

# Remedial Investigation/ Alternatives Analysis Report (RI/AAR) Work Plan

*Phase III Business Park Area  
Lackawanna, New York  
BCP Site No. C915199*

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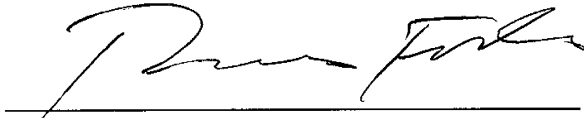
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RI/AAR WORK PLAN

ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.  
PHASE III BUSINESS PARK  
LACKAWANNA, NEW YORK

CERTIFICATION:



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## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Background.....	1
1.2	Purpose and Scope .....	2
1.3	Project Organization and Responsibilities .....	3
<b>2.0</b>	<b>ENVIRONMENTAL CONDITIONS .....</b>	<b>4</b>
2.1	Historical Operations .....	4
2.2	Current Conditions .....	5
2.2.1	<i>Site Topography, Physiography and Drainage</i> .....	5
2.2.2	<i>Site Geology and Hydrogeology</i> .....	5
2.2.3	<i>Wetlands and Floodplains</i> .....	6
2.3	Constituents of Potential Concern (COPCs).....	6
<b>3.0</b>	<b>DATA OBJECTIVES .....</b>	<b>7</b>
3.1	Acceptance or Performance Criteria.....	7
3.2	Collection of Defensible Data .....	7
<b>4.0</b>	<b>INVESTIGATION ACTIVITIES.....</b>	<b>9</b>
4.1	Underground Utility Clearance .....	9
4.2	Soil/Slag-Fill Investigation .....	9
4.2.1	<i>Test Pit Excavation</i> .....	9
4.2.2	<i>Boring Advancement</i> .....	11
4.2.3	<i>Soil/Slag-Fill Sample Analysis</i> .....	11
4.2.4	<i>Grossly-Impacted Soil/Slag-Fill</i> .....	12
4.3	Groundwater Investigation .....	12
4.3.1	<i>Monitoring Well Installation</i> .....	13
4.3.2	<i>Well Development</i> .....	14
4.3.3	<i>Groundwater Elevation Measurements</i> .....	15
4.3.4	<i>In-Situ Hydraulic Conductivity Testing</i> .....	15
4.3.5	<i>Groundwater Sample Collection and Analysis</i> .....	15
4.4	Field Specific Quality Assurance/Quality Control (QA/QC) .....	16
4.5	Documentation .....	18
4.6	Site Mapping & Survey.....	19
<b>5.0</b>	<b>REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT.....</b>	<b>20</b>
5.1	Remedial Investigation Report.....	20
5.2	Alternative Analysis Report.....	21
<b>6.0</b>	<b>INVESTIGATION SUPPORT DOCUMENTS .....</b>	<b>23</b>
6.1	Site-Wide Health and Safety Plan (HASP).....	23
6.2	Community Participation Plan (CP Plan).....	23
6.3	Quality Assurance Project Plan (QAPP).....	24

## TABLE OF CONTENTS

7.0	PROJECT SCHEDULE AND SEQUENCE OF THE WORK.....	25
8.0	REFERENCES .....	26

### LIST OF TABLES

---

Table 1	Constituents of Potential Concern (COPCs)
Table 2	Expanded Parameter List
Table 3	Analytical Program Summary
Table 4	Subsurface Soil/slag-fill Analytical Program Summary – Test Pit Investigation

### LIST OF FIGURES

---

Figure 1	Site Location and Vicinity Map
Figure 2	Site Plan
Figure 3	Redevelopment Master Plan
Figure 4	Project Schedule

### LIST OF APPENDICES

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Appendix A	Historical Groundwater Analytical Data (RFI)
Appendix B	Geotechnical Boring Logs/Monitoring Well Completion Records/ Groundwater Elevation Tables (RFI)
Appendix C	Site-Wide Health and Safety Plan
Appendix D	Citizen Participation Plan

## 1.0 INTRODUCTION

### 1.1 Background

ArcelorMittal Tecumseh Redevelopment, Inc. (Tecumseh) owns approximately 1,100-acres of land (property) located on the west side of New York State Route 5 (Hamburg Turnpike) in the City of Lackawanna, NY (see Figures 1 and 2). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with a portion of the property extending into the Town of Hamburg. Tecumseh's property is bordered by NY State Route 5 on the east, Lake Erie to the west and northwest, and other industrial properties to the south and the northeast.

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 Lackawanna property from BSC as a bankruptcy asset purchase in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in January 2005. In August 2006, USEPA approved the RFI and terminated Bethlehem Steel's obligations under the 1990 Administrative Order. Tecumseh is presently negotiating an Order on Consent with the New York State Department of Environmental Conservation (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.

Redevelopment of the entire Tecumseh property is guided by a Master Plan (see Figure 3). Specifically, in April of 2005, Tecumseh signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote redevelopment of the former BSC Lackawanna property. The resultant Master Plan calls for a variety of site uses, including wind energy, passive recreation and business development. At present one parcel encompassing 29 acres along the Lake Erie shoreline, has been redeveloped by BQ Energy, LLC under lease to Tecumseh. This parcel, referred to as the "Steel Winds Site," contains eight wind turbines and supporting power generation equipment and infrastructure. The

Steel Winds Site was investigated and underwent remedial measures through the NY State Brownfield Cleanup Program.

Tecumseh has separately applied for and received NYSDEC acceptance of three additional parcels into the NY State Brownfield Cleanup Program, with a fourth pending. The present status of each of these parcels is summarized below:

- **Phase I Business Park:** This parcel, encompassing approximately 102 acres, has been investigated and is presently in the final stages of a Remedial Investigation and Alternatives Analysis Report (RI/AAR).
- **Phase IA Business Park:** This parcel, encompassing approximately 12.9 acres, has been issued a notice of complete application status and has been advertised. A Brownfield Cleanup Agreement will be prepared pending final approval by the NYSDEC.
- **Phase II Business Park:** A Brownfield Cleanup Agreement has been executed for this parcel, which encompasses approximately 173 acres. An RI/AAR is being prepared.
- **Phase III Business Park:** A Brownfield Cleanup Agreement has been executed for this parcel, which originally encompassed 148.8-acres. In July of 2007, BQ Energy, LLC, with permission from Tecumseh, submitted a BCP application to the NYSDEC to construct an additional 16 turbines on the Lackawanna property, 8 of which will be located along the western boundary of the Phase III Business Park Area of the Tecumseh property. These eight additional turbines will occupy an approximate 55.47-acre parcel deemed “Steel Winds II.” The Steel Winds II BCP Site extends along the full length of the western boundary of the Phase III Business Park. Since the Phase III Business Park parcel was already in the BCP, Tecumseh and the NYSDEC “carved out” and reassigned this portion of the Phase III Business Park to BQ Energy, LLC, and the Phase III Business Park Area has been redefined as the remaining 93.4-acres of the original parcel. BQ Energy has executed a Brownfield Cleanup Agreement for the Steel Winds II parcel.

## 1.2 Purpose and Scope

This Phase III Business Park Area RI/AAR Work Plan addresses the remaining 93.4-acres of the original Phase III Business Park Area. Tecumseh intends to investigate groundwater and soil/slag-fill within the redefined Phase III Business Park Site for the

purpose of characterizing the site and identifying/evaluating remedial alternatives. Accordingly, the RI/AAR Work Plan identifies the scope of the planned Remedial Investigation and the means by which it will be completed, including sampling and reporting requirements, as well as the identification and evaluation of remedial options for impacted soil/slag-fill and on-site groundwater.

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

- Analysis of representative soil/slag-fill samples from test pits to establish concentrations of Constituents of Potential Concern (COPCs) within the soil/slag-fill matrix.
- Visual/olfactory/PID characterization of subsurface soil/slag-fill.
- Installation of on-site upgradient and downgradient groundwater monitoring wells.
- Collection and analysis of groundwater samples and groundwater potentiometric data from existing and newly installed monitoring wells on the Site.

A detailed description of the scope of work follows. A summary of the soil/slag-fill and groundwater data obtained during the RI and historical investigations on the Phase III Business Park Site will be presented in the RI/AAR report.

### 1.3 Project Organization and Responsibilities

Tecumseh has submitted the Phase III Business Park Area Site for entrance into the BCP as a non-responsible party (volunteer) per ECL§27-1405. TurnKey Environmental Restoration, LLC (TurnKey) in association with Benchmark Environmental Engineering & Science, PLLC will manage the brownfield cleanup on behalf of Tecumseh. 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 RI/AAR Work Plan, and NYSDEC DER-10 guidance.

## 2.0 ENVIRONMENTAL CONDITIONS

### 2.1 Historical Operations

The Phase III Business Park Site formerly housed a portion of BSC's steel making operations. Fourteen (14) historical SWMUs (i.e., P-17, and P-19 through P-32) are present on the redefined Phase III Business Park Site, including SWMUs P-28 through P-32 (see Figure 2). BSC performed assessments for these SWMUs during the RCRA Facility Assessment (RFA) and subsequent RFI. Based on the findings, USEPA Region II issued "No Further Action" determination for the identified SWMU's within the Business Park III area (Final RFI Report, URS, October 2004)

Buildings and operations historically located on the Site are shown on Figure 2. As indicated, prior facilities within the Phase III Business Park boundaries included:

- A portion of the 45"-90" Universal Slabbing Mill and Slabbing Mill Return Water Trench (filled). This facility encompassed oil and grease houses, electrical equipment (including transformers), the eastern portion of a "soaking pit building" that was used for reheating steel ingots prior to milling. SWMUs P-28 through P-32 (including scale and scarfer pits, settling tank and sand filters) are associated with the former slabbing mill. The former soaking pit building foundation is alleged to be filled with asbestos containing materials (ACM).
- A Basic Oxygen Furnace (BOF) Plant. This facility included fuel oil above-ground storage tanks (ASTs), electrical equipment (including transformers), dust collectors, and an oil house.
- Water Quality Control Station (WQCS) # 3. This facility included the scalping tanks, primary thickener, north thickener, south thickener, and final thickeners; multiple USTs, electrical equipment (including transformers). As indicated on Figure 2, WQCS # 3 was comprised of two nearby areas, with several of the northern WQCS # 3 buildings and thickeners still standing. SWMUs P-17, P-19, and P-21 through P-27 are associated with the former WQCS # 3.
- A portion of the Open Hearth No.3, which contained 11 brick-lined furnaces; electrical equipment (including transformers); tar pump house; stripper building; multiple ASTs and USTs; and precipitators.



- The Sintering Building, which contained two 105' chimneys; a scrubber (SWMU P-20); electrical equipment (transformers); and miscellaneous ASTs and underground storage tanks (USTs).
- Miscellaneous office production support buildings, and Welfare buildings.

## 2.2 Current Conditions

### 2.2.1 Site Topography, Physiography and Drainage

The Phase III Business Park Area Site is generally characterized as a flat area covered by sparse brush and low lying vegetation. The Site is transected by Smoke Creek (though not included in the Site). The Site contains no discernable features, except for the remaining buildings of the former WQCS No. 3, remnants of overhead coke gas conveyance lines, access roads, electrical power lines, and railroad tracks. The land surface is sparsely vegetated with voluntary indigenous shrubs, grasses, weeds, and emergent trees.

Due to the nature of the slag/soil fill there is very little ponded storm water or surface runoff as most of the precipitation seeps into the highly permeable slag/soil fill.

### 2.2.2 Site Geology and Hydrogeology

Historically, due to the proximity of Lake Erie, groundwater in the area has not been developed for industrial, agriculture, or public supply purposes. There is a deed restriction that prohibits the use of groundwater on the property. Consequently, no groundwater supply wells are present on the entire 1,100-acre Tecumseh property. Measurements taken in several monitoring wells on or near the Site indicate that the water table is 5 to 6 feet below grade within the soil/slag-fill unit. Monitoring well MWN-10, presented on Figure 2, is located in the northern half of the BP III Site. Well MWN-10 was installed to 21.0 feet below ground surface (fbgs) and screened within the soil/slag-fill unit from 6.0 to 16.0 fbgs (10-feet) (URS, October 2004).

During the RFI, groundwater samples were collected from the existing well MWN-10. Results showed that MWN-10 had no exceedances of the Class GA Standards for VOCs or SVOCs, with the exception of pH which was in the range of 11.3 – 11.8, and naturally occurring metals (i.e. iron, sodium, etc).

### 2.2.3 *Wetlands and Floodplains*

No state/federal wetlands or floodplains exist within the Site boundaries.

## 2.3 **Constituents of Potential Concern (COPCs)**

Based on the Site history, groundwater sampling data, and SWMU investigation reports discussed in Section 2.1, the following environmental concerns have been identified on the Phase III Business Park Area Site:

- The potential impact of soil/slag-fill by metals associated with steel manufacturing operations and presence of slag fill.
- The potential impact of soil/slag-fill by base-neutral semi-volatile organic compounds (SVOCs) associated with oils, greases, and fuels associated with the operation of steel mills and petroleum bulk storage.
- Potential soil and groundwater impacts from VOCs associated with petroleum storage and/or maintenance activities.
- The potential impact of soil/slag-fill by PCBs associated with transformers and other electrical equipment.

Based on these potential conditions, the constituents of potential concern (COPCs) for the Phase III Business Park Site are presented on Table 1. The COPC parameter list presented in Table 1 includes provisions for analysis of an “expanded” list of parameters presented in Table 2. The “expanded” list will be employed at a frequency of approximately 1 per 10 samples per matrix to check for the presence of other constituents.

### 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 RI 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 RI: 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 (i.e., 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 RI 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 include the collection and analysis of soil/slag-fill and groundwater samples to support remedial action objectives. Definitive level data quality will be required for chemical analysis of groundwater and soil/slag-fill 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. A full (Category B) deliverables package will be provided for all site characterization samples (i.e., excluding waste profile samples). Analytical results for site characterization samples will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP.

## 4.0 INVESTIGATION ACTIVITIES

Individual scopes of work, developed for environmental media to be addressed during the Remedial Investigation, are presented in the following sections. The proposed locations of the on-site RI activities are presented on Figure 2. A summary of the RI sampling and analytical program is presented as Table 3.

### 4.1 Underground Utility Clearance

Prior to any intrusive activity (e.g., excavation, Geoprobe®, drill rig), TurnKey will request a utility clearance from the Underground Facilities Protective Organization (or approved other), and underground utilities will be identified and clearly marked. TurnKey will also review historic plant engineering drawings for on-site utility locations prior to initiating fieldwork.

### 4.2 Soil/Slag-Fill Investigation

#### *4.2.1 Test Pit Excavation*

Approximately 86 test pits will be excavated across the Phase III Business Park Site to allow for visual/olfactory/PID assessment of subsurface conditions as well as to obtain representative samples for chemical characterization. As presented on Figure 2, test-pit locations have been preliminarily identified; however, locations may need to be modified and/or additional test pits may be excavated pending field findings.

In general, test pits will be excavated using a small excavator from ground surface to native soils or first groundwater, whichever is encountered first. Test pit dimensions (i.e., depths and lengths) will vary depending on the vertical and horizontal extents of the soil/slag-fill horizon, depth to groundwater, or encountered impacts (test pits exhibiting evidence of significant impact will require further delineation as described in Section 4.2.4). Test pit walls and excavated soil/slag-fill will be examined by qualified TurnKey personnel and classified in accordance with the Unified Soil Classification System (USCS), and characterized for impacts via visual and/or olfactory observations. Excavated soil/slag-fill and the test pit atmosphere will be field screened for the presence of VOCs using a field

PID as a procedure for ensuring the health and safety of personnel at the site and to identify potentially impacted soil/slag-fill samples for laboratory analysis. If field screening indicates potential VOC impact or olfactory evidence of impact, the test pit will also be subjected to headspace screening as discussed below.

The majority of the test pit samples will be biased toward the upper 2-foot interval, as this is the depth where most exposure is likely to occur prior to and following redevelopment. At locations where field observations suggest greater potential impact with depth, the sample will be collected from the subsurface interval (i.e., 2-feet to native/groundwater depth). All test pit soil/slag-fill samples will be retrieved from the sidewall of the excavation using dedicated stainless steel sampling equipment. For deeper samples, the excavator bucket will be used to obtain the sample, with a representative subsurface soil/slag-fill sample collected from the center of the excavator bucket using a dedicated stainless steel hand trowel or spoon. Samples will be transferred to laboratory supplied, pre-cleaned sample containers for laboratory analysis as discussed below.

For test pits exhibiting elevated PID readings in the test pit atmosphere or in the excavated spoils, a second representative aliquot from each soil/slag-fill location will be transferred to a sealable plastic bag for discrete headspace determination. In general, representative soil/slag-fill samples will be collected, placed in a sealable plastic bag, and kept at or near room temperature (approximately 65-70°F) for a minimum of 15 minutes prior to PID measurement. Headspace determinations will be recorded on the appropriate field forms and Project Field Book. PID scan and/or headspace determination values greater than 20 parts per million (ppm) will require the collection of an additional sample for VOC analysis using USEPA SW-846 methodology. The chosen soil/slag-fill samples will be transferred directly into a laboratory supplied, pre-cleaned sample container for analysis of full List VOCs.

Following completion of each test pit, soil/slag-fill material will be returned to the excavation in the opposite order in which it was removed and compacted to match the existing grade. Only the number of test pits that can be adequately backfilled during a single workday will be excavated. No excavated test pit will be left open overnight.

#### ***4.2.2 Boring Advancement***

In the event that test pit activities experience refusal at the surface due to the presence of concrete or other obstructions, an alternative location will be field selected. However, if an alternative location cannot be accessed within reasonable proximity (25 feet) of the intended location, direct-push technology via a Geoprobe® drill rig equipped with a concrete core barrel will be implemented to obtain subsurface soil/slag-fill samples. Once the surface obstruction is breached, each boring location will be advanced a minimum of one-foot into native soil or first groundwater, whichever is encountered first, using a 1.5-inch diameter, 4-foot core sampler with dedicated PVC sleeve. Recovered samples will be described in the field by qualified TurnKey personnel using the USCS, scanned for total volatile organic vapors with a calibrated Photovac 2020 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. As with the test pit soil/slag-fill samples, headspace determinations will also be completed based on field screening observations.

Upon reaching the desired depth, representative subsurface soil/slag-fill samples from each sample location will be collected from the PVC sleeve(s) using a dedicated stainless steel hand trowel or stainless steel spoon. Following sample collection, the geoprobe boreholes will be backfilled with the remaining soil cuttings and supplemented, as necessary, with bentonite powder.

#### ***4.2.3 Soil/Slag-Fill Sample Analysis***

The planned soil/slag-fill analytical program is identified on Tables 3 and 4. As indicated, a minimum of 55 soil/slag-fill samples are slated for analysis. Depending on historical use, several of the soil/slag-fill samples will be analyzed for COPC metals, pH, polychlorinated biphenyls (PCBs), cyanide, and/or STARS-list VOCs<sup>1</sup>. An expanded analytical list (see Table 2) will be employed at a frequency of one per 10 samples.

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<sup>1</sup> Samples with a headspace PID reading greater than 20 ppm will be analyzed for “full list” (i.e., NYSDEC STARS List plus USEPA Target Compound List) VOCs, and Target Compound List SVOCs.

Although certain test pit locations are not necessarily planned for analysis, representative samples will be collected from all test pit locations and the laboratory will be instructed to archive samples for potential analysis pending the outcome of the results for surrounding locations.

#### *4.2.4 Grossly-Impacted Soil/Slag-Fill*

If grossly-impacted soil/slag-fill samples are encountered, the extent of the impacts will be determined in the field, to the degree feasible, so as to allow estimation of the volume and extent of the impact. This will involve expanding the test pit dimensions and/or stepping out from the source area with perimeter test pits, as necessary. In addition, representative samples of the grossly-impacted soil/slag-fill will be subjected to waste profile analysis to determine whether they would require special handling (e.g., as hazardous waste) or treatment if disposed offsite. Waste profile analysis will include Toxicity Characteristic Leaching Procedure (TCLP) VOCs, SVOCs, and metals, as well as PCBs and flashpoint via USEPA SW-846 Methodology.

### **4.3 Groundwater Investigation**

Groundwater elevation maps completed during the RFI (Ref. 2) indicate that groundwater generally flows west across the Site toward Lake Erie, with local influence in the southern portion of the Site toward Smokes Creek, which eventually discharges into 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 approximately 7.5 to 10.5 feet below grade within the soil/slag-fill unit. In order to supplement existing historic groundwater quality data (see Appendix A), groundwater at the Site will be sampled in accordance with this section of the Work Plan. The existing Site monitoring well (MWN-10) 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, well completion details, and groundwater elevation tables are presented in Appendix B.



An evaluation of on-site groundwater quality data collected during the RI will be performed to determine if an increase in constituents of concern is evident compared to upgradient off-site groundwater. If the groundwater evaluation determines that the Phase III Business Park Site is contributing adverse impacts to Site groundwater quality, potential remedial alternatives will be identified and evaluated in the AAR (see Section 5.0).

#### ***4.3.1 Monitoring Well Installation***

In addition to the one existing on-site groundwater monitoring well (i.e., MWN-10), nine new monitoring wells, identified as MWS-30A, MWS-33A through MWS-35A, and MWN-53A through MWN-57A, will be installed to further assess groundwater quality at the Site. The location of the new wells will be based on field observations recorded during the soil/slag-fill investigation, but will be generally located as shown on Figure 2. Each boring location will be advanced into the unconsolidated overburden soil/slag-fill to a depth of approximately 18 feet below ground surface (fbgs) or a minimum of 10 feet below the first encountered groundwater, whichever is greater. Shallow overburden well borings will be advanced using 4.25-inch I.D. hollow stem augers (HSA). A 2-inch diameter, 2-foot long split spoon sampler will be advanced ahead of the auger string with a standard 140-pound hammer falling freely over a 30-inch fall until 24 inches have been penetrated or 50 blows applied. Recovered samples will be described in the field by qualified TurnKey personnel using the Unified Soil Classification System (USCS), scanned for total volatile organic vapors with a calibrated Photovac 2020 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox).

In addition, PID scans will be supplemented with headspace determinations. In general, representative soil/slag-fill samples from each recovered interval will be collected, placed in a sealable plastic bag, and kept at or near room temperature (approximately 65-70°F) for a minimum of 15 minutes prior to PID measurement.

Subsequent to boring completion, each monitoring well will be constructed of 2-inch I.D. flush-joint Schedule 40 PVC solid riser and machine slotted screen (0.010-inch slot size). The monitoring well screen will be approximately 10 feet in length. Approximately 6 inches of silica sand will be placed at the bottom of each boring as a base for the well screen

and as part of the sand pack. The well screen and attached riser will be placed within the borehole on top of the 6-inch sand layer and the remainder of the sand pack will be installed within the borehole annulus to a level of 2 to 3-feet above the top of the well screen. A bentonite seal (2 to 3 feet thick) will be installed immediately above the sand layer. The bentonite seal will be constructed with 3/8-inch bentonite pellets or medium bentonite chips and allowed to hydrate sufficiently to mitigate the potential for down-hole grout contamination. Cement/bentonite grout will be installed via pressure tremie pipe injection to fill the remaining annulus to approximately 1 foot below ground surface.

The top of the well riser pipe will extend approximately 3 feet above grade and will be fitted with a lockable J-plug and protected by a vented, 4-inch diameter protective steel casing. The steel casing will be installed to a depth of approximately 2 fbs and anchored in a 2-foot by 2-foot concrete surface pad. Each steel protective casing will be fitted with a locking cap, keyed alike lock, and labeled with permanent markings for identification. The concrete surface pad will be placed around the protective steel casing to allow surface water to drain away from the well. Drill cuttings will be disposed onsite unless gross contamination (i.e., visible product) is encountered, in which case they will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal.

#### *4.3.2 Well Development*

All newly installed and existing monitoring wells will be developed in accordance with NYSDEC and TurnKey protocols. Each well will be left undisturbed for a minimum of 24 hours following installation before development activities begin to ensure that the cement/bentonite grout has set. 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 (FOPs).

#### *4.3.3 Groundwater Elevation Measurements*

Following installation, the locations and elevations of the newly installed monitoring wells will be surveyed against a fixed benchmark and located on the site plan. The top of the PVC casings will be referenced to existing site vertical datum to provide a reference point for groundwater elevation measurements. Approximately 72 hours or more following completion of Site well development activities, depth to groundwater will be measured in all newly installed and existing 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. This site-specific isopotential map will be used to determine the groundwater flow direction and hydraulic gradient at the Site.

#### *4.3.4 In-Situ Hydraulic Conductivity Testing*

In-situ permeability of the first water bearing zone screened by all newly installed monitoring wells will be determined using the variable-head test method ("rising head") by the method of Bouwer and Rice (1976). The hydraulic conductivity testing will be performed in accordance with TurnKey's field operating procedure presented in the QAPP.

#### *4.3.5 Groundwater Sample Collection and Analysis*

Prior to sampling the monitoring wells, static water levels will be measured and recorded as described above. 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. 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 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 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 the analytical laboratory for analysis as indicated in Table 3.

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

In addition to the soil/slag-fill and 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 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, soil/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, soil/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.

#### 4.5 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 soil/slag-fill)
- Tailgate Safety Meeting Form
- Test Pit Excavation Log
- Underground/Overhead Utility Checklist for Sampling
- Variance Log (as necessary)
- Water Level Monitoring Record
- Well Completion Detail: Stick-up (Monitoring Well)

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

#### 4.6 Site Mapping & Survey

The investigation locations identified in this Work Plan were selected based on historical site features and operations. Because few historical site features remain, X-Y coordinates for all proposed test pit locations will be determined and marked in the field using a Trimble GeoXT handheld GPS unit. Monitoring well locations and elevations will be measured by TurnKey's resident surveyor. All sample locations and remaining site monuments will be measured relative to a fixed benchmark and a base map will be prepared.

An isopotential map showing the general direction of groundwater flow will be prepared based on water level measurements relative to USGS vertical datum. The maps will be provided with the RI report.

