submittals shall be submitted:
 - 1. Before delivery and unloading, for the following types of submittals:
 - a. Manufacturers' installation instructions
 - b. Affidavits and manufacturers' certification of compliance with indicated product requirements
 - C. The ENGINEER will record the date that a QC submittal was received and review it for compliance with submittal requirements, but the review procedures above for Shop Drawings and samples will not apply.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

1.1 SITE SECURITY

- A. The CONTRACTOR shall be responsible for temporary site security at all times when open excavations or heavy equipment are present on site. Temporary construction fence shall be installed and maintained as required to control access to the construction site.
- B. The CONTRACTOR shall provide manned security at the site during all nonworking hours. The security detail shall hold a NYS Security guard license required pursuant to NYS General Business law. This requirement is specifically itemized in the Bid Schedule as bid line item 1a.
- C. Site sign-in/out logs shall be maintained at all times.
- 1.2 DUST ABATEMENT
- A. The CONTRACTOR shall prevent its operation from producing dust in amounts damaging to property or causing a nuisance to persons occupying buildings in the vicinity of the Site. The CONTRACTOR shall be responsible for any damage resulting from dust originating from its operations. Dust abatement measures shall be approved by the ENGINEER and continued until the CONTRACTOR is relieved of further responsibility by the ENGINEER.
- B. Vehicle Loads: Cover or maintain at least 2-feet of freeboard vertical distance between the top of the load and the top of the trailer sides on trucks hauling dirt, sand, soil, or other loose materials off of the Site.
- C. Roads: When there is visible track-out onto a paved public road, install wheel washers where the vehicles exit and enter onto the paved roads and/or wash the undercarriage of trucks and any equipment leaving the Site on each trip. Sweep the paved street at the end of each shift as necessary or as directed.
- D. Vehicle Speeds: Vehicle speeds throughout project site and along Canal Street shall be 5 mph or less.
- 1.3 SEDIMENTATION ABATEMENT
- A. The CONTRACTOR shall be responsible for collecting, storing, hauling, and disposing of spoil, silt, and waste materials in compliance with applicable federal, state, and local rules and regulations and the Contract Documents.
- B. Install and maintain erosion and sediment control measures, such as swales, grade stabilization structures, berms, dikes, waterways, filter fabric fences, hay bales, and sediment basins.
- C. Filter fabric barrier systems, if used, shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated. Filter fabric barrier systems shall be installed to the required depth below grade as indicated on the contract drawings.

SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

- D. Remove and dispose of sediment deposits at the designated spoil area. If a spoil area is not indicated, dispose of sediment at an approved off-Site location not in or adjacent to a stream or floodplain. Sediment to be placed at the spoil area should be spread evenly, compacted, and stabilized. Sediment shall not be allowed to flush into a stream or drainage way.
- E. Maintain erosion and sediment control measures until final acceptance or until requested by the ENGINEER to remove it.
- 1.4 RUBBISH CONTROL
- A. During the progress of the WORK, the CONTRACTOR shall keep the Site and other areas for which it is responsible in a neat and clean condition and free from any accumulation of rubbish. The CONTRACTOR shall properly dispose of rubbish and waste materials of any nature and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of rubbish and surplus materials shall be off the Site in accordance with local codes and ordinances governing locations and methods of disposal and in conformance with applicable safety laws and the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.5 SANITATION

- A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets shall conform to the requirements of Part 1926 of the OSHA Standards for Construction. Hand-washing facilities shall accompany portable toilet facilities, and adequate supply of soap, potable water, and towels shall be maintained by the CONTRACTOR.
- B. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular collection of sanitary and organic wastes. Wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the Site in a manner satisfactory to the ENGINEER and in accordance with Laws and Regulations pertaining thereto.

1.6 CHEMICALS

A. Chemicals used on the WORK or furnished for facility operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer. All chemicals used on the WORK are subject to approval by the ENGINEER.

SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

- 3.1 MONITORING
- A. Site perimeter monitoring for dust, noise, VOCs, and odor will be performed by the ENGINEER.
- B. The CONTRACTOR shall perform corrective actions as required (dust suppression, odor control, work practices, etc.) if notified by the ENGINEER that construction activities are adversely impacting the site perimeter.
- 3.2 DECONTAMINATION
- A. The CONTRACTOR shall decontaminate all equipment and tools that contacted MGP-impacted soils prior to initiating backfill of clean materials and/or prior to equipment and tools leaving the site.
- B. Water used in decontamination operations shall be collected and properly transported and disposed off-site as waste material.

