Site Investigation/Remedial Alternatives Report/Interim Remedial Measures Work Plan for Brownfield Cleanup Program

September 2006

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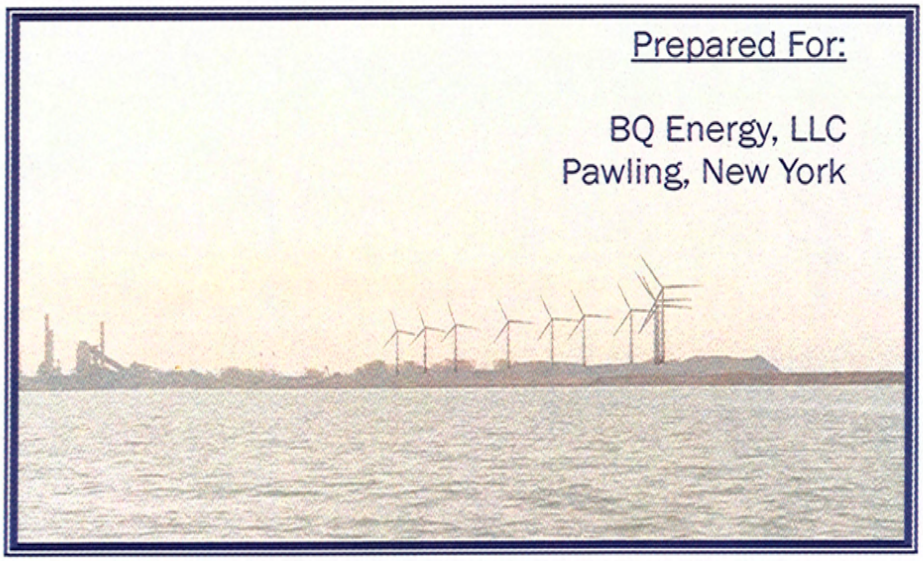

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SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT/IRM WORK PLAN

STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

September 2006 0083-003-100

Prepared for:

BQ Energy, LLC

SI/RAR/IRM WORK PLAN

STEELWINDS FACILITY
LACKAWANNA, NEW YORK

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STEEL WINDS FACILITY
SI/RAR/IRM WORK PLAN

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1.0 INTRODUCTION

1.1 Background

Tecumseh Redevelopment, Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast. Figure 2 provides an overview of the Tecumseh Property, including major leased or licensed parcels, and adjacent parcels owned by others.

The Tecumseh property is located on a portion of the site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in December 2004. USEPA and the New York State Department of Environmental Conservation (NYSDEC) are currently reviewing the RFI. Tecumseh is presently negotiating an Order on Consent with the NYSDEC to undertake corrective measures at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property.

Tecumseh has signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote and implement redevelopment of the former BSC Lackawanna property following cleanup. The conceptual Redevelopment Master Plan for the redevelopment of the entire 1,100-acre site has been prepared by Tecumseh as illustrated in Figure 3. Approximately 310-acres along the eastern boundary of the Tecumseh site are planned for phased redevelopment as a Business Park. Tecumseh has entered into a Brownfield Cleanup Agreement with the NYSDEC to investigate, remediate, and redevelop

the Phase I Business Park. Tecumseh has also submitted an application to the NYSDEC for the Phase II and III Business Parks to also participate in the Brownfield Cleanup Program. A determination of eligibility by NYSDEC is pending for those parcels.

A portion of the Redevelopment Master Plan incorporates a parcel designated for redevelopment with wind energy facilities, a golf course, and/or a passive recreational park. BQ Energy, LLC has entered into a long-term lease agreement with Tecumseh to construct and operate wind turbines and supporting power generation equipment and infrastructure on approximately 31-acres of the above-referenced parcel. The wind energy facilities and the associated property, hereafter referred to as the "Steel Winds Site," "subject properties," or the "Site," have been submitted to the NYSDEC for entrance into New York State's Brownfield Cleanup Program (BCP). The City of Lackawanna Planning Board, acting in its capacity as Lead Agency under SEQRA, issued a Negative Declaration to BQ Energy for the Steel Winds wind energy project on September 7, 2005.

As a condition of the BQ-Tecumseh lease agreement, BQ will be conducting an engineering feasibility study for development of a "clean" coal gasification and synthetic natural gas production facility on the former Coke Works portion of the Tecumseh site.

1.2 Purpose and Scope

This Site Investigation / Remedial Alternatives Report / Interim Remedial Measures (SI/RAR/IRM) Work Plan was prepared to accompany the Brownfield Cleanup Program (BCP) Application for the Steel Winds site. BQ Energy intends to investigate groundwater and remediate impacted slag/fill within the subject property and redevelop the property under the New York State Brownfield Cleanup Program (BCP). Accordingly, the SI/RAR/IRM Work Plan identifies the scope of planned site investigation and interim remedial measures and the means by which they will be completed, including sampling and reporting requirements, as well as identification and evaluation of remedial options for on-site groundwater and slag/fill on portions of the Site not subject to the IRM.

This Work Plan proposes the following activities to delineate on-site slag/fill and groundwater impacts at the Site:

- Analysis of representative surface and subsurface slag/fill sample(s) to establish concentrations of Constituents of Potential Concern (COPCs) within the slag/fill matrix (e.g., RCRA metals) outside the wind turbine footprints.

- Visual/olfactory/PID characterization of surface and subsurface slag/fill in the wind turbine locations and interconnecting conduit trenches.

- Collection and analysis of groundwater samples and groundwater potentiometric data from existing installed monitoring wells on the Site and water level data only from existing monitoring wells on the adjacent Tecumseh property.

The investigation will be geared toward collection of representative analytical data to characterize on-site source area slag/fill, slag/fill outside the wind turbine footprints but within Site boundaries, and groundwater quality. A detailed description of the scope of work follows. A summary of the slag/fill and groundwater data obtained during the SI and historical investigations on the Steel Winds Site will be presented in the SI/RAR report.

1.3 Project Organization and Responsibilities

BQ Energy, LLC has submitted the Steel Winds property for entrance into the BCP as a non-responsible party (volunteers) per ECL§27-1405. TurnKey Environmental Restoration, LLC, shall manage the brownfield cleanup on behalf of BQ Energy and Tecumseh Redevelopment. The NYSDEC Division of Environmental Remediation shall monitor the remedial actions to verify that the work is performed in accordance with the Brownfield Cleanup Agreement, the approved Site Investigation/Remedial Alternatives Report/IRM Work Plan, and NYSDEC DER-10 guidance.

2.0 ENVIRONMENTAL CONDITIONS

2.1 Site Description

The proposed Steel Winds Site is located on a portion of the former BSC Lackawanna Works (Tecumseh Redevelopment property) that was created from the historic disposal of slag fill along the Lake Erie shoreline. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as semi-volatile organic compounds (SVOCs). Adjacent to but not on the Steel Winds Site, several SWMUs (see Figure 2) were identified on the Tecumseh property and evaluated as part of RCRA Facility Assessment and RCRA Facility Investigation activities. These SWMUs include S-12 through S-18, S-23, S-28, and S-29.

2.2 Constituents of Potential Concern (COPCs)

Based on historical data review and Site use, the main COPCs on the Steel Winds site are semi-volatile organic compounds (SVOCs) (base-neutral fraction) and metals in surface and subsurface slag/fill. SVOCs may originate from several sources, including greases, lubricating and hydraulic oils, and fuels associated with the operation of former steel mills, as well as coal handling, coke manufacturing, and coal tar processing operations historically conducted on the Site. Metals are naturally occurring in the slag as a result of steel manufacturing. Volatile organic compounds (VOCs), specifically BTEX, from historic fuel use and coal tar processing may also be encountered.

In addition to these constituents, metals associated with steel manufacturing are also expected to be ubiquitous in surface and subsurface slag/fill at the Site. Table 1 presents a list of COPCs that may be encountered during site investigation and interim remediation activities. The list of COPCs may be modified based on full TCL/TAL analytical results obtained during the SI.

3.0 DATA OBJECTIVES

3.1 Acceptance or Performance Criteria

Acceptance or performance criteria specify the quality of data required to support decisions regarding remedial response activities. Acceptance or performance criteria are based on the data quality objectives. Specifically, the data quality and level of analytical documentation necessary for a given set of samples will vary depending on the intended use of the data.

As part of the SI process, site-specific remedial action objectives will be developed. Sampling data will be used to evaluate whether or not remedial alternatives can meet the objectives. The intended uses of these data dictate the data confidence levels. Two data confidence levels will be employed in the SI: screening level data and definitive level data. In general, screening level confidence will apply to field measurements, including photoionization detector (PID) measurements, groundwater elevation measurements, and field analyses (viz., pH, temperature, specific conductivity, and turbidity). Definitive level confidence will apply to samples for chemical analysis.

The applicability of these levels of data will be further specified in the Quality Assurance Project Plan (QAPP). Sampling and analytical acceptance and performance criteria such as precision, accuracy, representativeness, comparability, completeness, and sensitivity, will also be defined in the QAPP.

3.2 Collection of Defensible Data

The SI scope of work is focused on providing defensible data to identify areas of the Site requiring remediation, define chemical constituent migration pathways, qualitatively assess human health and ecological risks, and perform the remedial alternatives evaluation. The investigation will also include the collection and analysis of groundwater samples to support remedial action objectives. Definitive level data quality will be required for chemical analysis of groundwater samples.

Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the Field Sampling Plan (FSP) presented in the QAPP. USEPA and NYSDEC-approved sample collection and handling techniques will be used. Samples for chemical analysis will be analyzed, in accordance with USEPA SW-846

methodology to meet the definitive-level data requirements, by a New York State Department of Health Environmental Laboratory Accreditation Program (ELAP) CLP-certified laboratory. Analytical results will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP.

4.0 GROUNDWATER INVESTIGATION/ASSESSMENT

Based on previous investigations completed at the Site, groundwater modeling indicates that shallow groundwater flows west toward Lake Erie. Historical groundwater elevation measurements taken from monitoring wells on the Site indicate that the first water bearing zone (i.e., water table) ranges from 10 to as much as 50 feet below grade within the slag/fill unit. In order to supplement existing historic groundwater quality data, groundwater at the Site will be sampled in accordance with this section of the work plan. Existing Site monitoring wells will be incorporated into a comprehensive sampling plan that will provide sufficient information pertaining to groundwater quality at the Site. Existing monitoring well installation logs and well completion details are presented in Appendix A.

An evaluation of on-site groundwater quality data collected during the SI will be performed to determine if an increase in constituents of concern has occurred compared to upgradient off-site groundwater. If the groundwater evaluation determines that the Steel Winds Site is contributing adverse impacts to Site groundwater quality, potential remedial alternatives will be identified and evaluated in the RAR (see Section 6.0).

4.1 Well Development

Existing monitoring wells presented in Table 2 will be developed in accordance with NYSDEC and TurnKey protocols. Prior to development, the static water level and well depth will be measured. Development will be accomplished using a bottom-discharging bailer (either polyethylene or PVC) and submersible pump via purge and surge methodologies. Development will be recorded on field forms and considered completed when the pH, specific conductivity and temperature have stabilized; and when the turbidity is below 50 Nephelometric Turbidity Units (NTU), or has stabilized above 50 NTU and a minimum of 10 well volumes have been removed. Stability is defined as variation between measurements of 10 percent or less and no overall upward or downward trend in the measurements. Water removed during development will be discharged to the ground surface no closer than 50 feet in any radial direction from the monitoring well unless visual non-aqueous phase liquid (NAPL) is present, in which case the purged groundwater will be drummed for characterization and disposal.

Field personnel will perform visual NAPL surveillance during development of each well. All data collected during well development will be recorded on TurnKey's

Groundwater Well Development and Purge Logs. Well development procedures, including the field forms, and calibration and maintenance of field instruments used to measure stability parameters will be performed and/or completed in accordance with TurnKey's Field Operating Procedures.

4.2 Groundwater Elevation Measurements

The existing monitoring well network locations on the Site are shown on Figure 2. Site wells are situated in a line parallel to Lake Erie and likely will not provide sufficient data to draw potentiometric surfaces for the three hydrostratigraphic units screened. As such, in order to draw an isopotential map for each unit, several additional groundwater measurements will be required to supplement Site data. Additional data will be obtained from a minimum of ten existing monitoring wells located to the east of the Site.

During previous investigations, the locations and elevations of existing Site and off-site monitoring wells were surveyed against a fixed benchmark. Ground and top of riser elevations were referenced to existing site vertical datum to provide a reference point for groundwater elevation measurements of each well presented in Table 2 and are available for the additional wells. Approximately 72 hours or more following completion of Site well development activities, depth to groundwater will be measured in existing Site monitoring wells and the additional ten off-site monitoring wells from the top of each riser using an electric water level indicator to the nearest 0.01 feet. Depth to water measurements will be used to calculate the groundwater elevations for each location. Groundwater elevations will be used to prepare an isopotential map of the Site.

4.3 Groundwater Sample Collection and Analysis

Prior to sampling the monitoring wells, static water levels will be measured and recorded. Following water level measurement, TurnKey personnel will purge and sample each monitoring well in accordance with low-flow/minimal drawdown purge and sample collection procedures (see Table 2). Prior to sample collection, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min). Field measurements for pH, specific conductance, temperature, turbidity, and water level as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity and

temperature stabilize and when turbidity measurements fall below 50 NTU, or become stable above 50 NTU. Stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed for the TCL/TAL parameters presented in Table 3. In the event that low-flow purging and sampling techniques cannot be accomplished, standard purging and sampling techniques will be implemented via a dedicated polyethylene disposable bailer.

Groundwater samples collected for volatile organic compound (VOC) analysis will not be sampled directly through the peristaltic pump due to potential degassing (i.e., loss of VOCs) of the groundwater sample. Instead, upon collection of VOC samples, the pump will be turned off and the pressure on the flexible walled tubing within the pump head will be maintained in order to prevent water within the tubing from escaping. The tubing will be removed from the well and coiled as to prevent any contact with the ground surface. Upon removal of the tubing and prior to re-activating the pump, the pump flow direction will be reversed. Upon pump re-activation, the pumping rate will be slowly increased; positively displacing groundwater within the tubing allowing it to flow, without disturbance and degassing, into the appropriate VOC sample jars.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, Eh, and water level as well as visual and olfactory field observations will be recorded. All collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to an analytical laboratory for analysis as indicated in Table 1.

4.4 Field Specific Quality Assurance/Quality Control (QA/QC)

In addition to the groundwater samples described above, site-specific field quality assurance/quality control (QA/QC) samples will be collected and analyzed to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates, and blind duplicates. Trip blanks will accompany the aqueous VOC samples only. Dedicated sampling equipment will be used to minimize field decontamination time and avoid the need for equipment blanks. QA/QC

field sampling requirements are summarized in the QAPP. A brief summary of each is presented below:

- **Trip Blanks** – A sufficient number of trip blanks for VOC analysis will be prepared by the laboratory and delivered to the sampling team prior to a sampling event. One sealed blank will be carried into the field per day along with the sample containers for each day that water matrix volatile organic samples are collected. Trip blanks will be transported and handled in the same manner as the actual samples. The results of the trip blank analysis will be reviewed to evaluate if the potential for sample contamination during transportation and handling exists. The trip blanks will be analyzed for "full list" VOCs (TCL plus STARS List) by USEPA Method 8260B.

- **Blind Duplicate** – One blind duplicate will be collected and analyzed per 20 samples collected for the parameters presented in Table 3 per matrix (i.e., groundwater, slag/fill, etc.). The location of the sample collection point will not be disclosed to the analytical laboratory, therefore the field sample containers will be returned to the laboratory identified only as the "blind duplicate." The well or sample location will be recorded in the Project Field Book and on the respective Water Sample Collection Log and the results will be compared to review analytical precision.

- **Matrix Spike/Matrix Spike Duplicate (MS/MSD)** – A sufficient volume of sample will be collected at one sampling location per sampling event for MS/MSD analysis for the parameters presented in Table 3 per matrix (i.e., groundwater, slag/fill, etc.). The laboratory will report the results of the MS/MSD analysis, which will be reviewed for sampling and analysis precision and accuracy.

Laboratory and field QC data will be evaluated by a third-party data validation expert. A Data Usability Summary Report (DUSR) will be prepared following the evaluation, with qualifiers added to the data as appropriate. The laboratory will report data with an equivalent "Category B" deliverables package to facilitate DUSR preparation.

4.5 Decontamination & Investigation-Derived Waste (IDW)

Every attempt will be made to use dedicated sampling equipment, however if non-dedicated equipment is required, the equipment will be decontaminated, at a minimum, with a non-phosphate detergent (i.e., Alconox®) and potable water mixture, rinsed with distilled

water, and air-dried before each use in accordance with TurnKey's field operating procedures (see the QAPP presented under separate cover). All decontaminated sampling equipment will be kept in a clean environment prior to sample collection.

Investigative-Derived Waste (IDW), if generated during this investigation, such as decontamination rinse water, well development and purge water will be placed in sealed NYSDOT-approved 55-gallon drums and labeled with an alphanumeric identifier for characterization and disposal. Liquid IDW (e.g., decontamination rinse water) may be processed through the on-site treatment system at the Benzol Plant ICM upon approval from NYSDEC. Discarded personal protective equipment (PPE) (i.e., latex gloves, Tyvek, paper towels, etc.) and disposable sampling equipment (i.e., stainless steel spoons) will be placed in sealed plastic garbage bags and disposed of as municipal solid waste. TurnKey field personnel will coordinate the on-site handling and temporary storage of IDW, including transportation and off-site disposal.

4.6 Documentation

All investigation field activities will be documented in the Project Field Book. This logbook will provide a record of activities conducted at the Site. All entries will be signed and dated at the end of each day of fieldwork by the Field Team Leader. The field logbook will include, at a minimum, the following: date and time of all entries, names of all personnel on site, weather conditions (temperature, precipitation, etc.), location of activity, and description of activity. Sampling activities will be logged and photographed as necessary to document the activities at the Site. TurnKey personnel will complete the following standard field forms:

- Chain of Custody Form
- Daily Drilling Report, (as necessary)
- Drilling Safety Checklist, (as necessary)
- Equipment Calibration Log
- Field Activity Daily Log (FADLs)
- Field Borehole/Geoprobe/Monitoring Well Installation Log, (as necessary)
- Groundwater Well Development Log

- Groundwater Well Inspection Form
- Groundwater Purge & Sample Collection Log – Low Flow
- Investigative-Derived Waste Container Log
- Photographic Log
- Real-Time Air Monitoring Log
- Sample Summary Collection Logs (groundwater and slag/fill)
- Tailgate Safety Meeting Form
- Underground/Overhead Utility Checklist for Sampling
- Variance Log (as necessary)
- Water Level Monitoring Record
- Well Completion Detail: Stick-up (Monitoring Well/Piezometer)
- Well Completion Detail: Stick-up (Temporary Well)

Examples of the field forms are provided in the QAPP under separate cover.

5.0 SLAG/FILL ASSESSMENT

Based on previous investigations completed at the Site, it is anticipated that predominantly slag/fill will be encountered during excavation of the wind turbine footprints and their interconnecting conduit trenches as shown on Figure 2. Each wind turbine foundation will require an excavation that is approximately 76 feet in diameter extending to approximately 6 feet below grade. An additional 3 to 4 feet below the initial excavation will be compacted using a dynamic compaction technique. Since these excavations are similar to test pit operations, the slag/fill assessment approach described below uses the large foundation excavations as the investigation test pits. As such, the slag fill assessment is proposed to be performed during foundation and trench excavations required to construct the turbines.

5.1 Scope of Assessment

BQ Energy intends to investigate and remediate fill contamination, if any, within the subject property and redevelop the property under the New York State Brownfield Cleanup Program (BCP). The NYSDEC has requested an investigation of the fill on the Site, including sampling and analytical testing of the fill materials present. The fill on the Site contains highly variable and sometimes elevated concentrations of metals, and potentially semi-volatile organic compounds (SVOCs). Based on studies performed in the past, a significant portion of the fill is steel-making slag, of which the boring information and analytical data is included in the RFI. Pertinent slag/fill characterization data from the RFI will be compiled and summarized in the SI/RAR report. Visual assessment and field screening of slag/fill will be performed during foundation and trench excavation as part of the investigation. Although analytical data of the slag/fill already exists, additional samples will be collected to provide a more comprehensive characterization as described in Section 5.3.

5.2 Assessment Methodology

During wind turbine foundation and trench construction, slag/fill excavation will occur at each of the eight footprints. The proposed foundation footprints are approximately 76 feet in diameter and approximately 6 feet deep (i.e., investigation zones) are shown on Figure 2. TurnKey Environmental Restoration, LLC or a New York State Licensed

Professional Engineer with experience in environmental site investigations and the New York State Brownfield Cleanup Program (BCP) will inspect excavation of each investigation zone to determine the presence or absence of impacted fill materials.

The excavated slag/fill will be monitored for staining or discoloration, and will be field screened for the presence of VOCs with a photoionization detector (PID) fitted with a 10.7 eV lamp. If fill is encountered that is visibly stained, discolored relative to other fill, or produces elevated PID readings (i.e., sustained readings of 5 ppm above background or greater), it will be characterized and handled as described in Section 7.0.

5.3 Slag/Fill Characterization

To assess the potential need for imported/suitable cover material outside the wind turbine footprints and provide additional subsurface data, supplemental surface and subsurface slag/fill samples will be collected from the 0- to 3-inch and 3-inch to 4-foot intervals, respectively, from areas of the Site not previously sampled. One surface sample per acre (approximately 29 samples total) will be collected. Five subsurface composite samples, consisting of four grab samples each, will also be collected. The composite subsurface samples will be evenly spaced across the Site unless specific locations designated by the Department are requested during the sampling event. The samples will be analyzed for full TCL/TAL analysis as shown on Table 3. In addition, five synthetic precipitation leaching procedure (SPLP) will be performed on the composite subsurface samples. Slag/fill samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to an analytical laboratory for analysis. Table 3 and Section 5.4 describe the required QA/QC samples that will be used for this sampling.

5.4 Field Specific Quality Assurance/Quality Control (QA/QC)

In addition to the slag/fill samples described above, site-specific field quality assurance/quality control (QA/QC) samples will be collected and analyzed to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates, and blind duplicates. Trip blanks will accompany the VOC samples only. Dedicated sampling equipment will be used to minimize field decontamination time and avoid the need for equipment blanks. QA/QC field

sampling requirements are summarized in the QAPP. A brief summary of each is presented below:

- **Trip Blanks** - A sufficient number of trip blanks for volatile organic compound analysis will be prepared by the laboratory and delivered to the sampling team prior to a sampling event. One sealed blank will be carried into the field per day along with the sample containers for each day that water matrix volatile organic samples are collected. Trip blanks will be transported and handled in the same manner as the actual samples. The results of the trip blank analysis will be reviewed to evaluate if the potential for sample contamination during transportation and handling exists. The trip blanks will be analyzed for "full list" VOCs (TCL plus STARS List) by USEPA Method 8260B.

- **Blind Duplicate** - One blind duplicate will be collected and analyzed per 20 samples collected for the parameters presented in Table 3 per matrix (i.e., groundwater, slag/fill, etc.). The location of the sample collection point will not be disclosed to the analytical laboratory, therefore the field sample containers will be returned to the laboratory identified only as the "blind duplicate". The well or sample location will be recorded in the Project Field Book and on the respective Water Sample Collection Log and the results will be compared to review analytical precision.

- **Matrix Spike/Matrix Spike Duplicate (MS/MSD)** – A sufficient volume of sample will be collected at one sampling location per sampling event for MS/MSD analysis for the parameters presented in Table 3 per matrix (i.e., groundwater, slag/fill, etc.). The laboratory will report the results of the MS/MSD analysis, which will be reviewed for sampling and analysis precision and accuracy.

The laboratory will be required to furnish an equivalent ASP Category B deliverables package to facilitate data evaluation and preparation of a DUSR by a third-party validation expert. Accordingly, the samples will be analyzed by an NYSDOH ELAP-approved laboratory certified to perform CLP work.

5.5 Decontamination & Investigation-Derived Waste (IDW)

Every attempt will be made to use dedicated sampling equipment, however if non-dedicated equipment is required, the equipment will be decontaminated, at a minimum, with a non-phosphate detergent (i.e., Alconox®) and potable water mixture, rinsed with distilled

water, and air-dried before each use in accordance with TurnKey's field operating procedures (see the QAPP presented under separate cover). All decontaminated sampling equipment will be kept in a clean environment prior to sample collection. Heavy equipment, such as an excavator and drilling tools, will be decontaminated via high-pressure steam cleaning on a temporary decontamination pad between grab sample locations and composite groups (i.e., test pits, borings, etc.), as necessary.

Investigative-Derived Waste (IDW), if generated during this investigation, such as decontamination rinse water will be placed in sealed NYSDOT-approved 55-gallon drums and labeled with an alphanumeric identifier for characterization and disposal. Liquid IDW (e.g., decontamination rinse water) may be processed through the on-site treatment system at the Benzol Plant ICM upon approval from NYSDEC. Discarded personal protective equipment (PPE) will be disposed of and handled as discussed in Section 4.5.

5.6 Backfilling

Subgrade material used to backfill excavations or to increase site grades or elevations in all areas of the Steel Winds site shall meet the following criteria:

- Excavated on-site slag/fill that does not exhibit evidence of staining, discoloration, or elevated PID readings will not require testing or special handling.

- Off-site soil/fill material will be documented as having originated from locations having no evidence of disposal or releases of hazardous, toxic, or radioactive substances, or petroleum products. The soil/fill material must be tested to meet the TAGM criteria as specified in Table 1 of the Soil/Fill Management Plan attached as Appendix D. Borrow source sampling requirements are outlined in the QAPP.

- No off-site materials meeting the definition of a solid waste as defined in 6NYCRR, Part 360-1.2(a) shall be used as backfill.

All backfill material will be compacted in accordance with specifications provided by BQ Energy's geotechnical and structural engineering consultants.

5.7 Groundwater and Surface Water Management

Groundwater elevation measurements recorded during the RFI indicate that groundwater is present in the vicinity of the Steel Winds site at depths of approximately 18-38 feet below ground surface. Excavation for wind turbine towers and infrastructure is not planned for depths greater than approximately 10 feet below grade. Accordingly, groundwater management is not anticipated to be necessary as part of the construction effort.

Perched water and surface water run-in to excavations during the remediation and redevelopment periods will be observed for presence of sheen or floating layers. If no sheen or non-aqueous liquids are present, the waters will be discharged to ground surface a suitable distance from the excavation. Surface discharge of waters will be controlled to prevent overland flow to Lake Erie or Smokes Creek. If sheen or other layers are present, the waters will be treated on-site prior to discharge to ground surface. Specifically, water designated for treatment will be stored/settled in a portable tank and pumped through bag filter units (fitted with oil absorbing bags, if required), followed by treatment using granular activated carbon (GAC). Following completion of excavation work, settled solids remaining in the tank and spent filter bags will be containerized for off-site disposal. Spent GAC will be characterized and regenerated off-site, or disposed at a permitted TSDF in accordance with applicable federal and state regulations. The tank will be decontaminated via pressure washing.

5.8 Documentation

All investigation field activities will be documented in the Project Field Book. This logbook will provide a record of activities conducted at the Site. All entries will be signed and dated at the end of each day of fieldwork by the Field Team Leader. The field logbook will include, at a minimum, the following: date and time of all entries, names of all personnel on site, weather conditions (temperature, precipitation, etc.), location of activity, and description of activity. All test pits will be logged and photographed to indicate the stratigraphic profile of each hole. TurnKey personnel will complete the following standard field forms:

- Chain of Custody Form

- Daily Drilling Report
- Drilling Safety Checklist
- Equipment Calibration Log
- Field Activity Daily Log (FADLs)
- Investigative-Derived Waste Container Log
- Photographic Log
- Real-Time Air Monitoring Log
- Sample Summary Collection Logs (groundwater and slag/fill)
- Tailgate Safety Meeting Form
- Test Pit Excavation Log
- Underground/Overhead Utility Checklist for Sampling
- Variance Log (as necessary)

Examples of the field forms are provided in the QAPP under separate cover.

6.0 REMEDIAL ALTERNATIVES REPORT

The SI/RAR Report will include a remedial alternatives evaluation for on-site groundwater and slag/fill on portions of the Site if determined, based on the Site Investigation and reasonably anticipated future Site use, to exhibit elevated concentrations of constituents of concern. The remedial alternatives report (RAR) will follow details outline in the NYSDEC's "Draft" DER-10 guidance. Proposed site-specific action levels (SSALs) for the property will also be presented.

Based on the remedial action objectives (RAOs) and cleanup goals established for the Site, volumes and areas of media potentially requiring remediation will be calculated. General Response Actions will then be delineated to address each of the Site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR 375-1.10:

- Protection of Human Health and the Environment
- Compliance with Standards, Criteria, & Guidance (SCGs)
- Short-term Effectiveness & Impacts
- Long-term Effectiveness & Permanence
- Reduction of Toxicity, Mobility, or Volume
- Implementability
- Cost

In addition, the criteria of Community Acceptance will be considered based on public comments on the SI/RAR Report and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate preparation of a Proposed Remedial Action Plan (PRAP).

7.0 INTERIM REMEDIAL MEASURES

7.1 Excavation and Disposal

Excavation of impacted fill will continue horizontally until visually impacted materials are removed to the satisfaction of TurnKey and the NYSDEC representative, but will not extend beyond the Site boundaries. Excavations will extend to a maximum depth of 10 feet below grade to account for sidewall stability concerns. Documentation samples will be collected as described in Section 7.2 below and results will be compared to slag/fill sample results. Borings were recently completed to depths of 60 feet below ground surface (fbgs) at the eight wind tower locations by SJB Services, Inc. for BQ Energy to collect geotechnical data. Based on the PID and visual field observations, the slag beneath the Site was not impacted. The boring logs are included in Appendix A of the SI/RAR/IRM Work Plan. If slag/fill exhibits visual impacts or elevated PID readings at a depth of 5 feet, a boring will be performed, prior to completion of dynamic compaction procedures, and split spoon samples collected to characterize that material.

Visually impacted fill, olfactory evidence of petroleum contamination or fill exhibiting elevated PID readings (i.e. >5 ppm) encountered during excavation of the investigation zones will be hauled directly to Zone 2 Slag Fill Area of the Tecumseh property (See Figure 2) and placed on and covered with polyethylene sheeting. The stockpiled material will be managed to prevent infiltration of precipitation and wind erosion.

The stockpiled impacted material placed in Zone 2 will be characterized per the requirements of a permitted disposal facility and an appropriate disposal plan will be developed. Stockpiled impacted material will not remain on the Zone 2 Site for more than 90 days.

7.2 Documentation Sampling

Documentation sampling will be performed on the sidewalls and bottom of the excavation after lateral excavation limits have been achieved and visibly impacted fill has been removed. In general, one sidewall sample will be collected on each of the four sides of the excavation and one on the bottom of the excavation. The samples will be collected by retrieving a discrete sample from across the excavation face. The backhoe bucket will be used to assist in sample collection and avoid the need for confined space entry. For

excavations having lengths greater than 100 feet, an additional discrete sample will be collected for each additional 100 feet of excavation length. Documentation samples will be analyzed for the parameters listed in Table 3 in accordance with NYSDEC SW-846 Methodology. QA/QC samples will be handled in accordance with Section 5.4.

8.0 HEALTH AND SAFETY AND COMMUNITY AIR MONITORING

8.1 Site-Specific HASP

A Site-Specific Health and Safety Plan (HASP) will be prepared and enforced by the contractor in accordance with the requirements of 29 CFR 1910.120. The HASP will cover all on-site remediation activities. TurnKey's HASP is provided for informational purposes in Appendix B. The contractor will be required to develop a HASP as or more stringent than TurnKey's HASP.

8.2 Community Air Monitoring

Real-time community air monitoring will be performed during cleanup and development activities at the Site. A Community Air Monitoring Plan (CAMP) is included with TurnKey's HASP. Although the nearest residential receptor is greater than 1 mile downwind of the property, particulate and VOC monitoring will be performed at upwind and downward locations during all intrusive activities (e.g., subgrade excavation, grading, and slag/fill handling) in accordance with the CAMP. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (NYSDOH) and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDOH's Generic Community Air Monitoring Plan (dated June 20, 2000) and NYSDEC Technical Assistance and Guidance Memorandum (TAGM) 4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

8.2.1 Dust Controls

Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed slag/fill to the extent practicable during construction and redevelopment. Dust suppression techniques will be initiated if the downwind PM-10 particulate level is 100 $\mu g/m^3$ above background (upwind perimeter). Techniques to be used may include one or more of the following:

- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Hauling materials in properly tarped containers or vehicles.

- Restricting vehicle speeds on-site.
- Covering excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum.

9.0 IRM CLOSEOUT REPORT

An IRM Closeout Report will be prepared and submitted to the NYSDEC after the Steel Winds site is remediated/redeveloped. The report will be stamped by a NYS licensed Professional Engineer and will be submitted within 90 days of completion of the remediation. A hard copy of the final and approved report will be submitted to the NYSDEC as well as an electronic version in PDF searchable format. At a minimum, the report will include:

- A Site or area planimetric map showing the parcel(s) remediated and residual contamination, if any.
- A survey showing: the lateral limits of excavation, the grade before excavation, the grade when excavation is complete, and grade following backfill where slag/fill is excavated. The survey will be accurate to within 0.1 feet on a grid spacing no greater than 25 feet by 25 feet.
- Tabular summaries of unit quantities including, at a minimum: volume of slag/fill excavated; disposition of excavated slag/fill and collected ground/surface water; volume/type/source of backfill; volume of ground/surface water pumped and treated.
- Tabular comparison of documentation and other sample analytical results to pertinent acceptance criteria.
- Copies of daily inspection reports and a photographic log of remedial activities.
- Analytical data.
- Text describing the excavation activities performed; a description of any deviations from the Work Plan and associated corrective measures taken; and other pertinent information necessary to document that the site activities were carried out in accordance with this Work Plan.
- A certification by a licensed NYS Professional Engineer that all work was performed in accordance with the BCA and the approved BCP RI/RAR/IRM Work Plan.

- A Site Management Plan (SMP) that includes an evaluation and description of institutional controls/engineering controls; identification of the ability to control the property, implement remedies and ability to file necessary environmental easements. The SMP will also include an Operation, Maintenance, and Monitoring (OM&M) manual and Soil/Fill Management Plan.

10.0 CITIZEN PARTICIPATION PLAN

In accordance with NYSDEC's Brownfield Cleanup Program guidance, a Citizen Participation Plan is required for the Steel Winds remedial activities. A Citizen Participation Plan is included as Appendix C of this Work Plan.

11.0 PROJECT SCHEDULE AND SEQUENCE OF THE WORK

The remedial design and remedial actions detailed in this Work Plan shall be completed within approximately 6 months of the execution of the Brownfield Cleanup Agreement. Figure 4 presents an overall project schedule for the performance of remedial construction and redevelopment activities.

12.0 REFERENCES

1. URS Consultants, Inc., *RCRA Facility Investigation (RFI) Report for the Former Bethlehem Steel Corporation Facility, Lackawanna, New York, Parts I through VII*, prepared for Bethlehem Steel Corporation, October 2004.

TABLES

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 1

CONSTITUENTS OF PRIMARY CONCERN (COPCs)

SI/RAR/IRM Work Plan
BQ Energy, LLC - Steel Winds Site
Lackawanna, New York

COMPOUND	CAS #
Volatile Organic Compounds	
(ASP Method OLM04.3)	
Benzene	*71-43-2*
Ethylbenzene	*100-41-4*
Toluene	*108-88-3*
m-Xylene	*95-47-6*
o-Xylene	*106-42-3*
p-Xylene	*108-38-3*
TCL Semi-Volatile Organic Compounds	
(ASP Method OLM04.3)	
Acenaphthene	*83-32-9*
Acenaphthylene	*208-96-8*
Anthracene	*120-12-7*
Benzo(a)anthracene	*56-55-3*
Benzo(b)fluoranthene	*205-99-2*
Benzo(k)fluoranthene	*207-08-9*
Benzo(g,h,i)perylene	*191-24-2*
Benzo(a)pyrene	*50-32-8*
Benzyl alcohol	*100-51-6*
Bis(2-chloroethoxy) methane	*111-91-1*
Bis(2-chloroethyl) ether	*111-44-4*
2,2'-Oxybis (1-Chloropropane)	*108-60-1*
Bis(2-ethylhexyl) phthalate	*117-81-7*
4-Bromophenyl phenyl ether	*101-55-3*
Butyl benzyl phthalate	*85-68-7*
4-Chloroaniline	*106-47-8*
2-Chloronaphthalene	*91-58-7*
4-Chlorophenyl phenyl ether	*7005-72-3*
Chrysene	*218-01-9*
Dibenzo(a,h)anthracene	*53-70-3*
Dibenzofuran	*132-64-9*
Di-n-butyl phthalate	*84-74-2*
1,2-Dichlorobenzene	*95-50-1*
1,3-Dichlrobenzene	*541-73-1*
1,4-Dichlrobenzene	*106-46-7*
3,3'-Dichlorobenzidine	*91-94-1*
Diethyl phthalate	*84-66-2*
Dimethyl phthalate	*131-11-3*
2,4-Dinitrotoluene	*121-14-2*
2,6-Dinitrotoluene	*606-20-2*
Di-n-octyl phthalate	*117-84-0*
Fluoranthene	*206-44-0*
Fluorene	*86-73-7*
Hexachlorobenzene	*118-74-1*
Hexachlorobutadiene	*87-68-3*
Hexachlorocyclopentadiene	*77-47-4*
Hexachloroethane	*67-72-1*
Indeno(1,2,3-cd)pyrene	*193-39-5*

COMPOUND	CAS #
TCL Semi-Volatile Organic Compounds (cont'd)	
(ASP Method OLM04.3)	
Isophorone	*78-59-1*
2-Methylnaphthalene	*91-57-6*
Naphthalene	*91-20-3*
2-Nitroaniline	*88-74-4*
3-Nitroaniline	*99-09-2*
4-Nitroaniline	*100-01-6*
Nitrobenzene	*95-95-3*
N-Nitrosodiphenylamine	*86-30-6*
N-Nitroso-Di-n-propylamine	*621-64-7*
Phenanthrene	*85-01-8*
Pyrene	*129-00-0*
1,2,4-Trichlorobenzene	*120-82-1*
Total Metals	
(ASP Method ILM05.2)	
Arsenic	*7440-38-2*
Cadmium	*7440-43-9*
Chromium	*7440-47-3*
Lead	*7439-92-1*
Mercury	*7439-97-6*

Note
Analytical procedures used in accordance with NYSDEC ASP-2000 protocol

TABLE 2

SUMMARY OF MONITORING WELL CONSTRUCTION DETAILS

SI/RAR/IRM Work Plan
Steel Winds Facility
Lackawanna, New York

Well I.D.	Ground Elevation (fmsl)	TOR Elevation (fmsl)	Stick-up (feet)	Construction Date	Total Depth		Screened Interval (fbTOR)	Screen Length (feet)	Riser/Screen Diameter (in.)	Riser/Screen Material	Screen Slot Size (in.)	Stratigraphic Unit Monitored (per Final RFI)	Sampling Method
					fbgs	fbTOR							
MWN-01	582.99	585.14	2.15	08/30/90	17.0	19.15	9.15 - 19.15	10.0	4.0	PVC / SS	0.010	fill	low-flow - peristaltic pump
MWN-01B	583.79	587.03	3.24	11/02/92	29.0	32.24	22.24 - 32.24	10.0	2.0	PVC,SS / SS	0.010	sand, fill	low-flow - peristaltic pump
MWN-02	598.89	601.01	2.12	09/10/90	31.5	33.62	23.62 - 33.62	10.0	4.0	PVC / SS	0.010	fill	low-flow - peristaltic pump
MWN-02B	599.00	601.28	2.28	11/02/92	54.0	56.28	46.28 - 56.28	10.0	2.0	PVC,SS / SS	0.010	sand	low-flow - submersible pump
MWN-02D	600.61	602.95	2.34	08/04/95	77.0	79.34	74.34 - 79.34	5.0	2.0	PVC,SS / SS	0.020	bedrock	low-flow - submersible pump
MWN-03	609.79	611.96	2.17	09/06/90	47.0	49.17	39.17 - 49.17	10.0	4.0	PVC / SS	0.010	fill	low-flow - submersible pump
MWN-03B	609.57	612.29	2.72	11/05/92	88.0	90.72	60.72 - 70.72	10.0	2.0	PVC,SS / SS	0.010	sand, clay, peat	low-flow - submersible pump
MWN-03D	610.75	613.51	2.76	07/29/94	118.5	121.26	111.26 - 121.26	10.0	2.0	PVC,SS / SS	0.020	bedrock	low-flow - submersible pump
MWN-04	621.02	623.45	2.43	09/12/90	56.1	58.53	48.53 - 58.53	10.0	4.0	PVC / SS	0.010	fill	low-flow - submersible pump
MWN-05A	620.22	622.84	2.62	01/02/91	55.5	58.12	48.12 - 58.12	10.0	4.0	PVC / SS	0.010	fill	low-flow - submersible pump
MWN-05B	617.85	620.54	2.69	11/03/92	74.0	76.69	66.69 - 76.69	10.0	2.0	PVC,SS / SS	0.010	sand	low-flow - submersible pump
MWN-05D	615.03	618.42	3.39	08/18/95	102.0	105.39	100.39 - 105.39	5.0	2.0	PVC,SS / SS	0.020	bedrock	low-flow - submersible pump

Notes:
1. " fmsl " = feet above mean sea level.
2. " fbgs " = feet below ground surface
3. " fbTOR " = feet below Top of Riser
4. " per Final RFI " = as published in the Final RCRA Facility Investigation Report, prepared by URS Corporation, October 2004.