## 5.0 REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT

Upon completion of the RI fieldwork, a comprehensive RI/AAR report will be completed summarizing the tasks completed as described below.

### 5.1 Remedial Investigation Report

The RI section of the RI/AAR report will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 1).

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this Work Plan.
- The data obtained during the RI and historical data considered by Benchmark to be of useable quality. This will include geochemical data, field measurements, etc.
- The results of an assessment of the achievement of RI acceptance/performance criteria as specified in the QAPP.
- Comparative criteria that may be used to calculate cleanup levels during the alternatives analysis report (AAR) process, such as NYSDEC Soil Cleanup Objectives and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative exposure assessment and fish and wildlife impact analysis, including any recommendations for more detailed assessments, if applicable.



- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, and similar information.

In addition, TurnKey will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and draft DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

## 5.2 Alternative Analysis Report

The AAR Report will include a remedial alternatives evaluation for on-site groundwater and soil/slag-fill on portions of the Site if determined, based on the Remedial Investigation and reasonably anticipated future Site use, to exhibit elevated concentrations of constituents of concern. The Alternative Analysis Report (AAR) will meet the requirements identified in NYSDEC Standards, Criteria, and Guidance (SCGs) (e.g. Part 375 SCO's and GA Groundwater Quality Standards)

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 375-1.8(f):

- 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
- Land Use

In addition, the criteria of Community Acceptance will be considered based on public comments on the RI/AAR 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 recommendation of a remedial action.

## 6.0 INVESTIGATION SUPPORT DOCUMENTS

### 6.1 Site-Wide Health and Safety Plan (HASP)

A Health and Safety Plan (HASP) has been prepared in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 for the entire Tecumseh property. The HASP will be enforced by TurnKey and any subcontractors engaged in RI field activities in accordance with the requirements of 29 CFR 1910.120. The HASP covers all on-site investigation activities. TurnKey's HASP is provided for informational purposes in Appendix C. Subcontractors will be required to develop and implement a HASP as or more stringent than TurnKey's HASP. Health and safety activities will be monitored throughout the Remedial Investigation. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation activities. The HASP and CAMP will be modified/expanded as appropriate if significant site invasive activities are performed, such as those associated with a remedial alternative involving soil/slag-fill excavation. 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.

### 6.2 Community Participation Plan (CP Plan)

In accordance with NYSDEC's Brownfield Cleanup Program guidance, a Citizen Participation Plan (CP Plan) is required for the Phase III Business Park investigative

activities. The CP Plan, included as Appendix D, meets the requirements of Attachment 2 of the NYSDEC Technical Administrative Guidance Memorandum (TAGM) DER-97-4058 and NYSDEC's Draft DER-10 guidance. TurnKey will coordinate and lead community relations throughout the course of the project.

### **6.3 Quality Assurance Project Plan (QAPP)**

A Quality Assurance Project Plan (QAPP) will be prepared as a stand-alone document (under separate cover) for the RI activities described herein. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) identifying methods for sample collection, decontamination, handling, and shipping, is provided as Section 4.0 of the QAPP. The RI project management methods, organizational structure, and schedule are also included in the QAPP.

The QAPP will assure the accuracy and precision of data collection during the site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to assure compliance with USEPA SW-846 methodology. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5); the EPA Region II CERCLA Quality Assurance Manual, and NYSDEC's December 2002 draft DER-10 Technical Guidance for Site Investigation and Remediation.

## 7.0 PROJECT SCHEDULE AND SEQUENCE OF THE WORK

A tentative schedule for completion of RI activities is presented as Figure 4. As indicated, start of field activities is dependent on NYSDEC approval of the RI Work Plan.

## 8.0 REFERENCES

1. USEPA Office of Enforcement and Compliance Monitoring - National Enforcement Investigations Center, Denver, Colorado. *RCRA Facility Assessment for Bethlehem Steel Corporation Lackawanna Plant*, September 1988.
2. 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.

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# TABLES

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TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN (COPCs)

RI/AAR Work Plan  
Phase III Business Park Site  
Lackawanna, New York

COMPOUND	CAS #	COMPOUND	CAS #
<b>Volatile Organic Compounds</b> (STARS Method 8021B)		<b>TCL Semi-Volatile Organic Compounds (cont'd)</b> (Method 8270C - base/neutrals only)	
Benzene	71-43-2	Dimethyl phthalate	131-11-3
n-Butylbenzene	104-51-8	2,4-Dinitrotoluene	121-14-2
sec-Butylbenzene	135-98-8	2,6-Dinitrotoluene	606-20-2
tert-Butylbenzene	98-06-6	Di-n-octyl phthalate	117-84-0
p-Cymene	99-87-6	Fluoranthene	206-44-0
Ethylbenzene	100-41-4	Fluorene	86-73-7
Isopropylbenzene	98-82-8	Hexachlorobenzene	118-74-1
Methyl tert butyl ether	1634-04-4	Hexachlorobutadiene	87-68-3
n-Propylbenzene	103-65-1	Hexachlorocyclopentadiene	77-47-4
Toluene	108-88-3	Hexachloroethane	67-72-1
1,2,4-Trimethylbenzene	95-63-6	Indeno(1,2,3-cd)pyrene	193-39-5
1,3,5-Trimethylbenzene	108-67-8	Isophorone	78-59-1
m-Xylene	95-47-6	2-Methylnaphthalene	91-57-6
o-Xylene	106-42-3	Naphthalene	91-20-3
p-Xylene	108-38-3	2-Nitroaniline	88-74-4
<b>TCL Semi-Volatile Organic Compounds</b> (Method 8270C - base/neutrals only)		3-Nitroaniline	99-09-2
Acenaphthene	83-32-9	4-Nitroaniline	100-01-6
Acenaphthylene	208-96-8	Nitrobenzene	95-95-3
Anthracene	120-12-7	N-Nitrosodiphenylamine	86-30-6
Benzo(a)anthracene	56-55-3	N-Nitroso-Di-n-propylamine	621-64-7
Benzo(b)fluoranthene	205-99-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0
Benzo(g,h,i)perylene	191-24-2	1,2,4-Trichlorobenzene	120-82-1
Benzo(a)pyrene	50-32-8	<b>Metals</b>	
Benzyl alcohol	100-51-6	(Method 6010B)	
Bis(2-chloroethoxy) methane	111-91-1	Arsenic	7440-38-2
Bis(2-chloroethyl) ether	111-44-4	Cadmium	7440-43-9
2,2'-Oxybis (1-Chloropropane)	108-60-1	Chromium	7440-47-3
Bis(2-ethylhexyl) phthalate	117-81-7	Lead	7439-92-1
4-Bromophenyl phenyl ether	101-55-3	Mercury (Method 7470A (water) and 7471A (solid))	7439-97-6
Butyl benzyl phthalate	85-68-7	<b>Wet Chemistry</b>	
4-Chloroaniline	106-47-8	Cyanide (Method 9010B)	
2-Chloronaphthalene	91-58-7		
4-Chlorophenyl phenyl ether	7005-72-3	<b>PCBs</b>	
Chrysene	218-01-9	Method 8082	
Dibenzo(a,h)anthracene	53-70-3	Aroclor 1016	12674-11-2
Dibenzofuran	132-64-9	Aroclor 1221	11104-28-2
Di-n-butyl phthalate	84-74-2	Aroclor 1232	11141-16-5
1,2-Dichlorobenzene	95-50-1	Aroclor 1242	53469-21-9
1,3-Dichlorobenzene	541-73-1	Aroclor 1248	12672-29-6
1,4-Dichlorobenzene	106-46-7	Aroclor 1254	11097-69-1
3,3'-Dichlorobenzidine	91-94-1	Aroclor 1260	11096-82-5
Diethyl phthalate	84-66-2		





TABLE 2

EXPANDED PARAMETER LIST

RI/AAR Work Plan  
Phase III Business Park Site  
Lackawanna, New York

Collected 1 per 10 samples per matrix (or as indicated on Table 3)

COMPOUND	CAS #	COMPOUND	CAS #	COMPOUND	CAS #
<b>TCL Volatile Organic Compounds</b> <i>(Full List TCL VOGs plus STARS, via Method 8021B)</i>		<b>TCL Semi-Volatile Organic Compounds</b> <i>(Method 8270C - base-neutrals and acid extractables)</i>		<b>TCL Semi-Volatile Organic Compounds</b> <i>(Method 8270C - base-neutrals and acid extractables)</i>	
Acetone	67-64-1	Acenaphthene	83-32-9	N-Nitrosodiphenylamine	86-30-6
Benzene	71-43-2	Acenaphthylene	208-96-8	N-Nitroso-di-n-propylamine	621-64-7
Bromoform	75-25-2	Anthracene	120-12-7	Pentachlorophenol	87-86-5
Bromochloromethane	74-97-5	Benzo(a)anthracene	56-55-3	Phenanthrene	85-01-8
Bromodichloromethane	75-27-4	Benzo(a)pyrene	50-32-8	Phenol	108-95-2
Bromomethane (Methyl bromide)	74-83-9	Benzo(b)fluoranthene	205-99-2	Pyrene	129-00-0
2-Butanone (MEK)	78-93-3	Benzo(g,h,i)perylene	191-24-2	1,2,4-Trichlorobenzene	120-82-1
n-Butylbenzene	104-51-8	Benzo(k)fluoranthene	207-08-9	2,4,5-Trichlorophenol	95-95-4
sec-Butylbenzene	135-98-8	Benzyl alcohol	100-51-6	2,4,6-Trichlorophenol	88-06-2
tert-Butylbenzene	98-06-6	bis(2-Chloroethoxy)methane	111-91-1		
Carbon disulfide	75-15-0	bis(2-Chloroethyl)ether	111-44-4	<b>TAL Metals</b>	
Carbon tetrachloride	56-23-5	2,2'-oxybis(1-chloropropane); bis(2-chloroisopropyl)ether	108-60-1	<i>(Method 6010B)</i>	
Chlorobenzene	108-90-7	bis(2-Ethylhexyl)phthalate	117-81-7	Antimony	7440-38-2
Chloroethane	75-00-3	Butyl benzyl phthalate	85-68-7	Arsenic	7440-38-2
Chloroform	67-66-3	4-Bromophenyl phenyl ether	101-55-3	Barium	7440-39-3
Chloromethane (Methyl chloride)	74-87-3	4-Chloroaniline	106-47-8	Beryllium	7440-39-3
Cyclohexane	110-82-7	4-Chloro-3-methylphenol	59-50-7	Cadmium	7440-43-9
p-Cymene (p-isopropyltoluene)	99-87-6	2-Chloronaphthalene	91-58-7	Calcium	7440-70-2
1,2-Dibromo-3-chloropropane	96-12-8	2-Chlorophenol	95-57-8	Chromium	7440-47-3
1,2-Dibromoethane (EDB)	106-93-4	4-Chlorophenyl-phenylether	7005-72-3	Cobalt	7440-48-4
Dibromochloromethane	124-48-1	Chrysene	218-01-9	Copper	7440-50-8
Dichlorodifluoromethane (Freon-12)	75-71-8	Dibenzo(a,h)anthracene	53-70-3	Iron	7439-89-6
1,2-Dichlorobenzene	95-50-1	Dibenzofuran	132-64-9	Lead	7439-92-1
1,3-Dichlorobenzene	541-73-1	3,3'-Dichlorobenzidine	91-94-1	Mercury (Method 7470A(water) and 7471A(solid))	7439-97-6
1,4-Dichlorobenzene	106-46-7	2,4-Dichlorophenol	120-83-2	Magnesium	7439-95-4
1,1-Dichloroethane	75-34-3	1,2-Dichlorobenzene	95-50-1	Manganese	7439-96-5
1,2-Dichloroethane (EDC)	107-06-2	1,3-Dichlorobenzene	541-73-1	Nickel	7440-02-0
1,1-Dichloroethylene (1,1-DCE)	75-35-4	1,4-Dichlorobenzene	106-46-7	Potassium	7440-09-7
trans-1,2-Dichloroethylene	156-60-5	Diethyl phthalate	84-66-2	Selenium	7782-49-2
cis-1,2-Dichloroethylene	156-59-2	2,4-Dimethylphenol	105-67-9	Silver	7440-22-4
cis-1,3-Dichloropropene	10061-01-5	Dimethyl phthalate	131-11-3	Sodium	7440-23-5
trans-1,3-Dichloropropene	10061-02-6	Di-n-butyl phthalate	84-74-2	Thallium	7440-28-0
1,2-Dichloropropane	78-87-5	Di-n-octyl phthalate	117-84-0	Vanadium	7440-62-2
Ethylbenzene	100-41-4	4,6-Dinitro-2-methylphenol	534-52-1	Zinc	7440-66-6
2-Hexanone	591-78-6	2,4-Dinitrophenol	51-28-5		
Isopropylbenzene (Cumene)	98-82-8	2,4-Dinitrotoluene	121-14-2	<b>Wet Chemistry</b>	
Methyl acetate	79-20-9	2,6-Dinitrotoluene	606-20-2	Cyanide (Method 9010B)	
Methylene chloride	75-09-2	Fluoranthene	206-44-0		
Methylcyclohexane	108-87-2	Fluorene	86-73-7	<b>PCBs</b>	
4-methyl-2-pentanone (MIBK)	108-10-1	Hexachlorobenzene	118-74-1	<b>Method 8082</b>	
Methyl tert butyl ether (MTBE)	1634-04-4	Hexachlorobutadiene	87-68-3	Aroclor 1016	12674-11-2
n-Propylbenzene	103-65-1	Hexachlorocyclopentadiene	77-47-4	Aroclor 1221	11104-28-2
Styrene	100-42-5	Hexachloroethane	67-72-1	Aroclor 1232	11141-16-5
1,1,1,2-Tetrachloroethane	630-20-6	Indeno(1,2,3-cd)pyrene	193-39-5	Aroclor 1242	53469-21-9
Tetrachloroethylene (PCE)	127-18-4	Isophorone	78-59-1	Aroclor 1248	12672-29-6
Toluene	108-88-3	2-Methylnaphthalene	91-57-6	Aroclor 1254	11097-69-1
1,2,3-Trichlorobenzene	87-61-6	2-Methylphenol (o-Cresol)	95-48-7	Aroclor 1260	11096-82-5
1,2,4-Trichlorobenzene	120-82-1	4-Methylphenol (p-Cresol)	106-44-5		
1,1,1-Trichloroethane	71-55-6	Naphthalene	91-20-3		
1,1,2-Trichloroethane	79-00-5	2-Nitroaniline	88-74-4		
Trichloroethylene (TCE)	79-01-6	3-Nitroaniline	99-09-2		
Trichlorofluoromethane (Freon-11)	75-69-4	4-Nitroaniline	100-01-6		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	76-13-1	Nitrobenzene	98-95-3		
1,2,4-Trimethylbenzene	95-63-6	2-Nitrophenol	88-75-5		
1,3,5-Trimethylbenzene	108-67-8	4-Nitrophenol	100-02-7		
Vinyl chloride	75-01-4				
m-Xylene	95-47-6				
o-Xylenes	106-42-3				
p-Xylene	108-38-3				
Total Xylenes	1330-20-7				



TABLE 3

**ANALYTICAL PROGRAM QUALITY ASSURANCE/  
QUALITY CONTROL SUMMARY**

RI/AAR Work Plan  
Phase III Business Park Site  
Lackawanna, New York

Matrix	Parameter <sup>1</sup>	Estimated Number of Samples	Estimated Number of QC Samples			
			Trip Blank <sup>2</sup>	MS <sup>3</sup>	MSD <sup>3</sup>	Blind Duplicate <sup>3</sup>
Soil/Fill - Subsurface	STARS VOCs <sup>5</sup>	20		1	1	1
	Full List VOCs <sup>6</sup>	6		1	1	1
	TCL SVOCs (BN only) <sup>7</sup>	49		3	3	3
	TCL SVOCs <sup>8</sup>	6		1	1	1
	COPC Metals <sup>9</sup>	49		3	3	3
	TAL Metals <sup>10</sup>	6		1	1	1
	Cyanide <sup>11</sup>	55		3	3	3
	TCL PCBs <sup>12</sup>	14		1	1	1
	pH	4		1	1	1
Groundwater	STARS VOCs <sup>5</sup>	9	1	1	1	1
	Full List VOCs <sup>6</sup>	1	1	1	1	
	TCL SVOCs (BN only) <sup>7</sup>	9		1	1	1
	TCL SVOCs <sup>8</sup>	1		1	1	1
	COPC Metals <sup>9, 13</sup>	9		1	1	
	TAL Metals + Cyanide <sup>10, 11, 13</sup>	1		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 soil/fill and groundwater sample collection.
5. NYSDEC Spill Technology and Remediation Series (STARS) List VOCs via Method 8021B.
6. Full TCL list of VOCs plus the STARS List VOCs, via Method 8021B.
7. TCL SVOCs, base-neutrals (BN) only, via Method 8270C.
8. Full TCL list of SVOCs, including base-neutrals and acid extractables, via Method 8270C.
9. COPC Metals include: arsenic (6010B), cadmium (6010B), chromium (6010B), lead (6010B), mercury (7470A for water; 7471A for soil).
10. TAL Metals, via Method 6010B, per Table 2.
11. Cyanide via Method 9010B.
12. Full TCL list of PCBs via Method 8082.
13. A filtered (soluble) metals sample will be collected and analyzed if sample turbidity exceeds 50 NTU.
14. Field parameters include: pH, specific conductance, Eh, turbidity, and temperature.

**Acronyms:**

BN = Base Neutral SVOC Compounds  
 TCL = Target Compound List  
 TAL = Target Analyte List  
 VOCs = Volatile Organic Compounds  
 SVOCs = Semi-Volatile Organic Compounds  
 PCBs = Polychlorinated Biphenyls

STARS = Spill Technology And Remediation Series; NYSDEC  
 COPCs = Constituents of Potential Concern  
 MS = Matrix Spike  
 MSD = Matrix Spike Duplicate  
 NA = Not Applicable



TABLE 4

SUBSURFACE SOIL/FILL ANALYTICAL PROGRAM SUMMARY  
TEST PIT INVESTIGATION

RI/AAR Work Plan  
Phase III Business Park Site  
Lackawanna, New York

Investigation Location (BPA 3-TP-#)	Rationale	Estimated Number of Samples	STARS List VOCs	Full List VOCs <sup>1</sup>	SVOCs (BN only)	TCL SVOCs	COPC Metals	TAL Metals	Cyanide	PCBs	pH
TP-1	General Coverage: No known or suspected impact	1			1		1		1		
TP-2	Area of multiple fuel, oil, and grease tanks	1	1		1		1		1		
TP-3		1		1		1		1	1	1	
TP-4	Former Sinter Building										
TP-5		1	1		1		1		1	1	
TP-6											
TP-7		1	1		1		1		1	1	
TP-8											
TP-9	Area of existing WQCS #3a garage (SWMU-19)	1	1		1		1		1		
TP-10	Former area of SWMU-25 and SWMU-26										
TP-11	Former thaw house										
TP-12		1	1		1		1		1		
TP-13	Former stripper building	1			1		1		1		
TP-14	Portion of former Open Hearth No. 3										
TP-15											
TP-16		1			1		1		1		
TP-17		1			1		1		1		
TP-18											
TP-19											
TP-20		1		1		1		1	1	1	
TP-21	Area of former warehouse building										
TP-22		1	1		1		1		1		
TP-23		1	1		1		1		1	1	
TP-24											
TP-25		1			1		1		1		
TP-26		1			1		1		1	1	
TP-27	Former Open Hearth No. 3 substation										
TP-28		1			1		1		1	1	
TP-29	Area of SWMU-21 through SWMU-23										
TP-30		1			1		1		1		
TP-31		1			1		1		1		
TP-32		1	1		1		1		1		
TP-33											
TP-34		1			1		1		1		
TP-35											
TP-36	1			1		1		1			
TP-37	General Coverage: No known or suspected impact	1			1		1		1		
TP-38	Area of 2,000 gal oil tank	1	1		1		1		1		
TP-39											
TP-40	Area of molding warming building	1			1		1		1		
TP-41	General Coverage: No known or suspected impact										
TP-42		1			1		1		1		
TP-43	Former Basic Oxygen Furnace (BOF) Plant	1			1		1		1		
TP-44											
TP-45		1			1		1		1		
TP-46											
TP-47		1			1		1		1		
TP-48		1			1		1		1		
TP-49		1	1		1		1		1	1	
TP-50		1		1			1		1	1	
TP-51		1	1		1		1		1		
TP-52											
TP-53											
TP-54	1	1		1		1		1			
TP-55											



TABLE 4

SUBSURFACE SOIL/FILL ANALYTICAL PROGRAM SUMMARY  
TEST PIT INVESTIGATION

RI/AAR Work Plan  
Phase III Business Park Site  
Lackawanna, New York

Investigation Location (BPA 3-TP-#)	Rationale	Estimated Number of Samples	STARS List VOCs	Full List VOCs <sup>1</sup>	SVOCs (BN only)	TCL SVOCs	COPC Metals	TAL Metals	Cyanide	PCBs	pH
TP-56	Area of former Linde Plant	1			1		1		1		
TP-57											
TP-58		1	1		1		1		1	1	
TP-59	General Coverage: No known or suspected impact	1			1		1		1		
TP-60	General Coverage: No known or suspected impact	1			1		1		1		
TP-61	Area of 1,000 gal. tank										
TP-62		1	1		1		1		1		
TP-63	Former stripper building										
TP-64		1			1		1		1		
TP-65		1			1		1		1		
TP-66	General Coverage: No known or suspected impact										
TP-67	Portion of former 45"-90" Universal Slabbing Mill (SWMU P-28 through SWMU P-32)	1			1		1		1	1	
TP-68											
TP-69		1		1				1	1	1	
TP-70		1	1		1		1		1		
TP-71	Area of former Universal Slabbing Mill return water trench (filled-in)	1			1		1		1	1	
TP-72											
TP-73		1	1		1		1		1		
TP-74											
TP-75	Area of 2,000 gal. and 5,000 gal. USTs	1		1		1		1	1	1	
TP-76	Potential former AST area										
TP-77		1		1		1		1	1		
TP-78											
TP-79	General Coverage: No known or suspected impact	1			1		1		1		
TP-80		1			1		1		1		
TP-81		1			1		1		1		
TP-82		1			1		1		1		
TP-83	Area of WQS Clarifiers and Thickeners	1	1		1		1		1		1
TP-84		1	1		1		1		1		1
TP-85		1	1		1		1		1		1
TP-86	Area of WQS Tank	1	1		1		1		1		1
<b>TOTAL:</b>		<b>55</b>	<b>20</b>	<b>6</b>	<b>49</b>	<b>6</b>	<b>49</b>	<b>6</b>	<b>55</b>	<b>14</b>	<b>4</b>

Notes:

1. Full List VOCs = TCL VOCs plus STARS List VOCs via Method 8021B.
2. All Samples to be collected from 0-2' BGS interval unless field observations indicate greater impact with depth. A minimum of one per 10 samples shall be collected from 2' to bottom depth.
3. All locations shall be sampled and archived by the laboratory for potential analysis / reanalysis.