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- 1.1 THE REQUIREMENT
 - A. The WORK of this Section includes measures required during the CONTRACTOR's initial move onto the Site for clearing, grubbing and stripping; and regrading of certain areas to receive embankment fill.
- 1.2 SITE INSPECTION
 - A. Prior to moving onto the Site, the CONTRACTOR shall inspect the Site conditions and review maps of the existing site facilities delineating the OWNER's property and right-of-way lines.

PART 2 -- PRODUCTS - NOT USED

PART 3 -- EXECUTION

- 3.1 PRIMARY PLANT SITE ACCESS
 - A. The CONTRACTOR shall develop any necessary access to the Site, including access barriers to prohibit entry of unauthorized persons.
 - B. **Utility Interference:** Where existing utilities interfere with the WORK, notify the utility owner and the ENGINEER before proceeding in accordance with the General Conditions.
- 3.2 CLEARING, GRUBBING, AND STRIPPING
 - A. CONTRACTOR shall provide all erosion and sedimentation control measures, as defined within Specification 01560 – Temporary Environmental Controls, prior to the start of WORK.
 - B. Construction areas shall be cleared of grass and weeds to at least a depth of six inches and cleared of structures, pavement, sidewalks, concrete or masonry debris, trees, logs, upturned stumps, loose boulders, and any other objectionable material of any kind which would interfere with the performance or completion of the WORK, create a hazard to safety, or impair the subsequent usefulness of the WORK, or obstruct its operation. Loose boulders within 10 feet of the top of cut lines shall be incorporated in landscaping or removed from the Site. Trees and other natural vegetation outside the actual lines of construction shall be protected from damage during construction, as directed by the ENGINEER.
 - C. Within the limits of clearing, the areas below the natural ground surface shall be grubbed to a depth necessary to remove all stumps, roots, buried logs, and all other objectionable material. Septic tanks, drain fields, and connection lines and any other underground structures, debris or waste shall be removed if found on the Site. All objectionable material from the clearing and grubbing process shall be removed from the Site and

SECTION 02100 - SITE PREPARATION

wasted in approved safe locations.

D. Unless otherwise indicated, native trees larger than three inches in diameter at the base shall not be removed without the ENGINEER's approval. The removal of any trees, shrubs, fences, or other improvements outside of rights-of-way, if necessary for the CONTRACTOR's choice of means and methods, shall be arranged with the owner of the property, and shall be removed and replaced, at no additional cost to the OWNER.

3.3 OVEREXCAVATION, REGRADING, AND BACKFILL UNDER FILL AREAS

A. After the fill areas have been cleared, grubbed, and excavated, the areas to receive fill will require overexcavation, regrading, and backfill, consisting of the removal and/or stockpiling of undesirable soils. The ground surface shall be recontoured for keying the fill and removing severe or abrupt changes in the topography of the Site.

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall dewater excavations in accordance with the Contract Documents. The CONTRACTOR shall secure all necessary permits to complete the requirements of this Section.
- 1.2 CONTRACTOR SUBMITTALS
 - A. Dewatering Plan Prior to commencement of excavation, the CONTRACTOR shall submit a detailed plan and operation schedule for dewatering of excavations. The CONTRACTOR may be required to demonstrate the system proposed and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times. The CONTRACTOR's dewatering plan is subject to review by the ENGINEER.
- 1.3 QUALITY CONTROL
 - A. It shall be the sole responsibility of the CONTRACTOR to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.
 - B. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the CONTRACTOR.
 - C. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.

PART 2 -- PRODUCTS

2.1 EQUIPMENT

- A. Dewatering, where required, may include the use of sump pumps, temporary pipelines for water transport, portable storage tanks, treatment/filtration equipment, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the jobsite.
- B. The CONTRACTOR'S Dewatering Plan shall specify all required equipment, installation, operation, maintenance, and spill protection measures.

PART 3 -- EXECUTION

3.1 PLANNING

A. Four groundwater monitoring wells are present on site. The CONTRACTOR shall evaluate groundwater levels at the site prior to excavation and adjust excavation and dewatering plans accordingly.