TABLE 3

ANALYTICAL PROGRAM QUALITY ASSURANCE/ QUALITY CONTROL SUMMARY

SI/RAR/IRM Work Plan
Steel Winds Facility
Lackawanna, New York

Matrix	Parameter [1]	No. Samples	Estimated Number of QC Samples				
			Trip Blank [2]	MS [3]	MSD [3]	Equipment Blank [4]	Blind Duplicate [3]
Slag/Fill - Surface (Outside Wind Turbine Footprint)	TCL SVOCs [9]	29	NA	2	2		2
	TAL Metals + CN [10]	29	NA	2	2		2
Slag/Fill - Subsurface (Outside Wind Turbine Footprint)	TCL VOCs + STARS [8]	5	NA	1	1		1
	TCL SVOCs [9]	5	NA	1	1		1
	TAL Metals + CN [10]	5	NA	1	1		1
	SPLP[11]	5	NA	1	1		1
Slag/Fill (Documentation Sampling)	STARS VOCs [5]	TBD	NA	TBD	TBD		TBD
	SVOCs (BN only) [6]	TBD	NA	TBD	TBD		TBD
	Metals [7]	TBD	NA	TBD	TBD		TBD
Groundwater	TCL VOCs + STARS [5,8]	12	1	1	1		1
	TCL SVOCs [6,9]	12	NA	1	1		1
	TAL Metals + CN [7,10]	12	NA	1	1		1

Notes:

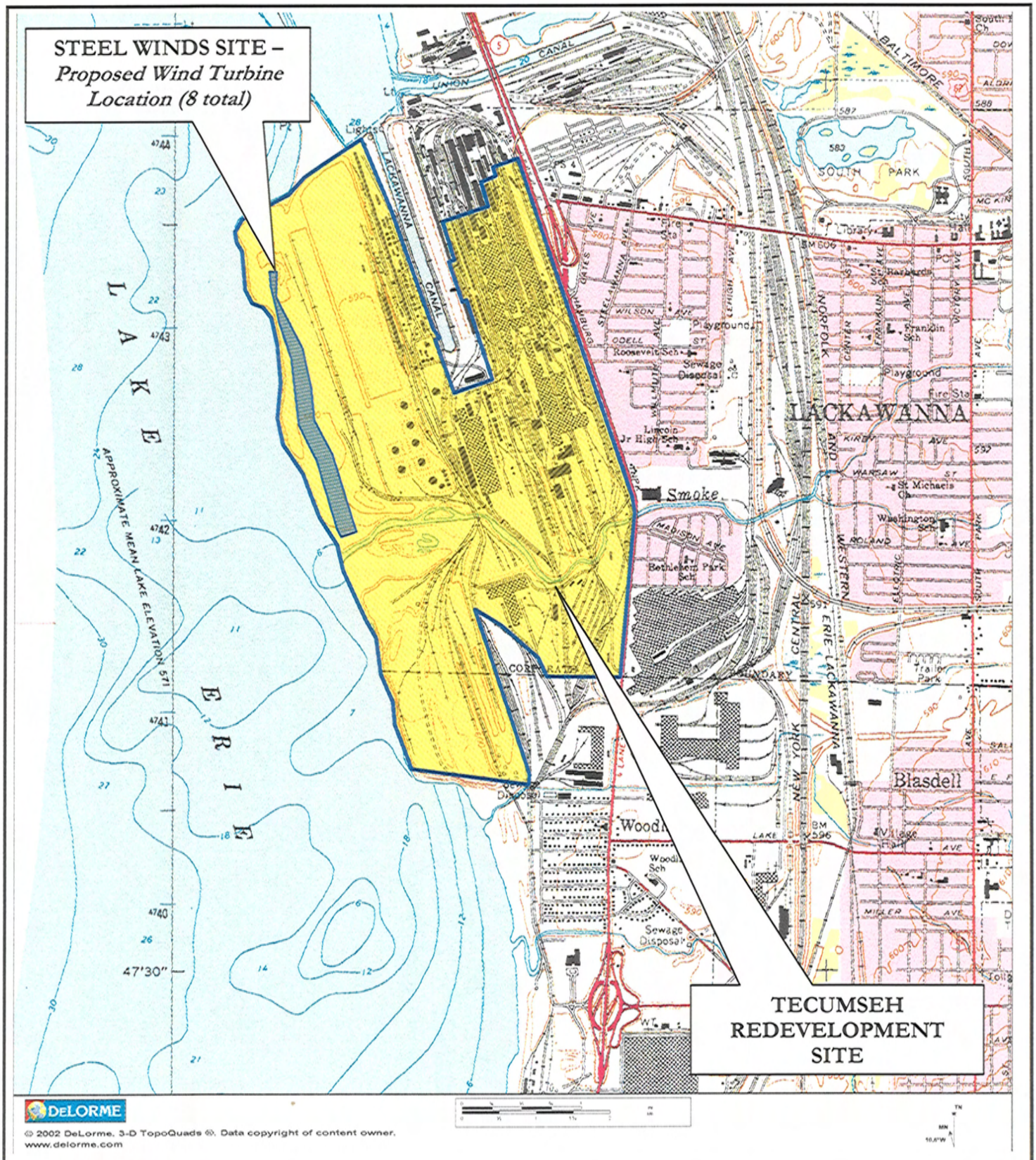
1. All analyses will be performed via SW-846 methodologies with Category B equivalent deliverables package.
2. Trip blanks will be submitted to the laboratory each day groundwater volatile organic samples are collected.
3. Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples collected.
4. Equipment blanks will be collected each day non-dedicated equipment is used; dedicated sampling equipment will be used for slag/fill and groundwater sample collection.
5. VOCs include: STARS List VOCs via Method 8021.
6. SVOCs include: TCL SVOCs via Method 8270C, base-neutrals (BN) only.
7. Metals include: arsenic (6010B), cadmium (6010B), chromium (6010B), cyanide (9010B), lead (6010B), mercury (7470A for water; 7471A for soil). Analytical methods shown parenthetically.
8. Full TCL list of VOCs via Method 8260B, plus the STARS List VOCs via Method 8021.
9. Full TCL list of SVOCs via Method 8270C, including base-neutrals and acid extractables.
10. TAL Metals plus cyanide.
11. Synthetic Precipitation Leaching Procedure (SPLP) to be performed on the five composite subsurface slag/fill samples.

Acronyms:

BN = base neutral SVOC compounds
MS = matrix spike
MSD = matrix spike duplicate
NA = Not Applicable
STARS = Spill Technology And Remediation Series; NYSDEC

FIGURES

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0083-003-100

DATE: MAY 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

SI/RAR/IRM WORK PLAN

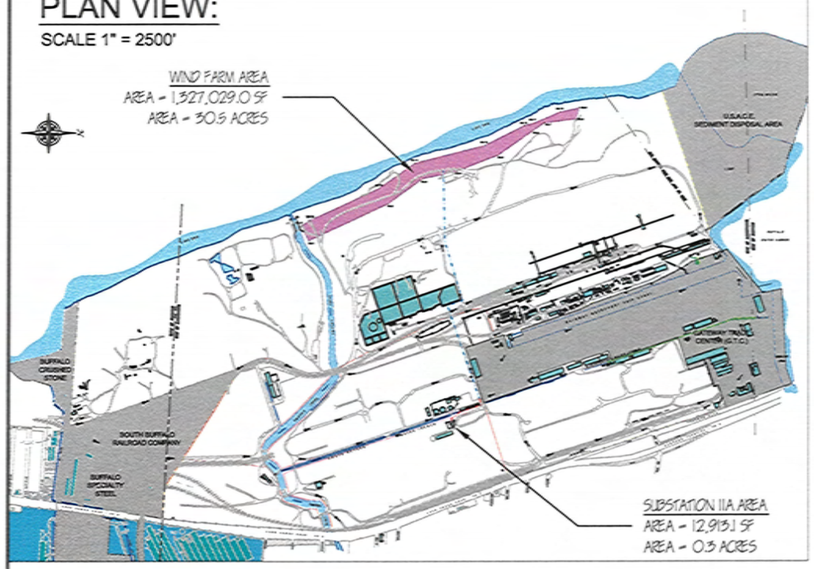
STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

REVISED 8/31/06

PLAN VIEW:

SCALE 1" = 2500'



LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK
- BELOW GROUND UTILITY CORRIDOR (10' EASEMENT)
- WT#1 — PROPOSED LOCATION OF WIND TURBINE (WT)
- PROPOSED LOCATION OF ANEMOMETER
- MWN-03B — WIND FARM MONITORING WELL LOCATION
- MWN-15A — EXISTING MONITORING WELL LOCATION
- SWMU P-07 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU)
- APPROXIMATE BOUNDARY OF SWMU

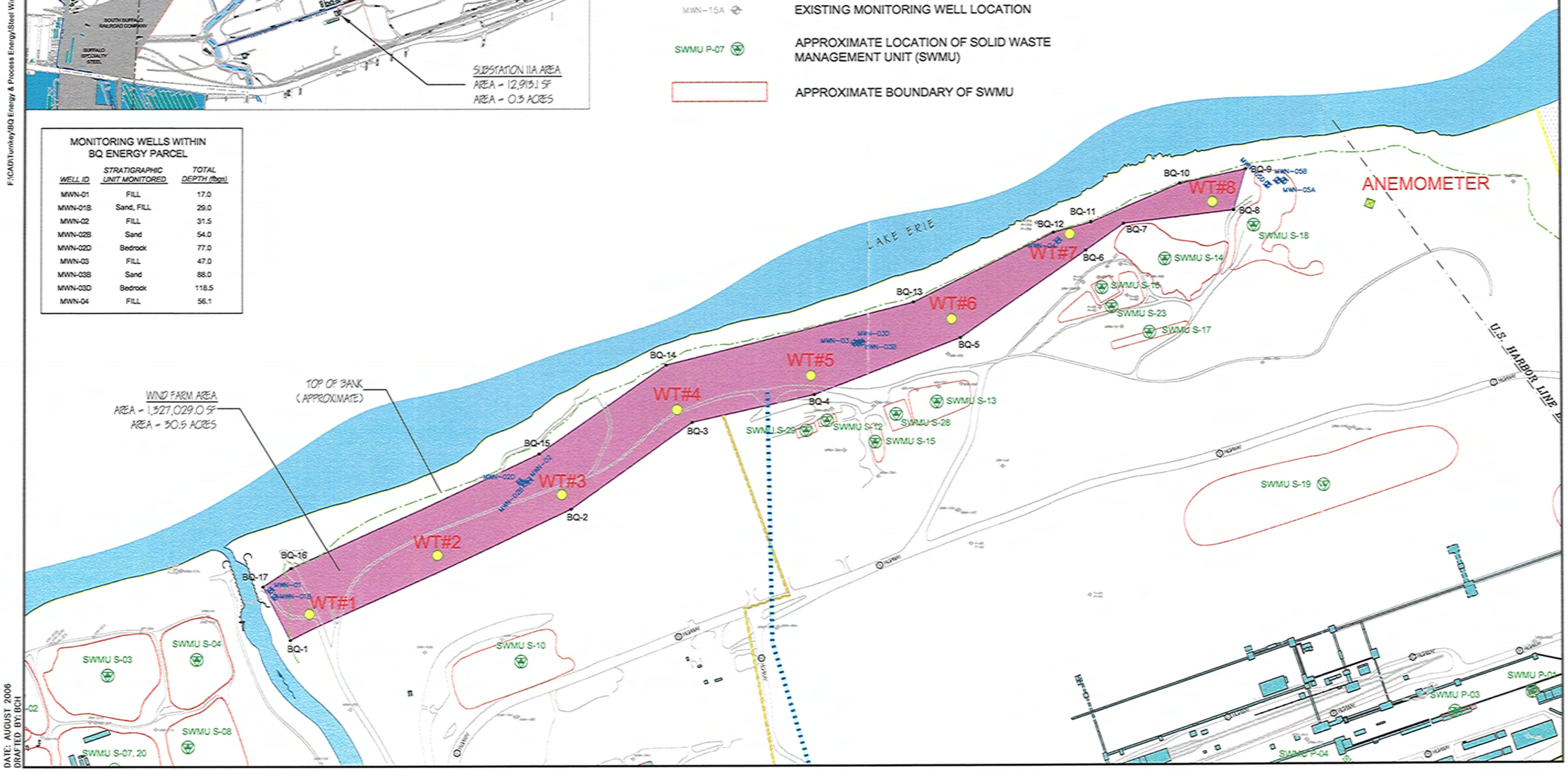
N

500' 0' 500' 1000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

MONITORING WELLS WITHIN BQ ENERGY PARCEL

WELL ID	STRATIGRAPHIC UNIT MONITORED	TOTAL DEPTH (fbgs)
MWN-01	FILL	17.0
MWN-01B	Sand, FILL	29.0
MWN-02	FILL	31.5
MWN-02B	Sand	54.0
MWN-02D	Bedrock	77.0
MWN-03	FILL	47.0
MWN-03B	Sand	88.0
MWN-03D	Bedrock	118.5
MWN-04	FILL	56.1



728 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

TURNKEY ENVIRONMENTAL RESTORATION, LLC

JOB NO.: 0083-003-100

REVISED 8-28-06

SITE PLAN

SI/RAR/IRM WORK PLAN
STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

FIGURE 2

DATE: AUGUST 2006
DRAFTED BY: BCH

F:\CAD\Turnkey\BQ Energy & Process Energy\Steel Winds\BCP Application\SI RAR (RM Work Plan\Figure 2, Site Plan (REV 8-28-06).dwg

G:\CAD\Turnkey\BQ Energy & Process Energy\Steel Winds\BCP Application\SI-RAR-IRM Work Plan\Figure 3, Redevelopment Master Plan.dwg

N

LAKE FRONT ACCESS & GREENWAY

PASSIVE RECREATION (CAMUs)

WIND ENERGY, GOLF COURSE AND/OR PASSIVE RECREATION

INTERMODAL AND/OR GREEN ENERGY DEVELOPMENT

WATER AMENITY & RECREATION

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

OPEN WATER

LAND

BUFFALO OUTER HARBOR

GATEWAY METROPORT SHIP CANAL

GATEWAY TRADE CENTER (G.T.C.)

PHASE III - BUSINESS PARK

PHASE II - BUSINESS PARK

PHASE I - BUSINESS PARK

BUFFALO CRUSHED STONE

SOUTH BUFFALO RAILROAD COMPANY

BUFFALO SPECIALTY STEEL

MITTAL STEEL GALVANIZING MILL

REPUBLIC ENGINEERED PRODUCTS, INC.

SOUTH BUFFALO

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK
- SMOKES CREEK RELOCATION OPTION #1
- SMOKES CREEK RELOCATION OPTION #2
- LAKE FRONT ACCESS & GREENWAY

NOTES:

1. Building locations are based on historical surveys and maps, all locations should be considered approximate.
2. All buildings known to exist on site since 1944 are shown, some buildings were expanded or demolished following 1944, maximum building extents are shown.

1000' 0' 1000' 2000'

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

DATE: AUGUST 2006
DRAFTED BY: BCH

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

TURNKEY ENVIRONMENTAL RESTORATION, LLC

JOB NO.: 0083-003-100

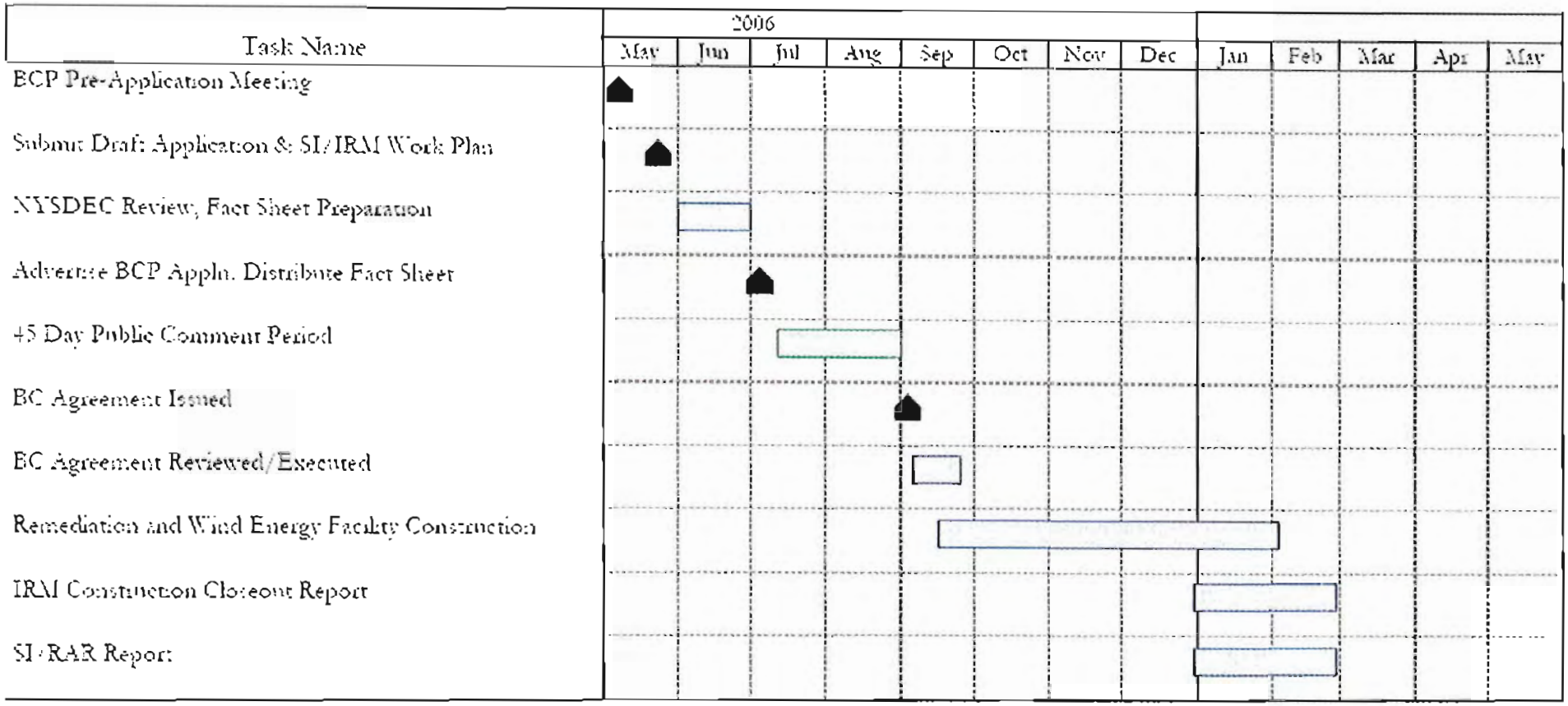
REDEVELOPMENT MASTER PLAN

SI/RAR/IRM WORK PLAN

STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

FIGURE 3



TURNKEY ENVIRONMENTAL RESTORATION LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0083-003-100

DATE: AUGUST 2006

DRAFTED BY: BCH

PROJECT SCHEDULE

SI/RAR/IRM WORK PLAN

LACKAWANNA, NEW YORK
STEEL WINDS FACILITY

PREPARED FOR
BQ ENERGY, LLC

FIGURE 4

APPENDIX A

MONITORING WELL INSTALLATION LOGS/WELL COMPLETION DETAILS/TURBINE LOCATION GEOTECHNICAL BORING LOGS

MWN-01

DATE
STARTED 8/29/90
FINISHED 8/30/90
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

(BTA-90-133)

HOLE NO. MWN-1
SURF. ELEV. 584.4
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								Brown-gray f.c gravel (slag) and f.c sand, little tr. silt (moist, fill)	
5								Becomes wet	
10									
		1	11	39		118	BG	Black f.c Sand (cinders & coke) and some f.c Gravel (silt), little tr. silt (wet, Fill)	
			79	49					
15									
20									
25								Black cinders (coke) and sand	PID= Organic vapor measurements taken with a photoionization detector (PID). Measurements recorded in parts per million (ppm)
30								Gray-brown sandy silt	BG = Background PID Measurements= 0.0 - 0.2 ppm
35									Note: Very slight sheen on return water from black cinders.
40								Gray-brown Silty Clay	

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 using 6-¼" Hollow Stem Augers

DATE
STARTED 8/28/90
FINISHED 8/30/90
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-1
SURF. ELEV. 584.4
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40									
45									
50									
55								Refusal with Hollow Stem Augers Top of Rock Boring complete at 55' approx.	Free Standing Water measured at 10.9' at boring completion

Refer to Monitoring Well Completion Reports For Well Installation Details.

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

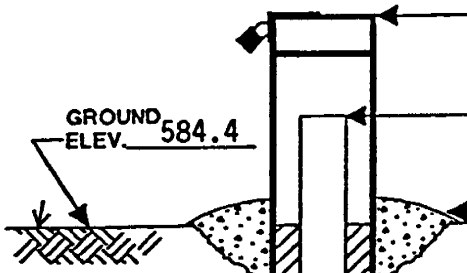
METHOD OF INVESTIGATION ASTM D-1586 using 6-¼" Hollow Stem Augers

EMPIRE
SOILS INVESTIGATIONS INC.

MONITORING WELL COMPLETION RECORD

PROJECT : Bethlehem Steel WELL No. MWN-1
PROJECT No. : BTA-90-133 LOCATION : Lackawanna, N.Y.
INSTALLATION DATE(S) : 8/30/90 to 8/31/90
FIELD GEOLOGIST : L.A. Zimmerman

DRILLER : J. Lamm
DRILLING METHOD : ASTM-D-1586
DEVELOPMENT METHOD Bailer/Handpump



ELEVATION / TOP OF SURFACE CASING : 587.16
STICK-UP / TOP OF SURFACE CASING : 2.76'
ELEVATION / TOP OF RISER PIPE : 586.43
STICK-UP / TOP OF RISER PIPE : 2.03'
TYPE OF SURFACE SEAL : Sakrete
I.D. OF SURFACE CASING : 8-Inch Square
TYPE OF SURFACE CASING : Corrosion-resistant steel
TYPE OF BACKFILL : Cement/Bentonite grout
BOREHOLE DIAMETER : Nominal 12-1/4-inches
I.D. OF RISER PIPE : 4.0-inches
TYPE OF RISER PIPE : Polyvinyl Chloride (PVC), Schedule 40, threaded
DEPTH OF SEAL : 2.0'
TYPE OF SEAL : Bentonite Pellets
Bentonite Slurry
DEPTH OF SAND PACK : 4.5'
DEPTH TOP OF SCREEN : 7.0'
TYPE OF SCREEN : Type 316-Stainless Steel
SLOT SIZE x LENGTH : 0.010" slot x 10'
I.D. OF SCREEN : 4.0-inches
TYPE OF SAND PACK: #2-ORok Sand
DEPTH BOTTOM OF SCREEN : 17.0'
DEPTH BOTTOM OF SAND PACK : 19.0'
* TYPE OF BACKFILL BELOW OBSERVATION WELL : #2 ORok Sand & Cement/Bentonite Grout
ELEVATION / DEPTH OF HOLE : 529.4 / 55.0'

*Test Boring Tremie Grouted from 55.0-ft to 19.0-ft.

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WELL DEVELOPMENT RECORD

WELL No. MW-N1

PROJECT : BSC - Phase 1 Investigation PROJECT No. : BTA-90-133 SITE LOCATION : Lackawanna, New York

CONTRATOR : Empire Soils Investigations METHOD(S) OF DEVELOPMENT : Purged with BK Pump

FIELD INSPECTOR(S) : Sharon McLellan, Robert Rae

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
11/27/90	Sunny, 50°-60°F, moderate winds	10:15-	Initial : 12.35						Initial water level prior to development
				12.1	14.2	1.45	76	Black, turbid, slight organic odor	20 gallons removed
				12.2	14.2	1.67	72		35 gallons removed
				12.1	14.4	1.37	72		45 gallons removed
				12.1	14.3	1.38	68		50 gallons removed
				12.2	14.4	1.38	66		55 gallons removed
		11:20	Final = 12.45						Final water level After development

Note: 4 2" = one. inch volume.

LOG OF BORING

PROJECT: Bethlehem Steel Corp., RFI	PROJECT NUMBER: 00120-158-152	SHEET NO.: 1 of 1	HOLE NUMBER: MWN-1B
SITE: Lackawanna, NY	COORDINATES: S50+37.08 / W34+50.66	LOGGED BY: K. Ignaszak	CHECKED BY: KDI 3/11/93
BEGUN: 11/2/92	COMPLETED: 11/2/92	DRILLER: Empire Soils/D. Beltz	DRILLING EQUIPMENT: Falling F-10, 4-1/4" HS Augers
BORING DIA.: 8"	TOTAL DEPTH: 29.5	CORE RECOVERY (FT./%): /	CORE BOXES:
SAMPLES: 3	CASING STICKUP: 3.70	GROUND ELEV.: 584.8 Plant	DEPTH/*ELEV.* GROUND WATER: ▽ 9.76 / *575.0*, ▼ 9.76 / *575.0*
DEPTH/*ELEV.* TOP OF ROCK: 55.0 / *529.8*	SAMPLE TYPE: Split Spoon	CASING DIA/LENGTH: 6"SQ/4	NOTES: Units =Feet HNu bkg=0.3ppm

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
					BROWN AND GRAY FINE TO MEDIUM GRAVEL AND COARSE SILTY SAND with trace of roots and organic material (moist) (loose)[SLAG FILL]	
					GRAY TO DARK GRAY COARSE SILTY SAND AND FINE DARK GRAY GRAVEL with trace of silt (moist) (loose)[SLAG FILL]	Augering very easy.
						Augering slightly more difficult.
						Augering very difficult at 17'.
1	3/1	100/3"	BKG		DARK GRAY TO DARK BROWN COARSE SILTY SAND AND FINE DARK GRAY GRAVEL (moist) (dense)[SLAG FILL]	
2	24/20	44	BKG	*558.8* 26.0	DARK GRAY TO BLACK MEDIUM GRAINED SILTY SAND (moist) (medium dense) [SAND]	
3	24/24	14	BKG		DARK BROWN SANDY SILT with trace of silty clay (moist) (medium stiff to stiff)[SAND]	
				555.3 29.5	Boring completed at 29.5 ft. on 11/2/92 at 2:00pm.	

Dames & Moore

WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	MWN-1B

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S50+37.08 / W34+50.66	584.8 Plant ☒Surveyed ☐Estimated	3.70

Soil Boring Cross-Reference *MWN-1B*
Town and City *Lackawanna*
County and State *Erie, NY*

Installation Date (s) *11/2/92*

Drilling Method *Failing F-10, 4-1/4" HS Augers*
Drilling Contractor *Empire Soils/D. Beitz*
Drilling Fluid *None*

Development Technique (s) / Dates
Bailer 12/4/93

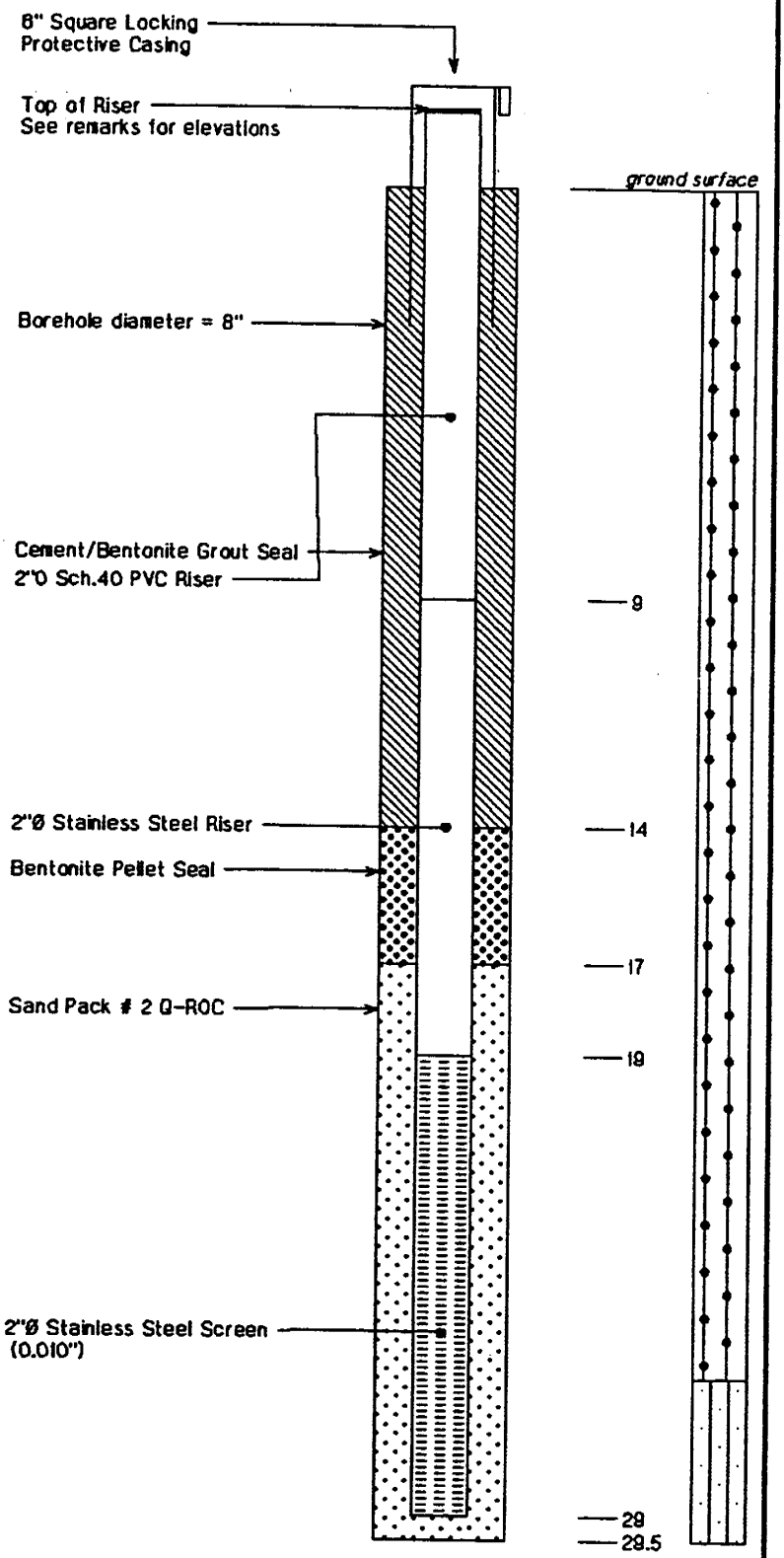
Fluid Loss During Drilling (gals) _____
Water Removed During Development (gals)
21.4 - 12/4/92

Static Depth to Water Date *12/4/92*
Static Depth to Water (feet) *13.22 (Top of riser)*

Well Purpose *Groundwater monitoring*

Remarks ***Not to Scale***
Top of riser elevation: 588.26
Top of protective casing elevation: 588.50

Prepared By *J. Paul*
Date Prepared *11/6/92*



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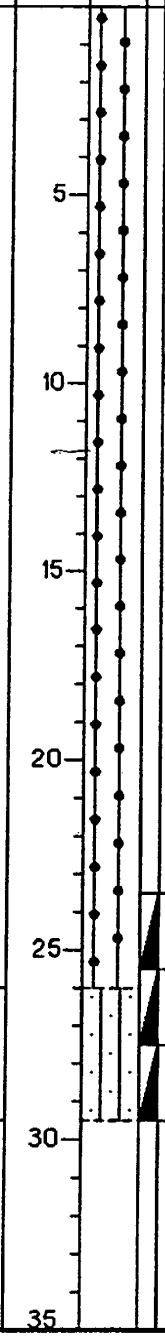
MWN-01B

LOG OF BORING

PROJECT: Bethlehem Steel Corp., RFI	PROJECT NUMBER: 00120-158-152	SHEET NO.: 1 of 1	HOLE NUMBER: MWN-1B		
SITE: Lackawanna, NY	COORDINATES: S50+37.08 / W34+50.66	LOGGED BY: K. Ignaszak	CHECKED BY: KDI 3/11/93		
BEGUN: 11/2/92	COMPLETED: 11/2/92	DRILLER: Empire Soils/D. Beltz	DRILLING EQUIPMENT: Falling F-10, 4-1/4" HS Augers	BORING DIA.: 8"	TOTAL DEPTH: 29.5
CORE RECOVERY (FT./%): /	CORE BOXES:	SAMPLES: 3	CASING STICKUP: 3.70	GROUND ELEV.: 584.8 Plant	DEPTH/*ELEV.* GROUND WATER: ▽ 9.78 / *575.0* ▼ 9.78 / *575.0*
SAMPLE TYPE: Split Spoon	CASING DIA/LENGTH: 6"SG/4	NOTES: Units =Feet HNu bkg=0.3ppm			DEPTH/*ELEV.* TOP OF ROCK: 55.0 / *529.8*

SAMPLE NUMBER	LENGTH/RECOV. (Inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
					BROWN AND GRAY FINE TO MEDIUM GRAVEL AND COARSE SILTY SAND with trace of roots and organic material (moist) (loose)[SLAG FILL]	
						Augering very easy.
					GRAY TO DARK GRAY COARSE SILTY SAND AND FINE DARK GRAY GRAVEL with trace of silt (moist) (loose)[SLAG FILL]	
						Augering slightly more difficult.
						Augering very difficult at 17'.
1	3/1	100/3"	BKG		DARK GRAY TO DARK BROWN COARSE SILTY SAND AND FINE DARK GRAY GRAVEL (moist) (dense)[SLAG FILL]	
2	24/20	44	BKG	*558.8* 26.0	DARK GRAY TO BLACK MEDIUM GRAINED SILTY SAND (moist) (medium dense) [SAND]	
3	24/24	14	BKG		DARK BROWN SANDY SILT with trace of silty clay (moist) (medium stiff to stiff)[SAND]	
				555.3 29.5	Boring completed at 29.5 ft. on 11/2/92 at 2:00pm.	



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WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	MWN-1B

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S50+37.08 / W34+50.66	584.8 Plant ☒Surveyed ☐Estimated	3.70

Soil Boring Cross-Reference *MWN-1B*
Town and City *Lackawanna*
County and State *Erie, NY*

Installation Date (s) *11/2/92*

Drilling Method *Failing F-10, 4-1/4" HS Augers*
Drilling Contractor *Empire Soils/D. Beitz*
Drilling Fluid *None*

Development Technique (s) / Dates
Bailer 12/4/93

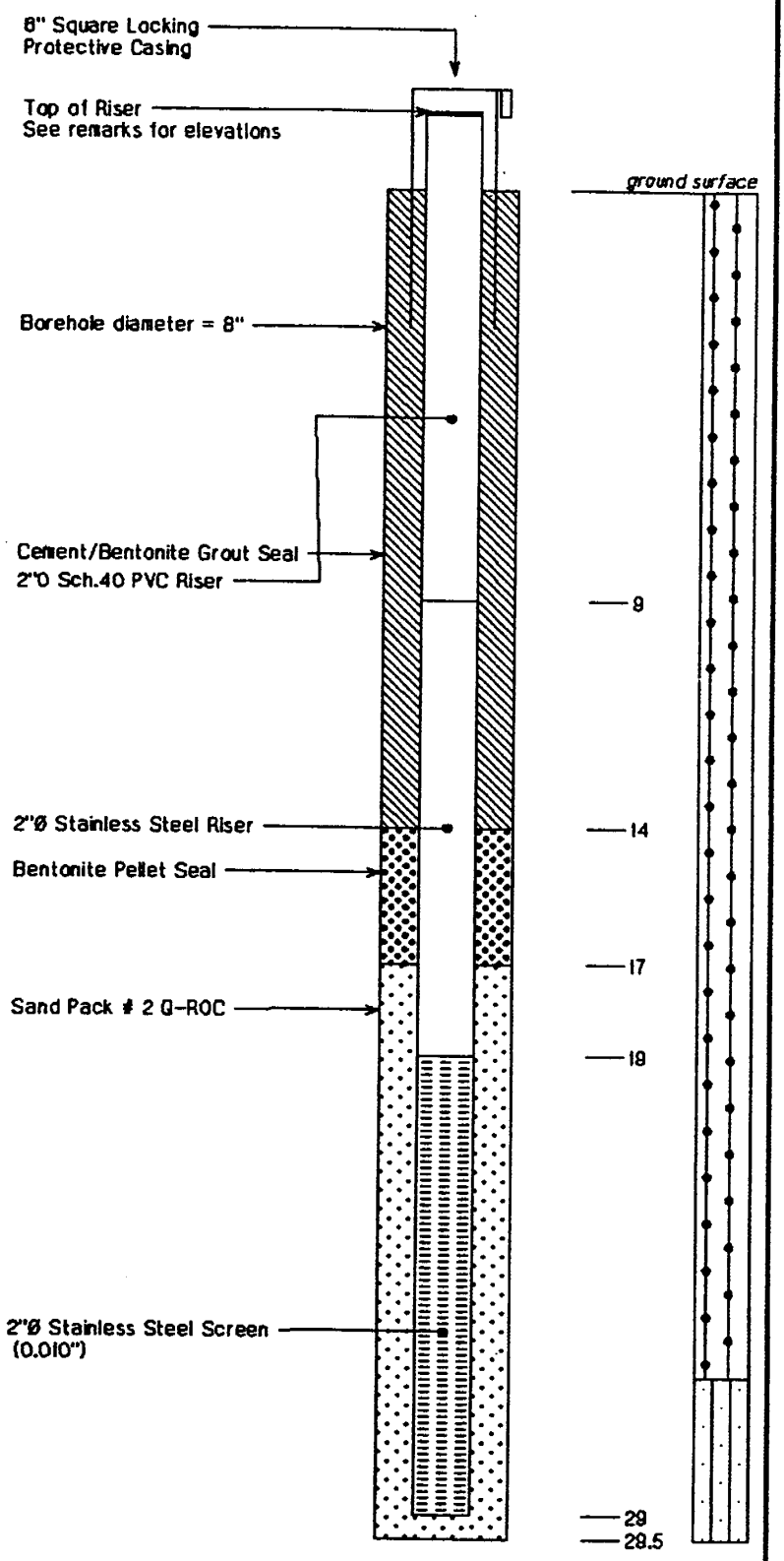
Fluid Loss During Drilling (gals) _____
Water Removed During Development (gals)
21.4 - 12/4/92

Static Depth to Water Date *12/4/92*
Static Depth to Water (feet) *13.22 (Top of riser)*

Well Purpose *Groundwater monitoring*

Remarks *Not to Scale*
Top of riser elevation: 588.28
Top of protective casing elevation: 588.50

Prepared By *J. Paul*
Date Prepared *11/6/92*



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BETHLEHEM STEEL CORPORATION PHASE IIA INVESTIGATION
GROUND WATER SAMPLING RECORD - PROJECT NO BD-92-093

Well # N-01B

WELL VOLUME CALCULATIONS:

Constants for ($V = r^2h \times 7.48$ gal/ft) 2" Well = 0.1632 gal/linear foot

Well Diameter (in): 2" 1 Well Vol = [18.76 ft] x [0.1632 gal/linearar ft] = 3.06 gal.

Well Depth *(ft): 31.98

Water Level *(ft): 13.22

Height of Water Column(ft): 18.76

(*Reference Point-Top of Well Riser Pipe)

WELL DEVELOPMENT

Date: 12/4/92 Time Start: 1146

Evacuation Method: PVC Bailer/Polyethyline Rope

GAL.EVAC./ WELL VOL.	pH (SU)	TEMP (°C)	SPECIFIC CONDUC. (~~MHO/CM~~) µS/cm	TURBID (NTU)	PURGE WATER CHARATERISTICS
Initial	11.44	12.9	950	-	Ext. Turbd, minor sheen Black In Color, Coke odor
9.2 (3wv)	11.51	12.9	990	-	Same
12.3 (4wv)	11.59	12.8	900	-	Same
15.3 (5wv)	11.63	12.8	960	-	Same
18.4 (6wv)	11.62	12.6	950	-	Same
19.9 (6.5wv)	11.62	12.8	1050	-	Same
21.4 (7wv)	11.62	12.7	1000	-	Same

Comments: (Time Complete 1228) Removed an extra well volume to ensure pH trend was broken

Signature: Debbie J Bachorik

MWN-02

DATE
STARTED 9-4-90
FINISHED 9-10-90
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-2
SURF. ELEV. 599.8
G. W. DEPTH See Note

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6 6/12 12/18 N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
0					Dark brown f-c SAND, some Silt, tr. gravel, tr. slag, tr. organics, tr. cinders (moist, FILL)	Augered from 0.0- to 38.0' with 6-1/4" Hollow Stem Augers.
5					Becomes black f-c SAND-sized cinders, some f-c Gravel, little Silt, tr. slag (moist, FILL)	
10						Drillers note the presence of slag fill at 14.0'. Very difficult drilling from 14.0' to 15.0'.
15					Black f-c SAND-sized CINDERS, some f-c Gravel, little Silt, tr. slag, (moist, FILL)	
20						
25						Free Standing Water measured at approx. 31.0' during drilling on 9-4-90.
30						
35		S-1	100/.2	BG	Auger Refusal	
40					Obstruction at 38.0'	

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

DATE
STARTED 10-15-90
FINISHED 10-16-90
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-2
SURF. ELEV. 599.8
G. W. DEPTH See Notes

PROJECT Bethelehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTHFT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
40						
45						10-15-90 Air Rotary from 0' to 37'.
		2	15 | 93 | 100/3" | REF	BG	Brown m-c SAND, some f-m Gravel, tr. silt, tr. slag, tr. cinders (wet, FILL)	REF=Split Spoon Refusal Slag/Steel button encountered at approx. 41.0' to 45.0'
50						Note: 3.0' of running sands in augers at 48.0'.
55						
		3	3 | 5 | 5 | 6 | 10	BG	Gray SILTY CLAY, little f-m Sand, tr. gravel, occasional silt laminations (moist, medium)	
60		ST-1				WOH=Weight of hammer.
		4	WOH | 2 | 4 | 5 | 6	BG		
65						Shelby Tube pushed from 62'-64' REC=100%
70					Auger Refusal at 73.0'	
					Boring Complete at 73.0'.	Drillers note glacial till at about 68.0'.
75					Refer to Monitoring Well Completion Reports for Well Installation Details.	PID=Organic vapor measurements taken with a photoionization detector (PID). Measurements recorded in parts per million (ppm).
80						

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

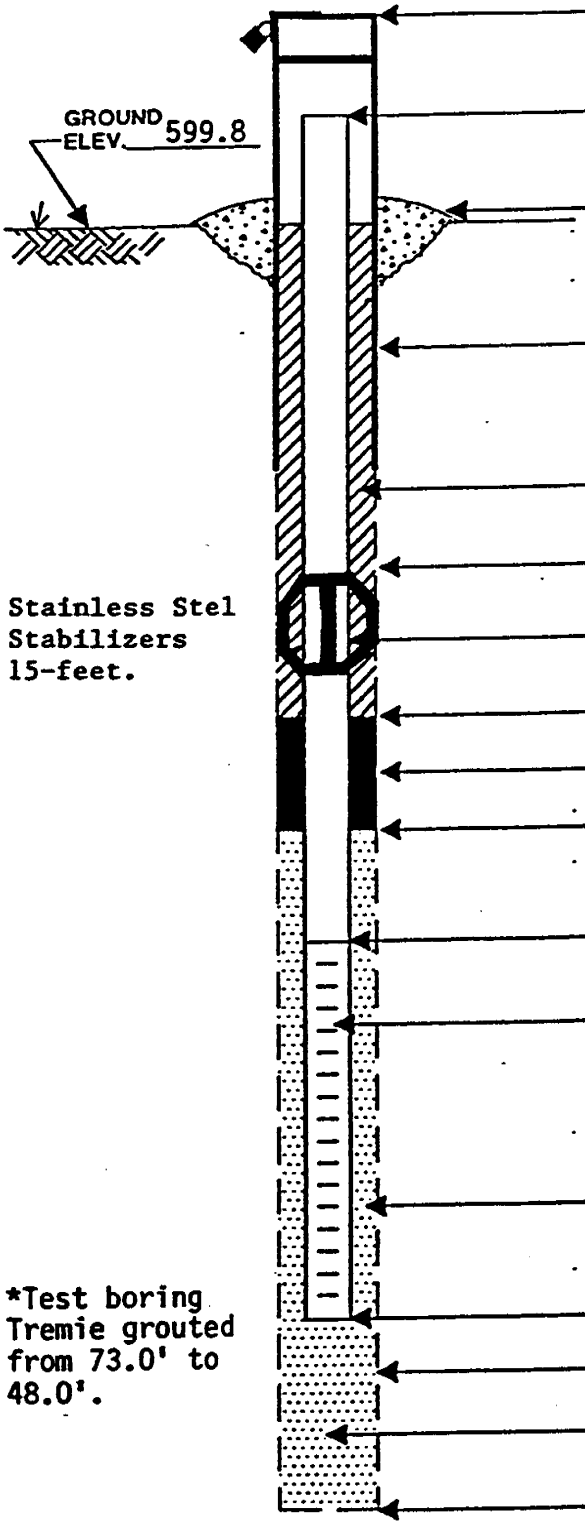
METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

EMPIRE
SOILS INVESTIGATIONS INC.

MONITORING WELL COMPLETION RECORD

PROJECT : Bethlehem Steel WELL No. MWN-2
PROJECT No. : BTA-90-133 LOCATION : Lackawanna, N.Y.
INSTALLATION DATE(S) : 9/10/90
FIELD GEOLOGIST : D.R. Steiner

DRILLER : J. Lamm
DRILLING METHOD : ASTM-D-1586
DEVELOPMENT METHOD : Bailer/Handpump



ELEVATION / TOP OF SURFACE CASING : 603.00
STICK-UP / TOP OF SURFACE CASING : 3.2'
ELEVATION / TOP OF RISER PIPE : 602.21
STICK-UP / TOP OF RISER PIPE : 2.41'
TYPE OF SURFACE SEAL : Sakrete
LD. OF SURFACE CASING : 8-Inch Square
TYPE OF SURFACE CASING : Corrosion-resistant steel
TYPE OF BACKFILL : Cement/Bentonite grout
BOREHOLE DIAMETER : Nominal 12-1/4-inches
LD. OF RISER PIPE : 4.0-inches
TYPE OF RISER PIPE : Polyvinyl Chloride (PVC), Schedule 40, threaded
DEPTH OF SEAL : 17.0'
TYPE OF SEAL : Bentonite Pellets Bentonite Slurry
DEPTH OF SAND PACK : 20.3'
DEPTH TOP OF SCREEN : 21.5'
TYPE OF SCREEN : Type 316-Stainless Steel
SLOT SIZE x LENGTH : 0.010" slot x 10'
LD. OF SCREEN : 4.0-inches
TYPE OF SAND PACK: #2-QRok Sand
DEPTH BOTTOM OF SCREEN : 31.5'
DEPTH BOTTOM OF SAND PACK : 34.5'
*TYPE OF BACKFILL BELOW OBSERVATION WELL : Natural material & #2 QRok Sand 48.0'-34.5'
ELEVATION / DEPTH OF HOLE : 526.8/ 73.0'

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WELL DEVELOPMENT RECORD

WELL No. MW-N2

PROJECT : BSC - Phase 1 Investigation PROJECT No. : BTA-90-133 SITE LOCATION : Lackawanna, New York

CONTRATOR : Empire Soils Investigations METHOD(S) OF DEVELOPMENT : Purged with BK Pump

FIELD INSPECTOR(S) : Sharon McLellan, Robert Rae

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
11/27/90	Sunny, 40°-60°F, moderate winds	2:00	Inital = 28.41						Initial water level prior to development
				12.7	15.7	2.98	70	Black, very turbid + silty, slight organic odor	5 gallons removed
				12.6	15.4	2.63	82		10 gallons removed Well dry
				12.7	15.6	2.67	100		15 gallons removed Well dry
				12.7	15.6	2.62	100		19 gallons removed Well dry
				12.6	15.6	2.61	100		23 gallons removed
		3:20	Final = 29.39						Final water level after development

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	1 of 2	MWN-2B

SITE	COORDINATES	LOGGED BY	CHECKED BY
Lackawanna, NY	S37+65.49 / W35+86.21	B. McLoughlin	KDI 3/11/93

BEGUN	COMPLETED	DRILLER	DRILLING EQUIPMENT	BORING DIA.	TOTAL DEPTH
11/2/92	11/2/92	Empire Soils/D. Maddex	Falling F-10, 6-1/4" HS Augers	10"	58.00

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	CASING STICKUP	GROUND ELEV.	DEPTH/*ELEV.* GROUND WATER	DEPTH/*ELEV.* TOP OF ROCK
/		2	2.61	600.1 Plant	▽ 26.08 / *574.0* ▼ 26.08 / *574.0*	73.0 / *527.1*

SAMPLE TYPE	CASING DIA/LENGTH	NOTES
Split Spoon	6"SQ/4	Units =**Feet** HNu bkg=0.3ppm

SAMPLE NUMBER	LENGTH/RECOV. (Inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
			BKG	*599.1* 1.0	0			GRAY TO LIGHT GRAY FINE TO COARSE GRAVEL AND SILTY SAND (moist) (dense) [SLAG FILL]	
					5				Driller noted very dense slag at 8', augers grinding hard.
			BKG		10			LIGHT GRAY COARSE GRAVEL AND SILTY SAND (moist) (dense)[SLAG FILL]	Trace of wire and cable in cuttings.
					15				Augers grind steady medium hard to hard in slag from 14 to 20'.
			BKG		20			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	Augers grinding hard at 20 to 22.5'. Augers continue to grind very hard.
					25		▼		Cuttings show tan to reddish brown fire bricks.
			BKG		30			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	Cuttings show tan to reddish brown fire bricks.
					35			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	2 of 2	MWN-2B

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
					40			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	Driller noted grinding very hard at 38'. Augers stop grinding very hard at 39.5', fire bricks continue in cuttings. Pieces of copper scrap in cuttings.
				554.6 45.5	45			DARK GRAY FINE TO COARSE SILTY SAND with trace of washed fine gravel (wet)[SAND]	Drilling easy at 45.5'.
1	24/23	24	BKG						
					50			DARK GRAY FINE TO COARSE SILTY SAND with trace of washed fine gravel (wet)[SAND]	
2	24/24	39	BKG		55				Driller noted change at 55 to 58.5'.
				543.6 58.5				LIGHT GRAY SILTY CLAY (moist)[FAT CLAY]	
				542.1 58.0				Boring completed at 58 ft. on 11/2/92 at 12:10pm.	
					60				
					65				
					70				
					75				

Dames & Moore

WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	MWN-2B

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S37+65.49 / W35+86.21	600.1 Plant ☒Surveyed ☐Estimated	2.61

Soil Boring Cross-Reference *MWN-2B*
Town and City *Lackawanna*
County and State *Erie, NY*

Installation Date (s) *11/2/92*

Drilling Method *Failing F-10, 8-1/4" HS Augers*
Drilling Contractor *Empire Soils/D. Maddex*
Drilling Fluid *None*

Development Technique (s) / Dates
Bailer 11/18/92

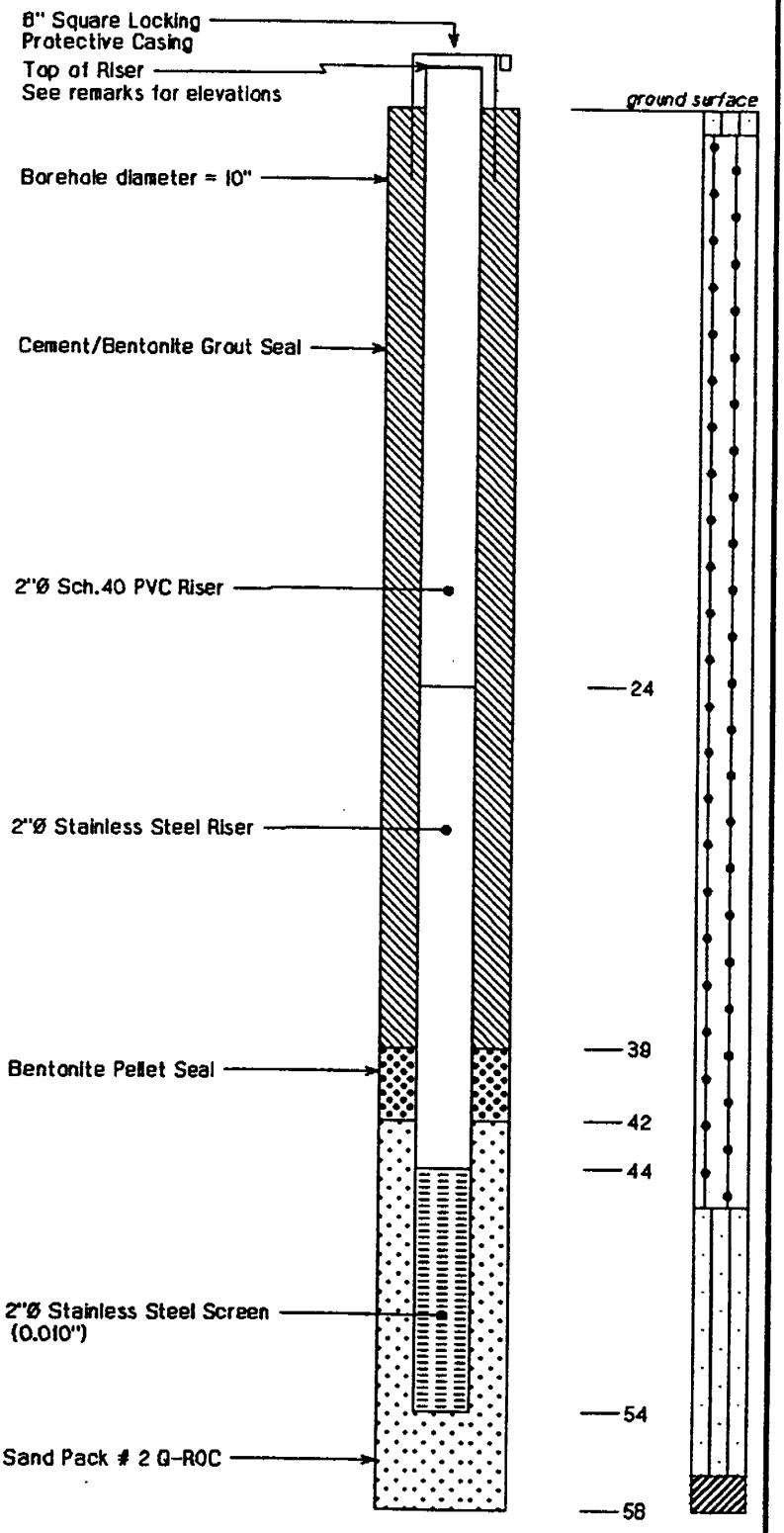
Fluid Loss During Drilling (gals)
Water Removed During Development (gals)
25 - 11/18/92

Static Depth to Water Date *11/18/92*
Static Depth to Water (feet) *28.49 (Top of riser)*

Well Purpose *Groundwater monitoring*

Remarks *Not to Scale*
Top of riser elevation: 602.51
Top of protective casing elevation: 602.71

Prepared By *J. Paul*
Date Prepared *11/6/92*



Dames & Moore

BETHLEHEM STEEL CORPORATION PHASE IIA INVESTIGATION
GROUND WATER SAMPLING RECORD - PROJECT NO BD-92-093

Well # N-2B

WELL VOLUME CALCULATIONS:

Constants for ($V = r^2h \times 7.48$ gal/ft) 2" Well = 0.1632 gal/linear foot

Well Diameter (in): 2" 1 Well Vol = [27.93' ft] x [0.1632 gal/linear ft] = 4.56 gal.

Well Depth *(ft): 56.42'

Water Level *(ft): 28.49'

Height of Water Column(ft): 27.93'

(*Reference Point-Top of Well Riser Pipe)

WELL DEVELOPMENT

Date: 11-19-92 Time Start: 0910

Evacuation Method: PVC Bailer/Polyethyline Rope

GAL.EVAC./ WELL VOL.	PH (SU)	TEMP (°C)	SPECIFIC CONDUC. (MS/CM)	TURBID (NTU)	PURGE WATER CHARATERISTICS
Initial	11.60	13.8	1.158	>100	Turbid - Brown Color
2.0 gals	—	—	—	Same	Becomes V. Turbid - Blk
10 gals (2WV)	—	—	—	Same	Same
15 gals (3WV) ~~20 gals~~	11.77	13.7	1.266	Same	Ext. Turbid
20 gals (4WV)	11.66	13.7	1.220	Same	Same
25 gals (5WV)	11.76	13.9	1.276	Same	Same

Comments: (Time Complete 1012) Development Complete - Measurements Stable And Developed For 1 Hour. Slight Petroleum Odor Was Present During Purging.

Signature: [signature]

MWN-02B

LOG OF BORING

PROJECT: Bethlehem Steel Corp., RFI	PROJECT NUMBER: 00120-158-152	SHEET NO.: 1 of 2	HOLE NUMBER: MWN-2B	
SITE: Lackawanna, NY	COORDINATES: S37+65.49 / W35+86.21	LOGGED BY: B. McLoughlin	CHECKED BY: KDI 3/11/93	
BEGUN: 11/2/92	COMPLETED: 11/2/92	DRILLER: Empire Soils/D. Maddex	DRILLING EQUIPMENT: Falling F-10, 6-1/4" HS Augers	BORING DIA.: 10"
TOTAL DEPTH: 58.00				
CORE RECOVERY (FT./%): /	CORE BOXES:	SAMPLES: 2	CASING STICKUP: 2.61	GROUND ELEV.: 600.1 Plant
DEPTH/*ELEV.* GROUND WATER: ▼ 26.08 / *574.0*; ▼ 26.08 / *574.0*	DEPTH/*ELEV.* TOP OF ROCK: 73.0 / *527.1*			
SAMPLE TYPE: Split Spoon	CASING DIA/LENGTH: 6"SQ/4	NOTES: Units =**Feet** HNu bkg=0.3ppm		

SAMPLE NUMBER	LENGTH/RECOV. (Inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
			BKG	*599.1* 1.0				GRAY TO LIGHT GRAY FINE TO COARSE GRAVEL AND SILTY SAND (moist) (dense) [SLAG FILL]	
					5				Driller noted very dense slag at 8', augers grinding hard.
			BKG		10			LIGHT GRAY COARSE GRAVEL AND SILTY SAND (moist) (dense)[SLAG FILL]	Trace of wire and cable in cuttings.
					15				Augers grind steady medium hard to hard in slag from 14 to 20'.
			BKG		20			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	Augers grinding hard at 20 to 22.5'. Augers continue to grind very hard.
					25		▼		Cuttings show tan to reddish brown fire bricks.
			BKG					LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	Cuttings show tan to reddish brown fire bricks.
					30				
					35			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	

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LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	2 of 2	MWN-2B

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
					40			LIGHT GRAY COARSE GRAVEL AND SILTY COARSE SAND (moist) (dense)[SLAG FILL]	Driller noted grinding very hard at 38'. Augers stop grinding very hard at 39.5', fire bricks continue in cuttings. Pieces of copper scrap in cuttings.
				554.6 45.5	45			DARK GRAY FINE TO COARSE SILTY SAND with trace of washed fine gravel (wet)[SAND]	Drilling easy at 45.5'.
1	24/23	24	BKG		50			DARK GRAY FINE TO COARSE SILTY SAND with trace of washed fine gravel (wet)[SAND]	
2	24/24	39	BKG		55				Driller noted change at 55 to 58.5'.
				543.6 58.5				LIGHT GRAY SILTY CLAY (moist)[FAT CLAY]	
				542.1 58.0				Boring completed at 58 ft. on 11/2/92 at 12:10pm.	
					60				
					65				
					70				
					75				

WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	MWN-2B

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S37+65.49 / W35+86.21	600.1 Plant ☒Surveyed ☐Estimated	2.61

Soil Boring Cross-Reference *MWN-2B*
Town and City *Lackawanna*
County and State *Erie, NY*

Installation Date (s) *11/2/92*

Drilling Method *Failing F-10, 8-1/4" HS Augers*
Drilling Contractor *Empire Soils/D. Maddex*
Drilling Fluid *None*

Development Technique (s) / Dates
Bailer 11/19/92

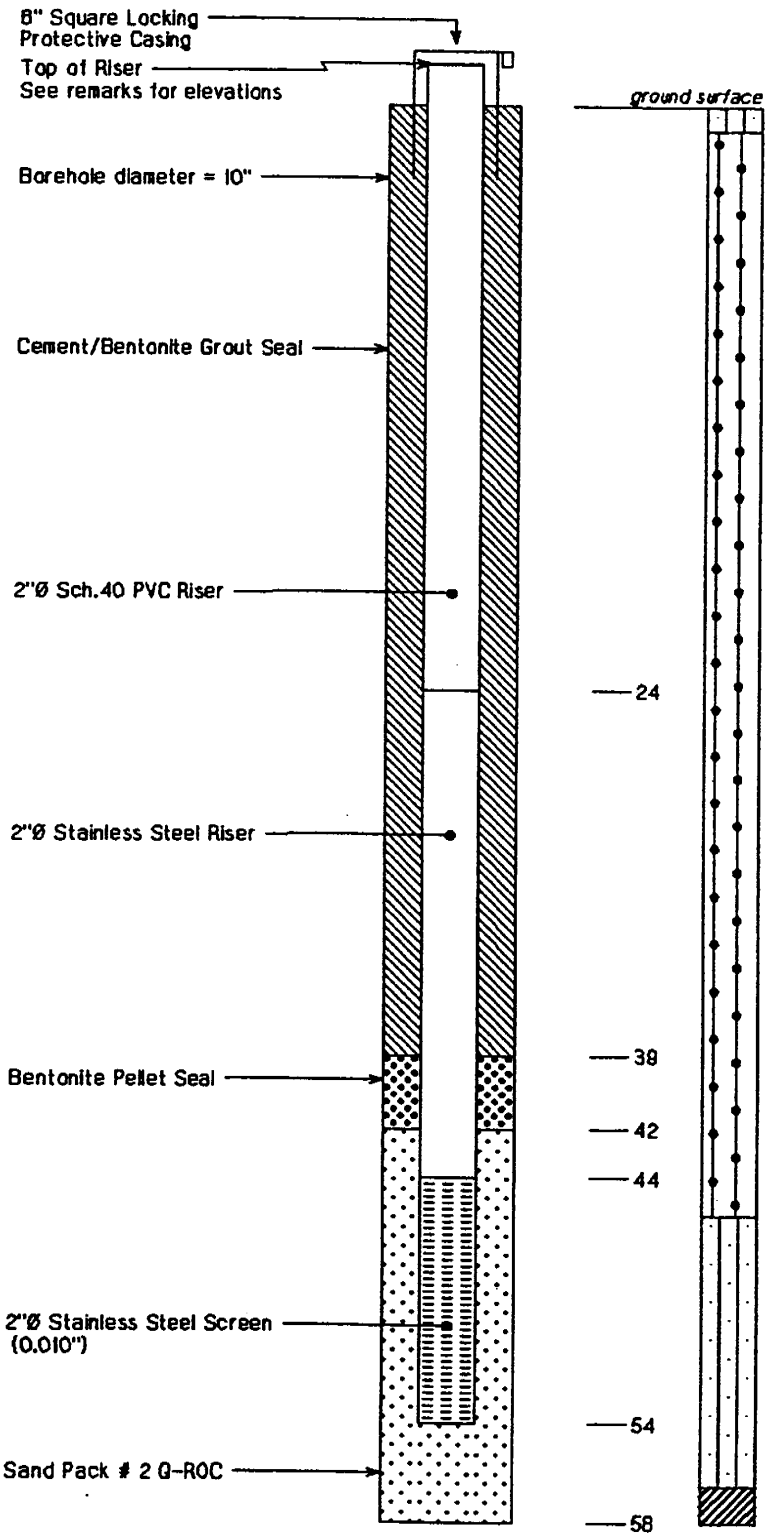
Fluid Loss During Drilling (gals) _____
Water Removed During Development (gals)
25 - 11/19/92

Static Depth to Water Date *11/19/92*
Static Depth to Water (feet) *28.49 (Top of riser)*

Well Purpose *Groundwater monitoring*

Remarks *Not to Scale*
Top of riser elevation: 602.51
Top of protective casing elevation: 602.71

Prepared By *J. Paul*
Date Prepared *11/6/92*



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BETHLEHEM STEEL CORPORATION PHASE IIA INVESTIGATION
GROUND WATER SAMPLING RECORD - PROJECT NO BD-92-093

Well # N-2B

WELL VOLUME CALCULATIONS:

Constants for ($V = r^2h \times 7.48$ gal/ft) 2" Well = 0.1632 gal/linear foot

Well Diameter (in): 2" 1 Well Vol = [27.93' ft] x [0.1632 gal/linearar ft] = 4.56 gal.

Well Depth *(ft): 56.42'

Water Level *(ft): 28.49'

Height of Water Column(ft): 27.93'

(*Reference Point-Top of Well Riser Pipe)

WELL DEVELOPMENT

Date: 11-19-92 Time Start: 0910

Evacuation Method: PVC Bailer/Polyethyline Rope

GAL.EVAC./ WELL VOL.	PH (SU)	TEMP (°C)	SPECIFIC CONDUC. (MS/CM)	TURBID (NTU)	PURGE WATER CHARATERISTICS
Initial	11.60	13.8	1.158	>100	Turbid- Brown Color
2.0 gals	—	—	—	Same	Becomes V. Turbid-Blk
10 gals (2wv)	—	—	—	Same	Same
~~20 gals~~ 15 gals (3wv)	11.77	13.7	1.266	Same	Ext. Turbid
20 gals (4wv)	11.66	13.7	1.220	Same	Same
25 gals (5wv)	11.76	13.9	1.276	Same	Same

Comments: (Time Complete 1012) Development Complete - Measurements Stable And Developed For 1 Hour. Slight Petroleum Odor Was Present During Purging.

Signature: [signature]

MWN-02D

LOG OF BORING

PROJECT: Bethlehem Steel Corp., RFI	PROJECT NUMBER: 00120-186-152	SHEET NO.: 1 of 3	HOLE NUMBER: MWN-02D		
SITE: Lackawanna, NY	COORDINATES: S37+81.81 / W36+00.08	LOGGED BY: J. Gabreski	CHECKED BY: E. Fujita		
BEGUN: 7/20/95	COMPLETED: 8/14/95	DRILLER: SJB Svs Inc./D. Maddex	DRILLING EQUIPMENT: CME 85, 8-1/4" HS Augers	BORING DIA.: 11.5" to 4"	TOTAL DEPTH: 80.5
CORE RECOVERY (FT./%): 10.0 / 88.5	CORE BOXES: 1	SAMPLES: 36	CASING STICKUP: 2.34	GROUND ELEV.: 600.84 Plan	DEPTH/*ELEV.* GROUND WATER: ▽ 29.0 / *571.8*; ▼ 27.87 / *573.0*
DEPTH/*ELEV.* TOP OF ROCK: 70.5 / *530.3*					
SAMPLE TYPE: 2" x 2' Standard Split Spoon	CASING DIA/LENGTH: 8"SG/4	NOTES: Units =Feet HNu bkg=0.2ppmv			

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
1	24/24	29	BKG		BROWN-BLACK SILTY SANDY EARTHEN LOAM with minor coarse gravel (dry) (loose) trace of organic and oxidized metal debris	Augers grind slow thru dense obstruction;-steel
2	24/22	29	BKG		BROWN SILTY SANDY LOAM with gray-brown gravel and trace of clay [SLAG FILL] (dry) (loose) minor metal debris	
3	24/20	19	BKG		BROWN SILTY SANDY LOAM with gray-brown gravel and trace of clay [SLAG FILL] (dry) (loose) minor metal debris	
4	24/24	27	BKG		DARK BROWN COARSE GRAVEL with silty medium sand (dry) (medium dense) [SLAG FILL]	Augers advance easily
5	24/14	18	BKG		DARK BROWN FINE TO COARSE GRAVEL with brown silty sand (moist) (medium dense) [SLAG FILL]	
6	24/24	18	BKG		DARK BROWN FINE TO COARSE GRAVEL with brown-gray silty medium sand (moist) (medium dense) [SLAG FILL]	
7	24/18	88	BKG		DARK BROWN FINE TO COARSE GRAVEL with brown-gray silty medium sand (moist) (medium dense) [SLAG FILL]	Augers advance easily
8	24/12	14	BKG		DARK BROWN-BLACK FINE TO COARSE GRAVEL with gray medium sand (moist) (medium dense) [SLAG FILL] trace fire brick debris	
9	24/24	21	BKG		DARK BROWN FINE TO COARSE GRAVEL with brown-gray medium sand (moist) (medium dense) [SLAG FILL]	
10	24/18	19	BKG		DARK BROWN-BLACK FINE TO COARSE GRAVEL with gray medium sand (moist) (medium dense) [SLAG FILL]	Augers grind medium hard
11	24/12	28	4.0		DARK BROWN-BLACK FINE TO COARSE GRAVEL with gray medium sand (moist) (medium dense) [SLAG FILL]	
12	24/3	12	3.7		BROWN FINE TO COARSE GRAVEL with brown silty medium sand (moist) (medium dense) [SLAG FILL]	Poor SS recovery SS shoe plugged w/wood debris
13	24/18	50	7.0		BROWN FINE TO COARSE GRAVEL with brown medium sand, trace silt, clay (moist) (medium dense) [SLAG FILL]	
14	24/24	100/.4	1.5		BROWN FINE TO COARSE GRAVEL with gray-brown medium sand (moist) (medium dense) [SLAG FILL]	
15	24/18	59	2.5		GRAY FINE TO COARSE GRAVEL with silty gray medium sand (wet) (medium dense) [SLAG FILL]	Estimate top groundwater at 29.0'
16	24/20	23	2.3		GRAY FINE TO COARSE GRAVEL with silty gray medium sand (wet) (medium dense) [SLAG FILL]	Augers advance slow; > grinding/chattering
17	24/18	60	BKG		GRAY FINE TO COARSE GRAVEL with silty gray medium sand, yellow-orange fire brick and trace of wood debris (wet) (dense) [SLAG FILL]	

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-186-152	2 of 3	MWN-02D

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
18	24/24	97	3.0					GRAY FINE TO COARSE GRAVEL with silty gray medium sand, trace of wood organic matter (wet) (dense) [SLAG FILL]	
19	24/18	100/.1	BKG					GRAY FINE TO COARSE GRAVEL with silty gray medium sand, (wet) (dense) [SLAG FILL]	
20	24/4	100/.1	BKG					GRAY FINE TO COARSE GRAVEL with silty gray medium Sand, (wet) (dense) [SLAG FILL]	Driller notes 1.5 feet of running sands in augers
21	24/8	100/.2	9.0		40			GRAY FINE TO COARSE GRAVEL with gray silty medium Sand (wet) (dense) [SLAG FILL]	
22	24/8	100/.4	3.5					GRAY FINE TO COARSE GRAVEL with gray silty medium Sand (wet) (dense) [SLAG FILL]	2.0 feet of running sands in augers
23	24/12	100/.5	2.4		45			GRAY FINE TO COARSE GRAVEL gradational to dark gray silty medium SAND trace Clay (wet) (medium dense) [SLAG FILL]	Top of Sand; native sediments approx. 45.0' below grade
24	24/0	91	NA					No Recovery	
				552.8 48.0					Augers grind very hard due to large diameter Gravel pieces (slag fill cavings)
25	24/20	18	BKG					DARK GRAY SILTY MEDIUM SAND (wet) (loose)	
26	24/22	4	1.9		50			GRAY-BROWN SILTY CLAY with gray medium sand (wet) (loose)	
27	24/24	31	3.8					GRAY FINE TO MEDIUM SILTY SAND some fine to coarse gravel (wet) (medium dense)	
28	24/22	47	15.0		55			GRAY FINE TO MEDIUM SILTY SAND with trace of brown clay (wet) (medium dense)	
29	24/22	53	3.7					GRAY FINE TO MEDIUM SILTY SAND with trace of brown clay (wet) (medium dense)	
				542.8 58.0					
30	24/24	3	2.2					GRAY-BROWN SILTY CLAY with medium Sand (moist) (soft)	
31	24/20	3	BKG		60			GRAY-BROWN SILTY SANDY CLAY (moist) (soft)	Driller sets 8" dia. steel casing to depth of 62.0' @ 4:00 pm. on 7/21/95
32	24/20	4	BKG					GRAY SILTY CLAY (moist) (soft)	
33	24/24	8	BKG		65			GRAY SILTY CLAY (moist) (stiff)	Begin rotary wash drilling with 4" dia. temporary steel casing thru cement plug at 61.0' in bottom of 8"casing at 1:15pm on 8/04/95.
34	24/20	7	BKG	533.8 67.0				GRAY SILTY CLAY (moist) (stiff) GRADES TO TILL with subrounded-rounded gravel at 67.0 feet [TILL]	
35	24/18	8	BKG					GRAY SANDY SILTY TILL (moist) (stiff)	Good returns on drill water
38	7/5	100/.1	BKG	530.3 70.5	70			GREY SANDY SILT [TILL] (moist) (hard) Refusal top of bedrock	
								RUN #1 - 70.5'-74.0' GRAY LIMESTONE with trace of vugs, fossil corals, brachiopods etc., partly weathered, REC=85%, RQD= 54% horizontal bedding fractures	Top LIMESTONE Bedrock at 70.5'
					75				Run #1 - No drill water returns to surface

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LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-186-152	3 of 3	MWN-02D

continuation

SAMPLE NUMBER	LENGTH/RECOV. (Inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
				525.3 75.5					
								RUN #2 – 74.0'–80.5' GRAY LIMESTONE fossilized, partly weathered, thick bedded, gradational to DARK GRAY SHALE at 75.5', thinly laminated, few vertical fractures btwn 76'–78', REC=92%, RQD=21%	Run #2 – No drill water returns to surface; total 800 gallons lost to formation.
				520.3 80.5	80			Boring completed – at 80.5 feet on 8/14/95 at 1500.	Note: Free standing water not recorded at boring completion due to use of drilling water.
					85				
					90				
					95				
					100				
					105				
					110				
					115				

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WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-186-152	MWN-02D

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S37+81.81 / W36+00.08	600.84 Plant ☒Surveyed ☐Estimated	2.34

Soil Boring Cross-Reference *MWN-02D*
Town and City *Lackawanna, Lackawanna*
County and State *Erie, NY*

Installation Date (s) *7/20/95, 8/04/95*

Drilling Method *CME 85, 8-1/4" HS Augers*
Drilling Contractor *SJB Svs Inc./D. Maddex*
Drilling Fluid *Water*

Development Technique (s) / Dates
Pump

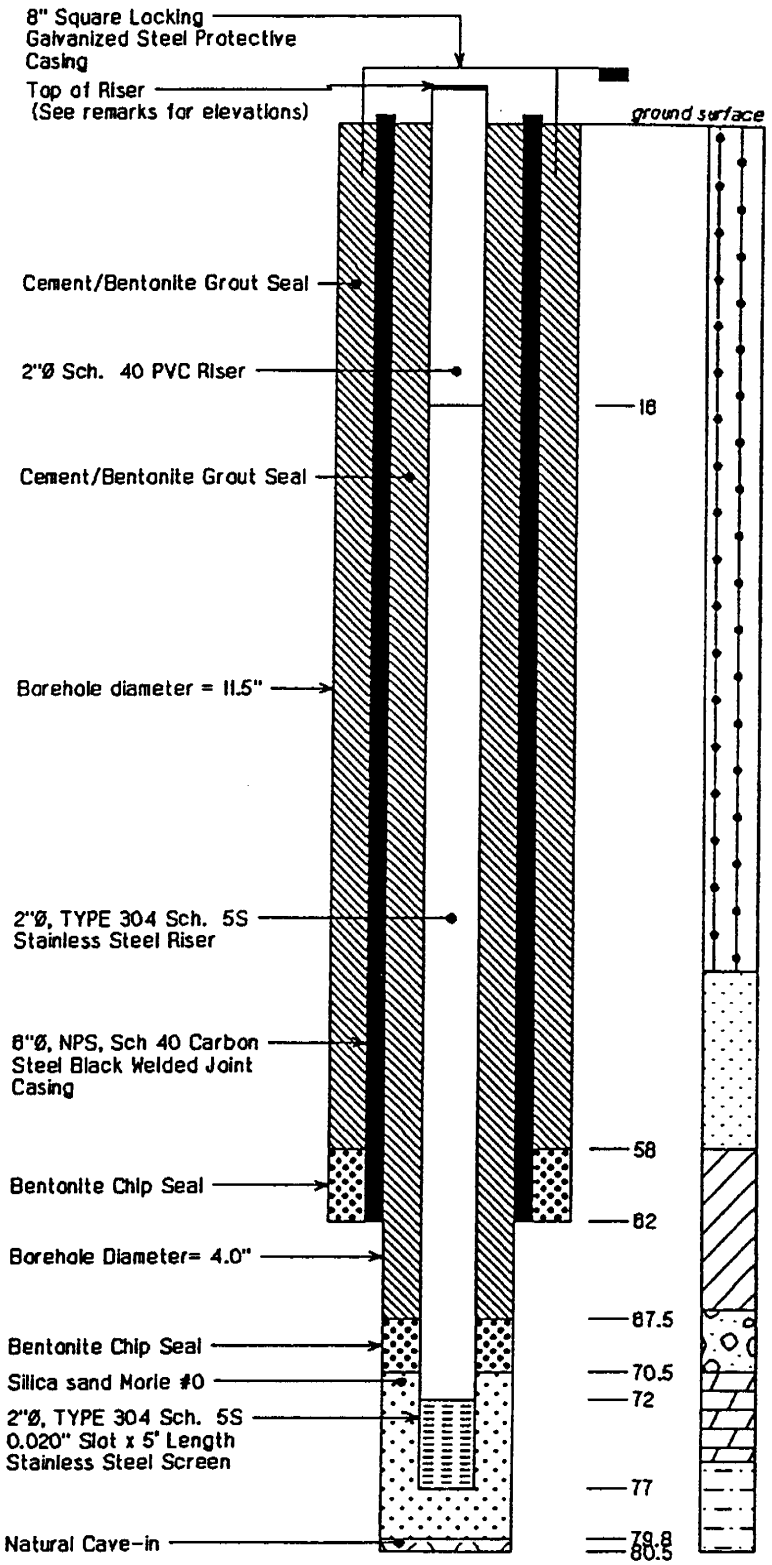
Fluid Loss During Drilling (gals) *800*
Water Removed During Development (gals)
900 - 8/17/95

Static Depth to Water Date *9/19/95*
Static Depth to Water (feet) *30.17 TOR*

Well Purpose *Groundwater elevations*

Remarks *Not to Scale*
Top of riser elevation: 602.85
Top of casing elevation: 603.18

Prepared By *J. Gabreski*
Date Prepared *08/31/95*



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WELL DEVELOPMENT RECORD

WELL No. MWN - 02D

PROJECT : BSC PHASE III PROJECT No. : 00120-186-152 SITE LOCATION : LACKAWANNA

CONTRATOR : SJB SERVICES METHOD(S) OF DEVELOPMENT : 2" Grundfos Pump

FIELD INSPECTOR(S) : FRANK MINNOLERA

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
8/1/95	Sunny Warm 85°	0920	29.61 TOW 79.90 BOW	Start (5 gpm average)		Pump 0935			50.29' water column (50.29)(.17) = 8.54 1 WV = 8.5 gallons
		0955	100 Gallons (4.5 gpm)	6.63	70.5	855	13.01 ~~855~~	V.S. Turbid no Clear no Odors	
		1021	200 Gallons (4 5 gpm)	6.92	71.2	845	7.45	Clear very! Slight H_2S odor	
		1047	300 Gallons	7.00	71.6	855	3.53	Slightly odor	
		1110	400 Gallons	7.25	72.7	839	2.79		
		1130	500 Gallons	7.01	72.9	855	2.41		
		1150	600 Gallons	6.95	73.1	863	2.24		
		1220	700 Gallons	7.01	72.9	868	2.64		
		1240	800 Gallons	7.09	72.6	840	N/A		Batteries Dead on Turbidity Meter 1230 HRS

ATTACHME

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WELL DEVELOPMENT RECORD

WELL No. MWN - 02D

PROJECT : BSC PHASE III PROJECT No. : 00120-186-152 SITE LOCATION : LACKAWANNA, NY

CONTRATOR : SJB SERVICES METHOD(S) OF DEVELOPMENT : 2" Grundfos Pump

FIELD INSPECTOR(S) : FRANK MINNOCERA

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
8/18/95	Sunny, Air 85°	1300	900 Gallons	7.05	11.8	861	N/A		
			Pumping Stopped @ 900 Gallons 1300 hrs						

ATTACHME

MWN-03

DATE
STARTED 9-4-90
FINISHED 9-6-90
SHEET 1 OF 3

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-3
SURF. ELEV. 610.9
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6 6/12 12/18 N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
0					Brown-gray f-c GRAVEL (SLAG), and f-c SAND, tr. silt (moist, FILL)	PID=Organic vapor measurements taken with a photoionization detector (PID). Measurements recorded in parts per million (ppm).
5					Becomes Gray	
10						Driller notes obstructions at 9.0', difficult drilling.
15						
20						
25						Soil becomes cohesive (moist-wet) at approx. 27.0'.
30	1	72	100/3 REF	BG	Gray-white f-c GRAVEL (SLAG) and f-c Sand, tr. silt (moist-wet,FILL)	REF=Split Spoon Refusal At approx. 33.0' driller notes obstruction.
35						2" x 1/4" thick piece of steel/ore/carbon came up with auger spoil.
40						Note: Water at approx. 40.0'

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 6-1/4" HOLLOW STEM AUGERS

DATE
STARTED 9-4-90
FINISHED 9-6-90
SHEET 2 OF 3

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-3
SURF. ELEV. 610.9
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
40									At approx. 40.0' Driller notes apparent change in augering possibly sand.
45		2	32	61	100/5"	REF	BG	Black-gray f-c SAND (Cinders & Coke), some f-c Gravel (slag), little Silt (wet, FILL)	
50									
55		3	76	78	80	158	BG	Black f-c SAND (Cinders) little f-m Gravel, little Silt (wet,FILL)	
60									Driller notes a change in augering at 60.0'. Possibly encountered clay or sand.
65		4	17	14				Contains little Concrete	
			36	17		50	BG	Gray f-c Silty SAND tr. f.-gravel, tr. clay (wet, very compact)	
70									
75									
80									

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 6-1/4" HOLLOW STEM AUGERS

DATE
STARTED 9-4-90
FINISHED 9-6-90
SHEET 3 OF 3

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-3
SURF. ELEV. 610.9
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
80									Driller estimates encountering clay at approx. 80.0'.
85		5	2	2	4	6	BG	Gray SILTY CLAY, little f-c Sand, tr. gravel (moist-wet, soft) Contains gray silt partings.	
90									
95									Driller notes difficult drilling, possible boulder at 97.5'.
100								Gray LIMESTONE BOULDER from approx. 99.0' to 99.6'. Gray-black f-c SAND, some Clayey Silt, little f-c Gravel, (wet, GLACIAL TILL) TOP OF ROCK 104.7'	Driller notes auger refusal at 99.0'. Free Standing Water measured at 84' on 9-6-90 am. NQ Size Rock Core RUN#1=99.0' to 104' REC=12% RQD=0% Note: Boulder and Glacial Till from 99.0' to 104'.
105								Black SHALE ROCK, medium hard, sound to slightly weathered, thin bedded. Slight petroleum hydrocarbon odor (PID=.8-1.2 ppm)	
110								Boring Complete at 109.7'. Refer to Monitoring Well Completion Reports for Well Installation Details.	Driller notes auger refusal at approx. 104.7' NQ Size Rock Core RUN#2=104.7'-109.7' REC=92%

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 6-1/4" HOLLOW STEM AUGERS

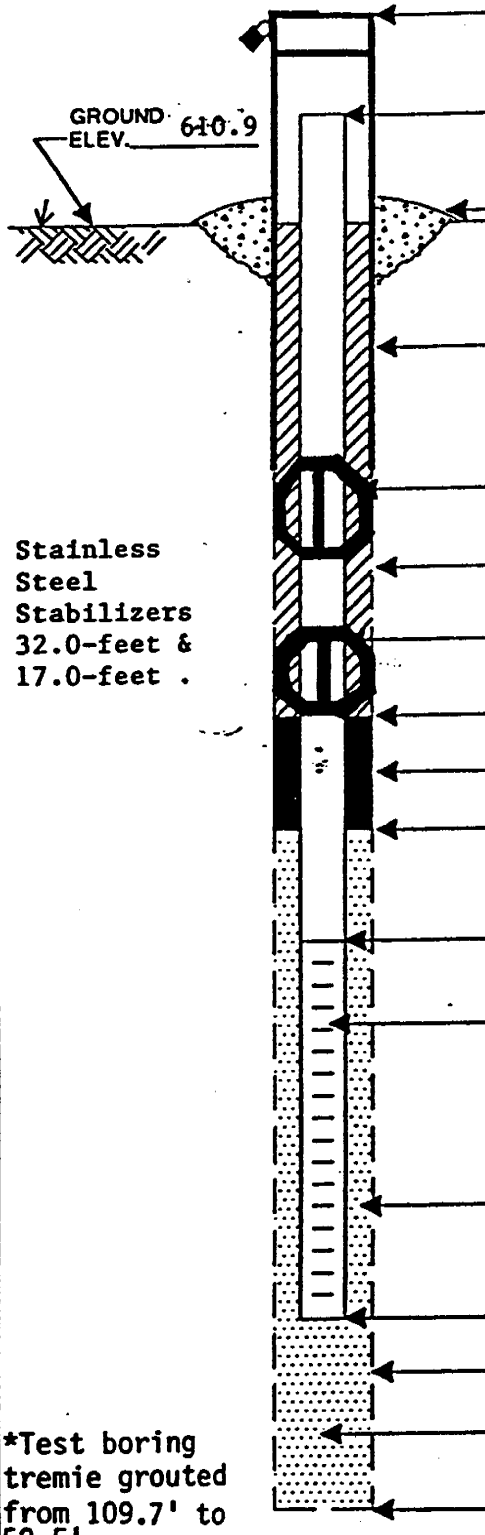
EMPIRE
SOILS INVESTIGATIONS INC.

MONITORING WELL COMPLETION RECORD

PROJECT : Bethlehem Steel
PROJECT No. : BTA-90-133
INSTALLATION DATE(S) : 9-7-90
FIELD GEOLOGIST : L.A. Zimmerman

WELL No. MWN-3
LOCATION : Lackawanna, N.Y.

DRILLER : J. Lamm
DRILLING METHOD : ASTM-D-1586
DEVELOPMENT METHOD Bailer/Handpump



ELEVATION / TOP OF SURFACE CASING : 613.93
STICK-UP / TOP OF SURFACE CASING : 3.03'
ELEVATION / TOP OF RISER PIPE : 613.20
STICK-UP / TOP OF RISER PIPE : 2.3'
TYPE OF SURFACE SEAL : Sakrete
I.D. OF SURFACE CASING : 8-Inch Square
TYPE OF SURFACE CASING : Corrosion-resistant steel
TYPE OF BACKFILL : Cement/Bentonite grout
BOREHOLE DIAMETER : Nominal 12-1/4-inches
I.D. OF RISER PIPE : 4.0-inches
TYPE OF RISER PIPE : Polyvinyl Chloride (PVC), Schedule 40, threaded
DEPTH OF SEAL : 32'
TYPE OF SEAL : Bentonite Pellets
Bentonite Slurry
DEPTH OF SAND PACK : 35'
DEPTH TOP OF SCREEN : 37'
TYPE OF SCREEN : Type 316-Stainless Steel
SLOT SIZE x LENGTH : 0.010" slot x 10'
I.D. OF SCREEN : 4.0-inches
TYPE OF SAND PACK: #2-QRok Sand
DEPTH BOTTOM OF SCREEN : 47'
DEPTH BOTTOM OF SAND PACK : 52.5'
* TYPE OF BACKFILL BELOW OBSERVATION WELL : Cement/Bentonite Grout tremied into hole
ELEVATION / DEPTH OF HOLE : 501.2/109.7'

DAMES & MOORE
A PROFESSIONAL LIMITED PARTNERSHIP

WELL DEVELOPMENT RECORD

WELL No. MW-N3

PROJECT : BSC - Phase 1 Investigation PROJECT No. : BTA-90-133 SITE LOCATION : Lackawanna, New York

CONTRATOR : Empire Soils Investigations METHOD(S) OF DEVELOPMENT : Hand Bailed

FIELD INSPECTOR(S) : Sharon McLellan, Robert Rae

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
12/4/90	Overcast, 65°-70° F, 10-25mph WSW winds	10:20	Initial = 38.64						Initial water level prior to development
				12.5	10.8	2.92	85	Blue-tint, turbid, no odors noted	7 gallons removed
				12.4	11.3	2.91	24	Water becoming less turbid	14 gallons removed
				12.4	11.4	2.91	24		21 gallons removed
				12.4	11.5	2.95	25		28 gallons removed
				12.4	11.0	2.91	36		35 gallons removed
				12.4	11.0	2.92	37		42 gallons removed
		11:29	Final = 38.53						Final water level after development

Note: 6.8g = one well volume

LD

MWN-03B

LOG OF BORING

PROJECT: Bethlehem Steel Corp., RFI	PROJECT NUMBER: 00120-158-152	SHEET NO.: 1 of 2	HOLE NUMBER: MWN-3B	
SITE: Lackawanna, NY	COORDINATES: S20+60.53 / W37+08.62	LOGGED BY: K. Ignaszak	CHECKED BY: KDI 3/11/93	
BEGUN: 11/3/92	COMPLETED: 11/5/92	DRILLER: Empire Soils/D. Beltz	DRILLING EQUIPMENT: Falling F-10, 4-1/4" HS Augers	BORING DIA.: 8"
TOTAL DEPTH: 72.00				
CORE RECOVERY (FT./%): /	CORE BOXES:	SAMPLES: 4	CASING STICKUP: 2.62	GROUND ELEV.: 611.2 Plant
DEPTH/*ELEV.* GROUND WATER: ▽ 37.31 / *573.9*; ▽ 37.31 / *573.9*	DEPTH/*ELEV.* TOP OF ROCK: 104.7 / *506.5*			
SAMPLE TYPE: Split Spoon	CASING DIA/LENGTH: 6"SG/4	NOTES: Units =Feet HNu bkg=0.3ppm		

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
			BKG		5			LIGHT GRAY MEDIUM SILTY SAND AND FINE TO COARSE GRAVEL (dry) (loose)[SLAG FILL]	Augering becoming difficult.
			BKG		10			LIGHT GRAY MEDIUM SILTY SAND AND FINE TO COARSE GRAVEL (dry) (dense)[SLAG FILL]	
			BKG		15			LIGHT GRAY MEDIUM SILTY SAND AND FINE TO MEDIUM GRAVEL with trace of silt (dry) (dense)[SLAG FILL]	
			BKG		20			grades to more fine to medium gravel	
								grades to moist at 24'	
					25			LIGHT GRAY TO GRAY FINE TO MEDIUM GRAVEL AND MEDIUM SILTY SAND (moist) (dense)[SLAG FILL]	
			BKG		30				
1	24/20	103	BKG		35			GRAY MEDIUM GRAVEL AND MEDIUM SILTY SAND with traces of silt (moist) (dense)[SLAG FILL]	Driller noted easier augering at 33'.

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	2 of 2	MWN-3B

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
					40			37 MWN-3A Screen	
					45			GRAY MEDIUM GRAVEL WITH MEDIUM SILTY SAND with trace of silt (moist) (dense)[SLAG FILL] 47	
					50				Augering very difficult from 51' to 52'
2	7/7	75/1"	BKG	556.2 55.0	55			DARK GRAY MEDIUM SILTY SAND with some silt (moist) (very dense) [SLAG FILL]	Trace of cinders
				553.7 57.5				BROWN SILTY CLAY WITH FINE GRAVELS (moist) (medium stiff)[SILTY CLAY] 58	Driller noted much easier drilling at 57.5'.
3	24/24	21	BKG		60			BROWN SILTY CLAY WITH FINE GREY GRAVELS (moist) (medium stiff)[SILTY CLAY]	Strong petroleum odor.
				550.2 61.0				DARK GRAY CLAYEY SILT AND FINE SILTY SAND with some organics and trace of fine gravels (moist) (stiff)[PEAT]	
				546.2 65.0	65			DARK GRAY TO GRAY MEDIUM GRAINED SILTY SAND with trace of fine gravels (moist) (medium dense) 68	
4	24/24	30	BKG	540.8 70.4	70			GRAY SILTY CLAY with trace of fine sand (moist) (stiff)	
				539.2 72.0				Boring completed at 72 ft. on 11/5/92 at 10:45am.	
					75				

WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-158-152	MWN-3B

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S20+60.53 / W37+08.62	611.2 Plant ☒Surveyed ☐Estimated	2.62

Soil Boring Cross-Reference *MWN-3B*
Town and City *Lackawanna*
County and State *Erie, NY*

Installation Date (s) *11/3/92,11/4/92,11/5/92*

Drilling Method *Failing F-10, 4-1/4" HS Augers*
Drilling Contractor *Empire Soils/D. Beltz*
Drilling Fluid *None*

Development Technique (s) / Dates
Bailer 11/19/92

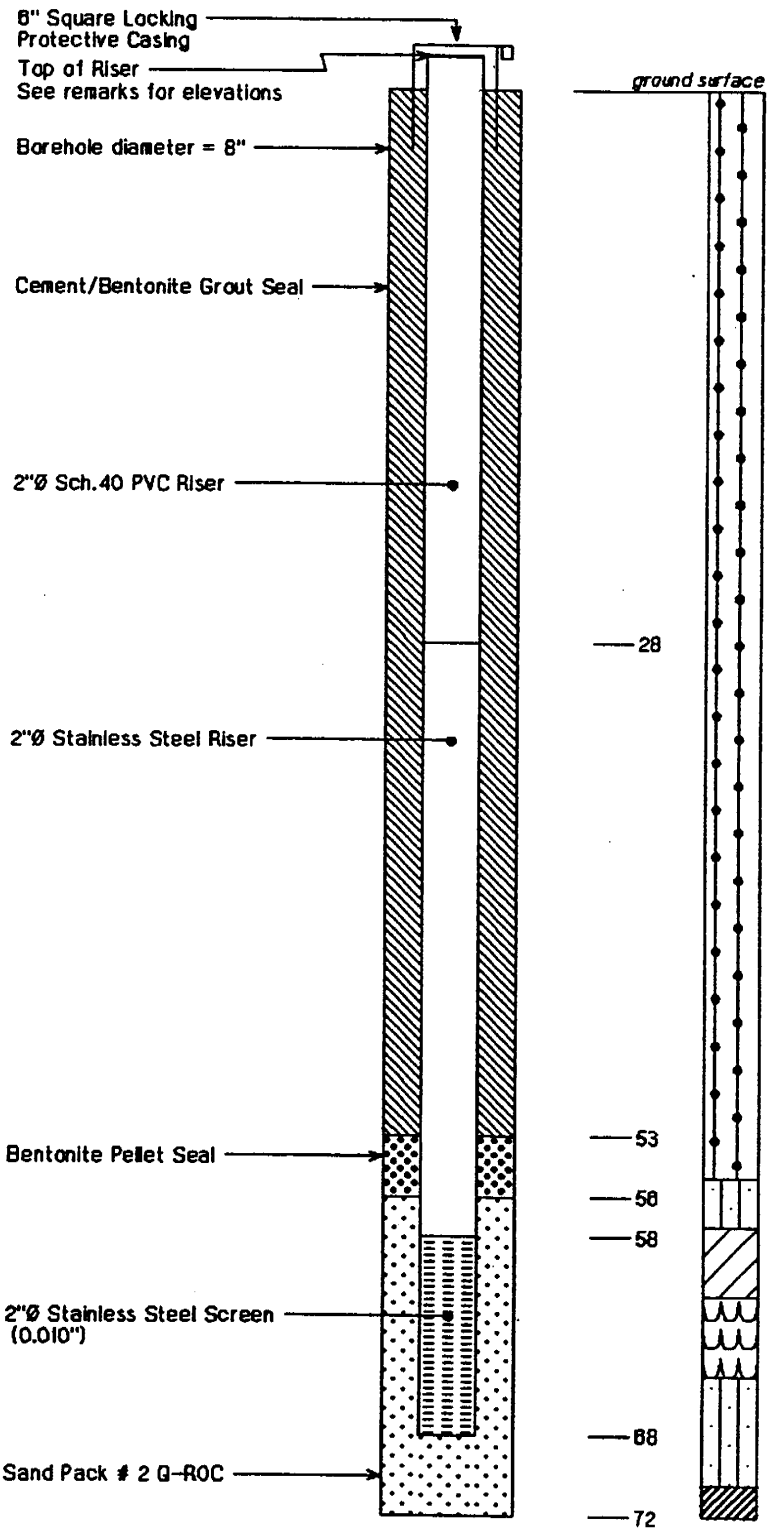
Fluid Loss During Drilling (gals) _____
Water Removed During Development (gals)
30 - 11/19/92

Static Depth to Water Date *11/19/92*
Static Depth to Water (feet) *38.75 (Top of riser)*

Well Purpose *Groundwater monitoring*

Remarks ***Not to Scale***
Top of riser elevation: 613.64
Top of protective casing elevation: 613.82

Prepared By *J. Paul*
Date Prepared *11/6/92*



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BETHLEHEM STEEL CORPORATION PHASE IIA INVESTIGATION
GROUND WATER SAMPLING RECORD - PROJECT NO BD-92-093

Well # N-3B

WELL VOLUME CALCULATIONS:

Constants for (V=r²h x 7.48 gal/ft) 2" Well = 0.1632 gal/linear foot

Well Diameter (in): 2" 1 Well Vol = [28.97' ft] x [0.1632 gal/linear ft] = 4.73 gal.

Well Depth *(ft): 68.72'

Water Level *(ft): 39.75'

Height of Water Column(ft): 28.97'
(*Reference Point-Top of Well Riser Pipe)

WELL DEVELOPMENT

Date: 11-19-92 Time Start: 1030

Evacuation Method: PVC Bailer/Polyethyline Rope

GAL.EVAC./ WELL VOL.	pH (SU)	TEMP (°C)	SPECIFIC CONDUC. (MS/CM)	TURBID (NTU)	PURGE WATER CHARATERISTICS
Initial	9.36	13.2	0.830	>100	mod. Turbid-Green Tint
2nd Bailer	—	—	—	Same	Becomes V. Turbid Dark Green Black
10gals (2wv)	—	—	—	Same	Ext. Turbid, Water Level Drops 3.5' And Staying Steady
12.5gals	—	—	—	—	Dry @ 1100-Let Recover
Back @	N-3B @ 1122 - W.L.			47.12'	(~60% Rec); 1125 Continue Developing
12.5gals	10.21	13.6	0.799	>100	Same
15.0 (3wv)	9.65	14.1	0.904	Same	Same
20.0 (4wv)	9.40	11.2	0.787	Same	Green-Gray Color; Dry @ 1150
Back @ N-3B @ 1258 - W.L. 42.24' (~80% Rec)					

Comments: (Time Complete) pg 1 of 2

Signature: Steph J Bachuk

BETHLEHEM STEEL CORPORATION PHASE IIA INVESTIGATION
GROUND WATER SAMPLING RECORD - PROJECT NO BD-92-093

Well # N-3B

WELL VOLUME CALCULATIONS:

Constants for {$V = r^2h \times 7.48$ gal/ft} 2" Well = 0.1632 gal/linear foot

Well Diameter (in): ______ 1 Well Vol = [______ ft] x [0.1632 gal/linearar ft] = ______ gal.

Well Depth *(ft): ______

Water Level *(ft): ______

Height of Water Column(ft): ______
(*Reference Point-Top of Well Riser Pipe)

WELL DEVELOPMENT

Date: 11·19·92 Time Start: Continued

Evacuation Method: PVC Bailer/Polyethyline Rope

GAL.EVAC./ WELL VOL.	PH (SU)	TEMP (°C)	SPECIFIC CONDUC. (MS/CM)	TURBID (NTU)	PURGE WATER CHARATERISTICS
Initial 20.0gals	9.40	13.8	0.550	7100	Turbid; Green Grey Color
23.5(4.5wv)	9.37	13.9	0.677	Same	Same
25.0(5wv)	9.37	14.0	0.881	Same	Becomes Very Turbid
28.0(5.5wv)	9.66	13.6	0.667	Same	Same
30.0(6wv)	—	—	—	—	Dry @1326

Comments: (Time Complete 1326) Development Complete. Evacuated Well To Dryness 3 Times. Pg 2 of 2

Signature: [signature]

MWN-3D

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-173-152	1 of 4	MWN-3D

SITE	COORDINATES	LOGGED BY	CHECKED BY
Lackawanna, NY	S20+76.80 / W37+12.89	E. Fujita	L. Keefe

BEGUN	COMPLETED	DRILLER	DRILLING EQUIPMENT	BORING DIA.	TOTAL DEPTH
5/31/94	7/26/94	Empire Soils/Dave Maddex	Failing F-10, 8-1/4" HS Augers	12" - 4"	121

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	CASING STICKUP	GROUND ELEV.	DEPTH/ELEV. GROUND WATER	DEPTH/ELEV. TOP OF ROCK
17.5 / 99	2	33	2.76	610.76 Plant	▽ 38.30 / 572.5 ▽ 39.87 / 570.9	99.2 / 511.6

SAMPLE TYPE	CASING DIA/LENGTH	NOTES
2" x 2' Standard Split Spoon	8"SQ/4	Units =Feet HNu bkg=0.3ppm

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
1	24/12	31	4.8					BROWN FINE GRAINED SILTY SAND GRADES TO GRAY FINE GRADED SILTY SAND with coarse gray sand (dry) (loose to medium dense) [FILL]	
2	3/3	50/.3	.2					GRAY FINE GRADED SILTY SAND with coarse gray sand (dry) (very dense) [FILL]	Augers hard @ 4 ft.
3	0/0	50/0	NA		5			No recovery	
4	1/1	50/.1	.2					GRAY FINE GRAINED SILTY SAND with gray coarse sand (dry) (very dense) [FILL]	09:00 @ 8' BGS top of rod ground, 09:10 augers slow but penetrating slag, steam from inside augers visible, bit ruined @ 09:55.
					10				Resume 6/01/94 @ 07:45, remove augers and replace bit reset @ 10' BGS.
5	7/7	50/.1	1.0					6" OF GRAY CUTTINGS, LIGHT GRAY FINE GRAINED SILTY SAND with gray coarse sand (dry) (very dense) [FILL]	
					15				Augers very slow to 14', plug sits @ 6" below augers, so first 6" with spoon cuttings. Augers hard @ 16'. 16' @ 10:45, 11:00 no change, replace plug. 11:05 remove plug, use augers only.
					20				@ Approx. 16.5-17' refusal, pull augers.
					25				6/02/94, move borehole 5' west. 08:45 resume with 8 1/4" augers hard 2.5' BGS. Augers slow 10-14' BGS. 12:45 @ 19' BGS driller notes possible change @ 33' BGS, reset with 8 1/4" HSA.
					30				End 6/02/94, 8 1/4" HSA to 30', Resume 6/03/94 @ 08:00, Auger 34' and resume sampling. End 6/03/94 Augers @ 32'.
					35				

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LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-173-152	2 of 4	MWN-30

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
6	14/4	50/.7	.2					GRAY FINE GRAINED SILTY SAND with gray coarse sand (moist) (loose to very dense) [FILL] (mostly cuttings)	Resume 8/06/94 @ 07:30, Auger to 34' and resume sampling.
7	20/14	34	.2		40			GRAY FINE AND COARSE GRAINED SILTY SAND (wet) (very dense) Tip of Spoon- DARK GREEN-GRAY FINE GRAINED SITLY SAND (moist) (very dense)	Augers hard @ 35', sample at 38'.
8	3/0	50/.3	NA					No recovery	
9	7/8	50/.1	.2		45			DARK GREENISH GRAY FINE SILTY SAND (wet) (dense) [FILL] 1" of gravel in tip of spoon	Need to grind top threads of NW rods. Augering very slow and hard @ 42'. 10:35 44' BGS, water level = 38.30'.
10	1/0	50/.1	NA					No recovery	
11	4/4	50/.4	.2					DARK GREENISH GRAY FINE GRAINED SILTY SAND (wet) (very dense) [FILL] (petrol odor)	Augers very hard at 48'.
12	0/0	50/0	NA		50			No recovery	End 50' BGS on 8/08/94 Resume 07:40 on 8/07/94.
13	0/0	50/0	NA		55			No recovery	Driller notes 6" of cuttings inside augers, 08:40 @ 50' BGS, augers hard, possibly on steel. 09:10 @ 52' BGS- Steel possibly. augers hard and slow.
14	24/20	5	24	550.8 60.0	60			8" OF BLUEGREEN CUTTINGS, DARK GRAY AND BROWN SILTY CLAY (moist) (medium stiff) (alternating colors) (petroleum odor)	Driller notes soft material by drop of rods and spoon for sampling.
15	24/24	39	44	547.8 63.0				DARK GRAY AND BROWN MOTTLED SILTY CLAY (moist) (stiff to very stiff)	
16	24/3	30	0.8		65			DARK GRAY FINE GRAINED SILTY SAND with a trace of coarse brown sand (moist) (medium dense) (petrol odor)	
17	24/24	45	22	542.8 68.0				DARK GRAY FINE GRAINED SILTY SAND with trace of coarse sand (moist) (very dense) GRADES TO BROWN FINE SILTY SAND (wet) (dense)	
18	24/24	18	0.4	540.8 70.0	70			BROWN FINE GRAINED SILTY SAND with gray silty clay (wet) (loose) gray fat clay in tip of spoon	
19	24/18	32	0.3	538.8 72.0				GRAY SILTY CLAY (dry) (stiff), 2" gray fat clay in tip of spoon	
20	24/20	18	0.3	536.8 74.0	75			GRAY SILTY CLAY (dry) (stiff) [FAT CLAY]	Augered to 74' end 8/07/94, Resume 8/08/94

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-173-152	3 of 4	MWN-3D

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER *Elev.* Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
21	24/18	WOR	0.4					GRAY SILTY CLAY (dry) (soft) [FAT CLAY]	
22	24/13	25	0.3					GRAY FINE GRAINED SILTY SAND GRADES TO GRAY SILTY CLAY with fine gravel (moist) (very stiff)	WOR= Weight of Rods
23	24/24	17	0.3					GRAY FAT CLAY with few fine gray round sands (dry) (very stiff) [FAT CLAY]	8/08/94 Start installation of 6" I.D. permanent casing to 78'.
24	24/24	21	0.3		80			GRAY FINE GRAINED SILTY CLAY with fine gray round sand (moist) (very stiff) [FAT CLAY]	7/25/94, set 4" pipe.
25	24/24	6	0.3					GRAY FINE GRAINED SILTY SILTY CLAY with fine gray sand seams (moist) (stiff) [FAT CLAY]	7/26/94, resume drilling using spin bit on casing.
26	24/24	12	0.3		85			GRAY FINE GRAINED SILTY CLAY (moist) (stiff) [FAT CLAY]	
27	24/24	7	0.3					GRAY FINE GRAINED SILTY CLAY (moist) (stiff) [FAT CLAY]	
28	24/24	WOH	0.3					GRAY FINE GRAINED SILTY CLAY with some fine gray sand seams (dry) (very soft) [FAT CLAY]	
29	24/24	WOH	0.3		90			GRAY AND REDDISH GRAY MOTTLED SILTY CLAY (moist) (very soft) [FAT CLAY]	
30	24/24	7	0.3					GRAY AND REDDISH GRAY MOTTLED SILTY CLAY with fine grained gray sand seams (dry) (medium stiff) [FAT CLAY]	
31	24/24	28	0.3		95			GRAY AND REDDISH GRAY MOTTLED SILTY CLAY with fine grained gray sand seams and trace of fine gray round sand (dry) (very stiff) [FAT CLAY]	
32	24/24	48	5.0					GRAY AND REDDISH GRAY MOTTLED SILTY CLAY GRADES TO DARK GRAY SILTY CLAY with dark gray coarse rounded gravel (dry) (stiff) [TILL]	
33	18/0	67/.8	NA	511.6 99.2	100			No recovery	Driller will spin 4" approximately 2' into rock, driller notes rocks @ Approx. 99.2'.
									Driller will spin casing to 103' BGS, Approx. 3.5' into bedrock.
					105			RUN #1 103.3'-111.0'	
								DARK GRAY TO GRAY SHALE with few fractures, upper slightly weathered, thin bedded becomes fresh, crystalline layer REC=97%, RQD=81% FAIR	Resume on 7/27/94, 10:00 start coring, 10:30 Driller measures length of first rod down to 111'.
					110				
					115				

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-173-152	4 of 4	MWN-3D

continuation

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
				1089.8 120	120			RUN #2 111'-121' DARK GRAY THINLY BEDDED SHALE with abundant vertical fractures, fresh Boring completed @ 121 ft on 7/27/94 @ 11:00.	10:40, start boring #2, driller notes petroleum odor, sheen on outflow 11:08 run #2 cored.

WELL CONSTRUCTION LOG

PROJECT	PROJECT NUMBER	WELL NUMBER
Bethlehem Steel Corp., RFI	00120-173-152	MWN-3D

SITE	COORDINATES	GROUND SURFACE ELEVATION	CASING STICKUP
Lackawanna, NY	S20+75.80 / W37+12.99	610.76 Plant ☒Surveyed ☐Estimated	2.76

Soil Boring Cross-Reference *MWN-3D*
Town and City *Lackawanna*
County and State *Erie, NY*

Installation Date (s) *6/09/94, 7/27/94, 7/28/94*

Drilling Method *Failing F-10, 8-1/4" HS Augers*
Drilling Contractor *Empire Soils/Dave Hadder*
Drilling Fluid *None*

Development Technique (s) / Dates
PVC Bailer/Polyethylene Rope
Dates: 8/02/94

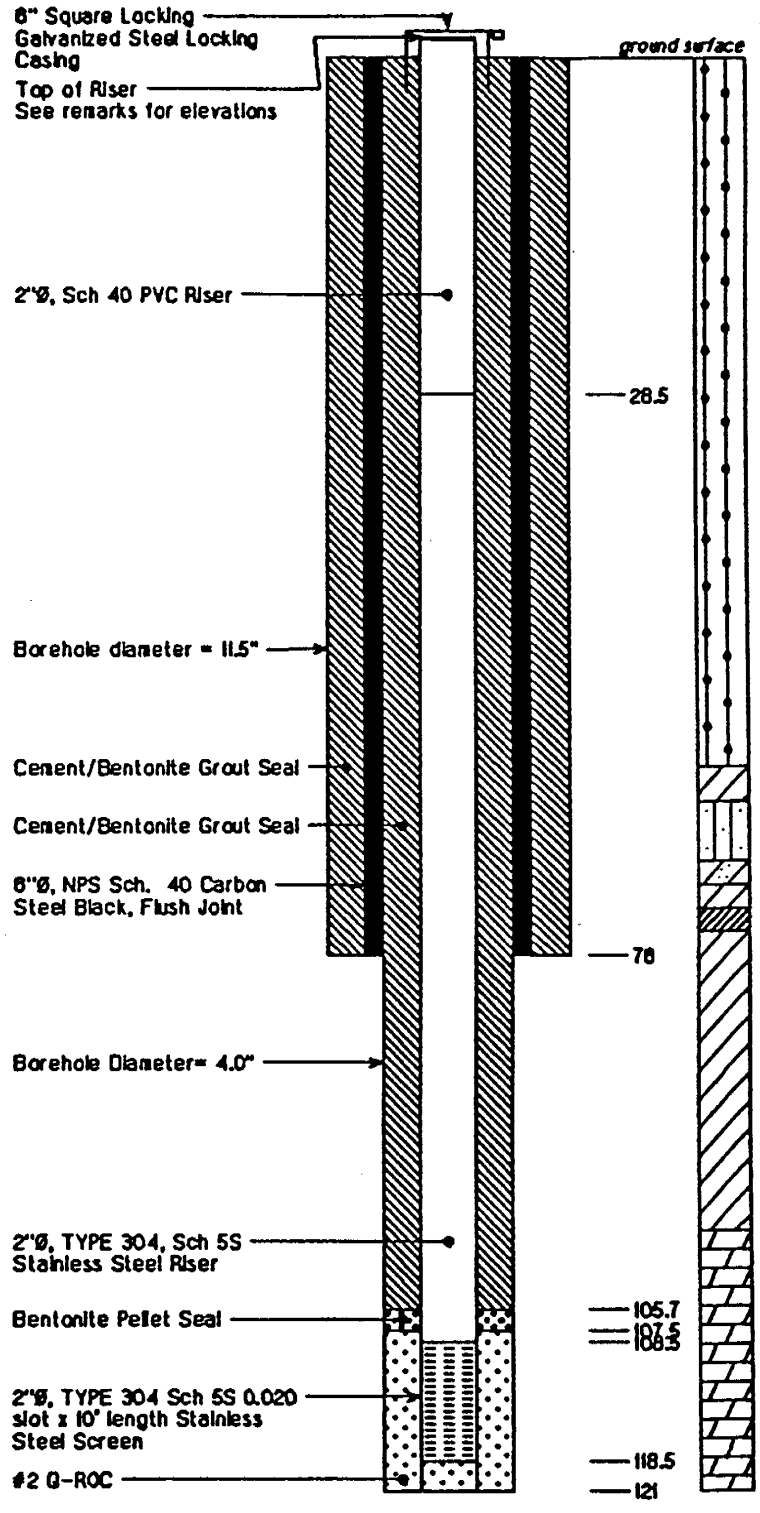
Fluid Loss During Drilling (gals) *None*
Water Removed During Development (gals)
27.0 - 8/02/94

Static Depth to Water Date *8/02/94*
Static Depth to Water (feet) *39.87*

Well Purpose *Groundwater Monitoring*

Remarks *Not to Scale*
Top of Riser Elevation: 613.51
Top of Protective Casing: 613.52

Prepared By *J. Ignaszak*
Date Prepared *06/15/94*



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WELL DEVELOPMENT RECORD

WELL No. MWN-3D

PROJECT : BSC - Well Development PROJECT No. : BD-94-010 SITE LOCATION :

CONTRATOR : Huntingdon / Empire Soils METHOD(S) OF DEVELOPMENT : PVC Bailer w/ Poly Rope

FIELD INSPECTOR(S) : Stephen Bachenek / Tracy Duzyer

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
8/2/94	Hazy Humid 80's°F	1220	Initial WL 39.87 BOW 121.10 WC 81.23 WV 13.26	-	-				Background (BG) = 3.4 ppm At Riser = BG
		1233	Initial Purging	12.37	17.4	2.60	>100	Mod Turbid; Gray	
		1317	87.10	6.71	16.4	1.243	>100	Turbid; Brown Gray	1 Well Volume 13.25 Gals.
		1320							Surge w/ PVC Bailer For Approx. 5 min. PID = BG Hear Water Flowing Into Well
		1344	99.01						
		1355	"Dry"					18.0 Gals Purged	Insufficient Water Being Brought Up By Bailer (~1" 2')
		1515	2nd Initial W.L. 96.28 2nd Initial Purging	6.37	16.9	1.082	>100	Turbid; Brown Gray	
		1550	"Dry"	6.48	16.6	1,080	>100	Turbid; Brown Gray	Insufficient Water Being Brought Up By Bailer (~.5' 1.0') 27.0 Gals Purged

Monitoring well is developed. Since well went to "dryness" twice during development and the Final ~~Fine~~ Field measurements are within the

MWN-04

DATE
STARTED 9-10-90
FINISHED 9-12-90
SHEET 1 OF 3

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG
(BTA-90-133)

HOLE NO. MWN-4
SURF. ELEV. 622.2
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
0								Black f-c SAND and SILT, some f-c Gravel, little Cinders, tr. organics, tr. slag (moist, FILL)	
5								Black to brown f-c SILTY Sand, some Cinders, little Wood, little Gravel (moist, FILL)	Distinct cresote-like odor noted during augering from 2.0 to 20.0'. Wood appears to be buried rail-road ties.
10									PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm). BG=Background PID measurements=0.0-0.2 ppm.
15									
20								Black f-c SILTY SAND and CINDERS, some f-c Gravel, tr. clay (moist, FILL)	
25		1	28	34			50-		Auger spoil has a distinct "tar" - like odor and appeared to be some-what cohesive starting at 30.0'
			10	13		44	62	Contains tr. brick, tr. slag	
30									
35								Contains tr. steel cable	Driller notes auger spoil appearing wet at 38.0'.
40								Black to gray f-c SILTY SAND, little Clay, little f. Gravel (moist-wet, FILL)	

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

DATE
STARTED 9-10-90
FINISHED 9-12-90
SHEET 2 OF 3

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

HOLE NO. MWN-4
SURF. ELEV. 622.2
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTHS	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
40		2	100/.4				BG	Gray SLAG (wet, FILL)	Obstruction noted at 40.4' difficult drilling. *Water noted at 38.0'.
45									
50									
55									
60									Change noted by Driller.
65								Black f-c SILTY SAND, tr. gravel, tr. wood (moist-wet, FILL)	
70		3	4	6			4.2-		
			7	10		13	4.4	Gray SILTY CLAY, little f. Sand, tr. gravel (moist, FILL)	Strong organic decay type odor noted on Sample No. 3.
75									
80									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow.
C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

DATE
STARTED 9-10-90
FINISHED 9-12-90
SHEET 3 OF 3

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

(BTA-90-133)

HOLE NO. MWN-4
SURF. ELEV. 622.2
G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation
Phase I Investigation

LOCATION Lackawanna Facility
Lackawanna, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER (0/6 | 6/12 | 12/18 | N)	PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
80						
	ST-1		TUBE (Attempt)		Gray to black f-c SILTY SAND, little Wood, (possible railroad ties), tr. gravel (moist, FILL)	Driller notes a 3.0' blow-up of sand into augers at 75.0'.
85			5 6 4			
			5 6 9	BG	Gray SILT and Clay, little f-c Sand, contains sand partings (moist-wet, medium)	"Running Sand" noted at 80.0'
	ST-2		TUBE (No Recovery)			ST-1 (Shelby Tube) (89.0'-91.0') No recovery
90						
95						Driller notes difficult drilling conditions at 95.0'-116.0' (possible glacial till)
100						
105						
110						Driller notes difficult drilling possible weathered rock at approx. 116.0'.
115						Free Standing Water at 38.0' at boring completion
		5	100/0.0	REF	Weathered SHALE Rock	
120					Boring completed at 117.1' with Auger & Split spoon refusal.	Refer to Monitoring Well Completion Reports for Well Installation Details.

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow. Visual by Geologist

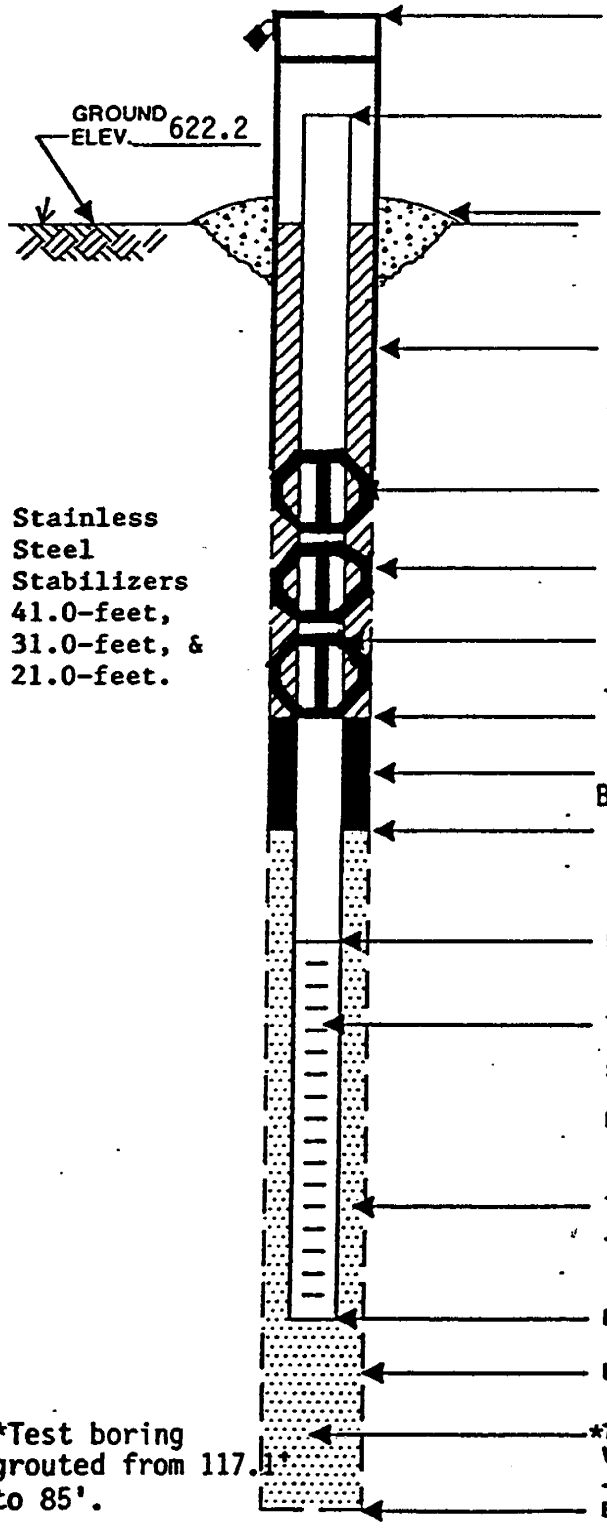
METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

EMPIRE
SOILS INVESTIGATIONS INC.

MONITORING WELL COMPLETION RECORD

PROJECT : Bethlehem Steel WELL No. MWN-4
PROJECT No. : BTA-90-133 LOCATION : Lackawanna, N.Y.
INSTALLATION DATE(S) : 9-14-90, 9-17-90
FIELD GEOLOGIST : D.R. Steiner

DRILLER : J. Lamm
DRILLING METHOD : ASTM-D-1586
DEVELOPMENT METHOD Bailer/Handpump



ELEVATION / TOP OF SURFACE CASING : 625.43
STICK-UP / TOP OF SURFACE CASING : 3.23'
ELEVATION / TOP OF RISER PIPE : 624.74'
STICK-UP / TOP OF RISER PIPE : 2.54'
TYPE OF SURFACE SEAL : Sakrete
I.D. OF SURFACE CASING : 8-Inch Square
TYPE OF SURFACE CASING : Corrosion-resistant steel
TYPE OF BACKFILL : Cement/Bentonite grout
BOREHOLE DIAMETER : Nominal 12-1/4-inches
I.D. OF RISER PIPE : 4.0-inches
TYPE OF RISER PIPE : Polyvinyl Chloride (PVC), Schedule 40, threaded
DEPTH OF SEAL : 41.0'
TYPE OF SEAL : Bentonite Pellets - Bentonite Slurry
DEPTH OF SAND PACK : 44.1'
DEPTH TOP OF SCREEN : 46.1'
TYPE OF SCREEN : Type 316-Stainless Steel
SLOT SIZE x LENGTH : 0.010" slot x 10'
I.D. OF SCREEN : 4.0-inches
TYPE OF SAND PACK : #2-ORok Sand
DEPTH BOTTOM OF SCREEN : 56.1'
DEPTH BOTTOM OF SAND PACK : 59.6'
*TYPE OF BACKFILL BELOW OBSERVATION WELL : Cement/Bentonite Grout, Natural material.
ELEVATION / DEPTH OF HOLE : 505.1/117.1'

DAMES & MOORE
A PROFESSIONAL LIMITED PARTNERSHIP

WELL DEVELOPMENT RECORD

WELL No. MW-N4

PROJECT : BSC - Phase 1 Investigation PROJECT No. : BTA-90-133 SITE LOCATION : Lackawanna, New York

CONTRATOR : Empire Soils Investigations METHOD(S) OF DEVELOPMENT : Hand Bailed

FIELD INSPECTOR(S) : Sharon McLellan, Robert Rae, Don Wartinger,

DATE	WEATHER/ TEMP.	TIME	WATER DEPTH TOP OF RISER (FT)	pH (UNITS)	TEMP. (°C)	SP. COND. (umhos)	NTU	VISUAL APPEAR., ODOR, ETC...	NOTES : GAL. REMOVED, ETC...
12/7/90	Overcast, 25°-35° F, 15-35 Mph WSW winds	12:30	Initial = 51.69						Initial water level prior to development
				11.5	18.4	5.66	1080	Very black, very turbid, "coke-oven"-type odor.	8 gallons removed Well dry at 8g.
				11.3	19.8	6.00	348		9 gallons removed well dry at 9g
				11.3	20.0	6.05	200		12 gallons removed well dry at 12g
				11.3	20.1	6.06	192		12.5 gallons removed well dry at 12.5g
		1:55	Final = 57.30						Final water level after development.

Note: ~2.9 gallons well Volume

LD

TUBINE FOUNDATION GEOTECHNICAL BORING LOGS (SJB Services)

12/12/05

DRILL RIG: 85

DRILLERS NAME: ? Brown - J. ?

FIELD LOG

S B SERVICES, INC. Contract Drilling and Testing

HOLE # WT-1

SHEET 1 of 2

PROJECT

LOCATION

Depth ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing	Sample Recovered	Classification of Materials Drilled (Moisture/Color)	Other Data / Well Details
0-2	1	5	50/2					4	Slag	
2-4	2	10	12	28	18	40		13	sand slag Fill	
4-6	3	3	4	4	4	8		0	No Rec	
6-8	4	5	4	3	3	7		12	silt sand slag	
8-10	5	8	10	11	13	21		15	Same To Gravel at 8.5'	
10-12	6	17	18	12	11	30		12	gravel slag	
13.5-15.5?	7	16	11	14	16	35		12	Same	
15-17	8	7	8	9	9	17		4	Same	
17.5-19.5	9	10	30	50/4				7	Sand + cinders	
20-22	10	10	35	50/4				5	Same	
22.5-24.5	11	15	50/4					5	Same	
25-27	12	30	50/2					5	Same water 25.7'	12/13/05
27.8-28.8	13	50/4						2	slag	
32-34	14	50/1								@ 38' after drilling (out of slag)
37-37.5	15	50/3						.3	slag	
42-44	16	7	9	8	10	17		.9	sand change to clay w/gravel	
47-49	17	5	9	9	8	18		1.5	silty clay	[illegible] 13-14-05
52-54	18	6	9	6	9	15		1.5	layered silt, sand	
57-59	19	16	14	19		33		1.1	sandy till	
62-64	20	50/3						.5	sandy till w/shale	
67-67.5	21	50/6						.6	Same	

SIZE AUGERS/CASING ______ SIZE SPOON ______

SIZE THIN-WALLED TUBE ______ SIZE CORE ______

OVER

N = No. blows to drive ____" spoon ____" with ____ lb. pin wt. falling ____" per blow.

OVER

____ lb. weight falling ____" per blow.

FIELD LOG

HOLE # MW-1

SHEET 2 of 2

SJB SERVICES, INC. Contract Drilling and Testing

DRILL RIG:

DRILLERS NAME:

PROJECT

LOCATION

Depth Ft.	Sample #	Blows on Sampler 0/6 6/12 12/18 18/24 N	Blows on Casing O	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS

Run	Depth	Rec.	WATER loss
1	69.5 to 74.5	5	0%
2	74.5 to 79.5	4.5	0%

SIZE AUGERS/CASING

SIZE SPOON

SIZE THIN-WALLED TUBE

SIZE CORE

OVER

N = No. blows to drive ___ spoon ___ with ___ lb. pin wt. falling ___" per blow.

12/16/05

FIELD LOG

HOLE #WT2

SHEET ___ of ___

DRILL RIG: 85

DRILLERS NAME:

SB SERVICES, INC. Contract Drilling and Testing

PROJECT

LOCATION

Depth ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing 0	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
0-2	1	12	43	38	45	80		19	Slag	
2.5-4.5	2	5	11	14	22	25		13	Ash + Slag	
5-7	3	8	9	14	20	23		12	Same	
7.5-9.5	4	4	5	8	8	13		10	Same	
10-12	5	4	25	7	5	32		10	Same + Fire Brick	
12.5-14.5	6	4	10	12	12	22		12	Same	
15-17	7	5	5	6	6	11		12	Fire brick	
17.5-19.5	8	4	6	5	5	11		12	Slag	
20-22	9	8	12	8	8	20		12	Slag + wood	
22.5-24.5	10	5	13	26	50/4			14	Slag	
(1) 25-27	11	16	50/5					4	Ash slag gravel + wood	
								0	Could Not Get Through Fill with Roller Bit	
									Moved Hole 10' North After Ref. at 22' (2)	
									Moved Hole 10' North Ref at 16' (3)	
(4) 30-32	12	50/1						0	NO RECOVERY	

COPY

MOVED LINE AGAIN 50' WEST

HIT REFUSAL AT 30.1

B.O.H. @ 30.1'

SIZE AUGERS/CASING ___ SIZE SPOON ___

SIZE THIN-WALLED TUBE ___ SIZE CORE ___

OVER

N = No. blows to drive ___ spoon ___ with ___ lb. falling ___ per blow

OVER

DATE	TIME	FROM	TO	WEATHER	TEMP
1/19/06					

FIELD LOG

HOLE # Wt2 5th Try

SHEET ___ of ___

DRILL RIG: 85

DRILLERS NAME: Ron Brown, Dale Miller

PROJECT BQ Energy

LOCATION B.S. Plant

SJB SERVICES, INC. Contract Drilling and Testing

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	SAMPLE Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTEER DATA	WELL DETAILS
									Still Augering in DeBris at 40'		
45-47	1	50/3						0	No Rec.		
50-52	2	50/4						.4	Slag & Sand	Augering Got Softer at 48'	
55-57	3	4	4	12	10			.5	Gray Sand & Gravele Trace of clay		
57-59	4	11	9	7	20			1.0	Grey clay & Sand		
										Water 34' G.S. at completion	
									B.O.H. at 59'		
									(3)		

SIZE AUGERS/CASING _____ SIZE SPOON _____

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

OVER

N = No. blows to drive _____" spoon _____" with _____ lb. pin wt. falling _____" per blow.

OVER

DATE: 1/4/06 | FROM | TO | FIELD LOG

DRILL RIG: CME 85 | DRILLERS NAME: RON BROWN / DALE MILLER

PROJECT B S ENERGY

LOCATION BS PLANT

SJB SERVICES, INC. Contract Drilling and Testing

HOLE # WT-3

SHEET 1 of 2

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing O	Sample Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
0-2	1	2	22	28	14	50		1.4	BROWN SILT/GRAVEL - SLAG	
2.5-4.5	2	4	10	10	20	20		1.1	BROWN SILT / SLAG	
5-7	3	4	15	17	15	32		1.2	BLACK SAND/SLAG & GRAVEL	
7.5-9.5	4	13	11	9	18	20		1.2	BLACK SAND/SLAG & GRAVEL WITH BRICK	
10-12	5	7	10	9	6	19		1.9	BLACK SAND/SLAG	
12.5-14.5	6	7	13	15	11	28		1.3	SAME	
15-17	7	6	12	17	10	29		1.1	SAME	
17.5-19.5	8	5	7	9	9	16		1.8	SAME	
20-22	9	9	19	12	9	31		1.2	SAME	
22.5-24.5	10	2	2	7	1	9		0	NO RECOVERY	
25-27	11	2	4	17	18	21		1.5	BLACK SAND/SLAG	
27.5-29.5	12	10	50/0			—		1.5	BLACK WET SAND/GRAVEL	- HIT WATER @ 27.5'-29.5'
30-32	13	12	50/1			—		1.5	SAME	
									← → PUT 4" CASING IN HOLE TO 35' + ROLLERBIT OUT	
35-37	14	3	5	8	7	13		1.5	BLACK WET SAND/SLAG	
40-42	15	23	19	20	23	39		1.7	BLACK WET SAND/SLAG	100% water Loss Between 30' & 44'
45-47	16	50/4						1.2	BLACK WET SAND/SLAG	
50-52	17	50/3						0	NO RECOVERY	1/5/06 water 18' G.S. in 4" casing
55-57	18	2	4	7	20	11		1.7	GRAY CLAY/SILT W/GRAVEL	
60-62	19	push	push	1	4	—		2.0	SAME	
65-67		—	—	—	—	—			SHELBY TUBE REC. = 2.0	
									→	HIT SOMETHING HARD @ 69'
70-72	20	6	10	12	50/4	22		1.3	GRAY SILT/SAND W/GRAVEL & SHALE FRAGMENTS	

SIZE AUGERS/CASING 6 1/4 AUGERS / 4" CASING | SIZE SPOON

SIZE THIN-WALLED TUBE | SIZE CORE

OVER . . . . .

N = No. blows to drive _____" spoon _____" with _____ lb. pin wt. falling _____" per blow.

OVER . .

DATE: 1-5-06 | FROM | TO |

FIELD LOG

HOLE # WT-3

SHEET 1 of 2

SB SERVICES, INC. Contract Drilling and Testing

DRILL RIG: CME 85

DRILLERS NAME: RON BROWN / DALE MILLER

PROJECT BROWERLY

LOCATION BS PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6 6/12 12/18 18/24 N	Blows on Casing O	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
25-77	21	50/2"		11	GRAY/BLACK SHALE	HIT HARD ROCK @ 72'
					B.O.H. @ 75.2'	

SIZE AUGERS/CASING _____ SIZE SPOON _____

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

OVER . . . . .

N = No. blows to drive _____" spoon _____" with _____ lb. pin wt. falling _____" per blow.

OVER . .

12/28/05

FIELD LOG

HOLE # WT-4

SHEET 1 of

DRILL RIG: CME 75

DRILLERS NAME: Ron Brown / Scott F

PROJECT

LOCATION

SERVICES, INC. Contract Drilling and Testing

Depth Ft	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing O	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
0-2	1	15	30	DC	20	60		18	moist, Black, Brown, gravel, 10-15% gravel, Sand, Slag, fine to very coarse size sands - fill	
2.5-4.5	2	4	14	14	7	28		16		
5-7	3	2	6	4	9	10		6		
7.5-9.5	4	3	5	5	4	10		12		
10-12	5	5	6	14	12	20		14		
12.5-14.5	6	3	50	45/5		75		18		12/29/05
15-17	7	7	14	7	5	21		16		
17.5-19.5	8	2	3	7	15	10		14		
20-22	9	7	8	7	5	15		15		25'
22.5-24.5	10	2	6	7	7	13		15		
25-27	11	5	17	30	50/3			18	moist, Brown, gravelly, 10-15% gravel, sand, Slag, organic matter, fine to very coarse size sands	
27.5-29.5	12	50/2						2	dry, white/gray, sand, Slag, fine to very coarse size sands	water in 4 3'
30-32	13	30	50/4					16		Switch to 5 7/8 Roller Bit @ 32'
35-37	14	2	1	3	1	4		12	moist to wet, olive green, gravel, Sand, Slag, fine to very coarse size sands fill	40 Drilling @ 35' Roller Bitting @ 39'
40-41.3	15	20	50	50/3				12		Put 4" In @ 40' lost water Return @ 35'
45-47	16	5	6	6	8	12		24	wet moist to wet, olive green to Black Slag Sand, Slag, fine to very coarse size sands + steel fillings	Down to 45'
50 51.4	17	50	50	50/4				16		
55-57	18	10	12	13	13	20	26	24	Black, wet, sandy silt, fine to fine size sands, tends to liquify when disturbed	Harder to drill @ 58'
60-60.3	19	50/3						12		
65-67	20	50/6	7	8	7			24	wet moist, gray clay	

SIZE AUGERS/CASING 6 1/4 SIZE SPOON 2"

SIZE THIN-WALLED TUBE SIZE CORE NA

OVER

N = No. blows to drive 2 ft. spoon 12 in. with 130 lb. pin wt. falling 30 in. per blow.

OVER

FIELD LOG

HOLE # 444
SHEET 2 of

SB SERVICES, INC. Contract Drilling and Testing

DRILL RIG: CME 55
DRILLERS NAME: Ron Brown / Scott F
PROJECT BS Energy
LOCATION B.S. Plant

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing	Sample Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS
										12/29/05	
70-72	[illegible]	/	/	/	/				[illegible] By tube - clay Rec 2.5		
75-77	21	WH	WH	5	5			24	-moist, gray [illegible], [illegible] silt, Has [illegible] layered		
80-82	22	WH	WH	WH	4			24	[illegible] moist, gray, [illegible] 30-40% sand, sandy silt, with some silt [illegible] very coarse [illegible] sand		
85-87	23	10	10	15	31	25		18		got hard at 87.5	
90-91.4	24	31	50	50/4				12	fill		
95-95.1	25	50/1						Ø	NO RECOVERY	CORED FROM 95' TO 100" REC. 18"	
100-102	26	23	35	50	9/4			1.2	BROWN CLAY WITH SHALE FRAGMENTS		
105-107	27	28	31	39	50/4			1.4	BROWN CLAY/SILT WITH SHALE AT BOTTOM		
110-112	28	48	27	29	30			1.3	SAME	CORED FROM 107' TO 110' REC. 18"	

ROLLER BIT TO 113'
HIT ROCK START TO CORE.
113' - 123'
REC. 9' 20% water loss

SIZE AUGERS/CASING
SIZE THIN-WALLED TUBE
SIZE SPOON
SIZE CORE

OVER . . . . .

N = No. blows to drive ____" spoon ____" with ____ lb. pin wt. falling ____" per blow.

OVER

DATE	TIME	FROM	TO	WEATHER	TEMP
1-12-06					

FIELD LOG

HOLE # WT-5
SHEET ___ of ___

SB SERVICES, INC. Contract Drilling and Testing

DRILL RIG: CME 55
DRILLERS NAME: RON BROOM / DALE MILLER

PROJECT B.Q. ENERGY

LOCATION B.S. PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing @	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)
0 - 2	1	16	28	50/4		—		1.5	SLAG/SAND
2.5 - 4.5	2	10	43	50/4		—		.8	SAME
5 - 7	3	32	40	35	38	75		1.5	SAME
7.5 - 9.5	4	3	36	50/2		—		.5	SAME - MOIST
10 - 12	5	6	41	50/1		—		1.5	SAME
12.5 - 14.5	6	17	32	26	50/4	58		1.0	SAME
15 - 17	7	9	50/3			—		.4	SLAG W/ GRAY SAND
17.5 - 19.5	8	50/2						.1	SAME
20 - 22	9	50/2						.1	SAME
22.5 - 24.5	10	50/1						.1	SLAG + STEEL - SAMPLE WAS WET

PIF

OTHER DATA / WELL DETAILS

- HIT WATER @ 22.5'

- HIT STEEL WITH AUGERS MOVED SOUTH WEST 5' START NEW HOLE.

- HIT STEEL WITH AUGERS @ 16' MOVE AHEAD 15' START NEW HOLE.

HIT STEEL WITH AUGERS @ 15' HOLE WAS CALLED

SIZE AUGERS/CASING _____ SIZE SPOON _____
SIZE THIN-WALLED TUBE _____ SIZE CORE _____

OVER

N = No. blows to drive ____" spoon ____" with ____ lb. pin wt. falling ____" per blow.

OVER

DATE	FROM	TO			FIELD LOG
~~[illegible]~~					
1-19-06					

DRILL RIG: CME 85

DRILLERS NAME:

PROJECT B.Q. ENERGY

LOCATION B-S. PLANT

SJB SERVICES, INC.
Contract Drilling and Testing

HOLE # WT-5 4TH TRY

SHEET ___ of ___

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)
25-27	1	21	21	29	18	50		1.0	GRAY SLAG
30-32	2	21	18	21	50/3	39		1.2	SAME
35-37	3	38	50/4					.9	GRAY SLAG/SAND
40-42	4	30	15	8	8			.5	BLACK SAND
45-47	5	32	18	21	50/3			.5	SAME
50-52	6	WOH	WOH	WOH	11			.8	GRAY SAND/GRAVEL
									B.O.H. @ 52'

OTHER DATA / WELL DETAILS

AUGERED TO 25'

1-20-06 WATER @ 24'

WATER @ 25' AFTER COMPLETE

SIZE AUGERS/CASING ______ SIZE SPOON ______

SIZE THIN-WALLED TUBE ______ SIZE CORE ______

OVER.....

N = No. blows to drive ____" spoon ____" with ____ lb. pin wt. falling ____" per blow.

OVER..

DATE	TIME	FROM	TO	WEATHER	TEMP
1-20-06					

FIELD LOG

HOLE # WT-5 5 TB

SHEET ___ of ___ TRY

SJB SERVICES, INC. Contract Drilling and Testing

DRILL RIG: CME 85

DRILLERS NAME: R. Blount

PROJECT B.Q. ENERGY

LOCATION B.S. PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing Q	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS
25-27	1	11	15	23	28			1.5	SLAG		
30-32	2	17	23	50/4				.5	SAME		
35-37	3	21	50/4					.8	SAME		
40-42	4	28	21	13	14			1.3	BLACK SAND		
45-47	5	4	11	9	7			.9	GRAY SAND/SOME CLAY		
47-49	6	19	39	13	11			.5	SAND/ CLAY + SILT		

B.O.H. 49'

water 25' G.S. at completion

SIZE AUGERS/CASING _____ SIZE SPOON _____

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

OVER

N = No. blows to drive _____" spoon _____" with _____ lb. pin wt. falling _____" per blow.

OVER

DATE	TIME	FROM	TO	WEATHER	TEMP

FIELD LOG

SB SERVICES, INC — Contract Drilling and Testing

HOLE # MW-6

SHEET 1 of 2

DRILL RIG: CME 85

DRILLERS NAME: RON BROWN / DALE MILLER

PROJECT B.Q. ENERGY

LOCATION B.S PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing O	Sample Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
0 - 2	1	40	31	31	45	62		.6	SLAG/GRAVEL	
2.5-4.5	2	12	41	33	16	74		1.0	SAME	-NO CUTTINGS CAME BACK FOR 10' SAMPLE (BAG)
5 - 7	3	8	12	40	38	52		.9	TAN SILT W/SLAG & GRAVEL	
7.5-9.5	4	19	50/4			—		.6	SLAG	
10 -12	5	32	50/2			—		.5	SAME	
12.5-14.5	6	21	37	34	50/3	71		1.1	SAME	
15 - 17	7	20	40	13	5	53		.8	SAME	
17.5-19.5	8	27	50/4			—		.7	SAME	
20 - 22	9	4	13	28	50/3	41		1.0	SAME	
22.5-24.5	10	7	14	17	17	31		1.1	SAME	
25 - 27	11	8	32	50/4		—		1.0	SAME	
27.5-29.5	12	22	50/2			—		.5	SAME	
30 - 32	13	9	37	23	50/3	60		1.3	SAME	
32.5-34.5	14	15	37	50/2		—		.7	SAME	
35 - 37	15	24	40	46	50/3	—		1.2	SAME (SAMPLE WAS WET)	HIT WATER @ 35-37 SAMPLE
40 - 42	16	14	18	8	10	26		1.0	SAME	
45 - 47	17	15	24	12	12	36		1.6	BLUE/WHITE SLAG (WET)	
50 - 52	18	20	50/4			—		.7	SAME	
55 - 57	19	16	50/4			—		.5	SAME	
60 - 62	20	20	26	50/3		—		.7	BLACK SAND	

Fill To About 60'

SIZE AUGERS/CASING _____ SIZE SPOON _____

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

OVER . . . . .

N = No. blows to drive _____" spoon _____" with _____ lb. pin wt. falling _____" per blow.

OVER

DATE	TIME	FROM	TO	WEATHER	TEMP

FIELD LOG

SJB SERVICES, INC. Contract Drilling and Testing

HOLE # WT-6
SHEET 2 of 2

DRILL RIG: CME 85
DRILLERS NAME: RON BROWN / DALE MILLER
PROJECT BP ENERGY
LOCATION BS PLANT

Depth Ft	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing @	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
65-67	21	7	5	5	6	10		1.5	BROWN CLAY	
70-72	22	17	17	9	11	26		1.0	GRAY SAND	1-11-06 WATER @ 43.5' IN MORN.
75-77	23	5	2	2	3	4		1.4	BROWN CLAY	
80-82	24	-	-	-	-	-			TOOK SHELBY TUBE - NO RECOVERY	
85-87	25	1	2	2	5	4		2.0	GRAY CLAY	
90-92	26	2	2	7	9	9		1.8	SAME	
92-94	27								SHELBY TUBE 2' Rec.	
95-97	28	WT	5	7	18	12		2.0	GREY SILTY CLAY, tr gravel, fr-(ith weathered clay fragments (wet, STIFF, CL)	POSSIBLE (TILL SOIL)
100-100.1	29	50/.1			REF			0.1	WEATHERED SHALE FRAGMENTS	
									BOH @ 100.1 SPOON BOUNCE AT 100.1 SHALE	
									ABANDONED WATER READING @ 34 FT	

SIZE AUGERS/CASING
SIZE THIN-WALLED TUBE
SIZE SPOON
SIZE CORE

OVER

" spoon " with lb. pin wt. falling " per blow.

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
1-13-06		0			

FIELD LOG

SB SERVICES, INC. Contract Drilling and Testing

HOLE # WT-7

SHEET 1 of 2

DRILL RIG: CME 85

DRILLERS NAME: RON BROWN, DALE MILLER

PROJECT B.Q. ENERGY

LOCATION B.S. PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS
0-2	1	19	39	30	37	69		1.0	SLAG + SAND		
2.5-4.5	2	3	14	26	12	40		1.0	SLAG		
5-7	3	5	15	12	17	27		1.0	SAME		
7.5-9.5	4	50/2				—		0	NO RECOVERY		
10-12	5	7	8	50/4		—		.5	SLAG		
12.5-14.5	6	50/4				—		.3	SLAG		
15-17	7	59	50/2			—		.5	SLAG	- START TO ROLLER BIT @ 15'	
17.5-19.5	8	1	28	50/2		—		.5	SLAG		
20-22	9	2	50/2			—		.3	SLAG		
22.5-24.5	10	2	34	41	34	75		.5	SLAG		
30-32	11	5	50/1			—		.4	SLAG		
35-37	12	4	16	24	50/2	—		.5	SLAG	- HIT WATER @ 34.5' 1-16-06	
40-42	13	3	22	50/1		—		.2	SLAG		
45-47	14	22	15	9	14	24		1.0	SLAG		
50-52	15	50/2				—		0	NO RECOVERY		
55-57	16	22	38	18	15	46		1.9	BLACK SAND LAST 6" WAS SLAG + SAND		
60-62	17	28	24	37	37	61		1.2	SAME		
65-67	18	17	13	7	5	20		1.0	BROWN CLAY		
70-72	19	1	6	8	12	14		.8	~~SAME~~ GRAY SILT/SAND WITH CLAY		
75-77	20	12	24	20	25	44		1.1	GRAY TILL + GRAY SILT/SAND		

SIZE AUGERS/CASING ______ SIZE SPOON ______

SIZE THIN-WALLED TUBE ______ SIZE CORE ______

O V E R . . . . .

N - No. blows to drive " spoon " with lb. pin wt. falling " per blow

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
1-17-06					

FIELD LOG

SJB SERVICES, INC. Contract Drilling and Testing

HOLE # WT-7
SHEET 2 of 2

DRILL RIG: CME 85
DRILLERS NAME: RON BROWN / DALE MILLER
PROJECT B.Q. ENERGY
LOCATION B.S. PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	Sample Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS
80-82	21	WOH	WOH	WOH	2	2		2.0	BROWN CLAY		
82-84	22	-	-	-	-	-			SHELBY TUBE		
85-87	23	1	3	5	3	8		1.0	GRAY CLAY		

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
1-18-06					

FIELD LOG

SJB SERVICES, INC. Contract Drilling and Testing

HOLE # WT-7
SHEET 3 of 3

DRILL RIG: CME 85
DRILLERS NAME: RON BROWN / DALE MILLER
PROJECT B.Q. ENERGY
LOCATION B.S. PLANT

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	Sample Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS
90-92	24	WOH	WOH	WOH	1			2.0	BROWN CLAY		
95-97	25	7	4	4	11			0	NO RECOVERY		
100-102	26	14	17	24	25			1.0	BROWN TILL		
105-107	27	36	45	50/4				.9	TILL WITH WEATHERED SHALE IN BOTTOM	- HIT HARDER MATERIAL WITH ROLLER BIT AT 97'	

12/20/05

FIELD LOG

HOLE # WT-8

SHEET ___ of ___

SB SERVICES, INC. Contract Drilling and Testing

DRILL RIG: 85

DRILLERS NAME: Ron Brown / Scott P.

PROJECT [illegible]

LOCATION Bethlehem Steel

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	Sample Recovery	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)
0-2	1	18	10	29	29	39		14	Black moist sand gravel, slag fill
2.5-4.5	2	11	20	21	32	41		22	
5-7	3	8	27	15	20	42		24	Sand gravel slag Brick
7.5-9.5	4	7	14	16	22	30		[illegible]	
10-12	5	50/3						3	Sand, silt, moist Black, cobble
12.5-14.5	6	6	10	7	7	17		[illegible]	Sand, silt, slag brick
15-17	7	3	22	50/[illegible]				12	
17.5-19.5	8	17	22	50/[illegible]				12	sand, slag
20-22	9	[illegible]	50/3					6	Slag
22.5-24.5	10	12	50/[illegible]					6	Slag sand
25-27	11	12	20	17	42			18	Slag, sand
27.5-29.5	12	2	9	7	7			24	Slag sand
30-32	13	1	9	7	24			23	Slag, Brick, sand
		12							
	14	[illegible]							
32.5-34.5	[illegible]	12	31	26	[illegible]				" "
35-37	15	12	13	16	42			14	" "
38-40	16	50/[illegible]						[illegible]	No recovery
42.5-44.5	17	13	22	40	18			6	Slag, sand, cobble fragments
40-45	18	10	40	31	12			22	silt, slag, gravel - wet
		16							
47-49	19	10	9	11	14			22	Slag, sand, gravel

OTHER DATA / WELL DETAILS

First encountered water @ 43'

~~[illegible]~~

Started Roller Bitting @ 44.5

12/21/05

was losing mud lost 900 gal.

SIZE AUGERS/CASING ______ SIZE SPOON ______

SIZE THIN-WALLED TUBE ______ SIZE CORE ______

OVER.....

[illegible] lb. rig wt. falling ___ " per blow.

FIELD LOG

HOLE # MW8

SHEET ___ of ___

SJB SERVICES, INC. Contract Drilling and Testing

DRILL RIG:

DRILLERS NAME:

PROJECT

LOCATION

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing C	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA / WELL DETAILS
									[redacted]	12/22/05
									augering 6 1/4" ID to 55'	lost 900 gals of mud - 12/22/05
55-57	20	17	14	12	16	26		100	Black, wet, gravel, 10 20% sand Sand, fine to very course size sands, Slag - Fill	60
60-62	[illegible]							14	Slag, gravel, wet Black	12/22/05
										12/23/05
										*Set 41" casing to 60'
62-64	22	[illegible]						0	no Recovery	
67-69	23	14	17	22	30	39		24	wet, Brown, sand, silt with trace to little silt, fine to fine size Sands, Liquifys when disturbed	63.5 drilling got softer
72-74	24	4	4	7	9	11		24		72'
77-79	25	3	4	5	7	9		24	damoist, Gray, [redacted] silt with some clay, layered clay, and silt seams silt also	77
									moist, gray, sand silt with little to some silt, silt sand tends to liquify when disturbed,	12/23/05 12/27/05 got hard drilling at 85'
82-84	26	5	5	6	6	11		18	ex moist, gray, sand silt with some silt, fine to very course size sands	
87-89	27	3	6	7	5	13		24	damoist, 87 gravel 20-30% gravel, sand silt, clay, with little to some silt, little clay, with fine to very course size sands	
92-94	28	7	8	6	8	14		12		
97-99	29	7	7	9	9			18	101.9	
102-104	30	50/1						4	Shale, Black	Hit Bedrock at 102.6'

SIZE AUGERS/CASING ___ SIZE SPOON ___

SIZE THIN-WALLED TUBE ___ SIZE CORE ___

OVER

N = No. blows to drive ___" spoon ___" with ___ lb. pin wt. falling ___" per blow.

OVER

FIELD LOG

HOLE # WT-8

SHEET ___ of ___

SJB SERVICES, INC. — Contract Drilling and Testing

DRILL RIG: Cme 55

DRILLERS NAME: Ron Brown / Scott F

PROJECT Wind mill Borings

LOCATION Bethlehem Steel

Depth Ft.	Sample #	Blows on Sampler 0/6	6/12	12/18	18/24	N	Blows on Casing Q	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED (Moisture/Color)	OTHER DATA	WELL DETAILS
									12/28/05	Set 3" casing to Bed Rock 102.6 to keep out sands	
									CORE RUN # 1		
									102.5 - 112.5		
									Rec - 9.5		
									Shale		

SIZE AUGERS/CASING _____ SIZE SPOON _____

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

OVER - - - - -

N = No. blows to drive _____" spoon _____" with _____ lb. pin wt. falling _____" per blow.

OVER - -

APPENDIX B

SITE HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN
for
BROWNFIELD CLEANUP PROGRAM
SI/RAR/IRM ACTIVITIES

BQ ENERGY, LLC
STEEL WINDS SITE

LACKAWANNA, NEW YORK

September 2006 0083-002-400

BQ ENERGY STEEL WINDS SITE
HEALTH AND SAFETY PLAN FOR SI/RAR/IRM ACTIVITIES

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

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

Project Manager: Thomas H. Forbes, P.E.

Designated Site Safety and Health Officer: Bryan C. Hann

Acknowledgement:
I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

BQ ENERGY, LLC STEEL WINDS SITE
HEALTH AND SAFETY PLAN FOR SI/RAR/IRM ACTIVITIES

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BQ ENERGY, LLC STEEL WINDS SITE
HEALTH AND SAFETY PLAN FOR SI/RAR/IRM ACTIVITIES

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BQ ENERGY, LLC STEEL WINDS SITE
HEALTH AND SAFETY PLAN FOR SI/RAR/IRM ACTIVITIES

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APPENDICES

1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by TurnKey Environmental Restoration, LLC and Benchmark Environmental Engineering & Science, PLLC employees (referred to jointly hereafter as "TurnKey-Benchmark") during Site Investigation, Remedial Alternatives Report, and Interim Remedial Measures (SI/RAR/IRM) activities on the Steel Winds portion of the Tecumseh Redevelopment Site (former Bethlehem Steel Lackawanna Works), located in the City of Lackawanna, New York.. This HASP presents procedures for TurnKey-Benchmark employees who will be involved with SI/RAR/IRM field activities; it does not cover the activities of other contractors, subcontractors, or other individuals on the site. These firms will be required to develop and enforce their own HASPs as discussed in Section 2.0. TurnKey-Benchmark accepts no responsibility for the health and safety of contractor, subcontractor, or other personnel.

This HASP presents information on known site health and safety hazards using available historical information, and identifies the equipment, materials and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards.

1.2 Background

Tecumseh Redevelopment, Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast. Figure 2 provides an overview of the Tecumseh Property, including major leased or licensed parcels, and adjacent parcels owned by others.

The Tecumseh property is located on a portion of the site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in December 2004. USEPA and the New York State Department of Environmental Conservation (NYSDEC) are currently reviewing the RFI. Tecumseh is presently negotiating an Order on Consent with the NYSDEC to undertake corrective measures at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property.

Tecumseh has signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote and implement redevelopment of the former BSC Lackawanna property following cleanup. The conceptual Redevelopment Master Plan for the redevelopment of the entire 1,100-acre site has been prepared by Tecumseh as illustrated in Figure 3 in the SI/IRM Work Plan. Approximately 310-acres along the eastern boundary of the Tecumseh site are planned for phased redevelopment as a Business Park. Tecumseh has entered into a Brownfield Cleanup Agreement with the NYSDEC to investigate, remediate, and redevelop the Phase I Business Park. Tecumseh has also submitted an application to the NYSDEC for the Phase II and III Business Parks to also participate in the Brownfield Cleanup Program. A determination of eligibility by NYSDEC is pending for those parcels.

A portion of the Redevelopment Master Plan incorporates a parcel designated for redevelopment with wind energy facilities, a golf course, and/or a passive recreational park. BQ Energy, LLC has entered into a lease agreement with Tecumseh to construct and operate wind turbines and supporting power generation equipment and infrastructure on approximately 31-acres of the above-referenced parcel. The wind energy facilities and the associated property, hereafter referred to as the "Steel Winds Site," "subject properties," or the "Site," have been submitted to the NYSDEC for entrance into New York State's Brownfield Cleanup Program (BCP). The City of Lackawanna Planning Board, acting in its

capacity as Lead Agency under SEQRA, issued a Negative Declaration to BQ Energy for the Steel Winds wind energy project on September 7, 2005.

As a condition of the BQ-Tecumseh lease agreement, BQ will be conducting an engineering feasibility study for development of a "clean" coal gasification and synthetic natural gas production facility on the former Coke Works portion of the Tecumseh site.

1.3 Known and Suspected Environmental Conditions

The proposed Steel Winds Site is located on a portion of the former BSC Lackawanna Works that was created from the historic disposal of slag fill along the Lake Erie shoreline. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as semi-volatile and volatile organic compounds.

1.4 Parameters of Interest

Constituents of potential concern (COPCs) at the site include:

- **Volatile Organic Compounds (VOCs)** – VOCs present at elevated concentration may include benzene, toluene, ethylbenzene and xylene (i.e., BTEX). These VOCs are typically associated with storage and handling of petroleum products such as gasoline.

- **Semi-Volatile Organic Compounds (SVOCs)** – SVOCs present at elevated concentrations may include poly-aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Although PAHs are commonly found in urban soil environments, they may be present at the site at concentrations that are elevated compared to typical "background" levels.

- **Inorganics** – Inorganic COPCs potentially present at elevated concentrations due to steel making activities may include arsenic, cadmium, chromium, lead, and mercury. Several of these parameters are components of coke and slag which are prevalent in the planned work area.

1.5 Overview of SI/IRM Activities

TurnKey-Benchmark personnel will be on-site to observe and perform SI/IRM activities. The field activities to be completed are described below. Planned SI/IRM activities are more fully described in the SI/RAR/IRM Work Plan for the Site (Reference 2).

1. **Slag/Fill Sampling:** Collection of surface and subsurface slag/fill samples.

2. **Groundwater Sampling:** Development and sampling of groundwater monitoring wells.

3. **Slag/Fill Excavation for Wind Turbine Construction:** While excavating for the wind turbine foundations, TurnKey-Benchmark will monitor all soil/fill excavation and related activities to visually inspect slag/fill for evidence of contamination.

4. **Surface Water Management:** During excavation for the wind turbine foundations, surface water and/or perched groundwater infiltration may occur. TurnKey-Benchmark will direct the contractor to collect and characterize the surface water for proper disposal.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility and communication as they pertain to health and safety functions at the site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establishes the lines of communications among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this site.

2.1 Roles and Responsibilities

All Turnkey-Benchmark personnel on the site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The TurnKey-Benchmark Corporate Health and Safety Director is ***Mr. Thomas H. Forbes***. The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates TurnKey-Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this site is ***Mr. Thomas H. Forbes, P.E.*** The Project Manager has the responsibility and authority to direct all TurnKey-Benchmark work operations at the site. The Project Manager coordinates safety and health functions with the Site Safety and Health Officer, and bears ultimate responsibility for proper implementation

of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the site work plan.
- Providing TurnKey-Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this site is ***Mr. Bryan C. Hann.*** The qualified alternate SSHO is ***Mr. Richard L. Dubisz.*** The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for TurnKey-Benchmark personnel on the site.
- Serving as the point of contact for safety and health matters.
- Ensuring that TurnKey-Benchmark field personnel working on the site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP

- Maintaining site-specific safety and health records as described in this HASP
- Coordinating with the Project Manager, Site Workers and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other site personnel who will have health and safety responsibilities will include the Drilling and Test Pit Contractors, who will be responsible for developing, implementing and enforcing a Health and Safety Plan equally stringent or more stringent than TurnKey-Benchmark's HASP. TurnKey-Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. Each Contractor's HASP shall cover all non-TurnKey/Benchmark site personnel. Each Contractor shall assign a SSHO who will coordinate with TurnKey-Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to TurnKey-Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the site, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of fill/soils, and through the inhalation of contaminated particles or vapors. Other points of exposure may include direct contact with groundwater. In addition, the use of drilling and/or medium to large-sized construction equipment (e.g., excavator) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

As discussed in Section 1.3, historic activities related to the former steel-manufacturing operations and facilities have resulted in elevated concentrations of petroleum products and inorganic compounds in the site soils. No field investigations have been conducted on this portion of the property in order to obtain quantitative data. Table 1 identifies COPCs detected throughout the Tecumseh property. Table 2 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent constituents of potential concern and related health and safety guidance and criteria are provided below.

- **Arsenic (CAS #7440-38-2)** is a naturally occurring element and is usually found combined with one or more elements, such as oxygen or sulfur. Inhalation is a more important exposure route than ingestion. First phase exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.

- **Benzene (CAS #71-43-2)** poisoning occurs most commonly through inhalation of the vapor, however, benzene can also penetrate the skin and poison in that way. Locally, benzene has a comparatively strong irritating effect, producing erythema and burning and, in more severe cases, edema and blistering. Exposure to high concentrations of the vapor (i.e., 3,000 ppm or higher) may result in acute poisoning characterized by the narcotic action of benzene on the central nervous system. In acute poisoning, symptoms include confusion, dizziness, tightening of the leg muscles, and pressure over the forehead. Chronic exposure to benzene (i.e., long-term exposure to concentrations of 100 ppm or less) may lead to damage of the blood-forming system. Benzene is very flammable when exposed to heat or flame and can react vigorously with oxidizing materials.

- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.

- **Chromium (CAS #7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.

- **Ethylbenzene (CAS #100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin liver and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, headache. Narcosis and coma may result in more severe cases.

- **Lead (CAS #7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists or ankles and possibly affect memory. Lead may cause anemia.

- **Mercury (CAS #7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Over-exposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue and salivation. Mercury is a skin and eye irritant.

- **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAH's are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.

- **Toluene (CAS #108-88-3)** is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness and coordination loss. Repeated exposures may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.

- **Xylenes (o, m, and p) (CAS #95-47-6, 108-38-3, and 106-42-3)** are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure of high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

With respect to the anticipated SI/IRM activities discussed in Section 1.4, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

SI/IRM field activities at the Steel Winds Site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as backhoes, excavators and drilling equipment.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may be present during SI activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing SI/IRM activities at the site (such as, but not limited to, equipment operators, general laborers, and drillers) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and site control.

- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.
- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at TurnKey-Benchmark's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for site safety and health.
- Safety, health and other hazards present on the site.
- The site lay-out including work zones and places of refuge.

- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.
- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.
- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in site conditions (viz., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix A of this HASP, Emergency Response Plan.

4.4 Site Visitors

Each Contractor's SSHO will provide a site-specific briefing to all site visitors and other non-TurnKey/Benchmark personnel who enter the site beyond the site entry point. The site-specific briefing will provide information about site hazards, the site layout including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to TurnKey-Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all TurnKey-Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by ADP Screening & Selection Services, an occupational health care provider under contract with TurnKey-Benchmark. ADP's local facility is Health Works WNY, Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the TurnKey-Benchmark Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).

- Medical certification of physical requirements (i.e., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data.

In conformance with OSHA regulations, TurnKey-Benchmark will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All TurnKey-Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the site as required by the HASP or as modified by the site safety officer. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the TurnKey-Benchmark occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during the workday.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for TurnKey-Benchmark employees, as requested and required.

The recommended specific safety practices for working around the contractor's equipment (e.g., backhoes, bulldozers, excavators, drill rigs etc.) are as follows:

- Although the Contractor and subcontractors are responsible for their equipment and safe operation of the site, TurnKey-Benchmark personnel are also responsible for their own safety.
- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the site.
- Proper lighting must be provided when working at night.
- Construction activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories, designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.

- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.

- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.

- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to

escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally-encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.

- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based upon current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the remedial activities, the minimum required Levels of Protection for these tasks shall be as identified in Table 4.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the site, the possibility exists that organic vapors and/or particulates may be released to the air during intrusive construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

TurnKey personnel will conduct routine, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by TurnKey personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Air Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined by NYSDOH Appendix 1A Generic Community Air Monitoring Plan (Reference 4) and attached as Appendix C. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Non-intrusive activities include the

collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community because of site investigation work.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, or other appropriate instrument(s), will be used by TurnKey personnel to monitor organic vapor concentrations as specified in this HASP. Combustible gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s). In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion (i.e., well/boring installation) using a real-time particulate monitor as specified in this plan. In the absence of such monitoring, appropriate respiratory protection for particulates shall be donned. Sustained readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for TurnKey-Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding

sustained readings of >5 ppm to 50 ppm above background on the PID - Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during RD activities. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.
- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.
- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.
- 19.5% - 21% oxygen - proceed with extreme caution; attempt to determine potential source of oxygen displacement.
- Less than 19.5% oxygen - leave work zone immediately.
- 21-25% oxygen - Continue engineering operations with caution.
- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of site soil/fill. Action levels based on the instrument readings shall be as follows:

- Less than 50 $\mu g/m^3$ - Continue field operations.
- 50-150 $\mu g/m^3$ - Don dust/particulate mask or equivalent
- Greater than 150 $\mu g/m^3$ - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (i.e., wetting of excavated soils or tools at discretion of SSHO).

Readings with the organic vapor analyzer, combustible gas meter, and particulate monitor will be recorded and documented on the appropriate Project Field Forms. All instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

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

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

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

- ***Organic Vapor Contingency Monitoring Plan***:
  - If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.

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

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

- ***Major Vapor Emission Response Plan***:

  Upon activation, the following activities will be undertaken:

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

  2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.

  3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the SSHO.

  The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911

SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

- **EXPLOSIVE VAPORS:**
  - Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
  - Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **Airborne Particulate Community Air Monitoring**

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

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

provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding RQ.
- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding RQ.

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes that could form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.

- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on site history and decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during SI/IRM efforts.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented as Appendix A of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be

contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Contractor will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (NYSDEC approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the site. The response contractor may use heavy equipment (i.e., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Environmental Products and Services, Inc.: (716) 447-4700
- Op-Tech: (716) 873-7680

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Site will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to TurnKey-Benchmark employees. The SSHO and/or his or her designee will be responsible for monitoring TurnKey-Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed

to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.

- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same, If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period

should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No TurnKey-Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frost nip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue, which will be firm to the touch but will yield little pain. The treatment is identical for Frost nip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frost nip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering

  2) Apathy (i.e., a change to an indifferent or uncaring mood)

3) Unconsciousness

4) Bodily freezing

Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
  - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
  - At a workers request.

- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).

- As a screening measure whenever anyone worker on site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established on a daily basis and communicated to all employees and other site users by the SSHO. It shall be each Contractor's SSHO's responsibility to ensure that all site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.

- Contamination Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contamination Reduction Zone until decontaminated.

- Support Zone - The part of the site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation and construction activities involving disruption or handling of site soils or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling/construction activity.

- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling/construction activity.

- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the

completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO.

The SSHO will maintain a Health and Safety Logbook containing the names of TurnKey-Benchmark workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination For TurnKey-Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions that may arise at the site. All TurnKey-Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves. Deposit tape and gloves in waste disposal container.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for a duration of 6 consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination For Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination Of Field Equipment

Decontamination of heavy equipment will be conducted by the Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

Decontamination of all tools used for sample collection purposes will be conducted by TurnKey-Benchmark personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal), which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment
- Water wash to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.
- Wrap all parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by TurnKey-Benchmark employees is not anticipated to be necessary to complete the SI/RAR/IRM activities identified in Section 2.0. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by TurnKey-Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through TurnKey-Benchmark's corporate Health and Safety Director. TurnKey-Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment And Requirements

Fire extinguishers will be provided by each Contractor and are required on all heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable And Combustible Substances

All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

14.4 Hot Work

If the scope of work necessitates welding or blowtorch operation, the hot work permit presented in Appendix B will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix A. The hospital route map is presented as Figure A-1.

16.0 REFERENCES

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

TABLES

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

Steel Winds Site
BQ Energy, LLC
Lackawanna, New York

Parameter	CAS No.	Maximum Detected Concentration		
		Groundwater (mg/L)	Surface Soil/Fill (mg/kg)	Sub-Surface Soil/Fill (mg/kg)
Volatile Organic Compounds (VOCs):		NA	NA	NA
Polycyclic Aromatic Hydrocarbons (PAHs):		NA	NA	NA
Inorganics:				
Arsenic	7440-38-2	NA	NA	NA
Cadmium	7440-43-9	NA	NA	NA
Chromium	7440-47-3	NA	NA	NA
Lead	7439-92-1	NA	NA	NA
Mercury	7439-97-6	NA	NA	NA

Notes:
NA = not analyzed.

TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN [1]

Steel Winds Site
BQ Energy, LLC
Lackawanna, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs): ppm						
Benzene	Benzol, Phenyl hydride	71-43-2	Ca	1	0.5	500
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Toluene	Methyl benzene, Methyl benzol	108-88-3	C-300	200	50	500
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Polycyclic Aromatic Hydrocarbons (PAHs) [2] : ppm						
Acenaphthene	*none*	83-32-9	*none*	--	--	--
Acenaphthylene	*none*	208-96-8	*none*	--	--	--
Anthracene	*none*	120-12-7	*none*	--	--	--
Benz(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(ghi)perylene	*none*	191-24-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Chrysene	*none*	218-01-9	*none*	--	--	--
Dibenz(ah)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--
Coal Dust (mg/m^3)	Anthracite, Bituminous, or Lignite coal dust	NA	*none*	2.4	--	ND
Inorganics: mg/m^3						
Arsenic	*none*	7440-38-2	Ca	0.01	0.01	5
Cadmium	*none*	7440-43-9	Ca	0.005	0.01	9
Chromium	*none*	7440-47-3	*none*	1	0.5	250
Lead	*none*	7439-92-1	*none*	0.05	0.15	100
Mercury	*none*	7439-97-6	C-0.1	0.1	0.05	10

Notes:

1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. Individual parameters listed are those most commonly detected at steel/coke manufacturing sites.
3. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:
Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hours/day @ 40 hours/week.
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-STEL or Short Term Exposure Limits are 15 minute exposures that should not be exceeded for even an instant. It is not a stand alone value but is accompanied by the TLV-TWA. It indicates a higher exposure that can be tolerated for a short time without adverse effect as long as the total time weighted average is not exceeded.
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximum exposure conconcentration allowable for 8 hours per day @ 40 hours per week

TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN [1]

Steel Winds Site
BQ Energy, LLC
Lackawanna, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
1. Soil/Fill Excavation for Windmill Construction	x	x	
2. Surface Water Management	x		x

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

TABLE 4

REQUIRED LEVELS OF PROTECTION FOR RD TASKS

Steel Winds Site
BQ Energy, LLC
Lackawanna, New York

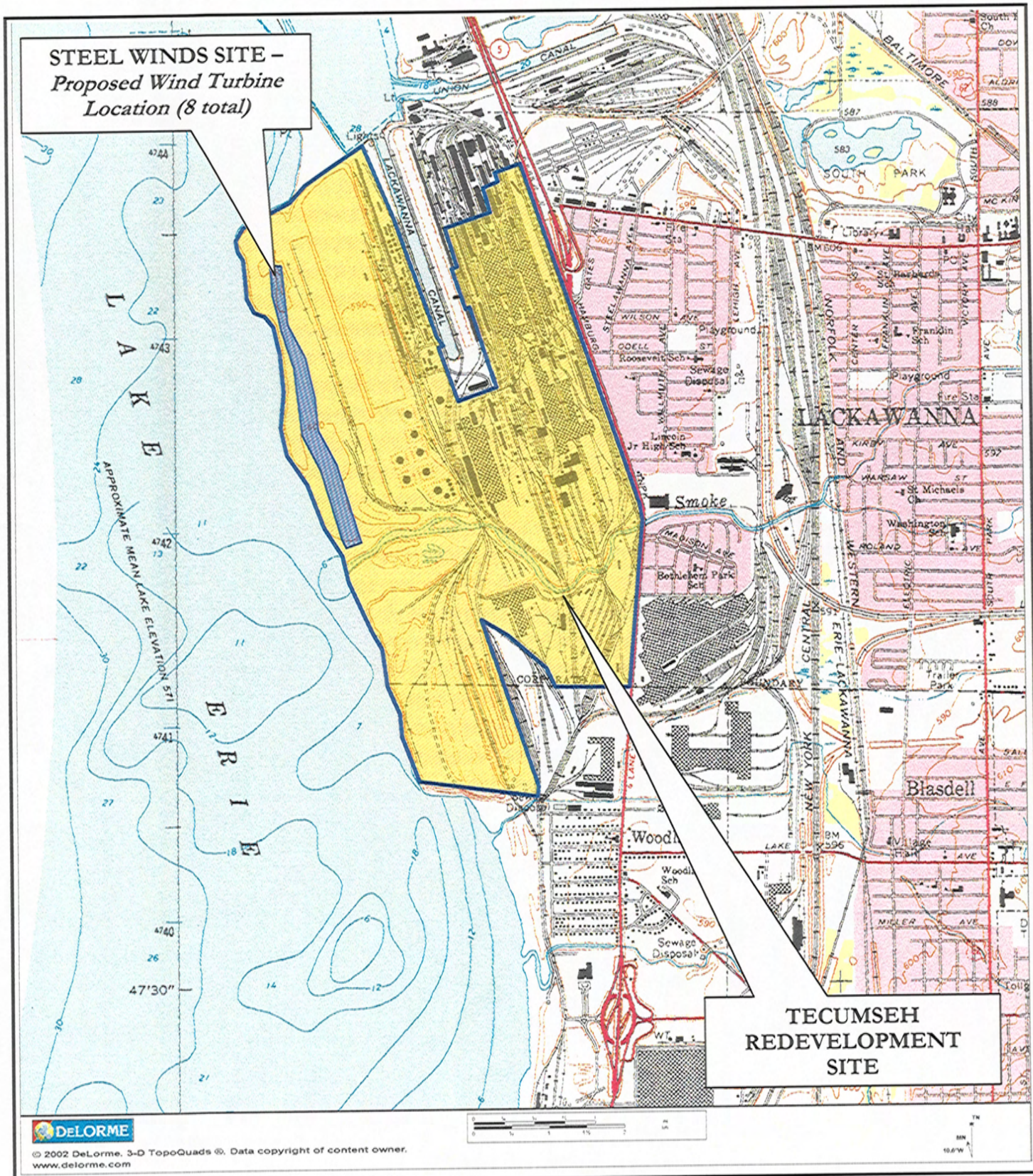
Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
1. Soil/Fill Excavation for Windmill Construction	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Surface Water Management	Level D (upgrade to Level C if necessary)	Poly-coated Tyvek or S	L/N	outer: L inner: STSS	HH SGSS

Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

FIGURE B-1



TurnKey Environmental Restoration, LLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0083-003-100

DATE: MAY 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

APPENDIX B - HEALTH AND SAFETY PLAN

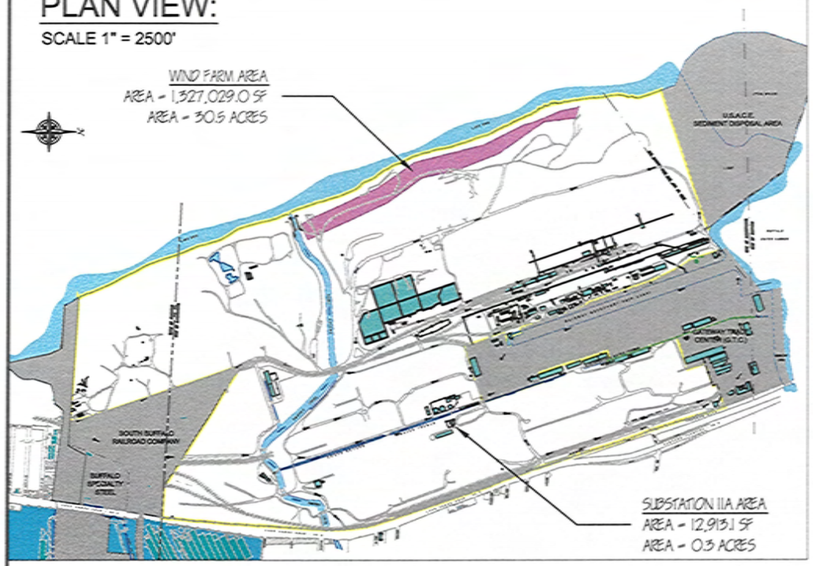
STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

F:\CAD\Turnkey\BQ Energy & Process Energy\Steel Winds\BCP Application\SI IRAP IRM Work Plan\Appendix B, IIASP\Figure B-2 Site Plan.dwg

PLAN VIEW:

SCALE 1" = 2500'



MONITORING WELLS WITHIN BQ ENERGY PARCEL

WELL ID	STRATIGRAPHIC UNIT MONITORED	TOTAL DEPTH (bgs)
MWN-01	FILL	17.0
MWN-01B	Sand, FILL	29.0
MWN-02	FILL	31.5
MWN-02B	Sand	54.0
MWN-02D	Bedrock	77.0
MWN-03	FILL	47.0
MWN-03B	Sand	88.0
MWN-03D	Bedrock	118.5
MWN-04	FILL	56.1

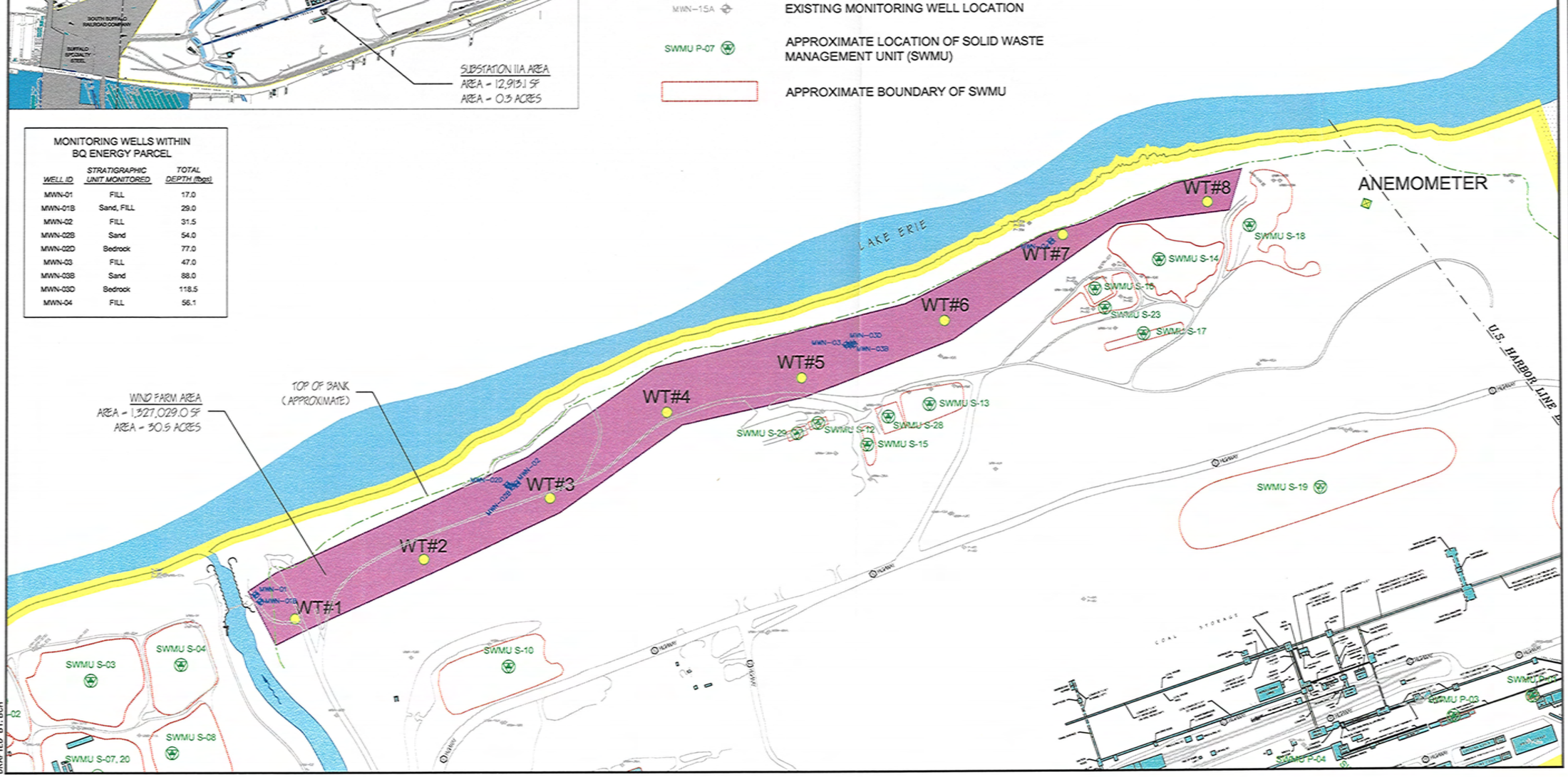
LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK
- BELOW GROUND UTILITY CORRIDOR (10' EASEMENT)
- WT#1 — PROPOSED LOCATION OF WIND TURBINE (WT)
- PROPOSED LOCATION OF ANEMOMETER
- MWN-03B — WIND FARM MONITORING WELL LOCATION
- MWN-15A — EXISTING MONITORING WELL LOCATION
- SWMU P-07 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU)
- APPROXIMATE BOUNDARY OF SWMU

N

500' 0' 500' 1000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)



DATE: MAY 2006
DRAFTED BY: BCH

728 EXCHANGE STREET
SUITE 824
BUFFALO, NEW YORK 14210
(716) 856-0635

JOB NO.: 0083-003-100

SITE PLAN

APPENDIX B - HEALTH AND SAFETY PLAN

STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

FIGURE B-2

APPENDIX A

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM
SI/RAR/IRM ACTIVITIES

at the
BQ ENERGY, LLC
STEEL WINDS SITE

LACKAWANNA, NEW YORK

September 2006 0083-002-400

Prepared for:

BQ ENERGY, LLC
LACKAWANNA, NY

STEEL WINDS SITE BCP
HEALTH AND SAFETY PLAN FOR SI/RAR/IRM ACTIVITIES
APPENDIX A: EMERGENCY RESPONSE PLAN

TABLE OF CONTENTS

LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site Health and Safety Plan (HASP) prepared for Site Investigation / Remedial Alternatives Report / Interim Remedial Measure (SI/RAR/IRM) activities conducted in the proposed Steel Winds Site Tecumseh Redevelopment Site (former Bethlehem Steel Lackawanna Works), Lackawanna, New York. This appendix of the HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury
2. Fire

Source of Emergency:

1. Slip/trip/fall
2. Fire

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
Spill Response Kit	1	Benzol Plant Field Enclosure
First Aid Kit	1	Site Vehicle
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Steel Winds Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features; however, the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the TurnKey personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: ***Thomas H. Forbes***
Work: (716) 856-0599
Mobile: (716) 864-1730

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

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

Alternate SSHO: ***Richard L. Dubisz***
Work: (716) 856-0635
Home: (716) 655-7406

MERCY HOSPITAL (ER):	(716) 826-7000
FIRE:	911
AMBULANCE:	911
BUFFALO POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The site location is:
Tecumseh Redevelopment, Inc
1951 Hamburg Turnpike
Lackawanna, New York 14218
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's SSHO to ensure an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform all TurnKey-Benchmark workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the SSHO (***Bryan***

Hann or ***Richard Dubisz***) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the SSHO in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (i.e., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Mercy Hospital.

- Inhalation: Move to fresh air and, if necessary, transport to Mercy Hospital.

- Ingestion: Decontaminate and transport to Mercy Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Mercy Hospital via ambulance. The SSHO will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Mercy Hospital (see Figure A-1):

The following directions describe the best route to Mercy Hospital:

- From Gate 2, proceed onto the Hamburg Turnpike (SR 5).

- Proceed east on Hamburg Turnpike (SR 5) to the Tifft Street Exit and turn right onto Tifft Street.

- Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.

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

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

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

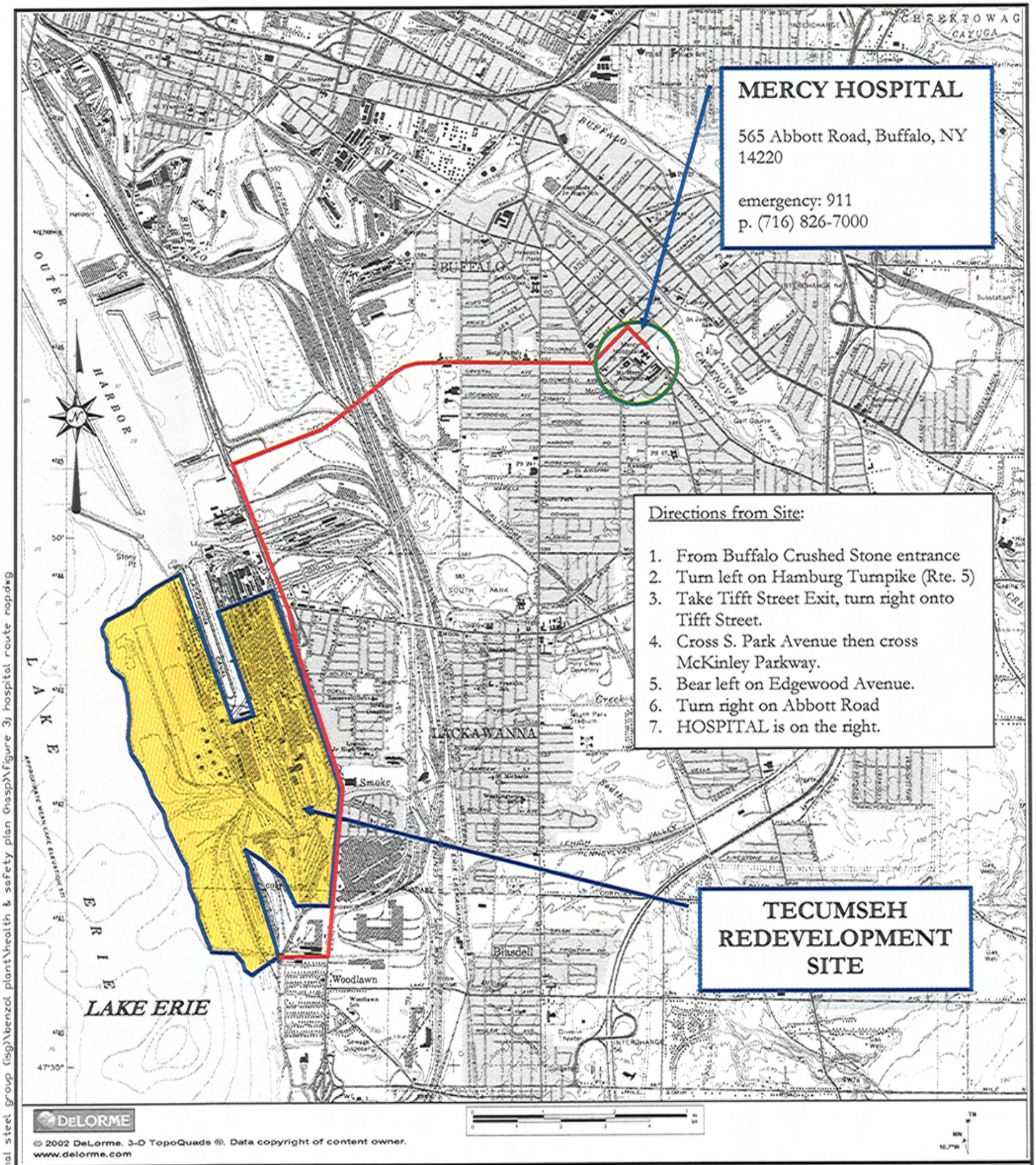
- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES

FIGURE A-1



FILEPATH:g:\caa\turnkey\international steel group (isg)\benzol plant\health & safety plan (hasp)\figure 3) hospital route map.dwg

TURNKEY ENVIRONMENTAL RESTORATION, LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0071-002-901
DATE: NOVEMBER 2004
DRAFTED BY: BCH

HOSPITAL ROUTE MAP

HEALTH & SAFETY PLAN (HASP)

FORMER BETHLEHEM STEEL LACKAWANNA COKE DIVISION SITE
LACKAWANNA, NEW YORK

PREPARED FOR
TECUMSEH REDEVELOPMENT, INC.

APPENDIX B

HOT WORK PERMIT FORM

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:

Date Work to be Performed: Start: Finish (permit terminated):

Performed By:

Work Area:

Object to be Worked On:

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

APPENDIX C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

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

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

APPENDIX C

CITIZEN PARTICIPATION PLAN

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
BQ Energy, LLC
Steel Winds Site

Site # (TBD)
1951 Hamburg Turnpike
Lackawanna
Erie County, New York

May 2006

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the brownfield site's remedial process.

Applicant: **BQ Energy, LLC & Tecumseh Redevelopment, Inc. ("Applicant")**
Site Name: **Steel Winds Facility ("Site")**
Site Number: **TBD**
Site Address: **1951 Hamburg Turnpike, Lackawanna, NY 14218**
Site County: **Erie**

1. What is New York's Brownfield Cleanup Program?

New York' Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site remedial activities.[1] An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: **www.dec.state.ny.us/website/der/bcp**

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the site.

[1] "Remedial activities, remedial action, and remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Project Contacts

Appendix B identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's remedial program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Document Repositories

The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List

Appendix C contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project, including notifications of upcoming remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield site contact list includes, at a minimum:

- Chief executive officer and zoning chairperson of each county, city, town and village in which the site is located;
- Residents, owners, and occupants of the site and properties adjacent to the site;
- The public water supplier which services the area in which the site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility; and
- Document repositories.

Where the site or adjacent real property contains multiple dwelling units, the Applicant will work with the Department to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants, and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The brownfield site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the brownfield site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the site remedial process. The public is informed about these CP activities through fact sheets and notices developed at significant points in the site's remedial process.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation.

The public is encouraged to contact project staff anytime during the site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern, identified in Section 6, or in the nature and scope of remedial activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

3. Site Information

Site Description

The Steel Winds Facility is an approximate 16-acre parcel located at 1951 Hamburg Turnpike (a.k.a New York State Route 5) in the City of Lackawanna (the City), Erie County, New York. The surrounding properties to the north, south, and east of the Site are industrial. Lake Erie borders the property to the west. A site location map is included as Appendix A.

Site History

The Tecumseh property is located on a portion of the site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

Environmental History

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in December 2004. USEPA and the New York State Department of Environmental Conservation (NYSDEC) are currently reviewing the RFI. Tecumseh is presently negotiating an Order on Consent with the NYSDEC to undertake corrective measures at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property.

Tecumseh has signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote and implement redevelopment of the former BSC Lackawanna property following cleanup. The conceptual Redevelopment Master Plan for the redevelopment of the entire 1,100-acre site has been prepared by Tecumseh. A portion of the Redevelopment Master Plan incorporates a parcel designated for redevelopment with wind energy facilities, a golf course, and/or a passive recreational park. BQ Energy, LLC has entered into a lease agreement with Tecumseh to construct and operate windmills and supporting power generation equipment and infrastructure on approximately 16-acres of the above-referenced parcel. The wind energy facilities and the associated property, hereafter referred to as the "Steel Winds Site," "subject properties," or the "Site," have been submitted to the NYSDEC for entrance into New York State's Brownfield Cleanup Program (BCP). The City of Lackawanna Planning Board, acting in its capacity as Lead Agency under SEQRA, issued a Negative Declaration to BQ Energy for the Steel Winds wind energy project on September 7, 2005.

As a condition of the BQ Energy-Tecumseh lease agreement, BQ Energy will be conducting an engineering feasibility study for development of a "clean" coal gasification and synthetic natural gas production facility on the former Coke Works portion of the Tecumseh site.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting a remedial program at the site.

Remedy Selection

If remediation is required, the Applicant will be able to develop a Remedial Work Plan. The Remedial Work Plan describes how the Applicant would address the contamination related to the site.

The public will have the opportunity to review and comment on the draft Remedial Work Plan. The site contact list will be sent a fact sheet that describes the draft Remedial Work Plan and announces a 45-day public comment period. NYSDEC will factor this input into its decision to approve, reject or modify the draft Remedial Work Plan.

A public meeting may be held by NYSDEC about the proposed Remedial Work Plan if requested by the affected community and if significant substantive issues are raised about the draft Remedial Work Plan. Please note that in order to request a public meeting, the health, economic well-being, or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the site. In addition, the request for the public

meeting should be made within the first 30 days of the 45-day public comment period for the draft Remedial Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Remedial Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the site. The site contact list will receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a final engineering report that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use of the site. The site contact list will receive a fact sheet that announces the completion of remedial activities and the review of the final engineering report.

Certificate of Completion and Site Management

Once NYSDEC approves the final engineering report, NYSDEC will issue the Applicant a Certificate of Completion. This Certificate states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The Certificate also includes a description of any institutional and engineering controls or monitoring required by the approved remedial work plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the site contact list will receive a fact sheet that discusses such controls.

An institutional control is a non-physical restriction on use of the brownfield site, such as a deed restriction that would prevent or restrict certain uses of the remediated property. An institutional control may be used when the remedial action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the brownfield site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Proposed Remedial Work Plan.

All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval, of NYSDEC.

6. Major Issue of Public Concern

This section of the CP Plan identifies major issues of public concern, if any, that relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

Local Residents

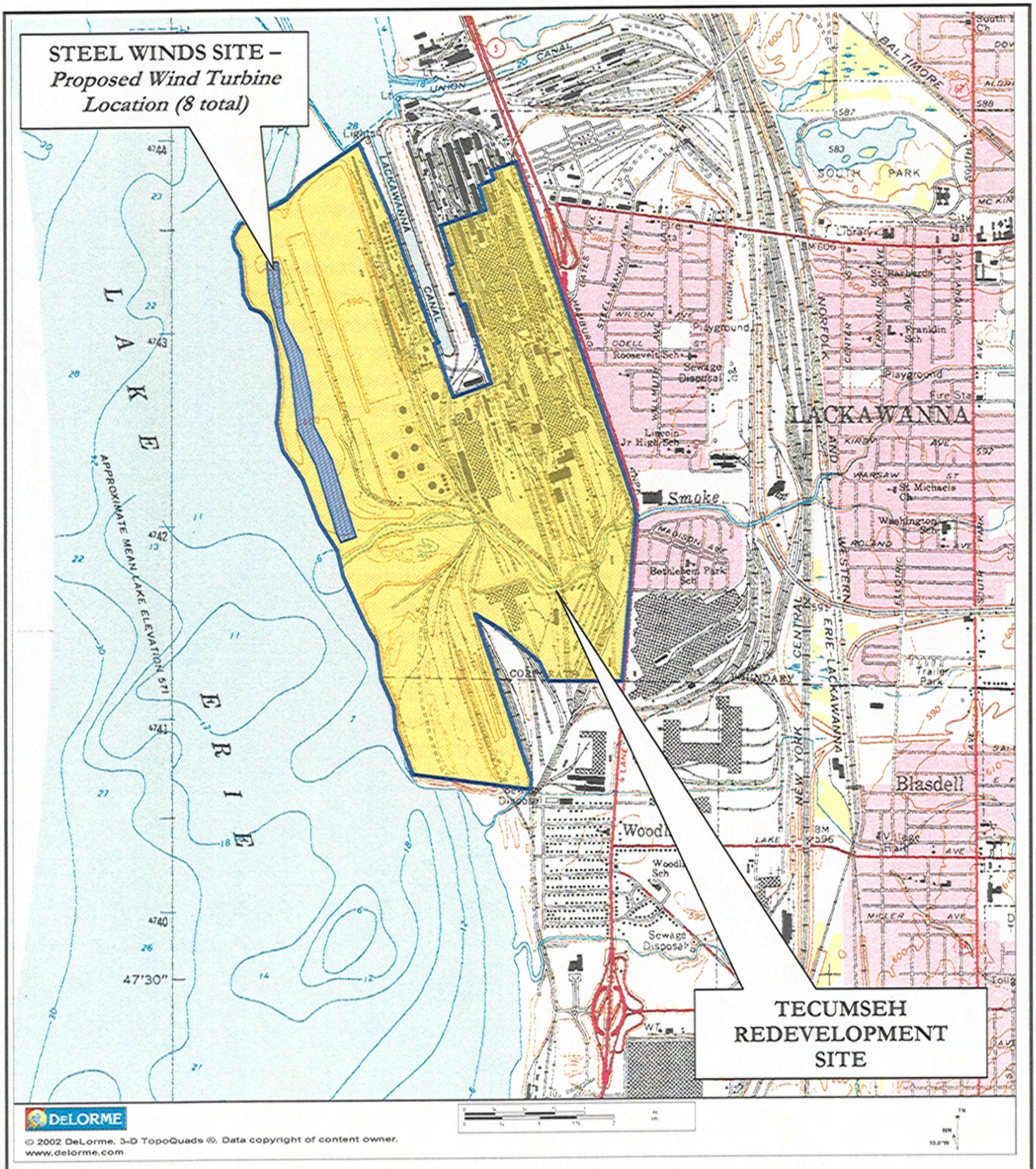
The Site Remediation will be carried out by professionals experienced in performing cleanup activities in densely populated areas. All work will be conducted under a site-specific Health and Safety Plan and Community Air Monitoring Program approved by the NYSDEC and NYSDOH. The Site Remediation will be conducted over a limited duration and during normal business hours. Soil excavations will be secured to eliminate the risk of injury. The Site Remediation will be performed with minimal equipment; hence, there will be no change in traffic patterns.

Stakeholders

The remedial design and remedial actions must be completed within approximately 6 months of the execution of the Brownfield Cleanup Agreement. The sequencing of events is important to the timely redevelopment of the Site.

Appendix A – Site Location Map

FIGURE C-1



TurnKey Environmental Restoration, LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0083-003-100

DATE: MAY 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

APPENDIX C - CITIZEN PARTICIPATION PLAN

STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

Appendix B – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact the following NYSDEC project contacts:

Mr. Maurice Moore, Engineering Geologist
Project Manager
NYSDEC Region 9
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7220

Ms. Megan Gollwitzer
Citizen Participation Specialist
NYSDEC Region 9
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7220

New York State Department of Health (NYSDOH):

Mr. Cameron O'Conner
Project Manager
NYSDOH
584 Delaware Avenue
Buffalo, New York 14202
(716) 847-4501

Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

Lackawanna Public Library
560 Ridge Road
Lackawanna, NY 14218
Attn: Jennifer Hoffman, Librarian
Phone: (716) 823-0630
Hours: M, W 1-9
T, Th-Sat. 10-5
Sun. (closed)

NYSDEC Region 9 Office
270 Michigan Avenue
Buffalo, NY 14203
Attn: Ms. Megan Gollwitzer
Phone: (716) 851-7220
Hours: M-F 8:30-4:45
(Call for appointment)

Appendix C – Brownfield Site Contact List

CITY OF LACKAWANNA

Mayor Norman L. Polanski, Jr.
714 Ridge Road
Lackawanna, NY 14218

NEW YORK STATE

Director Abby Snyder
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. Stanley Radon
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. Martin Doster
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Ms. Megan Gollwitzer
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, N.Y 14203

Mr. Cameron O'Connor
NYSDOH
584 Delaware Avenue
Buffalo, NY 14202

Senator Charles Schumer
U.S. Senate, Suite 660
130 So. Elmwood Ave
Buffalo, NY 14202

Appendix C – Brownfield Site Contact List

NEW YORK STATE (continued)

Senator Hillary Rodham-Clinton
U.S. Senate
726 Exchange Street, Suite 511
Buffalo, NY 14210

Senator William Stachowski
58th District, N.Y.S. Senate
2030 Clinton Street
Buffalo, NY 14206

Congressman Brian Higgins
Larkin Building
726 Exchange Street, Suite 610
Buffalo, NY 14210

Assemblyman Jack Quinn, Jr
146th Assembly District
3812 South Park Avenue
Blasdell, NY 14219

Assemblyman Mark J.F. Schroeder
145th Assembly District
2019 Seneca Street
Buffalo, NY 14210

ERIE COUNTY

Commissioner Anthony Billittier
Erie Co. Health Dept., Rm 931
95 Franklin Street
Buffalo, NY 14202

Mr. Peter Camaratta
Erie County Industrial Development Agency
275 Oak Street
Buffalo, NY 14203

Appendix C – Brownfield Site Contact List

ERIE COUNTY (continued)

Honorable Joel Giambra
Erie County Executive
95 Franklin Street
Buffalo, NY 14202

Mr. Paul Kranz
Erie Co. Environment & Plan.
95 Franklin Street
Buffalo, NY 14202

Daniel M. Kozub
Erie County Legislator – District 1
609 Ridge Road
Lackawanna, New York 14218

Commissioner Andrew Eszak
Erie Co. Environment & Plan.
95 Franklin Street
Buffalo, NY 14202

PUBLIC WATER SUPPLIER

Erie County Water Authority
350 Ellicott Square Building
295 Main Street
Buffalo, NY 14203

DOCUMENT REPOSITORIES

Lackawanna Public Library
560 Ridge Road
Lackawanna, NY 14218
Attn: Jennifer Hoffman, Librarian
Phone: (716) 823-0630

Appendix C – Brownfield Site Contact List

Document Repository (Cont.)

NYSDEC Region 9 Office
270 Michigan Avenue
Buffalo, NY 14203
Attn: Mr. Stanley Radon
Phone: (716) 851-7220

NEARBY SCHOOL

Lackawanna City School
30 Johnson St.
Lackawanna, NY 14218
Attn: Superintendent Paul Hashem
Phone: (716) 827-6708

LOCAL NEWS MEDIA

The Buffalo News
1 News Plaza
Buffalo, NY 14240

WBEN News Radio 930
Entercom Radio of Buffalo
500 Corporate Pkwy
Suite 200
Buffalo, NY 14226

WKBW-TV
7 Broadcast Plaza
Buffalo, NY 14202

RESIDENTS ON AND/OR ADJACENT TO THE SITE

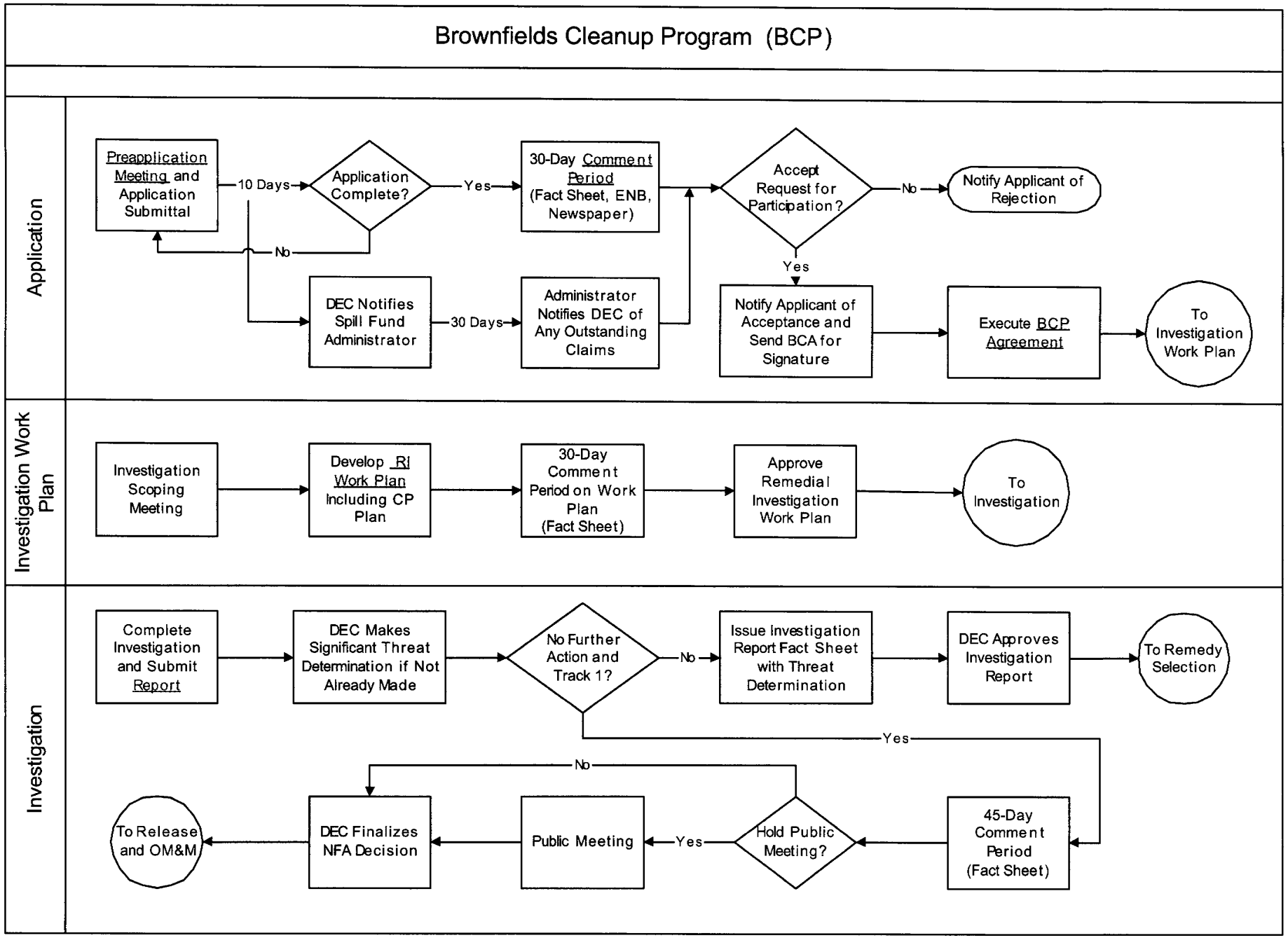
See attached tables.

Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities:	CP Activities Occur at this Point:
Application Process:	
• Prepare brownfield site contact list (BSCL) • Establish document repositories • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period • Publish above ENB content in local newspaper • Mail above ENB content to BSCL	At time of preparation of application to participate in BCP. When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare Citizen Participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution
After Remedial Investigation (RI) Work Plan Received:	
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ ends as per dates identified in fact sheet.
After RI Completion:	
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report
After Remedial Work Plan (RWP) Received:	
• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.
After Approval of RWP:	
• Mail fact sheet to BSCL summarizing upcoming remedial construction	Before the start of remedial construction.
After Remedial Action Completed:	
• Mail fact sheet to BSCL announcing that remedial construction has been completed • Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets should be combined when possible if there is not a delay in issuance of COC.

Appendix E – Brownfield Cleanup Program Process

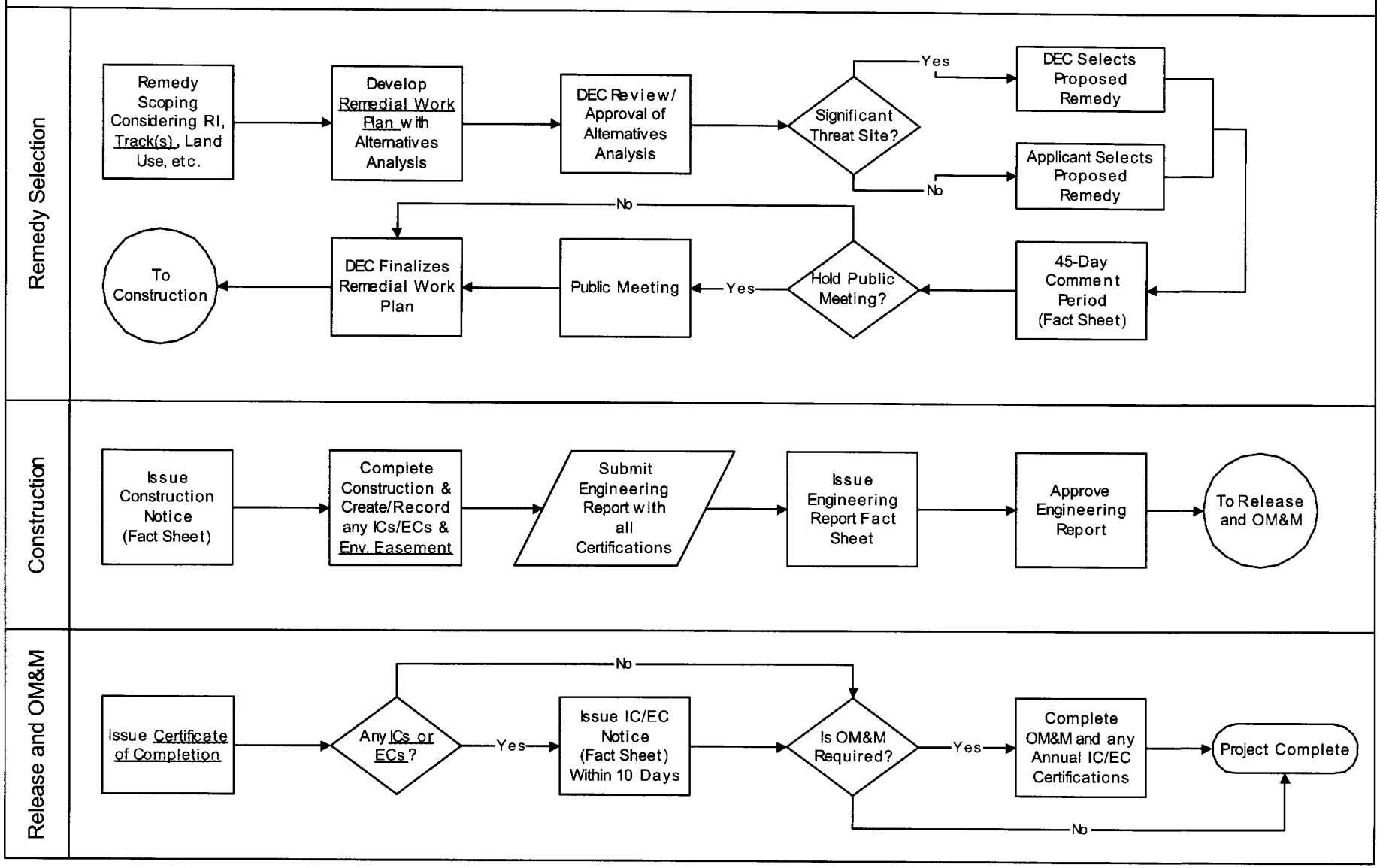
Brownfields Cleanup Program (BCP)



Underlined Topics are Links to Fact Sheets

11/20/03

Brownfields Cleanup Program (BCP)



Underlined Topics are Links to Fact Sheets

11/20/03

APPENDIX D

SOIL/FILL MANAGEMENT PLAN

SOIL/FILL MANAGEMENT PLAN
for
BROWNFIELD CLEANUP PROGRAM
REMEDIAL INVESTIGATION
&
INTERIM REMEDIAL MEASURES

STEEL WINDS SITE
LACKAWANNA, NEW YORK

AUGUST 2006 0118-001-100

Prepared for:

BQ Energy, LLC

SOIL/FILL MANAGEMENT PLAN

Steel Winds Site

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SOIL/FILL MANAGEMENT PLAN
Steel Winds Site

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APPENDICES

1.0 INTRODUCTION

1.1 Background and History

Tecumseh Redevelopment, Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast.

The Tecumseh property is located on a portion of the site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

Tecumseh has signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote and implement redevelopment of the former BSC Lackawanna property following cleanup and has prepared a conceptual Redevelopment Master Plan for the redevelopment of the entire 1,100-acre site.

A portion of the Redevelopment Master Plan incorporates a parcel designated for redevelopment with wind energy facilities. BQ Energy, LLC (BQ Energy) has entered into a long-term lease agreement with Tecumseh to construct and operate eight wind turbines and supporting power generation equipment and infrastructure on approximately 30 acres of the above-referenced parcel. The wind energy facilities and the associated property are hereafter referred to as the "Steel Winds Site," "subject properties," or the "Site." (see Figure 2). The City of Lackawanna Planning Board, acting in its capacity as Lead Agency under SEQRA, issued a Negative Declaration to BQ Energy for the Steel Winds wind energy project on September 7, 2005.

BQ Energy, LLC intends to investigate groundwater and remediate impacted slag/fill within the subject property and redevelop the property under the New York State Brownfield Cleanup Program (BCP).

1.2 Environmental Investigations and Remedial Efforts

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in December 2004. There are numerous solid waste management units (SWMUs) that will require further action under the RCRA corrective measures program at the Tecumseh site, including 6 SWMUs in the general vicinity of the Steel Winds Site. USEPA and the New York State Department of Environmental Conservation (NYSDEC) are currently reviewing the RFI.

The proposed Steel Winds Site is located on a portion of the former BSC Lackawanna Works that was created from the historic disposal of slag fill along the Lake Erie shoreline. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as volatile and/or semi-volatile organic compounds.

BQ Energy, LLC is completing a Site Investigation (SI) at the Steel Winds Site under the NYSDEC BCP that will supplement previously collected environmental data. Interim Remedial Measures will be also implemented during wind turbine construction to address slag/fill soils excavated during construction activities.

1.3 Purpose and Scope

The purpose of this Soil/Fill Management Plan (SFMP or Plan) is to protect both the environment and human health during redevelopment of the Site and subsequent to completion of BCP activities to address areas of slag/fill contamination, if encountered, during site redevelopment. It should be noted that IRM activities will address impacted slag/fill during excavations associated with wind turbine foundations and utility trenches. This SFMP addresses all other slag/fill handled during site redevelopment such as site grading and clearing and infrastructure construction (i.e., access roads, crane and rotor pads).

Compliance with this SFMP is required to properly manage any potentially contaminated subsurface slag/fill encountered during redevelopment activities at the Site. This SFMP was developed with the express purpose of addressing unknown subsurface impacts if and when encountered.

This SFMP provides protocols for the proper handling of site slag/fill during development activities, including:

- Grading, sampling and handling of site slag/fill.
- Acceptability of soil/fill from off-site sources for backfill or subgrade slag/fill.
- Erosion and dust control measures.
- Access controls.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final cover, if required.
- Environmental easements.
- BCP responsibilities.
- Notification and reporting requirements.

1.4 Soil/Fill Management Program Responsibility

The developer, BQ Energy, LLC, or their agents will be responsible for all monitoring, implementation, and reporting requirements of this Plan related to the construction and operation of the planned wind farm on the BCP Site. The developer will not perform, nor contract, nor permit their employees, agents, or assigns to perform any excavations or disturbance of site slag/fill, except as delineated in this Plan. The developers or their agents will be responsible for proper notification and reporting to regulatory agencies (i.e., NYSDEC Region 9, Division of Environmental Remediation and NYS Department of Health) prior to and following site development as described in Section 2.8.

The NYSDEC may provide periodic construction oversight and monitoring during site redevelopment activities to verify adherence to the requirements of this SFMP.

2.0 SOIL/FILL MANAGEMENT

2.1 Excavation and Handling of On-Site Slag/Fill

During both the initial site redevelopment by Steel Winds and during future intrusive work on the site (excluding minor landscaping maintenance), TurnKey Environmental Restoration, LLC or a Professional Engineer with experience in environmental site investigations and the New York State Brownfield Cleanup Program (BCP) as approved by the site owner (Tecumseh Redevelopment, Inc) will inspect slag/fill excavations or disturbances on behalf of the subject property owner and/or developer. The slag/fill as well as the excavation sidewalls and floor will be inspected for staining or discoloration, and will be field screened for the presence of VOCs with a photoionization detector (PID). The PID detector will be calibrated as per the manufacturer's requirements.

Based on historical review and site reconnaissance, the main potential COPCs on the Site appear to be SVOCs (base-neutral fraction only) and metals associated with steel manufacturing (i.e., arsenic, cadmium, chromium, lead, and mercury). Impacts from other potential COPCs, including polychlorinated biphenyls (PCBs), VOCs, and acids, are unlikely based on available historic data.

If, during redevelopment activities other than excavation of wind turbine foundation areas and utility trenches (which will be addressed through the IRM activities), slag/fill is encountered that is visibly stained, discolored, or produces elevated PID readings (i.e., sustained readings of 5 ppm above background or greater), NYSDEC will be contacted and the excavation will be advanced to remove the impacted slag/fill, to the extent practicable. Impacted material, if encountered, will be stockpiled on plastic sheeting in an area away from the primary work activities and then sampled to determine whether it is subject to special disposal/reuse requirements[1].

Sampling and analyses to verify excavation limits and analysis for disposal purposes will be in accordance with the protocols delineated in Section 2.3.

[1] The presence of subsurface construction and demolition debris, such as brick, concrete, wood, miscellaneous metal products, etc. does not necessitate stockpiling in accordance with this SFMP.

2.2 Subgrade Backfill Material

2.2.1 Use Criteria

Subgrade material used to backfill excavations or to increase site grades or elevations may be comprised of excavated on-site slag/fill or off-site soil/fill. The criteria under which these materials may be used as subgrade backfill are presented below.

- **Excavated, On-Site Slag/Fill:** Slag/fill that is excavated from the site during site grading activities, may be used on-site as subgrade backfill provided that it does not exhibit evidence of staining, discoloration, or elevated PID readings as described in Section 2.1.

- **Off-Site Soil/Fill:** Off-site soil/fill may be used as subgrade backfill provided that it originates from known sources having no evidence of disposal or releases of hazardous substances; hazardous, toxic or radioactive wastes; or petroleum. If the off-site soil/fill is of unknown origin or it originates from a commercial, industrial or urban site then it must be tested in to meet the restricted industrial SCOs criteria identified in Appendix C. In addition, no off-site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2 (a) shall be used as backfill.

2.2.2 Borrow Source Sampling Requirements

If an off-site soil/fill borrow source is of unknown origin or originates from a commercial, industrial or urban site, then it must be tested to meet the criteria identified on Table 1. A minimum of one composite sample will be collected for each 250 cubic yards (CY) up to 1,000 CY of a borrow source. If the first 1,000 CY meet the re-use criteria, the sample collection frequency may be reduced to one composite sample for each additional 1,000 CY of borrow source, up to 5,000 CY and one composite sample per 5,000 CY thereafter. A minimum of four grab samples will be collected for each composite sample. The composite sample will be analyzed in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory for target compound list (TCL) VOCs, TCL SVOCs and RCRA metals.

2.3 Slag/Fill Sampling and Analysis Protocol

Slag/fill that exhibits visual and/or olfactory evidence of petroleum contamination or fill exhibiting elevated PID readings (i.e. >5 ppm) encountered during intrusive activities will be placed on plastic sheeting in an area away from primary work activities and then sampled to determine whether it is subject to special disposal/reuse requirements.

The stockpiled material will be analyzed for VOCs (only if elevated PID readings are reported), SVOCs and RCRA metals. If such analysis indicates that the concentrations of the constituents in these segregated materials are below draft 6NYCRR Part 375 restricted-industrial SCOs (see Appendix C), the materials can be re-used on-Site. However, if such analysis indicates that the concentrations of the constituents in these segregated materials are above draft 6NYCRR Part 375 restricted-industrial SCOs, the materials will be characterized per the requirements of a permitted off-site disposal facility and an appropriate disposal plan will be developed.

In addition, the resulting excavation following removal of impacted slag/fill will require verification sampling and analysis to determine the limits of impact. Both characterization and verification sampling and analysis are discussed in the following sections. Such additional excavation and verification sampling will be limited to within the BCP Site.

2.3.1 Impacted Slag/Fill Characterization

The following procedure represents a suggested method for determining off-site disposal requirements for impacted slag/fill designated for off-site disposal. *The sampling procedures, frequency and parameter list must be coordinated with the off-site disposal facility prior to undertaking characterization work.*

Excavated slag/fill should be separately stockpiled in 250 CY or smaller piles. A single grab sample will be collected from each stockpile, with the grab biased toward the zone displaying the most elevated field PID reading. If the stockpiles are from a single source area, sampling may be reduced to one sample per 1,000 CY following receipt of data from the first four 250 cubic yard stockpiles. The grab sample will be analyzed by a NYSDOH ELAP-certified laboratory for VOCs (only if elevated PID readings are reported), SVOCs and RCRA metals in accordance with USEPA SW-846 methodology. If such analysis indicates that the concentrations of the constituents in these segregated

materials are above draft 6NYCRR Part 375 restricted-industrial SCOs, the materials will be analyzed for disposal characterization purposes per the requirements of a permitted disposal facility.

2.3.2 Verification Sampling

Verification sampling will be performed on the excavation sidewalls and bottom following removal of visibly impacted slag/fill. Lateral and vertical excavation will continue until visually impacted slag/fill is less than 0.5 feet thick, the SCOs are met, the boundaries of the BCP Site have been reached, or NYSDEC agrees that no further excavation is required. Verification sampling will be performed after excavation limits have been achieved and visibly impacted slag/fill has been removed. In general, one sidewall sample will be collected on each of the four sides of the excavation and one sample will be collected from the bottom of the excavation. The samples will be collected by retrieving a representative sample from across the excavation face. The backhoe bucket will be used to assist in sample collection and avoid the need for confined space entry. For excavations having lengths greater than 100 feet, an additional sample will be collected for each additional 100 feet of excavation length. Verification samples will be analyzed for VOCs (if there are elevated PID readings), SVOCs and RCRA metals in accordance with NYSDEC SW-846 Methodology.

2.4 Final Surface Coverage

Final surface cover requirements, if any, will be determined based on the results of the Site Investigation. If final surface cover specifications are established based on the SI data, this section of the SFMP will be amended accordingly.

2.5 Erosion Controls

An important element of soil/fill management on this site is the mitigation and control of surface erosion from stormwater runoff. For this reason, a Master Erosion Control Plan to be used by all developers has been developed and incorporated as Appendix A.

2.6 Dust Controls

Particulate monitoring will be performed along the downwind perimeter of the Site during subgrade excavation, grading, and handling activities in accordance with the NYSDOH Generic Community Monitoring Plan contained in Appendix B. Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed soil/fill during post-remediation construction and redevelopment. Techniques to be used may include one or more of the following:

- Applying water on haul roads.
- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Covering excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum.

2.7 Fencing and Access Control

A chain-link fence that borders the property along Route 5 and a remote-control access gate at the Ridge Road guardhouse restrict access to the property.

2.8 Property Use Limitations

Requirements for surface coverage over the site and/or limitations placed on the type of buildings or structures to be constructed will be enforced through the issuance of building permits by the City of Lackawanna. Obtaining a building permit from the City will be contingent on agreeing to implement and comply with this SFMP. The City has zoned the Site for commercial, office, and light industrial use. Commercial use includes retail and wholesale establishments (e.g., shoe stores, gasoline service stations, food stores, etc.) while light industrial use includes manufacturing, warehousing, storing, etc. The zoning specifically prohibits residential use.

Environmental easements will be part of the final remedial measures for the site and filed with Erie County. The environmental easements will include:

- Use restrictions such as commercial, office, and light industrial use. The zoning specifically prohibits residential use.
- Restriction for the use of site groundwater (deed restriction presently exists).
- Requirements for annual certification as discussed in Section 2.9.

2.9 Notification and Reporting Requirements

Upon completion of BCP activities, if intrusive activities are planned for the Site, the NYSDEC and NYSDOH will be notified that such activities are being initiated a minimum of 5 working days in advance. A NY State Licensed Professional Engineer or his/her designated representative shall inspect all subsurface excavation work for conformance with this SFMP.

By January 15 of each year, the site owner shall complete and submit to the NYSDEC an annual report that contains certification that: the institutional controls put in place are still in place, have not been altered and are still effective; the remedy and protective cover have been maintained; and the conditions at the site are fully protective of public health and the environment. If the cover system has been breached during the year covered by the Annual Report, the site owner shall include a certification that all work was performed in conformance with the SFMP.

3.0 HEALTH AND SAFETY PROCEDURES

During redevelopment activities, the developer and site owner(s) are responsible for implementing suitable procedures to prevent both site construction workers and the community from adverse exposure to residual parameters of concern and other potential hazards posed by the redevelopment work. This will be accomplished through adherence to a written, parcel-specific worker Health and Safety Plan (HASP), prepared in accordance with the regulations contained in OSHA 29CFR 1910.120 and a Community Air Monitoring Plan prepared in conformance with NYSDOH requirements.

Although Brownfield Cleanup remedial measures are anticipated to reduce the potential for encountering parameters of concern above SCOs, the redevelopment activities governed by this SFMP are a required element of the Brownfield Cleanup Agreement for the site. Thus, 29CFR 1910.120 indicates that these activities are subject to OSHA's hazardous waste operations and emergency response (Hazwopper) standard. This includes the requirement for preparation and implementation of a site-specific worker Health and Safety Plan addressing the following items:

- A safety and health or hazard analysis for each site task and operation.
- Employee training requirements.
- Personal protective equipment (PPE) to be used by employees for the site tasks.
- Medical surveillance requirements.
- Frequency and type of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of equipment.
- Site control measures.
- Decontamination procedures.
- An emergency response plan.
- Confined space entry procedures.
- A spill containment program.

As an integral component of the worker HASP, the developer and site owner(s) will be responsible for implementing a Community Air Monitoring Plan (CAMP) designed to prevent the surrounding community from adverse exposures due to potential release/migration of airborne particulates or vapors. The community as referenced herein includes potential receptors located off-site (e.g., neighboring residents or businesses) as well as on-site receptors not directly involved in redevelopment activities (e.g., businesses or contractors occupying the site prior to final redevelopment). The New York State Department of Health Generic CAMP, presented as Appendix B, will be implemented during redevelopment work involving disturbance or handling of Site slag/fill. The CAMP includes appropriate monitoring, mitigation and response measures consistent with NYSDOH and NYSDEC guidelines.

4.0 REFERENCES

1. Turnkey Environmental Restoration, LLC, *Site Investigation/Remedial Alternatives Report/Interim Remedial Measures Work Plan for the Steel Winds Site*, Lackawanna, New York, May 2006.

TABLES

TABLE 1

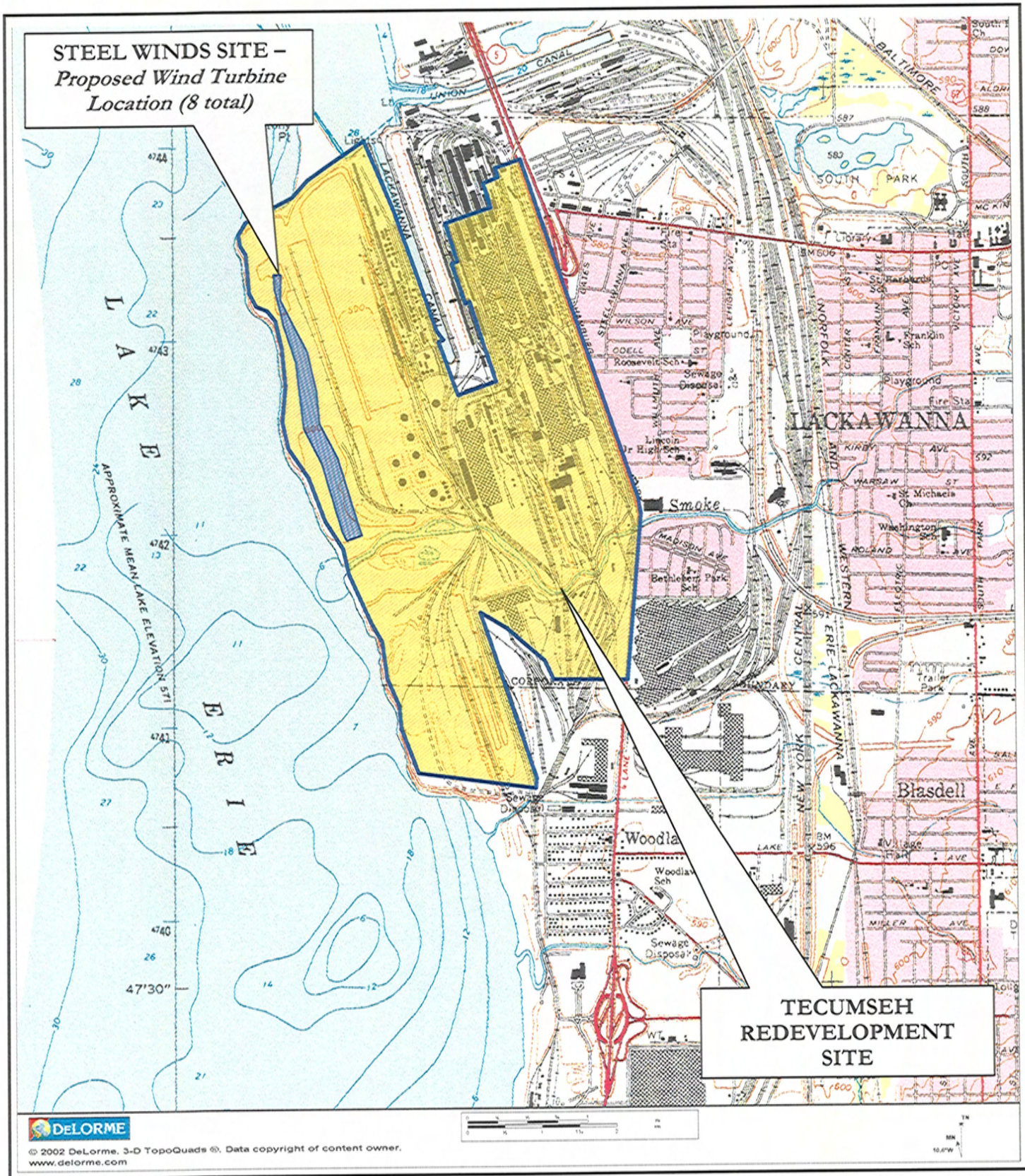
CRITERIA FOR USE OF OFF-SITE BACKFILL AS SUBGRADE MATERIAL

Soil/Fill Management Plan
Steel Winds Site
Lackawanna, New York

Parameter	Individual Concentration (mg/kg)	Total Concentration (mg/kg)
TCL VOCs	1.0	10
TCL SVOCs	-	500
RCRA Metals (8)		
Arsenic	12	-
Barium	600	-
Cadmium	1.0	-
Chromium	40	-
Lead	500	-
Mercury	0.2	-
Selenium	3.9	-
Silver	10	-
Pesticides/Herbicides	< TAGM #4046	-
TCL PCBs	-	1.0

FIGURES

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0083-003-100

DATE: SEPTEMBER 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

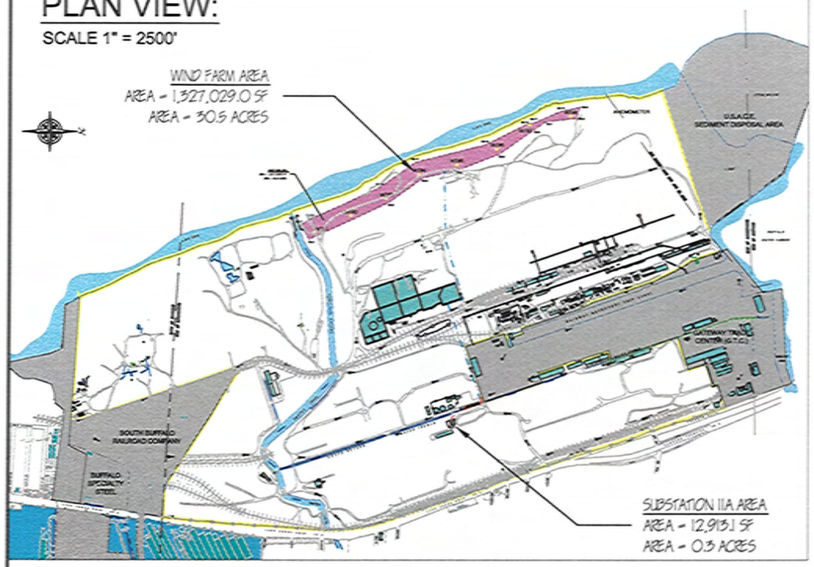
APPENDIX D - SOIL/FILL MANAGEMENT PLAN

STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

PLAN VIEW:

SCALE 1" = 2500'



LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK
- PROPOSED ELECTRICAL EASEMENT
- WT#1 — PROPOSED LOCATION OF WIND TURBINE (WT)
- PROPOSED LOCATION OF ANEMOMETER
- MWN-03B — WIND FARM MONITORING WELL LOCATION
- MWN-15A — EXISTING MONITORING WELL LOCATION
- SWMU P-07 — APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU)
- APPROXIMATE BOUNDARY OF SWMU

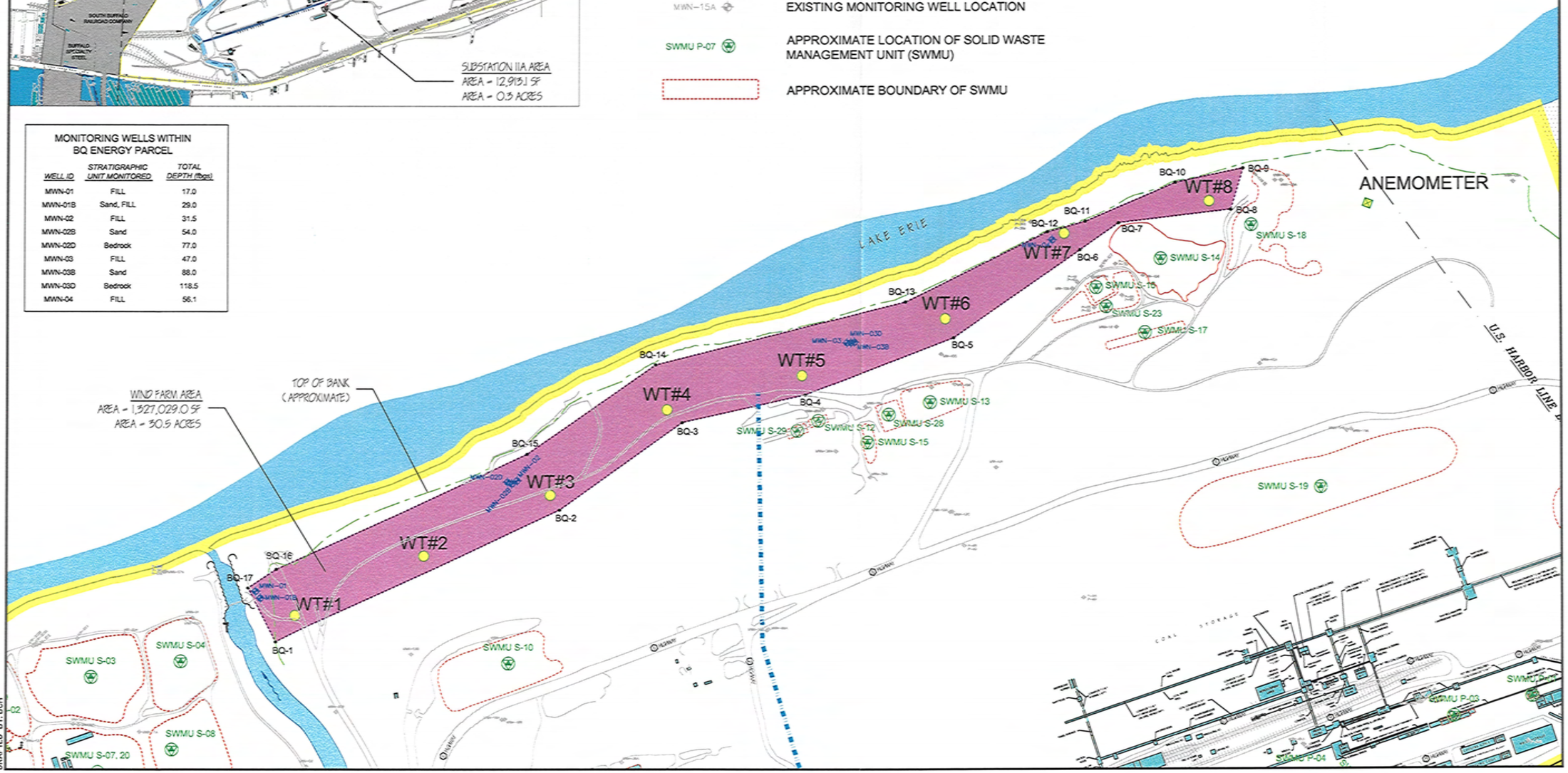
N

500' 0' 500' 1000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

MONITORING WELLS WITHIN BQ ENERGY PARCEL

WELL ID	STRATIGRAPHIC UNIT MONITORED	TOTAL DEPTH (fbgs)
MWN-01	FILL	17.0
MWN-01B	Sand, FILL	29.0
MWN-02	FILL	31.5
MWN-02B	Sand	54.0
MWN-02D	Bedrock	77.0
MWN-03	FILL	47.0
MWN-03B	Sand	88.0
MWN-03D	Bedrock	118.5
MWN-04	FILL	56.1



726 EXCHANGE STREET
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SITE PLAN
APPENDIX D - SOIL/FILL MANAGEMENT PLAN
STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR
BQ ENERGY, LLC

FIGURE 2

F:\CAD\TurnKey\BQ Energy & Process Energy\Steel Winds\BCP Application\SI\RAR\IRM Work Plan\Appendix D, Soil-Fill Management Plan\Figure 2, Site Plan.dwg

DATE: SEPTEMBER 2006
DRAFTED BY: BCH

APPENDIX A

MASTER EROSION CONTROL PLAN
(MEC PLAN)

MASTER EROSION CONTROL PLAN

STEEL WINDS SITE
LACKAWANNA, NEW YORK

August 2006 0118-001-100

Prepared for:

BQ Energy, LLC

MASTER EROSION CONTROL PLAN

Steel Winds Site

Table of Contents

MASTER EROSION CONTROL PLAN

Steel Winds Site

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APPENDICES

1.0 INTRODUCTION

1.1 Background and History

Tecumseh Redevelopment, Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1 of the Soil/Fill Management Plan (SFMP)). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast.

The Tecumseh property is located on a portion of the site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

Tecumseh has signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote and implement redevelopment of the former BSC Lackawanna property following cleanup and has prepared a conceptual Redevelopment Master Plan for the redevelopment of the entire 1,100-acre site.

A portion of the Redevelopment Master Plan incorporates a parcel designated for redevelopment with wind energy facilities. BQ Energy, LLC (BQ Energy) has entered into a long-term lease agreement with Tecumseh to construct and operate eight wind turbines and supporting power generation equipment and infrastructure on approximately 31-acres of the above-referenced parcel. The wind energy facilities and the associated property are hereafter referred to as the "Steel Winds Site," "subject properties," or the "Site." (see Figure 2 of the SFMP). The City of Lackawanna Planning Board, acting in its capacity as Lead Agency under SEQRA, issued a Negative Declaration to BQ Energy for the Steel Winds wind energy project on September 7, 2005.

BQ Energy intends to investigate groundwater and remediate impacted slag/fill within the subject property and redevelop the property under the New York State Brownfield Cleanup Program (BCP).

1.2 Purpose and Scope

The Soil/Fill Management Plan (SFMP), prepared as part of the Site Investigation (SI)/Interim Remedial Measures (IRM) Work Plan, describes protocols for the proper handling of site soil/fill during development activities. The developer or property owner at the time of development will be responsible for all monitoring, implementation, and reporting requirements of the SFMP.

Since erosion control will be a critical component of preventing the potential migration of contaminants onto developed property or off-site during development of the site, this Master Erosion Control Plan (MECP) was prepared to provide guidance to developers during build-out activities on the properties. This MECP is a critical component of the SFMP. This document is generic in nature and provides minimum erosion control practices to be used by site owners and/or developers.

2.0 GENERAL PERMIT REQUIREMENTS

Redevelopment of the Site will be in accordance with the SFMP and Brownfield Cleanup Agreement (BCA). Since development activities at the Site will be completed under a BCA, a State Pollutant Discharge Elimination System (SPDES) will not be required.

3.0 POTENTIAL EROSION CONTROL CONCERNS

Following remediation, redevelopment activities will proceed for commercial and light industrial uses of the property. Erosion control measures will be designed once the development approach has been determined. Potential areas and items of concern during site redevelopment activities include the following:

- All portions of the site not covered by buildings, sidewalks, roadways, parking areas, or other structures will be required to be covered with 4 to 6 inches of "clean" soils, asphalt, or concrete to limit exposure to remaining subsurface soil/fill materials. The transportation and placement activities associated with this work will require erosion and sediment controls to prevent the surface soil from being washed off the area being developed.

- Remediated areas or off-site properties adjacent to unremediated parcels need protection so they do not become impacted by site operations.

- Storm water inlets will require protective measures to limit sediment transfer to storm sewers.

- Runoff from soil stockpiles will require erosion controls.

- Surface slopes need to be minimized as much as practical to control sediment transfer.

- Soil/fill excavated during development will require proper handling and disposal.

4.0 EROSION CONTROL MEASURES

4.1 Background

Standard soil conservation practices need to be incorporated into the construction and development plans to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures, many of which will be permanent in nature and become part of the completed project (e.g., drainage channels and grading). Other measures will be temporary and serve only during the construction stage. Selected erosion and sediment control measures will meet the following criteria:

- Minimize erosion through project design (maximum slopes, phased construction, etc.).
- Incorporate temporary and permanent erosion control measures.
- Remove sediment from sediment-laden storm water before it leaves the site.

4.2 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be used during construction. They will be installed by the site developer and will be maintained until they are either no longer needed or until such time as permanent measures are installed and become effective. At a minimum, the following temporary measures will be used:

- Silt fencing
- Straw/hay bales
- Temporary vegetation/mulching
- Temporary sedimentation basins
- Cautious placement, compaction and grading of stockpiles

4.2.1 Silt Fencing

Construction and regrading activities will result in surface water flow to drainage ditches and swales, storm sewers, and adjacent properties. Silt fencing will be the primary

sediment control measure used in these areas. Prior to extensive soil excavation or grading activities, silt fences will be installed along the perimeter of all construction areas. The orientation of the fencing will be adjusted as necessary as the work proceeds to accommodate changing site conditions.

Intermediate fencing will be used upgradient of the perimeter fencing to help lower surface water runoff velocities and reduce the volume of sediment to perimeter fencing. Stockpiles will also be surrounded with silt fencing.

As sediment collects, the silt fences will be cleaned as necessary to maintain their integrity. Removed sediment will be used elsewhere on-site as general fill. All perimeter silt fences will remain in place until construction activities in an area are complete and vegetative cover has been established. Silt fences will be installed in accordance with the details presented in Appendix A-A.

4.2.2 Straw and/or Hay Bales

Straw and/or hay bales will be used to intercept sediment laden storm water runoff in drainage channels during construction. The use of either hay or straw will be based on the availability of materials at the time of construction.

Bales will be placed in swales and ditches where the anticipated flow velocity is not expected to be greater than 5 feet/second (fps). Intermediate bales will be placed upgradient of the final barrier to reduce flow velocities and sediment loadings where higher velocities are anticipated.

As with silt fencing, sediment will be removed as necessary from behind the bales and disposed of on-site. Bales that have become laden with sediment or have lost their structural integrity or effectiveness due to the weather will be replaced. Bales should be installed in accordance with the details presented in Appendix A-A.

4.2.3 Cautious Placement of Stockpiles

As development occurs, excavation activities will produce stockpiles of soil and subgrade soil/fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than 50 feet from storm water inlets and parcel boundaries, if practicable. Additionally, stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control. Impacted

stockpiles will be underlain and covered with secured polyethylene tarpaulin until they are properly disposed.

4.3 Permanent Control Measures During Site Redevelopment

Permanent erosion and sedimentation control measures and structures will be installed as soon as practical during construction for long-term erosion protection. Specific design features will be selected once the detailed development approach for the site has been determined. Examples of permanent erosion control measures could include:

- Using maximum slopes in erosion prone areas to limit erosion.
- Minimizing the potential contact with, and migration of, subsurface soil/fill through the placement of a "clean" soil cover system in all areas not covered with structures, roads, parking areas, sidewalks, etc.
- Planting and maintaining vegetation.
- Limiting runoff flow velocities to the extent practical.
- Lining collection channels with riprap, erosion control fabric, vegetation, or similar materials.

5.0 CONSTRUCTION MANAGEMENT PRACTICES

5.1 General

The following general construction practices should be evaluated for erosion and sedimentation control purposes during site development activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (i.e., phasing the work).
- Covering exposed or disturbed areas of the site as quickly as practical.
- All erosion and sediment control measures should be installed prior to disturbing the site subgrade.
- Both on-site and off-site tracking of soil by vehicles should be minimized by using routine entry/exit routes.

5.2 Monitoring, Inspection, and Maintenance Plan

All erosion and sedimentation controls described in this Plan will be inspected by a qualified representative of the site developer within 24 hours of a heavy rainfall event and repaired or modified as necessary to effectively control erosion or turbidity problems. Inspections should include areas under construction, stockpile areas, erosion control devices (e.g., silt fences, hay bales), and locations where vehicles enter and leave the site. Routine inspections of the entire site should also be made on a monthly basis during development.

If inspections indicate problems, corrective measures should be implemented within 24 hours. A report summarizing the scope of the inspection, name of the inspector, date, observations made, and a description of the corrective actions taken should be completed. Appendix A-B contains the monitoring, inspection, and maintenance plan with example inspection forms.

APPENDIX A-A

EROSION CONTROL DETAILS

- *Silt Fence*
- *Straw Bale Dike*
- *Perimeter Dike/Swale*
- *Temporary Swale*
- *Sediment Trap for Drop Inlet*

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric (filter cloth) used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used.

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence are:

Slope Steepness	Maximum Slope Length (Ft)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

2. Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required. All silt fences shall be placed as close to the area as possible, and the area below the fence must be undisturbed or stabilized.

A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

1. The type, size, and spacing of fence posts.
2. The size of woven wire support fences. (OPTIONAL)
3. The type of filter cloth used.
4. The method of anchoring the filter cloth.
5. The method of fastening the filter cloth to the fencing support.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. See Figure 4.4 on page 4.12 for details.

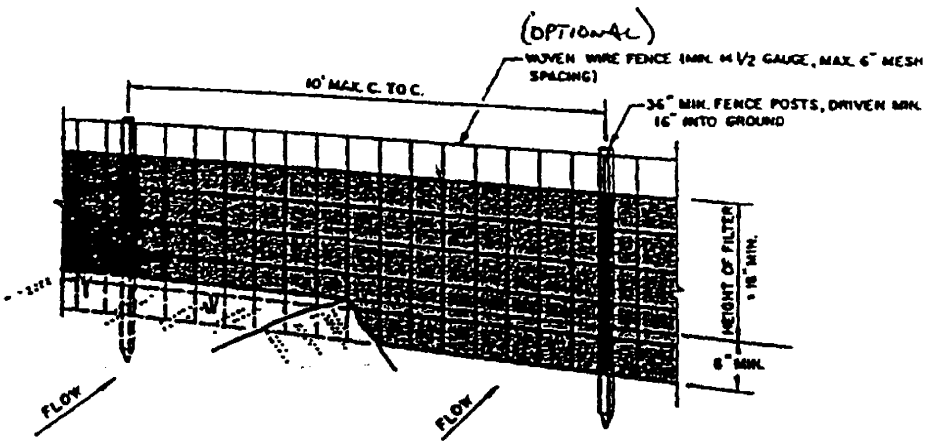
Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance. Statewide acceptability shall depend on in field and/or laboratory observations and evaluations.

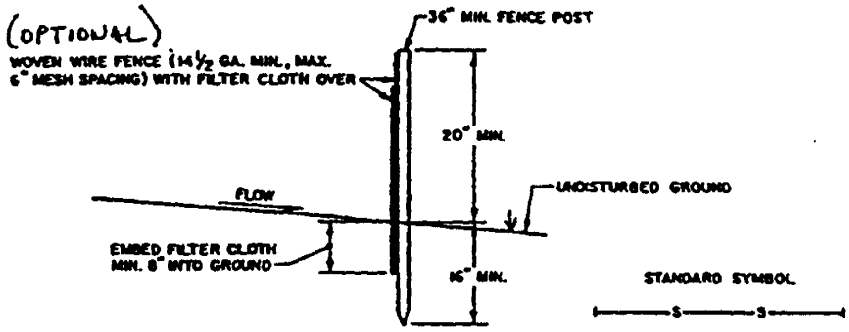
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Sizw	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.
3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14-1/2 gage with a maximum 6 in. mesh opening, or as approved. (OPTIONAL)
4. Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per manufacturer's instructions.

Figure 4.4
Silt Fence Details



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

(OPTIONAL)

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14½ GA. (OPTIONAL) 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	SILT FENCE	STANDARD DRAWING
		SF-1

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw or similar material used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes are to be used for no more than three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits:

Constructed Slope	Percent Slope	Slope Length (feet)
2:1	50	25
2-1/2:1	40	50
3:1	33	75
3-1/2:1	30	100
4:1	25	125

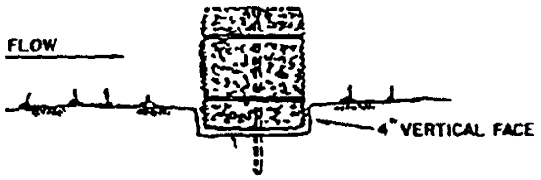
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Design Criteria

A design is not required. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 4.3 on page 4.10 or details.

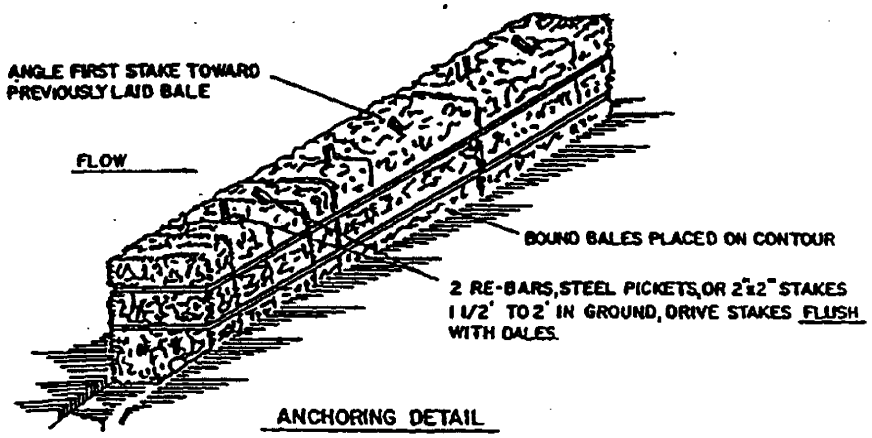
Figure 4.3
Straw Bale Dike Details



BEDDING DETAIL

STANDARD SYMBOL

SBD — DRAINAGE AREA NO MORE THAN 1/4 ac. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	STRAW BALE DIKE	STANDARD DRAWING SBD-1

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 4.16 on page 4.34 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from effected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area - Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres see earth dike; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height - 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike - 2 feet minimum.

Width of swale - 2 feet minimum.

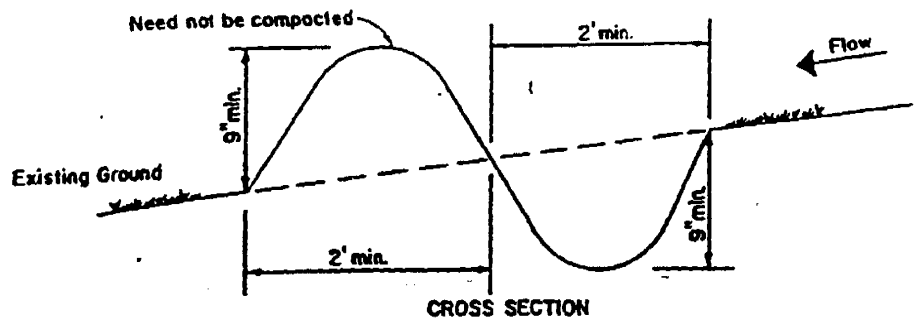
Grade - Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 20 percent.

Stabilization - The disturbed area of the dike and swale shall be stabilized within 10 days of installation, in accordance with the standard and specifications for seed and straw mulch or straw mulch only if not in the seeding season.

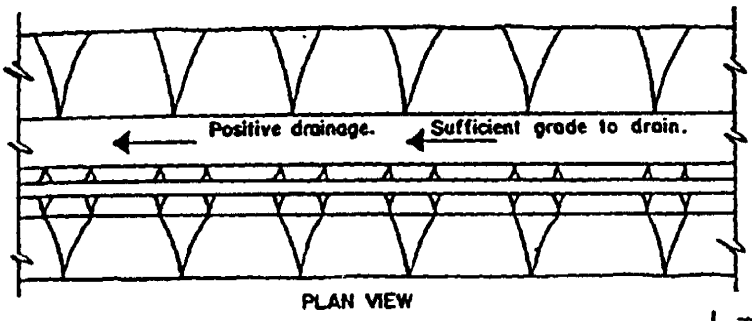
Outlet

1. Perimeter dike/swale shall have an outlet that functions with a minimum of erosion.
2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.
3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.
4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 4.16
Perimeter Swale Dike Detail



CROSS SECTION



PLAN VIEW

STANDARD SYMBOL

CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTRUBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SEED AND STRAW MULCH, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

Max. Drainage Area Limit: 2 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PERIMETER DIKE/SWALE	Standard Drawing PDS-1

STANDARD AND SPECIFICATION FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary Swales are constructed:

1. To divert flows from a disturbed area.
2. Intermittently across disturbed areas to shorten overland flow distances.
3. To direct sediment laden water along the base of slopes to a trapping device.
4. To transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 4.5 on page 4.14 for details.

	Swale A <5 Ac	Swale B 5-10 Ac
Drainage Area		
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or Flatter	2:1 or Flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specifications for Waterways on page 4.91.

Stabilization

Stabilization of the swale shall be completed within 10 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

		FLOW CHANNEL	
Type of Treatment	Channel Grade	A ≤5 Ac	B 5-10 Ac
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with Jute or Excelsior; Sod, or lined with 2 in. stone
3	5.1-8.0%	Seed and cover with Jute or Excelsior, Sod line with 2 in. stone	Line with 4-8 in. stone or Recycled Concrete Equivalent
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[1]	Engineering Design

In highly erodible soils, as defined by local approving agency, refer to the next higher slope grade for type of stabilization.

[1] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

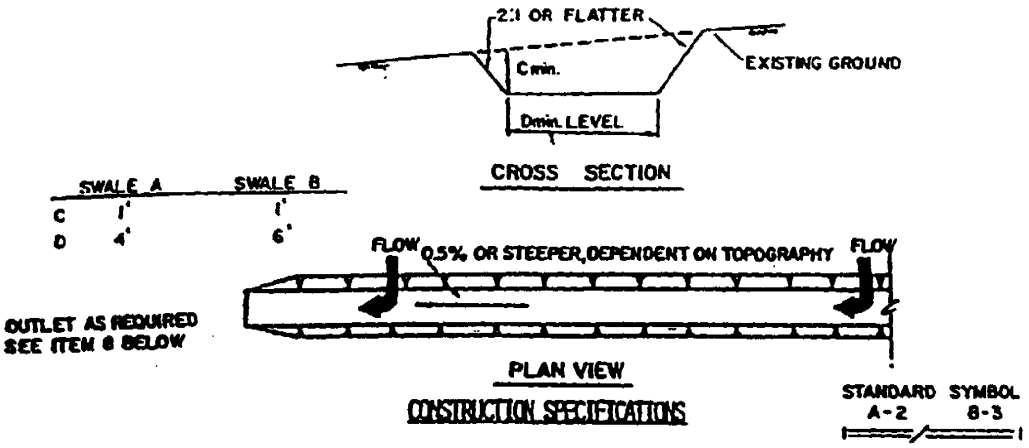
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If swale is used to divert flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 4.5
Temporary Swale Detail



CONSTRUCTION SPECIFICATIONS

STANDARD SYMBOL A-2 B-3

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED ON CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE CHART BELOW:

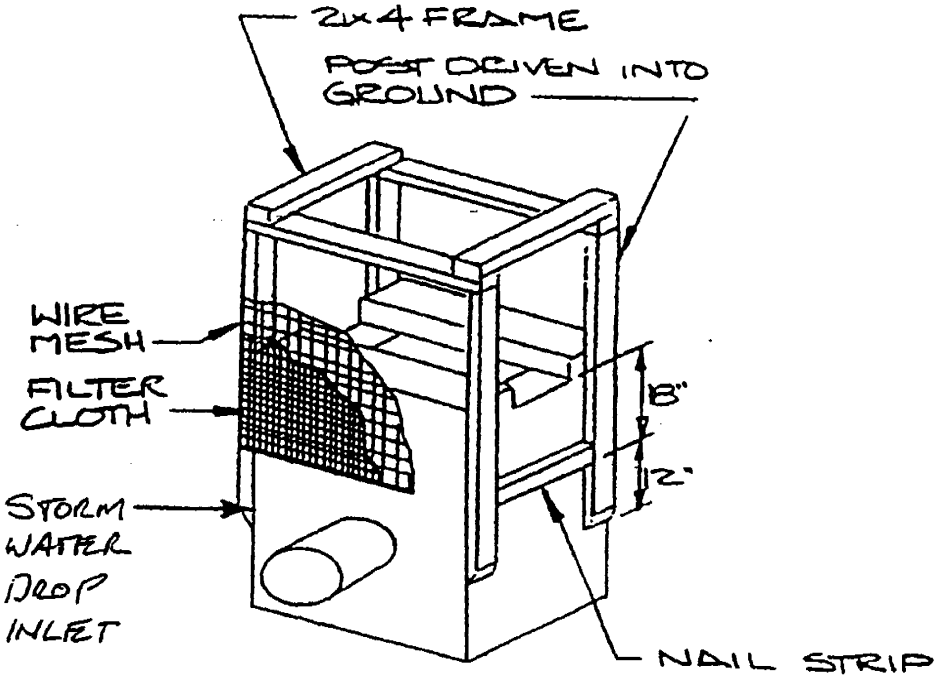
FLOW CHANNEL STABILIZATION

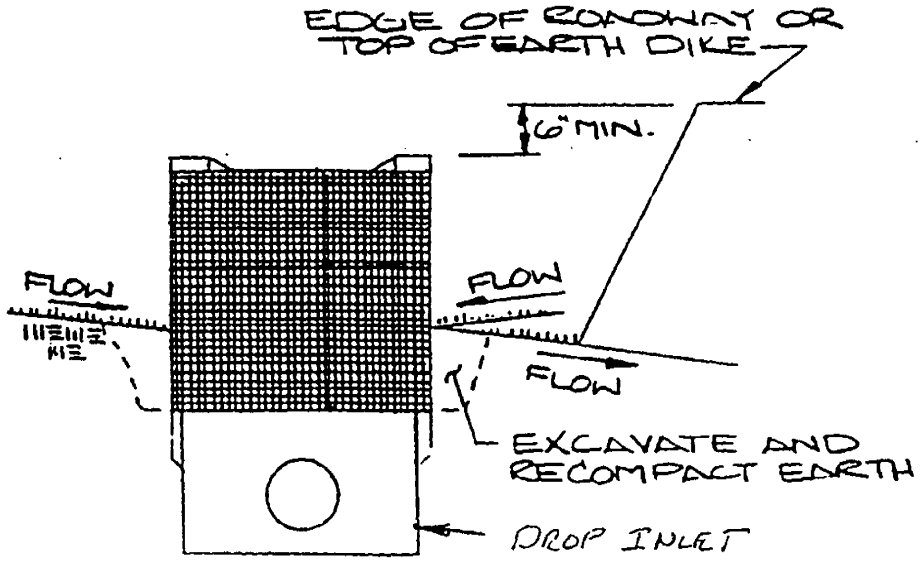
TYPE OF TREATMENT	CHANNEL GRADE	A (5 AC OR LESS)	B (5 AC - 10 AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1-8.0%	SEED WITH JUTE OR EXCELSIOR; SOD	LINED RIP-RAP 4-8" RECYCLED CONCRETE EQUIVALENT
4	8.1-20%	LINED 4-8" RIP-RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	TEMPORARY SWALE	STANDARD DRAWING TS-1

Sediment Trap
for
Drop Inlets





APPENDIX A-B

MONITORING, INSPECTION, AND MAINTENANCE PLAN

MONITORING, INSPECTION & MAINTENANCE PLAN

STEEL WINDS SITE
LACKAWANNA, NEW YORK

August 2006 0118-001-100

Prepared for:

BQ Energy, LLC

MONITORING, INSPECTION, AND MAINTENANCE PLAN

IMPLEMENTATION

A. The Contractor at this site shall at all times, properly construct, operate and maintain all erosion controls and features, as part of the construction activities, in accordance with regulatory requirements, and with good construction practices. Erosion control measures and activities will be in accordance with the Master Erosion Control Plan (MECP).

B. This erosion control monitoring, inspection, and maintenance plan has been developed to achieve compliance with the requirements of the MECP. The key elements of the monitoring effort are described herein and include the following:

- Site Inspections and Maintenance.
- Best Management Practices Monitoring.
- Record keeping.
- Review and Modifications.
- Certification of Compliance.

SITE INSPECTIONS AND MAINTENANCE PRACTICES

A. The temporary erosion control features installed by the Contractor will be maintained by the contractor until no longer needed or permanent erosion control methods are installed.

Site inspections are required every 7 days or within 24 hours of a rainfall of 0.5 inches or greater. All disturbed areas, areas for material storage, locations where vehicles enter or exit the site, and all of the erosion and sediment controls that are identified as part of this site's construction storm water and erosion control plan must be inspected. Controls must be in good operating condition until the affected area they protect has been completely stabilized and the construction activity is complete. If a

repair is necessary, it must be completed within 7 days of receipt of a report or notice, if practical. Inspection for specific erosion and sediment controls will include the following:

- Silt fences will be inspected to determine the following:

  1) Depth

  2) Condition of fabric

  3) Fabric is attached to the posts

  4) Fence posts are firmly in the ground

- The silt fences will be inspected weekly and within 24 hours of a 0.5-inch or greater storm event.

- Diversion berms, if used, will be inspected and any breaches promptly repaired.

- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and other potential erosion control problems.

- The Contractor shall designate individual(s) that will be responsible for erosion control, maintenance, and repair activities. The designated individual will also be responsible for inspecting the site and filling out the inspection and maintenance report.

- Personnel selected for inspection and maintenance responsibilities will receive training. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on-site in good working order.

B. The individual inspecting the site must record any damages or deficiencies on an inspection form (Attachment 1). These forms can be used to request maintenance and repair and to document inspection and maintenance activities. Damages or deficiencies must be corrected as soon as possible after the inspection. Any changes that may be required to correct deficiencies in the MECP should also be made as soon as possible, but in no case later than 7 days after the inspection.

C. An Inspection and Maintenance Report Form is attached to record the inspection and assessment (see Attachment 1).

D. A Stabilization Measures Report Form is attached (see Attachment 2) to record the effects of any corrective measures implemented as reported in the Inspection and Maintenance Report Form.

RECORDKEEPING

A. Records Retention

A copy of the MECP and inspection, maintenance and amendment records must be kept at the construction site from the time construction begins until the site is stabilized.

Inspection records shall be retained for a minimum of three years, as detailed in the General Permit.

The Plan and related records will be made available upon request to any regulatory agency representatives or members of the public.

REVIEW AND MODIFICATIONS

A. During the course of construction, unanticipated changes that affect this plan may occur such as scheduling changes, phasing changes, staging area modifications, off-site drainage impacts and repeated failures of designed controls. Any changes to the activities and controls identified in this plan must be documented and the Plan revised accordingly. An Amendment Report must be completed and attached to the plan (see Attachment 3).

B. Certification of revisions to this plan shall be included at the end of the document.

ATTACHMENT 1

INSPECTION & MAINTENANCE REPORT FORM (SAMPLE)

MECP: INSPECTION & MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT OF 0.5-INCHES OR MORE

Project: Date:

Client: Report No.:

Job No.: Personnel:

Rainfall (approx. inches): Rainfall Event Personnel:

Contractor Activities	OK	NO	N/A	Notes
Are construction onsite traffic routes, parking and storage of equipment and supplies restricted to areas specifically designated for those uses?				
Are locations of temporary soil stockpiles of construction materials in approved areas?				
Is there any evidence of spills and resulting cleanup procedures?				
GENERAL EROSION & SEDIMENT CONTROLS				
Are sediment and erosion BMPs installed in the proper location and according to the specifications set out in the SWPPP?				
Are all operational storm drain inlets protected from sediment inflow?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding or mulching?				
Is there any evidence that sediment is leaving the site?				
Is there any evidence of erosion or cut fill slopes?				
PERIMETER ROAD USE				
Does much sediment get tracked on to the perimeter road				
Is the gravel clean or is it filled with sediment?				
Does all traffic use the perimter road to leave the site?				
Is maintenance or repair required for the perimeter road?				
REFER TO STABILIZATION MEASURES REPORT				

PREPARED BY: **DATE:**

MECP = Master Erosion Control Plan
Appendix A-B-1; Inspection and Maintenance Report Form

ATTACHMENT 2

STABILIZATION MEASURES REPORT FORM (SAMPLE)

MECP: STABILIZATION MEASURES REPORT FORM

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT OF 0.5-INCHES OR MORE

Project:	Date:
Client:	Report No.:
Job No.:	Personnel:
Rainfall (approx. inches):	Rainfall Event Personnel:

STABILIZATION MEASURES

Area	Date Since Last Disturbed	Date of Next Disturbance	Stabilized? Yes/No	Stabilized With	Condition

STABILIZATION REQUIRED:

TO BE PERFORMED BY: **ON OR BEFORE:**

PREPARED BY: **DATE:**

MECP = Master Erosion Control Plan
Appendix A-B-2; Stabilization Measures Report Form

ATTACHMENT 3

AMENDMENT REPORT
(SAMPLE)

MECP: AMMENDMENT REPORT

Project:	Date:
Client:	Report No.:
Job No.:	Personnel:
Rainfall (approx. inches):	Rainfall Event Personnel:

CHANGES REQUIRED TO THE SWPPP:

REASONS FOR CHANGES:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are signification penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

PREPARED BY: **DATE:**

APPENDIX B

NYSDOH
GENERIC COMMUNITY AIR MONITORING PLAN

APPENDIX B

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

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring

particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ 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 $\mu g/m^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

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

APPENDIX C

DRAFT 6NYCRR PART 375 RESTRICTED USE SOIL CLEANUP OBJECTIVES

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Metals							
Arsenic	7440-38-2	16[f]	16[f]	16[f]	16[f]	13[f]	16[f]
Barium	7440-39-3	350[f]	400	400	10,000 [d]	433	820
Beryllium	7440-41-7	14	72	590	2,700	10	47
Cadmium	7440-43-9	2.5[f]	4.3	9.3	60	4	7.5
Chromium, hexavalent[h]	18540-29-9	22	110	400	800	1[e]	19
Chromium, trivalent[h]	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50-8	270	270	270	10,000 [d]	50	1,720
Total Cyanide[h]	57-12-5	27	27	27	10,000 [d]	NS	40
Lead	7439-92-1	400	400	1,000	3,900	63[f]	450
Manganese	7439-96-5	2,000[f]	2,000[f]	10,000 [d]	10,000 [d]	1600[f]	2,000[f]
Total Mercury		0.81[j]	0.81[j]	2.8[j]	5.7[j]	0.18[f]	0.73
Nickel	7440-02-0	140	310	310	10,000 [d]	30	130
Selenium	7782-49-2	36	180	1,500	6,800	3.9[f]	4[f]
Silver	7440-22-4	36	180	1,500	6,800	2	8.3
Zinc	7440-66-6	2200	10,000 [d]	10,000 [d]	10,000 [d]	109[f]	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	93-72-1	58	100[a]	500[b]	1,000[c]	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 [e l]	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 [e l]	136
4,4'-DDD	72-54-8	2.6	13	92	180	0.0033 [e l]	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04[k]	0.02

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71-9	0.91	4.2	24	47	1.3	2.9
delta-BHC	319-86-8	100[a]	100[a]	500[b]	1,000[c]	0.04[k]	0.25
Dibenzofuran	132-64-9	14	59	350	1,000[c]	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8[i]	24[i]	200[i]	920[i]	NS	102
Endosulfan II	33213-65-9	4.8[i]	24[i]	200[i]	920[i]	NS	102
Endosulfan sulfate	1031-07-8	4.8[i]	24[i]	200[i]	920[i]	NS	1,000[c]
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36-3	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	83-32-9	100[a]	100[a]	500[b]	1,000[c]	20	98
Acenapthylene	208-96-8	100[a]	100[a]	500[b]	1,000[c]	NS	107
Anthracene	120-12-7	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Benz(a)anthracene	56-55-3	1[f]	1[f]	5.6	11	NS	1[f]
Benzo(a)pyrene	50-32-8	1[f]	1[f]	1[f]	1.1	2.6	22
Benzo(b)fluoranthene	205-99-2	1[f]	1[f]	5.6	11	NS	1.7
Benzo(g,h,i)perylene	191-24-2	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Benzo(k)fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1[f]	3.9	56	110	NS	1[f]
Dibenz(a,h)anthracene	53-70-3	0.33[c]	0.33[e]	0.56	1.1	NS	1,000[c]

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Fluoranthene	206-44-0	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Fluorene	86-73-7	100[a]	100[a]	500[b]	1,000[c]	30	386
Indeno(1,2,3-cd)pyrene	193-39-5	0.5[f]	0.5[f]	5.6	11	NS	8.2
m-Cresol	108-39-4	100[a]	100[a]	500[b]	1,000[c]	NS	0.33[e]
Naphthalene	91-20-3	100[a]	100[a]	500[b]	1,000[c]	NS	12
o-Cresol	95-48-7	100[a]	100[a]	500[b]	1,000[c]	NS	0.33[e]
p-Cresol	106-44-5	34	100[a]	500[b]	1,000[c]	NS	0.33[e]
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8[e]	0.8[e]
Phenanthrene	85-01-8	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Phenol	108-95-2	100[a]	100[a]	500[b]	1,000[c]	30	0.33[e]
Pyrene	129-00-0	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Volatiles							
1,1,1-Trichloroethane	71-55-6	100[a]	100[a]	500[b]	1,000[c]	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100[a]	100[a]	500[b]	1,000[c]	NS	0.33
1,2-Dichlorobenzene	95-50-1	100[a]	100[a]	500[b]	1,000[c]	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02[f]
cis-1,2-Dichloroethene	156-59-2	59	100[a]	500[b]	1,000[c]	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100[a]	100[a]	500[b]	1,000[c]	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1[e]	0.1[c]
Acetone	67-64-1	100[a]	100[b]	500[b]	1,000[c]	2.2	0.05

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100[a]	100[a]	500[b]	1,000[c]	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100[a]	100[a]	500[b]	1,000[c]	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33[e]	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100[a]	100[a]	500[b]	1,000[c]	100[a]	0.12
Methyl tert-butyl ether	1634-04-4	62	100[a]	500[b]	1,000[c]	NS	0.93
Methylene chloride	75-09-2	51	100[a]	500[b]	1,000[c]	12	0.05
n- Propylbenzene	103-65-1	100[a]	100[a]	500[b]	1,000[c]	NS	3.9
sec-Butylbenzene	135-98-8	100[a]	100[a]	500[b]	1,000[c]	NS	11
tert-Butylbenzene	98-06-6	100[a]	100[a]	500[b]	1,000[c]	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100[a]	100[a]	500[b]	1,000[c]	36	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20-7	100[a]	100[a]	500[b]	1,000[c]	0.26	1.6

All Soil clean up objectives (SCOs) are in parts per million (ppm).
NS=Not specified. See Technical Support Document (TSD).
Footnotes
[a] The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm,, see TSD Section 9.3.
[b] The SCOs for commercial use were capped at a maximum value of 500 ppm, see TSD Section 9.3.

[c] The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm, see TSD Section 9.3.
[d] The SCOs for metals were capped at a maximum value of 10,000 ppm, see TSD Section 9.3.
[e] For constituents where the calculated SCO was lower than the Contract Required Quantitation Limit (CRQL), the CRQL is used as the SCO value.
[f] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the DEC/DOH rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.
[g] SCO is the sum of DDD, DDE and DDT.
[h] The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
[i] This SCO is for the sum of Endosulfan I, Endosulfan II, and Endosulfan Sulfate.
[j] This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts), See TSD table 5.6-1.
[k] This SCO is derived from data on mixed isomers of BHC
[l] This SCO is for the sum of DDD, DDE and DDT

375-6.9 Development and modification of soil cleanup objectives.

(a) Applicability. This section identifies when and the procedures under which a contaminant-specific soil cleanup objective may be developed or modified.

(1) Soil cleanup objectives for contaminants not included in Tables 375-6.8(a) and (b) may be developed by the remedial party or required by the Department.

(2) Soil cleanup objectives for contaminants included in Tables 375-6.8(a) and (b), may be modified based on site-specific data if desired by the remedial party; as set forth in:

(i) subpart 375-3 for Tracks 3 or 4, as set forth in paragraphs 375-3.8(e)(3) or (4), respectively; or

(ii) subparts 375-2, 375-4 and 375-5, as set forth in subparagraph 375-2.8(b)(1)(iii), subparagraph 375-4.8(c)(1)(iii) and clause 375-5.8(c)(1)(i)*(b)* respectively.

(3) Protection of ecological resources soil cleanup objectives were not developed for certain contaminants, which are identified in Table 375-6.7(b) as "NS". Where such contaminants:

(i) appear in Table 375-6.7(a), the applicant may be required by the Department to calculate a protection of ecological resources soil cleanup objective for the contaminant for use in Track 1 and apply such soil cleanup objective where it is lower than the soil cleanup objective set forth in Table 375-6.8(a); or

(ii) are identified as impacting or threatening an ecological resource for a restricted use remedial program the Department may require a protection of ecological resources soil cleanup objective be developed.

(b) Development of new soil cleanup objectives.

(1) Shall be developed utilizing the same methodologies that were used by the Department to develop the respective soil cleanup objective, as provided in the Technical Support Document.

(2) Shall apply the following caps, as set forth in Section 9.3 of the Technical Support Document, on any soil cleanup objective included in Tables 375-6.8(a) and (b), with the exception of metals, as set forth in paragraph (3) below, developed for:

(i) unrestricted use, residential, restricted-residential and ecological resources use, a maximum value of 100 ppm;

(ii) commercial use, a maximum value of 500 ppm; and

(iii) industrial use and the protection of groundwater a maximum value of 1000 ppm.

(3) Shall apply a cap for metals at a maximum value of 10,000 ppm.

(4) Development of unrestricted use soil cleanup objectives. The unrestricted use soil cleanup objective for a compound will be the lowest of the soil cleanup values, calculated as set forth in Appendix E of the Technical Support Document, for the protection of groundwater, protection of ecological resources and protection of public health.

(5) Development of restricted use soil cleanup objectives. The protection of:

(i) groundwater soil cleanup objective will be the values calculated for the protection of groundwater as set forth in Appendix E of the Technical Support Document;

(ii) ecological resources soil cleanup objectives will be the values calculated for the protection of ecological resources as set forth in Appendix E of the Technical Support Document; and

(iii) public health cleanup objective will be the values calculated for the protectin of public health for the identified use of the site, as set forth in Appendix E of the Technical Support Document.

(c) Modification of soil cleanup objectives. The contaminant-specific soil cleanup objectives set forth at Tables 675-6.8(a) and (b) may be modified by site specific data as set forth in this subdivision.

(1) Contaminant-specific soil cleanup objectives modified in accordance with this subdivision may be utilized by the remedial party for a site remedial program undertaken pursuant to:

(i) subpart 375-3 in Tracks 3 or 4, as set forth in paragraphs 375-3.8(e)(3) or (4), respectively; or

(ii) subparts 375-2, 375-4 and 375-5, as set forth in subparagraph 375-2.8(b)(1)(ii), subparagraph 375-4.8(c)(1)(ii) or clause 375-5.8(c)(1)(i)*(b)* respectively.

(2) For the calculation of a protection of groundwater or ecological resources contaminant -specific soil cleanup objective, the site-specific percentage of total organic carbon in the soil at the site may be substituted in the algorithms provided in Appendix E of the Technical Support Document.

(3) For the calculation of a protection of public health contaminant-specific soil cleanup objective, site-specific data may be used to modify two of the five exposure pathways, as follows:

(i) for the particulate inhalation pathway six parameters rely on site-specific data; and

(ii) for the volatile inhalation pathway, four parameters rely on site-specific data.

(4) The algorithms to be used for each protection of public health pathway and details on the parameters which can be substituted are included in Appendix E of the Technical Support Document.

(d) Use of soil cleanup objectives developed or modified. Once approved by the Department, contaminant-specific soil cleanup objectives developed or modified as set forth in this section may be utilized by the Department at other sites consistent with paragraphs (1) and (2) below.

(1) Contaminant-specific soil cleanup objectives developed for contaminants not included in Tables 375-6.8(a) and (b) as set forth in subdivisions 375-6.9(b), will be used as guidance and shall be considered by the Department for inclusion in the Tables in this subpart during any subsequent reevaluation of the soil cleanup objectives, as set forth by ECL 27-1415.

(2) Contaminant-specific soil cleanup objectives modified for site specific parameters as set forth in subdivision 375-6.9(c) above may be utilized at sites manifesting similar parameters, if approved by the Department.