Acronyms:

VOCs = volatile organic compounds  
SVOCs = semi-volatile organic compounds  
TCL = Target Compound List  
TAL = Target Analyte List  
BN = Base Neutrals  
PCBs = Polychlorinated Biphenyls

STARS = Spill Technology And Remediation Series; NYSDEC  
COPCs = Constituents of Potential Concern  
TBD = To Be Determined, based on PID measurement and visual and/or olfactory observations.  
SWMU = Solid Waste Management Unit  
TP = Test Pit

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# FIGURES

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726 EXCHANGE STREET  
SUITE 624  
BUFFALO, NEW YORK 14210  
(716) 856-635

## SITE LOCATION AND VICINITY MAP

PHASE III BUSINESS PARK AREA  
LACKAWANNA, NEW YORK

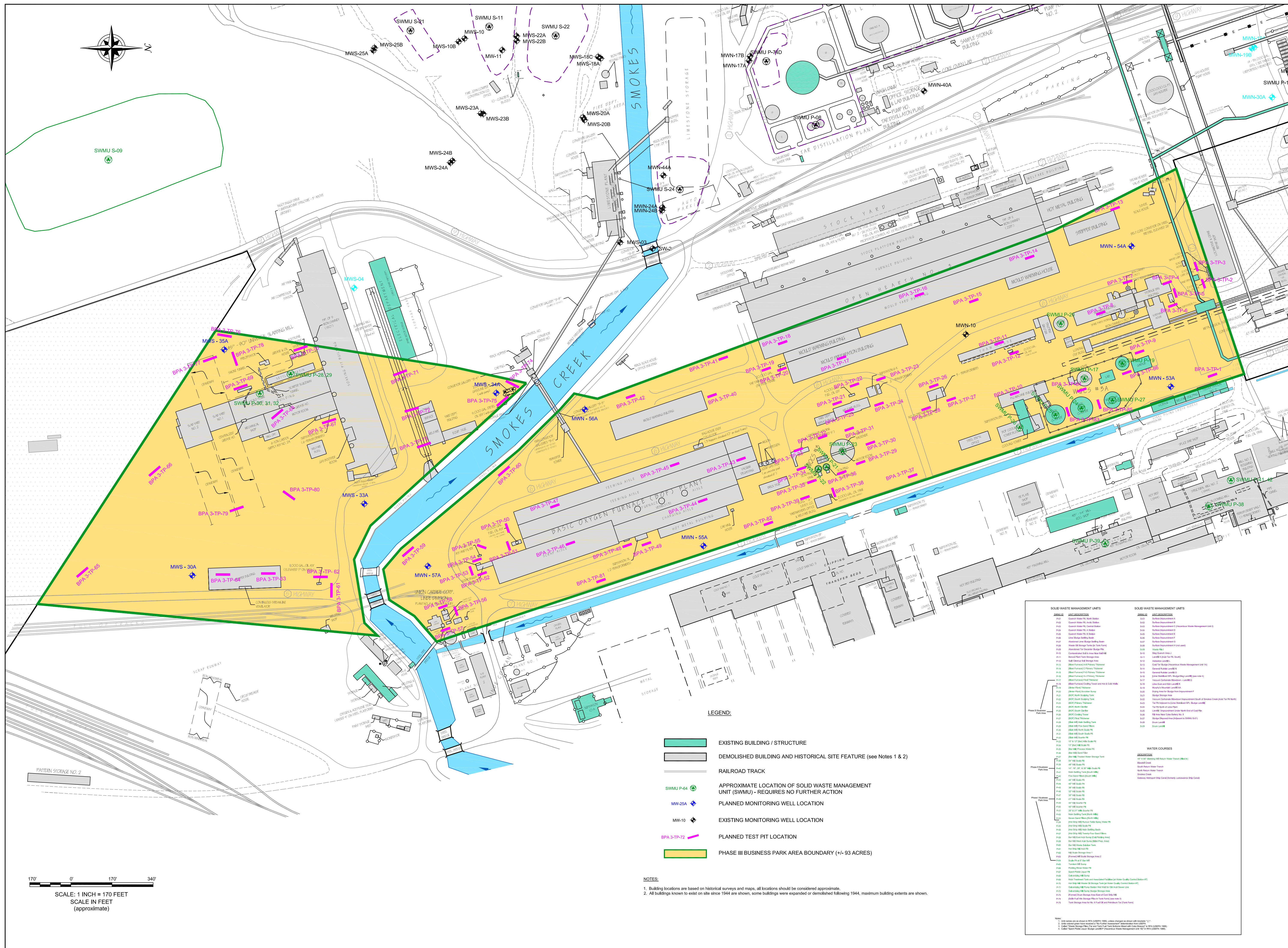
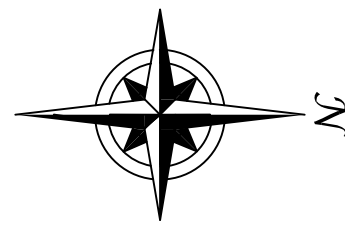
PREPARED FOR  
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

PROJECT NO.: 0071-007-300

DATE: JANUARY 2008

DRAFTED BY: NTM

FILEPATH:



170' 0' 170' 340'

SCALE: 1 INCH = 170 FEET  
SCALE IN FEET  
(approximate)

**LEGEND:**

- EXISTING BUILDING / STRUCTURE
- DEMOLISHED BUILDING AND HISTORICAL SITE FEATURE (see Notes 1 & 2)
- RAILROAD TRACK
- SWMU P-64
- MWS-25A
- MWN-10
- BPA 3-TP-72
- PHASE III BUSINESS PARK AREA BOUNDARY (+/- 93 ACRES)

**NOTES:**

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

SOLID WASTE MANAGEMENT UNITS		SOLID WASTE MANAGEMENT UNITS	
UNITS	DESCRIPTION	UNITS	DESCRIPTION
SWMU P-64	SWMU P-64	SWMU P-64	SWMU P-64
MWS-25A	MWS-25A	MWS-25A	MWS-25A
MWN-10	MWN-10	MWN-10	MWN-10
BPA 3-TP-72	BPA 3-TP-72	BPA 3-TP-72	BPA 3-TP-72

**TURNKEY Environmental, LLC**

726 EXCHANGE STREET  
SUITE 100  
LACKAWANNA, NEW YORK 14210  
(716) 856-0695

JOB NO.: 0141-002-101

**REVISIONS**

NO.	BY	DATE	REMARKS

DRAWN BY: BCH  
DATE: MAY 2008  
CHECKED BY:  
APPROVED BY:

**PLANNED SAMPLE LOCATIONS**  
REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS REPORT  
PHASE III BUSINESS PARK AREA  
LACKAWANNA, NEW YORK

PREPARED FOR  
**ARCELORMITTAL TECUMSEH DEVELOPMENT, INC.**

**FIGURE 2**

NO.	BY	DATE	REVISIONS

SEAL

DRAWN BY: BCH  
DATE: JANUARY 2008  
CHECKED BY: THF  
APPROVED BY:

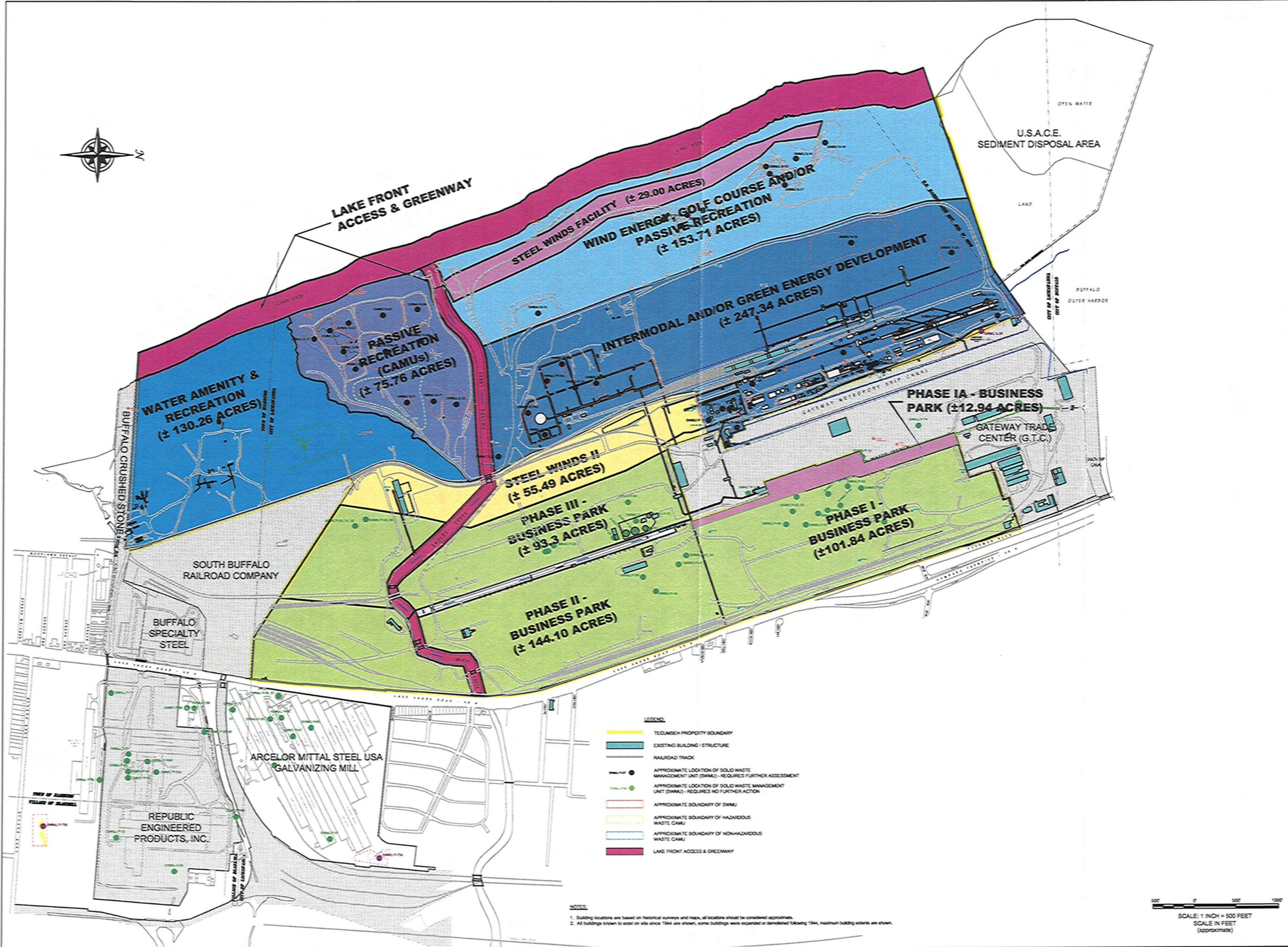
REPUBLIC OF BUFFALO, N.Y. P.L.C. APPROVES THIS PLAN AS A DEVELOPMENT PLAN FOR THE CITY OF BUFFALO, N.Y. AND AS A PART OF THE CITY OF BUFFALO, N.Y. DEVELOPMENT PLAN. THE CITY OF BUFFALO, N.Y. DOES NOT WARRANT THE ACCURACY OF THIS PLAN OR THE RESULTS OF ANY INVESTIGATION CONDUCTED BY ANY OTHER PARTY. THE CITY OF BUFFALO, N.Y. ACCEPTS NO LIABILITY FOR THE RESULTS OF ANY INVESTIGATION CONDUCTED BY ANY OTHER PARTY WITHOUT THE WRITTEN CONSENT OF BUFFALO, N.Y. P.L.C.

**REDEVELOPMENT MASTER PLAN**

LACKAWANNA, NEW YORK

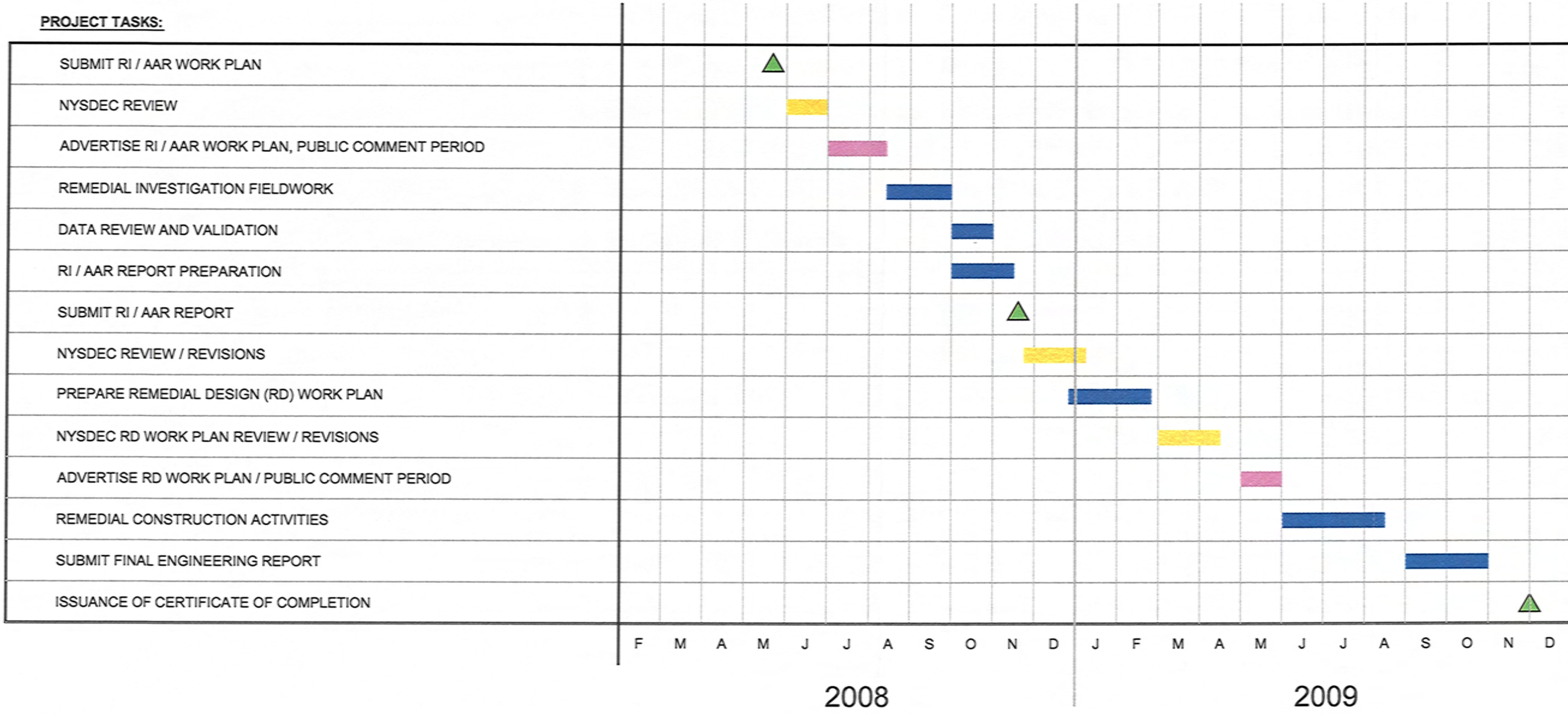
PREPARED FOR:  
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

**FIGURE 3**





**PROJECT TASKS:**



728 EXCHANGE STREET  
SUITE 824  
BUFFALO, NEW YORK 14210  
(716) 868-0636



JOB NO.: 0071-007-300

**PROJECT SCHEDULE**

RI / AAR REPORT  
PHASE III BUSINESS PARK AREA  
LACKAWANN, NEW YORK  
PREPARED FOR  
ARCELORMITTAL TECUMSEH REDEVELOPMENT INC.

**FIGURE 4**

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# APPENDIX A

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## HISTORICAL GROUNDWATER ANALYTICAL DATA (RFI)

TABLE 2-2  
 SAMPLING DATES FOR ALL WELLS USED IN RFI  
 BETHLEHEM STEEL CORPORATION - LACKAWANNA, NEW YORK

Sample Date	MWN-01	MWN-01B	MWN-02	MWN-02B	MWN-02D	MWN-03	MWN-03B	MWN-03D	MWN-04	MWN-05A	MWN-05B	MWN-05D	MWN-06A	MWN-07	MWN-08	MWN-09	MWN-10	MWN-11	MWN-13A
1/91	1	1				2			1	1				1	1	2	1	1	1
2/91													1						
4/91	1	1				1			1	1			1	1	2	1	1	1	1
7/91	2	1				2			1	1			1	1	1	1	1	1	1
10/91	2	1				1			1	1			1	1	1	2	1	2	1
1/92	2	1				1			1	1			1	1	1	2	1	1	1
12/92	1	1	1	1		1	1		1	1	1		1	1	1	1	1	2	1
11/93																2			
4/94																			
5/94																			
6/94																			
7/94																			
8/94								1											
10/94								1	2**									2	
1/95		2**						1	2**			2**							
2/95																			
5/95																			
8/95													1						
9/95													1						
11/95																			
4/96																			
11/96																			
5/97		2***	2***	2***		4***	2***		2***	4***	2***					1***	2***		1***
11/97																			
4/98																			
10/98																			
4/99																			
11/99	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
4/00																			
10/00																			
12/00																			
4/01																			
10/01																			

**TABLE 2-12  
GROUNDWATER ELEVATION/PRODUCT THICKNESS  
BETHLEHEM STEEL CORP., LACKAWANNA, NEW YORK**

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas. point (Riser) Elev. (ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
MNW								4/19/1991 0000	11.29	573.46	0.00	573.46	
MNW								7/15/1991 0000	10.13	574.62	0.00	574.62	
MNW								10/14/1991 0000	11.27	573.48	0.00	573.48	
MNW								1/17/1992 0000	12.02	572.73	0.00	572.73	
MNW								12/11/1992 0000	12.27	572.48	0.00	572.48	
MNW								9/20/1995 0000	12.76	571.99	0.00	571.99	
MNW								10/28/1999 0000	13.30	571.45	0.00	571.45	
MNW								1/19/2000 0000	13.30	571.45	0.00	571.45	
MNW								4/3/2000 0000	13.02	571.73	0.00	571.73	
MNW								7/12/2000 0000	12.10	572.65	0.00	572.65	
MNW								11/20/2001 0000	13.33	571.42	0.00	571.42	
MNW								7/25/2002 0000	12.90	571.85	0.00	571.85	
MNW								6/4/2004 0000	11.92	572.83	0.00	572.83	
MWN-10	1026368.159	1075621.529	582.96	585.76	585.36	F	0.836						
MNW								1/23/1991 0000	8.10	577.26	0.00	577.26	
MNW								4/19/1991 0000	8.28	577.08	0.00	577.08	
MNW								7/16/1991 0000	8.24	577.12	0.00	577.12	
MNW								10/14/1991 0000	8.44	576.92	0.00	576.92	
MNW								1/17/1992 0000	8.43	576.93	0.00	576.93	
MNW								12/11/1992 0000	8.05	577.31	0.00	577.31	
MNW								9/20/1995 0000	8.75	576.61	0.00	576.61	
MNW								5/15/1997 0000	8.23	577.13	0.00	577.13	
MNW								10/28/1999 0000	8.06	577.30	0.00	577.3	
MNW								1/19/2000 0000	7.80	577.56	0.00	577.56	
MNW								4/3/2000 0000	8.83	576.53	0.00	576.53	
MNW								7/12/2000 0000	7.85	577.51	0.00	577.51	
MNW								11/20/2001 0000	7.86	577.50	0.00	577.5	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Geologic Zone:

- C CLAY
- CS CLAYEY SILT
- F FILL
- P PEAT
- R BEDROCK
- S SAND
- T TILL

Type:

- ABN ABANDONED WELL
- EXW EXTRACTION WELL
- MNW MONITORING WELL
- PZ PIEZOMETER
- STG STAFF GAUGE

Remarks:

- SC - SMOKES CREEK
- NRWT - NORTH RETURN WATER TRENCH
- SRWT - SOUTH RETURN WATER TRENCH

TABLE 2-16

SUMMARY OF ELEVATIONS OF STRATIGRAPHIC UNITS  
BETHLEHEM STEEL CORPORATION - LACKAWANNA, NEW YORK

Elevation in Feet (MSL)

Location	Ground Elevation	Top of Sand	Top of Peat	Top of Clayey Silt	Top of Silty Clay	Top of Till	Top of Bedrock
<b>Monitoring Wells North</b>							
MWN-01	582.99	-	-	552.99	545.99	-	527.99
MWN-01B	583.79	-	-	556.29	-	-	-
MWN-02	598.89	-	-	-	542.89	530.89	525.89
MWN-02B	599.00	553.50	-	-	542.50	-	-
MWN-02D	599.51	551.51	-	-	541.51	532.51	529.01
MWN-03	609.79	542.79	-	-	529.79	510.19	505.09
MWN-03B*	609.57	544.57	548.57	-	552.07/539.17	-	-
MWN-03D*	609.83	546.83	-	-	549.83/539.83	513.33	510.53
MWN-04*	621.02	561.02/541.02	-	549.52	536.02	526.02	504.02
MWN-05A	620.22	-	-	-	-	-	-
MWN-05B	617.85	568.35	-	-	541.35	-	-
MWN-05D	614.07	554.07	-	544.07	543.07	537.07	518.57
MWN-06A	652.21	-	-	-	-	-	-
MWN-07	581.67	-	-	-	-	-	541.67
MWN-08	582.00	-	-	554.00	-	-	542.50
MWN-09	582.29	-	-	NR	-	513.29	508.29
MWN-10	582.96	-	-	561.46	-	-	529.96
MWN-11	597.80	-	-	-	-	543.40	542.80
MWN-12	606.71	541.71	-	-	-	521.71	505.71
MWN-13A	605.37	-	-	-	-	-	-
MWN-13B	605.15	545.15	-	537.15	-	-	505.15
MWN-13C	605.29	-	-	-	-	-	-
MWN-14A	609.78	-	-	-	-	-	-
MWN-14B	609.84	554.34	-	-	549.84	-	-
MWN-15A	589.67	-	-	-	-	-	-
MWN-15B	590.67	563.67	560.67	-	556.67	-	-
MWN-15D	591.04	563.04	561.04	557.04	541.04	508.04	495.04
MWN-16A	600.23	-	-	-	-	-	-
MWN-16B	600.40	-	-	-	-	545.40	-
MWN-17A	594.96	-	-	-	-	-	-
MWN-17B	594.88	563.88	-	-	-	-	557.88
MWN-18A	592.71	-	-	-	-	-	-
MWN-19A	582.64	570.14	568.64	-	566.64	-	-
MWN-19B	582.38	569.88	567.88	-	556.88	-	-
MWN-20A	599.86	-	-	-	-	-	-
MWN-20B	599.67	-	-	-	545.67	-	-
MWN-21A	581.83	-	-	-	-	-	-
MWN-21B	581.86	569.86	565.86	556.86	541.86	-	-
MWN-21C	582.03	-	-	-	559.53	-	-
MWN-22B	609.96	557.96	-	-	547.96	-	-
MWN-23B	596.25	556.25	549.25	547.25	-	544.75	-

**Table 2-19**  
**Hydraulic Conductivity Values for All Wells**  
**Bethlehem Steel Corporation**  
**Lackawanna, New York**

Phase/ Investigation	Well	GIS Strat Unit <sup>(1)</sup>	Test Type	K, cm/sec	Pump Test (PT), Falling (F) or Rising (R) Head Slug Test	Time (sec)	Time min)
PHASE IIA	MWN-03	F	Bouwer-Rice	7.62E-03	R	146	2
PHASE IIA	MWN-04	F	Bouwer-Rice	1.69E-06	R	15675	261
PHASE I	MWN-04	F	Bouwer-Rice	2.04E-05	F	4020	67
PHASE I	MWN-04	F	Theis	2.86E-04	PT	610	10
PHASE IIA	MWN-04	F	Bouwer-Rice	2.85E-05	R	15675	261
PHASE I	MWN-05A	F	Cooper Jacob	2.77E-02	PT	2760	46
PHASE I	MWN-06A	F	Theis	2.35E-01	PT	5100	85
PHASE I	MWN-07	F	Bouwer-Rice	1.11E-01	F	15	0
PHASE I	MWN-08	F	Bouwer-Rice	5.20E-03	F	517	9
PHASE I	MWN-09	F	Bouwer-Rice	7.00E-02	F	37	1
PHASE I	MWN-10	F	Bouwer-Rice	5.67E-03	R	240	4
PHASE I	MWN-11	F	Bouwer-Rice	1.00E-02	F	96	2
PHASE I	MWN-12	F	Bouwer-Rice	5.33E-03	F	184	3
PHASE IIA	MWN-13A	F	Bouwer-Rice	1.43E-05	R	4000	67
PHASE I	MWN-13A	F	Bouwer-Rice	1.28E-04	F	3040	51
PHASE IIA	MWN-13A	F	Bouwer-Rice	1.90E-04	R	3946	66
PHASE IIA	MWN-16B	F	Cooper Jacob	1.55E-04	PT	1576	26
PHASE IIB	MWN-21A	F	Bouwer-Rice	6.31E-03	F	116	2
PHASE IIB	MWN-21A	F	Bouwer-Rice	7.07E-03	R	74	1
PHASE IIB	MWN-25A	F	Bouwer-Rice	1.60E-01	F	3	0
PHASE IIB	MWN-25A	F	Bouwer-Rice	2.53E-02	R	8	0
PHASE IIB	MWN-26A	F	Bouwer-Rice	4.72E-03	F	107	2
PHASE IIB	MWN-26A	F	Bouwer-Rice	3.81E-03	R	102	2
PHASE IIB	MWN-27A	F	Bouwer-Rice	6.40E-03	F	27	0
PHASE IIB	MWN-27A	F	Bouwer-Rice	4.60E-02	R	18	0
PHASE III	MWN-30A	F	Bouwer-Rice	2.52E-02	F	12	0
PHASE III	MWN-30A	F	Bouwer-Rice	5.29E-02	R	105.8	2
PHASE III	MWN-30A	F	Bouwer-Rice	8.52E-02	R	12	0
PHASE III	MWN-31A	F	Bouwer-Rice	1.71E-02	F	14	0
PHASE III	MWN-31A	F	Bouwer-Rice	5.87E-02	R	11	0
PHASE III	MWN-31A	F	Bouwer-Rice	6.73E-02	R	12	0
PHASE III	MWN-33A	F	Bouwer-Rice	1.02E-01	R	10	0
PHASE III	MWN-33A	F	Bouwer-Rice	1.30E-01	R	11.6	0
PHASE III	MWN-34A	F	Bouwer-Rice	5.32E-03	F	51	1
PHASE III	MWN-34A	F	Bouwer-Rice	2.90E-03	R	90	2
Supplemental	MWN-38A	F	Bouwer-Rice	7.85E-02	R	5.28	0
Supplemental	MWN-38A	F	Bouwer-Rice	1.01E-01	F	5.28	0
Supplemental	MWN-39A	F	Bouwer-Rice	2.19E-02	R	967.2	16
Supplemental	MWN-39A	F	Bouwer-Rice	1.67E-02	F	1287	21
Supplemental	MWN-40A	F	Bouwer-Rice	1.56E-01	R	29.28	0
Supplemental	MWN-40A	F	Bouwer-Rice	1.72E-01	R	3.96	0
Supplemental	MWN-40A	F	Bouwer-Rice	1.23E-01	F	28.26	0
Supplemental	MWN-52A	F	Bouwer-Rice	4.62E-02	R	197.64	3.3
Supplemental	MWN-52A	F	Bouwer-Rice	5.68E-02	F	30.54	1
PHASE I	MWS-01	F	Bouwer-Rice	1.00E-01	F	13	0
PHASE I	MWS-02	F	Bouwer-Rice	3.72E-05	F	2026	34

**TABLE 3-29**  
**GROUNDWATER CONTAMINANT TREND ANALYSIS**  
**MANN-KENDALL STATISTICAL ANALYSIS**  
**BETHLEHEM STEEL CORP., LACKAWANNA, NEW YORK**

LOCID: MWN-08

Parameter	Matrix	Class	Num of Data Points	Num of Data Point Detections	Mann-Kendall Statistic S	Probabilities (1)	Trend (2)
2,4-Dimethylphenol	WG	SVOC	4	1	3	0.375	No Trend
bis(2-Ethylhexyl)phthalate	WG	SVOC	4	1	3	0.375	No Trend
Naphthalene	WG	SVOC	7	7	-9	0.119	No Trend
Phenanthrene	WG	SVOC	4	1	3	0.375	No Trend
Phenol	WG	SVOC	4	2	-1	0.625	No Trend

LOCID: MWN-09

Parameter	Matrix	Class	Num of Data Points	Num of Data Point Detections	Mann-Kendall Statistic S	Probabilities (1)	Trend (2)
Benzene	WG	VOC	8	6	3	0.452	No Trend
Acenaphthylene	WG	SVOC	4	1	3	0.375	No Trend
Fluoranthene	WG	SVOC	4	1	1	0.625	No Trend
Fluorene	WG	SVOC	4	1	3	0.375	No Trend
Naphthalene	WG	SVOC	8	6	-2	0.452	No Trend
Phenol	WG	SVOC	4	4	4	0.167	No Trend
Pyridine	WG	SVOC	4	1	3	0.375	No Trend

LOCID: MWN-10

Parameter	Matrix	Class	Num of Data Points	Num of Data Point Detections	Mann-Kendall Statistic S	Probabilities (1)	Trend (2)
Naphthalene	WG	SVOC	8	1	7	0.274	No Trend
Phenol	WG	SVOC	5	1	-4	0.242	No Trend

LOCID: MWN-11

Parameter	Matrix	Class	Num of Data Points	Num of Data Point Detections	Mann-Kendall Statistic S	Probabilities (1)	Trend (2)
Benzene	WG	VOC	8	8	-4	0.36	No Trend
1,1-Dichloroethane	WG	VOC	4	1	3	0.375	No Trend
Toluene	WG	VOC	5	4	-3	0.408	No Trend
Xylenes, Total	WG	VOC	5	2	-7	0.117	No Trend
2,4-Dimethylphenol	WG	SVOC	4	2	3	0.375	No Trend

For multiple observations per time period, the Mann-Kendall test to the median was used.