3.2 GENERAL REQUIREMENTS

- A. The CONTRACTOR shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.
- B. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected and be pumped from the excavation to maintain a bottom free from standing water.
- C. The CONTRACTOR shall dispose of water from the WORK in a suitable manner without discharge to the environment and without damage to adjacent property. CONTRACTOR shall be responsible for obtaining any permits that may be necessary to dispose of water. Water shall be filtered using an approved method to remove sand and fine-sized soil particles before disposal into any drainage system. The CONTRACTOR'S dewatering plan shall specify a primary treatment and disposal method and a contingency disposal location should the primary be deemed unsuitable or in the event of treatment system malfunction.

1.1 DESCRIPTION

- A. CONTRACTOR shall provide all labor, materials, equipment and incidentals required to collect, contain, and dispose liquid and solid, hazardous, nonhazardous, or non-regulated inert waste materials specified to complete the WORK in every respect. Handling, waste characterization, transporting, and disposal are included.
- B. Generic hazardous, non-hazardous, and non-regulated inert waste types are identified on the disposal bid form. The specific types of waste to be collected, contained, and disposed may include:
 - 1. Coal Tar Tank approximate 300-1000 gallon tank to be cleaned and recycled.
 - Coal Tar and Clay Tile Pipe Hardened coal tar from the tank, hardened coal tar chunks in soils, and clay tile pipe containing hardened coal tar to be mixed with soils as required and disposed via off-site thermal treatment at Environmental Soils Management Inc. (ESMI) of Ft. Edward, NY.
 - 3. Demolition debris concrete rubble, miscellaneous construction materials.
 - 4. Non-hazardous soils
 - 5. Non-hazardous wastewater
 - 6. Used personal protective equipment (PPE)
 - 7. Miscellaneous trash
- C. CONTRACTOR shall dispose of hazardous and non-hazardous regulated waste:
 - 1. Using a NYSDEC Part 364 licensed waste hauler approved by OWNER in advance for the appropriate waste classification.
 - 2. At a USEPA licensed hazardous or non-hazardous waste disposal facility, approved by OWNER in advance.
 - 3. In accordance with National Grid Environmental Procedure (EP) #1.
- D. The CONTRACTOR shall properly characterize all waste materials to ensure transportation and disposal in accordance with federal and state regulations. Characterization shall include representative sampling and analysis as applicable to ensure proper characterization.

- 1. Figures 5-1 through 5-7 identify concentrations of PAHs and cyanide in soils at various depths encountered during soil boring investigations.
- 1.2 QUALITY ASSURANCE
 - A. Permits and Regulations:
 - 1. CONTRACTOR will obtain and comply with all necessary permits for transportation and off-site disposal of waste materials.
- 1.3 SUBMITTALS
 - A. CONTRACTOR shall not dispose of waste materials at a disposal facility that is not approved by OWNER. CONTRACTOR shall be responsible for delays caused by proposing a disposal facility that is not acceptable to OWNER.
 - B. The CONTRACTOR is responsible for completing all disposal applications for the selected receiving facility and providing copies to the ENGINEER. Copies will be submitted at no later than five business days prior to scheduled transportation and disposal is to begin.
 - C. The CONTRACTOR shall submit copies of the waste disposal and transportation manifests or bills of lading which are specified in this Section. Copies shall be submitted within three business days after the manifests are signed by the disposal facility.
 - D. The CONTRACTOR shall submit copies of any and all laboratory testing results for samples collected pursuant to Section 3.3, and additional results for samples that may be required by the disposal facility, no later than one business day after the analytical results are received by the CONTRACTOR.

PART 2 -- PRODUCTS

- 2.1 CONTAINERS
 - A. The CONTRACTOR may use a portable above ground storage tank or appropriate drum(s) for containing liquid recovered from excavation dewatering and cleaning/decontamination.
 - 1. Containers shall be empty, clean, and of sound construction. Excepting a top access way, there shall be no cutouts, cracks, or breaches in the container of any kind.
 - 2. Container shall be equipped with a means for measuring the total volume of contained liquid in gallons.
 - 3. Container shall be compatible with solid and liquid waste product.
 - B. The CONTRACTOR shall use end dump trucks, drums, roll-offs, boxes, or other approved containers for solid waste materials.

- 1. Containers shall be empty, clean, and of sound construction. Excepting a top access way, there shall be no cutouts, cracks, or breaches in the container of any kind.
- 2. Container shall be capable of being closed or covered and should remain so unless waste is being added or taken out.

PART 3 -- EXECUTION

- 3.1 GENERAL
 - A. CONTRACTOR shall manage all wastes in accordance with National Grid Environmental Procedure (EP) #1.
 - B. CONTRACTOR shall contain all liquid that is generated during excavation dewatering and equipment cleaning/decontamination, and all liquid from other decontamination operations or that comes in contact with waste materials while being handled, or accumulates within the Work areas.
 - C. CONTRACTOR shall contain all collected liquid so that no liquid is released or spilled into the environment. CONTRACTOR shall provide sufficient capacity to store liquid, prior to its disposal. All liquid that is conveyed on site shall be conveyed in closed conduits. CONTRACTOR shall not use trench excavations as temporary drainage ditches.
 - D. CONTRACTOR shall collect all waste soils, sludges, and miscellaneous other debris and trash in appropriate containers for transportation and disposal to proper disposal facilities.
 - E. Roll-offs should be provided with covers or tarps that are utilized when waste is not being added.
 - F. All liquid wastes shall be provided with adequate secondary containment.
 - G. CONTRACTOR shall be the liaison with the disposal facilities and transporters to promote rapid turnaround of liquid and solid disposal containers.
 - H. CONTRACTOR shall maintain a disposal log on-site that summarizes the daily and cumulative quantity of waste materials disposed at all off-site disposal facilities. The log shall show which disposal facilities receive waste for disposal and the quantity of waste disposed on a daily basis. The log shall also include company names of the waste transporters who ship waste to off-site disposal facilities for each load shipped and NYSDEC Part 364 Permit number for each load and a copy of the weight ticket (if possible). At least daily, CONTRACTOR shall reconcile this disposal log with that of the ENGINEER to verify accountability for waste.
 - I. Dispose of all waste in such a manner as not to endanger public health, property, the environment, or the WORK and in accordance with all applicable regulations.

- J. The CONTRACTOR is responsible to coordinate the arrival and departure of waste transportation trucks and is to consider the limited site access and space restrictions of the Site.
- K. Waste will be direct loaded into end dump trucks, lined roll-off boxes, or other approved containers, when possible, in a manner that prevents spilling, tracking, or dispersal of waste. Hand trucks, forklifts, or carts will be used when moving containers into truck cargo areas. Containers will not be dragged, dropped, or thrown. All loads must be covered prior to exiting the Site. Waste containers and waste container cargo areas will be free of debris and lined with 6-mil polyethylene sheeting to prevent material from leaking or spilling during transport.
- L. The CONTRACTOR will inspect vehicles or containers for proper operation and covering and will document the results of the inspections. If damaged containers are identified, the CONTRACTOR will repair or replace. The CONTRACTOR will inspect vehicles and containers for proper markings, manifest documents, and other requirements for waste shipment. Noncompliance to applicable regulations will be corrected prior to transporting the waste from the Site.
- 3.2 DISPOSAL OF WASTE AT OFF-SITE DISPOSAL FACILITY
 - A. CONTRACTOR will not remove waste materials from site without written approval from the OWNER. Written approval can be e-mail.
 - B. All waste transported off-site shall be delivered to a USEPA licensed disposal facility as approved by the OWNER in accordance with all Federal and State regulations.
 - C. CONTRACTOR shall be responsible for obtaining approval from the disposal facility for disposing waste at their facility. In this capacity, CONTRACTOR shall be responsible for completing and submitting all applications for waste disposal at the appropriate disposal facility. CONTRACTOR shall also be responsible for all aspects of collecting and analyzing waste samples which are required by the disposal facility for waste acceptance approval purposes. CONTRACTOR shall be responsible for satisfying and complying with all other requirements imposed by the disposal facility.
 - D. CONTRACTOR shall be responsible for properly completing waste transportation and disposal manifests and bills of lading and all other documents required for shipment to disposal facility.
 - E. CONTRACTOR shall retain copies of all waste transportation and disposal manifests and bills of lading, and all other documents required for waste shipment, for each load of waste that is transported from the site. Original completed manifest sets shall be provided to the ENGINEER. CONTRACTOR will make all waste transportation and disposal documents available for review upon request.

– END OF SECTION –

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall perform all earthwork indicated and required for construction of the WORK, complete and in place, in accordance with the Contract Documents.
- 1.2 CONTRACTOR SUBMITTALS
 - A. The CONTRACTOR shall submit samples of all materials proposed to be used in the work in accordance with the requirements in Section 01300 Contractor Submittals. Sample sizes shall be as determined by the testing laboratory.