Data reported as less than the detection limit were used by assigning a common value to the data that was smaller than the smallest measurement in the data set.

(1) - Probabilities for Mann-Kendall Nonparametric Test for Trend (Gilbert R.O. 1987, Table A18)

(2) - Assuming a probability of error of 10% in the analysis method and/or data, then the probability of no trend as calculated by the Mann-Kendall statistic is less than 10%, then it is assumed that there is a trend.

\* - Number of observations too small to calculate probabilities.

\*\* - Probability Undefined for S=0 and N=6, 7, 10, 11, 14, 15, 18, 19, 22, 23, 26, 27, 30, 31, 34, or 35

Note: Trend Analysis is based on maximum of 40 Data Points.

Note: A 'No Value' Probability may be shown if the maximum S value exceeds that allowed for the given Data Points value

Only Detected Results Reported.

Advanced Selection: TREND WALL DATA  
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WHERE (MATRIX) = WG AND ((SACODE) = N OR (SACODE) LIKE 'F') AND ((SITEID) <> UNDE AND ((PRCODE) = VOC OR (PRCODE) = SVOC) AND (LOCID) NOT LIKE 'A' AND (LOCID) NOT LIKE 'RW':

**PHASE I - 1ST ROUND (JANUARY 1991)  
GROUNDWATER**

Location ID		MWN-09	MWN-10	MWN-11	MWN-12	MWN-13A
Sample ID		MWN-09 DUP	MWN-10	MWN-11	MWN-12	MWN-13A
Lab Sample ID		BS-39	BS-10	BS-11	BS-12	BS-13
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/23/91	01/23/91	01/23/91	01/24/91	01/24/91
Parameter	Units	FIELD DUPLICATE (1-1)				
Volatile Organic Compounds						
Acrylonitrile	UG/L	1,300 U	50 U	50 U	50 U	50 U
Benzene	UG/L	3,100	5 U	26	5.3	50
Bromodichloromethane	UG/L	130 U	5 U	5 U	5 U	5 U
Bromoform	UG/L	130 U	5 U	5 U	5 U	5 U
Bromomethane	UG/L	250 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	UG/L	130 U	5 U	5 U	5 U	5 U
Chlorobenzene	UG/L	130 U	5 U	5 U	5 U	5 U
Chloroethane	UG/L	250 U	10 U	10 U	10 U	10 U
2-Chloroethyl vinyl ether	UG/L	250 UJ	10 UJ	10 UJ	10 U	10 U
Chloroform	UG/L	130 U	5 U	5 U	5 U	5 U
Chloromethane	UG/L	250 U	10 U	10 U	10 U	10 U
Dibromochloromethane	UG/L	130 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	UG/L	130 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	UG/L	130 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	UG/L	130 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	UG/L	130 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	UG/L	130 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	UG/L	130 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	UG/L	130 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	UG/L	130 U	5 U	5 U	5 U	5 U
Ethylbenzene	UG/L	130 U	5 U	5 U	5 U	5 U
Methylene chloride	UG/L	250 U	10 U	10 U	10 U	11
1,1,1,2-Tetrachloroethane	UG/L	130 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	UG/L	130 U	5 U	5 U	5 U	5 U

Flags assigned during chemistry validation are shown

Detection Limits shown are PQL

(LLOCI) = MW-101 OR (LOCI) = MW-102 OR (LOCI) = MW-103 OR (LOCI) = MW-104 OR (LOCI) = MW-101 OR (LOCI) = MW-202 OR (LOCI) = MW-203 OR (LOCI) = MW-204 OR (LOCI) = MW-201 OR (LOCI) = MW-011 OR (LOCI) = MW-02 OR (LOCI) = MW-03 OR (LOCI) = MW-04 OR (LOCI) = MW-05A OR (LOCI) = MW-06A OR (LOCI) =

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**PHASE I - 1ST ROUND (JANUARY 1991)  
GROUNDWATER**

Location ID		MWN-09	MWN-10	MWN-11	MWN-12	MWN-13A
Sample ID		MWN-09 DUP	MWN-10	MWN-11	MWN-12	MWN-13A
Lab Sample ID		BS-39	BS-10	BS-11	BS-12	BS-13
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/23/91	01/23/91	01/23/91	01/24/91	01/24/91
Parameter	Units	FIELD DUPLICATE (1-1)				
<b>Volatile Organic Compounds</b>						
Tetrachloroethene	UGL	130 U	5 U	5 U	5 U	5 U
Toluene	UGL	130 U	5 U	7.1	3 J	17
1,1,1-Trichloroethane	UGL	130 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	UGL	130 U	5 U	5 U	5 U	5 U
Trichloroethene	UGL	130 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	UGL	130 U	5 U	5 U	5 U	5 U
Vinyl chloride	UGL	250 U	10 U	10 U	10 U	10 U
Xylenes, Total	UGL	130 U	5 U	7.5	7.7	39
<b>Semivolatile Organic Compounds</b>						
Acenaphthylene	UGL	20 U	10 U	100 U	10 U	10 U
Anthracene	UGL	20 U	10 U	100 U	10 U	10 U
Benzo(a)anthracene	UGL	20 U	10 U	100 U	10 U	10 U
Benzo(a)pyrene	UGL	20 U	10 U	100 U	10 U	10 U
Butyl benzyl phthalate	UGL	20 U	10 U	100 U	10 U	10 U
4-Chloro-3-methylphenol	UGL	20 U	10 U	100 U	10 U	10 U
bis(2-Chloroethyl)ether	UGL	20 U	10 U	100 U	10 U	10 U
2-Chloronaphthalene	UGL	20 U	10 U	100 U	10 U	10 U
Chrysene	UGL	20 U	10 U	100 U	10 U	10 U
Di-n-butyl phthalate	UGL	20 UJ	10 U	100 U	10 UJ	10 UJ
Di-n-octyl phthalate	UGL	20 U	10 U	100 U	10 U	10 U
1,2-Dichlorobenzene	UGL	20 U	10 U	100 U	10 U	10 U
1,3-Dichlorobenzene	UGL	20 U	10 U	100 U	10 U	10 U
1,4-Dichlorobenzene	UGL	20 U	10 U	100 U	10 U	10 U
2,4-Dichlorophenol	UGL	20 U	10 U	100 U	10 U	10 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL.

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(L)CID) = MW-101 OR (L)CID) = MW-102 OR (L)CID) = MW-103 OR (L)CID) = MW-104 OR (L)CID) = MW-101 OR (L)CID) = MW-202 OR (L)CID) = MW-203 OR (L)CID) = MW-204  
 OR (L)CID) = MW-201 OR (L)CID) = MWN-01 OR (L)CID) = MWN-02 OR (L)CID) = MWN-03 OR (L)CID) = MWN-04 OR (L)CID) = MWN-05 OR (L)CID) = MWN-06 OR (L)CID) =

**PHASE I - 1ST ROUND (JANUARY 1991)  
GROUNDWATER**

Location ID		MWN-09	MWN-10	MWN-11	MWN-12	MWN-13A
Sample ID		MWN-09 DUP	MWN-10	MWN-11	MWN-12	MWN-13A
Lab Sample ID		BS-39	BS-10	BS-11	BS-12	BS-13
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/23/91	01/23/91	01/23/91	01/24/91	01/24/91
Parameter	Units	FIELD DUPLICATE (1-1)				
<b>Semivolatile Organic Compounds</b>						
Diethyl phthalate	UG/L	20 U	10 U	100 U	10 U	10 U
Dimethyl phthalate	UG/L	20 U	10 U	100 U	10 U	10 U
2,4-Dimethylphenol	UG/L	20 U	10 U	100 U	10 U	10 U
4,6-Dinitro-2-methylphenol	UG/L	100 U	50 U	500 U	50 U	50 U
2,4-Dinitrotoluene	UG/L	20 U	10 U	100 U	10 U	10 U
2,6-Dinitrotoluene	UG/L	20 U	10 U	100 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	UG/L	20 U	10 U	100 U	28 J	66
Fluoranthene	UG/L	20 U	10 U	100 U	10 U	10 U
Fluorene	UG/L	20 U	10 U	100 U	23	10 U
Hexachlorobenzene	UG/L	20 U	10 U	100 U	10 U	10 U
Hexachlorocyclobutadiene	UG/L	20 U	10 U	100 U	10 U	10 U
Hexachlorocyclopentadiene	UG/L	20 U	10 U	100 U	10 U	10 U
Hexachloroethane	UG/L	20 U	10 U	100 U	10 U	10 U
Isophorone	UG/L	20 U	10 U	100 U	10 U	10 U
2-Methylphenol	UG/L	20 U	10 U	320	10 U	10 U
3-Methylphenol	UG/L	20 U	10 U	100 U	10 U	10 U
4-Methylphenol	UG/L	20 U	10 U	100 U	10 U	10 U
Naphthalene	UG/L	90	10 U	58 J	80	42
Pentachlorophenol	UG/L	100 U	50 U	500 U	50 U	50 U
Phenanthrene	UG/L	20 U	10 U	100 U	40	10 U
Phenol	UG/L	35	13	860	10 U	10 U
Pyrene	UG/L	20 U	10 U	100 U	10	10 U
Pyridine	UG/L	20 UJ	10 U	100 U	10 UJ	10 UJ
2,3,4,6-Tetrachlorophenol	UG/L	100 U	50 U	500 U	50 U	50 U

Flags assigned during chemistry validation are shown

Detection Limits shown are PQL

Advanced Selection: PI 1R WG  
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([LOCID] = 'MWN-01' OR [LOCID] = 'MWN-02' OR [LOCID] = 'MWN-03' OR [LOCID] = 'MWN-04' OR [LOCID] = 'MWN-05' OR [LOCID] = 'MWN-06' OR [LOCID] = 'MWN-07' OR [LOCID] = 'MWN-08' OR [LOCID] = 'MWN-09' OR [LOCID] = 'MWN-10' OR [LOCID] = 'MWN-11' OR [LOCID] = 'MWN-12' OR [LOCID] = 'MWN-13A' OR [LOCID] = 'MWN-201' OR [LOCID] = 'MWN-202' OR [LOCID] = 'MWN-203' OR [LOCID] = 'MWN-204' OR [LOCID] = 'MWN-205' OR [LOCID] = 'MWN-206' OR [LOCID] = 'MWN-207' OR [LOCID] = 'MWN-208' OR [LOCID] = 'MWN-209' OR [LOCID] = 'MWN-210' OR [LOCID] = 'MWN-211' OR [LOCID] = 'MWN-212' OR [LOCID] = 'MWN-213A')

**PHASE I - 1ST ROUND (JANUARY 1991)  
GROUNDWATER**

Location ID		MWN-09	MWN-10	MWN-11	MWN-12	MWN-13A
Sample ID		MWN-09 DUP	MWN-10	MWN-11	MWN-12	MWN-13A
Lab Sample ID		BS-39	BS-10	BS-11	BS-12	BS-13
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/23/91	01/23/91	01/23/91	01/24/91	01/24/91
Parameter	Units	FIELD DUPLICATE (1-1)				
<b>Semivolatile Organic Compounds</b>						
1,2,4-Trichlorobenzene	UG/L	20 U	10 U	100 U	10 U	10 U
2,4,5-Trichlorophenol	UG/L	20 U	10 U	100 U	10 U	10 U
2,4,6-Trichlorophenol	UG/L	20 U	10 U	100 U	10 U	10 U
<b>Dissolved Metals</b>						
Antimony -DISS	UG/L	60 U	60 U	60 U	60 U	60 U
Arsenic -DISS	UG/L	10 U	10 U	14	10 U	10 U
Barium -DISS	UG/L	200 U	200 U	200 U	200 U	330
Cadmium -DISS	UG/L	5 U	5 U	5 U	5 U	5 U
Calcium -DISS	UG/L	120,000 J	100,000 J	77,000 J	280,000 J	250,000 J
Chromium -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Lead -DISS	UG/L	3 U	3 U	3 U	3 U	3 U
Mercury -DISS	UG/L	0.2 U	0.2 U	0.2	0.2 U	0.2 U
Nickel -DISS	UG/L	40 U	40 U	40 U	40 U	40 U
Selenium -DISS	UG/L	5 U	25 U	25	25 UJ	25 UJ
Silver -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Sodium -DISS	UG/L	36,000 J	160,000 J	580,000 J	97,000 J	110,000 J
Thallium -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
<b>General Chemistry Parameters</b>						
Alkalinity (as CaCO3)	MG/L	270	110	480	430	510
Chloride	MG/L	64	66	460	180	160
Cyanide	MG/L	0.38	0.04	0.29	0.010 U	0.06
pH Liquid	S.U.	7.7	11	12	12	12
Sulfate	MG/L	68	230	350	370	240
Total Organic Carbon	MG/L	18	9.5	48	6.2	4.8

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

( [LOCID] = 'MWN-10' OR [LOCID] = 'MWN-12' OR [LOCID] = 'MWN-13' OR [LOCID] = 'MWN-14' OR [LOCID] = 'MWN-11' OR [LOCID] = 'MWN-20' OR [LOCID] = 'MWN-23' OR [LOCID] = 'MWN-24'  
OR [LOCID] = 'MWN-21' OR [LOCID] = 'MWN-01' OR [LOCID] = 'MWN-02' OR [LOCID] = 'MWN-07' OR [LOCID] = 'MWN-04' OR [LOCID] = 'MWN-05' OR [LOCID] = 'MWN-06' OR [LOCID] =

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**PHASE I - 1ST ROUND (JANUARY 1991)  
GROUNDWATER**

Location ID		MWN-09	MWN-10	MWN-11	MWN-12	MWN-13A
Sample ID		MWN-09 DUP	MWN-10	MWN-11	MWN-12	MWN-13A
Lab Sample ID		BS-39	BS-10	BS-11	BS-12	BS-13
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/23/91	01/23/91	01/23/91	01/24/91	01/24/91
Parameter	Units	FIELD DUPLICATE (1-1)				
General Chemistry Parameters						
Total Dissolved Solids	MGL	460	830	1,700	1,400	1,200
Total Organic Halogens	MGL	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Total Recoverable Phenolics	MGL	0.038	0.012	3.1	0.025	0.04

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

{(LOCID) = 'MW-101' OR (LOCID) = 'MW-102' OR (LOCID) = 'MW-103' OR (LOCID) = 'MW-104' OR (LOCID) = 'MW-101' OR (LOCID) = 'MW-202' OR (LOCID) = 'MW-203' OR (LOCID) = 'MW-204' OR (LOCID) = 'MW-201' OR (LOCID) = 'MW-201' OR (LOCID) = 'MWN-01' OR (LOCID) = 'MWN-02' OR (LOCID) = 'MWN-03' OR (LOCID) = 'MWN-04' OR (LOCID) = 'MWN-05A' OR (LOCID) = 'MWN-06A' OR (LOCID) =

**PHASE I - 2nd, 3rd AND 4th ROUNDS (APRIL THROUGH OCTOBER 1991)  
GROUNDWATER**

Location ID		MWN-09	MWN-09	MWN-10	MWN-10	MWN-10
Sample ID		MWN-09	MWN-09 DUP	MWN-10	MWN-10	MWN-10
Lab Sample ID		BSC-4-17	BSC-4-19	BS-34	BS-26	BSC-4-23
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		10/14/91	10/14/91	04/19/91	07/16/91	10/14/91
Parameter	Units	FIELD DUPLICATE (1-1)				
<b>Volatile Organic Compounds</b>						
Benzene	UG/L	530 J	450 J	0.43 J	1 U	1 UJ
<b>Semivolatile Organic Compounds</b>						
Naphthalene	UG/L	4.7 J	13	20 U	10 U	10 U
<b>Dissolved Metals</b>						
Calcium -DISS	UG/L	66,000	67,000	110,000	2,300,000	72,000
Chromium -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Lead -DISS	UG/L	3.0 UJ	30 UJ	3 U	30.0 U	3.0 UJ
Potassium -DISS	UG/L	5,000 U	5,000 U	18,000	310,000	18,000
Sodium -DISS	UG/L	14,000	15,000	160,000	280,000	140,000
<b>General Chemistry Parameters</b>						
Alkalinity (as CaCO <sub>3</sub> )	MG/L	180	180	86	240	96
Carbonate Alkalinity (as CaCO <sub>3</sub> )	MG/L	NA	NA	45	53	38
Chloride	MG/L	25 J	25 J	230	4,700	200 J
Field pH	S U	8.25	8.25	11.3	11.2	11.1
Sulfate	MG/L	20	21	240	530	170
Total Organic Carbon	MG/L	6.9	8	8.1	16 J	6.1
Total Dissolved Solids	MG/L	320	310	860	10,000 J	60
Total Organic Halogens	MG/L	0.050 U	0.050 U	0.10 U	0.12	0.050 U
Total Recoverable Phenolics	MG/L	0.02	0.018	0.01	0.11 J	0.008

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

Advanced Selection: PI 2,3,4R WG  
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( [LOCID] = 'MW-1D1' OR [LOCID] = 'MW-1D2' OR [LOCID] = 'MW-1D3' OR [LOCID] = 'MW-1D4' OR [LOCID] = 'MW-1U1' OR [LOCID] = 'MW-2D2' OR [LOCID] = 'MW-2D3' OR [LOCID] = 'MW-2D4'  
OR [LOCID] = 'MW-2U1' OR [LOCID] = 'MWN-01' OR [LOCID] = 'MWN-02' OR [LOCID] = 'MWN-03' OR [LOCID] = 'MWN-04' OR [LOCID] = 'MWN-05A' OR [LOCID] = 'MWN-05B' OR [LOCID] =

**PHASE I - 5th ROUND (JANUARY 1992)  
GROUNDWATER**

Location ID		MWN-08	MWN-09	MWN-09	MWN-10	MWN-11
Sample ID		MWN-08	MWN-09	MWN-09 DUP	MWN-10	MWN-11
Lab Sample ID		BSC-5-8	BSC-5-7	BSC-5-9	BSC-5-14	BSC-5-23
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/17/92	01/17/92	01/17/92	01/17/92	01/20/92
Parameter	Units			FIELD DUPLICATE (1-1)		
Volatile Organic Compounds						
Acrylonitrile	UG/L	50 U	200 U	200 U	10 U	10 U
Benzene	UG/L	89	1,100	1,100	5 U	9.6 J,c
Bromodichloromethane	UG/L	25 U	100 U	100 U	5 U	5 U
Bromoform	UG/L	25 U	100 U	100 U	5 U	5 U
Bromomethane	UG/L	50 U	200 U	200 U	10 U	10 U
Carbon tetrachloride	UG/L	25 U	100 U	100 U	5 U	5 U
Chlorobenzene	UG/L	25 U	100 U	100 U	5 U	5 U
Chloroethane	UG/L	50 U	200 U	200 U	10 U	10 U
2-Chloroethyl vinyl ether	UG/L	50 U	200 U	200 U	10 U	10 U
Chloroform	UG/L	25 U	100 U	100 U	5 U	5 U
Chloromethane	UG/L	50 U	200 U	200 U	5 U	10 U
Dibromochloromethane	UG/L	25 U	100 U	100 U	5 U	5 U
Dichlorodifluoromethane	UG/L	25 U	100 U	100 U	5 U	5 U
1,1-Dichloroethane	UG/L	25 U	100 U	100 U	5 U	5 U
1,2-Dichloroethane	UG/L	25 U	100 U	100 U	5 U	5 U
1,1-Dichloroethene	UG/L	25 U	100 U	100 U	5 U	5 U
trans-1,2-Dichloroethene	UG/L	25 U	100 U	100 U	5 U	5 U
1,2-Dichloropropane	UG/L	25 U	100 U	100 U	5 U	5 U
cis-1,3-Dichloropropene	UG/L	25 U	100 U	100 U	5 U	5 U
trans-1,3-Dichloropropene	UG/L	25 U	100 U	100 U	5 U	5 U
Ethylbenzene	UG/L	290	100 U	100 U	5 U	5 U
Methylene chloride	UG/L	50 U	200 U	200 U	10 U	10 U
1,1,1,2-Tetrachloroethane	UG/L	25 U	100 U	100 U	5 U	5 U
1,1,1,2,2-Tetrachloroethane	UG/L	25 U	100 U	100 U	5 U	5 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

{ [LOCID] = 'MW-101' OR [LOCID] = 'MW-102' OR [LOCID] = 'MW-103' OR [LOCID] = 'MW-104' OR [LOCID] = 'MW-101' OR [LOCID] = 'MW-202' OR [LOCID] = 'MW-203' OR [LOCID] = 'MW-204' OR [LOCID] = 'MW-201' OR [LOCID] = 'MW-01' OR [LOCID] = 'MW-02' OR [LOCID] = 'MW-03' OR [LOCID] = 'MW-04' OR [LOCID] = 'MW-05A' OR [LOCID] = 'MW-05A' OR [LOCID] =



**PHASE I - 5th ROUND (JANUARY 1992)  
GROUNDWATER**

Location ID		MWN-08	MWN-09	MWN-09	MWN-10	MWN-11
Sample ID		MWN-08	MWN-09	MWN-09 DUP	MWN-10	MWN-11
Lab Sample ID		BSC-5-8	BSC-5-7	BSC-5-9	BSC-5-14	BSC-5-23
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/17/92	01/17/92	01/17/92	01/17/92	01/20/92
Parameter	Units			FIELD DUPLICATE (1-1)		
Semivolatile Organic Compounds						
Diethyl phthalate	UG/L	20 U	10 U	10 U	10 U	100 U
Dimethyl phthalate	UG/L	20 U	10 U	10 U	10 U	100 U
2,4-Dimethylphenol	UG/L	20 U	10 U	10 U	10 U	100 U
4,6-Dinitro-2-methylphenol	UG/L	100 U	50 U	50 U	50 U	500 U
2,4-Dinitrotoluene	UG/L	20 U	10 U	10 U	10 U	100 U
2,6-Dinitrotoluene	UG/L	20 U	10 U	10 U	10 U	100 U
bis(2-Ethylhexyl)phthalate	UG/L	20 U	10 U	10 U	10 U	100 U
Fluoranthene	UG/L	20 U	10 U	10 U	10 U	100 U
Fluorene	UG/L	20 U	10 U	10 U	10 U	100 U
Hexachlorobenzene	UG/L	20 U	10 U	10 U	10 U	100 U
Hexachlorocyclobutadiene	UG/L	20 U	10 U	10 U	10 U	100 U
Hexachlorocyclopentadiene	UG/L	20 U	10 U	10 U	10 U	100 U
Hexachloroethane	UG/L	20 U	10 U	10 U	10 U	100 U
Isophorone	UG/L	20 U	10 U	10 U	10 U	100 U
3-Methylphenol & 4-Methylphenol	UG/L	20 U	10 U	10 U	10 U	200
2-Methylphenol	UG/L	20 U	10 U	10 U	10 U	57 J
Naphthalene	UG/L	180	47	51	10 U	66 J
Pentachlorophenol	UG/L	100 U	50 U	50 U	50 U	500 U
Phenanthrene	UG/L	20 U	10 U	10 U	10 U	100 U
Phenol	UG/L	20 U	85	86	10 U	570
Pyrene	UG/L	20 U	10 U	10 U	10 U	100 U
Pyridine	UG/L	20 U	10 U	10 U	10 U	100 U
2,3,4,6-Tetrachlorophenol	UG/L	100 U	50 U	50 U	50 U	500 U
1,2,4-Trichlorobenzene	UG/L	20 U	10 U	10 U	10 U	100 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

[ (LOCID) = MW-101 OR (LOCID) = MW-102 OR (LOCID) = MW-103 OR (LOCID) = MW-104 OR (LOCID) = MW-101 OR (LOCID) = MW-202 OR (LOCID) = MW-203 OR (LOCID) = MW-204 OR (LOCID) = MW-201 OR (LOCID) = MW-01 OR (LOCID) = MW-02 OR (LOCID) = MW-03 OR (LOCID) = MW-04 OR (LOCID) = MW-05A OR (LOCID) = MW-05A OR (LOCID) =