PART 2 -- PRODUCTS

- 2.1 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS
 - A. **General:** Fill, backfill, and embankment materials shall be selected or processed clean, fine earth, rock, or sand, free from grass, roots, brush, or other vegetation.
 - B. Fill and backfill materials to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension no larger than ½-inch.
 - C. **Suitable Materials:** Materials not defined as unsuitable below are defined as suitable materials and may be used in fills, backfilling, and embankment construction subject to the indicated limitations. In addition, when acceptable to the ENGINEER, some of the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite.
 - D. Suitable materials may be obtained from on-site excavations, may be processed on-site materials, or may be imported.
 - E. Documentation samples will be collected by the ENGINEER from clean fill imported to the site for backfill and restoration and from any clean soils excavated on-site and retained for backfill purposes. The soils are expected to meet the criteria for restricted residential use. Placement of backfill materials is subject to receipt of analytical results.
 - F. The following types of suitable materials are defined:
 - Type B (Class I crushed stone): Manufactured angular, crushed stone. crushed rock, or bank run gravel with the following gradation requirements. The material shall have a minimum sand equivalent value of 75. CONTRACTOR will advise OWNER'S REPRESENTATIVE in writing of the source and type of the fill material, and submit a sample of the material for approval along with analytical testing to validate it is free of contamination.

SECTION 02200 - EARTHWORK

Sieve Size	Percentage Passing		
3/4-inch	100		
No. 4	30 - 50		
No. 200	0 - 5		

- 2. Type K (topsoil): Topsoil shall be the material placed in final 6 inches of backfill operations in areas designated for vegetative restoration (not intended for paving), and will be use clean topsoil that has not been previously treated, reclaimed, or thermally processed. CONTRACTOR will advise OWNER'S REPRESENTATIVE in writing of the source and type of the fill material, and submit a sample of the material for approval along with analytical testing to validate it is free of contamination.
- 3. Alternative Materials CONTRACTOR may propose alternative materials including re-use of treated soils, changes to gradation, or other treated soils from the treatment facility. Approval of alternative materials shall be by ENGINEER and OWNER in writing prior to delivery. Approval shall be contingent upon submittal of certification of treatment, documentation samples as described in Paragraph E, compaction test if alternative gradation.
- 2.2 UNSUITABLE MATERIAL
 - A. Unsuitable materials include the materials listed below.
 - 1. Soils which, when classified under ASTM D 2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System), fall in the classifications of Pt, OH, CH, MH, or OL.
 - 2. Soils which cannot be compacted sufficiently to achieve the density specified for the intended use.
 - 3. Materials that contain hazardous or designated waste materials including petroleum hydrocarbons, pesticides, heavy metals, and any material which may be classified as hazardous or toxic according to applicable regulations.
- 2.3 USE OF FILL, BACKFILL, AND EMBANKMENT MATERIAL TYPES
 - A. The CONTRACTOR shall use the types of materials as designated herein for all required fill, backfill, and embankment construction hereunder.
 - B. Fill and backfill types shall be used in accordance with the following provisions:
 - 1. Backfill shall be Type B material.
 - 2. Topsoil shall be Type K material.

2.4 MATERIALS TESTING

A. Particle size analysis of soils and aggregates will be performed using ASTM D 422 -Standard Test Method for Particle-Size Analysis of Soils.

- B. Determination of sand equivalent value will be performed using ASTM D 2419 Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- C. **Unified Soil Classification System:** References in this Section to soil classification types and standards shall have the meanings and definitions indicated in ASTM D 2487. The CONTRACTOR shall be bound by all applicable provisions of said ASTM D 2487 in the interpretation of soil classifications.
- 2.5 GEOTEXTILE FABRIC
 - A. Geotextile Fabric shall be Propex Inc. Geotex 311, or equal.
- 2.6 BARRIER IDENTIFICATION MATERIAL
 - A. Unless indicated otherwise, barrier identification material of the type orange plastic construction fencing shall be placed above all buried geotextile fabric.

PART 3 -- EXECUTION

- 3.1 EXCAVATION GENERAL
 - A. General: Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the WORK. The removal of said materials shall conform to the lines and grades indicated or ordered. Unless otherwise indicated, the excavation site shall be stripped of all vegetation and debris, and such material shall be removed from the site prior to performing any excavation or placing any fill. The CONTRACTOR shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926).
 - B. Limits of Excavation: Excavation limits shall be as indicated. CONTRACTOR shall mark excavation boundaries in accordance with contract drawings and ENGINEER shall approve boundaries prior to initiating excavation. ENGINEER shall collect documentation samples at sidewalls and bottoms of excavations upon completion to approved boundaries. Backfill of excavations will not be contingent upon results of documentation samples.
 - C. Removal and Exclusion of Water: The CONTRACTOR shall remove and exclude water, including stormwater, groundwater, irrigation water, and wastewater, from all excavations. Dewatering wells, wellpoints, sump pumps, or other means shall be used to remove water and continuously maintain groundwater at a level at least two feet below the bottom of excavations before the excavation work begins at each location. Water shall be removed and excluded until backfilling is complete.

3.2 STRUCTURE, ROADWAY, AND EMBANKMENT EXCAVATION

A. **Notification of ENGINEER:** The CONTRACTOR shall notify the ENGINEER at least 3 business days in advance of completion of any structure excavation and before an exposed foundation is removed or is covered with backfill or with any construction materials.

3.3 OVER-EXCAVATION NOT ORDERED OR INDICATED

A. Any over-excavation carried below the grade ordered or indicated, shall be backfilled and compacted to the required grade with the indicated material.

3.4 EXCAVATION IN LAWN AREAS

A. Excavated material may be placed on the lawn; provided, that a drop cloth or other suitable method is employed to protect the lawn from damage. The lawn shall not remain covered for more than 72 hours. Immediately after completion of backfilling [and testing of the pipeline], the sod shall be replaced and lightly rolled in a manner so as to restore the lawn as near as possible to its original condition.

3.5 EXCAVATION IN VICINITY OF TREES

A. Except where trees are indicated to be removed, trees shall be protected from injury during construction operations. No tree roots over 2 inches in diameter shall be cut without express permission of the ENGINEER. Trees shall be supported during excavation by any means previously reviewed by the ENGINEER.

3.6 BACKFILL - GENERAL

- A. Backfill shall begin immediately upon acceptance of final excavation limits and collection of documentation samples by ENGINEER. Backfill will not be contingent upon results of documentation samples.
- B. Backfill shall not be dropped directly upon any structure or pipe. Backfill shall not be placed around or upon any structure until the concrete has attained sufficient strength to withstand the loads imposed.
- C. Except for drainrock materials being placed in over-excavated areas or trenches, backfill shall be placed after all water is removed from the excavation.
- D. If a moveable trench shield is used during excavation and backfill operations, the shield shall be moved by lifting the shield free of the trench bottom or backfill and then moving the shield horizontally, The CONTRACTOR shall not drag trench shields along the trench causing damage or displacement to the trench sidewalls or the bedding and backfill.
- E. Immediately prior to placement of backfill materials, the bottoms and sidewalls of trenches and structure excavations shall have all loose sloughing, or caving soil and rock materials removed. Trench sidewalls shall consist of excavated surfaces that are in a relatively undisturbed condition before placement of backfill materials.

3.7 PLACING AND SPREADING OF BACKFILL MATERIALS

- A. The area where a fill or embankment is to be constructed shall be cleared of all vegetation, roots and foreign material. Backfill materials shall be placed and spread evenly in layers. When compaction is achieved using mechanical equipment, the layers shall be evenly spread so that, when compacted, each layer shall not exceed 24 inches in thickness.
- B. During spreading, each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer.
- 3.8 COMPACTION OF TYPE B AND TYPE K FILL MATERIALS
 - A. Each layer of Type B backfill material as defined herein, where the material is graded such that 10 percent or more passes a No. 4 sieve, shall be mechanically compacted to the indicated percentage of density. Equipment that is consistently capable of achieving the required degree of compaction shall be used and each layer shall be compacted over its entire area while the material is at the required moisture content.
 - B. Compaction Requirements: The following compaction test requirements shall be in accordance with ASTM D 1557 Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft lbf/ft³) for Type B and K materials. Where agency or utility company requirements govern, the highest compaction standards shall apply.

Location or Use of Fill	Percentage of Standard Proctor Density		
Final backfill (Type B material)	85		
Type B Material Parking Area	95		
Topsoil (Type K material)	80		

3.9 INSTALLATION OF GEOTEXTILE FABRIC

- A. Geotextile fabric shall be installed as indicated on the contract drawings and in accordance with manufacturer's instructions. The geotextile shall be laid smooth without wrinkles or folds on the prepared subgrade in the direction of construction traffic. Adjacent geotextiles rolls shall be overlapped at least one foot.
- B. Orange plastic construction fence shall be laid flat on top of geotextile fabric as a visual demarcation and to warn of the presence of the geotextile fabric for future excavation operations.