**PHASE I - 5th ROUND (JANUARY 1992)  
GROUNDWATER**

Location ID		MWN-08	MWN-09	MWN-09	MWN-10	MWN-11
Sample ID		MWN-08	MWN-09	MWN-09 DUP	MWN-10	MWN-11
Lab Sample ID		BSC-5-6	BSC-5-7	BSC-5-9	BSC-5-14	BSC-5-23
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/17/92	01/17/92	01/17/92	01/17/92	01/20/92
Parameter	Units			FIELD DUPLICATE (1-1)		
<b>Semivolatile Organic Compounds</b>						
2,4,5-Trichlorophenol	UG/L	100 U	50 U	50 U	50 U	500 U
2,4,6-Trichlorophenol	UG/L	20 U	10 U	10 U	10 U	100 U
<b>Dissolved Metals</b>						
Antimony -DISS	UG/L	60 U	60 U	60 U	60 U	60 U
Arsenic -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Barium -DISS	UG/L	200 U	200 U	200 U	200 U	200 U
Cadmium -DISS	UG/L	5 U	5 U	5 U	5 U	5 U
Calcium -DISS	UG/L	210,000 J,m	101,000 J,m	102,000 J,m	81,400 J,m	96,000 J,m
Chromium -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Lead -DISS	UG/L	3 U	3 U	3 U	3 U	3 UJ,m
Mercury -DISS	UG/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel -DISS	UG/L	40 U	40 U	40 U	40 U	40 U
Potassium -DISS	UG/L	17,100	5,000 U	5,000 U	16,800	23,100
Selenium -DISS	UG/L	5 U	25 U	5 U	5 U	5 U
Silver -DISS	UG/L	10 U	10 U	10 U	10 U	10 UJ,m
Sodium -DISS	UG/L	156,000	24,400	29,500	139,000	242,000
Thallium -DISS	UG/L	50 UR,m	50 UR,m	50 UR,m	10 UR,m	50 UR,m
<b>General Chemistry Parameters</b>						
Alkalinity (as CaCO3)	MG/L	350	180	180	77	320
Carbonate Alkalinity (as CaCO3)	MG/L	NA	NA	NA	34	110
Chloride	MG/L	220	52	53	180	180
Cyanide	MG/L	0.010 U	0.31	0.34	0.03	0.32
Field pH	S U	7.6	7.7	7.7	11	12
Sulfate	MG/L	250	72	72	200	260

Flags assigned during chemistry validation are shown

Detection Limits shown are PQL

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**PHASE I - 5th ROUND (JANUARY 1992)  
GROUNDWATER**

Location ID		MWN-08	MWN-09	MWN-09	MWN-10	MWN-11
Sample ID		MWN-08	MWN-09	MWN-09 DUP	MWN-10	MWN-11
Lab Sample ID		BSC-5-8	BSC-5-7	BSC-5-9	BSC-5-14	BSC-5-23
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/17/92	01/17/92	01/17/92	01/17/92	01/20/92
Parameter	Units			FIELD DUPLICATE (1-1)		
General Chemistry Parameters						
Total Organic Carbon	MGL	17	16	15	6.8	22
Total Dissolved Solids	MGL	1,200	460	440	700	1,000
Total Organic Halogens	MGL	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Total Recoverable Phenolics	MGL	0.006	0.014	0.013	0.005 U	1.1

Flags assigned during chemistry validation are shown

Detection Limits shown are PQL

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**PHASE IIA - 6th ROUND (DECEMBER 1992 THROUGH JUNE 1993)  
GROUNDWATER**

Location ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Sample ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Lab Sample ID		69336	69337	69338	69339	69340
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/11/92	12/11/92	12/11/92	12/11/92	12/10/92
Parameter	Units					
<b>Volatile Organic Compounds</b>						
Acrylonitrile	UG/L	50 U	50 U	50 U	50 U	50 U
Benzene	UG/L	5 U	5 U	5 U	5 U	14
Bromodichloromethane	UG/L	5 U	5 U	5 U	5 U	5 U
Bromoform	UG/L	5 U	5 U	5 U	5 U	5 U
Bromomethane	UG/L	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	UG/L	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	UG/L	5 U	5 U	5 U	5 U	5 U
Chloroethane	UG/L	10 U	10 U	10 U	10 U	10 U
2-Chloroethyl vinyl ether	UG/L	R	R	R	R	10 U
Chloroform	UG/L	5 U	5 U	5 U	5 U	5 U
Chloromethane	UG/L	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	UG/L	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	UG/L	5 U,J,c	5 U,J,c	5 U,J,c	5 U,J,c	5 U,J,c
1,1-Dichloroethane	UG/L	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	UG/L	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	UG/L	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	UG/L	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	UG/L	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	UG/L	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	UG/L	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	UG/L	5 U	5 U	5 U	5 U	5 U
Methylene chloride	UG/L	10 U	10 U	10 U	10 U	10 U
1,1,1,2-Tetrachloroethane	UG/L	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	UG/L	5 U	5 U	5 U	5 U	5 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

**PHASE IIA - 6th ROUND (DECEMBER 1992 THROUGH JUNE 1993)**  
**GROUNDWATER**

Location ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Sample ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Lab Sample ID		69336	69337	69338	69339	69340
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/11/92	12/11/92	12/11/92	12/11/92	12/10/92
Parameter	Units					
<b>Volatile Organic Compounds</b>						
Tetrachloroethene	UGL	5 U	5 U	5 U	5 U	5 U
Toluene	UGL	5 U	5 U	5 U	5 U	4.5 J
1,1,1-Trichloroethane	UGL	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	UGL	5 U	5 U	5 U	5 U	5 U
Trichloroethene	UGL	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	UGL	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	UGL	10 U	10 U	10 U	10 U	10 U
Xylenes, Total	UGL	5 U	120	5 U	5 U	5 U
<b>Semivolatile Organic Compounds</b>						
Acenaphthylene	UGL	1.0 J	10 U	10 U	10 U	50 U
Anthracene	UGL	10 U	10 U	10 U	10 U	50 U
Benzo(a)anthracene	UGL	10 U	10 U	10 U	10 U	50 U
Benzo(a)pyrene	UGL	10 U	10 U	10 U	10 U	50 U
Butyl benzyl phthalate	UGL	10 U	10 U	10 U	10 U	50 U
4-Chloro-3-methylphenol	UGL	10 U	10 U	10 U	10 U	50 U
bis(2-Chloroethyl)ether	UGL	10 U	10 U	10 U	10 U	50 U
2-Chloronaphthalene	UGL	10 U	10 U	10 U	10 U	50 U
Chrysene	UGL	10 U	10 U	10 U	10 U	50 U
Di-n-butyl phthalate	UGL	10 U	10 U	10 U	10 U	50 U
Di-n-octyl phthalate	UGL	10 U	10 U	10 U	10 U	50 U
1,2-Dichlorobenzene	UGL	10 U	10 U	10 U	10 U	50 U
1,3-Dichlorobenzene	UGL	10 U	10 U	10 U	10 U	50 U
1,4-Dichlorobenzene	UGL	10 U	10 U	10 U	10 U	50 U
2,4-Dichlorophenol	UGL	10 U	10 U	10 U	10 U	50 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

**PHASE IIA - 6th ROUND (DECEMBER 1992 THROUGH JUNE 1993)  
GROUNDWATER**

Location ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Sample ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Lab Sample ID		69336	69337	69338	69339	69340
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/11/92	12/11/92	12/11/92	12/11/92	12/10/92
Parameter	Units					
<b>Semivolatle Organic Compounds</b>						
Diethyl phthalate	UG/L	10 U	10 U	10 U	10 U	50 U
Dimethyl phthalate	UG/L	10 U	10 U	10 U	10 U	50 U
2,4-Dimethylphenol	UG/L	10 U	10 U	10 U	10 U	30 J
4,6-Dinitro-2-methylphenol	UG/L	50 U	50 U	50 U	50 U	250 U
2,4-Dinitrotoluene	UG/L	10 U	10 U	10 U	10 U	50 U
2,6-Dinitrotoluene	UG/L	10 U	10 U	10 U	10 U	50 U
bis(2-Ethylhexyl)phthalate	UG/L	10 U	10 U	10 U	10 U	50 U
Fluoranthene	UG/L	3.0 J	10 U	6.0 J	10 U	50 U
Fluorene	UG/L	4.0 J	10 U	10 U	10 U	50 U
Hexachlorobenzene	UG/L	10 U	10 U	10 U	10 U	50 U
Hexachlorocyclobutadiene	UG/L	10 U	10 U	10 U	10 U	50 U
Hexachlorocyclopentadiene	UG/L	R	R	R	R	R
Hexachloroethane	UG/L	10 U	10 U	10 U	10 U	50 U
Isophorone	UG/L	10 U	10 U	10 U	10 U	50 U
3-Methylphenol & 4-Methylphenol	UG/L	NA	NA	NA	NA	NA
2-Methylphenol	UG/L	10 U	10 U	10 U	10 U	130
3-Methylphenol	UG/L	10 U	10 U	10 U	10 U	50 U
4-Methylphenol	UG/L	10 U	10 U	10 U	10 U	610
Naphthalene	UG/L	20	4.0 J	18	10 U	130
Pentachlorophenol	UG/L	50 U	50 U	50 U	50 U	250 U
Phenanthrene	UG/L	3.0 J	10 U	10 U	10 U	50 U
Phenol	UG/L	10 U	10 U	220	10 U	1,400
Pyrene	UG/L	4.0 J	10 U	10 U	10 U	50 U
Pyridine	UG/L	10 U	10 U	10 U	10 U	50 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

**PHASE IIA - 6th ROUND (DECEMBER 1992 THROUGH JUNE 1993)  
GROUNDWATER**

Location ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Sample ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Lab Sample ID		69336	69337	69338	69339	69340
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/11/92	12/11/92	12/11/92	12/11/92	12/10/92
Parameter	Units					
<b>Semivolatile Organic Compounds</b>						
2,3,4,6-Tetrachlorophenol	UG/L	50 U	50 U	50 U	50 U	250 U
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	10 U	10 U	50 U
2,4,5-Trichlorophenol	UG/L	10 U	10 U	10 U	10 U	50 U
2,4,6-Trichlorophenol	UG/L	10 U	10 U	10 U	10 U	50 U
<b>Dissolved Metals</b>						
Antimony -DISS	UG/L	R	R	R	R	R
Arsenic -DISS	UG/L	10 U	10 U	10 U	10 U	10
Barium -DISS	UG/L	200 U	200 U	200 U	200 U	200 U
Cadmium -DISS	UG/L	5 U	5 U	5 U	5 U	5 U
Calcium -DISS	UG/L	140,000 J,m	120,000 J,m	120,000 J,m	73,000 J,m	60,000 J,m
Chromium -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Lead -DISS	UG/L	3 U	3 U	3 U	3 U	3 U
Mercury -DISS	UG/L	0.2 UJ,m	0.2 UJ,m	0.2 UJ,m	0.2 UJ,m	0.2 UJ,m
Nickel -DISS	UG/L	40 U	40 U	40 U	40 U	40 U
Potassium -DISS	UG/L	11,000	14,000	6,000	19,000	24,000
Selenium -DISS	UG/L	R	R	R	R	R
Silver -DISS	UG/L	R	R	R	R	R
Sodium -DISS	UG/L	190,000	130,000	33,000	140,000	330,000
Thallium -DISS	UG/L	10 UJ,m	10 UJ,m	10 UJ,m	10 UJ,m	10 UJ,m
<b>General Chemistry Parameters</b>						
Alkalinity (as CaCO <sub>3</sub> )	MG/L	270	360	330	74 J,f	530
Carbonate Alkalinity (as CaCO <sub>3</sub> )	MG/L	65	NA	NA	69	180
Chloride	MG/L	280	140	75	210	280
Cyanide	MG/L	0.05	0.02	0.34	0.05	3.2

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

**PHASE IIA - 6th ROUND (DECEMBER 1992 THROUGH JUNE 1993)  
GROUNDWATER**

Location ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Sample ID		MWN-07	MWN-08	MWN-09	MWN-10	MWN-11
Lab Sample ID		69336	69337	69338	69339	69340
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/11/92	12/11/92	12/11/92	12/11/92	12/10/92
Parameter	Units					
<b>General Chemistry Parameters</b>						
Sulfate	MGL	170	180	28	190	280
Total Organic Carbon	MGL	3.2	14	19	7.4	35
Total Dissolved Solids	MGL	990	850	540	740	1,400
Total Organic Halogens	MGL	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Total Recoverable Phenolics	MGL	0.05 U	0.05 U	0.05 U	0.05 U	2.5

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

## COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999) GROUNDWATER

Location ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Sample ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Lab Sample ID		C9K110118010	P24A 345	C9K110118007	P24A 337	C9K040118008
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/10/99	11/10/99	11/10/99	11/10/99	11/03/99
Parameter	Units					
<b>Volatile Organic Compounds</b>						
1,1,2,2-Tetrachloroethane	UG/L	10 U	NA	250 U	NA	5.0 UJ
Tetrachloroethene	UG/L	10 U	NA	250 U	NA	5.0 UJ
Toluene	UG/L	10 U	NA	250 U	NA	5.0 U
1,1,1-Trichloroethane	UG/L	10 U	NA	250 U	NA	5.0 U
1,1,2-Trichloroethane	UG/L	10 U	NA	250 U	NA	5.0 U
Trichloroethene	UG/L	3.2 J	NA	250 U	NA	5.0 U
Trichlorofluoromethane	UG/L	20 UJ	NA	500 UJ	NA	10 UJ
Vinyl chloride	UG/L	20 U	NA	500 U	NA	10 U
Xylenes, Total	UG/L	560	NA	250 U	NA	5.0 U
<b>Semivolatile Organic Compounds</b>						
Acenaphthylene	UG/L	10 U	NA	2.7 J	NA	10 U
Anthracene	UG/L	10 U	NA	10 U	NA	10 U
Benzo(a)anthracene	UG/L	10 U	NA	10 U	NA	10 U
Benzo(a)pyrene	UG/L	10 U	NA	10 U	NA	10 U
Butyl benzyl phthalate	UG/L	10 U	NA	10 U	NA	10 U
4-Chloro-3-methylphenol	UG/L	10 U	NA	10 U	NA	10 U
bis(2-Chloroethyl)ether	UG/L	10 U	NA	10 U	NA	10 U
2-Chloronaphthalene	UG/L	10 U	NA	10 U	NA	10 U
Chrysene	UG/L	10 U	NA	10 U	NA	10 U
Di-n-butyl phthalate	UG/L	10 U	NA	10 U	NA	10 U
Di-n-octyl phthalate	UG/L	10 U	NA	10 U	NA	10 U
1,2-Dichlorobenzene	UG/L	10 U	NA	10 U	NA	10 U
1,3-Dichlorobenzene	UG/L	10 U	NA	10 U	NA	10 U
1,4-Dichlorobenzene	UG/L	10 U	NA	10 U	NA	10 U

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Detection Limits shown are PQL

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**COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999)  
GROUNDWATER**

Location ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Sample ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Lab Sample ID		C9K110118010	P24A 345	C9K110118007	P24A 337	C9K040118008
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/10/99	11/10/99	11/10/99	11/10/99	11/03/99
Parameter	Units					
<b>Semivolatile Organic Compounds</b>						
2,4-Dichlorophenol	UG/L	10 U	NA	10 U	NA	10 U
Diethyl phthalate	UG/L	10 U	NA	10 U	NA	10 U
Dimethyl phthalate	UG/L	10 U	NA	10 U	NA	10 U
2,4-Dimethylphenol	UG/L	2.4 J	NA	10 U	NA	10 U
4,6-Dinitro-2-methylphenol	UG/L	50 U	NA	50 U	NA	50 U
2,4-Dinitrotoluene	UG/L	10 U	NA	10 U	NA	10 U
2,6-Dinitrotoluene	UG/L	10 U	NA	10 U	NA	10 U
bis(2-Ethylhexyl)phthalate	UG/L	4.1 J	NA	10 U	NA	10 U
Fluoranthene	UG/L	10 U	NA	10 U	NA	10 U
Fluorene	UG/L	10 U	NA	10	NA	10 U
Hexachlorobenzene	UG/L	10 U	NA	10 U	NA	10 U
Hexachlorobutadiene	UG/L	10 U	NA	10 U	NA	10 U
Hexachlorocyclopentadiene	UG/L	50 U	NA	50 U	NA	50 U
Hexachloroethane	UG/L	10 U	NA	10 U	NA	10 U
Isophorone	UG/L	10 U	NA	10 U	NA	10 U
3-Methylphenol & 4-Methylphenol	UG/L	20 U	NA	20 U	NA	20 U
2-Methylphenol	UG/L	10 U	NA	10 U	NA	10 U
Naphthalene	UG/L	70 D	NA	18	NA	2.3 J
Pentachlorophenol	UG/L	50 U	NA	50 U	NA	50 U
Phenanthrene	UG/L	2.0 J	NA	10 U	NA	10 U
Phenol	UG/L	2.3 J	NA	150 D	NA	10 U
Pyrene	UG/L	10 U	NA	10 U	NA	10 U
Pyridine	UG/L	20 U	NA	4.0 J	NA	20 U
2,3,4,6-Tetrachlorophenol	UG/L	10 U	NA	10 U	NA	10 U

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**COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999)  
GROUNDWATER**

Location ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Sample ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Lab Sample ID		C9K110118010	P24A 345	C9K110118007	P24A 337	C9K040118008
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/10/99	11/10/99	11/10/99	11/10/99	11/03/99
Parameter	Units					
<b>Semivolatile Organic Compounds</b>						
1,2,4-Trichlorobenzene	UG/L	10 U	NA	10 U	NA	10 U
2,4,5-Trichlorophenol	UG/L	10 U	NA	10 U	NA	10 U
2,4,6-Trichlorophenol	UG/L	10 U	NA	10 U	NA	10 U
<b>Polychlorinated Biphenyls</b>						
Aroclor 1016	UG/L	NA	NA	NA	NA	NA
Aroclor 1221	UG/L	NA	NA	NA	NA	NA
Aroclor 1232	UG/L	NA	NA	NA	NA	NA
Aroclor 1242	UG/L	NA	NA	NA	NA	NA
Aroclor 1248	UG/L	NA	NA	NA	NA	NA
Aroclor 1254	UG/L	NA	NA	NA	NA	NA
Aroclor 1260	UG/L	NA	NA	NA	NA	NA
<b>Metals</b>						
Antimony	UG/L	10 U	NA	10 U	NA	60 UJ
Arsenic	UG/L	4.6 B	NA	3.2 B	NA	10.0 U
Barium	UG/L	148 BJ	NA	150 BJ	NA	13.1 BJ
Cadmium	UG/L	2.0 U	NA	2.0 U	NA	2.0 U
Calcium	UG/L	231,000	NA	164,000	NA	35,400
Chromium	UG/L	2.7 B	NA	2.4 B	NA	0.59 B
Iron	UG/L	1,460	NA	4,640	NA	44.9 B
Lead	UG/L	3.0 U	NA	3.0 U	NA	3.0 U
Magnesium	UG/L	27,000	NA	27,700	NA	258 B
Mercury	UG/L	0.20 U	NA	0.20 U	NA	0.20 U
Nickel	UG/L	8.2 B	NA	40 U	NA	40 U
Potassium	UG/L	21,300	NA	10,200	NA	16,200

Flags assigned during chemistry validation are shown.

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## COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999) GROUNDWATER

Location ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Sample ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Lab Sample ID		C9K110118010	P24A 345	C9K110118007	P24A 337	C9K040118008
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/10/99	11/10/99	11/10/99	11/10/99	11/03/99
Parameter	Units					
<b>Metals</b>						
Selenium	UG/L	5.0 U	NA	5.0 U	NA	1.6 B
Silver	UG/L	5.0 U	NA	0.78 B	NA	5.0 U
Sodium	UG/L	344,000	NA	59,600	NA	73,400
Thallium	UG/L	10 U	NA	10 U	NA	10 U
<b>Dissolved Metals</b>						
Antimony -DISS	UG/L	10 U	NA	10 U	NA	NA
Arsenic -DISS	UG/L	5.4 BJ	NA	3.3 BJ	NA	NA
Barium -DISS	UG/L	149 BJ	NA	157 BJ	NA	NA
Cadmium -DISS	UG/L	2.0 U	NA	2.0 U	NA	NA
Calcium -DISS	UG/L	228,000	NA	171,000	NA	NA
Chromium -DISS	UG/L	1.1 B	NA	1.3 B	NA	NA
Iron -DISS	UG/L	763	NA	4,380	NA	NA
Lead -DISS	UG/L	3.0 U	NA	3.0 U	NA	NA
Magnesium -DISS	UG/L	27,300	NA	28,900	NA	NA
Mercury -DISS	UG/L	0.20 U	NA	0.20 U	NA	NA
Nickel -DISS	UG/L	40 U	NA	40 U	NA	NA
Potassium -DISS	UG/L	22,300	NA	10,800	NA	NA
Selenium -DISS	UG/L	5.0 U	NA	5.0 U	NA	NA
Silver -DISS	UG/L	5.0 U	NA	5.0 U	NA	NA
Sodium -DISS	UG/L	364,000	NA	64,100	NA	NA
Thallium -DISS	UG/L	10 U	NA	10 U	NA	NA
<b>General Chemistry Parameters</b>						
Alkalinity (as CaCO <sub>3</sub> )	MG/L	5.0 U	NA	5.0 U	NA	53.5
Alkalinity (Total)	MG/L	835 J	NA	386 J	NA	87.4

Flags assigned during chemistry validation are shown

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**COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999)  
GROUNDWATER**

Location ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Sample ID		MWN-08	MWN-08	MWN-09	MWN-09	MWN-10
Lab Sample ID		C9K110118010	P24A 345	C9K110118007	P24A 337	C9K040118008
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/10/99	11/10/99	11/10/99	11/10/99	11/03/99
Parameter	Units					
<b>General Chemistry Parameters</b>						
Chloride	MG/L	533	NA	82.9	NA	71.6
Cyanide	MG/L	0.029	NA	0.14	NA	0.012 J
Dissolved Oxygen	MG/L	0.8	NA	0.4	NA	2.2
Field pH	S U	7.29	NA	7.10	NA	10.9
Nitrate Nitrogen	MG/L	0.10 U	NA	0.10 U	NA	0.10 U
Sulfate	MG/L	196	NA	161	NA	78.9
Total Organic Carbon	MG/L	13.8	NA	26.2	NA	3.2 J
Total Dissolved Solids	MG/L	1,760	NA	840	NA	365
Total Organic Halogens	MG/L	0.014 BJ	NA	0.022 BJ	NA	0.025 BJ
Total Recoverable Phenolics	MG/L	0.0050 U	NA	0.0050 U	NA	0.0050 U
Turbidity	NTU	200	NA	190	NA	6
Redox Potential	Millivolts	-205	NA	-204	NA	-397
Temperature	DEG C	16.7	NA	16.9	NA	15.4
Specific Conductance	UMHOS/CM	3,470	NA	1,400	NA	640
<b>Dissolved Gases</b>						
Carbon Dioxide	MG/L	NA	59.5	NA	49.9	NA
Carbon Monoxide	MG/L	NA	0.40 U	NA	0.40 U	NA
Methane	MG/L	NA	6.9	NA	10.0	NA
Nitrogen	MG/L	NA	12.9	NA	9.7	NA
Oxygen	MG/L	NA	0.75	NA	0.44	NA

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Detection Limits shown are PQL

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## COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999) GROUNDWATER

Location ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Sample ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Lab Sample ID		P24A 180	C9K040118001	P24A 176	C9K100121003	C9K100121003
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/03/99	11/03/99	11/03/99	11/03/99	11/09/99
Parameter	Units					
<b>Volatile Organic Compounds</b>						
Acrylonitrile	UG/L	NA	R	NA	NA	R
Benzene	UG/L	NA	4.5 J	NA	NA	5.0 U
Bromochloromethane	UG/L	NA	5 U	NA	NA	5 U
Bromodichloromethane	UG/L	NA	5.0 U	NA	NA	5.0 U
Bromoform	UG/L	NA	5.0 U	NA	NA	5.0 U
Bromomethane	UG/L	NA	10 UJ	NA	NA	10 U
Carbon tetrachloride	UG/L	NA	5.0 U	NA	NA	5.0 U
Chlorobenzene	UG/L	NA	5.0 U	NA	NA	5.0 U
Chloroethane	UG/L	NA	10 UJ	NA	NA	10 U
2-Chloroethyl vinyl ether	UG/L	NA	50 UJ	NA	NA	50 UJ
Chloroform	UG/L	NA	5.0 U	NA	NA	5.0 U
Chloromethane	UG/L	NA	10 U	NA	NA	10 UJ
Dibromochloromethane	UG/L	NA	5.0 U	NA	NA	5.0 U
Dichlorodifluoromethane	UG/L	NA	R	NA	NA	10 U
1,1-Dichloroethane	UG/L	NA	1.5 J	NA	NA	5.0 U
1,2-Dichloroethane	UG/L	NA	5.0 U	NA	NA	5.0 U
1,1-Dichloroethene	UG/L	NA	5.0 U	NA	NA	5.0 U
trans-1,2-Dichloroethene	UG/L	NA	2.5 U	NA	NA	2.5 U
1,2-Dichloropropane	UG/L	NA	5.0 U	NA	NA	5.0 U
cis-1,3-Dichloropropene	UG/L	NA	5.0 UJ	NA	NA	5.0 U
trans-1,3-Dichloropropene	UG/L	NA	5.0 UJ	NA	NA	5.0 U
Ethylbenzene	UG/L	NA	5.0 U	NA	NA	5.0 U
Methylene chloride	UG/L	NA	5.0 U	NA	NA	5.0 U
1,1,1,2-Tetrachloroethane	UG/L	NA	5.0 U	NA	NA	5.0 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

**COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999)  
GROUNDWATER**

Location ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Sample ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Lab Sample ID		P24A 180	C9K040118001	P24A 176	C9K100121003	C9K100121003
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/03/99	11/03/99	11/03/99	11/03/99	11/09/99
Parameter	Units					
<b>Volatile Organic Compounds</b>						
1,1,2,2-Tetrachloroethane	UG/L	NA	5.0 UJ	NA	NA	5.0 U
Tetrachloroethene	UG/L	NA	5.0 U	NA	NA	5.0 U
Toluene	UG/L	NA	5.0 U	NA	NA	2.1 J
1,1,1-Trichloroethane	UG/L	NA	5.0 U	NA	NA	5.0 U
1,1,2-Trichloroethane	UG/L	NA	5.0 U	NA	NA	5.0 U
Trichloroethene	UG/L	NA	5.0 U	NA	NA	5.0 U
Trichlorofluoromethane	UG/L	NA	10 U	NA	NA	10 UJ
Vinyl chloride	UG/L	NA	10 U	NA	NA	10 U
Xylenes, Total	UG/L	NA	5.0 U	NA	NA	4.7 J
<b>Semivolatile Organic Compounds</b>						
Acenaphthylene	UG/L	NA	10 U	NA	NA	7.5 J
Anthracene	UG/L	NA	10 U	NA	NA	4.5 J
Benzo(a)anthracene	UG/L	NA	10 U	NA	NA	10 U
Benzo(a)pyrene	UG/L	NA	10 U	NA	NA	10 U
Butyl benzyl phthalate	UG/L	NA	10 U	NA	NA	10 U
4-Chloro-3-methylphenol	UG/L	NA	10 U	NA	NA	10 U
bis(2-Chloroethyl)ether	UG/L	NA	10 U	NA	NA	10 U
2-Chloronaphthalene	UG/L	NA	10 U	NA	NA	10 U
Chrysene	UG/L	NA	10 U	NA	NA	10 U
Di-n-butyl phthalate	UG/L	NA	10 U	NA	NA	10 U
Di-n-octyl phthalate	UG/L	NA	10 U	NA	NA	10 U
1,2-Dichlorobenzene	UG/L	NA	10 U	NA	NA	10 U
1,3-Dichlorobenzene	UG/L	NA	10 U	NA	NA	10 U
1,4-Dichlorobenzene	UG/L	NA	10 U	NA	NA	10 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

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## COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999) GROUNDWATER

Location ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Sample ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Lab Sample ID		P24A 180	C9K040118001	P24A 176	C9K100121003	C9K100121003
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/03/99	11/03/99	11/03/99	11/03/99	11/09/99
Parameter	Units					
<b>Semivolatile Organic Compounds</b>						
2,4-Dichlorophenol	UG/L	NA	10 U	NA	NA	10 U
Diethyl phthalate	UG/L	NA	10 U	NA	NA	10 U
Dimethyl phthalate	UG/L	NA	10 U	NA	NA	10 U
2,4-Dimethylphenol	UG/L	NA	3.3 J	NA	NA	10 U
4,6-Dinitro-2-methylphenol	UG/L	NA	50 U	NA	NA	50 UJ
2,4-Dinitrotoluene	UG/L	NA	10 U	NA	NA	10 U
2,6-Dinitrotoluene	UG/L	NA	10 U	NA	NA	10 U
bis(2-Ethylhexyl)phthalate	UG/L	NA	10 U	NA	NA	10 U
Fluoranthene	UG/L	NA	10 U	NA	NA	10
Fluorene	UG/L	NA	10 U	NA	NA	25
Hexachlorobenzene	UG/L	NA	10 U	NA	NA	10 U
Hexachlorobutadiene	UG/L	NA	10 U	NA	NA	10 U
Hexachlorocyclopentadiene	UG/L	NA	50 U	NA	NA	50 U
Hexachloroethane	UG/L	NA	10 U	NA	NA	10 U
Isophorone	UG/L	NA	10 U	NA	NA	10 U
3-Methylphenol & 4-Methylphenol	UG/L	NA	37	NA	NA	20 U
2-Methylphenol	UG/L	NA	8.4 J	NA	NA	10 U
Naphthalene	UG/L	NA	4.3 J	NA	NA	62
Pentachlorophenol	UG/L	NA	50 U	NA	NA	50 U
Phenanthrene	UG/L	NA	1.2 J	NA	NA	46
Phenol	UG/L	NA	2.1 J	NA	NA	10 U
Pyrene	UG/L	NA	10 U	NA	NA	7.0 J
Pyridine	UG/L	NA	20 U	NA	NA	20 UJ
2,3,4,6-Tetrachlorophenol	UG/L	NA	10 U	NA	NA	10 U

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

[LOGDATE] = #11/2/99# OR [LOGDATE] = #11/2/99# OR [LOGDATE] = #11/4/99# OR [LOGDATE] = #11/5/99# OR [LOGDATE] = #11/8/99# OR [LOGDATE] = #11/9/99# OR [LOGDATE] = #11/10/99# OR [LOGDATE] = #11/11/99# ) AND [MATRIX] = 'WG'

## COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999) GROUNDWATER

Location ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Sample ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Lab Sample ID		P24A 180	C9K040118001	P24A 176	C9K100121003	C9K100121003
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/03/99	11/03/99	11/03/99	11/03/99	11/09/99
Parameter	Units					
<b>Semivolatile Organic Compounds</b>						
1,2,4-Trichlorobenzene	UG/L	NA	10 U	NA	NA	10 U
2,4,5-Trichlorophenol	UG/L	NA	10 U	NA	NA	10 U
2,4,6-Trichlorophenol	UG/L	NA	10 U	NA	NA	10 U
<b>Polychlorinated Biphenyls</b>						
Aroclor 1016	UG/L	NA	NA	NA	NA	NA
Aroclor 1221	UG/L	NA	NA	NA	NA	NA
Aroclor 1232	UG/L	NA	NA	NA	NA	NA
Aroclor 1242	UG/L	NA	NA	NA	NA	NA
Aroclor 1248	UG/L	NA	NA	NA	NA	NA
Aroclor 1254	UG/L	NA	NA	NA	NA	NA
Aroclor 1260	UG/L	NA	NA	NA	NA	NA
<b>Metals</b>						
Antimony	UG/L	NA	60 UJ	NA	NA	10 UJ
Arsenic	UG/L	NA	4.3 B	NA	NA	10.0 U
Barium	UG/L	NA	98.7 BJ	NA	NA	59.7 B
Cadmium	UG/L	NA	2.0 U	NA	NA	2.0 U
Calcium	UG/L	NA	114,000	NA	NA	264,000
Chromium	UG/L	NA	1.1 B	NA	NA	2.8 B
Iron	UG/L	NA	113	NA	NA	36.0 B
Lead	UG/L	NA	3.0 U	NA	NA	3.0 U
Magnesium	UG/L	NA	43.8 B	NA	NA	17.6 B
Mercury	UG/L	NA	0.20 U	NA	NA	0.20 U
Nickel	UG/L	NA	40 U	NA	NA	40 U
Potassium	UG/L	NA	20,800	NA	NA	95,300

Flags assigned during chemistry validation are shown

Detection Limits shown are PQL

(LOGDATE) = #11/2/99# OR (LOGDATE) = #11/3/99# OR (LOGDATE) = #11/4/99# OR (LOGDATE) = #11/5/99# OR (LOGDATE) = #11/6/99# OR (LOGDATE) = #11/7/99# OR (LOGDATE) = #11/8/99# OR (LOGDATE) = #11/9/99# OR (LOGDATE) = #11/10/99# OR (LOGDATE) = #11/11/99# OR (LOGDATE) = #11/12/99# OR (LOGDATE) = #11/13/99# AND (MATRIX) = WG

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**COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999)  
GROUNDWATER**

Location ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Sample ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Lab Sample ID		P24A 180	C9K040118001	P24A 176	C9K100121003	C9K100121003
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/03/99	11/03/99	11/03/99	11/03/99	11/09/99
Parameter	Units					
<b>Metals</b>						
Selenium	UG/L	NA	10.4	NA	NA	4.9 B
Silver	UG/L	NA	5.0 U	NA	NA	5.0 U
Sodium	UG/L	NA	38,400	NA	NA	75,300
Thallium	UG/L	NA	10 U	NA	NA	10 U
<b>Dissolved Metals</b>						
Antimony -DISS	UG/L	NA	NA	NA	NA	NA
Arsenic -DISS	UG/L	NA	NA	NA	NA	NA
Barium -DISS	UG/L	NA	NA	NA	NA	NA
Cadmium -DISS	UG/L	NA	NA	NA	NA	NA
Calcium -DISS	UG/L	NA	NA	NA	NA	NA
Chromium -DISS	UG/L	NA	NA	NA	NA	NA
Iron -DISS	UG/L	NA	NA	NA	NA	NA
Lead -DISS	UG/L	NA	NA	NA	NA	NA
Magnesium -DISS	UG/L	NA	NA	NA	NA	NA
Mercury -DISS	UG/L	NA	NA	NA	NA	NA
Nickel -DISS	UG/L	NA	NA	NA	NA	NA
Potassium -DISS	UG/L	NA	NA	NA	NA	NA
Selenium -DISS	UG/L	NA	NA	NA	NA	NA
Silver -DISS	UG/L	NA	NA	NA	NA	NA
Sodium -DISS	UG/L	NA	NA	NA	NA	NA
Thallium -DISS	UG/L	NA	NA	NA	NA	NA
<b>General Chemistry Parameters</b>						
Alkalinity (as CaCO3)	MG/L	NA	87.5	NA	NA	40.5
Alkalinity (Total)	MG/L	NA	190	NA	NA	391 J

Flags assigned during chemistry validation are shown

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Detection Limits shown are PQL

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## COMPREHENSIVE GROUNDWATER SAMPLING ROUND (NOVEMBER 1999) GROUNDWATER

Location ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Sample ID		MWN-10	MWN-11	MWN-11	MWN-12	MWN-12
Lab Sample ID		P24A 180	C9K040118001	P24A 176	C9K100121003	C9K100121003
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/03/99	11/03/99	11/03/99	11/03/99	11/09/99
Parameter	Units					
<b>General Chemistry Parameters</b>						
Chloride	MG/L	NA	38.1	NA	NA	147
Cyanide	MG/L	NA	0.10 J	NA	NA	0.010 UJ
Dissolved Oxygen	MG/L	NA	1.3	NA	NA	1.8
Field pH	S.U.	NA	11.6	NA	12.1	NA
Nitrate Nitrogen	MG/L	NA	0.10 U	NA	NA	0.10 U
Sulfate	MG/L	NA	133	NA	NA	331
Total Organic Carbon	MG/L	NA	4.4 J	NA	NA	3.4
Total Dissolved Solids	MG/L	NA	472	NA	NA	1,130
Total Organic Halogens	MG/L	NA	0.021 BJ	NA	NA	0.030 UJ
Total Recoverable Phenolics	MG/L	NA	0.020	NA	NA	0.0080
Turbidity	NTU	NA	9	NA	NA	1
Redox Potential	Millivolts	NA	-326	NA	NA	-310
Temperature	DEG C	NA	126	NA	NA	14.6
Specific Conductance	UMHOS/CM	NA	1,300	NA	NA	3,100
<b>Dissolved Gases</b>						
Carbon Dioxide	MG/L	0.60 U	NA	0.60 U	NA	NA
Carbon Monoxide	MG/L	0.40 U	NA	0.40 U	NA	NA
Methane	MG/L	8.7	NA	0.18 J	NA	NA
Nitrogen	MG/L	12.6	NA	17.4	NA	NA
Oxygen	MG/L	0.43	NA	0.58	NA	NA

Flags assigned during chemistry validation are shown.

Detection Limits shown are PQL

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## APPENDIX B

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GEOTECHNICAL BORING LOGS/ MONITORING WELL COMPLETION  
RECORDS / GROUNDWATER ELEVATION TABLES (RFI)

DATE

STARTED 9-5-90

FINISHED 9-5-90

SHEET 1 OF 2



SUBSURFACE LOG

BTA-90-133

HOLE NO. MWN-10

SURF. ELEV. 583.8

G.W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation  
Phase I Investigation

LOCATION Lackawanna Facility  
Lackawanna, New York

DEPTH	SAMPLES SAMPLE NO	BLOWS ON SAMPLER				PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
		0-6	6-12	12-18	18-N			
0							Black f-c SAND, some f-c Gravel, little Cinders, tr. slag (moist, FILL)	
5								
10								
15								
20	1	7	7		17		Gray CLAYEY SILT, little f. Sand, tr. gravel (moist-wet, medium)	
25		10	12					
30								
35								
40	2	40	100/3		REF		Contains some f-c Sand, little f-m Gravel, tr. wood, tr. broken rock (moist-wet, HARD)	Driller notes drilling becomes more difficult at 38.0' possible clay inter- face. REF=Split Spoon Refusal

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

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

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

DATE

STARTED 9-5-90

FINISHED 9-5-90

SHEET 2 OF 2



**SUBSURFACE LOG**  
( BTA-90-133 )

HOLE NO. MWN-10

SURF. ELEV. 583.8

G. W. DEPTH See Notes

PROJECT Bethlehem Steel Corporation  
Phase I Investigation

LOCATION Lackawanna Facility  
Lackawanna, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER				PID	SOIL OR ROCK CLASSIFICATION	NOTES
			0-6	6-12	12-18	N			
40									
45									
50									
53.0							Auger and Split Spoon Refusal at 53.0'		
54.0		3	100	0		REF	Boring Complete at 53.0'.		
55								Free Standing Water measured at 18.1' at boring completion. Free Standing Water measured at 6.0' on 9-11-90 at 9:20 am. Test boring open to 8.0'.	
60							Refer to Monitoring Well Completion Reports for Well Installation Details.		
65								Boring grouted to 21.0' upon 4-1/4" H.S.A. completion.	
70								PID=Organic vapor measurements taken with a photoionization detector (PID). Measurements recorded in parts per million (ppm).	
75								BG=Background PID measurements=0.0-0.2 ppm.	
80									

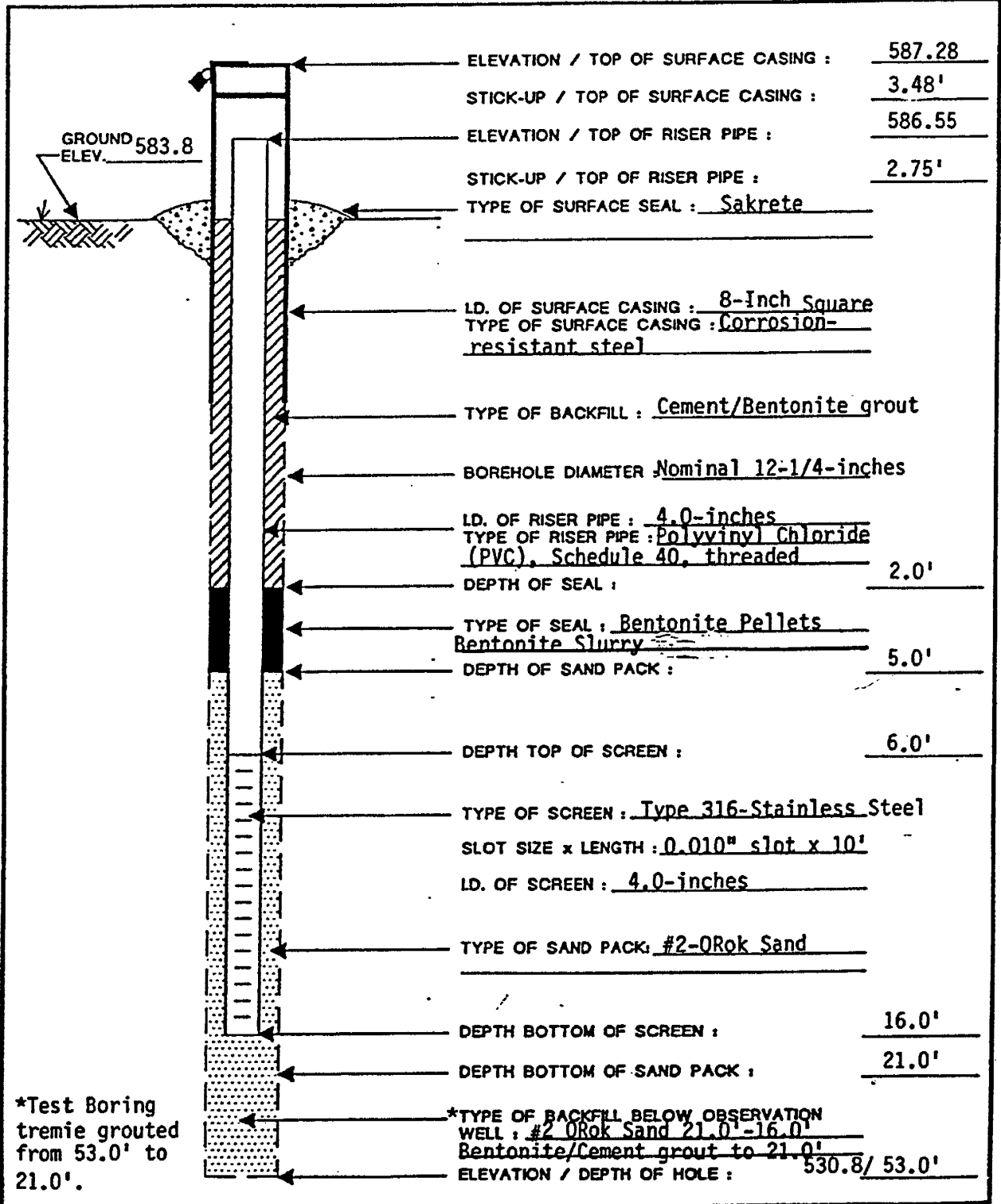
N = No blows to drive 2 " spoon 12 with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION Visual by

C = No blows to drive \_\_\_\_\_ " casing \_\_\_\_\_ " with \_\_\_\_\_ lb weight falling \_\_\_\_\_ "per blow. Onsite Geologist

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

## MONITORING WELL COMPLETION RECORD

PROJECT : <u>Bethlehem Steel</u>	WELL No. <u>M/N-10</u>	DRILLER : <u>J. Lamm</u>
PROJECT No. : <u>BIA-90-133</u>	LOCATION : <u>Lackawanna, N.Y.</u>	DRILLING METHOD : <u>ASTM-D-1586</u>
INSTALLATION DATE(S) : <u>9-11-90</u>		DEVELOPMENT METHOD : <u>Isco Pump</u>
FIELD GEOLOGIST : <u>D. Abrams</u>		





A PROFESSIONAL LIMITED PARTNERSHIP

**WELL DEVELOPMENT RECORD**

WELL No. MW-110

PROJECT : ISC - Phase 1 Investigation PROJECT No. : BTA-90-132 SITE LOCATION : Lackawanna, New York  
 CONTRACTOR : Empire Soils Investigations METHOD(S) OF DEVELOPMENT : Purged with ISCO Pump  
 FIELD INSPECTOR(S) : Sharon McLellan, 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...
11/29/90	Overcast, 30°-40°E, 10-25 mph NW winds	12:15	Initial = 8.56	11.7	11.8	1.50	12	Water clear, no odor	5 gallons removed
				11.8	11.3	1.54	7		10 gallons removed
				11.7	12.0	1.57	6		15 gallons removed
				11.7	11.7	1.58	4		20 gallons removed
				11.7	11.7	1.55	3.7		25 gallons removed
				11.7	11.9	1.54	3.5		30 gallons removed
				11.6	12.4	1.50	3.6		35 gallons removed
				11.6	12.5	1.50	3.5		40 gallons removed



# DAMES & MOORE

A PROFESSIONAL LIMITED PARTNERSHIP

## WELL DEVELOPMENT RECORD

PROJECT : BSC - Phase 1 Investigation PROJECT No. : BTA-90-133 SITE LOCATION : Lackawanna, New York  
 WELL No. : MWL-1110  
 CONTRACTOR : Empire Soils Investigations METHOD(S) OF DEVELOPMENT : Purged with ISCO Pump  
 FIELD INSPECTOR(S) : Sharon McLellan, Don Waringer,

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...
11/29/90				11.5	12.5	1.50	3.6		45 gallons removed
				11.5	12.6	1.51	3.6		50 gallons removed
		1:15	Final= 13.08						Final water level after development.

Note: 6.6g = one well volume



---

# APPENDIX C

---

## SITE-WIDE HEALTH AND SAFETY PLAN

---

**SITE HEALTH AND SAFETY PLAN  
for  
BROWNFIELD CLEANUP PROGRAM**

**ARCELORMITTAL TECUMSEH REDEVELOPMENT  
SITE**

**LACKAWANNA, NEW YORK**

---

March 2008

0071-007-350

**ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE  
SITE-WIDE HEALTH AND SAFETY PLAN**

**ACKNOWLEDGEMENT**

**Plan Reviewed by (initial):**

Corporate Health and Safety Director: \_\_\_\_\_

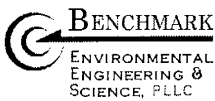
Project Manager: \_\_\_\_\_

Designated Site Safety and Health Officer: \_\_\_\_\_

**Acknowledgement:**

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

NAME (PRINT)	SIGNATURE	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____



**ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE  
SITE-WIDE HEALTH AND SAFETY PLAN**

**TABLE OF CONTENTS**

**1.0 INTRODUCTION ..... 1**

    1.1 General..... 1

    1.2 Background ..... 1

    1.3 Known and Suspected Environmental Conditions..... 3

    1.4 Parameters of Interest..... 4

    1.5 Overview of BCP Activities..... 4

**2.0 ORGANIZATIONAL STRUCTURE ..... 6**

    2.1 Roles and Responsibilities ..... 6

        2.1.1 Corporate Health and Safety Director..... 6

        2.1.2 Project Manager ..... 6

        2.1.3 Site Safety and Health Officer ..... 7

        2.1.4 Site Workers..... 8

        2.1.5 Other Site Personnel ..... 8

**3.0 HAZARD EVALUATION ..... 9**

    3.1 Chemical Hazards..... 9

    3.2 Physical Hazards..... 12

**4.0 TRAINING .....14**

    4.1 Site Workers ..... 14

        4.1.1 Initial and Refresher Training ..... 14

        4.1.2 Site Training..... 15

    4.2 Supervisor Training ..... 16

    4.3 Emergency Response Training..... 16

    4.4 Site Visitors..... 16

**5.0 MEDICAL MONITORING.....18**

**6.0 SAFE WORK PRACTICES ..... 20**

**7.0 PERSONAL PROTECTIVE EQUIPMENT ..... 22**

    7.1 Equipment Selection..... 22

    7.2 Protection Ensembles ..... 23

        7.2.1 Level A/B Protection Ensemble ..... 23

        7.2.2 Level C Protection Ensemble ..... 24

        7.2.3 Level D Protection Ensemble..... 24

        7.2.4 Recommended Level of Protection for Site Tasks ..... 25



**ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE  
SITE-WIDE HEALTH AND SAFETY PLAN**

**TABLE OF CONTENTS**

**8.0 EXPOSURE MONITORING..... 26**

    8.1 General..... 26

        8.1.1 On-Site Work Zone Monitoring..... 26

        8.1.2 Off-Site Community Air Monitoring..... 26

    8.2 Monitoring Action Levels ..... 27

        8.2.1 On-Site Work Zone Action Levels ..... 27

        8.2.2 Community Air Monitoring Action Levels..... 29

**9.0 SPILL RELEASE/RESPONSE ..... 33**

    9.1 Potential Spills and Available Controls ..... 33

    9.2 Initial Spill Notification and Evaluation ..... 34

    9.3 Spill Response ..... 35

    9.4 Post-Spill Evaluation..... 36

**10.0 HEAT/COLD STRESS MONITORING ..... 37**

    10.1 Heat Stress Monitoring..... 37

    10.2 Cold Stress Monitoring..... 39

**11.0 WORK ZONES AND SITE CONTROL..... 42**

**12.0 DECONTAMINATION ..... 44**

    12.1 Decontamination for TurnKey-Benchmark Employees ..... 44

    12.2 Decontamination for Medical Emergencies ..... 45

    12.3 Decontamination of Field Equipment ..... 45

**13.0 CONFINED SPACE ENTRY ..... 46**

**14.0 FIRE PREVENTION AND PROTECTION..... 47**

    14.1 General Approach..... 47

    14.2 Equipment and Requirements ..... 47

    14.3 Flammable and Combustible Substances..... 47

    14.4 Hot Work..... 47

**15.0 EMERGENCY INFORMATION ..... 48**

**16.0 REFERENCES..... 49**



**ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE  
SITE-WIDE HEALTH AND SAFETY PLAN**

**TABLE OF CONTENTS**

**LIST OF TABLES**

---

Table 1	Constituents of Potential Concern
Table 2	Toxicity Data for Constituents of Potential Concern
Table 3	Potential Routes of Exposure to Constituents of Potential Concern
Table 4	Required Levels of Protection for BCP Investigation and Remedial Activities

**LIST OF FIGURES**

---

Figure 1	Site Vicinity and Location Map
Figure 2	Site Map

**APPENDICES**

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Appendix A	Emergency Response Plan
Appendix B	Hot Work Permit Form
Appendix C	NYSDOH Generic Community Air Monitoring Plan

## 1.0 INTRODUCTION

### 1.1 General

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

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

### 1.2 Background

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

The Tecumseh property is located on a portion of the Site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was

formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). According to the Real Estate Records, in 1937, Bethlehem Steel Company owned the subject Site. In 1964, Bethlehem Steel Company merged into Bethlehem Steel Corporation. Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in January 2005. In August 2006, USEPA approved the RFI and terminated Bethlehem Steel's (and in turn Tecumseh's) obligation under the 1990 Administrative Order. Tecumseh is presently negotiating an Order on Consent with the New York State Department of Environmental Conservation (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.

In April 2005, Tecumseh signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote redevelopment of the former BSC Lackawanna property following cleanup. Tecumseh has entered into Brownfield Cleanup Agreements (BCAs) with the NYSDEC to investigate, remediate, and redevelop the Phase I, II and III Business Parks. The BCP application for the Phase IA Business Park was submitted to NYSDEC and deemed complete in August 2007; the BCA is pending.

In August 2006, USEPA approved the RFI and terminated Bethlehem Steel's (and in turn Tecumseh's) obligation under the 1990 Administrative Order. Tecumseh is presently negotiating an Order on Consent with the NYSDEC to undertake corrective measures at certain SWMUs primarily on the western slag fill and coke manufacturing portion of the property. The Phase I Business Park Area encompasses approximately 102 acres, and is presently in the final stages of a Remedial Investigation and Alternatives Analysis Report (RI/AAR). The Phase IA Business Park encompasses approximately 12.9 acres to the west of the Phase I Business Park. The RI/AAR Work Plan and associated documents for the Phase IA Business Park were submitted to the NYSDEC in January 2008. Separate RI/AAR Work Plans are currently being prepared for the Phase II Business Park Area (approximately 173 acres) and the Phase III Business Park Area (approximately 93.4 acres).



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 29 acres of the Tecumseh property, referred to as the “Steel Winds Site.” This 29-acre parcel, located along the Lake Erie shoreline, was investigated and has undergone final remedial measures under the NY State Brownfield Cleanup Program. Eight wind turbines and supporting power generation equipment and infrastructure are presently operating on this parcel.

Consistent with the Redevelopment Master Plan, BQ Energy, LLC has submitted applications to the NYSDEC for participation in the Brownfield Cleanup Program for construction of wind turbines on two additional parcels. BQ Energy is proposing construction of two additional wind turbines to the north of the existing eight turbines on an approximate 9.33-acre parcel, referred to as Steel Winds IA. The Steel Winds IA Site is part of an existing lease agreement between ArcelorMittal Tecumseh Redevelopment, Inc and BQ Energy, LLC. The project has been subjected to SEQRA review and has been issued a negative declaration by the City of Lackawanna, the lead agency for the project. In addition, BQ Energy intends to construct eight turbines along the western boundary of the Phase III Business Park Area of the Tecumseh property. These additional turbines will occupy an approximate 55.47-acre parcel deemed “Steel Winds II.” The Steel Winds II BCP Site will extend along the full length of the western boundary of Phase III Business Park. As the Phase III Business Park is already in the BCP, the Steel Winds II BCP application “carved out” or reassigned this portion of the Phase III Business Park to BQ Energy, LLC for the express purpose of expediting the RI/AAR and expanding the wind farm on this portion of the site under the BCP. A Brownfield Cleanup Agreement (BCA) was signed for the Steel Winds II Site on March 27, 2008.

### 1.3 Known and Suspected Environmental Conditions

The Phase I, IA, II, and III Business Park Areas were formerly used to house portions of BSC's steel making operations. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as semi-volatile and volatile organic compounds (SVOCs and VOCs). In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX) in groundwater.

## 1.4 Parameters of Interest

Constituents of potential concern (COPCs) at the 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 base-neutral semi-volatile organic compounds (SVOCs) from oils, greases, and fuels associated with the operation of locomotive engines, steel mills, petroleum bulk storage, and other historic steel manufacturing operations. Specifically, polynuclear aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Although PAHs are commonly found in urban soil environments, they may be present at the Site at concentrations that are elevated compared to typical “background” levels. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned.
- **Polychlorinated Biphenyls (PCBs)** – The potential impact of surface and subsurface soils by PCBs in discrete areas associated with former substations, rail yards, and hydraulic pump houses.
- **Inorganic Compounds** – Inorganic COPCs potentially present at elevated concentrations due to steel making activities may include arsenic, cadmium, chromium, lead, and mercury. Several of these parameters are components of coke and slag which are prevalent in the planned work area.

In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX).

## 1.5 Overview of BCP Activities

TurnKey-Benchmark personnel will be on-site to observe BCP investigation and remedial activities. General field activities to be completed are described below. Detailed BCP activities are more fully described in the individual work plans for each property.

1. **Soil/Fill Excavation:** TurnKey-Benchmark will monitor all soil/fill excavations (e.g., wind turbine foundation excavation, test pit investigations) and related activities to visually inspect soil/fill for evidence of contamination.
2. **Soil/Fill Documentation Sampling:** TurnKey-Benchmark will collect surface and subsurface soil/fill documentation samples following excavation.
3. **Surface Water Management:** During excavation, surface water and/or perched groundwater infiltration may occur. TurnKey-Benchmark will direct the contractor to collect and characterize the surface water for proper disposal.
4. **Subgrade Work:** Significant grading of the Site may be required before implementation of remedial measures (e.g., cover system placement).
5. **Cover Soil Placement:** A soil cover system will be placed over select portions of the Site to reduce potential contact with impacted soil/fill. TurnKey-Benchmark will oversee installation of the cover system.
6. **Groundwater Monitoring Well Installation and Sampling:** TurnKey-Benchmark will install groundwater monitoring wells and collect samples for the long-term groundwater monitoring program.
7. **Groundwater Remediation:** TurnKey-Benchmark personnel will oversee the potential groundwater remediation at the Site, which may include installation of treatment (ORC/HRC) filter socks in groundwater monitoring wells.

## 2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility, and communication as they pertain to health and safety functions at the 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, P.E.* The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates TurnKey-Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

#### 2.1.2 Project Manager

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

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

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

### 2.1.3 Site Safety and Health Officer

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

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

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

#### 2.1.4 Site Workers

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

#### 2.1.5 Other Site Personnel

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

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

### 3.0 HAZARD EVALUATION

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

#### 3.1 Chemical Hazards

As discussed in Section 1.3, historic activities related to the former steel-manufacturing operations and facilities have resulted in elevated concentrations of VOCs, SVOCs, PCBs, and inorganic compounds in Site soils and groundwater. Table 1 identifies maximum concentrations of COPCs detected throughout the Tecumseh property. Table 2 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent constituents of potential concern and related health and safety guidance and criteria are provided below.

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

- **Benzene (CAS # 71-43-2)** poisoning occurs most commonly through inhalation of the vapor; however, benzene can also penetrate the skin and poison in that way. Locally, benzene has a comparatively strong irritating effect, producing erythema and burning and, in more severe cases, edema and blistering. Exposure to high concentrations of the vapor (i.e., 3,000 ppm or higher) may result in acute poisoning characterized by the narcotic action of benzene on the central nervous system. In acute poisoning, symptoms include confusion, dizziness, tightening of the leg muscles, and pressure over the forehead. Chronic exposure to benzene (i.e., long-term exposure to concentrations of 100 ppm or less) may lead to damage of the blood-forming system. Benzene is very flammable when exposed to heat or flame and can react vigorously with oxidizing materials.
- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.
- **Chromium (CAS # 7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.
- **Ethylbenzene (CAS # 100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin liver and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, headache. Narcosis and coma may result in more severe cases.
- **Lead (CAS # 7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists or ankles and possibly affect memory. Lead may cause anemia.
- **Mercury (CAS # 7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Over-exposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue and salivation. Mercury is a skin and eye irritant.



- **Naphthalene (CAS # 91-20-3)** is a white solid with a strong smell; is also called mothballs, moth flakes, white tar, and tar camphor. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned. Acute exposure to naphthalene can cause systemic reactions, including nausea, headache, diaphoresis, hematuria, fever, anemia, liver damage, vomiting, convulsions, and coma. Acute exposure can also cause eye irritation, confusion, excitement, malaise, abdominal pain, irritation to the bladder, profuse sweating, jaundice, hematopoietic, hemoglobinuria, renal shutdown, and dermatitis. Exposure to a large amount of naphthalene can cause red blood cells to be damaged or destroyed, a condition called hemolytic anemia, which leads to fatigue, lack of appetite, restlessness, and a pale appearance. Poisoning may occur by ingestion of large doses, skin and/or eye contact, inhalation, or skin absorption.
- **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAHs are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.
- **Polynuclear Chlorinate Biphenyls (PCBs)** are associated with former substations, rail yards, and hydraulic pump houses on the Site. PCBs can be absorbed into the body by inhalation of its aerosol, through the skin, and by ingestion. Repeated or prolonged contact with skin may cause dermatitis. PCBs may have effects on the liver. Animal tests show that PCBs possibly cause toxic effects in human reproduction. In the food chain, bioaccumulation takes place, specifically in aquatic organisms. A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

- Toluene (CAS # 108-88-3) is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.
- Xylenes (o, m, and p) (CAS # 95-47-6, 108-38-3, and 106-42-3) are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure of high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

With respect to the anticipated BCP activities discussed in Section 1.5, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

### 3.2 Physical Hazards

BCP investigation and remedial activities at the Tecumseh site may present the following physical hazards:

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

These hazards represent only some of the possible means of injury that may be present during investigation and remedial activities at the Site. Since it is impossible to list all

potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

## 4.0 TRAINING

### 4.1 Site Workers

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

#### 4.1.1 Initial and Refresher Training

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

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

- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

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

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

#### **4.1.2 Site Training**

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

- Names of personnel and alternates responsible for site safety and health.
- Safety, health and other hazards present on the Site.
- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.

- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.
- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

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

#### **4.2 Supervisor Training**

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

#### **4.3 Emergency Response Training**

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

#### **4.4 Site Visitors**

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

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

## 5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to TurnKey-Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all TurnKey-Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, 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 purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).
- Medical certification of physical requirements (i.e., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.



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

## 6.0 SAFE WORK PRACTICES

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

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

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

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

## 7.0 PERSONAL PROTECTIVE EQUIPMENT

### 7.1 Equipment Selection

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

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

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.
- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.
- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.
- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

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

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

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

## 7.2 Protection Ensembles

### 7.2.1 Level A/B Protection Ensemble

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

The recommended PPE for level A/B is:

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

### 7.2.2 Level C Protection Ensemble

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

Recommended PPE for Level C conditions includes:

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

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

### 7.2.3 Level D Protection Ensemble

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

Recommended PPE for Level D includes:

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

#### **7.2.4 Recommended Level of Protection for Site Tasks**

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

## 8.0 EXPOSURE MONITORING

### 8.1 General

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

#### 8.1.1 On-Site Work Zone Monitoring

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

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

#### 8.1.2 Off-Site Community Air Monitoring

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

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



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

## 8.2 Monitoring Action Levels

### 8.2.1 On-Site Work Zone Action Levels

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

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID -

Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

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

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

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

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

- Less than 50  $\mu\text{g}/\text{m}^3$  - Continue field operations.
- 50-150  $\mu\text{g}/\text{m}^3$  - Don dust/particulate mask or equivalent
- Greater than 150  $\mu\text{g}/\text{m}^3$  - 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):

- o **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.

o **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**

- If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.
- If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).
- If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the *Major Vapor Emission Response Plan* (see below) will automatically be placed into effect.

o ***Major Vapor Emission Response Plan:***

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.
2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.
3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the SSHO.

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

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

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

o **EXPLOSIVE VAPORS:**

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

o **Airborne Particulate Community Air Monitoring**

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

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

are successful in reducing the downwind PM-10 particulate concentration to within 150  $\mu\text{g}/\text{m}^3$  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, countermeasures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

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

## 9.1 Potential Spills and Available Controls

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

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

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

- The potential for a “harmful quantity” of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes that could form a visible sheen on the water or violate applicable water quality standards.
- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.
- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

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

## 9.2 Initial Spill Notification and Evaluation

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

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



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

### 9.3 Spill Response

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

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

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

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

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Op-Tech: (716) 873-7680
- AAA Environmental (585) 750-2811

#### 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 next 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.

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

## 14.0 FIRE PREVENTION AND PROTECTION

### 14.1 General Approach

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

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

### 14.2 Equipment and Requirements

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

### 14.3 Flammable and Combustible Substances

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

### 14.4 Hot Work

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

## 15.0 EMERGENCY INFORMATION

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

## 16.0 REFERENCES

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

---

# TABLES

---





TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan  
 ArcelorMittal Tecumseh Redevelopment, Inc.  
 Lackawanna, New York

Parameter <sup>1</sup>	CAS No.	Maximum Detected Concentration <sup>2</sup>			
		Groundwater <sup>3</sup> (mg/L)	Surface Soil/Fill (mg/kg)	Sub-Surface Soil/Fill (mg/kg)	LNAPL (mg/kg)
<b>Volatiles Organic Compounds (VOCs):</b>					
Benzene	71-43-2	570	0.0047	2800	14,000
Ethylbenzene	100-41-4	25	Not 4	170	4,600
Toluene	108-88-3	77	0.001	1700	5,700
Xylene, Total	1330-20-7	390	0.0017	1100	31,000
<b>Polycyclic Aromatic Hydrocarbons (PAHs):</b>					
Acenaphthene	83-32-9	0.36	Not 4	Not 4	400
Acenaphthylene	208-96-8	0.09	Not 4	Not 4	570
Anthracene	120-12-7	0.27	0.23	Not 4	240
Benz(a)anthracene	56-55-3	0.28	0.7	Not 4	27
Benzo(a)pyrene	50-32-8	0.23	0.56	Not 4	ND
Benzo(b)fluoranthene	205-99-2	0.069	0.86	Not 4	12
Benzo(ghi)perylene	191-24-2	0.033	0.35	Not 4	ND
Benzo(k)fluoranthene	207-08-9	0.071	0.38	Not 4	ND
Chrysene	218-01-9	0.26	0.67	Not 4	17
Dibenz(ah)anthracene	53-70-3	0.022	0.08	Not 4	ND
Fluoranthene	206-44-0	0.76	1.3	Not 4	200
Fluorene	86-73-7	1.7	Not 4	Not 4	9,600
Indeno(1,2,3-cd)pyrene	193-39-5	0.04	0.36	Not 4	ND
Naphthalene	91-20-3	280	0.29	1100	49,000
Phenanthrene	85-01-8	0.94	0.87	Not 4	800
Pyrene	129-00-0	0.41	0.87	Not 4	220
<b>Inorganic Compounds:</b>					
Arsenic	7440-38-2	70.6	30.5	17.7	28.2
Cadmium	7440-43-9	20.6	9.7	3.7	0.03
Chromium	7440-47-3	306	1190	508	1.7
Lead	7439-92-1	26.3	160	224	0.34
Mercury	7439-97-6	0.22	4.2	0.99	ND
<b>Polychlorinated Biphenyls (PCBs):</b>					
Aroclor 1242	53469-21-9	Not 4	Not 4	Not 4	2
Aroclor 1260	11096-82-5	Not 4	Not 4	Not 4	3.3

Notes:

1. Constituents were identified as parameters of interest during the RFI for the Benzol Plant Tank Storage Area (SWMU P-11).
2. Maximum detected concentrations as presented in the Final RFI Report for the Benzol Plant Tank Storage Area (SWMU P-11), and as presented in the Final \_\_\_\_\_ for the Steel Winds Site.
3. Groundwater analytical data collected from the Coke Oven Area of the Former Bethlehem Steel Lackawanna Coke Division Site.
4. Compounds with a detection frequency greater than 5% and a maximum concentration greater than the screening criteria were retained as potential parameters of interest during the RFI (Reference 1).

Acronyms:

- NA = Not analyzed.
- ND = Parameter not detected above method detection limits.



TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan  
ArcelorMittal Tecumseh Redevelopment Site  
Lackawanna, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits <sup>1</sup>		
				PEL	TLV	IDLH
<b>Volatile Organic Compounds (VOCs): ppm</b>						
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
<b>Polycyclic Aromatic Hydrocarbons (PAHs)<sup>2</sup>: ppm</b>						
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	--	--	--
<b>Polychlorinated Inorganic Compounds: mg/m<sup>3</sup></b>						
Aroclor 1242	Chlorodiphenyl, 42% chlorine	53469-21-9	Ca	--	--	--
Aroclor 1260	Chlorodiphenyl, 60% chlorine	11096-82-5	none	--	--	--
<b>Inorganic Compounds: mg/m<sup>3</sup></b>						
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 concentration allowable for 8 hours per day @ 40 hours per week



TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO  
CONSTITUENTS OF POTENTIAL CONCERN

Site-Wide Health and Safety Plan  
ArcelorMittal Tecumseh Redevelopment Site  
Lackawanna, New York

Activity <sup>1</sup>	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
1. Soil/Fill Excavation	x	x	
2. Soil/Fill Documentation Sampling	x	x	
3. Surface Water Management			x
4. Slag/Fill Subgrade Preparation	x	x	
5. Cover Soil Placement	x	x	
6. Groundwater Monitoring Well Installation/Sampling	x	x	x
7. Groundwater Remediation	x	x	x

Notes:

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

**TABLE 4**  
**REQUIRED LEVELS OF PROTECTION**  
**FOR BCP INVESTIGATION AND REMEDIAL ACTIVITIES**

**Site-Wide Health and Safety Plan**  
**ArcelorMittal Tecumseh Redevelopment Site**  
**Lackawanna, New York**

Activity	Respiratory Protection <sup>1</sup>	Clothing	Gloves <sup>2</sup>	Boots <sup>2,3</sup>	Other Required PPE/Modifications <sup>2,4</sup>
1. Soil/Fill Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
2. Soil/Fill Documentation Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
3. Surface Water Management	Level D (upgrade to Level C if necessary)	Poly-coated Tyvek or S	L/N	outer: L inner: STSS	HH SGSS
4. Slag/Fill Subgrade Preparation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
5. Cover Soil Placement	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
6. Groundwater Monitoring Well Installation/Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
7. Groundwater Remediation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS

**Notes:**

- Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equipped with organic compound/acid gas/dust cartridge.
- HH = hardhat; L = Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with shields; STSS = steel toe safety shoes.
- 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.
- 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.

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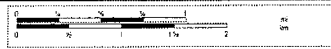
# FIGURES

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FIGURE 1



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www.delorme.com



726 EXCHANGE STREET  
SUITE 624  
BUFFALO, NEW YORK 14210  
(716) 856-635

## SITE LOCATION AND VICINITY MAP

PHASE III BUSINESS PARK AREA  
LACKAWANNA, NEW YORK

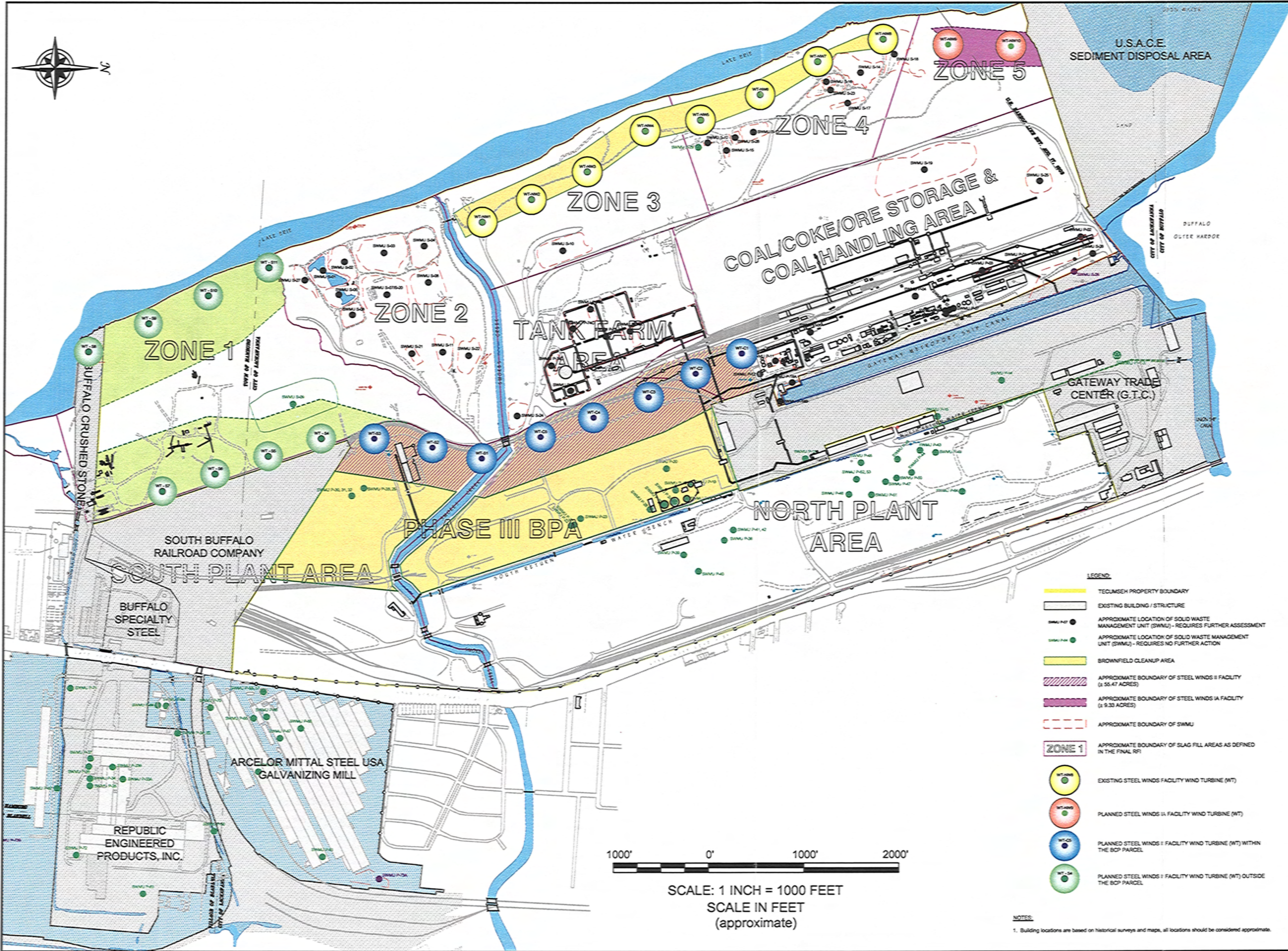
PREPARED FOR  
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

PROJECT NO.: 0071-007-300

DATE: JANUARY 2008

DRAFTED BY: NIM

E.L.P.A.T.



- LEGEND:**
- TECUMSEH PROPERTY BOUNDARY
  - EXISTING BUILDING / STRUCTURE
  - APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - REQUIRES FURTHER ASSESSMENT
  - APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - REQUIRES NO FURTHER ACTION
  - BROWNFIELD CLEANUP AREA
  - APPROXIMATE BOUNDARY OF STEEL WINDS II FACILITY (± 55.47 ACRES)
  - APPROXIMATE BOUNDARY OF STEEL WINDS IA FACILITY (± 9.33 ACRES)
  - APPROXIMATE BOUNDARY OF SWMU
  - APPROXIMATE BOUNDARY OF SLAG FILL AREAS AS DEFINED IN THE FINAL RFI
  - EXISTING STEEL WINDS FACILITY WIND TURBINE (WT)
  - PLANNED STEEL WINDS II FACILITY WIND TURBINE (WT)
  - PLANNED STEEL WINDS I FACILITY WIND TURBINE (WT) WITHIN THE BCP PARCEL
  - PLANNED STEEL WINDS I FACILITY WIND TURBINE (WT) OUTSIDE THE BCP PARCEL

**NOTES:**  
1. Building locations are based on historical surveys and maps, all locations should be considered approximate.

1000' 0' 1000' 2000'  
SCALE: 1 INCH = 1000 FEET  
SCALE IN FEET  
(approximate)

**SITE PLAN**  
SITE-WIDE HEALTH AND SAFETY PLAN  
ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE  
LACKAWANNA, NEW YORK

PREPARED FOR  
TECUMSEH REDEVELOPMENT, INC.

**BENCHMARK**  
720 EXCHANGE STREET  
SUITE 624  
BUFFALO, NEW YORK 14210  
(716) 866-0599  
ENVIRONMENTAL  
ENGINEERING &  
SCIENCE, PLLC

JOB NO.: 0071-007-350

**FIGURE 2**

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# APPENDIX A

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## EMERGENCY RESPONSE PLAN





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**EMERGENCY RESPONSE PLAN  
for  
BROWNFIELD CLEANUP PROGRAM**

**ARCELORMITTAL TECUMSEH  
REDEVELOPMENT SITE**

**LACKAWANNA, NEW YORK**

---

March 2008

0071-007-350

ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE  
SITE-WIDE HEALTH AND SAFETY PLAN  
APPENDIX A: EMERGENCY RESPONSE PLAN

TABLE OF CONTENTS

1.0 GENERAL ..... 1

2.0 PRE-EMERGENCY PLANNING ..... 2

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT ..... 3

4.0 EMERGENCY PLANNING MAPS..... 4

5.0 EMERGENCY CONTACTS..... 5

6.0 EMERGENCY ALERTING & EVACUATION..... 6

7.0 EXTREME WEATHER CONDITIONS..... 8

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID..... 9

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING.....10

10.0 EMERGENCY RESPONSE TRAINING ..... 11

LIST OF FIGURES

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Figure A-1 Hospital Route Map



## 1.0 GENERAL

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

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

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

## 2.0 PRE-EMERGENCY PLANNING

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

### Type of Emergency:

1. Medical, due to physical injury
2. Fire

### Source of Emergency:

1. Slip/trip/fall
2. Fire

### Location of Source:

1. Non-specific

### 3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

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

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

Emergency Equipment	Quantity	Location
Spill Response Kit	2	Benzol Yard ICM Treatment Building; Wastewater Treatment Plant Garage (Phase III parcel)
First Aid Kit	3	Site Vehicle; Benzol Yard ICM Treatment Building; Field Office in Coke Oven Office Building
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

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

## 4.0 EMERGENCY PLANNING MAPS

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

## 5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

### Emergency Telephone Numbers:

**Project Manager: *Patrick T. Martin***

Work: (716) 856-0599

Mobile: (716) 867-2860

**Corporate Health and Safety Director: *Thomas H. Forbes***

Work: (716) 856-0599

Mobile: (716) 864-1730

**Site Safety and Health Officer (SSHO): *Richard L. Dubisz***

Work: (716) 856-0635

Mobile: (716) 998-4334

**Alternate SSHO: *Thomas Behrendt***

Work: (716) 856-0635

Mobile: (716) 818-8358

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

### The Site location is:

ArcelorMittal Tecumseh Redevelopment, Inc

1951 Hamburg Turnpike

Lackawanna, New York 14218

Site Phone Number: (Insert Cell Phone or Field Trailer): \_\_\_\_\_

## 6.0 EMERGENCY ALERTING & EVACUATION

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

- 1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site evacuation.
- 2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

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



site. If any worker cannot be accounted for, notification is given to the SSHO (*Thomas Behrendt* or *Richard Dubisz*) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

## 7.0 EXTREME WEATHER CONDITIONS

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

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

## 8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

### Personnel Exposure:

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

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

### Personal Injury:

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

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

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

The following directions describe the best route to Mercy Hospital:

- From Gate 2, proceed onto the Hamburg Turnpike (SR 5).
- Proceed east on Hamburg Turnpike (SR 5) to the Tifft Street Exit and turn right onto Tifft Street.
- Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.
- Turn right on Abbott Road and Mercy Hospital will be on right hand side. Follow signs to emergency room (ER).

## 9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

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

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

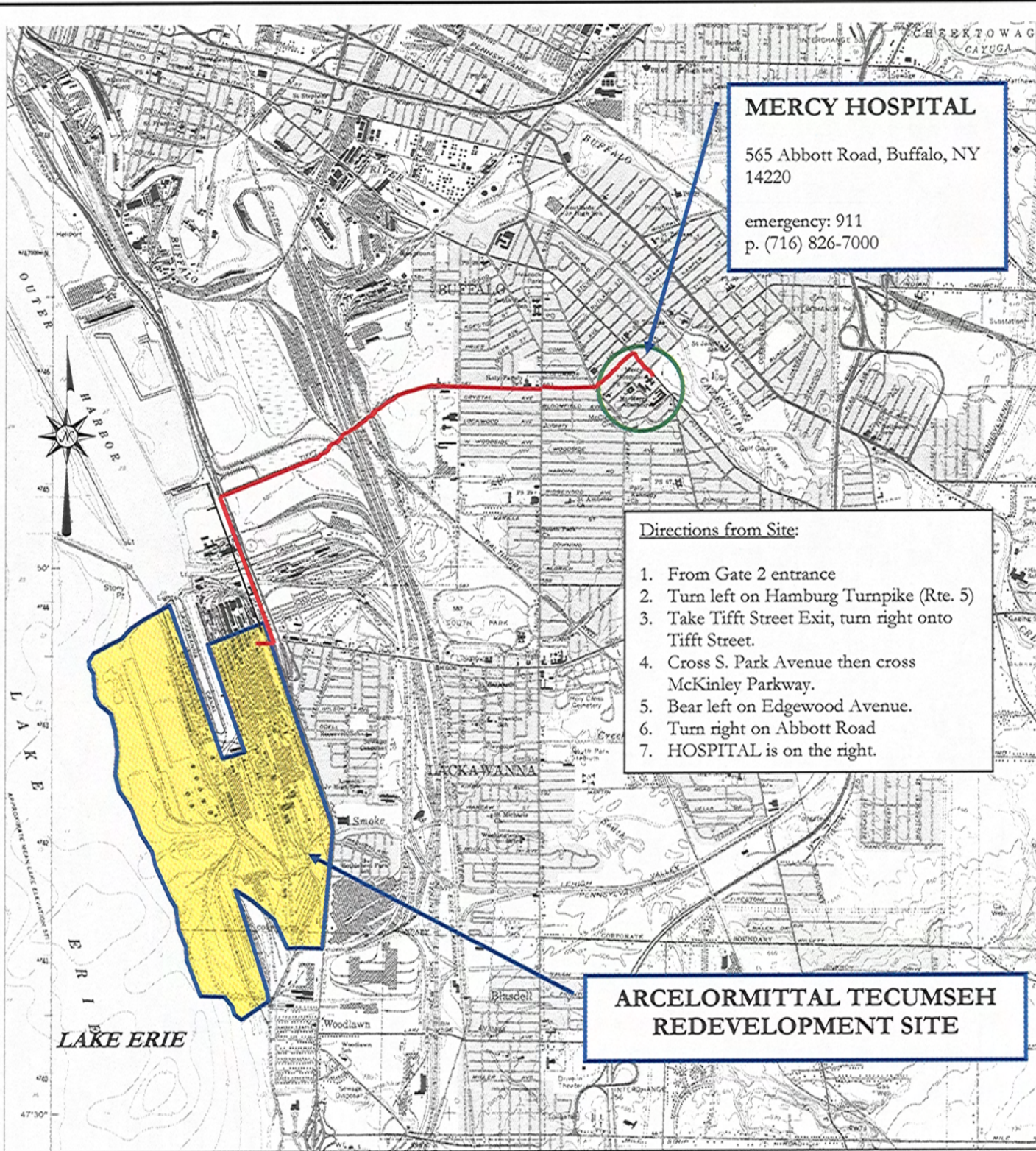
## 10.0 EMERGENCY RESPONSE TRAINING

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

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# FIGURES

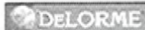
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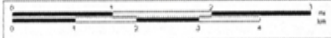
**MERCY HOSPITAL**  
 565 Abbott Road, Buffalo, NY  
 14220  
 emergency: 911  
 p. (716) 826-7000

- Directions from Site:
1. From Gate 2 entrance
  2. Turn left on Hamburg Turnpike (Rte. 5)
  3. Take Tiftt Street Exit, turn right onto Tiftt Street.
  4. Cross S. Park Avenue then cross McKinley Parkway.
  5. Bear left on Edgewood Avenue.
  6. Turn right on Abbott Road
  7. HOSPITAL is on the right.

**ARCELORMITTAL TECUMSEH REDEVELOPMENT SITE**



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 www.delorme.com



FILEPATH\F\TurnKey\Clients\Tecumseh Redevelopment\Brownfield Cleanup Program (BCP)\Site-Wide HASP\CAD\Figure A-1j, hospital route map.dwg



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

**HOSPITAL ROUTE MAP**  
 SITE-WIDE HEALTH AND SAFETY PLAN (HASP)  
 ARCELOR MITTAL TECUMSEH REDEVELOPMENT SITE  
 LACKAWANNA, NEW YORK

PREPARED FOR  
 TECUMSEH REDEVELOPMENT, INC.

PROJECT NO.: 0071-007-350

DATE: JANUARY 2008

DRAFTED BY: AJZ

---

# APPENDIX B

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

Other precautions:

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

## SIGNATURES

Originating Employee:

Date:

Project Manager:

Date:

Part 2 Approval:

Date:

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# APPENDIX C

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## 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 ( $\text{mcg}/\text{m}^3$ ) 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  $\text{mcg}/\text{m}^3$  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  $\text{mcg}/\text{m}^3$  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  $\text{mcg}/\text{m}^3$  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.

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# APPENDIX D

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## CITIZEN PARTICIPATION PLAN



New York State Department of Environmental Conservation

## **Brownfield Cleanup Program**

### **Citizen Participation Plan for ArcelorMittal Tecumseh Redevelopment, Inc. Phase III Business Park**

Site # (C915199)  
1951 Hamburg Turnpike  
Lackawanna  
Erie County, New York

January 2008

## Contents

<u>Section</u>	<u>Page Number</u>
1. What is New York’s Brownfield Cleanup Program? .....	2
2. Citizen Participation Plan Overview .....	2
3. Site Information .....	4
4. Remedial Process .....	6
5. Citizen Participation Activities .....	8
6. Major Issues of Public Concern .....	9
Appendix A – Site Location Map .....	9
Appendix B – Project Contacts and Document Repositories .....	10
Appendix C – Brownfield Site Contact List.....	11
Appendix D – Identification of Citizen Participation Activities .....	21
Appendix E – Brownfield Cleanup Program Process.....	22

\* \* \* \* \*

**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: ArcelorMittal Tecumseh Redevelopment, Inc. (“Applicant”)  
Site Name: Phase III Business Park (“Site”)  
Site Number: C915199  
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.<sup>1</sup> 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.ny.gov/chemical/8450.html](http://www.dec.ny.gov/chemical/8450.html)

## 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.

---

<sup>1</sup> “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 Phase III Business Park Area is an approximate 93.3-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 property is located on the site of the former Bethlehem Steel Corporation (BSC)

Lackawanna Works in a primarily industrial area of the City. Tecumseh Redevelopment, Inc. acquired the property, along with other BSC assets, out of bankruptcy in 2003. The surrounding properties to the north, west, and south of the Site are industrial. The property uses east of the Site (east of Route 5) are primarily industrial, commercial, and vacant. A site location map is included as Appendix A.

### *Site History*

The ArcelorMittal 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.

The Phase III Business Park Area Site is generally characterized as a flat area covered by sparse brush and low lying vegetation. The Site is transected by Smoke Creek (though not included in the Site), and the South Return Water Trench buffer along the eastern boundary to the north of Smokes Creek. The Site contains no discernable features, except for the remaining buildings of the former WQCS No. 3, former slag-filled access roads, electrical power lines, and railroad tracks.

### *Environmental History*

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of all solid waste management units (SWMUs) located within the 1,100-acre parcel was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in October 2004. USEPA and the New York State Department of Environmental Conservation (NYSDEC) are reviewing the RFI for completion. A number of SWMUs are present on the Tecumseh property; however, none were identified on the Phase IA Business Park Area.

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 property following cleanup. The conceptual redevelopment plans for the entire 1,100-acre site incorporates a Business Park area along NYS Route 5. Phase I of the Business Park, encompassing approximately 102 acres, will be completed first. The Phases II and III Business Park Areas, encompassing approximately 173 and 93 acres, respectively, will follow. The Phase IA Business Park encompasses approximately 12.9 acres to the west of the Phase I Business Park. The Phase IA area will likely undergo redevelopment concurrent with or soon after the Phase I Business Park Area.

Tecumseh is currently pursuing an agreement with the NYSDEC under the BCP to investigate and, if necessary, remediate the property for future development as a commercial/light industrial business park.

#### **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-Wide 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 in a timely fashion and coordinated with remedial measures on other Business Park areas to assure maximum opportunity for redevelopment.

## Appendix A – Site Location Map

## 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

Mr. Mark Batezhold  
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

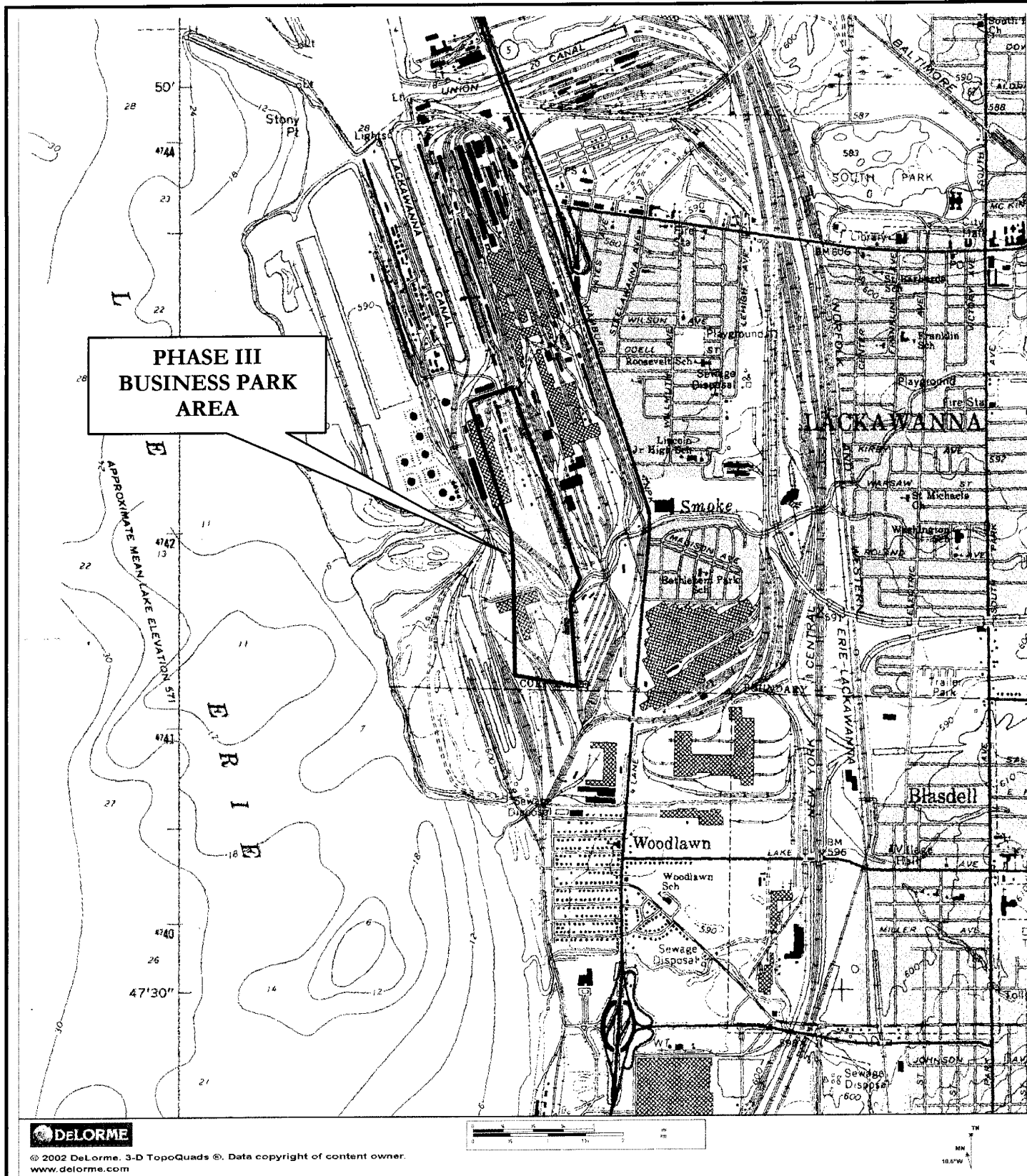
The document repositories identified below have been established to provide the public with convenient access to important project documents:

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: Mr. Mark Batezhold  
Phone: (716) 851-7220  
Hours: M-F 8:30-4:45  
(Call for appointment)



FIGURE 1



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www.delorme.com



726 EXCHANGE STREET  
SUITE 624  
BUFFALO, NEW YORK 14210  
(716) 856-635

### SITE LOCATION AND VICINITY MAP

PHASE III BUSINESS PARK AREA  
LACKAWANNA, NEW YORK

PREPARED FOR  
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

PROJECT NO.: 0071-007-300

DATE: JANUARY 2008

DRAFTED BY: NTM

FILEPATH:

## Appendix C – Brownfield Site Contact List

### New York State Contacts

Director Abby Snyder  
N.Y.S. D.E.C., Region 9  
270 Michigan Avenue  
Buffalo, NY 14203

Mr. Maurice Moore  
N.Y.S. D.E.C., Region 9  
270 Michigan Avenue  
Buffalo, NY 14203

Mr. Stan Radon  
N.Y.S. D.E.C., Region 9  
270 Michigan Avenue  
Buffalo, NY 14203

Mr. Mark Batezhold  
N.Y.S. D.E.C., Region 9  
270 Michigan Ave.  
Buffalo, N.Y 14203

Mr. Cameron O'Connor  
N.Y.S. D.O.H.  
584 Delaware Avenue  
Buffalo, NY 14202

Senator Charles Schumer  
U.S. Senate, Suite 660  
130 South Elmwood Avenue  
Buffalo, NY 14202

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

## **Appendix C – Brownfield Site Contact List**

### **New York State Contacts**

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

Congressman Brian Higgins  
Larkin Building, Suite 601  
726 Exchange Street  
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 Contacts**

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

Honorable Christopher Collins  
Erie County Executive  
95 Franklin Street  
Buffalo, NY 14202

## Appendix C – Brownfield Site Contact List

### **Erie County Contacts**

Commissioner Holly A. Sinnott  
Erie Co. Environment & Plan.  
95 Franklin Street  
Buffalo, NY 14202

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

Mr. Christopher S. Pawenski  
Erie County Department of Environment and Planning  
Rath County Office Building  
95 Franklin Street, Room 1056  
Buffalo, NY 14202

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

### **City of Lackawanna**

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

### **Supplier of Potable Water**

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

## Appendix C – Brownfield Site Contact List

### 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

News Director  
WGRZ TV Channel 2  
259 Delaware Avenue  
Buffalo, NY 14202

News Director  
WIVB TV Channel 4  
2077 Elmwood Avenue  
Buffalo, NY 14207

News Director  
Time Warner  
795 Indian Church Road  
West Seneca, NY 14224

News Director  
WB 49  
699 Hertel Avenue, Suite 100  
Buffalo, NY 14207

## Appendix C – Brownfield Site Contact List

### Local News Media

Mark Scott, News Director  
WBFO 88.7/WOLN 91.3  
3435 Main Street  
Buffalo, NY 14214-3001

News Director  
Infinity Radio  
14 Lafayette Square #1300  
Buffalo, NY 14203-1913

News Director  
Citadel Communications  
50 James E Casey Dr  
Buffalo, NY 14206-2367

Jim Ranney, News Director  
WNED 94.5/970 AM  
PO Box 1263  
Buffalo, NY 14240-1263

Annemarie Franczyk  
Business First of Buffalo, Inc.  
465 Main Street  
Buffalo, NY 14203-1793

Editor  
Challenger  
1303 Fillmore Avenue  
Buffalo, NY 14211-1205

Editor  
Pennysavers  
49 E Main Street  
Springville, NY 14141-1245

## Appendix C – Brownfield Site Contact List

### **Local News Media**

Editor  
South Buffalo News  
2703 S Park Avenue  
Buffalo, NY 14218-1511

Editor  
ARTVOICE  
810 Main Street  
Buffalo, NY 14202

### **Nearby School**

Lackawanna City School  
Superintendent Dr. Fredrick A. Wille  
245 South Shore Blvd  
McKinley School Administration Building  
Lackawanna, NY 14218  
Phone: (716) 827-6767

### **RESIDENTS ON AND/OR ADJACENT TO THE SITE**

See attached tables.

**Property Owners - Companies & Organizations**

Property Address		Owner 1		Owner 2		Mailing Address			
No.	Street	Name	Name	No.	Street	City	State	Zip	
60	Commerce Dr.	One Commerce Drive Properties, Inc.		60	Commerce Dr.	Lackawanna	NY	14218	
100	Commerce Dr.	Kenworth of Buffalo NY, Inc.		100	Commerce Dr.	Lackawanna	NY	14218	
170	Commerce Dr.	Crown Atlantic Co., LLC			P.O. Box 353	McMurray	PA	15317	
47	Gates Ave.	Lackawanna Municipal Housing A		135	Odell	Lackawanna	NY	14218	
0	Hamburg Tpke.	Gateway Trade Center, Inc.			P.O. Box 880	Buffalo	NY	14224	
2256	Hamburg Tpke.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
2290	Hamburg Tpke.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
2300	Hamburg Tpke.	T&T Andolino Properties, LLC		2300	Hamburg Tpke.	Lackawanna	NY	14218	
2350	Hamburg Tpke.	RAF Supply, Inc.		2350	Hamburg Tpke.	Lackawanna	NY	14218	
2770	Hamburg Tpke.	State of New York		182	E. Union St.	Allegany	NY	14706	
0	Kane St.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
18	Kane St.	Fruci Apartments LLC			P.O. Box 116	West Seneca	NY	14224	
10	N. Gates Ave.	Punto Franco Ltd. c/o Lincoln Securities Corp.		155	Great Arrow Dr.	Buffalo	NY	14207	
31	N. Gates Ave.	Safety Kleen Systems, Inc. c/o Burr Wolf			P.O. Box 27713	Houston	TX	77227	
41	N. Gates Ave.	Safety Kleen Systems, Inc. c/o Burr Wolf			P.O. Box 27713	Houston	TX	77227	
70	N. Gates Ave.	Marotta Leasing, Inc.		70	N. Gates Ave.	Lackawanna	NY	14218	
121	N. Gates Ave.	Puglisi Funding, Inc.		50	Ridge Rd.	Lackawanna	NY	14218	
17	Odell St.	RAF Supply, Inc.		2350	Hamburg Tpke.	Lackawanna	NY	14218	
0	Ridge Rd.	LCDC		640	Ridge Rd.	Lackawanna	NY	14218	
10	Ridge Rd.	55 North Gates Avenue, LLC		5500	Pebble Beach Dr.	Hamburg	NY	14075	
43	Ridge Rd.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
47	Ridge Rd.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
50	Ridge Rd.	Puglisi Funding, Inc.		50	Ridge Rd.	Lackawanna	NY	14218	



Tecumseh Redevelopment, Inc.  
 New York State Department of Environmental Conservation  
 Citizens Participation Plan

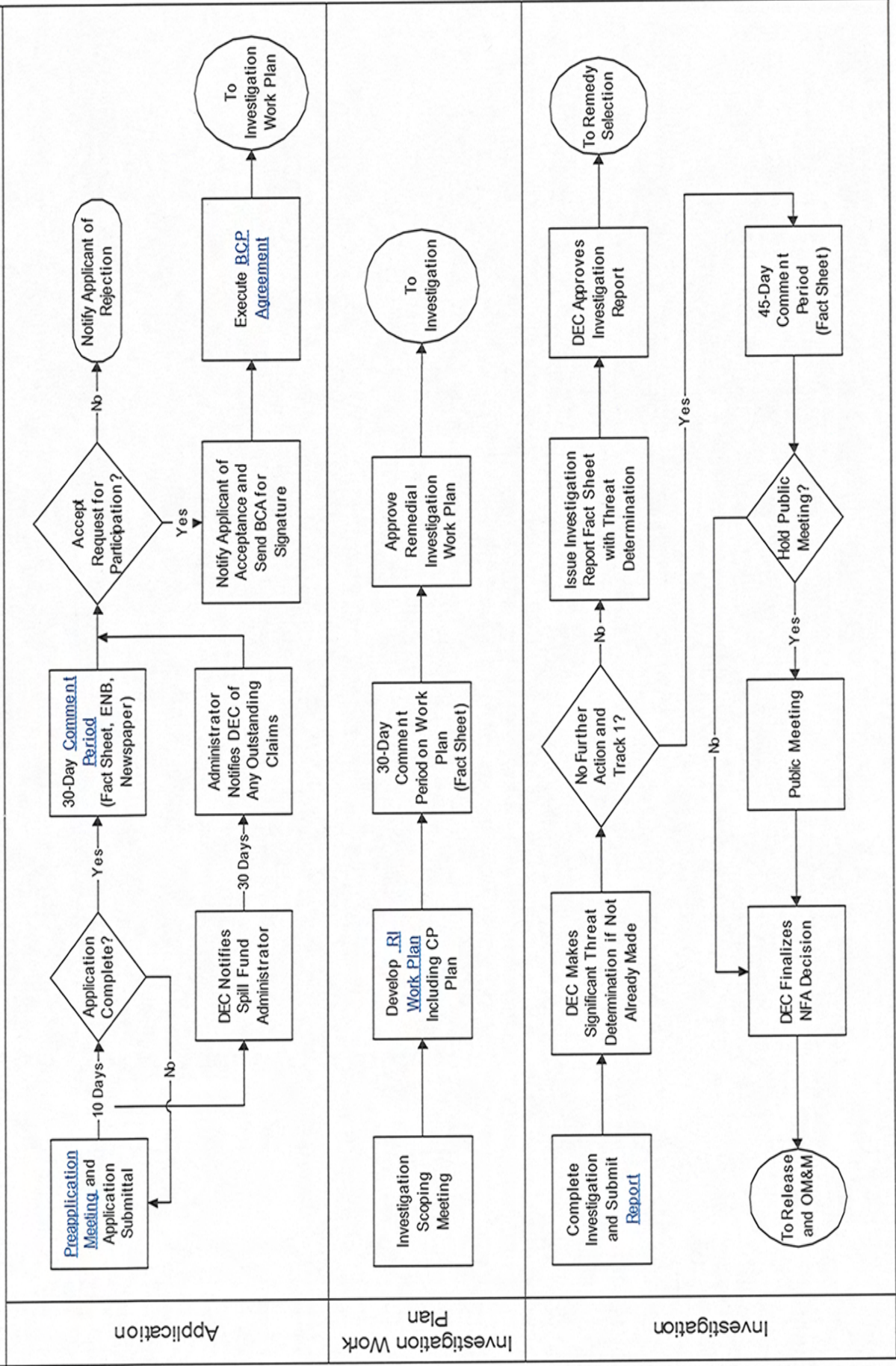
<b>Property Owners - Companies &amp; Organizations</b>									
<b>Property Address</b>		<b>Owner 1</b>			<b>Owner 2</b>		<b>Mailing Address</b>		
<b>No.</b>	<b>Street</b>	<b>Name</b>	<b>Name</b>	<b>No.</b>	<b>Street</b>	<b>City</b>	<b>State</b>	<b>Zip</b>	
55	Ridge Rd.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
15	Simon Ave.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
22	Simon Ave.	BGI Interiors, Inc.		22	Simon Ave.	Lackawanna	NY	14218	
36	Simon Ave.	City of Lackawanna		714	Ridge Rd.	Lackawanna	NY	14218	
0	Steelawanna Ave.	T&T Andolino Properties, LLC		2300	Hamburg Tpke.	Lackawanna	NY	14218	
243	Steelawanna Ave.	RAF Supply, Inc.		2350	Hamburg Tpke.	Lackawanna	NY	14218	

## Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities:	CP Activities Occur at this Point:
<b>Application Process:</b>	
<ul style="list-style-type: none"> <li>• Prepare brownfield site contact list (BSCL)</li> <li>• Establish document repositories</li>   <li>• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period</li> <li>• Publish above ENB content in local newspaper</li> <li>• Mail above ENB content to BSCL</li> </ul>	<p>At time of preparation of application to participate in BCP.</p> <p>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.</p>
<b>After Execution of Brownfield Site Cleanup Agreement:</b>	
<ul style="list-style-type: none"> <li>• Prepare Citizen Participation (CP) plan</li> </ul>	<p>Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution</p>
<b>After Remedial Investigation (RI) Work Plan Received:</b>	
<ul style="list-style-type: none"> <li>• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan</li> </ul>	<p>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.</p>
<b>After RI Completion:</b>	
<ul style="list-style-type: none"> <li>• Mail fact sheet to BSCL describing results of RI</li> </ul>	<p>Before NYSDEC approves RI Report</p>
<b>After Remedial Work Plan (RWP) Received:</b>	
<ul style="list-style-type: none"> <li>• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period</li> <li>• 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)</li> </ul>	<p>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.</p>
<b>After Approval of RWP:</b>	
<ul style="list-style-type: none"> <li>• Mail fact sheet to BSCL summarizing upcoming remedial construction</li> </ul>	<p>Before the start of remedial construction.</p>
<b>After Remedial Action Completed:</b>	
<ul style="list-style-type: none"> <li>• Mail fact sheet to BSCL announcing that remedial construction has been completed</li> <li>• Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)</li> </ul>	<p>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.</p>

## **Appendix E – Brownfield Cleanup Program Process**

# Brownfields Cleanup Program (BCP)



# Brownfields Cleanup Program (BCP)