3.10 FIELD TESTING

A. **General:** All field soils testing will be done by a testing laboratory of the OWNER's choice at the OWNER's expense except as indicated below.

- B. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with Method C of ASTM D 1557. Field density in-place tests will be performed in accordance with ASTM D 1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, ASTM D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate in Place By Nuclear Methods (Shallow Depth), or by such other means acceptable to the ENGINEER.
- C. In case the test of the fill or backfill show non-compliance with the required density, the CONTRACTOR shall accomplish such remedy as may be required to insure compliance. Subsequent testing to show compliance shall be by a testing laboratory selected by the OWNER and paid by the CONTRACTOR.

- 1.1 THE REQUIREMENT
- A. The CONTRACTOR shall provide erosion protection including fertilizing, seeding, and mulching for all disturbed areas that are not to be paved or otherwise treated in accordance with the Contract Documents.
- B. The CONTRACTOR shall place large boulders at the property as specified and as indicated in the Contract Documents.

PART 2 -- PRODUCTS

2.1 MATERIALS

- A. **Fertilizer**: Fertilizer shall be a commercial, non-toxic chemical type, uniform in composition, free-flowing, conforming to federal, state, and local laws and regulations and suitable for application with equipment designed for that purpose.
- B. Seed: Seed shall be delivered in original unopened packages bearing an analysis of the contents. Seed shall be guaranteed 95 percent pure with a minimum germination rate of 80 percent. Seed shall be K-31 fescue and conform with applicable County, New York State, and Federal regulations. Seed shall be mixed by the seed supplier. The CONTRACTOR shall furnish the seed supplier's guaranteed germination of each variety listed in the seed mixture. Grass seed shall not be delivered to the Site until samples have been approved by the ENGINEER. Approval of samples, however, shall not affect the right of the ENGINEER to reject seed upon or after delivery. Seed which has become wet, moldy, or otherwise damaged prior to use will not be accepted.
- C. **Mulch**: Mulch shall be a fibrous, wood cellulose product produced for this purpose. It shall contain no growth or germination inhibiting substances, and shall be manufactured so that when thoroughly mixed with seed, fertilizer, and water, in the proportions indicated it will form a homogenous slurry which is capable of being sprayed.
- D. **Boulders:** Boulders shall be 3-ft to 4-ft in diameter native rock and substantially free from breaks, gouges, and other imperfections. The CONTRACTOR shall obtain approval of rock prior to installation. The CONTRACTOR shall remove any rejected boulders from the Site.

PART 3 -- EXECUTION

- 3.1 GENERAL
 - A. **Weather Conditions:** Fertilizing, seeding, or mulching operations will not be permitted when wind velocities exceed 10 miles per hour or when the ground is frozen, unduly wet, or otherwise not in a tillable condition.
 - B. **Soil Preparation:** The ground to be seeded shall be graded to promote positive drainage and avoid standing water. It shall be loose and reasonably free of large rocks, roots, and other material which will interfere with the work.

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C. **Method of Application:** Fertilizer, seed, and mulch may be applied separately (Dry Method), or they may be mixed together with water and the homogeneous slurry applied by spraying (Hydraulic Method), except that all slopes steeper than 3 units horizontal (H) to 1 unit vertical (V) shall be stabilized by the Hydraulic Method.

3.2 DRY METHOD

- A. Fertilizer shall be evenly applied to the prepared ground at a rate of 20 pounds per 1,000 square feet. Fertilizing shall be completed prior to seeding. The fertilizer shall be spread uniformly. The fertilizer shall be raked in and thoroughly mixed with the soil to a depth of approximately 3 inches prior to the application of seed or mulch.
- B. Sow seed at the application rate of 4 pounds per 1,000 square feet. Equal quantities of seed shall be sown in two directions at right angles to each other to produce an even distribution of seed over the entire area. The seed shall be broadcast uniformly. After the seed has been distributed it shall be incorporated into the soil by raking or by other approved methods.
- C. Flat, seeded areas shall be evenly covered with a weed-free straw mulch at the rate of 90 pounds per 1,000 square feet. Areas with slopes steeper than 4 horizontal to 1 vertical shall be covered with the indicated erosion control matting.

3.3 HYDRAULIC METHOD

A. The hydraulic method consists of the uniform application by spraying of a homogeneous mixture of water, seed, fertilizer, and mulch. The slurry shall have the proper consistency to adhere to the earth slopes without lumping or running. Mixing time of materials shall not exceed 45 minutes from the time the seeds come into contact with the water in the mixer to the complete discharge of the slurry onto the slopes; otherwise the batch shall be recharged with seed. The mixture shall be applied using equipment containing a tank having a built-in, continuous agitation and recirculation system, and a discharge system which will allow application of the slurry to the slopes at a continuous and uniform rate. The application rates of the ingredients shall be the same as those specified for the Dry Method. The nozzle shall produce a spray that does not concentrate the slurry nor erode the soil.

3.4 BOULDERS

A. Boulders shall be placed at a distance of 4-ft apart in accordance with Contract Documents or as specified by the ENGINEER.

3.5 CLEANUP

- A. Upon completion of all seeding operations, the portion of the Site used for a work or storage area by the CONTRACTOR shall be cleaned of all debris, superfluous materials, equipment, and garbage.
- B. Walks and pavement shall be swept or washed clean upon completion of the WORK of this Section.

SECTION 02270 – SITE RESTORATION

3.6 MAINTENANCE OF LANDSCAPING PLANTING PRIOR TO ACCEPTANCE OF PROJECT

- A. **General:** The CONTRACTOR shall be responsible for protecting, watering, fertilizing, and maintaining seeded areas until final acceptance of the WORK.
- B. Upon completion of seeding, the entire planted area shall be soaked to saturation by a fine spray. The new planting shall be kept watered by the sprinkling system on the Site during dry weather or whenever necessary for proper establishment of the turf. Care shall be taken to avoid excessive washing or puddling on the surface and any such damage caused thereby shall be repaired by the CONTRACTOR.
- C. **Protection:** The CONTRACTOR shall provide adequate protection to all newly seeded areas including the installation of approved boulders to prevent trespassing and damage, as well as erosion control, until the end of the one-year correction period.
- D. The CONTRACTOR shall replace any materials or equipment it has damaged or which has been damaged by its employees or subcontractors.
- E. Partial utilization of the project shall not relieve the CONTRACTOR of any of the requirements of this Section
- F. Maintenance shall include, in addition to the foregoing, cleaning, edging, the repair of erosion, and other maintenance work. Sidewalks and other paved areas shall be kept clean while planting and maintenance are in progress.
- 3.7 MAINTENANCE PRIOR TO FINAL ACCEPTANCE
 - A. The CONTRACTOR shall maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include the filling, leveling, and repairing of any washed or eroded areas, as may be necessary and sufficient watering to maintain the plant materials in a healthy condition. OWNER'S REPRESENTATIVE may require replanting of any areas in which the establishment of the vegetative ground cover does not appear to be developing satisfactorily.

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Item #	Description	Estimated Quantity	Unit	Unit Price	Extended Price		
1	Mobilization	1	Lump Sum		\$		
1a	Site Security	15	Per day				
2	2 Removal and Disposal of Structures						
2a	Coal Tar Tank	1	Lump Sum		\$		
2b	Clay Tile Piping	20	Per Linear Foot		\$		
2c	Removal of Concrete Former Gasometer Foundation Ring	380	Per Linear Foot		\$		
3	Excavation and Disposal of Soil						
3a	Excavation of soil including sloping and benching as necessary	900	Per CY				
3b	Disposal of soil as non-hazardous	1300	Per Ton				
3с	Management of water on site including run- on control, dewatering in accordance with 02140, and disposal of water collected from dewatering, tank cleaning, and equipment decontamination.	3	Per Week				
4	Site Restoration						
4a	Placement of Backfill	900	In Place Cubic Yard		\$		
4b	Fence	1200	Per Square Yard		\$		
4c	Placement of Top Soil	200	In Place Cubic Yard		\$		
4d	Seeding including fertilizer, mulch, and maintenance	1200	Per Square Yard		\$		
4e	Placement of Boulders	1	Lump Sum		\$		
4f	Installation of Gravel Parking Lot	15	In Place Cubic Yard		\$		
5	Wells	1	Lump Sum		\$		
6	Close out & Project Demobilization	1	Lump Sum		\$		
	GRAND TOTAL \$						

BID SCHEDULE - NATIONAL GRID FT. EDWARD INTERIM REMEDIAL MEASURES

If the measured quantities for items paid under unit pricing vary by +/- 20% from the estimated quantities in the bid schedule, a new unit price will be negotiated.

LIST ATTACHMENTS TO BID FORM:

CONTACT INFORMATION:

BID AUTHORIZATION: