

REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT

Volume 1 of 3: Remedial Investigation Report

Shenango Steel Mold
Buffalo, New York
(Site Code No. 9-15-172)
(WA No. D003970-03)

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INTRODUCTION

This Remedial Investigation Report has been prepared by Environmental Resources Management (ERM) on behalf of the New York State Department of Environmental Conservation (NYSDEC) under Work Assignment No. 003970-03 for the Shenango Steel Mold site. The NYSDEC site code for Shenango Steel Mold is No. 9-15-172.

1.1

PURPOSE AND ORGANIZATION OF REPORT

The purpose of this report is to present the findings of the remedial investigation (RI) performed at the Shenango Steel Mold site (The Site). The report is divided into the following sections:

- Introduction: contains the Site description and background information, a summary of physical characteristics of the Site and a discussion of the operational and disposal history.
- Remedial Investigation Activities: describes the scope of work and field activities conducted during the RI.
- Site Environmental Conditions: includes a discussion of the sampling program conducted during the RI, the analytical results, and the applicable Standards, Criteria and Guidance values (SCGs). Additionally, this section includes the Human Health Exposure Assessment and the Fish and Wildlife Impact Analysis (FWIA).
- Conclusions: includes an evaluation of the source of contamination, the migration paths, the actual or potential receptors of the contaminants, and the potential public health exposure pathways as well as any potential impacts to biota. The final section presents the reference documents that were used to prepare this report.

The former Shenango Steel Mold facility is listed on the NYSDEC Registry of Inactive Hazardous Waste Sites as a Class 2 site. Class 2 sites are considered to be significant threats to public health or the environment and require action. The Site is located on the south side of the City of Buffalo near the border with the City of Lackawanna. The Site is located at 1750 Fuhrmann Boulevard and approximately 2,000 feet south of the intersection of Route 5 and Tifft Street (see Figure 1-1).

The Site is reportedly owned by Sherland Incorporated and comprises approximately 18 acres of previously developed land. The site is currently vacant except for the remains of manufacturing buildings. Figure 1-2 presents the site topographic plan. The facility manufactured cast iron ingots from approximately 1963 to 1982 by processing pig iron that was produced at the adjacent Hanna Furnace Property.

In October 1993, after receiving an anonymous report of individuals scrapping transformers and disposing of the oil at the then abandoned site, the NYSDEC Division of Spills Management conducted a site visit and sampling program to delineate the location and extent of potential contamination. In April 1994, based on the results of the sampling event which indicated that oil on the ground surface contained polychlorinated biphenyls (PCBs) at concentrations as high as 600,000 milligrams/kilogram (mg/kg), the NYSDEC then conducted an emergency waste removal action. The removal action included the removal of 17 55-gallon drums and 25 5-gallon pails of material discovered near the PCB contaminated area. Visually contaminated materials such as heavily reinforced concrete slabs were also excavated, as

well as two transformer shells, and disposed at a licensed off-site transfer, storage and disposal facility (TSDF).

At the completion of the removal action, the NYSDEC collected 27 surface soil samples at the Site. Twenty-two of the soil samples collected were analyzed for the presence of PCBs using immunoassay techniques, while 8 samples were analyzed for inorganic compounds. Analytical results indicated that PCBs and selected inorganic compounds were present at the Site at levels which exceeded regulatory criteria.

A Preliminary Site Assessment (PSA) was conducted in 1994 at the Site and the adjacent Hanna Furnace property while the NYSDEC conducted the waste removal action. The investigation was conducted by ABB Environmental Services of Portland, Maine under the direction of the NYSDEC. The PSA included the sampling and analysis of liquid observed in an on-site sump, surface soil, surface water, groundwater, and sediment. Soil borings and monitoring wells were installed during the PSA. The Site was also surveyed for the purpose of preparing a base map.

1.3 SITE GEOLOGY

The Shenango Steel Mold site is underlain by unconsolidated (overburden) materials which lie on sedimentary bedrock. The overburden, from the land surface to approximately 8 to 15 feet below grade surface (bgs), consists of fill material, fine to coarse sand, and brown silty clay. The fill contains various industrial by-products such as fly ash, cinders, demolition debris, bricks, ash, and slag materials. At some locations, a discontinuous peat deposit was observed between the fill and underlying lacustrine deposits. Underlying the fill, beginning at a depth of approximately 8 to 15 feet, are black-brown organic clayey silt and lacustrine gray-brown clay/silty clays. Beneath the clay/silt layer is a discontinuous layer of sand and gravel and ultimately bedrock is

encountered at 22 to 48 feet bgs. Bedrock at the Site is the Middle Devonian Levanna Shale member of the Skaneateles Formation, Hamilton Group. The Levanna Shale overlies the Marcellus Formation and the Onondaga Limestone.

A north-south and an east-west cross-section is presented in Figures 1-3 and 1-4, respectively.

1.4 SITE HYDROGEOLOGY

Groundwater occurs in the fill, the natural overburden, and in bedrock at the Site. Generally, permanent groundwater is first encountered at five feet bgs. At some areas of the Site, perched groundwater was observed from 2 to 3 feet bgs. Data collected during the PSA indicates that groundwater flow in the fill is perched over the lacustrine deposits. According to the PSA, groundwater elevation data suggest that groundwater flows toward topographically low areas surrounding the Site, such as the wetlands areas north and east of the Site. The elevation data also suggest that a component of groundwater also flows in a southwesterly direction toward the Union Ship Canal (Canal). There are some local anomalies at the Site which are attributed to the presence of subsurface structures such as building foundations and railroad ties. Groundwater elevations in these areas are somewhat higher due to the restricted flow and/or increased infiltration. A component of groundwater also has been found to flow toward topographically low areas to the west and northwest of the Site. Groundwater in the area is not used for any purpose (ABB, 1994).

Surface water runoff at the Site either pools on the ground surface and infiltrates, is discharged to a storm sewer system, or discharges to ditches and wetlands areas bordering the adjacent railroad yard. Most of the Site, and the adjacent Hanna Furnace property, are located within the 100-year flood plain (Zone A) as defined by the Federal Emergency Management Agency (Community Panel No. 360230-020-B) (Recra, 1988; NYSDEC, 1994b). The shore of Lake Erie is located approximately 0.5 miles west of the Site (ABB, 1995). Lake Erie is used for drinking, irrigation, and recreation. The municipalities of Lackawanna and Buffalo receive drinking water from a municipal supply with intakes in Lake Erie location more than 3 miles from the Canal. Surface water in the Canal and the immediate vicinity of Lake Erie (Buffalo Inner Harbor) is designated as NYS Surface Water Class C (ABB, 1995). Residents were seen fishing along the Canal during the RI field work.

One manhole (MH-1) was discovered at the Site during previous investigations. Two manholes (MH-2 and MH-3) were discovered at various locations across the Site during the RI. The location of these three manholes is noted on Figure 1-2. The exact piping configuration for these manholes is currently unknown. Some information on the Site underground piping between the Hanna Furnace property and the Site is provided in the Hanna Furnace Drawing No. 4811 (Sanitary Sewer Plan and Profile), which is provided in Appendix A. A 36-inch corrugated metal pipe (CMP) that appears to originate from the Site discharges into the Canal. A photograph of this CMP is presented as Photograph No. 1 in Appendix B. The source of the flow into the CMP is currently unknown and no historical records or plans were found during the RI.

OPERATIONAL/DISPOSAL HISTORY

The Site had been previously developed and operated as cast iron molding facility from 1963 to 1982. The facility received liquid molten iron that was produced at the adjacent Hanna Furnace Site via railcars. The molten iron was then poured into brick-lined vessels and cooled for the purpose of molding cast iron ingots. The ingots were sold to the steel industry for use in blast furnaces. It has been reported that operations at the Site used large quantities of oil in the handling and molding of the pig iron; however, the Shenango facility never produced steel or generated wastes associated with blast furnaces. Currently, the property is vacant and unoccupied. When in operation, several buildings and railroad spurs were present at the Site. Only a portion of one of the manufacturing buildings exists, as the remaining structures have been demolished. All railroad ties and spurs have also been removed.

The only confirmed disposal of hazardous waste at the Site was the scrapping of transformers and the concurrent disposal of drums and pails which held oils containing PCBs, on the ground surface, in an adjacent former utility structure (sump), and on concrete slabs. The date of these events are unknown but it is believed that they occurred after the facility was closed in 1982. The incidents were investigated during a site visit by NYSDEC staff on October 18, 1993. Sampling conducted at that time confirmed the presence of PCBs at concentrations that exceeded 50 mg/kg such that the soil could be categorized as a hazardous waste. A PSA was performed by ABB Environmental Services in 1994 and soil sampling detected volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals (inorganic compounds) in soil. Groundwater sampling was also conducted during the PSA and the groundwater monitoring detected VOCs and metals in concentrations that exceeded New York State Class GA Groundwater Quality Standards.

Sampling in the Canal indicated that the sediment contained SVOCs and metals while the surface water was found to contain 4-methylphenol and metals (ABB, 1994). Finally, during the RI activities, several drums were discovered and removed from the Site. Further description of this waste removal action is provided in the NYSDEC report entitled "Emergency Drum Removal Action (No. 9097)", which is presented in Appendix C.

2.0

REMEDIAL INVESTIGATION ACTIVITIES

A work plan was developed for the RI in accordance with the specifications set forth in the NYSDEC State Superfund Standby Contract Work Assignment No. D003970-03. The scope of work and work plan for the RI was developed by the NYSDEC and ERM. The RI Work Plan was reviewed and approved by the NYSDEC. The purpose of the RI was to comprehensively characterize environmental conditions at the Site and to further delineate the contamination previously identified at the areas of concern (AOCs). The RI was performed after reviewing the reports and analytical data from previous work.

A discussion of the investigation activities that were completed as part of the RI is provided below. Additional details regarding the sampling and analytical methods and procedures that were complied with during the RI are presented in the Project Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP). Any modifications to activities specified in the RI Work Plan, necessitated/required by the field conditions, were reviewed and approved by the NYSDEC.

2.1

UTILITY SURVEY/GEOPHYSICAL INVESTIGATION

A utility survey of the Site was conducted by Underground Facilities Protection Organization (UFPO) prior to finalization of sampling locations and implementation of the intrusive field investigation. The information obtained from the utility survey indicated the location of underground utility lines and this was considered in the development of the geophysical survey.

A geophysical investigation of the Site was conducted by Advanced Geological Services of Malvern, Pennsylvania from September 19 through September 21, 2000. The objective of the investigation was to locate and define any subsurface features that may have potential environmental implications and to investigate the portion of the Site covered by the former building footprint. The majority of the Site property was included in the geophysical investigation with the exception of areas which contained waste piles or were otherwise inaccessible. The geophysical survey focused on the footprint of the former molding building and the adjacent areas. A geophysical survey of the building footprint was conducted in order to identify additional source areas such as sumps, dry wells, or underground storage tanks (USTs). Both electromagnetic (EM) and ground penetrating radar (GPR) geophysical methods were utilized to identify and characterize the subsurface features. In general, the geophysical survey identified several areas of subsurface rubble, concrete pads, and building foundations. The survey was not able to identify any subsurface structures that may be present at the Site, due to the large amount of surface debris (metal, rubble, and trash). This material interfered with the transmission of signals that would be expected from any possible buried pipes. The data and the results of the geophysical investigation are presented in Appendix D.

A grid system based upon a north-south and east-west coordinate system was developed such that any identified anomalies could be accurately located relative to permanent and recoverable landmarks at the Site. Grid coordinates were designated by the number of feet north by the number of feet east from the established grid datum (e.g. 00N/00E). The corners of the grid were permanently marked with wooden or metal stakes such that they could be located in the site survey. The following summarizes the geophysical survey activities that were completed.

2.1.1 *Electromagnetic (EM) Method*

Electromagnetic data was collected using a GSSI GEM-300 multi-frequency instrument. The GEM-300 operates by passing an alternating current through the transmitter coil in order to induce eddy currents into the subsurface. These eddy currents generate a secondary magnetic field. A component of the induced magnetic field is detected by a receiver coil and measured by the instrument. The receiver measures the field strength of both the quadrature and in-phase components in the units of parts per million (ppm) of the transmitted signal. The quadrature response is used by the GEM-300 instrument to calculate the conductivity response in units of milliSiemen per meter (mS/m).

For this investigation, EM measurements were collected at four transmitter frequencies of ranging from 3.99 Kilohertz (KHz) to 13.95 KHz. This was done in order to provide the maximum effective depth of investigation which was approximately 19 feet. Frequency domain EM measurements were collected at 5-foot intervals along each survey grid line which were located 20 feet apart. EM data measurements were made at more than 5,150 points throughout the survey area during this investigation.

Recorded EM data was transferred to a field computer at the completion of the data collection process. The data was then contoured to identify any potential features that could represent subsurface features of concern.

2.1.2 *Ground Penetrating Radar Method*

Ground penetrating radar (GPR) was used to better identify any anomalies that were identified by the EM survey. The GPR method is based upon the transmission of repetitive, radio-frequency EM pulses into

the subsurface. When the downward wave contacts an interface of dissimilar electrical character, it returns to the surface in the form of a reflected signal. This reflected signal is then detected by a receiving transducer within the GPR unit and added to the data file. The GPR anomaly remains prevalent as long as the electrical contrast between media is present and constant. The system records a continuous image of the subsurface by plotting the two-way travel time versus the distance traveled along the ground surface. Two-way travel time values are then converted to depths below grade surface, using known soil velocity functions.

A Geophysical Survey Systems SIR-2 System was utilized to collect the GPR data. A 400-megahertz (MHz) antenna and 60-nanosecond (Ns) recording window were used for data acquisition. Both a 200 MHz and a 100 MHz antenna were utilized in certain areas to achieve the required depth of investigation. Several traverses were collected across each anomaly to determine the areal and vertical extent of the feature and to determine if the feature could be an underground storage tank (UST) or a buried drum. Field evaluation of the GPR records were used to more fully characterize each EM anomaly. The locations of all GPR traverses were referenced to the site survey grid coordinate system and are presented in Appendix D.

2.2 *SITE SURVEY*

A survey of the Site was conducted by Foit-Albert Associates of Buffalo, New York. This firm is a New York State licensed and registered surveyor. The initial survey resulted in a topographic map with two foot contours (see Figure 1-2). This map includes the location of foundations,

structures, sumps, property lines, and other significant features including certified property boundaries.

A second survey was conducted at the completion of RI field activities in order to locate all sampling locations including soil borings, piezometers, monitoring wells, surface water, surface soil and sediment, manholes, and other locations (see Figures 2-1 and 2-2). The elevations of all monitoring well casings were established to within plus or minus 0.01 feet based on the North American Vertical Datum (NAVD) 88 datum. A notch was placed in all interior casings to provide a reference point for all subsequent monitoring events. The elevation of the manhole covers and surface water features were also surveyed. This included the level of the Canal and a staff gauge (SG-1) that was installed in the Canal to correlate the groundwater elevations with the surface water in the Canal. See Figure 2-2 for the location of SG-1.

2.3

SOIL INVESTIGATION

Aquifer Drilling and Testing (ADT) of Albany, New York installed a total of 68 soil borings as part of the soil investigation. Geoprobe sampling techniques were utilized to collect the surface and subsurface soil samples in accordance with the program established in the RI Work Plan. In addition, temporary piezometers were installed in select borings in order to observe the groundwater conditions at the Site. The RI Work Plan specified that soil samples were to be collected at 200 foot intervals for the majority of the Site. These samples include soil boring locations SB-01 through SB-37. The spacing was reduced to 50 feet within the area where the PCB contamination was known to exist. This area is referred to as the tight grid area (TGA). The TGA includes soil boring locations SB-P01 through SB-P31. Additional samples were collected in the TGA to better characterize the extent of the residual PCB contamination that remained at

the Site. The final locations of the soil borings verified in the field by ERM and the NYSDEC.

A number of the soil borings located inside of the TGA were also within the footprint of the emergency waste removal action conducted by the NYSDEC in 1994. It appeared that the transformers were being dismantled on top of the existing concrete slabs which are the remains of the former manufacturing facility floor. As part of the emergency waste removal action, two transformer shells and concrete with the underlying soil which exhibited visible evidence of oil staining were removed and disposed at a licensed off-site TSDF. The intent of the emergency waste removal action was to remove the majority of the material that was immediately dangerous to public health and the environment. It should also be noted that earthmoving and grading activities were performed in October 2000 prior to the RI soil investigation so that access to all of the locations in the TGA could be achieved.

Soil samples were collected continuously at each boring location using 4-foot macro-core sample units. Each soil boring was advanced to the groundwater table which was typically encountered between three and eight feet bgs. Each sample was inspected by a geologist and all observations were documented in a field log. The samples were also screened using a photoionization detector (PID), which is an instrument designed to detect VOCs. The geologic field logs and PID screening data are presented in Appendix E. Soil borings located within the larger sampling grid, 200 feet on center, were designated SB-01 through SB-37. Soil borings located within the TGA were designated SB-P01 through SB-P31. Borings designated SB-01 through SB-10 were located in select areas of the Site based on the results of the geophysical investigation and field observations. Soil boring locations are shown on Figure 2-1.

Targeted sample depths at certain boring locations were adjusted due to elevated groundwater levels encountered at the time of the soil boring investigation. This change to the RI Work Plan is described in ERM's memorandum to the NYSDEC dated October 11, 2000 that was reviewed and approved. A summary of the field sampling program is provided in the following paragraphs. A summary of the intervals sampled and their respective analyses are provided in Table 2-1.

At each of the 68 soil boring locations, samples were collected for PCB analysis and carried out according to the United States Environmental Protection Agency (USEPA) SW-846 Method 8082. Sampling was conducted in the intervals from 0 to 6 inches bgs (upper zone) and from 0 to 6 inches above the groundwater table (lower zone). PCB data is presented in Table 2-2, and is also presented on Figures 2-3 through 2-6. Soil sampling results exceeding Recommended Soil Cleanup Objectives (RSCO) are presented on Figure 2-7 and 2-8.

Upper zone samples collected from borings located within the 200 foot grid, as well as SB-P05, SB-P29, and SB-01 through SB-37 were also analyzed for the Target Compound List (TCL) SVOCs and the Target Analyte List (TAL) Metals. The samples were analyzed using NYSDEC Analytical Services Protocol (ASP) Methods 95-2 and CLP Methods for Inorganics, Exhibit D Part V respectively.

As identified in Table 2-1, seventeen samples from the lower zone, and two samples from an intermediate zone, were analyzed for TCL VOCs according to NYSDEC ASP Method 95-1, SVOCs and TCL metals. Two additional samples from SB-30 and SB-32 were also analyzed for TCL

VOCs. The analytical results from the sampling are presented in Tables 2-3 through 2-5.

Soil samples were collected in four-foot intervals, and divided into two-foot sections. A portion of each section was placed in glass jar. The headspace in the jar was then screened for VOCs using the PID. The headspace screening data served as an indication of contamination and aided in the determination if a sample should be collected in the field. The headspace data are presented in Table 2-6.

As previously stated, temporary piezometers were installed at selected soil boring locations (17 locations) to assess hydrogeological conditions at the Site such as groundwater table elevation and the presence of non-aqueous phase liquid (NAPL). A 1-inch diameter PVC screen and riser was placed into the boring once the groundwater table was reached. The groundwater was allowed to reach equilibrium and measurements of depth to water and depth to light non-aqueous phase liquid (LNAPL), if present, were then collected using an interface probe. A summary of the data obtained from the temporary piezometers is presented in Table 2-7. Measurements are presented in feet below top of casing. Since the top of casing is at approximately the ground surface, the depth to water is approximately the depth below grade surface.

2.4

CONCRETE SLAB SAMPLING

The RI Work Plan included the sampling and analysis of concrete chips collected from foundation material that appeared to be stained. The analytical results from the chip sampling were to be used in the development of remedial alternatives for the feasibility study (FS). However, it was noted during the RI field activities that the slabs

appeared to be weathered and fragmenting but not oil-stained. Therefore, it was determined that the concrete chip sampling would not be conducted and that sampling of the on-site manholes would be performed instead. LNAPL samples collected from manhole-1 (MH-1), TP-1, and MW-3 were submitted for petroleum hydrocarbon characterization (fingerprinting). LNAPL sampling and analysis is also discussed in Section 2.8 of the report.

2.5 *SURFACE WATER AND MANHOLE SAMPLING*

During the emergency waste removal action in 1994, a manhole (MH-1) was discovered in the TGA (MH-1) and an outfall (CMP) was observed in the northeast corner of the Canal. A photograph of MH-1 is presented as Photograph No. 2 in Appendix B. Two additional manholes were discovered during the RI field work and they were designated as MH-2 and MH-3. MH-2 is located approximately 250 feet northeast of the Canal. MH-3 is located approximately 300 feet north of MH-2. All of the manholes were found open to the atmosphere and without formal covers. The manholes appeared to be of similar construction with a diameter of approximately 30 inches with a nominal depth of 12 to 15 feet bgs. See Figure 2-2 for manholes and the location of the CMP. Surface water sampling results are presented in Tables 2-8 through 2-12. Surface water data that exceeded New York State Class GA groundwater standards are presented on Figure 2-9. The following sections summarize the investigation of these structures.

2.5.1 *Surface Water Sampling*

Two surface water samples (UC-1 and UC-2) were collected from the Canal. The samples were collected to assess any potential impacts that

previous Site activities may have had on the water quality in the Canal. Sample UC-1 was collected at the outfall of the CMP while UC-2 was obtained at the base of SG-1. The discharge rate from the CMP was estimated to be approximately 5 gallons per minute (gpm). Both samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Additionally, biological oxygen demand (BOD), chemical oxygen demand (COD) and total suspended solids (TSS) analyses was also performed on the sample collected at UC-1.

2.5.2 *Manhole Sampling*

As previously stated, three manholes (MH-1, MH-2 and MH-3) were located during previous investigations and the RI field work. The exact piping arrangement of the manholes is currently unknown. Some information on the Site underground piping is presented in the Sanitary Sewer Plan and Profile provided in Appendix A. The observations noted in the field during the RI are described below.

Water did not appear to be entering MH-1 and it was not possible to determine if any material was exiting. A blackish LNAPL was observed on the surface of the water that had accumulated in MH-1. An attempt to measure the LNAPL layer was made using an interface probe. However, the LNAPL adhered strongly to the instrument probe, and prevented accurate readings. Orange-brown water was found to be entering MH-3 from the northern portion of the manhole and exiting in a southerly direction toward MH-2. MH-2 appeared to have two inlets and one outlet that was located in the direction of the Canal. There was black staining observed surrounding the inlet of MH-2 that appeared to be originating from the direction of the TGA and MH-1. However, no material was found to be entering the manhole from this inlet during the time of

inspection. Water was entering MH-2, from the direction of MH-3, and it did exhibit the orange-brown color noted in MH-3.

Samples collected from the manholes were categorized as surface water samples and compared to New York State ambient water quality standards for surface water. The manhole samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. BOD and COD analysis were also performed on the samples collected from MH-2 and MH-3.

Field analyses of the water present in MH-2 and MH-3 were performed for pH, conductivity, temperature, and oxidation/reduction potential (ORP). The results are presented below:

<u>Location</u>	<u>pH</u>	<u>Conductivity (uS)</u>	<u>Temperature (°C)</u>	<u>ORP (mV)</u>
MH-2	8.1	391	7.9	+85
MH-3	7.0	584	10.1	+144

2.6

NAPL INVESTIGATION AND SAMPLING

As noted, LNAPL was observed on the water surface in MH-1 in 1994 and during the RI. Approximately 25,000 gallons of liquid was removed from the sump during the emergency waste removal action in 1994. A test pit (TP-1) was installed proximate to MH-1 during the RI in Fall 2000 in an attempt to identify any outside connections or piping. The location of TP-1 is shown on Figure 2-1. A water sample from MH-1 was collected from just below the NAPL/water interface and analyzed for full TCL and TAL parameters. LNAPL was also observed in the southwest corner of test pit TP-3, which was installed adjacent to TP-1.

LNAPL was discovered in the temporary piezometer installed in SB-18 and in MW-3, at thicknesses of 0.01 feet and 0.03 feet, respectively. A

second test pit (TP-2) was then excavated adjacent to MW-3 to investigate the source of the LNAPL. The location of TP-2 is shown on Figure 2-1 and a photograph of TP-2 is presented as Photograph No. 3 in Appendix B.

NAPL samples were collected from TP-2 (which is adjacent to MW-3), MH-1, and MW-3 and submitted for fingerprint analysis using USEPA SW-846 Method 8015. The results of the fingerprint analysis were inconclusive and are presented in Table 2-13. NYSDEC Memorandums on the investigation of MH-1 during Fall 2000, and test pit activities during Summer 2001 are presented in Appendix F. Additional test pit results are presented in Section 2.15 and Section 3.1.4.

2.7. *GROUNDWATER INVESTIGATION*

2.7.1 *Monitoring Well Installation*

Five overburden monitoring wells were installed by ADT to complement the historical hydrogeologic and groundwater quality data that has been obtained from the four existing monitoring wells. The location of the new wells (MW-1 through MW-5) was based on a review of the background data, the results of the geophysical investigation, field observations, and the findings of the RI soil boring investigation. During well drilling activities, continuous split spoons were collected and logged by an ERM geologist. The subsurface materials were logged using the Unified Soil Classification System and included a description of the color, texture, moisture content, odor, absence/presence of staining, and PID headspace data. The geologic logs are presented in Appendix G and the headspace readings are presented in Table 2-6.

The wells were installed using hollow stem auger drilling techniques utilizing a Mobile B-61 drill rig. The well screens were installed such that

the screened interval bridged the groundwater table. This was done to assure that any LNAPL present would be detected.

The new monitoring wells were constructed at each borehole once the hollow stem augers reached the target depth, typically 10 feet below the water table. The monitoring wells were constructed of 10-foot long, 2 inch diameter PVC well screen with 0.010-inch slots and PVC riser pipe. Following the screen and riser installation, a sandpack consisting of No. 1 Morie sand was installed to a level of up to three feet above the top of the screen. During sandpack installation, the augers were slowly pulled back allowing the sand to flow evenly into the borehole. A level of sand above the base of the lead auger was maintained during the installation process to insure proper placement of the sandpack. The remainder of the annulus to the surface was grouted with a bentonite seal.

Once installed, the top of the well risers was marked to establish a reference point for subsequent surveying and groundwater level measurement events. The wells were then completed with a steel protective casing (stick-up). The stick-ups were installed to approximately three feet above grade and equipped with locking caps. Adequate space was left above the top of the well riser and below the steel protective cover to allow for the installation of an expandable well cap. All wells were fitted with locks that were keyed alike. Monitoring well construction forms are presented in Appendix H.

2.7.2 *Well Development*

All newly installed monitoring wells were developed by using surging and evacuation. During well development, temperature, pH, specific conductivity and turbidity were measured at a minimum frequency of once per well volume of groundwater evacuated from the well. Well

development measurements are presented in Table 2-14. Development was continued until the above listed parameters stabilized and the turbidity value was less than 50 nephelometric turbidity units (NTUs).

2.7.3 *Hydraulic Monitoring*

New and existing Site monitoring wells were located horizontally and vertically by the surveyor, Foit-Albert Associates. Ground level and well casing elevations were surveyed to the nearest hundredth of a foot (0.01) vertically and to the nearest one-tenth (0.1) of a second of latitude and longitude.

The monitoring wells have a reference point that is permanently affixed on the highest point of the inner PVC casing to allow for accurate and reproducible groundwater level measurements. Depth to water measurements were collected to the nearest 0.01 foot from the surveyed points identified on the well risers. Synoptic rounds of groundwater level measurements were collected at the time of installation and periodically from January to March 2001. Groundwater levels were measured using an interface probe that is also capable of detecting NAPL. NAPL readings were also collected to monitor for the presence of LNAPL and dense non-aqueous phase liquids (DNAPLs). DNAPL was not detected. LNAPL was detected in one well, MW-3, at a thickness of approximately 0.03 feet. The groundwater elevation data which resulted from the monitoring events is presented in Table 2-15.

The series of synoptic rounds of groundwater level measurements were collected to better understand the hydraulic conditions at the Site. Selected rounds of groundwater level measurement data were plotted to ascertain groundwater flow directions and gradients. Groundwater contour maps are presented in Figures 2-10 and 2-11.

During water level measurements, the level of the water in Canal was also observed. The water level on the staff gauge (SG-1) was measured so that the groundwater elevations collected from the monitoring wells can be correlated with the surface water level in the Canal.

2.7.4 *Groundwater Sampling*

Groundwater samples were collected as part of the RI to determine if the groundwater at the Site has been impacted by historical manufacturing and/or transformer scrapping activities. Samples were collected from the five newly installed monitoring wells (MW-1, MW-2, MW-3, MW-4, and MW-5) and three of the four existing wells (MW-102, MW-109, and MW-110). A groundwater sample at MW-108 could not be collected due to an apparent obstruction that could not be removed. The well, MW-108, is scheduled for repair and samples will be collected once the necessary repairs are completed. Tables 2-16 through 2-19 provide a summary of the analytical results of the groundwater sampling conducted during the RI. Sample results which exceeded the New York State Class GA standards groundwater standards are presented on Figure 2-9.

The following parameters were monitored prior to the purging of the monitoring well and all resulting data was documented in field logs:

- Date, time and weather conditions;
- Well number and well permit number;
- PID reading taken from the well immediately after the cap was removed;
- LNAPL, measured thickness, if present;
- Total depth of well from the top of inner casing or surveyors mark if present;

- Depth from the top of inner casing to water; and
- Estimated volume of groundwater in monitoring well.

The following information was measured and documented after the well was properly purging using the surging and evacuation method:

- Start and end time for purging interval;
- Purge method;
- Purge rate;
- Total volume of groundwater purged

All groundwater samples were handled in a manner consistent with the NYSDEC-approved FSP and QAPP. Each sample was properly labeled and each label included the well or sample number, parameter sampled, date, time, samplers' initials, preservative, and the site name. The groundwater samples were analyzed for full TCL and TAL analyses. Groundwater sampling records are presented in Appendix I.

A low flow protocol was employed for sampling that was conducted during the RI. Groundwater sampling was conducted in accordance with EPA low-flow sampling procedures (USEPA, 1998). This technique was employed to provide minimum turbidity conditions.

2.7.5 *Aquifer Response Testing*

Aquifer response testing (slug testing) was conducted in five selected monitoring wells to evaluate hydraulic conductivity of Site soil. The wells tested included MW-1, MW-2, MW-4, MW-5 and MW-102. The wells were selected to ensure full Site coverage and to include areas of potentially different soil types. The locations of these wells are shown on

Figure 2-2. The screened interval in these wells was not fully submerged within the unconfined aquifer at the Site and therefore, the rising head method was used to estimate hydraulic conductivity. The testing procedure began by lowering a properly decontaminated solid slug into the monitoring well and allowing the groundwater level to equilibrate back to static conditions. The changes in the groundwater elevation were recorded by a digital-transducer system. Once the static groundwater level equilibrium was achieved, the test was initiated by quickly withdrawing the entire slug to above the initial static water level. Rapid removal of the slug displaced the column of water into the lower portion of the well which resulted in recharge from the surrounding aquifer. Immediately after removing the slug, the rate of recharge was recorded periodically until the water level in the well achieved static conditions. The test data were used to calculate hydraulic parameter values using the method of Bouwer and Rice (June 1976) and the updated methodology of Bouwer and Rice (May-June 1989). The method utilizes a slug test which permits the calculation of saturated hydraulic conductivity (K) of aquifer materials with a single well. The method consists of rapidly raising or lowering the water level in a well, and measuring its subsequent rate of rise or fall.

An average hydraulic conductivity was developed for the Site by evaluating the slug test data from the five monitoring wells, and is presented in Section 3.1.2.2. The slug test data and evaluation are presented in Appendix J.

LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) EVALUATION

LNAPL was encountered during the RI on the following occasions:

- the installation of SB-18 and MW-3,
- the excavation of test pit TP-2 and TP-2A,
- in manhole MH-1,
- in the test pit TP-1 around MH-1,
- in the southwest corner of test pit TP-3.

These locations are shown in Figure 2-1 and 2-2. Based on these LNAPL detections, Figure 2-10 shows the estimated extent of LNAPL near MH-1, and near MW-3 and SB-18.

The NAPL layer thickness was measured using an interface probe. Samples of the NAPL were collected from MH-1, MW-3, and TP-2 (which is adjacent to MW-3), and were submitted for fingerprinting analysis according to USEPA SW-846 Method 8015 in order to determine the chemical composition and petroleum product identity. The samples were obtained using a bottom-loading bailer. The results of the fingerprinting analyses were inconclusive and are presented in Table 2-13. An additional LNAPL sample was collected from TP-2A in August 2001, and the results are further discussed in Section 3.1.4.

WASTE MANAGEMENT AND DISPOSAL

Waste generated during the RI requiring management and disposal consisted of general trash (boxes, paper, etc.), wash water, residual soil generated during decontamination activities, polyethylene tubing used in

well development and purging activities, and personal protective equipment such as Tyvek clothing.

All paper, cardboard, and plastic refuse were taken off-site and disposed of as municipal waste. The volume of soil generated from the installation of soil borings and monitoring wells (drill cuttings) was limited due to the relatively shallow completion depths. The drill cuttings were disposed of adjacent to the well and soil boring locations and in accordance with NYSDEC TAGM No. 4032. Well development and purge water was discharged to the land surface in the vicinity of the well in accordance with the protocols established in the RI Work Plan. The sole exception to this was the development and purge water generated at MW-3. This material was containerized and disposed at a licensed off-site TSDF due to the elevated PID readings and the presence of LNAPL. LNAPL that was collected from MW-3 was also containerized and disposed off-site at a licensed TSDF.

2.10 ANALYTICAL DATA QUALITY EVALUATION

The Quality Assurance Project Plan (QAPP) details the Data Quality Objectives (DQO) and the analytical requirements. Quality Assurance (QA) protocols (both New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) and non-ASP) are provided in the QAPP. As required, the selected analytical laboratory (Accutest Laboratories, Inc. of Dayton, New Jersey) has maintained New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certification in all categories of Contract Laboratory Program (CLP) and Solid and Hazardous Waste analytical testing for the duration of the project. For all laboratory analytical work NYSDEC ASP Category B deliverables were

provided. A Data Usability Summary Report (DUSR) was prepared for each round of analytical work. There are a total of four DUSR. Each DUSR can be found in Appendix K. Included with each DUSR are the validated and qualified organic and inorganic analysis data sheets (Form I) for each sample referenced by the DUSR. These validated Form I results have been transferred to each applicable analytical results summary table. As part of the Fish and Wildlife Impact Assessment, an additional DUSR was generated to evaluate the sediment data collected from the Union Ship Canal (Parcel 2) Remedial Investigation.

2.11 *RELIABILITY OF LABORATORY ANALYTICAL DATA*

The following section summarizes the results of the laboratory analysis Quality Assurance (QA). Included in this section is the discussion of the analytical procedures performed for the analysis of all environmental samples of various media collected during the investigation. A discussion pertaining to the validation and qualification of the analytical results is also provided.

2.11.1 *Laboratory Performing Analyses*

The environmental samples gathered during the investigation were analyzed by Accutest Laboratories, Inc. (Accutest), located at 2235 Route 130, Fresh Ponds Corporate Village, Building B, Dayton, New Jersey 08810. Accutest is a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) Contract Laboratory Program (CLP) certified laboratory. Accutest meets the requirements for documentation, data reduction and reporting (Lab ID number 10983) and is certified to perform the NYSDEC ASP CLP analytical methods used in this investigation. As part of the Fish and Wildlife Impact Assessment, sediment samples from the Union Ship Canal

(Parcel 2) Remedial Investigation were analyzed by the Ecology and Environment (E&E) Laboratory, Lancaster, New York. E&E is also a certified NYSDOH ELAP Laboratory.

2.11.2 *Analytical Procedures*

The samples collected at the Site, including soil, surface water, groundwater, and sediment were analyzed following the NYSDEC ASP CLP for all parameters except polychlorinated biphenyl compounds (PCBs). PCBs were analyzed in accordance with "Test Methods for Evaluation Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions". The reported PCB analytical results were consistent with ASP deliverable requirements. The ASP provides the technical and contractual background for environmental laboratories to conduct analytical methods for the preparation, detection and quantitative measurement of organic target compounds and inorganic target analytes in various matrices.

The samples collected during the investigation were analyzed for combinations of the following analytical methods. Most samples were analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs) plus 10 Tentatively Identified Compounds (TICs) by NYSDEC ASP CLP Method 95-1, TCL Semivolatile Organic Compounds (SVOCs) plus 20 TICs by NYSDEC ASP CLP Method 95-2 and Target Analyte List (TAL) inorganics (23 metals) using the NYSDEC ASP CLP Analytical Methods for Inorganics. Samples collected from the Soil Boring Investigation, the Groundwater Investigation and as part of the Fish and Wildlife Impact Assessment were analyzed for PCBs by USEPA SW-846 Method 8082 while samples from the Canal (UC-1 and UC-2) and samples collected from numerous manholes (MH-1, MH-2 and MH-3) were analyzed for Pesticides and PCBs (Pest/PCBs) by NYSDEC ASP CLP

Method 95-3. The analytical protocols for the TCL VOCs, TCL SVOCs and Pest/PCBs are found in Exhibit D Parts II, III, and IV, respectively, of the NYSDEC CLP ASP. The analytical protocols for the TAL inorganics are found in Exhibit D, Part V of the NYSDEC CLP ASP. The TCL/TAL is detailed in Exhibit C of the ASP. The analytical protocols for the PCBs can be found in "Test Methods for Evaluation Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Additionally, select surface water and groundwater samples were analyzed for Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids by USEPA Methods 405.1, 410.1, 160.2 respectively following *Methods for Chemical Analysis of Water and Waste, EPA-600/4-79-020, March 1983* and GC Fingerprint analysis by a modified USEPA Method 8015B following "Test Methods for Evaluation Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions". Select sediment samples were analyzed for Total Organic Carbon USEPA Method 9060 following "Test Methods for Evaluation Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

2.12 DATA VALIDATION

2.12.1 Objectives

Data validation is the assessment of data quality with respect to method requirements and technical performance of the analytical laboratory. The overall objective of the data validation process is to determine the degree of confidence that may be placed on the analytical results. The validation process identifies deviations from the ASP, poor quality control (QC) results, matrix interference, and other analytical problems that may compromise the potential uses of the data. Analytical data packages were examined to ensure that all required laboratory components are included,

all QA/QC requirements were performed, and the data use restrictions were well defined. The analytical data were qualified and appropriately flagged by the data validator. This information was taken into account during the interpretation of the data.

2.12.2 *Procedures*

A Data Usability Summary Report (DUSR) was prepared for all data collected during the investigation. The DUSR was prepared according to the guidelines established by Division of Environmental Remediation Quality Assurance Group and reviewed the following questions:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?
- Have all holding times been met?
- Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?
- Have all of the data been generated using established and agreed upon analytical protocols?
- Does an evaluation of the raw data confirm the results provided in the data summary sheets and qualify control verification forms?
- Have the correct data qualifiers been used?

The data have been evaluated according to the protocols and quality control (QC) requirements of the analytical methods, the Analytical Services Protocols (ASP), the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic (Inorganic) Data Review (February 1994), the USEPA Region II Data Review Standard Operating Procedure (SOP) HW-2, Revision 11, January 1992: Evaluation of Metals Data for the CLP Program, the USEPA Region II Data Review SOP HW-6, Revision 12, March 2001: CLP Organics Data Review and Preliminary

Review and the reviewer's professional judgment. The order in which the aforementioned guidance documents and/or criteria were listed to be used for validation does not imply a hierarchy of reliance on a particular document. The most comprehensive reference sources of criteria will be used to perform a complete validation.

A preliminary review of the data was performed to verify that all of the necessary paperwork, such as chain-of-custodies, traffic reports, analytical reports, and deliverable packages, were present. A detailed quality assurance review was then performed by a qualified ERM chemist to verify the qualitative and quantitative reliability of the data as it was provided by the laboratory.

The following items/criteria were reviewed for Organics:

- Case narrative and deliverables compliance
- Holding times both technical and procedural and sample preservation (including pH and temperature)
- System Monitoring Compound (Surrogate) recoveries and summaries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) results, recoveries and summaries
- Blank spike (BS) results, recoveries and summaries
- Method blank results and summaries
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning and performance
- Initial and continuing calibration summaries
- Internal standard areas, retention times and summaries
- Field and Trip Blank Data
- Blind Field Duplicate sample results
- GC/Electron Capture Detector (ECD) Instrument Performance Check
- Pesticide Cleanup Checks

- Organic analysis data sheets (Form I)
- GC/MS chromatograms mass spectra and quantitation reports
- Quantitation/detection limits
- Qualitative and quantitative compound identification

The following items/criteria were reviewed for the Inorganics:

- Case narrative and deliverable requirements
- Holding times and sample preservation
- Detection limits
- Inorganic analysis data sheets (Form I)
- Initial and continuing calibration verifications
- Contract Required Detection Limit (CRDL) standard analysis
- Lab blank data
- Inductively Coupled Plasma Spectroscopy (ICP) interference check sample (ICS) analysis
- Matrix Spike analysis
- Matrix Duplicate analysis
- Laboratory control sample (LCS) results
- ICP serial dilution analysis
- Field Blank results
- Blind Field Duplicate results

Based upon the results of the data review, detailed data validation summary reports were prepared for each laboratory deliverables package. The reports consist of a section that contains an assessment of the deliverables, followed by a section that describes, on an item-by-item basis, the analytical results and any qualifications that should be considered when using the data. The qualifications were made by

assessing the results submitted by the laboratory in terms of the technical requirements of the analytical methods (including quality assurance/quality control [QA/QC] criteria) and the data validation requirements. The reports highlight the data results that did not meet QC limits and therefore may have required data qualification. The reports also indicate the data qualification actions taken as a result of these criteria.

Based upon the data evaluation process, the qualifications of data are made by the use of qualifier codes. These qualifiers serve as an indication of the qualitative and quantitative reliability of the data. The qualifier codes utilized for the are as follows:

- U – Non Detect. The compound was analyzed for, but not detected. The associated numerical value is the detection limit. The value is usable as a non-detect at the detection limit.
- J - Estimated value. The value was designated as estimated as a result of the data validation criteria. Also used to indicate tentatively identified compounds (TICs) or when an organic compound is present, but the concentration is less than the Contract Required Quantitation Limit (CRQL). The value is usable as an estimated result.
- UJ – The compound was analyzed for, but not detected. The associated numerical value is the detection limit. However, due to a QC exceedance the value is an estimated quantity. The value is usable as a non-detect at the estimated detection limit.
- B - for organics: The analyte was found in the associated blank as well as in the sample. However, the value is greater than the action level and has not been negated as blank contamination.
- B - for inorganics: Indicates the value is less than the Contract Required Detection Limit (CRDL) but greater than the Instrument Detection Limit (IDL).
- D – The compound was identified in an analysis at a secondary dilution factor.
- N - Indicates presumptive evidence of a compound. This flag is used for TICs. Typically a Chemical Abstract Services (CAS) number is reported with the TIC.

- P – Indicates that the difference between the sample results from the two analytical columns is greater than 25%.
- R - Rejected. Quality control indicates that the data are unusable (compound may or may not be present).

2.12.3 *Results*

The analytical results for all samples collected as part of the investigation are valid and usable with qualifications as noted in each DUSR. All data qualifiers were taken into account during the interpretation of the analytical results. Analytical results were simplified for preparation of the analytical results summary tables provided in Tables 2-2, through 2-5, 2-8 through 2-12, and 2-16 through 2-19. Qualifier flags were limited to “U” for non-detects, “J” for estimated values based upon results of the validation, “UJ” for non-detect values that were estimated based on the validation and “R” for values that were deemed as unusable during the validation process based on quality control deficiencies. A limited number of analytical results were rejected based on the data evaluation. The results were rejected due to severe QC deficiencies and/or a method by-product as discussed in the validation reports presented in Appendix K. Overall there was no significant impact regarding the usability of the data set. The validator has determined that after thorough review of the entire data set, all samples collected during the investigation are valid and should be considered usable.

The QAPP details the data quality objectives and analytical requirements. Quality assurance protocols (both ASP and non-ASP) are provided in the QAPP. As required, the selected analytical laboratory has maintain NYSDOH ELAP certification in all categories of CLP and Solid and Hazardous Waste analytical testing for the duration of the project. For all laboratory analytical work “Category B Deliverables” were provided. A

Data Usability Summary Report was prepared for each round of analytical work.

2.13 EXPOSURE ASSESSMENT

A qualitative Human Health Exposure Assessment for the Site was completed. The objectives of the Exposure Assessment were to:

- identify potential exposure pathways for contaminants at the Site;
- identify chemicals of concern for each exposure pathway; and
- qualitatively evaluate potential human health exposures for each pathway.

The Exposure Assessment was conducted in accordance with the protocols specified in the RI Work Plan (ERM, 2000), and is presented in Section 3.2.

2.14 FISH AND WILDLIFE IMPACT ANALYSIS

A fish and wildlife impact analysis (FWIA) was scheduled to be conducted concurrently with the RI activities which occurred in the Fall of 2000. However, it was determined that the FWIA should be conducted during the late spring or early summer months. Consequently, the FWIA was conducted in April 2001.

The FWIA was conducted in accordance with the NYSDEC FWIA procedures presented in the NYSDEC Division of Fish and Wildlife, "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites" (dated October, 1994). The FWIA, which includes Step I (Site Description) and the pathway analysis and criteria-specific sections of Step II (Contaminant-Specific Impact Analysis), is presented in Section 3.3.

Because no resources or pathways are present, impact to resources can be considered minimal and no additional analysis beyond Step II is required.

2.15 *SUPPLEMENTAL INVESTIGATION*

Additional RI activities were conducted in the Summer of 2001 to investigate MH-1, and to determine the nature and extent of contamination of NAPL in the vicinity of SB-18 and MW-3. The findings of this work are presented in Section 3.1.4.

3.0 DESCRIPTION OF ENVIRONMENTAL CONDITIONS

3.1 RELIABILITY OF LABORATORY ANALYTICAL DATA

The validated results of the sampling and analyses carried out as part of the Shenango Steel RI are presented in Tables 2-2 through 2-5, 2-8 through 2-12, and 2-16 through 2-19.

Data were evaluated by comparison of the results with the standards, and guidance values (criteria) presented in NYSDEC TAGM-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels" (January 1994), NYSDEC guidance "Technical Guidance for Screening Contaminated Sediments" (January 1999), and NYSDEC TOG No. 1.1.1 "Ambient Water Quality Standards and Guidance Values" (1998). In regard to inorganic constituents in soil, the NYSDEC TAGM-4046 Recommended Soil Cleanup Objectives (RSCOs) were used to screen the chemicals detected in soil. Accurate background samples were difficult to obtain due to the surrounding industrial properties. Therefore, New York regional data (E. Carol McGovern, NYSDEC Wildlife Resources Center) and Eastern U.S. background data (Shacklette and Boerngen, 1984) were used to evaluate metal concentrations when TAGM-4046 indicated the use of Site background concentrations.

3.1.1 Soil

As described Section 2.2, continuous soil samples were collected at each of the 68 soil boring installed as described Section 2.2. Of those samples collected, a total of 138 were sent to Accutest Laboratory for analysis for VOCs, SVOCs, PCBs and TAL Metals. Table 2-1 summarizes the samples collected and identifies those selected for analysis. As described in Section 2.2, soil samples were also screened in the field for the presence of

VOCs, checked for staining, discoloration, or other indications of contamination. These results are noted on the geologic logs, which are present in Appendix G. The results of the chemical analyses are presented on Table 2-2 through Table 2-5.

3.1.1.1. *Underground Storage Tanks*

Polychlorinated Biphenyls (PCBs)

A total of 75 PCB soil samples were collected from the 200-foot grid. The analytical results for these samples are presented in Table 2-2. Twenty-six of the 75 PCB soil samples from this area contained Aroclors 1242, 1248, 1254 and 1260 at varying concentrations. Total PCB concentrations in three surficial soil samples (0 to 6 inch bgs surficial soil samples collected from borings SB-30-A, SB-31-A and SB-36-A) were above the 1,000 ug/kg TAGM No. 4046 RSCOs at concentrations 1,093 ug/kg, 1,151 ug/kg and 2,154 ug/kg respectively. These borings are located on the southern boundary of the study area.

Sixty-three additional PCB soil samples were collected from the 50 foot by 50 foot PCB area grid (i.e., the TGA) and sent for analysis. The analytical results for these samples are also presented in Table 2-2. In 40 samples, a combination of Aroclors 1248, 1254 and 1260 were detected. PCB concentrations in 8 of those samples exceeded the TAGM-4046 RSCOs. Seven of the exceedances were from surficial samples, SB-P05-A, SB-P07-A, SB-P08-A, SB-P10-A, SB-P11-A, SB-P16-A and SB-P18-A, collected from 0 to 6 inches bgs. SB-P07-A contained Aroclor 1260 at 10,800 ug/kg and a total PCB concentration of 11,785 ug/kg. SB-P07-A contained Aroclor 1260 at 1,090 ug/kg. It was the only detected PCB compound detected in this sample. SB-P08-A contained Aroclor 1260 at 138,000 ug/kg and it was again the only detected PCB. The only PCB detected in sample SB-P10-A was Aroclor 1260 at 3,250 ug/kg. SB-P11-A only contained

Aroclor 1260 at a concentration of 22,800 ug/kg and SB-P16-A only contained Aroclor 1260 at concentrations of 11,300 and 7,800 ug/kg, respectively. Only one of the eight samples collected from this area, SB-P09-B, collected at a depth of 5-feet bgs exceeded the 10,000 ug/kg sub-surface TAGM-4046 RSCO. Aroclor 1260 was the only PCB detected at a concentration of 27,800 ug/kg. The locations of soil samples where PCBs were detected are shown on Figures 2-3 through 2-6.

Semivolatile Organic Compounds (SVOCs)

The analytical results for SVOCs in soil are presented in Table 2-5. A number of SVOCs were detected in the soil boring samples. The SVOC detected can be divided into three general categories: polynuclear aromatic hydrocarbons (PAHs), dichlorobenzenes, and phthalates. Contaminants from one more of these groups were detected in 37 out of the 42 samples collected. However, only PAHs exceeded TAGM-4046 criteria. Concentrations exceed TAGM-4046 RSCOs in a total of 15 locations. PAHs exceeding RSCOs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene. PAHs exceeded RSCOs in 11 borings including SB-02, SB-04, SB-06, SB-08, SB-10, SB-12, SB-16, B-18, SB-20, SB-22, SB-24, SB-26, SB-28, SB-34, SB-36, SB-P05, SB-P29. The locations of these borings are shown on Figure 2-1.

Benzo(a)anthracene was detected in exceedance of the 224 ug/kg RSCO in 11 borings at concentrations ranging from 240-11,000 ug/kg including samples SB-04-A at 890 ug/kg, SB-04-C at 240J ug/kg, SB-06-A at 2,000 ug/kg, SB-08-A at 11,000 ug/kg, SB-08-C at 3,800 ug/kg, SB-10-A at 420 ug/kg, SB-10-C at 580 ug/kg, SB-12-A at 290J ug/kg, SB-12-C at 1,000 ug/kg, SB-16-A at 1,400 ug/kg, SB-18-A at 240J ug/kg, SB-18-B at 390J ug/kg, SB-22-A at 370J ug/kg, SB-22-C at 700 ug/kg, SB-28-C at 330J

ug/kg, SB-P05-A at 320J ug/kg, SB-P05-C at 480J ug/kg, SB-P29-B at 310J ug/kg and SB-P29-C at 9,500 ug/kg.

Chrysene was detected in 10 borings at concentrations exceeding the 400 ug/kg RSCO in samples SB-04-A at 1,200 ug/kg, SB-06-A at 2,200 ug/kg, SB-08-A at 9,200 ug/kg, SB-08-C at 4,900 ug/kg, SB-10-A at 430 ug/kg, SB-10-C at 570 ug/kg, SB-12-C at 1,300 ug/kg, SB-16-A at 1,500 ug/kg, SB-18-B at 470 ug/kg, SB-22-A at 480 ug/kg, SB-22-C at 740 ug/kg SB-P05-C at 670J ug/kg and SB-P29-C at 8,500 ug/kg. Chrysene concentrations ranged from 430 to 9,200 ug/kg.

Benzo(b)fluoranthene was detected in 6 boring locations at concentrations exceeding the 1,100 ug/kg RSCO. The samples include SB-04-A at 2,000 ug/kg, SB-06-A at 2,200 ug/kg, SB-08-A at 9,200 ug/kg, SB-08-C at 7,000 ug/kg, SB-16-A at 1,200 ug/kg, SB-22-C at 1,500 ug/kg and SB-P29-C at 9,300 ug/kg. Benzo(b)fluoranthene concentrations ranged from 1,200 to 9,300 ug/kg.

Benzo(k)fluoranthene was detected in 3 borings in exceedance of the 1,100 ug/kg RSCO including samples SB-06-A at 1,200 ug/kg, SB-08-A at 6,200 ug/kg, SB-08-C at 2,900 ug/kg and SB-P29-C at 6,600 ug/kg. Concentrations of benzo(k)fluoranthene ranges from 1,200 to 6,600 ug/kg.

Benzo(a)pyrene was detected in exceedance of the 61 ug/kg RSCO in 17 borings locations including samples SB-02-C at 120J ug/kg, SB-04-A at 1,600 ug/kg, SB-04-C at 250J ug/kg, SB-06-A at 4,400 ug/kg, SB-06-C at 230J ug/kg, SB-08-A at 8,100 ug/kg, SB-08-C at 6,200 ug/kg, SB-10-A at 420 ug/kg, SB-10-C at 610 ug/kg, SB-12-A at 400J ug/kg, SB-12-C at 1,700 ug/kg, SB-16-A at 960 ug/kg, SB-18-A at 250J ug/kg, SB-18-B at 380J ug/kg, SB-20-A at 130J ug/kg, SB-22-A at 740 ug/kg, SB-22-C at 1,400 ug/kg, SB-24-A at 88J ug/kg, SB-24-C at 260J ug/kg, SB-26-A at 220J

ug/kg, SB-28-A at 230J ug/kg, SB-28-C at 660 ug/kg, SB-34-A at 68J ug/kg, SB-36-A at 100J ug/kg, SB-P05-A at 370J ug/kg, SB-P05-C at 620J ug/kg, SB-P29-B at 340J ug/kg and SB-P29-C at 9,000 ug/kg. Concentrations of benzo(a)pyrene ranged from an estimated 230 to 9,000 ug/kg.

Indeno(1,2,3-cd)pyrene was detected in only 1 boring location exceeding the 3,200 RSCO in sample SB-P29-C at a concentration of 4,300 ug/kg.

Dibenz(a,h)anthracene was detected in exceedance of the 14 ug/kg RSCO in 15 locations including samples SB-02-C at 57J ug/kg, SB-04-A at 570 ug/kg, SB-04-C at 76J ug/kg, SB-06-A at 1,100 ug/kg, SB-06-C at 64J ug/kg, SB-08-A at 1,500 ug/kg, SB-08-C at 1,300 ug/kg, SB-10-A at 74J ug/kg, SB-10-C at 120J ug/kg, SB-12-A at 100J ug/kg, SB-12-C at 530 ug/kg, SB-16-A at 250J ug/kg, SB-18-A at 67J ug/kg, SB-18-B at 120J ug/kg, SB-20-A at 23J ug/kg, SB-22-A at 270J ug/kg, SB-22-C at 530 ug/kg, SB-24-A at 22J ug/kg, SB-24-C at 60J ug/kg, SB-26-A at 48J ug/kg, SB-34-A at 45J ug/kg, SB-P05-A at 140J ug/kg, SB-P29-B at 64J ug/kg and SB-P29-C at 1500J ug/kg. Concentration ranged from an estimated concentration of 22 ug/kg to 1,500 ug/kg.

Dichlorobenzenes and phthalates detected in the soil samples did not exceed any RSCOs.

Volatile Organic Compounds (VOCs)

A total of twenty-four soil samples were collected for VOC analysis. The analytical results for these samples are presented in Table 2-3. Twenty of the twenty-four soil samples contained measurable concentrations several VOCs. Only two of those samples, SB-P29-B and SB-P29-C, exceeded the 200 ug/kg RSCO for 1,1-dichloroethane with detected concentrations of

310 ug/kg and 220 ug/kg respectively. Samples SB-02-C, SB-04-C, SB-14-C, and SB-16-C did not contain VOCs.

VOCs detected at concentrations below applicable RSCOs include: acetone, toluene, 2-butanone, 1,1,1-trichloroethane, chloroethane, methylene chloride.

Inorganic Compounds (Metals)

A total of forty-two Site wide soil samples were collected and analyzed for TAL Metals. The analytical results for these samples are presented in Table 2-4. Inorganic constituents detected in the soil boring samples include aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc. Background soil analyses were not carried out as part of this investigation; therefore RSCOs based either on Eastern U.S. background concentrations, New York regional background data or risk derived concentrations were used for comparison purposes. Comparison with these criteria indicated that the concentrations of arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, mercury, nickel, selenium, and zinc are above TAGM-4046 criteria. All samples exhibited exceedances of one or more RSCOs.

Arsenic was detected in exceedance of Site background concentrations, 12 mg/kg in 8 samples, SB-04-C at 38.5 mg/kg, SB-06-C at 29.5 mg/kg, SB-10-C at 26J mg/kg, SB-18B at 53.9 mg/kg, SB-18-C at 20.9 mg/kg, SB-20-A at 15.8J mg/kg, SB-P29-B at 14.7J mg/kg and SB-P29-C at 26.1J mg/kg.

Beryllium was detected at concentrations greater than the 1.75 mg/kg New York Region background concentration in 19 samples from 15

locations: SB-02-A at 2.3 mg/kg, SB-02-C at 2.8 mg/kg, SB-06-A at 2.2 mg/kg, SB-08-A at 3.6J mg/kg, SB-10-A at 2.1J mg/kg, SB-22-A at 2.1J mg/kg, SB-24-A at 3.5J mg/kg, SB-24-C at 3.6J mg/kg, SB-26-A at 3.7J mg/kg, SB-28-A at 4J mg/kg, SB-28-C at 2.7J mg/kg, SB-32-A at 5.2 mg/kg, SB-34-A at 4.6 mg/kg, SB-36-A at 5.2 mg/kg, SB-36-C at 3.5, SB-P05-A at 2.3 mg/kg, SB-P05-C at 1.8 mg/kg, SB-P29-A at 5.8J mg/kg and SB-P29-C at 26.1J mg/kg.

No beryllium concentration in any of the 19 samples, however, exceeds the Eastern US upper bound concentration.

Cadmium was detected above the NYSDEC RSCO of 1.0 mg/kg in three samples. These included: SB-06-C at 5.5 mg/kg, SB-10-C at 1.9 mg/kg, and SB-P05-A at 1.2 mg/kg.

The concentration of the chromium exceeds the 40 mg/kg New York Background concentration in only 3 samples including, SB-06-C at 50.3J mg/kg, SB-10-C at 43.7J mg/kg, and SB-32-A at 121 mg/kg.

Copper was detected above the 50 mg/kg New York background concentration in 11 samples: SB-04-C at 149 mg/kg, SB-06-C at 124 mg/kg, SB-10-C at 303J mg/kg, SB-12-A at 68.7 mg/kg, SB-12-C at 526 mg/kg, SB-18-B at 105 mg/kg, SB-18-C at 481 mg/kg, SB-32-A at 91.6 mg/kg, SB-34-A at 51.7 mg/kg, SB-P29-B at 150J mg/kg and SB-P29-C at 442J mg/kg. Concentrations ranged from 51.7 mg/kg to 526 mg/kg. All concentrations were within the Eastern US range.

Lead exceeded the New York background concentration of 200 mg/kg in 8 samples including SB-04-C, SB-06-C, SB-10-C, SB-12-A, SB-18-B, SB-18-C, SB-P29-B and SB-P29-C. Concentrations ranged from an estimated

concentration of 207 mg/kg to 1150 mg/kg. The latter concentration exceeds Eastern US background concentrations.

Magnesium exceeded New York background concentration in 31 of the 42 samples collected for metals analysis. However, all concentrations were below Eastern US background levels. Elevated concentrations of magnesium are not surprising considering their prevalence of calcium/magnesium bedrock minerals in this part of New York State.

Mercury exceeded the 0.2 mg/kg New York State background concentrations in 7 samples SB-04-C at 0.42J mg/kg, SB-06-C at 0.27J mg/kg, SB-10-C at 0.64 mg/kg, SB-12-A at 0.37 mg/kg, SB-12-C at 0.37 mg/kg, SB-18-B at 0.2J mg/kg, and SB-P05-A at 0.2J mg/kg.

Nickel exceeded the New York State background concentration of 25 mg/kg in samples SB-02-C at 25.9 mg/kg, SB-04-C at 37.8 mg/kg, SB-06-C at 33.8 mg/kg, SB-10-C at 27.1J mg/kg, SB-18-C at 61.5 mg/kg, SB-30-B at 26.8 mg/kg, SB-32-A at 41.8 mg/kg, SB-32-B at 33.3 mg/kg, SB-34-C at 25.8 mg/kg, and SB-P29-C at 31.1J mg/kg.

Selenium was detected in excess of the 3.9 mg/kg New York State background concentration in samples, SB-04-C at 5.7J mg/kg, SB-18-C at 5.1J mg/kg, and SB-P29-C at 3.9J mg/kg.

The New York State background concentration of zinc is 50 mg/kg. Samples SB-02-A at 187 mg/kg, SB-02-C at 80.6 mg/kg, SB-04-A at 82.7 mg/kg, SB-04-C at 667 mg/kg, SB-06-A at 96.3 mg/kg, SB-06-C at 1470 mg/kg, SB-08-A at 235Jmg/kg, SB-10-A at 90.6J mg/kg, SB-10-C at 877J mg/kg, SB-12-A at 243J mg/kg, SB-12-C at 162J mg/kg, SB-16-A at 114J mg/kg, SB-18-A at 86.4 mg/kg, SB-18-B at 351 mg/kg, SB-18-C at 710 mg/kg, SB-20-A at 407J mg/kg, SB-20-C at 300J mg/kg, SB-24-A at 92J

mg/kg, SB-26-A at 122J mg/kg, SB-28-A at 52.8J mg/kg, SB-28-C at 219J mg/kg, SB-30-A at 57.2 mg/kg, SB-30-B at 69.3 mg/kg, SB-32-A at 267 mg/kg, SB-32-B at 87.2 mg/kg, SB-34-A at 244 mg/kg, SB-34-C at 64.6 mg/kg, SB-36-A at 34.4 mg/kg, SB-36-C at 68 mg/kg, SB-P05-A at 259 mg/kg, SB-P05-C at 219 mg/kg, SB-P29-B at 211J mg/kg and SB-P29-C at 156J mg/kg. The zinc concentration range in these samples was from an estimated 52.8 mg/kg to 1470 mg/kg. This concentration range is within Eastern US values.

Iron, although detected in many samples above RSCOs, the metal did not exceed New York State background concentrations.

3.1.2 *Groundwater*

As described in Section 2.8, groundwater samples were collected from 8 monitoring wells during the RI. For the initial round of groundwater sampling, sample analyses included full TCL and TAL analyses. During the groundwater sampling events, groundwater elevation, pH, temperature, specific conductivity, and turbidity measurements were also collected from the wells being sampled. A summary of the measurements collected is presented on the Groundwater Sampling records (Appendix I).

3.1.2.1 *Groundwater Quality*

The groundwater quality data resulting from the initial sampling event in December 2000 are discussed in the following sections. Note that monitoring well MW-3 was sampled; however a layer of LNAPL was detected floating on the water table at this location. The LNAPL is a viscous fluid that appears to be hydrocarbon based. The LNAPL is discussed further in Section 3.1.4. Groundwater data from this initial sampling round are presented on Tables 2-16 to 2-19. Figure 2-9 presents

a summary of all groundwater sampling locations where the class GA groundwater quality standards were exceeded.

Volatile Organic Compounds

The analytical results for VOCs in groundwater are presented in Table 2-16. VOCs detected in MW-1 included toluene, ethylbenzene, and xylene. Acetone, 1,1-dichloroethane, methylene chloride, and 2-butanone were observed at concentrations below the applicable CRDL in MW-1, MW-3 and MW-4. Methylene chloride, acetone and 2-butanone were detected in MW-1. Acetone and 1,1-dichloroethane were detected in MW-3 and only acetone was detected in MW-4. These compounds are common laboratory contaminants; however, the concentrations at which they were detected are above concentrations associated with blank samples, and therefore reported values cannot be attributed to blank contamination. The presence of these compounds, even though valid under standard validation criteria, must be suspect because of their laboratory usage. These compounds will therefore be considered artifacts. At well MW-1, concentrations of toluene at a concentration of 15 ug/l, ethylbenzene at a concentration of 26 ug/l, and xylenes at a concentration of 120 ug/l exceeded the ambient water quality standards of NYSDEC TOGS 1.1.1. VOC results are shown in Table 2-16.

Semivolatile Organic Compounds

The analytical results for SVOCs in groundwater are presented in Table 2-17. Estimated concentrations of SVOCs were observed in monitoring wells MW-2, MW-3 and MW-109. In MW-2 acenaphthene, dibenzofuran, fluorene, carbazole, fluoranthene and pyrene were detected. In MW-3 2,4-dimethylphenol was detected and in MW-109 nitrosodiphenylamine was detected. Only two SVOCs exceeded ambient water quality standards in this round of sampling. In MW-109, the concentration of 4-methylphenol

at 2 ug/l, and at MW-3 the concentration of 3 ug/l exceeded the class GA groundwater water quality standard of 1 ug/l. In MW-3, the concentration of 2-methylphenol exceeded the water quality standard of 1 ug/l. SVOC results for groundwater are shown in Table 2-17.

PCBs

Analyses of groundwater samples collected during this round of samples did not detect any PCBs. PCB analyses of groundwater samples are shown in Table 2-18.

Inorganic Compounds

The analytical results for inorganic compounds (metals) in groundwater are presented in Table 2-19. Metals were detected in all wells sampled. Generally, the groundwater in all wells sampled contained iron, magnesium and sodium above Class GA groundwater quality standards and guidance values. The concentration of manganese, detected in MW-2, MW-4, and MW-102, suggests mineralization of the groundwater potentially by Site activities. The concentrations of antimony in MW-5 and arsenic in MW-110 also exceeded Class GA groundwater quality standards. The distribution of impacted monitoring wells, where groundwater chemistry exceeds standards, however, does not suggest a particular source of contamination.

3.1.2.2 *Groundwater Elevation and Flow*

Collected groundwater elevation data are presented in Table 2-15. The depth to water at the Site ranges from approximately 3.0 feet below grade in the western sections to approximately 11 feet in the eastern sections. Localized flow patterns, as shown on the groundwater gradient maps (Figure 3-1 and 3-2), illustrate a generalized flow toward the

topographically low areas to the north and east of the site, and, possibly toward the Canal. This flow direction appears to be consistent with the local and regional topographic setting.

As described in Section 2.7.5, slug tests were conducted in selected monitoring wells to evaluate hydraulic conductivity of Site soils. The wells tested included: MW-1, MW-2, MW-4, MW-5 and MW-102. The results of the tests are presented in Table 3-1.

The Site has a significant amount of fill material located on the eastern section in the locations of MW-2, MW-3, and MW-5 of the property and a mounding of groundwater appears to be occurring in that area. Using an average K of 6.8 feet/day (calculated from the slug test data), an assumed porosity of 0.35, and a hydraulic gradient of 0.013 to 0.046 (as estimated in the 1995 PSA), the groundwater velocity is calculated to be between 0.3 and 0.9 feet/day.

As presented in Table 3-1, the hydraulic conductivity at MW-4 is significantly lower than the other wells. MW-4 is located on the adjacent Hanna Furnace property. Also, as indicated in the Well Installation Logs in Appendix H, MW-4 is screened in deposits containing mostly clay and organic material, as opposed to the on-Site wells which seem to be located in looser material composed of sand, silt, and clay. Therefore, it is more appropriate to use the average K for the Site, excluding MW-4. Using the average K of 8.5 feet/day (excluding MW-4), an assumed porosity of 0.35, and a hydraulic gradient of 0.013 to 0.046 (as estimated by the PSA in 1995), the groundwater velocity is estimated to be between 0.3 and 1.1 feet/day.

At the Site, the most distant part of the Shenango Steel Mold property is located about 1500 feet away from the Canal. Therefore, the maximum

travel time for the Site groundwater to reach the Canal from this point would be approximately 3.7 to 13.7 years. The facility closed in 1982, therefore, if groundwater flows from the Site to the Canal, it is likely that Site groundwater, from the time of facility closure, would have already reached the Canal. However, groundwater contaminants typically travel slower than the groundwater itself. Therefore, it is difficult to predict whether or not Site contaminants could have reached the Canal.

3.1.3 *Surface Water Quality*

As part of the RI surface water samples were collected from the Canal (UC-1 and UC-2) and from three manholes (MH-1, MH-2 and MH-3). During initial Site activities, it was determined that the three manholes may be connected and may be discharging into the adjacent Canal. Thus, samples collected from the manholes were categorized as surface water samples and compared to NYS Ambient Water Quality Standards and Guidance Values for Class C waters. Additional evaluation of the manholes and the connection to the surrounding surface water bodies is presented in Section 3.1.4.

Samples were collected at each the five surface water locations for VOCs, SVOCs, Pesticides/PCBs and Metals. In addition, biological oxygen demand (BOD), chemical oxygen demand (COD) and total suspended solids (TSS) samples were also collected at MH-2, MH-3 and UC-1 locations. The results of the surface water sampling carried are presented in Tables 2-8 (TCL – VOCs), Table 2-9 (TCL - SVOCs), Table 2-10 (TAL – Inorganics), Table 2-11 (Pesticides/PCBs), and Table 2-12 (BOD, COD and TSS). Surface water sampling results which exceeded the Class C standards and guidance values are presented in Figure 2-9.

Volatile Organic Compounds

The analytical results for VOCs in surface water are presented in Table 2-8. Only one TCL VOC compound was detected in any of the surface water sample analyses. MH-1 contained acetone at a concentration of 23 ug/l. As described in section 3.1.2.1, acetone cannot be formally attributed to laboratory contamination. However, the presence of acetone at this low concentration must be considered suspect. No exceedances of other surface water quality standards or guidance values were observed.

Semivolatile Organic Compounds

The analytical results for SVOCs in surface water are presented in Table 2-9. Only one TCL SVOC compound was detected in surface water. In MH-1, 1,2,4-trichlorobenzene was detected at a concentration of 180 ug/l. This concentration exceeds the water quality standard of 5 ug/l.

Pesticides/PCBs

The analytical results for pesticides and PCBs in surface water are presented in Table 2-11. Only Aroclor 1260 was detected in surface water at a concentration of 120 ug/l. This concentration exceeds the water quality standard of 0.000001 ug/l.

BOD, COD and TSS

Analytical results for these parameters in surface water are presented in Table 2-12. BOD and COD were not detected in any of the surface water samples collected. TSS was detected in only one location. There were of 17.0 mg/l of TSS in MH-3.

Inorganic Compounds

The analytical results for metals (inorganics) are presented in Table 2-10. Metals were detected in all the surface water samples collected. Exceedance of ambient surface water quality standards occurred in two of the five samples collected: MH-1 and MH-3. In MH-1, detections of aluminum at a concentration of 10,400 ug/l, cobalt at a concentration of 5 ug/l, copper at a concentration of 134 ug/l, iron at a concentration of 19,900 ug/l, lead at a concentration of 174 ug/l, mercury at a concentration 0.5 ug/l, vanadium at a concentration of 17 ug/l and zinc at a concentration of 1,750 ug/l exceeded water quality standards. In MH-3, aluminum at a concentration of 17,200, cadmium at a concentration of 2.6 ug/l copper at a concentration of 79.5 ug/l, iron at a concentration of 87,300 ug/l, lead at a concentration of 70.8 ug/l, mercury at a concentration of 0.12 ug/l and zinc at a concentration of 1,440 ug/l exceeded surface water standards.

3.1.4 Results of Supplemental Investigation

In the Fall of 2000, test pits were installed near MW-3 to evaluate the extent of the LNAPL observed in this area. In August 2001, additional test pits were excavated to the south and west of SB-18 and MW-3. One LNAPL sample was collected from TP-2A (which is about 20 feet northwest of MW-3) in August 2001 and sent to a laboratory for forensic analysis consisting of a full scan GC/MS analysis of aliphatic and aromatic hydrocarbons containing between approximately four carbon atoms and thirty carbon atoms. Also, a simulated distillation was run on the sample to evaluate the type of fuel present. The specific gravity of the sample was measured at 0.935 (American Petroleum Institute gravity of 19.9). The analytical results, which are presented in Appendix L, show that the LNAPL was found to contain only petroleum hydrocarbons and did not

contain hazardous constituents. Based on the simulated distillation, specific gravity and GC/MS data, the LNAPL is likely an hydraulic oil. The nature and extent of the LNAPL (See Figure 2-10) has therefore been determined and the investigation and remediation of LNAPL-impacted areas will be transferred to the authority of the NYSDEC Region 9 Bureau of Spill Prevention and Response. This is in accordance with the protocols set forth in NYSDEC TAGM No. 4013, which states that State Superfund monies are not available to address a condition involving a non-hazardous material.

In addition, test pit activities were performed near manhole MH-1. These activities determined that MH-1 is an isolated structure, and no connections currently exist between MH-1 and the Canal, or any other piping network or subsurface structures. A photograph of MH-1 is presented as Photograph No. 4 in Appendix B, and presents this isolated nature of MH-1. Also, Appendix F contains a memorandum prepared by NYSDEC Region 9, and provides further discussion of the test pit activities near MH-1.

3.2 HUMAN HEALTH EXPOSURE ASSESSMENT

On the basis of the information presented in the preceding sections, a qualitative Human Health Exposure Assessment for the Site was completed. The purpose of the Exposure Assessment is to identify potential exposure pathways for contaminants at the Site and identify how any unacceptable exposure pathways might be eliminated/mitigated. The Exposure Assessment is conducted in accordance with the Site Work Plan (ERM, 2000).

The Exposure Assessment is divided into four sections. In the first step, potential exposure pathways for chemicals at the Site are identified

(Section 3.2.1). In the second step, chemicals of potential concern for each of the identified pathways/media are selected (Section 3.2.2). In the third step, a qualitative evaluation of potential human health exposures for each exposure pathway is conducted based on the identified chemicals of concern (Section 3.2.3). In the final step, the conclusions of the Exposure Assessment are presented (Section 3.2.4). - -

3.2.1 *Identification of Potential Exposure Pathways*

The Site occupies approximately 18 acres of developed land consisting of former mill building ruins and railroad spurs on the south side of the city of Buffalo. The Site is currently inactive, and is located within a heavily industrialized area. There are no surface water bodies at the Site itself. The mouth of the Canal is located approximately 200 feet to the southwest of the property boundary. The nearest residential areas are to the east and south at a distance of approximately one-half mile.

Three media were investigated at the Site: soil, groundwater, and surface water. Potential exposure pathways for each of these media are described below.

3.2.1.1 *Soil*

The Site is not currently in use for industrial activities, and the buildings on the property have been abandoned. The Site itself as well as all adjacent properties are zoned heavy industrial. However, there is evidence of use of the property by trespassers for various activities, including dirtbike riding, use of the abandoned buildings for temporary shelter, and access to fishing in the Canal. These trespassers could be exposed to Site soil via direct contact (incidental ingestion and dermal absorption). Future use of the Site has not been determined.

Chemicals in Site soil could also act as a source of groundwater contamination. Groundwater exposure pathways are discussed below.

3.2.1.2 *Groundwater*

There are currently no groundwater uses at the Site itself (e.g., domestic or industrial wells). Groundwater flow at the Site is toward topographically low areas surrounding the Site, such as the wetlands areas to the north and east of the Site. Groundwater may also flow to the southwest in the direction of the Canal and Lake Erie. As described above, this area is all zoned for heavy industrial use. According to the Preliminary Site Assessment Report (ABB, 1995), groundwater in the area is not used for any purpose. Based on the depth to the affected groundwater (5 to 10 feet) and the low yields (see Section 2.7), significant use of the groundwater for industrial purposes in the future is unlikely.

It is possible that groundwater may discharge to surface water (primarily the Canal). Potential impacts to surface water are discussed below.

3.2.1.3 *Surface Water*

The Preliminary Site Assessment Report (ABB, 1995) indicates that there are no surface water bodies at the Site itself. The nearest surface water is the Canal, which is located approximately 200 feet to the southwest of the property. Storm drains at the Site may discharge to the Canal. Exposure to chemicals in surface water in the Canal could occur through direct contact with and incidental ingestion of water from recreational activities (e.g., fishing and water skiing) and through ingestion of fish from the Canal. The Canal is designated as Class C (6 NYCRR 837.4), as is the immediately adjacent portion of Lake Erie to which the Canal discharges. The best usage of Class C waters is fishing and the waters are suitable for fish propagation and survival (6 NYCRR 701.8). NYSDEC regulations state that the water quality for Class C waters shall be suitable for primary

and secondary contact recreation, but that other factors may limit the use for these purposes.

3.2.2 *Identification of Chemicals of Potential Concern for Each Pathway*

Chemicals of potential concern for each exposure pathway/medium are identified based on exceedance of relevant SCGs. Data tables presented in Section 2.0 show all sampling results as well as the relevant SCGs. These tables were reviewed to identify chemicals of potential for each pathway/medium.

3.2.2.2 *Soil*

A total of 68 soil borings were installed as part of the RI, including both surface and subsurface samples. These samples were analyzed for one or more of the TCL/TAL groups of compounds (VOCs, SVOCs, PCBs, and inorganics). Additional information on the collection of these samples, sampling locations, and full sampling results are provided in Section 2.0. The results are discussed below.

Volatile Organic Compounds

A total of 24 soil samples were analyzed for VOCs. Table 2-3 (presented above) compares the VOC soil sampling data to the NYSDEC Recommended Soil Cleanup Objectives (RSCOs) from NYSDEC TAGM 4046 (dated January 24, 1994). As shown in that table, one chemical, 1,1-dichloroethane, was detected in concentrations in excess of the RSCO. This chemical is identified as a chemical of potential concern and is further evaluated in Section 3.2.3.

Semi-Volatile Organic Compounds

A total of 42 soil samples were analyzed for SVOCs. Table 2-5 (presented above) compares the SVOC soil sampling data to the relevant RSCOs. As shown in that table, seven SVOCs were detected in concentrations in excess of the relevant RSCOs (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene). These chemicals are identified as chemicals of potential concern and are further evaluated in Section 3.2.3.

PCBs

A total of 138 soil samples were analyzed for PCBs. Table 2-2 (presented above) compares the PCB soil sampling data to the relevant RSCOs. As shown in that table, two Aroclors (Aroclor-1248 and Aroclor-1260) were detected in concentrations in excess of the relevant RSCOs. These chemicals are identified as chemicals of potential concern and are further evaluated in Section 3.2.3.

Inorganics

A total of 42 soil samples were analyzed for inorganics. Table 2-4 (presented above) compares the inorganic soil sampling data to the relevant RSCOs. A number of the RSCOs for inorganics are based in part on Site background (SB). Site background soil data was not collected as part of the RI. As shown in Table 2-4, 10 inorganics were detected in concentrations in excess of the relevant RSCOs (arsenic, beryllium, cadmium, chromium, copper, iron, mercury, nickel, selenium, and zinc).

These chemicals are identified as chemicals of potential concern and are further evaluated in Section 3.2.3.

Because the RSCOs for some inorganics are based solely on Site background (SB), the above screening step does not consider these inorganics. Therefore, the detected concentrations of these inorganics were compared to the background concentrations listed in TAGM 4046 and shown in Table 2-4 in the column labeled "New York Region". Three inorganics with RSCOs listed as SB were found in concentrations in excess of "New York Region" background levels (calcium, lead, and magnesium). Therefore these three chemicals were also considered as chemicals of potential concern and are further evaluated in Section 3.2.3.

3.2.2.2 *Groundwater*

A total of eight groundwater samples were collected from eight monitoring wells during the RI. The samples were analyzed for the full suite of TCL/TAL compounds. Additional information on the sample locations and full sampling results are provided in Section 2.0. Tables 2-16, 2-17, 2-18, and 2-19 (presented above) provide the sampling results for VOCs, SVOCs, pesticides/PCBs, and inorganics, respectively. These tables compare the sampling data to the NYSDEC Water Quality Standards and Guidance Values for Class GA groundwater (from TOGS 1.1.1 dated June 1998), the relevant SCGs. As shown in these tables, chemicals detected in one or more samples above the SCGs include three VOCs (toluene, ethylbenzene, and xylene), two SVOCs (2-methylphenol and 4-methylphenol), and six inorganics (antimony, arsenic, iron, magnesium, manganese, and sodium). No pesticides/PCBs were detected above the SCGs. Therefore, these 11 chemicals are identified as chemicals of potential concern in groundwater and are further evaluated in Section 3.2.3.

3.2.2.3 *Surface Water*

Two surface water samples were collected from the Canal during the RI. One sample (UC-1) was collected at the outfall of the pipe which is believed to drain underground piping from the Site. This sample location is at the mouth of the Canal (see Figure 2-2). The second sample was taken downstream of the first sample. Both samples were analyzed for the full suite of TCL/TAL compounds. Further details of sample collection, sampling locations, and full analytical results are presented in Section 2.0.

Tables 2-8, 2-9, 2-10, and 2-11 (presented above) provide surface water sampling results for VOCs, SVOCs, inorganics, and pesticides/PCBs, respectively, as well as the relevant SCGs. It may be noted that this table also includes sampling results from the on-site manholes which may discharge to the Canal. Since sample UC-1 is located at the potential discharge point of these manholes, it is representative of potential impacts to surface water from these underground pipes. Thus, only data from the Canal (UC-1 and UC-2) are evaluated in this section.

Since the Canal is designated as Class C, the Class C standards and guidance values from TOGS 1.1.1 (dated June 1998) are the relevant SCGs. As shown in Tables 2-8 through 2-11, no volatile organics, semi-volatile organics, or pesticides/PCBs were detected in either UC-1 or UC-2. Furthermore, no inorganics were detected in these samples in concentrations above the SCGs. Therefore, discharges to the Canal from the Site do not represent a significant human exposure pathway and surface water is not further evaluated.

3.2.2.4 *Summary*

Table 3-2 summarizes the chemicals of potential concern at the Site. Potential human exposures for these chemicals and pathways are

qualitatively evaluated in Section 3.2.3. Exposure to chemicals in surface water does not represent a significant exposure pathway based on comparison of sampling data to SCGs.

3.2.3 *Qualitative Exposure Characterization*

3.2.3.1 *Soil*

Chemicals of potential concern in soil based on exceedance of SCGs include one VOC (1,1-dichloroethane), seven SVOCs (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene), two commercial PCB mixtures (Aroclor-1248 and Aroclor-1260), and 13 inorganics (arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, mercury, nickel, selenium, and zinc). Results for organic compounds and inorganics are addressed separately below.

Organic Compounds

NYSDEC TAGM-4046 presents acceptable soil levels for organic compounds for both direct contact with soil and for protection of groundwater. The lower of these two values is generally the Recommended Soil Cleanup Objective, which was used in Section 3.2.2 to screen the chemicals. The acceptable level for direct contact exposures is based on a residential exposure scenario, with children ages one to six ingesting soil. The acceptable level for protection of groundwater is based on leaching of chemicals in soil to groundwater where groundwater concentrations must meet promulgated or proposed New York State groundwater/drinking water quality standards. To determine which chemicals pose a human health exposure via each of the above pathways, the maximum detected concentration of each of the chemicals of concern is compared to these two acceptable levels (Table 3-3).

As shown in Table 3-3, organic chemicals present in soil at concentrations in excess of groundwater protection criteria include 1,1-DCA, Aroclor-1260, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. It may be noted that none of these chemicals were identified as chemicals of potential concern in Site groundwater (i.e., none had detected concentrations in groundwater in excess of groundwater quality standards and guidance).

Six of the seven chemicals (all but 1,1-DCA) were not detected in any groundwater samples. 1,1-DCA was detected in one sample at a concentration of 1J ug/l. Therefore, under current conditions, leaching of these chemicals in soil to groundwater is not a significant human exposure pathway. Furthermore, as noted in Section 3.2.2, groundwater in the area is not used for any purpose.

The NYSDEC direct contact screening criteria for Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene were exceeded in at least one surface and subsurface soil sample at the Site. The direct contact screening criterion for Aroclor-1248 was exceeded in surface samples, but not in any subsurface samples. Therefore, direct contact with these chemicals in soil may represent a significant current and future human exposure pathway. It may be noted that the direct contact criteria are based on incidental ingestion of soil by children in a residential setting. As noted above, the Site is zoned industrial (as is the surrounding land) and is not currently in use. However, currently, trespassers may gain access to the Site, and could be exposed to surface soil. Also, subsurface soils could become exposed depending on future use of the Site.

Inorganics

A total of 13 inorganics were identified as chemicals of potential concern in soil. These chemicals were identified based on exceedance of RSCOs without consideration of Site background data or, for those chemicals with RSCOs of "Site Background", based on exceedance of New York Region background levels as listed in TAGM 4046. TAGM 4046 does not include groundwater protection criteria and direct contact criteria for inorganics. Therefore, no pathway specific analysis can be completed for inorganics in soil.

To further evaluate the inorganic chemicals of potential concern in soil, Table 3-4 compares the maximum detected concentrations of these chemicals to the RSCOs, the New York Region background concentrations (as listed in TAGM 4046), and eastern U.S. background concentrations. As shown in this table, three metals are present in concentrations exceeding both New York Region background and eastern U.S. background concentrations, where available. These chemicals are cadmium, lead, and selenium. The concentrations of these metals is typical of the concentrations found in the soil of the surrounding industrial properties.

3.2.3.2 *Groundwater*

Chemicals of potential concern in groundwater at the Site based on exceedance of SCGs include three VOCs (toluene, ethylbenzene, and xylene), two SVOCs (2-methylphenol and 4-methylphenol), and six inorganics (antimony, arsenic, iron, magnesium, manganese, and sodium). Table 3-5 presents the maximum detected concentration of the chemicals of potential concern and the SCGs. The SCGs used to identify chemicals of potential concern in Section 3.2.2 are the NYSDEC Class GA groundwater quality standards and guidance values which are based on

use of water for water supply. However, as noted in Section 3.2.2, groundwater is not currently used for any purposes at the Site or in the Site area. Since groundwater can discharge to the Canal (a Class C surface water), Table 3-5 also presents the Class C surface water quality standards for human health impacts (fish ingestion) and aesthetics, where available.

The maximum detected concentrations of all eleven chemicals of potential concern exceed the Class GA groundwater quality standards or guidance values. The three VOCs (toluene, ethylbenzene, and xylene) were detected in one of eight wells (MW-1). The two SVOCs (2-methylphenol and 4-methylphenol) were detected in one and two samples, respectively. Of the inorganics, iron and manganese were detected in six of eight samples and four of eight samples, respectively, in concentrations above the Class GA standard of 300 ug/l. It may be noted that the Class GA standard for these two chemicals is based on aesthetics rather than human health impacts. Magnesium was detected in four of eight samples above the Class GA guidance value of 35,000 ug/l. No Class GA standard has been established for this chemical. Sodium was detected in six of eight samples in excess of the Class GA guidance value. As with magnesium, no Class GA standard has been established for sodium. Since groundwater is not currently used at the Site or in the Site vicinity for any purposes, although the Class GA standards and guidance values are exceeded, there is not a current complete exposure pathway for use of groundwater for water supply or other purposes. If groundwater were to be used in the future, the presence of these chemicals could pose a risk to human health.

Of the chemicals of potential concern in groundwater, Class C standards for the ingestion of fish or aesthetic impacts have been established for toluene, 2-methylphenol, and 4-methylphenol. The maximum detected concentrations of these three chemicals do not exceed the relevant Class C

standards. Therefore, no significant human exposures to chemicals in surface water are expected based on discharge of Site groundwater to the Canal.

3.2.4 *Conclusion – Human Health Exposure Evaluation*

Three media were evaluated for potential human health impacts: soil, groundwater, and surface water. A summary of the finding for each medium and the relevant pathways is provided below.

3.2.4.1 *Soil Pathways*

Direct Contact with Soil

Organic chemicals in soil that may pose an unacceptable exposure to human health via direct contact under current and future conditions include Aroclor-1248, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene. This evaluation is based on exceedance of residential direct contact criteria. However, the Site is currently zoned industrial and may remain so based on the Contemplated Use of the Site. Inorganics could not be evaluated on a pathway-specific basis. However, three inorganics (cadmium, lead, and selenium) were detected in concentrations above both New York regional background levels and eastern U.S. background levels.

Leaching of Chemicals in Soil to Groundwater

None of the organic chemicals detected in soil result in a significant human exposure pathway under current conditions through leaching to and subsequent use of groundwater. The concentrations of some chemicals in soil exceed the groundwater protection criteria. However, these chemicals were not detected in groundwater in excess of groundwater SCGs (Class GA groundwater standards), and the SCGs are

based on residential water usage. As noted in Section 3.2.2, there is currently no use of groundwater at the Site or in the Site vicinity.

Inorganics could not be evaluated on a pathway-specific basis. However, three inorganics (cadmium, lead, and selenium) were detected in concentrations above both New York region background levels and eastern U.S. background levels.

3.2.4.2 *Groundwater Pathways*

Use of Groundwater

Chemicals of potential concern in groundwater based on exceedance of water supply standards and guidance include three VOCs (toluene, ethylbenzene, and xylene), two SVOCs (2-methylphenol and 4-methylphenol) and six inorganics (antimony, arsenic, iron, magnesium, manganese, and sodium). However, groundwater at the Site itself and in the Site vicinity is not currently used for any purpose. Therefore, under current conditions, this does not represent a complete exposure pathway. If groundwater is used in the future for water supply or other purposes, this pathway would be a complete human exposure pathway. Based on the depth to the affected groundwater (5 to 10 feet) and the low yields, significant future use of Site groundwater is not expected.

Direct Contact with the Canal Water, Incidental Ingestion of the Canal Water, and Ingestion of Fish from the Canal Following Discharge of Site Groundwater to the Canal.

No significant impacts to human health based on direct contact with surface water, incidental ingestion of surface water, and ingestion of fish from the nearest surface water (the Canal) are expected to occur as a result of discharge of Site groundwater to the Canal.

3.2.4.3 *Surface Water Pathways*

Direct Contact with the Canal Water, Incidental Ingestion of the Canal Water, and Ingestion of Fish from the Canal

No significant impacts to human health based on direct contact with surface water, incidental ingestion of surface water, and ingestion of fish from the nearest surface water (the Canal) are expected to occur.

3.3 ***FISH AND WILDLIFE IMPACT ANALYSIS***

This Fish and Wildlife Impact Analysis was prepared as part of the RI for the Shenango Steel Mold site.

3.3.1 ***Scope of Work and Objectives for the FWIA***

The FWIA was conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC) guidance memorandum entitled “Fish and Wildlife Impact Analysis” dated October 1994. According to the NYSDEC guidance, the initial phase of the FWIA involves two steps:

Step I – Site Description, and

Step II – Contaminant-specific Impact Assessment

The objectives of Step I of the FWIA are (1) to identify the fish and wildlife resources that presently exist and that existed before contaminant introduction, and (2) to provide information necessary for the design of a remedial investigation. NYSDEC does not require a complete site description in cases where fish and wildlife resources are not affected by site-related contaminants.

The objective of Step II of the FWIA is to determine the impacts of site-related contaminants on fish and wildlife resources. Step IIA, Pathway Analysis, is the first step of the contaminant-specific impact assessment. If no resources or pathways are present, impact to resources can be considered minimal and no additional analysis is required. Step IIB, Criteria-Specific Analysis is conducted to compare site-specific contaminant levels with numerical criteria, and to determine the need for an additional and more in-depth phase of ecological investigation. By agreement with NYSDEC, this FWIA was to be conducted through Step IIB only.

3.3.2 *Step I – Site Description*

The Remedial Investigation (RI) report provides a general site description along with additional background information on site geology, hydrogeology, surface water hydrology, and operational/disposal history. The RI report provides a topographic map and drainage map for the site. A detailed cover type map was not prepared for this FWIA. However, cover types were generally identified from maps, aerial photos, and other information, and their associated fish and wildlife resources were described during a site visit, as described below.

A site visit was conducted by an ERM biologist on April 23, 2001. The purpose of the site visit was to satisfy FWIA requirements for an assessment of ecological conditions on and around the site, including a preliminary evaluation of potential threats of site contaminants to fish and wildlife. The site consists almost entirely of disturbed former industrial property. Based upon the classification system of the New York Natural Heritage Program (Reschke, C., 1990, *Ecological Communities of New York State*), the site could be described as a Terrestrial System: Urban vacant lot community type. Large portions of the property are barren and covered

with garbage, old tires, and other debris. Invasive shrub and herbaceous species are colonizing portions of the property, but due to the disturbed soils and recent history of industrial use at the site, the plant community is not well developed and does not provide important habitat for terrestrial wildlife. The primary woody species on site is aspen (*Populus* sp.), which vary in size from small saplings to trees.

A small number of songbirds were seen at the site including American robin (*Turdus migratorius*), red winged blackbird (*Agelaius phoeniceus*), and unidentified sparrows and other common birds. It is not known if these birds use the site for feeding or nesting, but some old nests were observed in small aspen trees. A white tailed deer was also observed on or near the western boundary of the site.

The site is generally well drained, but several small areas of standing water were seen. A few old foundations on site are collecting standing water, and several other small, inundated areas occur in natural depressions, which are occasionally fringed by reeds (*Phragmites*). A few aquatic insects such as water striders were observed in the shallow ponds. Although wetland delineation was not performed, it is unlikely that these areas would be classified as jurisdictional wetlands in New York State due to their small size, apparent impermanence, and lack of hydrophytic vegetation.

The most recent state and federal wetland maps were obtained to verify the absence of mapped wetlands on site. The New York State Freshwater Wetlands Map for Erie County and the United States Department of the Interior National Wetland Inventory (NWI) map for the Buffalo SE quadrangle do not show any mapped wetlands on or directly adjacent to the site. The New York State map is dated 1975 and the NWI map is based on aerial photography from October 1978.

Areas surrounding the site are generally similar in character to the site itself, and include abandoned as well as operating industrial facilities such as steel mills, junkyards, landfills, and roads. The Tifft Farm Nature Preserve, a 264-acre park administered by the Buffalo Museum of Science is located within 2 miles to the north, and could be a source of wildlife found on the site. The site is located within 1 mile of the eastern shoreline of Lake Erie, and within several hundred yards of the Union Ship Canal, a manmade abandoned shipping channel.

The USGS Buffalo SE topographic maps, dated 1965 and 1983 show the area directly to the west of the site and north of the Union Ship Canal as an open water pond. The NWI map also shows the western portion of this area consisting of two mapped wetlands, designated as POWZx (Palustrine Open Water Intermittently Exposed/Permanent Excavated) and PSS1E (Palustrine Scrub/Shrub Broad-Leaved Deciduous Seasonal Saturated) wetlands. Due to the age of these maps and the extensive disturbance of the area caused by former industrial use, abandonment, and site restoration activities over the past 20 to 30 years, the relevance of these maps to current conditions is believed to be limited. Several small ponds were observed to the west of the site but were not investigated as part of this FWIA. These ponds also appear on recent (1995) USGS aerial photos of the Buffalo Outer Harbor area (<http://terraservert.homeadvisor.msn.com>).

Due to the proximity of the site to the Union Ship Canal (the Canal) and the possibility of site drainage to the Canal (see below), fish and wildlife resources of the Canal were also evaluated during the site visit.

Fish and wildlife resources observed at the Union Ship Canal included numerous water birds, such as herring gulls (*Larus argentatus*), bank

swallows (*Riparia riparia*), bufflehead (*Bucephala albeola*), and Canada goose (*Branta canadensis*). The Canal also apparently supports abundant fish. Over ten people were observed fishing from the edge of the Canal during the site inspection, and one of the local fishermen described catching perch, bluegill, and bass. Many small minnows were observed in the water at the eastern end of the Canal, near a corrugated metal pipe (CMP) that may carry storm water from the Shenango site (see below). The edges, shoreline and concrete walls of the Canal are generally highly disturbed and in disrepair, and garbage and debris were observed along the waters edge. Because of the extensive disturbance and manmade nature of the Canal, it is not likely to support a large diverse ecosystem compared to natural riparian systems. Nevertheless, the Canal provides habitat connected to and protected from the open waters of Lake Erie, and it appears to be attractive to a variety of fish and wildlife species as well as a resource for human recreational use.

The New York State (NYS) Natural Heritage Program was contacted to update this information. Information was requested on the presence of rare or state-listed animals and plants, significant natural communities, and other significant habitats occurring on or in the immediate vicinity of the site. The information provided by the NYS Natural Heritage Program (June 27, 2001 correspondence) is considered sensitive and may not be released to the public without their permission. According to NYS Natural Heritage Program databases, the site is not within or adjacent to a NYS Wildlife Management Area. However, the project is within or adjacent to a designated Significant Coastal Fish and Wildlife Habitat. This habitat is part of New York State's Coastal Management Program , which is administered by the NYS Department of State. There is a record of a gull-nesting colony in Buffalo Harbor within approximately one mile of the site. The NYS legal status of this colony is unprotected and the state heritage rank is unknown. The colony was last seen on May 14, 1985

according to the database, and its quality, condition, viability, and defensibility was considered to be excellent at that time. The presence of rare species in the project area may result in the project requiring additional permits, permit conditions, or review by the NYSDEC regional office in Buffalo, N.Y. based on the Contemplated Use.

3.3.3 *Step II – Contaminant-Specific Impact Assessment*

Contaminants at the site are described in the RI report. The data were reviewed to evaluate potential contaminants of concern and exposure pathways for fish and wildlife. Based on the site survey, although wildlife do use the site and levels of some contaminants may present risk to those individuals, there do not appear to be fish and wildlife resources present in sufficient abundance or quality onsite to warrant an extensive evaluation of ecological risks. However, as described above, the nearby Union Ship Canal provides resources of value that could be of concern. Therefore, the RI data were reviewed to determine if there is evidence of potential site-related exposure to fish and wildlife in the Union Ship Canal. A corrugated metal pipe (CMP) located in the northeast corner of the Canal is believed to drain underground piping from the Shenango Steel Mold site. In the RI, two surface water samples were collected in the Canal, one at the outfall of the pipe and the other approximately 100 feet directly to the west. Water samples were also collected from several on-site manholes that may discharge to the Canal. The samples were analyzed for VOCs, SVOCs, pesticides/PCBs, and inorganics. The surface water samples taken from the Canal did not have any detectable organics, and inorganics were below Class C standards and guidance values from Technical and Operational Guidance Series (TOGS) 1.1.1 as prepared by the NYSDEC's Division of Water. However, several inorganics detected in the manhole water samples exceeded the standards and guidance values, including aluminum, cadmium, cobalt, copper, iron, lead,

mercury, vanadium, and zinc. Soils on-site are also contaminated with PCBs and PAHs in the former transformer scrapping area.

The presence of these inorganic contaminants and PCBs on-site suggests a possible pathway for contaminant migration to the Union Ship Canal. Although contaminants of concern were not identified in the surface water samples taken from the Canal, transport of PCBs and heavy metals is likely to be associated with soil particles, and sediment contamination in the Canal may be a more reliable indicator of site-related impacts. Moreover, due to the high detection limit used for analysis of PCBs in surface water, no conclusions can be made regarding potential impacts of PCBs to piscivorous wildlife that may use the Union Ship Canal from the surface water sample data.

In addition, a report of investigations conducted for the U.S. Army Corps of Engineers (USACE) was also reviewed for its relevance to the FWIA (PADIA Environmental Inc., *Final Report for Sediment Sampling and Chemical Analysis at the Union Ship Canal in Buffalo, New York, Volume I – Technical Report*, January 2000). The USACE investigation report describes the results of surface sediment sampling conducted in November 1999 at 11 locations spanning the length of the Union Ship Canal. Detected contaminants included organics (PCBs, PAHs), inorganics (metals), and petroleum hydrocarbons (oil and grease). PCBs were detected at eight of the sample stations at levels up to 1,341 ug/kg total PCBs (559 ug/kg Aroclor 1260 and 782 ug/kg Aroclor 1254). The maximum concentrations of inorganic contaminants included cadmium (4.1 mg/kg), copper (122 mg/kg), lead (857 mg/kg), mercury (.409 mg/kg), and zinc (2,480 mg/kg). These maximum concentrations generally exceed New York State sediment screening concentrations described in *Technical Guidance for Screening Contaminated Sediments*, NYSDEC Division of Fish, Wildlife and Marine Resources, January 1999 (see Table 3-6).

In addition, sediments were contaminated with PAHs exceeding NYSDEC screening values at certain locations. Based on the NYSDEC screening levels, sediments in the Canal would be considered moderately to severely impacted by organic and inorganic contamination at the maximum detected concentrations.

The closest sample to the site CMP in the USACE study was taken on the opposite side of the Canal. Given the Canal's long industrial use and proximity to heavy industry, past discharges from the site or from other sources in the vicinity could be responsible for the observed contamination. Concentrations of several constituents were lowest at the open western end of the channel (USACE Sample Location 1) and increased to a maximum concentration in the interior of the Canal, with a decreasing trend toward the closed eastern end of the Canal at USACE Sample Location 11 (e.g., for PCBs and zinc as shown in Figure 3-3). However, with the available data it is not possible to evaluate the relative contribution of recent or ongoing discharge from the site to contamination in Union Ship Canal sediments. Therefore, sediment samples were collected by ERM on July 31, 2001 in the vicinity of the CMP outfall to further investigate the historical transport of PCB and metal contamination to the Union Ship Canal via this pathway. The remainder of this report provides a discussion of this sampling data.

3.3.4 *Summary of NYSDEC Sediment Investigation Results in Union Ship Canal*

To evaluate sediment contamination extending from the CMP outfall into the Canal, seven sample stations were placed on two transects. Along one transect (designated Transect A), sampling station SED-1 was established adjacent to the mouth of the CMP and stations SED-3, SED-5 and SED-7 were placed at progressively greater distances from the outfall extending

approximately 400 feet to the southwest (see Figure 3-4). Along a second transect (designated Transect B) extending approximately 200 feet into the midchannel of the Canal, three samples were taken at sample stations SED 2, SED 4, and SED 6. A third set of six samples was taken along the opposite side of the Canal adjacent to Parcel 3 of the Hanna Furnace Site, designated sample stations USC-1 through USC-6.

The surficial sediment (top 6 inches) from each location was collected from a boat using a portable hand operated dredge according to standard project protocols. All samples were analyzed for volatile and semivolatile organic compounds, PCBs, inorganic analytes, and total organic carbon (TOC). Complete analytical results are provided in Table 3-7.

3.3.5 *Sediment Screening*

The available sediment data were evaluated according to the methodology presented in *Technical Guidance for Screening Contaminated Sediments* (NYSDEC, 1999). Maximum concentrations of the positively detected constituents were compared with the sediment screening levels identified in this guidance document. Table 3-8 provides a summary of frequency of detection, maximum concentration and maximum detection limit for nondetects. Table 3-9 summarizes the screening conducted for sediment samples collected from the Union Ship Canal. Four classes of constituents were evaluated in this screening assessment, inorganics, semivolatile organics, volatile organics and PCBs. The screening results for each of these classes of compounds are discussed further below.

Inorganics

As shown on Table 3-9, the maximum concentrations of positively detected inorganic sediment constituents were initially compared with the Lowest Effect Level (LEL) sediment criteria presented on Table 3-8 of the

NYSDEC guidance document. These criteria were available for twelve of the inorganic constituents identified from the sediment sampling in the Canal. According to NYSDEC guidance (1999), exceedances of the LEL criteria are indicative of “moderate” impacts. In general, reported concentrations of the inorganic constituents exceeded the available LEL values. However, it should be noted that exceedances of these criteria occurred at various locations in the Canal and no evidence of a site-related impact was indicated based on these screening results.

Following the comparison of sediment data with LEL criteria for inorganics, a secondary data comparison was conducted to evaluate maximum inorganic constituent concentrations with respect to Severe Effect Level (SEL) criteria (Table 3-10). NYSDEC considers exceedances of these levels to indicate “severe” impacts. As shown on Table 3-10, seven out of the twelve inorganic constituents discussed above exceeded the SEL criteria in at least one location. Mercury and silver concentrations exceeded SEL criteria in only one location each (USC-2), and copper exceeded the SEL criterion in two locations (SED-3 and USC-2). The remaining constituents, iron, lead, manganese and zinc exceeded the SEL criteria at seven or more of the sampling locations. It should again be noted that exceedances of these criteria occurred at various locations in the Canal and no evidence of a site-related impact was indicated based on the screening results.

Semivolatile Organics

With respect to positively detected semivolatile organic constituents (SVOCs), site-specific sediment criteria were derived using the organic carbon normalized criteria based on chronic toxicity to freshwater benthic aquatic life presented in Table 1 of the NYSDEC guidance document. Consistent with NYSDEC (1999), site-specific criteria were derived by multiplying the organic carbon normalized criteria by site-specific

concentrations of organic carbon. As shown on Table 3-9, phenol and benzo(a)anthracene were the only SVOCs with maximum concentrations greater than NYSDEC criteria. Phenol exceeded the criterion in the two samples in which it was positively detected, USC-1 and USC-2. Although benzo(a)anthracene was positively detected in all 13 samples, reported concentrations in only two locations, SED-3 and SED-7, were in excess of the sediment criterion.

Volatile Organics

Screening criteria were not available for the three volatile organic constituents (VOCs) detected in sediment samples, acetone, carbon disulfide and methylene chloride. However, these constituents were detected at relatively low concentrations (i.e., 3 ug/kg to 26 ug/kg) and are not believed to pose a significant risk to ecological receptors.

PCBs

Site-specific sediment criteria were derived for PCBs in the same manner described previously related to SVOCs. Organic carbon normalized criteria based on chronic toxicity to freshwater benthic aquatic life were multiplied by site-specific concentrations of organic carbon to derive site-specific sediment criteria. As shown on Table 3-9, only one Aroclor, Aroclor 1260, was reported at a maximum concentration in excess of the NYSDEC criterion. Because PCBs are potentially site-related, additional screening was conducted for Aroclor 1260, as further discussed below.

Site- and sample-specific sediment criteria were derived for Aroclor 1260 based on both the chronic toxicity to freshwater benthic aquatic life and wildlife bioaccumulation criteria presented in Table 1 of the NYSDEC guidance document. Individual sample results for Aroclor 1260 were compared with these criteria, as summarized on Table 3-11.

Concentrations of Aroclor 1260 exceeded the benthic life criteria at three locations, SED-1, SED-2 and SED-3. The wildlife bioaccumulation criteria were exceeded at each of the "SED" sampling locations, as well as the USC-1 location. PCB concentrations were highest at sampling locations SED-1 through SED-4, indicating a potential site-related source.

Based on these results, there is an area of apparently localized PCB contamination extending from the CMP at the northwestern end of the Union Ship Canal. Along both Transects A and B, concentrations of PCBs are highest at the stations closest to the CMP (SED-1 on Transect A, and SED-2 on Transect B). The spatial pattern of declining PCB contamination with distance from the outfall is evident as shown on Figures 3-3 and 3-4. Concentrations of Aroclor 1260 were higher at Stations SED-1 through SED-4 (all located within approximately 200 feet of the CMP outfall) than at any other locations sampled within the Union Ship Canal during the NYSDEC or USACE investigations.

Unlike the Aroclor 1260 results discussed above, increasing concentrations adjacent to the CMP are not evident for other contaminants of concern (COCs) such as inorganics. For example, zinc concentrations are evenly distributed along both transects (see Figures 3-5 and 3-6). Thus, the inorganic data in general indicate widespread metals contamination exceeding NYSDEC sediment criteria within the Union Ship Canal, with no apparent relationship to the Shenango Steel site. However, the Aroclor 1260 data indicate that the most highly elevated concentrations of this particular contaminant are related to discharge from the CMP and are likely to have originated from contaminated soils at the site. Sediment PCB contamination in the Union Ship Canal requires a more detailed evaluation to determine the significance of Site-related ecological risks for fish and wildlife.

4.0

CONCLUSIONS

4.1

POTENTIAL SOURCES OF CONTAMINATION

The Shenango Steel Mold site is located in a formerly heavily industrialized part of Buffalo, New York and proximate to the border of the City of Lackawanna. Within a short distance of the Site there were steel and iron manufacturing facilities, dye manufactures, scrap yards, municipal and industrial landfills, and railroad yards. The Hanna Furnace property, which is the largest of these, is adjacent to the Site. Also, the former Bethlehem Steel Plant is located less than one mile from the Site in Lackawanna. Airborne emissions from these facilities have likely impacted the Site, particularly on the quality of the surficial soils.

There were no reports or other documentation regarding the operations at Shenango Steel Mold available for review. Information has recently been provided by a former employee who worked at both the Shenango Steel and Hanna Furnace sites (NYSDEC, May 2001). The Hanna Furnace site contained four blast furnaces that produced molten pig iron from a mixture of iron ore, limestone, coke, and coal. The molten pig iron was tapped from the blast furnaces and ladled into railcars with a capacity of 110 tons. The railcars or torpedoes transported the molten pig iron to the Shenango Steel site where they were emptied into pouring pots which were located in pits inside of the building. The molten pig iron was then molded and shaped into steel ingots. The steel ingots were sold to the steel industry where they were used as taps for directing the flow of molten iron from blast furnaces. While it has been reported that the operation used large quantities of oil in the handling and molding of the pig iron, the Shenango facility never produced steel or generated the wastes associated with blast furnaces.

The development of the continuous iron casting process in the steel industry resulted in a reduced demand for steel produced by blast furnaces and the conventional molding methods. This development along with increased competition from foreign suppliers of steel ultimately led to the closure of the Shenango Steel and Hanna Furnace facilities in the early 1980s.

Municipal water was provided to the Shenango Steel site by the City of Buffalo while the sanitary wastewater was discharged to the City of Lackawanna POTW. Stormwater was generally collected by drop inlets located on the Site premises and discharged to the Canal.

As previously discussed, the NYSDEC responded to a report of illegal disposal of transformers at the Site in October 1993. The dielectric fluid from the transformers was disposed on the land surface. This action served to contaminate the surface and subsurface soil property with PCBs that were present in the dielectric fluid. The NYSDEC responded by performing an emergency waste removal action which included sampling and analysis of the soil at the Site in the TGA and the removal of impacted soil and concrete.

Based on the information presented above, the potential sources of contamination at the Shenango Steel Mold site include the following:

- Airborne particulate matter from surrounding industrial activity that contained metals, PAHs and SVOCs;
- PAHs, metals, and lubricating and hydraulic oils from the molding operation, as well as oil and diesel fuel from the railcars that were utilized to transport the molten steel produced at Hanna Furnace to the Shenango Steel Mold site. Since oil was used at the Site when PCB use was allowed, it is possible that PCBs were in the oil;

- PCBs contained in the dielectric fluid disposed at the Site resulting from the illegal dismantling of transformers at the Site, after operations halted.

4.1.1 *Impacts Observed*

The three media investigated at the Site were soil, groundwater, and surface water. The impacts to each of these media are described below.

Soil

A total of 68 soil borings (labeled SB-01 through SB-37 and SB-P01 through SB-P31) were completed during the RI. As presented in Table 2-1, a sample of surface soil was collected from 67 of these borings and at least one subsurface sample was collected from all 68 borings. One VOC compound (1,1-dichloroethane), seven SVOCs (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene), two commercial PCB mixtures (Aroclor-1248 and Aroclor-1260) and 10 inorganics (arsenic, beryllium, cadmium, chromium, copper, iron, mercury, nickel, selenium, and zinc) were detected in concentrations in excess of the recommended clean up criteria as listed in NYSDEC TAGM No. 4046. The findings of the Human Health Exposure Assessment indicate that the primary route of exposure to the PCBs and PAHs that are present in the TGA are inhalation and dermal contact. Such exposure may occur if residential development was being considered for the Site. However, this seems unlikely as the City of Buffalo has prepared the South Buffalo Redevelopment Plan for the Union Ship Canal and this plan includes commercial and industrial development for the Hanna Furnace property. This may include the Site which could act as a buffer property and enable access to the Canal and the nearby Tifft Farm Nature Preserve.

The distribution of contaminants which exceeded NYSDEC TAGM No. 4046 soil cleanup objectives indicates that the majority of the PCB contamination (Aroclor 1260) is present in the area north of the footprint of the former mill building. This is documented by the surface data obtained from borings SB-P-05, SB-P-07, SB-P-08, SB-P-10, SB-P-11, SB-P-16 and SB-P-18. PCBs were also exceeded in a subsurface location at a depth of 4.5 to 5.5 feet at SB-P09. PCBs were also detected in excess of New York State Class C surface water standards in MH-1 which is also located in this area. In addition, 1,2,4-trichlorobenzene was detected in MH-1. It is noteworthy that a common dielectric fluid used in transformers contained a mixture of Aroclor 1260 and trichlorobenzene. The source of these contaminants is therefore consistent with the illegal disposal of the transformers reported to the NYSDEC in 1993. PCBs were also detected in a series of borings installed on the Hanna Furnace property, specifically SB-30, SB-31 and SB-36. The principal PCB detected in these samples was Aroclor 1248 which suggests that a different source may be responsible for this contamination. The aerial photographs also appear to indicate that railroad spurs formerly occupied this area of the Hanna Furnace site. Railroad usage of PCBs is well documented and the PCBs detected in this area may be attributed to the former railroad operations at the Shenango and Hanna Furnace sites.

PAH contamination was distributed heterogeneously across the Site in borings SB-02, SB-04, SB-06, SB-08, SB-10, SB-12, SB-16, SB-18, SB-20, SB-22, SB-24, SB-26, SB-28, SB-P-05 and SB-P-29, from surface and subsurface samples. The ubiquitous nature of the PAH contamination is common in former industrial areas and the concentration of PAHs in Site soil is typical for the regional soil. The presence of PAHs likely resulted from operations at the Site and the railroad as well as from the deposition of airborne pollution from adjacent facilities.

Metals are also ubiquitous across the Site at concentrations that exceed the recommended soil cleanup guidelines listed in NYSDEC TAGM No. 4046. The presence of metals in the surface and subsurface soil is likely the result of the historical manufacturing activities, the airborne pollution from adjacent facilities, and from natural sources. The data for beryllium was remarkable given the metal was distributed across the entire Site at concentrations exceeding the recommended soil cleanup levels in TAGM No. 4046 and the New York State background concentrations as defined by the NYSDEC Wildlife Resources Center in NYSDEC TAGM No. 4046. The data did not exceed the Eastern United States background concentration range (Shacklette and Boerngen, *Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States*, USGS Professional Paper 1270, 1984). Usage of beryllium occurs principally in aerospace and defense applications due to its stiffness, light weight, and stability over a wide temperature range. However, a review of the technical literature revealed that beryllium also has potential for use in casting alloys, where it refines the grain size resulting in better surface polishing, reduces melt losses, and improves casting fluidity (Kirk-Othmer V.3, 1978; IARC V.23, 1980). Based on this information, it appears that the molding and shaping operations at the Site were the source of beryllium. The presence of beryllium on the Site does not indicate a source of contamination and may warrant further study depending on the future use of the property.

Groundwater

There were 3 VOCs (toluene, ethylbenzene and total xylenes), 2 SVOCs₇ (4-methylphenol and 2-methylphenol), and 6 metals (antimony, arsenic, iron, magnesium, manganese, and sodium) detected above New York State Class GA groundwater standards. There were few instances of VOC or SVOC data exceeding New York State Class GA groundwater standards. The contamination that did exceed the standards was found to

be at low concentrations and appears to reflect the previous use of the Site for manufacturing purposes. Metals were detected in groundwater across the Site and frequently exceeded New York State Class GA groundwater standards. The operation of the Shenango Steel mold facility represents the source of many of these metals. Elevated concentration of metals such as sodium and magnesium was observed and this appears to be related to the local geochemistry and the mineralization of groundwater. It is unlikely that the presence of sodium in large concentrations could be attributed to the operations at the Site and the presence of magnesium in an area underlain by a calcium/magnesium dolomite limestone is not unexpected.

There is no groundwater usage at the Site and as such an exposure pathway does not currently exist. Future use of the Site groundwater for consumption purposes is unlikely and is precluded by the low yield of the aquifer system.

Surface Water

New York State Class C surface water criteria were not exceeded in the samples collected from the Canal. However, the manhole structures appear to be connected and discharge to the Canal. Impacts to the sediment present in the Canal were not considered in the RI as it is not located on the Site premises. However, the quality of the surface water and the sediment in the Canal is presented in the FWIA in Section 3.3. In the three manhole structures, one SVOC (1,2,4-trichlorobenzene), one PCB (Aroclor 1260) and nine metals (aluminum, cadmium, cobalt, copper, iron, lead, mercury, vanadium and zinc) were detected in the water samples and the results exceeded New York State Class C surface water criteria. Additional study of this issue, as well as the quality of the Canal sediment, may be warranted based on the Contemplated Use of the Site and the Hanna Furnace property.

As noted above, no direct impacts to the Canal were observed from the Shenango Steel Mold site, with the exception of the manhole structures, MH-2 and MH-3, which may convey stormwater. The water sampled from MH-1 did contain concentrations of metals, PCBs, and semivolatile organic compounds that are above New York State Class C Surface Water criteria. The water from MH-2 did not exceed any New York State Class C Surface Water criteria. The water from MH-3 did contain metals that exceeded New York State Class C Surface Water criteria. In addition, LNAPL was observed in MH-1, MW-3, the temporary piezometer SB-18, and the test pits (TP-1, TP-2, and TP-3) adjacent to these structures.

LNAPL has been historically observed on the groundwater that collects in MH-1 since the emergency waste removal action in 1994. However, test pit activities around the vault confirmed that this is an isolated structure that does not appear to be connected to any other piping network or structure.

Additionally, the source of the water present in MH-2 and MH-3 is currently unknown, but it appears to convey stormwater from the surrounding area based upon field observations.

4.2

RECOMMENDATIONS

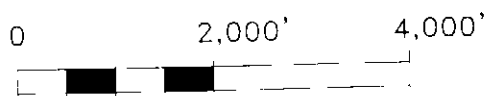
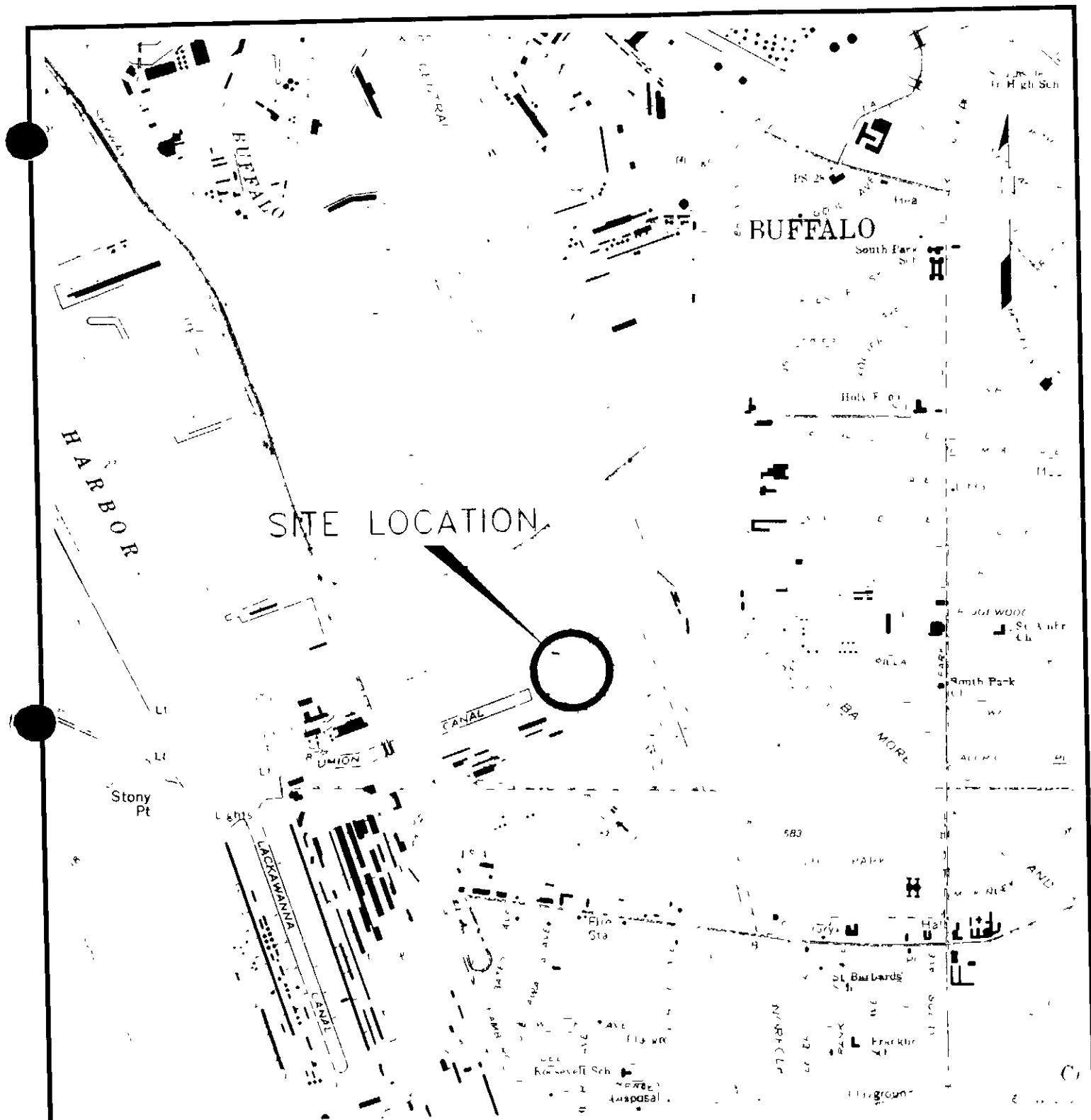
Remaining activities to be performed as part of the RI include the following:

- The damage to monitoring well MW-108 will be repaired, if possible. If the repair is not feasible, the well will be replaced and sampled.

The recommendations for supplemental remedial investigation activities at the Shenango Steel Mold site are described as follows:

- Because Site trespassers may be exposed to surface soil containing PCBs in excess of the NYSDEC direct contact screening criteria, additional methods to restrict Site access should be considered.
- LNAPL was discovered in the southwest corner of TP-3. Based upon field observations, it is possible that the LNAPL may continue beyond the limits of TP-3 and extend underneath a pile of concrete. It is recommended to break up this concrete and continue test pit activities to determine whether or not the LNAPL continues under the concrete.

- ERM, 2000. Work Plan for the Remedial Investigation/Feasibility Study, Shenango Steel Mold. August 2000.
- ABB Environmental Services, 1995. Preliminary Site Assessment Report, Volume 1, Hanna Furnace Site and Shenango Steel Mill, Buffalo, New York. November 1995.
- Bouwer, H. "The Bouwer and Rice Slug Test – An Update". Ground Water. May-June 1989.
- Bouwer, H. and Rice, R.C. "A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells". Water Resources Research. June 1976.
- NYSDEC. DFW guidance Technical Guidance for Screening Contaminated Sediments. November 1993.
- NYSDEC. Technical and Administrative Memorandum 4046 Determination of Soil Clean Up objectives and clean up levels. January 1994.
- NYSDEC. Ambient Water Quality Standards and Evidence Values and Groundwater Effluent Limitations. June 1998.
- Personal Communication Between James Malcolm, NYSDEC and Keith Lashway, P.E., Empire State Development. May 15, 2001.
- USEPA. Ground Water Sampling Procedure – Low Stress (Low Flow) Purging and Sampling. March 1998.
- US Geological Survey Professional Paper 1270 Elemental Concentrations in Soils and Other Surficial Material of the Conterminous United States. H. T. Shacklette and J. G. Boerngen. 1984



APPROXIMATE GRAPHIC SCALE

SOURCE U.S.G.S. 1:50,000 MAP, BUFFALO SE 1965

SITE LOCATION MAP SHENANGO STEEL MOLD RI/FS BUFFALO, NEW YORK

PREPARED FOR

NYSDEC WORK ASSIGNMENT NO. D003970-03



Environmental Resources Management

DRAWN

MKR

JOB NO.

72703

DATE

1-1

1-1

Figure 3-3

Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

USACE Sediment Data for Zinc and PCBs (Aroclor 1260)

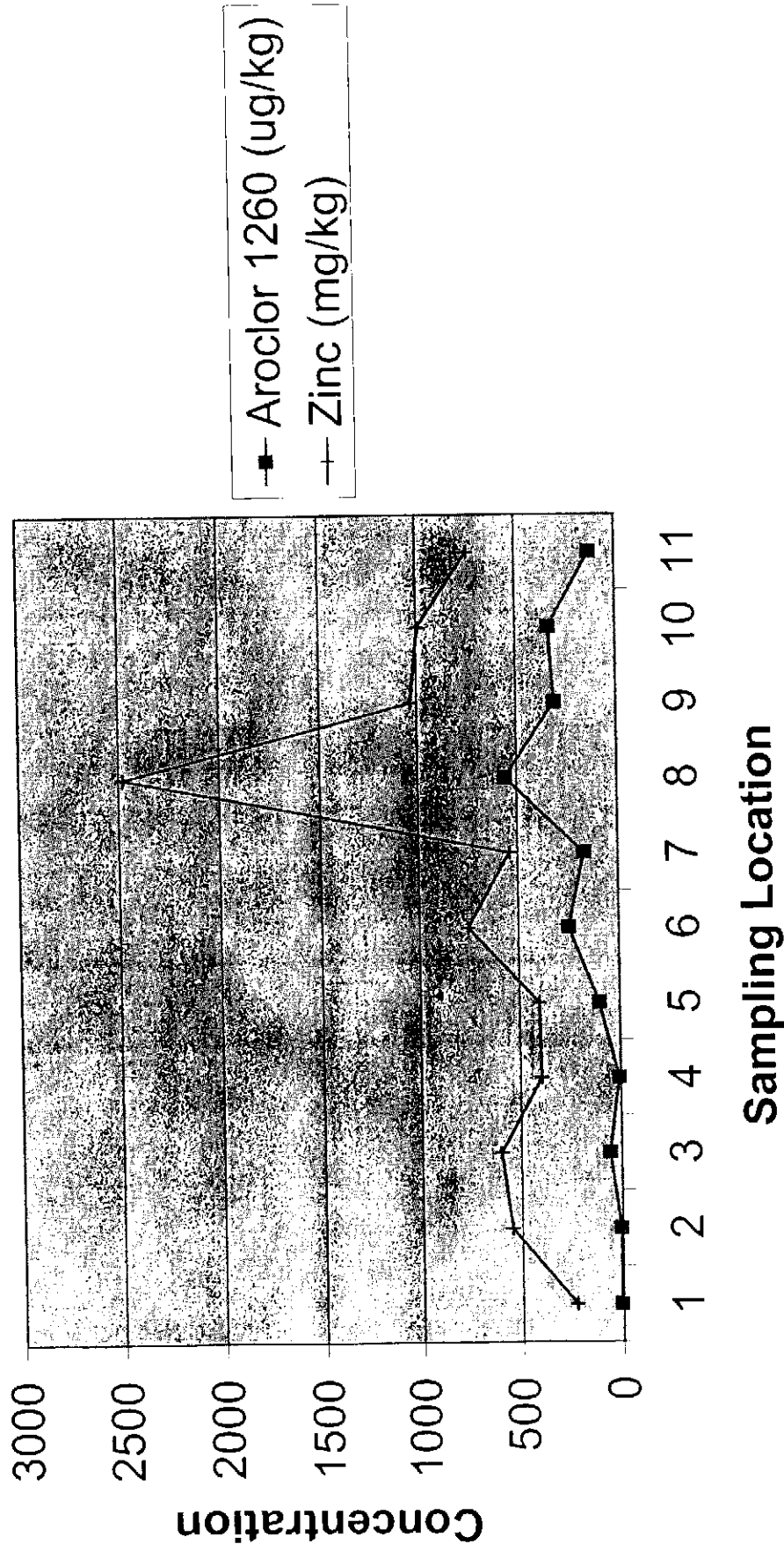


Figure 3-5

Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

NYSDEC Sediment Data for Zinc and PCBs (Aroclor 1260)

Transect A, Union Ship Canal, Buffalo, N.Y.

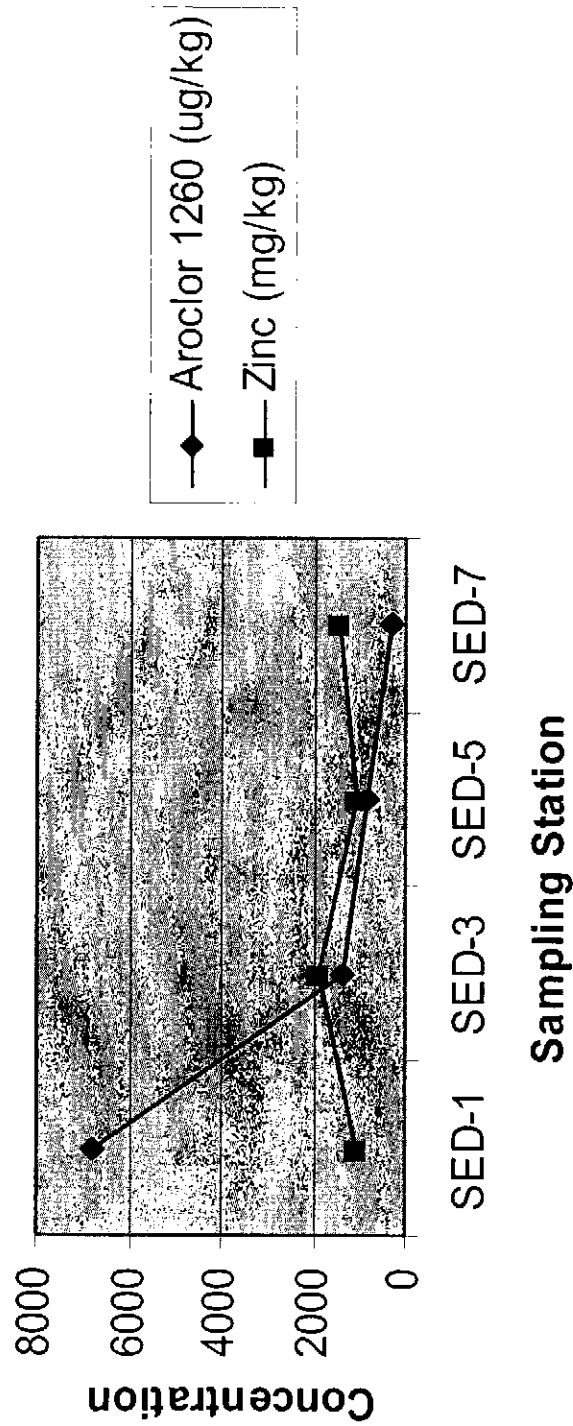


Figure 3-6

Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

NYSDEC Sediment Data for Zinc and PCBs (Aroclor 1260)

Transect B, Union Ship Canal, Buffalo, N.Y.

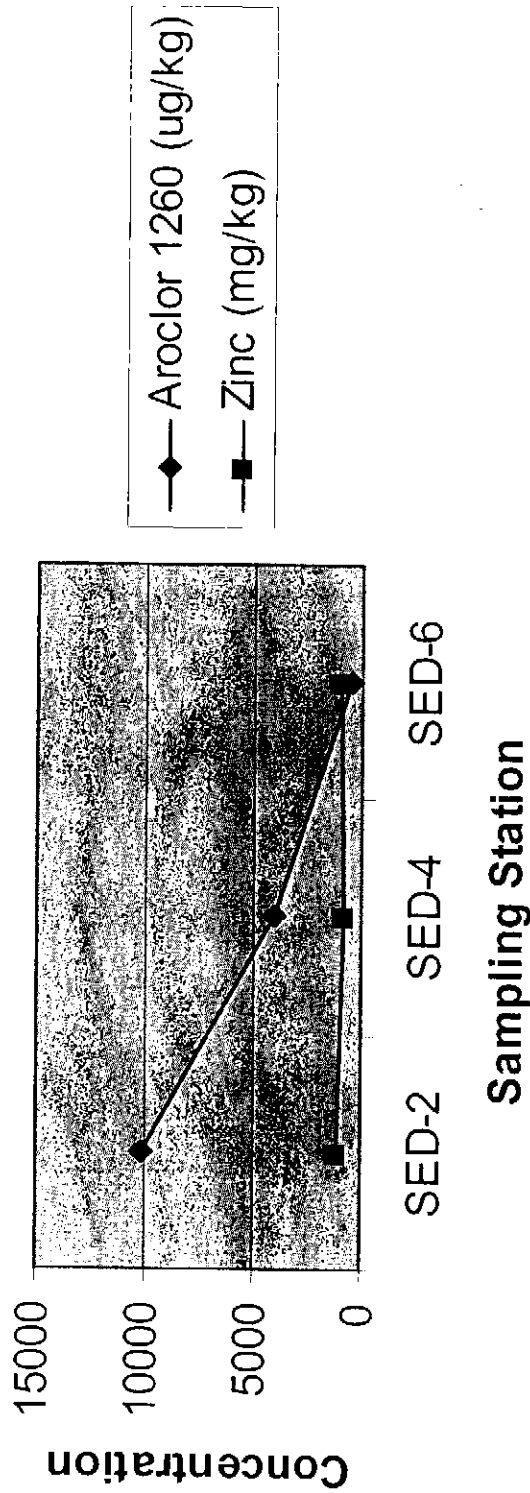


Table 2-1
Summary of Soil Sampling Intervals and Respective Analyses
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

	0 to 6-inches				Intermediate				6-inches above water table			
	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals
SB-01	X								X			
SB-02	X		X	X						X	X	X
SB-03	X								X			
SB-04	X		X	X					X	X	X	X
SB-05	X								X			
SB-06	X		X	X					X	X	X	X
SB-07	X								X			
SB-08	X		X	X					X	X	X	X
SB-09	X								X			
SB-10	X		X	X					X	X	X	X
SB-11					X				X			
SB-12	X		X	X					X	X	X	X
SB-13	X								X			
SB-14	X		X	X					X	X	X	X
SB-15	X								X			
SB-16	X		X	X					X	X	X	X
SB-17	X								X			
SB-18	X		X	X	X	X	X	X	X	X	X	X
SB-19	X								X			
SB-20	X		X	X					X	X	X	X
SB-21	X								X			
SB-22	X		X	X					X	X	X	X
SB-23	X								X			
SB-24	X		X	X					X	X	X	X
SB-25	X								X			
SB-26	X		X	X					X	X	X	X
SP-27	X								X			
SB-28	X		X	X					X	X	X	X
SB-29	X								X			

PCBs analyzed by Method 8082
VOCs analyzed by Method 95-1
SVOCs analyzed by Method 95-2
Metals analyzed by Method 200.7
X Analysis Conducted
C/A Collected and Archived

Table 2-1
Summary of Soil Sampling Intervals and Respective Analyses
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

	0 to 6-inches				Intermediate				6-inches above water table			
	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals
SB-30	X		X	X	X	X	X	X	C/A	X		
SB-31	X				X							
SB-32	X		X	X	X	X	X	X	C/A	X		
SB-33	X								X			
SB-34	X		X	X					X	X	X	X
SB-35	X								X			
SB-36	X		X	X					X	X	X	X
SB-37	X								X			
SB-P01	X								X			
SB-P02	X								X			
SB-P03	X								X			
SB-P04	X								X			
SB-P05	X		X	X					X	X	X	X
SB-P06	X								X			
SB-P07	X								X			
SB-P08	X								X			
SB-P09	X								X			
SB-P10	X								X			
SB-P11	X								X			
SB-P12	X								X			
SB-P13	X								X			
SB-P14	X								X			
SB-P15	X								X			
SB-P16	X								X			
SB-P17	X								X			
SB-P18	X								X			
SB-P19	X								X			
SB-P20	X								X			

PCBs analyzed by Method 8082
VOCs analyzed by Method 95-1
SVOCs analyzed by Method 95-2
Metals analyzed by Method 200.7
X: Analysis Conducted
C/A: Collected and Archived

Table 2-1
Summary of Soil Sampling Intervals and Respective Analyses
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

	0 to 6-inches				Intermediate				6-inches above water table			
	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals	TCL PCBs	TCL VOCs +10	TCL SVOCs +20	TAL Metals
SB-P21	X								X			
SB-P22	X								X			
SB-P23	X								X			
SB-P24	X								X			
SB-P25	X								X			
SB-P26	X								X			
SB-P27	X								X			
SB-P28	X								X			
SB-P29	X		X	X	X	X	X	X	X	X	X	X
SB-P30	X								X			
SB-P31	X								X			
Site Wide Grid	36	0	18	18	5	3	3	3	34	18	16	16
PCB Area Grid	31	0	2	2	1	1	1	1	31	2	2	2

	Total PCB	Total VOC	Total SVOC	Total Metals
Site Grid				
Samples	75	21	37	37
PCB Grid				
Samples	63	3	5	5
Discretionary				
Total Samples	138	24	42	42
MS/MSD	8	0	3	0
Blind Dup	0	0	0	0
Equip Blank	0	0	0	0
Trp Blank	0	3	0	0

PCBs analyzed by Method 8082
VOCs analyzed by Method 95-1
SVOCs analyzed by Method 95-2
Metals analyzed by Method 200.7
X: Analysis Conducted
C/A: Collected and Archived

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
 Soil Boring Investigation
 Sherrago Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE		SB-01		SB-02		SB-02		SB-03		SB-03		SB-04		SB-04		SB-05		SB-05	
	SAMPLE ID	DEPTH (ft)	SB-01-A	SB-01-B	SB-02-C	SB-02-A	SB-03-A	SB-03-B	SB-04-A	SB-04-C	SB-05-A	SB-05-B	SB-04-A	SB-04-C	SB-05-A	SB-05-B	SB-04-A	SB-04-C	SB-05-A	SB-05-B
			10/16/00	10/16/00	10/16/00	10/16/00	10/16/00	10/16/00	10/16/00	10/16/00	10/16/00	10/19/00	10/16/00	10/16/00	10/19/00	10/19/00	10/16/00	10/16/00	10/19/00	10/19/00
			0.25	3.25	5.5	0.25	0.25	3	0.25	5	0.25	3	0.25	5	0.25	3	0.25	5	0.25	3
Aroclor 1016			23 U	24 U	21 U	22 U	21 U	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Aroclor 1221			23 U	24 U	21 U	22 U	21 U	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Aroclor 1232			23 U	24 U	21 U	22 U	21 U	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Aroclor 1242			23 U	24 U	21 U	22 U	21 U	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Aroclor 1248			23 U	24 U	21 U	22 U	21 U	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Aroclor 1254			23 U	24 U	345	22 U	80.7	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Aroclor 1260			166	24 U	21 U	76.5	21 U	25 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U	20 U	23 U	19 U	20 U
Sum of Constituents			166	0	345	76.5	80.7	0	0	0	0	0	0	0	0	0	0	0	0	190

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended
 Soil Cleanup Objectives (RSCOs) as per NYSDEC TAGM No. HWR-
 94-4046 (1/24/94) 1,000 ug/l at surface / 10,000 ug/l in
 subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Sherango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SPT SAMPLE ID DATE DEPTH (ft)	SP-06 SB-06-A 10/16/00 0.25	SP-06 SB-06-C 10/16/00 6	SP-07 SB-07-A 10/19/00 0.25	SP-07 SB-07-B 10/19/00 5	SP-08 SB-08-A 10/19/00 0.25	SP-08 SB-08-C 10/19/00 7.75	SP-09 SB-09-A 10/19/00 0.25	SP-09 SB-09-B 10/19/00 5	SP-10 SB-10-A 10/19/00 0.25	SP-10 SB-10-C 10/19/00 7
Aroclor 1016		20 U	29 U	18 U	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Aroclor 1221		20 U	29 U	18 U	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Aroclor 1232		20 U	29 U	18 U	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Aroclor 1242		20 U	29 U	18 U	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Aroclor 1248		20 U	29 U	18 U	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Aroclor 1254		20 U	29 U	18 U	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Aroclor 1260		20 U	29 U	21.3	19 U	21 U	19 U	19 U	120 U	20 UJ	23 U
Sum of Constituents		0	0	21.3	0	0	0	0	0	0	0

Notes:
 U=Analyzed but not detected
 J=Estimated value
 UJ=Analyzed but not detected value
 N/A=Not Applicable
 Results are in ug/kg
 Shaded cells are detections above NYSDEC Recommended
 Soil Cleanup Levels (RSCOs) as per NYSDEC TAGM No. HWR-
 94-4046, at 100 ug/l at surface / 10,000 ug/l in
 subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE		SB-11		SB-12		SB-12		SB-12		SB-13		SB-13		SB-14		SB-14		SB-15		SB-15	
	SAMPLE ID	DEPTH (ft)	SB-11-A	SB-11-B	SB-12-A	SB-12-C	SB-13-A	SB-13-B	SB-14-A	SB-14-C	SB-15-A	SB-15-B	10/12/00	10/12/00	10/12/00	10/12/00	10/12/00	10/12/00	10/12/00	10/12/00	10/12/00	10/12/00
			1.25	5	0.25	3	0.25	5	0.25	4.25	0.25	3	0.25	5	0.25	4.25	0.25	4.25	0.25	3	0.25	3
Aroclor 1016			22 U	23 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	20 U	20 U	20 U	20 U	20 U
Aroclor 1221			22 U	23 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	20 U	20 U	20 U	20 U	20 U
Aroclor 1232			22 U	23 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	20 U	20 U	20 U	20 U	20 U
Aroclor 1242			22 U	23 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	151	20 U	20 U	20 U	20 U
Aroclor 1248			22 U	23 U	40.4	21 U	26.3	21 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	20 U	20 U	20 U	20 U	20 U
Aroclor 1254			22 U	23 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	20 U	20 U	20 U	20 U	20 U
Aroclor 1260			22 U	23 U	21 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	21 U	20 U	20 U	20 U	20 U	20 U	20 U
Sum of Constituents			0	0	40.4	0	26.3	0	0	0	26.3	0	0	0	0	0	0	151	151	0	0	0

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 NYSDEC RSCOs are presented in ug/kg
 NYSDEC TAGM No. HHP-24/94, 1000 ug/l at surface / 10,000 ug/l in

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-16 SB-16-A 10/12/00 0.25	SB-16 SB-16-C 10/12/00 3	SB-17 SB-17-A 10/12/00 0.25	SB-17 SB-17-B 10/12/00 2.75	SB-18 SB-18-A 10/16/00 0.25	SB-18 SB-18-B 10/16/00 5.75	SB-18 SB-18-C 10/16/00 7.5	SB-19 SB-19-A 10/16/00 0.25	SB-19 SB-19-B 10/16/00 2.75	SB-20 SB-20-C 10/11/00 2.75
Aroclor 1016		20 U	20 U	22 U	22 U	21 U	22 U	22 U	20 U	20 U	20 U
Aroclor 1221		20 U	20 U	22 U	22 U	21 U	22 U	22 U	20 U	20 U	20 U
Aroclor 1232		20 U	20 U	22 U	22 U	21 U	22 U	22 U	20 U	20 U	20 U
Aroclor 1242		20 U	20 U	22 U	22 U	21 U	22 U	22 U	20 U	20 U	20 U
Aroclor 1248		20 U	20 U	22 U	22 U	129	22 U	22 U	20 U	124	20 U
Aroclor 1254		20 U	20 U	22 U	143	21 U	22 U	22 U	20 U	20 U	20 U
Aroclor 1260		20 U	20 U	22 U	22 U	368	22 U	22 U	20.2	26.5	20 U
Sum of Constituents		0	0	0	143	1658	0	0	20.2	150.5	0

Notes
 U=Analyzed but not detected
 J=Estimated value
 LJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended
 Screening Levels (RSCOs) as per NYSDEC TAGM No. HWR-
 94-44r (44, 1000 ug/l at surface / 10,000 ug/l in
 1000 ug/kg)

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDC RSCOs - PCBs
Soil Boring Investigation
Sherango Steel Mold RI/FS, Buffalo, New York
NYSDC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-20 SB-20-A 10/11/00 0.25	SB-21 SB-21-A 10/11/00 0.25	SB-21-B 10/11/00 2.75	SB-22 SB-22-A 10/11/00 0.25	SB-22-C 10/11/00 2.75	SB-23 SB-23-A 10/11/00 0.25	SB-23-B 10/11/00 2.25	SB-24 SB-24-A 10/11/00 0.25	SB-24-C 10/11/00 2.25	SB-25 SB-25-A 10/11/00 0.25
Aroclor 1016		21 U	21 U	18 U	18 U	19 U	18 U	21 U	19 U	21 U	18 U
Aroclor 1221		21 U	21 U	18 U	18 U	19 U	18 U	21 U	19 U	21 U	18 U
Aroclor 1232		21 U	21 U	18 U	18 U	19 U	18 U	21 U	19 U	21 U	18 U
Aroclor 1242		21 U	21 U	18 U	18 U	19 U	18 U	21 U	19 U	21 U	18 U
Aroclor 1248		21 U	21 U	18 U	19	19 U	26.4	21 U	19 U	21 U	18 U
Aroclor 1254		21 U	21 U	18 U	18 U	19 U	18 U	21 U	19 U	21 U	18 U
Aroclor 1260		21 U	21 U	18 U	35.2	19 U	39.7	21 U	25.2	21 U	18 U
Sum of Constituents		0	0	0	54.2	0	66.1	0	25.2	0	0

Notes
 U=Analyzed for but not detected.
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are in ug/l unless otherwise noted
 Shaded cells are above NYSDC Recommended
 Soil Cleanup Levels per NYSDC TAGM No. HHR-
 94-0046, which are 10 ug/l for surface
 subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-25	SB-26	SB-26	SB-26	SB-27	SB-27	SB-27	SB-28	SB-28	SB-29	SB-29	SB-30
		SB-25-B 10/11/00 2	SB-26-A 10/11/00 0.25	SB-26-C 10/11/00 2.25	SB-27-B 10/11/00 2	SB-27-A 10/11/00 0.25	SB-28-A 10/11/00 0.25	SB-28-C 10/11/00 2	SB-29-A 10/10/00 0.25	SB-29-B 10/10/00 1.25	SB-30-A 10/9/00 0.25		
Aroclor 1016		22 U	20 U	20 U	20 U	20 U	18 U	19 U	21 U	20 U	18 U		
Aroclor 1221		22 U	20 U	20 U	20 U	20 U	18 U	19 U	21 U	20 U	18 U		
Aroclor 1232		22 U	20 U	20 U	20 U	20 U	18 U	19 U	21 U	20 U	18 U		
Aroclor 1242		22 U	20 U	20 U	20 U	20 U	18 U	19 U	21 U	20 U	18 U		
Aroclor 1248		22 U	79.2	20 U	20 U	20 U	18 U	19 U	21 U	20 U	937		
Aroclor 1254		22 U	20 U	20 U	20 U	20 U	18 U	19 U	21 U	20 U	18 U		
Aroclor 1260		22 U	117	20 U	20 U	20 U	18 U	19 U	21 U	20 U	156 J		
Sum of Constituents		0	196.2	0	0	0	0	0	0	0			

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended
 Soil Cleanup Objectives (RSCOs) as per NYSDEC TAGM No. HW-94-0046 (1/24/94) 1000 ug/l at surface / 10,000 ug/l at subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-35 SB-35-B 10/10/00 3	SB-36 SB-36-A 10/10/00 0.25	SB-36 SB-36-C 10/10/00 3.5	SB-37 SB-37-A 10/10/00 0.25	SB-37 SB-37-B 10/10/00 3
Aroclor 1016		26 U	19 U	21 U	20 U	19 U
Aroclor 1221		26 U	19 U	21 U	20 U	19 U
Aroclor 1232		26 U	19 U	21 U	20 U	19 U
Aroclor 1242		26 U	19 U	21 U	20 U	19 U
Aroclor 1248		98.4	1460	21 U	390	19 U
Aroclor 1254		26 U	19 U	21 U	20 U	19 U
Aroclor 1260		26 U	404	21 U	517	19 U
Sum of Constituents		98.4	2144	0	907	0

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Spills < 1 percent detections above NYSDEC Recommended
 Spills < 100 ug/kg (RSCOs) as per NYSDEC TACM No. HWR-
 94-10-1, 4-10-1, 1000 ug/kg at surface / 10000 ug/m

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-P01 SB-P01-A 10/17/00 0.5	SB-P01 SB-P01-B 10/17/00 6	SB-P02 SB-P02-A 10/17/00 0.5	SB-P02 SB-P02-B 10/17/00 7.5	SB-P03 SB-P03-A 10/17/00 0.25	SB-P03 SB-P03-B 10/17/00 4.5	SB-P04 SB-P04-A 10/17/00 0.25	SB-P04 SB-P04-B 10/17/00 5	SB-P05 SB-P05-A 10/17/00 0.25	SB-P05 SB-P05-C 10/17/00 5.25
Aroclor 1016		19 U	19 U	21 U	19 U	20 U	20 U	19 U	21 U	20 UJ	21 U
Aroclor 1221		19 U	19 U	21 U	19 U	20 U	20 U	19 U	21 U	20 UJ	21 U
Aroclor 1232		19 U	19 U	21 U	19 U	20 U	20 U	19 U	21 U	20 UJ	21 U
Aroclor 1242		19 U	19 U	21 U	19 U	20 U	20 U	19 U	21 U	20 UJ	21 U
Aroclor 1248		19 U	19 U	21 U	19 U	20 U	20 U	19 U	21 U	985 J	263 J
Aroclor 1254		19 U	19 U	21 U	19 U	274 J	20 U	19 U	21 U	20 U	21 U
Aroclor 1260		19 U	19 U	21 U	19 U	20 U	41.3	716	551	10810 J	988 J
Sum of Constituents		0	0	0	0	274	41.3	716	551	10810 J	1251

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=N/A
 Results in ug/kg
 Shaded cells indicate detections above NYSDDEC Recommended
 Soil Cleanup Levels (RSCOs) as per NYSDDEC TAGM No. HW-
 94-046 (1 ug/kg at surface / 10,000 ug/kg in
 subsurface)

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Sherango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-P06 SB-P06-A 10/17/00 0.25	SB-P06 SB-P06-B 10/17/00 5	SB-P07 SB-P07-A 10/17/00 0.25	SB-P07 SB-P07-B 10/17/00 3.5	SB-P08 SB-P08-A 10/17/00 0.25	SB-P08 SB-P08-B 10/17/00 3.5	SB-P09 SB-P09-A 10/17/00 0.25	SB-P09 SB-P09-B 10/17/00 5	SB-P10 SB-P10-A 10/18/00 0.25	SB-P10 SB-P10-B 10/18/00 7
Aroclor 1016		21 U	19 U	19 U	24 U	50 UJ	23 UJ	22 U	21 U	20 U	24 U
Aroclor 1221		21 U	19 U	19 U	24 U	50 UJ	23 UJ	22 U	21 U	20 U	24 U
Aroclor 1232		21 U	19 U	19 U	24 U	50 UJ	23 UJ	22 U	21 U	20 U	24 U
Aroclor 1242		21 U	19 U	19 U	24 U	50 UJ	23 UJ	22 U	21 U	20 U	24 U
Aroclor 1248		132	19 U	19 U	24 U	50 UJ	23 UJ	22 U	21 U	20 U	24 U
Aroclor 1254		21 U	19 U	19 U	72.4 J	50 UJ	23 UJ	22 U	21 U	20 U	24 U
Aroclor 1260		465	425	19 U	24 U	138000	23 UJ	274			24 U
Sum of Constituents		597	425	19 U	72.4	138000	0	274			0

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at recommended action
 N/A=Not available
 Results are presented as follows:
 Shaded cells represent values less than or equal to the Recommended
 Soil Cleanup Objectives (RSCOs) for the constituent. ACM No. HW-94-036 (1/24/94): 1000 ug/kg for PCBs in subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Sherango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE		SB-P11		SB-P12		SB-P12		SB-P13		SB-P13		SB-P14		SB-P14		SB-P15		SB-P15	
	SAMPLE ID	DEPTH (ft)	SB-P11-A	SB-P11-B	SB-P12-A	SB-P12-B	SB-P13-A	SB-P13-B	SB-P14-A	SB-P14-B	SB-P15-A	SB-P15-B	SB-P11-A	SB-P11-B	SB-P12-A	SB-P12-B	SB-P13-A	SB-P13-B	SB-P14-A	SB-P14-B
			10/18/00	10/18/00	10/18/00	10/18/00	10/19/00	10/19/00	10/19/00	10/19/00	10/17/00	10/17/00	10/19/00	10/19/00	10/19/00	10/19/00	10/17/00	10/17/00	10/17/00	10/17/00
			0.25	7	0.25	6	0.25	5	0.25	7	0.25	3	0.25	7	0.25	7	0.25	3	0.25	3
Aroclor 1016			22 U	25 U	18 U	26 U	21 U	19 U	21 U	21 U	19 U	22 U	21 U	120 U	21 U	120 U	19 U	22 U	19 U	22 U
Aroclor 1221			22 U	25 U	18 U	26 U	21 U	19 U	21 U	21 U	19 U	22 U	21 U	120 U	21 U	120 U	19 U	22 U	19 U	22 U
Aroclor 1232			22 U	25 U	18 U	26 U	21 U	19 U	21 U	21 U	19 U	22 U	21 U	120 U	21 U	120 U	19 U	22 U	19 U	22 U
Aroclor 1242			22 U	25 U	18 U	26 U	21 U	19 U	21 U	21 U	19 U	22 U	21 U	120 U	21 U	120 U	19 U	22 U	19 U	22 U
Aroclor 1248			22 U	25 U	18 U	26 U	21 U	19 U	21 U	21 U	19 U	22 U	21 U	120 U	21 U	120 U	19 U	22 U	19 U	22 U
Aroclor 1254			22 U	25 U	18 U	26 U	21 U	19 U	21 U	21 U	19 U	22 U	69 J	120 U	69 J	120 U	19 U	22 U	19 U	22 U
Aroclor 1260			22 U	3190	929	56.8	138	19 U	21 U	21 U	19 U	22 U	21 U	120 U	21 U	120 U	19 U	22 U	19 U	22 U
Sum of Constituents			22 U	3190	929	56.8	138	0	138	69	0	0	69	0	69	0	0	0	0	0

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended
 Soil Cleanup Objectives (RSCOs) as per NYSDEC TACM No. HW-94-4046 (1/24/99). Total ug/l at surface / 1000 ug/l in subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE		SB-P16		SB-P17		SB-P18		SB-P19		SB-P20	
	SAMPLE ID	DEPTH (ft)	SB-P16-A	SB-P16-B	SB-P17-A	SB-P17-B	SB-P18-A	SB-P18-B	SB-P19-A	SB-P19-B	SB-P20-A	SB-P20-B
			10/18/00 0.25	10/18/00 7	10/18/00 0.25	10/18/00 6.5	10/18/00 0.25	10/18/00 5	10/18/00 0.25	10/18/00 7	10/18/00 0.25	10/18/00 3.5
Aroclor 1016			20 U	29 U	19 U	22 U	21 U	24 U	19 U	24 U	24 U	24 U
Aroclor 1221			20 U	29 U	19 U	22 U	21 U	24 U	19 U	24 U	24 U	24 U
Aroclor 1232			20 U	29 U	19 U	22 U	21 U	24 U	19 U	24 U	24 U	24 U
Aroclor 1242			20 U	29 U	19 U	22 U	21 U	24 U	19 U	24 U	24 U	24 U
Aroclor 1248			20 U	29 U	19 U	22 U	21 U	24 U	19 U	24 U	24 U	24 U
Aroclor 1254			20 U	29 U	19 U	263	21 U	787	19 U	24 U	24 U	243
Aroclor 1260			1130	66	666	185	790	608	19 U	28.7	211	24 U
Sum of Constituents			1130	66	666	448	1395	1395	0	28.7	211	243

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended
 Soil Cleanup Objectives (RSCO), as per NYSDEC TAGM No. HWR-
 94-0046 (1/24/99). 1000 ug/l at surface / 10,000 ug/l in
 subsurface

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE		SR-P21	SR-P22	SR-P22	SR-P22	SR-P23	SR-P23	SR-P23	SR-P24	SR-P25	SR-P25
	SAMPLE ID	DEPTH (ft)	SB-P21-A 10/18/00 0.25	SB-P21-B 10/18/00 5.5	SB-P22-A 10/18/00 0.25	SB-P22-B 10/18/00 3.5	SB-P23-A 10/18/00 0.25	SB-P23-B 10/18/00 3	SB-P24-A 10/18/00 0.25	SB-P24-B 10/18/00 6	SB-P25-A 10/18/00 0.25	SB-P25-B 10/18/00 5
Aroclor 1016			22 U	21 U	25 U	21 U	18 U	25 U	18 U	22 U	22 U	28 U
Aroclor 1221			22 U	21 U	25 U	21 U	18 U	25 U	18 U	22 U	22 U	28 U
Aroclor 1232			22 U	21 U	25 U	21 U	18 U	25 U	18 U	22 U	22 U	28 U
Aroclor 1242			22 U	21 U	25 U	21 U	18 U	25 U	18 U	22 U	22 U	28 U
Aroclor 1248			22 U	21 U	25 U	21 U	18 U	25 U	66.1	22 U	22 U	28 U
Aroclor 1254			22 U	21 U	73.7	21 U	90.2	25 U	18 U	22 U	22 U	28 U
Aroclor 1260			22 U	197	37.5	167	27.1	25 U	39.7	48.2	22 U	28 U
Sum of Constituents			0	197	111.2	167	117.3	0	105.8	48.2	0	0

Notes

U=Analyzed for but not detected

Estimated value

UJ=Not detected at estimated value.

N/A=Not available

[illegible]

Recommended

[illegible]

1571/511000

— 3 —

TABLE 2-2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-P26 SB-P26-A 10/18/00 0.25	SB-P26 SB-P26-B 10/18/00 5	SB-P27 SB-P27-A 10/19/00 0.25	SB-P27 SB-P27-B 10/19/00 3	SB-P28 SB-P28-A 10/19/00 0.25	SB-P28 SB-P28-B 10/19/00 3.5	SB-P29 SB-P29-A 10/19/00 0.25	SB-P29 SB-P29-B 10/19/00 3.5	SB-P29 SB-P29-C 10/19/00 6.5	SB-P30 SB-P30-A 10/19/00 0.25
Aroclor 1016		19 U	19 U	19 U	21 U	18 U	21 U	19 U	20 U	120 U	22 U
Aroclor 1221		19 U	19 U	19 U	21 U	18 U	21 U	19 U	20 U	120 U	22 U
Aroclor 1232		19 U	19 U	19 U	21 U	18 U	21 U	19 U	20 U	120 U	22 U
Aroclor 1242		19 U	19 U	19 U	21 U	18 U	21 U	19 U	20 U	120 U	22 U
Aroclor 1248		19 U	19 U	19 U	21 U	18 U	21 U	19 U	20 U	120 U	22 U
Aroclor 1254		79.5	19 U	19 U	21 U	351	21 U	19 U	20 U	120 U	58.6
Aroclor 1260		49.5 J	19 U	52.4 J	21 U	18 U	46.2	19 U	20 U	120 U	22 U
Sum of Constituents		129	0	52.4	0	351	46.2	0	0	0	58.6

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results in $\mu\text{g/g}$
 Shaded cells are sections that are not recommended
 Soil Cleanup Criteria (SCC) for PCBs are 1.0 $\mu\text{g/g}$ for No HWR
 94-406 (1) $\mu\text{g/g}$ for HWR
 subunit

TABLE 2.2
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - PCBs
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	SB-P30	SB-P31	SB-P31
		SB-P30-B 10/19/00 4.5	SB-P31-A 10/17/00 0.25	SB-P31-B 10/17/00 5.5
Aroclor 1016		21 U	20 U	22 U
Aroclor 1221		21 U	20 U	22 U
Aroclor 1232		21 U	20 U	22 U
Aroclor 1242		21 U	20 U	22 U
Aroclor 1248		21 U	20 U	22 U
Aroclor 1254		21 U	20 U	22 U
Aroclor 1260		21 U	20 U	22 U
Sum of Constituents		0	0	0

Notes:
 U=Analyzed but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent concentrations above NYSDEC Recommended
 Soil Cleanup Levels (CO) as per NYSDEC TAGM No. HWR-
 94-046 (1/4 to 2.25 mg/kg/1 in surface, 10,000 ug/1 in
 subsurface)

TABLE 2-3
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs- Volatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. DW03070 03

CONSTITUENT	Recommended Soil Cleanup Objectives (RSCOs)	SITE SAMPLE ID DATE DEPTH (ft)	SB-02 SB-02-C 10/16/00 5.50	SB-04 SB-04-C 10/16/00 5.00	SB-06 SB-06-C 10/16/00 6	SB-09 SB-09-C 10/15/00 7.75	SB-10 SB-10-C 10/15/00 7	SB-12 SB-12-C 10/12/00 3	SB-14 SB-14-C 10/12/00 4.25	SB-16 SB-16-C 10/12/00 3	SB-18 SB-18-B 10/16/00 5.75
Chloromethane	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Bromomethane	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Vinyl chloride	200		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Chloroethane	1900		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Methylene chloride	100		16 U	13 U	19 U	30 U	26 U	12 U	12 U	11 U	12 U
Acetone	200		12 U	13 U	66	43	6 J	12 U	12 U	11 U	40
Carbon disulfide	2700		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,1-Dichloroethene	400		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,1-Dichloroethane	200		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,2-Dichloroethene (Total)	300		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Chloroform	300		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,2-Dichloroethane	100		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
2-Butanone	300		12 U	13 U	11 J	6 J	14 U	12 U	12 U	11 U	6 J
1,1,1-Trichloroethane	800		12 U	13 U	15 U	11 U	14 U	7 J	12 U	11 U	12 U
Carbon tetrachloride	600		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Bromodichloromethane	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,2-Dichloropropane	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
cis-1,3-Dichloropropene	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Trichloroethene	700		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Dibromochloromethane	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,1,2-Trichloroethane	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Benzene	60		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
trans-1,3-Dichloropropene	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Bromoform	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
4-Methyl-2-pentanone	1000		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
2-Hexanone	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Tetrachloroethene	1400		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
1,1,2,2-Tetrachloroethane	600		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Toluene	1500		12 U	13 U	2 J	11 U	14 U	12 U	12 U	11 U	12 U
Chlorobenzene	1700		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Ethylbenzene	5500		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Styrene	N/A		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Xylene (total)	1200		12 U	13 U	15 U	11 U	14 U	12 U	12 U	11 U	12 U
Sum of Constituents			0	0	77	49	6	7	0	0	46

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg

Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCOs) as per NYSDEC TAGM No. HW-94-4046 (1/24/994)

TABLE 2-3
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs- Volatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Recommended Soil Cleanup Objectives (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-18 SB-18-C 10/16/00 7.5	SB-20 SB-20-C 10/14/00 2.75	SB-22 SB-22-C 10/11/00 2.75	SB-24 SB-24-C 10/11/00 2.25	SB-26 SB-26-C 10/11/00 2.25	SB-28 SB-28-C 10/11/00 2	SB-30 SB-30-B 10/9/00 5	SB-30 SB-30-C 10/9/00 6.25	SB-32 SB-32-B 10/10/00 5
Chloromethane	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Bromomethane	200		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Vinyl chloride	1900		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Chloroethane	100		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Methylene chloride	200		12 U	12 U	12 U	22 U	13 U	12 U	20 U	18 U	12 U
Acetone	2700		46	100 J	12 UJ	20 J	25 J	12 J	34	21 J	30
Carbon disulfide	400		12 U	12 U	12 U	5 J	12 U	12 U	12 U	18 U	2 J
1,1-Dichloroethene	200		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,1-Dichloroethane	300		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,2-Dichloroethene (Total)	300		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Chloroform	100		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,2-Dichloroethane	300		9 J	15	12 U	13 U	12 U	12 U	12 U	22	12 U
2-Butanone	800		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,1,1-Trichloroethane	600		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Carbon tetrachloride	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Bromodichloromethane	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,2-Dichloropropane	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
cis-1,3-Dichloropropene	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Trichloroethene	700		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Dibromochloromethane	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,1,2-Trichloroethane	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Benzene	60		12 UJ	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
trans-1,3-Dichloropropene	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Bromoform	N/A		12 U	12 U	12 UJ	13 U	12 U	12 U	12 U	18 U	12 U
4-Methyl-2-pentanone	1000		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
2-Hexanone	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Tetrachloroethene	1400		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
1,1,2,2-Tetrachloroethane	600		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Toluene	1500		12 U	12 U	1 J	13 U	1 J	12 U	2 J	18 U	2 J
Chlorobenzene	1700		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Ethylbenzene	5500		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Styrene	N/A		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Xylene (total)	1200		12 U	12 U	12 U	13 U	12 U	12 U	12 U	18 U	12 U
Sum of Constituents			55	115	1	47	39	12	38	43	34

Notes
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg

Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994)

TABLE 2-3
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs- Volatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Recommended Soil Cleanup Objectives (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-32 SB-32-C 10/10/00 6.25	SB-34 SB-34-C 10/10/00 3.75	SB-36 SB-36-C 10/10/00 3.5	SB-P05 SB-P05-C 10/17/00 5.25	SB-P29 SB-P29-B 10/19/00 3.5	SB-P29 SB-P29-C 10/19/00 6.5
Chloromethane	N/A		13 U	12 U	11 U	12 U	11 U	13 U
Bromomethane	N/A		13 U	12 U	11 U	12 U	11 U	13 U
Vinyl chloride	200		13 U	12 U	11 U	12 U	2 J	1 J
Chloroethane	1900		13 U	12 U	11 U	12 U	130	36
Methylene chloride	100		13 U	12 U	24 U	13 U	70	21 U
Acetone	200		59	31	12	20	40	57
Carbon disulfide	2700		13 U	12 U	1 J	12 U	2 J	2 J
1,1-Dichloroethene	400		13 U	12 U	11 U	12 U	4 J	4 J
1,1-Dichloroethane	200		13 U	12 U	11 U	12 U	310	230
1,2-Dichloroethene (Total)	300		13 U	12 U	11 U	12 U	20	5 J
Chloroform	300		13 U	12 U	11 U	12 U	11 U	13 U
1,2-Dichloroethane	100		13 U	12 U	11 U	12 U	11 U	13 U
2-Butanone	300		13 U	12 U	11 U	5 J	7 J	15
1,1,1-Trichloroethane	800		13 U	12 U	11 U	12 U	67	130
Carbon tetrachloride	600		13 U	12 U	11 U	12 U	11 U	13 U
Bromodichloromethane	N/A		13 U	12 U	11 U	12 U	11 U	13 U
1,2-Dichloropropane	N/A		13 U	12 U	11 U	12 U	11 U	13 U
cis-1,3-Dichloropropene	N/A		13 U	12 U	11 U	12 U	7 J	13 U J
Trichloroethene	700		13 U	12 U J	11 U	12 U	11 U	13 U
Dibromochloromethane	N/A		13 U	12 U	11 U	12 U	11 U	13 U
1,1,2-Trichloroethane	N/A		13 U	12 U	11 U	12 U	11 U	13 U
Benzene	60		13 U	12 U J	11 U	12 U	1 J	2 J
trans-1,3-Dichloropropene	N/A		13 U	12 U	11 U	12 U	11 U	13 U
Bromoform	N/A		13 U	12 U	11 U	12 U	11 U	13 U
4-Methyl-2-pentanone	1000		13 U	12 U	11 U	12 U	11 U	13 U
2-Hexanone	N/A		13 U	12 U	11 U	12 U	11 U	13 U
Tetrachloroethene	1400		13 U	12 U	11 U	12 U	11 U	13 U
1,1,2,2-Tetrachloroethane	600		13 U	12 U	11 U	12 U	5 J	11 J
Toluene	1500		2 J	12 U J	2 J	12 U	2 J	1 J
Chlorobenzene	1700		13 U	12 U J	11 U	12 U	11 U	13 U
Ethylbenzene	5500		13 U	12 U	11 U	12 U	11 U	13 U
Styrene	N/A		13 U	12 U	11 U	12 U	11 U	13 U
Xylene (total)	1200		13 U	12 U	11 U	12 U	1 J	13 U
Sum of Constituents			61	31	15	25	668	504

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 N/A=Not available
 Results are presented in ug/kg

Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994)

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDEC Cleanup Levels and Background Levels

Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-02-A 10/16/00 0.25	SB-02-C 10/16/00 5.5	SB-04-A 10/16/00 0.25	SB-04-C 10/16/00 5	SB-06-A 10/16/00 0.25	SB-06-C 10/16/00 6
Aluminum	7000 - >100000	33000	SB		19500	20800	12500	5630	11000	7330
Antimony	N/A	N/A	SB		0.62 J	R	R	5.2 J	R	1.8 J
Arsenic	<0.1 - 73	3 - 12	7.5 or SB		6.1	4.3 U	2.3 U	38.5	2 U	29.5
Barium	100 - 1500	15 - 600	300 or SB		178	170	91	152	116	111
Beryllium	<1 - 7	0.1 - 75	0.16 or SB		2.3	2.8	1.4	0.86	2.2	1.2
Cadmium	N/A	0.1 to 1	1 or SB		0.44	0.12	0.07	0.07 U	0.3	5.5
Calcium	100 - 280000	130 - 35000	SB		87000	103000	57300	24900	65500	24300
Chromium	1 - 1000	1.5 - 40	10 or SB		27.3 J	20.9 J	20.9 J	38.1 J	17.4 J	50.3 J
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		7.5	7.3	4.8	14.4	2.6	10.1
Copper	<1 - 700	<1 - 50	25 or SB		28	17.1	13.7	149	25	124
Iron	100 - >100000	2000 - 550000	2000 or SB		42400	22600	26400	19800	51900	164000
Lead	<10 - 300	200 - 500	SB		50.9 J	29.1 J	27.2 J	91.4 J	45.2 J	388 J
Magnesium	50 - 50000	100 - 5000	SB		16300	16600	9270	4850	17500	2890
Manganese	<2 - 7000	50 - 5000	SB		2820	2670	1050	2430	1480	3280
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.07 J	0.05 U	0.04 U	0.42	0.04 U	0.27 J
Nickel	<5 - 700	0.5 - 25	13 or SB		22.7	25.9	17.6	37.8	10.9	33.8
Potassium	50 - 37000	8500 - 43000	SB		2310	1890	1190	735	999	882
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		2.1 J	1.3 J	0.92 J	5.7 J	0.92 J	3.7 J
Silver	N/A	N/A	SB		0.18	0.16 U	0.16 U	0.6	0.24	1.2
Sodium	<500 - 50000	6000 - 8000	SB		373	381	266	307	420	125
Thallium	N/A	N/A	SB		1.4 U	0.85 U	0.83 U	5.9	1.6 U	5.2 U
Vanadium	<7 - 300	1 - 300	150 or SB		22.8	13.2	12.4	15.2	11.5	35.4
Zinc	<5 - 2900	9 - 50	20 or SB		187	80.6	82.7	667	96.3	1470

Notes:

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

R= Analytical data rejected by data validation, data not usable

N/A= Not available

Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994).

Dark-shaded cells represent detections above 1) NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994), and 2) the larger of Eastern U.S. background & NY Region background

1. Backdraft, HT and IG Boregon, 1984, Element Concentrations in Soils and Other

2. Background Concentrations of 26 Elements in Soils with Special regard for

New York State, E. Geo McGovern NYSDEC Civil/Health Resources Center

Unless otherwise noted, chemicals present at concentrations above the NYSDEC RSCOs are

within the published background concentrations provided in this table.

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDEC Cleanup Levels and Background Levels
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-08-A 10/19/00 0.25	SB-08-C 10/19/00 7.75	SB-10-A 10/19/00 0.25	SB-10-C 10/19/00 7	SB-12-A 10/12/00 0.25	SB-12-C 10/12/00 3
Aluminum	7000 - >100000	33000	SB		28000	7500	14800	11500	10500	8280
Antimony	N/A	N/A	SB		R	0.53 UJ	R	3.7 UJ	1.8 UJ	2.3 UJ
Arsenic	<0.1 - 73	3 - 12	73 or SB		19.2 J	6.2 J	5.6 J	26 J	10.1 J	10.7 J
Barium	100 - 1500	15 - 600	300 or SB		208 J	20.5 J	151 J	192 J	151 J	76.4 J
Beryllium	<1 - 7	0.1 - 1.75	0.16 or SB		3.6 J	0.2 UJ	2.1 J	1.4 J	1.4 J	1.1 J
Cadmium	N/A	0.1 to 1	1 or SB		0.85 J	0.07 UJ	0.45 J	1.9 J	0.35 UJ	0.21 UJ
Calcium	100 - 280000	130 - 35000	SB		175000	3110	112000	43800	48400	29500
Chromium	1 - 1000	1.5 - 40	10 or SB		22.5 J	10.5 J	21.2 J	43.7 J	20.7 J	19.8 J
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		6.8	1.8	3.9	8.5	6.3 J	4.5 J
Copper	<1 - 700	<1 - 50	25 or SB		31.2 J	5.7 J	18.1 J	303 J	68.7	526
Iron	100 - >100000	2000 - 550000	2000 or SB		65400	19300 J	18300 J	95100 J	56300	34700
Lead	<10 - 300	200 - 500	SB		134 J	12.4 J	74.8 J	338 J	207 J	115 J
Magnesium	50 - 50000	100 - 5000	SB		12700	824	11200	4730	6070	4960
Manganese	<2 - 7000	50 - 5000	SB		2190 J	228 J	1550 J	1210 J	1580	1030
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.05 U	0.04 U	0.09 U	0.64	0.37	0.037
Nickel	<5 - 700	0.5 - 25	13 or SB		19.8 J	6.6 J	9.6 J	27.1 J	19.1	13.3 J
Potassium	50 - 37000	8500 - 43000	SB		2250	378	1180	1770	1370	1340
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		2 J	0.7 UJ	0.84 J	1.1 J	0.72 U	0.64 U
Silver	N/A	N/A	SB		0.48 J	0.16 UJ	0.2 J	0.38 J	0.46 U	0.52 U
Sodium	<500 - 50000	6000 - 8000	SB		394	172 U	259	467	247	249
Thallium	N/A	N/A	SB		1.3 UJ	0.81 UJ	0.78 UJ	1 UJ	0.84 UJ	0.74 UJ
Vanadium	<7 - 300	1 - 300	150 or SB		38.4 J	10.1 J	20 J	48.1 J	19.7 J	14.1 J
Zinc	<5 - 2900	9 - 50	20 or SB		255 J	12.2 J	90.6 J	87.7 J	243 J	166 J

Notes:

U=Analyzed for but not detected

J=Estimated value

UJ=Not detected at estimated value

R=Analytical data rejected by data validation, data not usable

N/A=Not available

Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-4046 (1/24/94).

Dark-shaded cells represent detections above 1) NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-4046 (1/24/94), and 2) the larger of Eastern U.S. background & NY Region background.

¹ Shaker, HT and G. Boring, 1984. Element Concentrations in Soils and Other Surface Materials of the Conterminous United States. USGS Professional Paper 1270

² Background Concentrations of 20 Elements in Soils with Special regard for New York State. E. Carol M. Gorm, NYSDEC Wildlife Resources Center

Unless otherwise noted, chemicals present at concentrations above the NYSDEC RSCOs are within the published background concentrations provided in this table

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDEC Cleanup Levels and Background Levels

Soil Boring Investigation
Shenango Steel Mold R/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-14-A 10/12/00 0.25	SB-14-C 10/12/00 4.25	SB-16-A 10/12/00 0.25	SB-16-C 10/12/00 3	SB-18-A 10/16/00 0.25	SB-18-B 10/16/00 5.75
Aluminum	7000 - >100000	33000	SB		9420	9920	10800	10500	6280	6300
Antimony	N/A	N/A	SB		R	R	R	R	R	9.4 J
Arsenic	<0.1 - 73	3 - 12	7.5 or SB		2.1 UJ	2 UJ	5.3 J	3.4 J	5.1	53.9
Barium	100 - 1500	15 - 600	300 or SB		19.4	20.7 J	46.1 J	55.7 J	54.2	167
Beryllium	<1 - 7	0 - 1.75	0.16 or SB		0.17 UJ	0.19 UJ	0.37 UJ	1.5 J	0.53 U	1.1
Cadmium	N/A	0.1 to 1	1 or SB		0.06 UJ	0.07 UJ	0.38 UJ	0.06 UJ	0.37	0.72
Calcium	100 - 280000	120 - 35000	SB		794	1030	14800	39600	46000	21500
Chromium	1 - 1000	1.5 - 40	10 or SB		9.3	10.8	20	12.8	10.4 J	156 J
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		1.2 J	1.2 J	3 J	1.7 J	4.9	7.5
Copper	<1 - 700	<1 - 50	25 or SB		3.7	4.1	24.8	9	32.1	105
Iron	100 - >100000	2000 - 550000	2,000 or SB		8470	9750	28600	41300	19300	67400
Lead	<10 - 300	200 - 500	SB		7.5 J	7.6 J	65.3 J	9.2 J	78.6 J	327 J
Magnesium	50 - 50000	100 - 5000	SB		254	488	2540	9830	11600	3300
Manganese	<2 - 7000	50 - 5000	SB		73.1	79.3	417	1150	332	823
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.07	0.04 U	0.08	0.05 U	0.15 J	0.2 J
Nickel	<5 - 700	0.5 - 25	13 or SB		6.6 J	6.9 J	13.6 J	8.4 J	13.3	21.3
Potassium	50 - 37000	8500 - 43000	SB		475	470	735	682	960	946
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		0.65 U	0.71 U	0.65 U	0.64 U	0.65 UJ	1.3 J
Silver	N/A	N/A	SB		0.21 U	0.21 U	0.3 U	0.22 U	0.15 U	0.25
Sodium	<500 - 50000	6000 - 8000	SB		123	120	129	268	120	158
Thallium	N/A	N/A	SB		0.75 UJ	0.83 UJ	0.76 UJ	0.74 UJ	0.75 U	1.9 U
Vanadium	<7 - 300	1 - 300	150 or SB		12.8 J	12.9 J	17.4 J	9.4 J	12.3	15.8
Zinc	<5 - 2900	9 - 50	20 or SB		7.5 J	7 J	114 J	9.2 J	88.4	160

Notes:

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

R= Analytical data rejected by data validation, data not usable

N/A= Not available

Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994).

Dark-shaded cells represent detections above: 1) NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994); and 2) the larger of Eastern U.S. background & N.Y. Region background.

1. Shukla, H.T. and K. Swenson, 1984. Element Concentrations in Soils and Other

Surficial Materials of the Conterminous United States, USGS Professional Paper 1270

2. Background Concentrations of 20 Elements in Soils with Special regard for

New York State, E. Carl M. Green, NYSDEC Wildlife Resources Center

Unless otherwise noted, chemicals present at concentrations above the NYSDEC RSCOs are within the published background concentrations provided in this table.

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDEC Cleanup Levels and Background Levels

Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-18-C 10/16/00 7.5	SB-20-A 10/11/00 0.25	SB-20-C 10/11/00 2.75	SB-22-A 10/11/00 0.25	SB-22-C 10/11/00 2.75	SB-24-A 10/11/00 0.25
Aluminum	7000 - >100000	33000	SB		6600	10800	12900	17800	12600	22000
Antimony	N/A	N/A	SB		48.9 J	1.3 UJ	R	R	R	R
Arsenic	<0.1 - 73	3 - 12	7.5 or SB		20.9	158 J	11.9 J	1.7 UJ	2.3 UJ	3.4 J
Barium	100 - 1500	15 - 600	300 or SB		162	133 J	115 J	154 J	69.7 J	141 J
Beryllium	<1 - 7	0 - 1.75	0.16 or SB		0.63 U	1.5 J	1.3 J	3.8 J	2.1 J	3.5 J
Cadmium	N/A	0.1 to 1	1 or SB		0.15 U	0.07 UJ	0.16 UJ	0.06 UJ	0.07 UJ	0.15 UJ
Calcium	100 - 280000	130 - 35000	SB		21000	42100	53400	106000	62900	100000
Chromium	1 - 1000	1.5 - 40	10 or SB		32.1 J	23.1 J	21.8 J	5	9.1	16.2 J
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		13	10.1 J	9.7 J	1 J	1.2 J	2.2 J
Copper	<1 - 700	<1 - 50	25 or SB		48	42.1 J	36.5 J	5.5	3.8	18.1
Iron	100 - >100000	2000 - 550000	2000 or SB		213000	101000 J	67800 J	7880 J	9020 J	18400 J
Lead	<10 - 300	200 - 500	SB		1150 J	91 J	65.6 J	11.4 J	12.9 J	39.2 J
Magnesium	50 - 50000	100 - 5000	SB		1840	7650	11100	22600	13100	22500
Manganese	<2 - 7000	50 - 5000	SB		1050	1980	2100	1220	1230	1150
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.06 J	0.1 J	0.05 U	0.05 U	0.05 U	0.06 U
Nickel	<5 - 700	0.5 - 25	13 or SB		61.5 J	22.3 J	23.6 J	2.7 J	3.4 J	9.2 J
Potassium	50 - 37000	8500 - 43000	SB		1460	1830	2390	1170	1080	1390
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		3.1 J	1.4	1.4	1.8	1.1	0.62 U
Silver	N/A	N/A	SB		0.27	0.64 U	0.41 U	0.15 U	0.36 U	0.34 U
Sodium	<500 - 50000	6000 - 8000	SB		299	211	249	621	380	617
Thallium	N/A	N/A	SB		7.6	0.86 UJ	0.8 UJ	0.75 UJ	0.8 UJ	0.72 UJ
Vanadium	<7 - 300	1 - 300	150 or SB		9.6	24.8 J	25.8 J	4.3 J	7.3 J	11.2 J
Zinc	<5 - 2900	9 - 50	20 or SB		710	407 J	300 J	26.4 J	35.2 J	52 J

Notes:

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

R= Analytical data rejected by data validation, data not usable

N/A= Not available

Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994).

Dark-shaded cells represent detections above 1) NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994), and 2) the larger of Eastern U.S. background & NY Region background.

1- Shukla, H.T. and G. Bawgen, 1984. Element Concentrations in Soils and Other Surface Materials of the Conterminous United States. USGS Professional Paper 1270

2- Background Concentrations of 20 Elements in Soils with Special regard for New York State. E. Carol McGovern, NYSDEC Wildlife Resources Center

Unless otherwise noted, chemicals present at concentrations above the NYSDEC RSCO are within the published background concentrations provided in this table.

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDEC Cleanup Levels and Background Levels
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-24-C 10/11/00 2.25	SB-26-A 10/11/00 0.25	SB-26-C 10/11/00 2.25	SB-28-A 10/11/00 0.25	SB-28-C 10/11/00 2	SB-30-A 10/9/00 0.25
Aluminum	7000 - >100000	33000	SB		18000	19200	9620	19200	17100	5560
Antimony	N/A	N/A	SB		R	R	R	R	1.6 UJ	0.37 UJ
Arsenic	<0.1 - 73	3 - 12	7.5 or SB		1.5 UJ	3.4 J	4.1 J	3.6 J	8.8 J	2.3
Barium	100 - 1500	15 - 600	300 or SB		112 J	122 J	57.2 J	157 J	171 J	52.2
Beryllium	<1 - 7	0 - 1.75	0.16 or SB		3.6 J	3.7 J	1.3 J	4.1 J	2.7 J	2.4
Cadmium	N/A	0.1 to 1	1 or SB		0.07 UJ	0.32 UJ	0.07 UJ	0.1 UJ	0.07 UJ	0.07 U
Calcium	100 - 280000	130 - 35000	SB		126000	114000	93100	133000	86100	238000
Chromium	1 - 1000	1.5 - 40	10 or SB		9.9	15.6	9.5	7.4	10.7	3.4
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		1.2 J	2.2 J	5.3 J	1.6 J	4.2 J	0.82
Copper	<1 - 700	<1 - 50	25 or SB		2	15.7	13.5	9.8	35.4	6.5
Iron	100 - >100000	2000 - 550000	2,000 or SB		6500	17800	17800	18200	54800	1500
Lead	<10 - 300	200 - 500	SB		6.4 J	44.7 J	11.2 J	26.5 J	110 J	47.3
Magnesium	50 - 50000	100 - 5000	SB		26600	23200	11000	23900	6310	35200
Manganese	<2 - 7000	50 - 5000	SB		2710	2070	719	2220	1580	581
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.06 U	0.05 U	0.08	0.05	0.04	0.05 U
Nickel	<5 - 700	0.5 - 25	13 or SB		1.8 UJ	7.4 J	15.6 J	5.1 J	10.1 J	3.3
Potassium	50 - 37000	8500 - 43000	SB		1030	1490	1870	1160	1310	439
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		2.3 U	0.81 U	0.74 U	2.2 U	0.72 U	1.4 UJ
Silver	N/A	N/A	SB		0.27 U	0.4 U	0.4 U	0.38 U	0.46 U	0.15 U
Sodium	<500 - 50000	6000 - 8000	SB		645	597	217	603	279	129
Thallium	N/A	N/A	SB		0.79 UJ	0.9 UJ	0.85 UJ	0.75 UJ	0.84 UJ	0.79 UJ
Vanadium	<7 - 300	1 - 300	150 or SB		7.6 J	10.2 J	10.5 J	6.7 J	17 J	3.2
Zinc	<5 - 2900	9 - 50	20 or SB		18.3 J	112 J	36.9 J	52.8 J	219 J	5670

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 R=Analytical data rejected by data validation, data not usable
 N/A=Not available
 Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994).

Dark-shaded cells represent detections above: 1) NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-94-4046 (1/24/994), and 2) the larger of Eastern U.S. background & NY Region background.

1. Shukla, H.T. and J.G. Berman, 1984. Element Concentrations in Soils and Other Surface Materials of the Conterminous United States. USGS Professional Paper 1270.

2. Background Concentrations of 20 Elements in Soils with Special regard for New York State, E. Carol McGovern, NYSDEC Wildlife Resources Center

Unless otherwise noted, chemicals present at concentrations above the NYSDEC RSCOs are within the published background concentrations provided in this table.

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDEC Cleanup Levels and Background Levels
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-30-B 10/9/00 5	SB-32-A 10/10/00 0.25	SB-32-B 10/10/00 5	SB-34-A 10/10/00 0.25	SB-34-C 10/10/00 3.75	SB-36-A 10/10/00 0.25
Aluminum	7000 - >100000	33000	SB		13100	20700	15400	19800	10700	21100
Antimony	N/A	N/A	SB		0.37 UJ	0.39 UJ	0.43 UJ	0.36 UJ	0.4 UJ	0.39 UJ
Arsenic	<0.1 - 73	3 - 12	7.5 or SB		9.6	5.5	8.5	4.4	6.6	1.4
Barium	100 - 1500	15 - 600	300 or SB		89.9	244	92.8	189	82.4	241
Beryllium	<1 - 7	0 - 1.75	0.16 or SB		0.72 U	0.52	0.88 U	4.6	0.57 U	5.2
Cadmium	N/A	0.1 to 1	1 or SB		0.07 U	0.4 U	0.11 U	0.47 U	0.07 U	0.1 U
Calcium	100 - 280000	130 - 35000	SB		48400	147000	41700	149000	47400	146000
Chromium	1 - 1000	1.5 - 40	10 or SB		19.9	121	23.7	32.1	16.4	6.2
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		10.8	3.7	13	3.2	9.5	1.1
Copper	<1 - 700	<1 - 50	25 or SB		23	91.6	29.1	51.7	18.8	5.8
Iron	100 - >100000	2000 - 550000	2000 or SB		27600	61900	29700	44000	22600	8770
Lead	<10 - 300	200 - 500	SB		14.2	13.7	16.2	10.5	10.3	26.6
Magnesium	50 - 50000	100 - 5000	SB		15600	32800	16900	33300	14300	32000
Manganese	<2 - 7000	50 - 5000	SB		435	1990	559	2030	338	1130
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.06 U	0.05 U	0.06 U	0.07	0.07	0.09
Nickel	<5 - 700	0.5 - 25	13 or SB		26.8	41.8	33.3	16.7	25.8	2.7
Potassium	50 - 37000	8500 - 43000	SB		2890	1560	3250	1440	2050	998
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		0.68 UJ	1.7 J	0.78 UJ	1.9 J	0.74 UJ	2.4 J
Silver	N/A	N/A	SB		0.15 U	0.2 U	0.23 U	0.19 U	0.17 U	0.16 U
Sodium	<500 - 50000	6000 - 8000	SB		171 U	731	289	722	172	699
Thallium	N/A	N/A	SB		0.79 UJ	0.83 UJ	0.91 UJ	0.77 UJ	0.85 UJ	0.83 UJ
Vanadium	<7 - 300	1 - 300	150 or SB		25.3	8.1	28.5	8	19.8	3.3
Zinc	<5 - 2900	9 - 50	20 or SB		69.3	267	87.2	244	64.6	294.5

Notes:
 UJ=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 R=Analytical data reported by data validation, data not usable
 N/A=Not available
 Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-4046 (1/24/994).

Dark-shaded cells represent detections above 1) NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-4046 (1/24/994), and 2) the larger of Eastern U.S. background & NY Region background.

1: Shaw, H. H. and G. B. Bormann, 1984. Element Concentrations in Soils and Other Surface Materials of the Conterminous United States. USGS Professional Paper 1279
 2: Background Concentrations of 20 Elements in Soils with Special regard for New York State. J. Carol McGovern, NYSDEC Wildlife Resources Center
 Unless otherwise noted, chemicals present at concentrations above the NYSDEC RSCOs are within the published background concentrations provided in this table.

TABLE 2-4
Summary of Soil Analytical Results for Metals and Comparison to NYSDDEC Cleanup Levels and Background Levels
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDDEC Work Assignment No. D003970-03

CONSTITUENT	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDDEC RSCO (mg/kg)	SAMPLE ID DATE DEPTH (ft)	SB-36-C 10/10/00 3.5	SB-P05-A 10/17/00 0.25	SB-P05-C 10/17/00 5.25	SB-P29-A 10/19/00 0.25	SB-P29-B 10/19/00 3.5	SB-P29-C 10/19/00 6.5
Aluminum	7000 - >100000	33000	SB		17600	14900	12700	26800	3340	4410
Antimony	N/A	N/A	SB		0.38 UJ	R	1.1 J	0.67 UJ	11.3 J	32.7 J
Arsenic	<0.1 - 73	3 - 12	7.5 or SB		3.7	9.3	7.9	2 J	14.7 J	266 J
Barium	100 - 1500	15 - 600	300 or SB		139	135	109	159 J	71.7 J	57.4 J
Beryllium	<1 - 7	0 - 1.75	0.16 or SB		5.5	2.3	1.8	5.8 J	0.47 UJ	0.99 J
Cadmium	N/A	0.1 to 1	1 or SB		0.18 U	1.2	0.64	0.07 UJ	0.52 J	0.09 UJ
Calcium	100 - 280000	130 - 35000	SB		119000	89400	61800	206000	49000	14900 J
Chromium	1 - 1000	1.5 - 40	10 or SB		8.2	18.9 J	18.7 J	13.5 J	19.8 J	34.1 J
Cobalt	<0.3 - 70	2.5 - 60	30 or SB		4.1	6.9	5.4	1.3	5.7	8.7
Copper	<1 - 700	<1 - 50	25 or SB		11.8	44	47	1.5 UJ	150 J	442 J
Iron	100 - >100000	2000 - 550000	2000 or SB		17400	49000	33700	5990 J	73300 J	49200 J
Lead	<10 - 300	200 - 500	SB		20.2	61.7 J	138 J	0.48 UJ	213 J	361 J
Magnesium	50 - 50000	100 - 5000	SB		24700	13600	10800	43400	11800	3240
Manganese	<2 - 7000	50 - 5000	SB		1510	1130	1120	3950 J	682 J	718 J
Mercury	0.01 - 3.4	0.001 - 0.2	0.1		0.05 U	0.2 J	0.11 J	0.05 U	0.03	0.016
Nickel	<5 - 700	0.5 - 25	13 or SB		9.7	19.3	19.5	0.41 J	25.1 J	31.1 J
Potassium	50 - 37000	8500 - 43000	SB		1690	1750	1530	1800	531	502
Selenium	<0.1 - 3.9	<0.1 - 3.9	2 or SB		2.1 J	0.69 UJ	0.82 UJ	1.7 J	1.2 J	3.9 J
Silver	N/A	N/A	SB		0.15 U	0.18	0.18 U	0.2 J	0.3 J	0.38 J
Sodium	<500 - 50000	6000 - 8000	SB		492	356	397	889	148 U	155 UJ
Thallium	N/A	N/A	SB		0.79 UJ	0.83 U	1.2 U	0.79 UJ	0.8 UJ	1.1 UJ
Vanadium	<7 - 300	1 - 300	150 or SB		10	19	15.6	10 J	13.1 J	11.8 J
Zinc	<5 - 2900	9 - 50	20 or SB		68	259	219	3.3 UJ	2.2 J	156 J

Notes:
 UJ= Analyzed for but not detected
 J= Estimated value
 UJ= Not detected at estimated value
 R= Analyzed, data rejected by data validation, data not usable
 N/A= Not available
 Results are presented in mg/kg

Light-shaded cells represent detections above the NYSDDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDDEC TAGM No. HVR-94-4046 (1/24/994).

Dark-shaded cells represent detections above 1) NYSDDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDDEC TAGM No. HVR-94-4046 (1/24/994), and 2) the larger of Eastern U.S. background & NY Region background.

1. Sheldete, PT and IG Remgmt. 1984. Element Concentrations in Soils and Other Surface Materials of the Conterminous United States. USGS Professional Paper 1270
 2. Background Concentrations of 20 Elements in Soils with Special regard for New York State. E. Carol McGovern, NYSDDEC, Wildlife Resources Center

Unless otherwise noted, chemicals present at concentrations above the NYSDDEC RSCOs are within the published background concentrations provided in this table.

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/TS, Buffalo, New York
 NYSDDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-02 SB-02-C 10/16/2000 5.50	SB-02 SB-02-A 10/16/00 0.25	SB-04 SB-04-A 10/16/00 0.25	SB-04 SB-04-C 10/16/00 5	SB-06 SB-06-A 10/16/00 0.25	SB-06 SB-06-C 10/16/00 6
Phenol	30	50,000,000	30		390 U	420 U	380 U	440 U	370 U	550 U
Bis(2-chloroethoxy)ether	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
2-Chlorophenol	800	400,000	800		390 U	420 U	380 U	440 U	370 U	550 U
1,3-Dichlorobenzene	1,350	N/A	1,600		390 U	420 U	380 U	440 U	370 U	550 U
1,4-Dichlorobenzene	8,500	N/A	8,500		390 U	420 U	380 U	440 U	370 U	550 U
1,2-Dichlorobenzene	7,900	N/A	7,900		390 U	420 U	380 U	440 U	370 U	550 U
2-Methylphenol	100	N/A	100		390 U	420 U	380 U	440 U	370 U	550 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
4-Methylphenol	900	4,000,000	900		390 U	420 U	380 U	440 U	370 U	550 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
Hexachlorocyclopentadiene	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
Nitrobenzene	200	40,000	200		390 U	420 U	380 U	440 U	370 U	550 U
Isophorone	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
2-Nitrophenol	330	N/A	330		390 U	420 U	380 U	440 U	370 U	550 U
2,4-Dimethylphenol	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
Bis(2-chloroethoxy)methane	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
2,4-Dichlorophenol	400	200,000	400		390 U	420 U	380 U	440 U	370 U	550 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		390 U	420 U	380 U	440 U	370 U	550 U
Naphthalene	13,000	300,000	13,000		390 U	420 U	380 U	440 U	370 U	550 U
4-Chloroaniline	220	200,000	220		390 U	420 U	380 U	440 U	370 U	550 U
Hexachlorobutadiene	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
4-Chloro-3-methylphenol	240	N/A	240		390 U	420 U	380 U	440 U	370 U	550 U
2-Methylnaphthalene	36,400	N/A	36,400		390 U	420 U	380 U	440 U	370 U	550 U
Hexachlorocyclopentadiene	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
2,4,6-Trichlorophenol	100	N/A	100		390 U	420 U	380 U	440 U	370 U	550 U
2,4,5-Trichlorophenol	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
2-Chloronaphthalene	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
2-Nitroaniline	430	N/A	430		390 U	420 U	380 U	440 U	370 U	550 U
Dimethylphthalate	2,000	80,000,000	2,000		390 U	420 U	380 U	440 U	370 U	550 U
Acenaphthylene	41,000	N/A	41,000		390 U	420 U	380 U	440 U	370 U	550 U
2,6-Dinitrotoluene	1,000	1,030	1,000		390 U	420 U	380 U	440 U	370 U	550 U
3-Nitroaniline	500	N/A	500		390 U	420 U	380 U	440 U	370 U	550 U

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 R=Value rejected, data not usable
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDDEC TAGM No. HVR-94-4046 (1/24/94)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds

Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-02 SB-02-C 10/16/2000 5.50	SB-02-A 10/16/00 0.25	SB-04 SB-04-A 10/16/00 0.25	SB-04 SB-04-C 10/16/00 5	SB-06 SB-06-A 10/16/00 0.25	SB-06 SB-06-C 10/16/00 6
Acenaphthene	90,000	5,000,000	50,000		390 U	420 U	210 J	440 U	790	550 U
2,4-Dinitrophenol	200	200,000	200		970 U	1000 U	940 U	1100 U	930 U	1400 U
4-Nitrophenol	100	N/A	100		970 U	1000 U	940 U	1100 U	930 U	1400 U
Dibenzofuran	6,200	N/A	6,200		390 U	420 U	380 U	26 J	56 J	37 J
2,4-Dinitrotoluene	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
Diethylphthalate	7,100	60,000,000	7,100		390 U	420 U	380 U	440 U	370 U	550 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
Fluorene	350,000	3,000,000	50,000		390 U	420 U	29 J	440 U	150 J	26 J
4-Nitroaniline	N/A	N/A	N/A		970 U	1000 U	940 U	1100 U	930 U	1400 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		970 U	1000 U	940 U	1100 U	930 U	1400 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		390 U	420 U	380 U	440 U	370 U	550 U
Hexachlorobenzene	1,400	410	410		970 U	1000 U	940 U	1100 U	930 U	1400 U
Pentachlorophenol	1,000	2,000,000	1,000		29 J	46 J	260 J	220 J	760	260 J
Phenanthrene	N/A	N/A	N/A		39 J	420 U	67 J	46 J	240 J	54 J
Anthracene	700,000	20,000,000	50,000		390 U	420 U	51 J	440 U	150 J	29 J
Carbazole	8,100	8,000,000	8,100		390 U	420 U	380 U	440 U	370 U	550 U
Di-n-butylphthalate	1,900,000	3,000,000	50,000		75 J	56 J	960	340 J	1800	370 J
Fluoranthene	665,000	2,000,000	50,000		98 J	50 J	1000	350 J	2100	350 J
Pyrene	122,000	2,000,000	50,000		390 U	420 U	380 U	440 U	370 U	550 U
Buylbenzylphthalate	N/A	N/A	N/A		91 J	420 U	380 U	440 U	370 U	550 U
3,3'-Dichlorobenzidine	3,000	224	224		190 J	34 J	600	240 J	2000	210 J
Benzo(a)anthracene	400	N/A	400		390 U	420 U	1200	310 J	2200	250 J
Chrysene	435,000	50,000	50,000		390 U	420 U	380 U	440 U	370 U	550 U
Bis(2-ethylhexyl)phthalate	120,000	2,000,000	50,000		230 J	55 J	2000	280 J	3000	280 J
Di-n-octylphthalate	1,100	N/A	1,100		170 J	45 J	740	200 J	4200	160 J
Benzo(b)fluoranthene	1,100	N/A	1,100		120 J	43 J	1600	250 J	4400	160 J
Benzo(k)fluoranthene	11,000	61	61		140 J	35 J	1300	170 J	2500	160 J
Benzo(a)pyrene	3,200	N/A	3,200		57 J	13 J	570	76 J	1100	67 J
Indeno(1,2,3-cd)pyrene	165,000,000	14	14		160 J	40 J	1400	190 J	2600	160 J
Dibenz(a,h)anthracene	800,000	N/A	50,000		1435	532	12339	2813	26097	27%
Benzo(g,h,i)perylene										
Sum of Constituents			500,000							

Notes:
 U= Analyzed for but not detected
 J= Estimated value
 UJ= Not detected at estimated value
 R= Value rejected, data not usable
 N/A= Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-0346 (1/24/99)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-08 SB-08-A 10/19/00 0.25	SB-08 SB-08-C 10/19/00 7.75	SB-10 SB-10-A 10/19/00 0.25	SB-10 SB-10-C 10/19/00 7	SB-12 SB-12-A 10/12/00 0.25	SB-12 SB-12-C 10/12/00 3
Phenol	30	50,000,000	30		400 U	370 U	390 U	440 U	410 U	410 U
Bis(2-chloroethyl)ether	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
2-Chlorophenol	800	400,000	800		400 U	370 U	390 U	440 U	410 U	410 U
1,3-Dichlorobenzene	1,550	N/A	1,600		400 U	370 U	390 U	440 U	410 U	410 U
1,4-Dichlorobenzene	8,500	N/A	8,500		400 U	370 U	390 U	440 U	410 U	410 U
1,2-Dichlorobenzene	7,900	N/A	7,900		400 U	370 U	390 U	440 U	410 U	410 U
2-Methylphenol	100	N/A	100		400 U	370 U	390 U	440 U	410 U	410 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
4-Methylphenol	900	4,000,000	900		400 U	370 U	390 U	440 U	410 U	410 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Hexachloroethane	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Nitrobenzene	200	40,000	200		400 U	370 U	390 U	440 U	410 U	410 U
Isophorone	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
2-Nitrophenol	330	N/A	330		400 U	370 U	390 U	440 U	410 U	410 U
2,4-Dimethylphenol	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Bis(2-chloroethoxy)methane	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
2,4-Dichlorophenol	400	200,000	400		400 U	370 U	390 U	440 U	410 U	410 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		400 U	370 U	390 U	440 U	410 U	410 U
Naphthalene	13,000	300,000	13,000		390 J	36 J	35 J	52 J	35 J	40 J
4-Chloroaniline	220	200,000	220		400 U	370 U	390 U	440 U	410 U	410 U
Hexachlorobutadiene	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
4-Chloro-3-methylphenol	240	N/A	240		400 U	370 U	390 U	440 U	410 U	410 U
2-Methylnaphthalene	36,400	N/A	36,400		400	38 J	20 J	69 J	44 J	60 J
Hexachlorocyclopentadiene	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
2,4,6-Trichlorophenol	100	8,000,000	100		400 U	370 U	390 U	440 U	410 U	410 U
2,4,5-Trichlorophenol	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
2-Chloronaphthalene	430	N/A	430		400 U	370 U	390 U	440 U	410 U	410 U
2-Nitroaniline	2,000	80,000,000	2,000		400 U	370 U	390 U	440 U	410 U	410 U
Dimethylphthalate	41,000	N/A	41,000		180 J	370 U	27 J	21 J	34 J	410 U
Acenaphthylene	1,000	1,030	1,000		400 U	370 U	390 U	440 U	410 U	410 U
2,6-Dinitrotoluene	500	N/A	500		1000 U	920 U	970 U	1100 U	1000 U	1000 U
3-Nitroaniline										

Notes:

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

R= Value rejected, data not usable

N/A= Not available

Results are presented in ug/kg

Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HVR-

94-4046 (1/24/99)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-08 SB-08-A 10/19/00 0.25	SB-08 SB-08-C 10/19/00 7.75	SB-10 SB-10-A 10/19/00 0.25	SB-10 SB-10-C 10/19/00 7	SB-12 SB-12-A 10/12/00 0.25	SB-12 SB-12-C 10/12/00 3
Acenaphthene	90,000	5,000,000	50,000		1800	65 J	45 J	59 J	44 J	200 J
2,4-Dinitrophenol	200	200,000	200		1000 U	920 U	970 U	1100 U	1000 U	1000 U
4-Nitrophenol	100	N/A	100		1000 U	920 U	970 U	1100 U	1000 U	1000 U
Dibenzofuran	6,200	N/A	6,200		1500	370 U	27 J	63 J	25 J	24 J
2,4-Dinitrotoluene	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Diethylphthalate	7,100	60,000,000	7,100		400 U	370 U	390 U	440 U	410 U	410 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Fluorene	350,000	3,000,000	50,000		2900	27 J	43 J	66 J	410 U	29 J
4-Nitroaniline	N/A	N/A	N/A		1000 U	920 U	970 U	1100 U	1000 U	1000 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		1000 U	920 U	970 U	1100 U	1000 U	1000 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Hexachlorobenzene	1,400	410	410		400 U	370 U	390 U	440 U	410 U	410 U
Pentachlorophenol	1,000	2,000,000	1,000		1000 U	920 U	970 U	1100 U	1000 U	1000 U
Phenanthrene	N/A	N/A	N/A		23000	590	480	700	180 J	250 J
Anthracene	700,000	20,000,000	50,000		6300	98 J	140 J	180 J	61 J	59 J
Carbazole	8,100	8,000,000	N/A		2000	220 J	92 J	91 J	410 U	42 J
Di-n-butylphthalate	8,100	8,000,000	8,100		400 U	370 U	390 U	440 U	410 U	410 U
Fluoranthene	1,900,000	3,000,000	50,000		26000	3900	810	1000	360 J	990
Pyrene	665,000	2,000,000	50,000		24000	4700	730	920	360 J	1200
3,3'-Dichlorobenzidine	122,000	2,000,000	50,000		170 J	370 U	390 U	440 U	410 U	410 U
Butylbenzylphthalate	N/A	N/A	N/A		400 U	370 U	390 U	440 U	410 U	410 U
Benzo(a)anthracene	3,000	224	224		1100	380	420	550	290 J	1600
Chrysene	400	N/A	400		920	600	430	570	320 J	1100
Bis(2-ethylhexyl)phthalate	435,000	50,000	50,000		65 J	370 U	390 U	440 U	410 U	410 U
Di-n-octylphthalate	120,000	2,000,000	50,000		400 U	370 U	390 U	440 U	410 U	410 U
Benzo(b)fluoranthene	1,100	N/A	1,100		7000	7000	500	630	420	2100
Benzo(k)fluoranthene	1,100	N/A	1,100		6200	2900	430	450	290 J	960
Benzo(a)pyrene	11,000	61	61		5100	6200	420	610	400 J	1700
Indeno(1,2,3-cd)pyrene	3,200	N/A	3,200		3000	2900	200 J	310 J	260 J	1200
Dibenz(a,h)anthracene	165,000,000	14	14		1500	1300	74 J	360 J	300 J	530
Benzo(g,h,i)perylene	800,000	N/A	50,000		2900	3300	200 J	360 J	300 J	1500
Sum of Constituents			500,000		140405	41974	5123	6851	3523	13184

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 R=Value rejected, data not usable
 N/A=Not available
 Results are presented in µg/kg
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-4346 (1/24/99)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-14 SB-14-A 10/12/00 0.25	SB-14 SB-14-C 10/12/00 4.25	SB-16 SB-16-A 10/12/00 0.25	SB-16 SB-16-C 10/12/00 3	SB-18 SB-18-A 10/16/00 0.25	SB-18 SB-18-B 10/16/00 5.75
Phenol	30	50,000,000	30		400 U	420 U	430 U	410 U	390 U	420 U
Bis(2-chloroethyl)ether	N/A	N/A	N/A		400 UJ	420 UJ	430 UJ	410 UJ	390 U	420 U
2-Chlorophenol	800	400,000	800		400 U	420 U	430 U	410 U	390 U	420 U
1,3-Dichlorobenzene	1,550	N/A	1,550		400 U	420 U	430 U	410 U	390 U	420 U
1,4-Dichlorobenzene	8,500	N/A	8,500		400 U	420 U	430 U	410 U	390 U	420 U
1,2-Dichlorobenzene	7,900	N/A	7,900		400 U	420 U	430 U	410 U	390 U	420 U
2-Methylphenol	100	N/A	100		400 U	420 U	430 U	410 U	390 U	420 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
4-Methylphenol	900	4,000,000	900		400 U	420 U	430 U	410 U	390 U	420 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Hexachloroethane	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Nitrobenzene	200	40,000	200		400 U	420 U	430 U	410 U	390 U	420 U
Isophorone	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
2-Nitrophenol	330	N/A	330		400 U	420 U	430 U	410 U	390 U	420 U
2,4-Dimethylphenol	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Bis(2-chloromethoxy)methane	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
2,4-Dichlorophenol	400	200,000	400		400 U	420 U	430 U	410 U	390 U	420 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		400 U	420 U	430 U	410 U	390 U	420 U
Naphthalene	13,000	300,000	13,000		400 U	420 U	75 J	25 J	390 U	170 J
4-Chloroaniline	220	200,000	220		400 UJ	420 UJ	430 UJ	410 UJ	390 UJ	420 UJ
Hexachlorobutadiene	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
4-Chloro-3-methylphenol	240	N/A	240		400 U	420 U	430 U	410 U	390 U	420 U
2-Methylnaphthalene	36,400	N/A	36,400		400 U	420 U	390 J	21 J	390 U	260 J
Hexachlorocyclopentadiene	N/A	N/A	N/A		400 UJ	420 UJ	430 UJ	410 UJ	390 U	420 U
2,4,6-Trichlorophenol	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
2,4,5-Trichlorophenol	100	8,000,000	100		990 U	1000 U	1100 U	1000 U	980 U	1000 U
2-Chloronaphthalene	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
2-Nitroaniline	430	N/A	430		990 U	1000 U	1100 U	1000 U	980 U	1000 U
Dimethylphthalate	2,000	80,000,000	2,000		400 U	420 U	430 U	410 U	390 U	420 U
Acenaphthylene	41,000	N/A	41,000		400 U	420 U	200 I	410 U	22 J	52 J
2,6-Dinitrotoluene	1,000	1,030	1,000		400 U	420 U	430 U	410 U	390 U	420 U
3-Nitroaniline	500	N/A	500		990 U	1000 U	1100 U	1000 U	980 U	1000 U

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 R=Value reported, data not usable
 N/A=Not available
 Results are presented in µg/kg
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HWR-94-0046 (1/24/99)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-14 SB-14-A 10/12/00 0.25	SB-14 SB-14-C 10/12/00 4.25	SB-16 SB-16-A 10/12/00 0.25	SB-16 SB-16-C 10/12/00 3	SB-18 SB-18-A 10/16/00 0.25	SB-18 SB-18-B 10/16/00 5.75
Acenaphthene	90,000	5,000,000	50,000		400 U	420 U	980	410 U	21 U	24 U
2,4-Dinitrophenol	200	200,000	200		990 U	1000 U	1100 U	1000 U	980 U	1000 U
4-Nitrophenol	100	N/A	100		990 U	1000 U	1100 U	1000 U	980 U	1000 U
Dibenzofuran	6,200	N/A	6,200		400 U	420 U	800	410 U	390 U	100 U
2,4-Dinitrotoluene	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Diethylphthalate	7,100	60,000,000	7,100		400 U	420 U	430 U	410 U	390 U	420 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Fluorene	350,000	3,000,000	50,000		400 U	420 U	1900	410 U	26 U	53 U
4-Nitroaniline	N/A	N/A	N/A		990 U	1000 U	1100 U	1000 U	980 U	1000 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		990 U	1000 U	1100 U	1000 U	980 U	1000 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Hexachlorobenzene	1,400	410	410		400 U	420 U	430 U	410 U	390 U	420 U
Pentachlorophenol	1,000	2,000,000	1,000		990 U	1000 U	1100 U	1000 U	980 U	1000 U
Phenanthrene	N/A	N/A	N/A		400 U	420 U	6000	24 U	260 U	560
Anthracene	700,000	20,000,000	50,000		400 U	420 U	2300	410 U	69 U	120 U
Carbazole	N/A	N/A	N/A		400 U	420 U	540	410 U	28 U	54 U
Di-n-butylphthalate	8,100	8,000,000	8,100		400 U	420 U	430 U	410 U	390 U	420 U
Fluoranthene	1,900,000	3,000,000	50,000		400 U	420 U	2400	30 U	430	650
Pyrene	665,000	2,000,000	50,000		400 U	420 U	1900	24 U	410	670
Butylbenzylphthalate	122,000	2,000,000	50,000		400 U	420 U	430 U	410 U	390 U	420 U
3,3'-Dichlorobenzidine	N/A	N/A	N/A		400 U	420 U	430 U	410 U	390 U	420 U
Benzol(a)anthracene	3,000	224	224		400 U	420 U	1400	410 U	390 U	420 U
Chrysene	400	N/A	400		400 U	420 U	1500	410 U	250 U	420 U
Bis(2-ethylhexyl)phthalate	435,000	50,000	50,000		400 U	420 U	430 U	410 U	21 U	420 U
Di-n-octylphthalate	120,000	2,000,000	50,000		400 U	420 U	430 U	410 U	390 U	420 U
Benzof(b)fluoranthene	1,100	N/A	1,100		400 U	420 U	1200	22 U	270 U	460
Benzol(k)fluoranthene	1,100	N/A	1,100		400 U	420 U	600	27 U	200 U	290 U
Benzol(a)pyrene	11,000	61	61		400 U	420 U	960	410 U	250 U	300 U
Indeno(1,2,3-cd)pyrene	3,200	N/A	3,200		400 U	420 U	440	410 U	180 U	260 U
Dibenz(a,h)anthracene	165,000,000	14	14		400 U	420 U	250 U	410 U	6 U	120 U
Benzol(g,h,i)perylene	800,000	N/A	50,000		400 U	420 U	480	24 U	190 U	280 U
Sum of Constituents			500,000		0	0	24,315	197	2934	5323

Notes:
 U=Analyzed for but not detected
 /=Estimated value
 U/=Not detected at estimated value
 R=Value reported, data not available
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDC Recommended Soil Cleanup Objectives (RSCO) as per NYSDC TAGM No. HWR-94-4046 (1/24/994)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold R/FS, Buffalo, New York
 NYSDC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-18 SB-18-C 10/16/00 7.5	SB-20 SB-20-C 10/11/00 2.75	SB-20 SB-20-A 10/11/00 0.25	SB-22 SB-22-A 10/11/00 0.25	SB-22 SB-22-C 10/11/00 2.75	SB-24 SB-24-A 10/11/00 0.25
Phenol	30	50,000,000	30		440 U	440 U	460 U	410 U	420 U	420 U
Bis(2-chloroethyl)ether	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
2-Chlorophenol	800	400,000	800		440 U	440 U	460 U	410 U	420 U	420 U
1,3-Dichlorobenzene	1,550	N/A	1,600		440 U	440 U	460 U	410 U	420 U	420 U
1,4-Dichlorobenzene	8,500	N/A	8,500		440 U	440 U	460 U	410 U	420 U	420 U
1,2-Dichlorobenzene	7,900	N/A	7,900		440 U	440 U	460 U	410 U	420 U	420 U
2-Methylphenol	100	N/A	100		440 U	440 U	460 U	410 U	420 U	420 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
4-Methylphenol	900	4,000,000	900		440 U	440 U	460 U	410 U	420 U	420 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Hexachloroethane	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Nitrobenzene	200	40,000	200		440 U	440 U	460 U	410 U	420 U	420 U
Isophorone	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
2-Nitrophenol	330	N/A	330		440 U	440 U	460 U	410 U	420 U	420 U
2,4-Dimethylphenol	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Bis(2-chloroethoxy)methane	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
2,4-Dichlorophenol	400	200,000	400		440 U	440 U	460 U	410 U	420 U	420 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		440 U	440 U	460 U	410 U	420 U	420 U
Naphthalene	13,000	300,000	13,000		37 f	440 U	460 U	410 U	59 f	420 U
4-Chloroaniline	220	200,000	220		440 U	440 U	460 U	410 U	420 U	420 U
Hexachlorobutadiene	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
4-Chloro-3-methylphenol	240	N/A	240		440 U	440 U	460 U	410 U	420 U	420 U
2-Methylnaphthalene	36,400	N/A	36,400		62 f	440 U	460 U	410 U	56 f	420 U
Hexachlorocyclopentadiene	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
2,4,6-Trichlorophenol	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
2,4,5-Trichlorophenol	180	8,000,000	100		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
2-Chloronaphthalene	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
2-Nitroaniline	430	N/A	430		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
Dimethylphthalate	2,000	80,000,000	2,000		440 U	440 U	460 U	410 U	420 U	420 U
Arenaphthylene	41,000	N/A	41,000		440 U	440 U	460 U	410 U	420 U	420 U
2,6-Dinitrotoluene	1,000	1,030	1,000		440 U	440 U	460 U	410 U	420 U	420 U
3-Nitroaniline	500	N/A	500		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U

Notes:
 U=Analyzed for but not detected
 f=Estimated value
 U)=Not detected at estimated value
 R=Value rejected, data not usable
 N/A=Not available
 Results are presented in ug/gX
 Shaded cells represent detections above NYSDC Recommended Soil Cleanup Objectives (RSCO) as per NYSDC TAGM No. HVR-94-4046 (12/4/94)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-18 SB-18-C 10/16/00	SB-20 SB-20-C 10/11/00	SB-20 SB-20-A 10/11/00	SB-22 SB-22-A 10/11/00	SB-22 SB-22-C 10/11/00	SB-24 SB-24-A 10/11/00
Acenaphthene	90,000	5,000,000	50,000		440 U	440 U	460 U	82 J	560	420 U
2,4-Dinitrophenol	200	200,000	200		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
4-Nitrophenol	100	N/A	100		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
Dibenzofuran	6,200	N/A	6,200		23 J	440 U	460 U	410 U	25 J	420 U
2,4-Dinitrotoluene	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Diethylphthalate	7,100	60,000,000	7,100		440 U	440 U	460 U	410 U	420 U	420 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Fluorene	350,000	3,000,000	50,000		440 U	440 U	460 U	410 U	420 U	420 U
4-Nitroaniline	N/A	N/A	N/A		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Hexachlorobenzene	1,400	410	410		440 U	440 U	460 U	410 U	420 U	420 U
Pentachlorophenol	1,000	2,000,000	1,000		1100 U	1100 U	1200 U	1000 U	1000 U	1000 U
Phenanthrene	N/A	N/A	N/A		110 J	440 U	460 U	84 J	280 J	26 J
Anthracene	700,000	20,000,000	50,000		23 J	440 U	37 J	25 J	97 J	420 U
Carbazole	N/A	N/A	N/A		440 U	440 U	460 U	410 U	46 J	420 U
Di-n-butylphthalate	8,100	8,000,000	8,100		440 U	440 U	460 U	410 U	420 U	420 U
Fluoranthene	1,900,000	3,000,000	50,000		91 J	440 U	190 J	250 J	590	52 J
Pyrene	665,000	2,000,000	50,000		240 J	440 U	180 J	330 J	610	54 J
Butylbenzylphthalate	122,000	2,000,000	50,000		440 U	440 U	460 U	410 U	190 J	420 U
3,3'-Dichlorobenzidine	N/A	N/A	N/A		440 U	440 U	460 U	410 U	420 U	420 U
Benzofuran	3,000	224	224		81 J	440 U	120 J	270 J	700	44 J
Chrysene	400	N/A	400		93 J	440 U	150 J	490	740	60 J
Bis(2-ethylhexyl)phthalate	435,000	50,000	50,000		440 U	440 U	460 U	54 J	420 U	420 U
Di-n-octylphthalate	120,000	2,000,000	50,000		440 U	440 U	460 U	410 U	420 U	420 U
Benzo(b)fluoranthene	1,100	N/A	1,100		440 U	440 U	460 U	410 U	420 U	420 U
Benzo(k)fluoranthene	1,100	N/A	1,100		440 U	440 U	460 U	410 U	420 U	420 U
Benzo(a)pyrene	11,000	61	61		440 U	440 U	460 U	410 U	420 U	420 U
Indeno(1,2,3-cd)pyrene	3,200	N/A	3,200		110 J	440 U	60 J	560	1200	65 J
Dibenz(a,h)anthracene	165,000,000	14	14		440 U	440 U	23 J	270 J	530	32 J
Benzo(g,h,i)perylene	800,000	N/A	50,000		110 J	440 U	70 J	280	1400	89 J
Sum of Constituents			500,000		980	0	1320	5205	10845	663

Notes:
 U=Analyzed but not detected
 J=Estimated value
 UI=Not detected at estimated value
 R=Value reported, data not usable
 N/A=Not available
 Results are presented in ug/g
 Shaded cells represent detections above NYDEC Recommended Soil Cleanup Objectives (RSCO) as per NYDEC TAGM No. HVR-94-0046 (1/2/99)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-24 SB-24-C 10/11/00 2.25	SB-26 SB-26-A 10/11/00 0.25	SB-26 SB-26-C 10/11/00 2.25	SB-28 SB-28-A 10/11/00 0.25	SB-28 SB-28-C 10/11/00 2	SB-30 SB-30-A 10/9/00 0.25
Phenol	30	50,000,000	30		450 U	460 U	430 U	410 U	420 U	370 U
Bis(2-chloroethyl)ether	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
2-Chlorophenol	800	400,000	800		450 U	460 U	430 U	410 U	420 U	370 U
1,3-Dichlorobenzene	1,550	N/A	1,600		450 U	460 U	430 U	410 U	420 U	370 U
1,4-Dichlorobenzene	8,500	N/A	8,500		450 U	460 U	430 U	410 U	420 U	370 U
1,2-Dichlorobenzene	7,900	N/A	7,900		450 U	460 U	430 U	410 U	420 U	370 U
2-Methylphenol	100	N/A	100		450 U	460 U	430 U	410 U	420 U	370 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
4-Methylphenol	900	4,000,000	900		450 U	460 U	430 U	410 U	420 U	370 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Hexachloroethane	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Nitrobenzene	200	40,000	200		450 U	460 U	430 U	410 U	420 U	370 U
Isophorone	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
2-Nitrophenol	330	N/A	330		450 U	460 U	430 U	410 U	420 U	370 U
2,4-Dimethylphenol	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Bis(2-chloroethoxy)methane	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
2,4-Dichlorophenol	400	200,000	400		450 U	460 U	430 U	410 U	420 U	370 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		450 U	460 U	430 U	410 U	420 U	370 U
Naphthalene	13,000	300,000	13,000		450 U	460 U	430 U	410 U	420 U	370 U
4-Chloroaniline	220	200,000	220		450 U	460 U	430 U	410 U	420 U	370 U
Hexachlorobutadiene	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
4-Chloro-3-methylphenol	240	N/A	240		450 U	460 U	430 U	410 U	420 U	370 U
2-Methylnaphthalene	36,400	N/A	36,400		450 U	28 J	32 J	410 U	44 J	69 J
Hexachlorocyclopentadiene	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
2,4,6-Trichlorophenol	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
2,4,5-Trichlorophenol	100	8,000,000	100		450 U	1100 U	1100 U	1000 U	1000 U	920 U
2-Chloronaphthalene	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
2-Nitroaniline	430	N/A	430		1100 U	1100 U	1100 U	1000 U	1000 U	920 U
Dimethylphthalate	2,000	80,000,000	2,000		450 U	460 U	430 U	410 U	420 U	370 U
Acenaphthylene	41,000	N/A	41,000		450 U	460 U	430 U	410 U	420 U	370 U
2,6-Dinitrotoluene	1,000	1,030	1,000		450 U	460 U	430 U	410 U	420 U	370 U
3-Nitroaniline	500	N/A	500		1100 U	1100 U	1100 U	1000 U	1000 U	920 U

Notes:
 U=Analyzed for but not detected
 J=Estimated value
 UJ=Not detected at estimated value
 R=Value rejected, data not usable
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TACM No. HW-94-4046 (1/24/94)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-24 SB-24-C 10/11/00 2.25	SB-26 SB-26-A 10/11/00 0.25	SB-26 SB-26-C 10/11/00 2.25	SB-28 SB-28-A 10/11/00 0.25	SB-28 SB-28-C 10/11/00 2	SB-30 SB-30-A 10/9/00 0.25
Acenaphthene	90,000	5,000,000	50,000		37 J	460 U	430 U	52 J	230 J	370 U
2,4-Dinitrophenol	200	200,000	200		1100 U	1100 U	1100 U	1000 U	1000 U	920 U
4-Nitrophenol	100	N/A	100		1100 U	1100 U	1100 U	1000 U	1000 U	920 U
Dibenzofuran	6,200	N/A	6,200		450 U	460 U	430 U	410 U	420 U	370 U
2,4-Dinitrotoluene	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Diethylphthalate	7,100	60,000,000	7,100		450 U	460 U	430 U	410 U	420 U	370 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Fluorene	350,000	3,000,000	50,000		450 U	460 U	430 U	410 U	420 U	370 U
4-Nitroaniline	N/A	N/A	N/A		1100 U	1100 U	1100 U	1000 U	1000 U	920 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		1100 U	1100 U	1100 U	1000 U	1000 U	920 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Hexachlorobenzene	1,400	410	410		450 U	460 U	430 U	410 U	420 U	370 U
Pentachlorophenol	1,000	2,000,000	1,000		1100 U	1100 U	1100 U	1000 U	1000 U	920 U
Phenanthrene	N/A	N/A	N/A		38 J	56 J	37 J	54 J	220 J	66 J
Anthracene	200,000	20,000,000	50,000		450 U	460 U	430 U	410 U	420 U	370 U
Carbazole	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Di-n-butylphthalate	8,100	8,000,000	8,100		450 U	460 U	430 U	410 U	420 U	370 U
Fluoranthene	1,900,000	3,000,000	50,000		110 J	120 J	42 J	95 J	340 J	27 J
Pyrene	665,000	2,000,000	50,000		130 J	130 J	38 J	110 J	390 J	59 J
Butylbenzylphthalate	122,000	2,000,000	50,000		450 U	460 U	430 U	410 U	420 U	370 U
3,3'-Dichlorobenzidine	N/A	N/A	N/A		450 U	460 U	430 U	410 U	420 U	370 U
Benzo(a)anthracene	3,000	224	224		120 J	120 J	25 J	100 J	300 J	42 J
Chrysene	400	N/A	400		160 J	180 J	34 J	130 J	340 J	46 J
Bis(2-ethylhexyl)phthalate	435,000	50,000	50,000		450 U	460 U	430 U	410 U	420 U	370 U
Di-n-octylphthalate	120,000	2,000,000	50,000		450 U	460 U	430 U	410 U	420 U	370 U
Benzo(b)fluoranthene	1,100	N/A	1,100		230 J	230 J	20 J	180 J	560 J	53 J
Benzo(k)fluoranthene	1,100	N/A	1,100		180 J	190 J	25 J	160 J	410 J	30 J
Benzo(a)pyrene	11,000	61	61		260 J	220 J	24 J	230 J	660 J	55 J
Indeno(1,2,3-cd)pyrene	3,200	N/A	3,200		170 J	160 J	430 U	140 J	420 J	42 J
Dibenz(a,h)anthracene	165,000,000	14	14		60 J	60 J	430 U	62 J	200 J	370 U
Benzo(g,h,i)perylene	800,000	N/A	50,000		220 J	210 J	430 U	180 J	480 J	61 J
Sum of Constituents			500,000		1735	1692	311	1493	4730	648

Notes:
 U=analyzed for but not detected
 J=Estimated value
 UJ= Not detected at estimated value
 R=Value rejected, data not usable
 N/A=Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. H1-VR-94-4046 (1/2-4/994)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/RS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-30 SB-30-B 10/9/00 5	SB-32 SB-32-A 10/10/00 0.25	SB-32-B SB-32-B 10/10/00 5	SB-34 SB-34-A 10/10/00 0.25	SB-34 SB-34-C 10/10/00 3.75	SB-36 SB-36-A 10/10/00 0.25
Phenol	30	50,000,000	30		420 U	400 U	410 U	370 U	410 U	390 U
Bis(2-chloroethyl)ether	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
2-Chlorophenol	800	400,000	800		420 U	400 U	410 U	370 U	410 U	390 U
1,3-Dichlorobenzene	1,550	N/A	1,600		420 U	400 U	410 U	370 U	410 U	390 U
1,4-Dichlorobenzene	8,500	N/A	8,500		420 U	400 U	410 U	370 U	410 U	390 U
1,2-Dichlorobenzene	7,900	N/A	7,900		420 U	400 U	410 U	370 U	410 U	390 U
2-Methylphenol	100	N/A	100		420 U	400 U	410 U	370 U	410 U	390 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
4-Methylphenol	900	4,000,000	900		420 U	400 U	410 U	370 U	410 U	390 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
Hexachloroethane	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
Nitrobenzene	200	40,000	200		420 U	400 U	410 U	370 U	410 U	390 U
Isophorone	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
2-Nitrophenol	330	N/A	330		420 U	400 U	410 U	370 U	410 U	390 U
2,4-Dimethylphenol	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
Bis(2-chloroethoxy)methane	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
2,4-Dichlorophenol	400	200,000	400		420 U	400 U	410 U	370 U	410 U	390 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		420 U	400 U	410 U	370 U	410 U	390 U
Naphthalene	13,000	300,000	13,000		420 U	400 U	410 U	370 U	410 U	390 U
4-Chloroaniline	220	200,000	220		34 J	28 J	44 J	30 J	410 U	25 J
Hexachlorobutadiene	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
4-Chloro-3-methylphenol	240	N/A	240		420 U	400 U	410 U	370 U	410 U	390 U
2-Methylnaphthalene	36,400	N/A	36,400		420 U	400 U	410 U	41 J	410 U	34 J
Hexachlorocyclopentadiene	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
2,4,6-Trichlorophenol	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
2,4,5-Trichlorophenol	100	8,000,000	100		1000 U	1000 U	1000 U	920 U	1000 U	970 U
2-Chloronaphthalene	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
2-Nitroaniline	430	N/A	430		1000 U	1000 U	1000 U	920 U	1000 U	970 U
Dimethylphthalate	2,000	80,000,000	2,000		420 U	400 U	410 U	370 U	410 U	390 U
Acenaphthylene	41,000	N/A	41,000		420 U	400 U	410 U	370 U	410 U	390 U
2,6-Dinitrotoluene	1,000	1,030	1,000		420 U	400 U	410 U	370 U	410 U	390 U
3-Nitroaniline	500	N/A	500		1000 U	1000 U	1000 U	920 U	1000 U	970 U

Notes:
 U= Analyzed for but not detected
 J= Estimated value
 UJ= Not detected at estimated value
 R= Value rejected, data not usable
 N/A= Not available

Results are presented in µg/kg
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. HW-94-4046 (1/24/94)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDEC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/ES, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-30 SB-30-B 10/9/00 5	SB-32-A SB-32-A 10/10/00 0.25	SB-32-B SB-32-B 10/10/00 5	SB-34 SB-34-A 10/10/00 0.25	SB-34 SB-34-C 10/10/00 3.75	SB-36 SB-36-A 10/10/00 0.25
Acenaphthene	90,000	5,000,000	50,000		420 U	400 U	410 U	370 U	410 U	390 U
2,4-Dinitrophenol	200	200,000	200		1000 UJ	1000 UJ	1000 UJ	920 U	1000 UJ	970 U
4-Nitrophenol	100	N/A	100		1000 U	1000 U	1000 U	920 U	1000 U	970 U
Dibenzofuran	6,200	N/A	6,200		420 U	400 U	410 U	370 U	410 U	390 U
2,4-Dinitrotoluene	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
Diethylphthalate	7,100	60,000,000	7,100		420 U	400 U	410 U	370 U	410 U	390 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
Fluorene	350,000	1,000,000	50,000		420 U	400 U	410 U	370 U	410 U	390 U
4-Nitroaniline	N/A	N/A	N/A		1000 U	1000 U	1000 U	920 U	1000 U	970 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		1000 U	1000 U	1000 U	920 U	1000 U	970 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		420 U	400 U	270 J	370 U	410 U	390 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		420 U	400 U	410 U	370 U	410 U	390 U
Hexachlorobenzene	1,400	410	410		420 U	400 U	410 U	370 U	410 U	390 U
Pentachlorophenol	1,000	2,000,000	1,000		1000 U	1000 U	1000 U	920 U	1000 U	970 U
Phenanthrene	N/A	N/A	N/A		420 U	24 J	410 U	59 J	410 U	47 J
Anthracene	700,000	20,000,000	50,000		420 U	400 U	410 U	370 U	410 U	390 U
Carbazole	N/A	N/A	N/A		420 U	400 U	33 J	370 U	410 U	390 U
Di-n-butylphthalate	8,100	8,000,000	8,100		420 U	400 U	410 U	370 U	410 U	390 U
Fluoranthene	1,900,000	3,000,000	50,000		420 U	67 J	410 U	370 U	410 U	390 U
Pyrene	665,000	2,000,000	50,000		420 U	72 J	410 U	340 J	410 U	170 J
Butylbenzylphthalate	122,000	2,000,000	50,000		420 U	400 U	410 U	370 UJ	410 U	390 U
3,3'-Dichlorobenzidine	N/A	N/A	N/A		420 U	400 U	410 U	370 UJ	410 U	390 U
Benzo(a)anthracene	3,000	224	224		56 J	36 J	29 J	79 J	410 U	60 J
Chrysene	400	N/A	400		420 U	53 J	410 U	190 J	410 U	110 J
Bis(2-ethylhexyl)phthalate	435,000	50,000	50,000		420 U	400 U	410 U	110 J	410 U	390 U
Di-n-octylphthalate	120,000	2,000,000	50,000		420 U	400 U	410 U	370 UJ	410 U	390 UJ
Benzo(b)fluoranthene	1,100	N/A	1,100		420 U	57 J	410 U	170 J	410 U	120 J
Benzo(k)fluoranthene	1,100	N/A	1,100		420 U	35 J	410 U	140 J	410 U	100 J
Benzo(a)pyrene	11,000	61	61		420 U	31 J	410 U	120 J	410 U	110 J
Indeno(1,2,3-cd)pyrene	3,200	N/A	3,200		420 U	31 J	410 U	120 J	410 U	110 J
Dibenz(a,h)anthracene	165,000,000	14	14		420 U	400 U	410 U	160 J	410 U	390 UJ
Benzo(g,h,i)perylene	800,000	N/A	50,000		420 U	41 J	410 U	176 J	410 U	140 J
Sum of Constituents			500,000		90	475	376	1762	0	1132

Notes:
 U= Analyzed, but not detected
 J= Estimated value
 UJ= Not detected at estimated value
 R= Value rejected, data not usable
 N/A= Not available
 Results are presented in ug/g
 Shaded cells represent detections above NYSDEC Recommended Soil Cleanup Objectives (RSCO) as per NYSDEC TAGM No. H4-VR-94-4746 (1/24/94)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDC RSCOs - Semivolatile Organic Compounds
 Soil Boring Investigation
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective to Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-36 SB-36-C 10/10/00	SB-P05 SB-P05-A 10/7/00	SB-P05 SB-P05-C 10/7/00	SB-P29 SB-P29-A 10/19/00	SB-P29 SB-P29-B 10/19/00	SB-P29 SB-P29-C 10/19/00
Phenol	30	50,000,000	30		380 U	400 U	2100 U	380 U	370 U	2300 U
Bis(2-chloroethyl)ether	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
2-Chlorophenol	800	400,000	800		380 U	400 U	2100 U	380 U	370 U	2300 U
1,3-Dichlorobenzene	1,550	N/A	1,600		380 U	400 U	2100 U	380 U	370 U	2300 U
1,4-Dichlorobenzene	8,500	N/A	8,500		380 U	400 U	2100 U	380 U	370 U	2300 U
1,2-Dichlorobenzene	7,900	N/A	7,900		380 U	400 U	2100 U	380 U	370 U	2300 U
2-Methylphenol	100	N/A	100		380 U	400 U	2100 U	380 U	370 U	2300 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
4-Methylphenol	900	4,000,000	900		380 U	400 U	2100 U	380 U	370 U	2300 U
N-Nitroso-di-n-propylamine	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	140 J
Hexachloroethane	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
Nitrobenzene	200	40,000	200		380 U	400 U	2100 U	380 U	370 U	2300 U
Isophorone	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
2-Nitrophenol	330	N/A	330		380 U	400 U	2100 U	380 U	370 U	2300 U
2,4-Dimethylphenol	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
Bis(2-chloroethoxy)methane	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
2,4-Dichlorophenol	400	200,000	400		380 U	400 U	2100 U	380 U	370 U	2300 U
1,2,4-Trichlorobenzene	3,400	N/A	3,400		380 U	81 J	2100 U	380 U	370 U	2300 U
Naphthalene	13,000	300,000	13,000		22 J	29 J	110 J	380 U	99 J	3700
4-Chloroaniline	220	200,000	220		380 U	400 U	2100 U	380 U	370 U	2300 U
Hexachlorobutadiene	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
4-Chloro-3-methylphenol	240	N/A	240		380 U	400 U	2100 U	380 U	370 U	2300 U
2-Methylnaphthalene	36,400	N/A	36,400		380 U	28 J	110 J	380 U	130 J	940 J
Hexachlorocyclopentadiene	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
2,4,6-Trichlorophenol	100	8,000,000	100		940 U	1000 U	2100 U	380 U	370 U	2300 U
2-Chloronaphthalene	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
2-Nitroaniline	430	N/A	430		940 U	1000 U	2100 U	380 U	370 U	2300 U
Dimethylphthalate	2,030	80,000,000	2,030		380 U	400 U	2100 U	380 U	370 U	2300 U
Acenaphthylene	41,000	N/A	41,000		380 U	400 U	2100 U	380 U	370 U	2300 U
2,6-Dinitrotoluene	1,000	1,030	1,000		380 U	400 U	2100 U	380 U	43 J	2300 U
3-Nitroaniline	500	N/A	500		940 U	1000 U	5300 U	940 U	920 U	5700 U

Notes:

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

R= Value rejected, data not usable

N/A= Not available

Results are presented in ug/kg

Shaded cells represent detections above NYSDC Recommended Soil Cleanup Objectives (RSCO) as per NYSDC TAGM No. HVR-94-4046 (1/24/94)

TABLE 2-5
Summary of Soil Analytical Results and Comparison to NYSDC RSCOs - Semivolatile Organic Compounds
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDC Work Assignment No. D003970-03

CONSTITUENT	Cleanup Objective To Protect Groundwater	USEPA Health- Based Direct Contact Criteria	Recommended Soil Cleanup Objective (RSCO)	SITE SAMPLE ID DATE DEPTH (ft)	SB-36 SB-36-C 10/10/00 3.5	SB-P05 SB-P05-A 10/17/00 0.25	SB-P05 SB-P05-C 10/17/00 5.25	SB-P29 SB-P29-A 10/19/00 0.25	SB-P29 SB-P29-B 10/19/00 3.5	SB-P29 SB-P29-C 10/19/00 6.5
Acenaphthene	90,000	5,000,000	50,000		380 U	42 J	2100 U	380 U	23 J	2500
2,4-Dinitrophenol	200	300,000	200		940 U	1000 U	5300 U	940 U	920 U	5700 U
4-Nitrophenol	100	N/A	100		940 U	1000 U	5300 U	940 U	920 U	5700 U
Dibenzofuran	6,200	N/A	6,200		380 U	29 J	2100 U	380 U	62 J	1100 J
2,4-Dinitrotoluene	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
Diethylphthalate	7,100	60,000,000	7,100		380 U	400 U	2100 U	380 U	370 U	2300 U
4-chlorophenyl-phenylether	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
Fluorene	350,000	3,000,000	50,000		380 U	38 J	2100 U	380 U	370 U	2300 U
4-Nitroaniline	N/A	N/A	N/A		940 U	1000 U	5300 U	940 U	920 U	5700 U
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A		940 U	1000 U	5300 U	940 U	920 U	5700 U
Nitrosodiphenylamine (I)	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
4-Bromophenyl-phenylether	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
Hexachlorobenzene	1,400	410	410		380 U	400 U	2100 U	380 U	370 U	2300 U
Pentachlorophenol	1,000	2,000,000	1,000		940 U	1000 U	5300 U	940 U	920 U	5700 U
Phenanthrene	N/A	N/A	N/A		380 U	370 J	300 J	380 U	420	13000
Anthracene	700,000	20,000,000	50,000		380 U	98 J	140 J	380 U	67 J	4100
Carbazole	N/A	N/A	N/A		380 U	49 J	2100 U	380 U	58 J	3100
Di-n-butylphthalate	8,100	8,000,000	8,100		380 U	400 U	2100 U	380 U	370 U	2300 U
Fluoranthene	1,900,000	3,000,000	50,000		380 U	440	190 J	380 U	550	16000
Pyrene	665,000	2,000,000	50,000		380 U	510	710 J	380 U	490	13000
Butylbenzylphthalate	122,000	2,000,000	50,000		380 U	400 U	2100 U	380 U	370 U	2300 U
3,3'-Dichlorobenzidine	N/A	N/A	N/A		380 U	400 U	2100 U	380 U	370 U	2300 U
Benzo(a)anthracene	3,000	224	224		380 U	320 J	480 J	380 U	310 J	5000
Chrysene	400	N/A	400		380 U	360 J	670 J	380 U	350 J	5000
Bis(2-ethylhexyl)phthalate	435,000	50,000	50,000		380 U	54 J	2100 U	380 U	370 U	2300 U
Di-n-octylphthalate	120,000	2,000,000	50,000		380 U	400 U	2100 U	380 U	370 U	2300 U
Benzo(b)fluoranthene	1,100	N/A	1,100		380 U	500	690 J	380 U	360 J	5000
Benzo(k)fluoranthene	1,100	N/A	1,100		380 U	300 J	670 J	380 U	300 J	5000
Benzo(a)pyrene	11,000	61	61		380 U	370 J	620 J	380 U	340 J	5000
Indeno(1,2,3-cd)pyrene	3,200	N/A	3,200		380 U	260 J	370 J	380 U	160 J	5000
Dibenz(a,h)anthracene	165,000,000	14	14		380 U	140 J	2100 U	380 U	64 J	5000
Benzo(g,h,i)perylene	800,000	N/A	50,000		380 U	300 J	640 J	380 U	190 J	4600
Sum of Constituents			500,000		22	4318	5820	0	4078	112980

Notes:
 U= Analyzed for but not detected
 J= Estimated value
 UJ= Not detected at estimated value
 R= Value rejected, data not usable
 N/A= Not available
 Results are presented in ug/kg
 Shaded cells represent detections above NYSDC Recommended Soil Cleanup Objectives (RSCO) as per NYSDC TAGM No. HW-94-4946 (1/24/94)

Table 3

Summary of PID Headspace Readings
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Soil Boring Date Depth	SB-01 10/16/00	SB-02 10/16/00	SB-03 10/16/00	SB-04 10/16/00	SB-05 10/19/00	SB-06 10/16/00	SB-07 10/19/00	SB-08 10/19/00	SB-09 10/19/00	SB-10 10/19/00	SB-11 10/12/00	SB-12 10/12/00
0-6"	2.5	0.0	0.0	0.0	7.0	0.0	9.6	18.1	1.9	4.9	0.0	0.0
1'	2.7	0.0	0.0	0.0	7.7	0.0	4.9	7.3	2.4	7.8	0.1	0.0
2'	5.7	0.0	0.0	0.0	20.7	0.0	5.4	18.3	0.9	6.5	2.8	0.0
3'	0.0	2.2	0.0	0.0	7.9	0.0	3.1	16.4	3.4	4.6	0.0	0.0
4'	4.4	5.2	0.0	0.0	8.2	0.0	3.1	12.7	14.7	5.6	13.7	0.0
5'	0.0	4.2	0.0	0.0	5.5	0.0	3.8	9.6	3.3	6.0	3.9	0.0
6'	0.0	1.3	0.0	0.0	4.5	0.0	4.1	11.0	2.7	5.5	4.1	NR
7'	0.0	5.1	0.0	0.0	6.1	0.0	4.5	7.7	4.0	6.0	3.8	NR
8'	0.0	0.0	0.0	0.0	6.8	0.0	1.1	6.4	1.6	7.4	4.3	NR

Soil Boring Date Depth	SB-13 10/12/00	SB-14 10/12/00	SB-15 10/12/00	SB-16 10/12/00	SB-17 10/12/00	SB-18 10/16/00	SB-19 10/16/00	SB-20 10/11/00	SB-21 10/11/00	SB-22 10/11/00	SB-23 10/11/00	SB-24 10/11/00
0-6"	0.1	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1'	3.9	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2'	3.3	0.0	0.0	4.2	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3'	4.1	0.0	0.0	4.2	5.0	0.0	35.9	0.0	0.0	0.0	0.0	0.0
4'	4.1	0.0	0.0	4.8	3.8	0.0	45.8	0.0	0.0	0.0	0.0	0.0
5'	5.5	0.0	0.0	2.6	2.1	0.0	34.6	0.0	0.0	0.0	0.0	0.0
6'	3.6	0.0	0.0	4.4	0.0	0.0	103.9	0.0	0.0	0.0	0.0	0.0
7'	5.7	0.0	0.0	NR	NR	0.0	NR	0.0	0.0	0.0	0.0	0.0
8'	NR	0.0	0.0	NR	NR	0.0	NR	0.0	0.0	0.0	0.0	0.0

Notes.

All readings were collected using a Photovac 2020 Photoionization detector (PID)

NR = PID reading not collected

Instrumentation calibrated daily

Results are presented in PPM

Table 2-6
Summary of PID Headspace Readings
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Soil Boring Date Depth	SB-25 10/11/00	SB-26 10/11/00	SB-27 10/11/00	SB-28 10/11/00	SB-29 10/10/00	SB-30 10/09/00	SB-31 10/09/00	SB-32 10/10/00	SB-33 10/10/00	SB-34 10/10/00	SB-35 10/10/00	SB-36 10/10/00
0-6"	0.0	0.0	0.0	0.0	0.0	5.2	3.7	0.8	2.1	0.5	0.0	0.0
1'	0.0	0.0	0.0	0.0	1.1		4.1	5.3	2.6	0.0	0.0	0.7
2'	0.0	0.0	0.0	1.3	0.0	5.1	3.8	7.1	3.1	0.0	0.0	0.0
3'	0.0	0.0	0.0	0.0	0.0		4.1	7.1	3.0	0.0	0.0	3.1
4'	0.0	0.0	0.0	0.6	0.0	4.9	4.2	7.6	4.2	0.0	0.0	0.0
5'	0.0	0.0	0.0	0.0	0.0		3.9	6.2	6.1	0.0	0.0	3.4
6'	0.0	0.0	0.0	0.0	0.0	4.2	4.1	6.2	6.2	0.0	0.0	1.0
7'	0.0	0.0	0.0	0.0	0.0		4.1	7.1	6.1	0.0	0.0	3.2
8'	0.0	0.0	0.0	0.0	0.0		3.9	5.2	5.8	0.0	0.0	1.4

Soil Boring Date Depth	SB-P01 10/17/00	SB-P02 10/17/00	SB-P03 10/17/00	SB-P04 10/17/00	SB-P05 10/17/00	SB-P06 10/17/00	SB-P07 10/01/00	SB-P08 10/17/00	SB-P09 10/17/00	SB-P10 10/18/00	SB-P11 10/18/00	SB-P12 10/18/00
0-6"	12.6	10.7	6.1	0.0	0.0	0.0	4.3	0.0	10.1	10.3	6.9	7.3
1'	10.9	10.2	6.4	0.0	0.0	1.1	5.6	0.0	9.8	10.6	7.2	6.9
2'	11.0	10.2	6.5	0.0	0.0	2.2	5.7	0.0	13.6	10.3	7.1	9.0
3'	10.6	10.2	3.9	0.0	0.0	2.0	6.4	0.0	10.2	10.4	6.9	9.1
4'	10.7	10.3	4.8	0.0	0.0	2.0	6.6	10.8	10.0	9.4	6.8	8.1
5'	10.6	9.3	5.6	0.0	0.0	0.0	5.6	2.1	9.1	10.0	6.4	8.8
6'	28.8	8.3	7.8	0.0	0.0	0.0	6.1	2.2	8.6	9.8	6.6	8.7
7'	7.6	9.8	7.3	0.0	0.0	0.0	6.0	1.3	NR	10.0	6.7	8.9
8'	6.6	15.7	NR	0.0	0.0	0.0	6.1	0.0	NR	10.1	6.8	8.8

Notes.
All readings were collected using a Photovac 2020 Photoionization detector (PID)
NR = PID reading not collected
Instrumentation calibrated daily
Results are presented in PPM

Table 2-6
Summary of PID Headspace Readings
Soil Boring Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Soil Boring Date Depth	SB-P13 10/19/00	SB-P14 10/19/00	SB-P15 10/17/00	SB-P16 10/18/00	SB-P17 10/18/00	SB-P18 10/18/00	SB-P19 10/18/00	SB-P20 10/18/00	SB-P21 10/18/00	SB-P22 10/18/00	SB-P23 10/18/00	SB-P24 10/18/00
0-6"	0.0	10.1	10.7	2.2	8.6	7.0	8.0	5.6	4.3	5.7	4.5	3.9
1'	0.0	9.3	10.0	2.4	7	7.0	8.0	4.8	4.1	5.7	4.6	3.9
2'	0.0	6.5	9.8	2.6	5.3	7.0	8.0	7.9	4.3	5.5	4.5	4.0
3'	0.0	7.2	9.6	2.6	5.6	7.1	8.3	8.1	5.3	6.8.9	5.3	4.2
4'	0.0	5.9	9.7	3.5	5.1	7.2	8.2	2.6	5.5	11.6	5.2	4.2
5'	0.0	1.3	10.8	3.7	6.0	7.3	8.3	2.1	5.2	7.6	5.6	4.3
6'	0.0	1.4	9.6	119.0	6.1	7.2	8.1	3.0	5.1	5.4	6.5	4.1
7'	0.0	2.8	9.6	130.0	6.3	7.3	8.1	1.2	4.8	5.6	6.1	4.2
8'	0.0	3.4	11.6	16.0	6.5	7.0	7.9	1.1	5.1	8.8	5.8	4.3

Soil Boring Date Depth	SB-P25 10/18/00	SB-P26 10/18/00	SB-P27 10/19/00	SB-P28 10/19/00	SB-P29 10/19/00	SB-P30 10/19/00	SB-P31 10/17/00
0-6"	4.6	0.0	2.7	4.7	1.8	0.0	10.0
1'	4.9	0.0	3.9	5.7	4.3	0.0	10.0
2'	4.8	0.0	4.0	8.4	6.2	0.0	10.0
3'	5.3	0.0	3.7	8.3	7.4	0.0	9.5
4'	5.4	0.0	4.0	7.9	5.6	0.0	9.8
5'	5.1	0.0	0.0	3.4	11.7	0.0	9.5
6'	5.1	0.0	0.0	4.4	5.2	0.0	10.0
7'	5.2	0.0	0.0	4.2	5.1	0.0	9.8
8'	5.4	0.0	0.0	4.1	6.2	0.0	10.0

Notes
All readings were collected using a Photovac 2020 Photoionization detector (PID)
NR = PID reading not collected
Instrumentation calibrated daily
Results are presented in PPM

TABLE 2-7
Depth to Water and Depth to LNAPL at Soil Boring Locations
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No D003970-03

Soil Boring Number	Depth to Water (Feet)	Depth to LNAPL (Feet)
SB-04	5.55	ND
SB-05	3.78	ND
SB-07	7.89	ND
SB-10	6.70	ND
SB-12	DRY	ND
SB-14	4.93	ND
SB-17	2.09	ND
SB-18	3.22	3.21
SB-20	4.89	ND
SB-21	3.49	ND
SB-22	6.22	ND
SB-23	3.45	ND
SB-29	2.10	ND
SB-36	2.37	ND
SB-37	2.49	ND
SB-P05	4.46	ND
SB-P14	4.55	ND

LNAPL = Light non-aqueous phase liquid
ND = Not Detected

TABLE 2-8
Summary of Surface Water Analytical Results - Volatile Organic Compounds
Surface Water Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class C Water Quality Standards	Class C Water Quality Guidance Values	SAMPLE ID DATE TIME	MH-1 11/15/00 11:35	MH-2 11/15/00 11:45	MH-3 11/15/00 12:15	UC-1 11/15/00 9:05	UC-2 11/15/00 9:45
Chloromethane	N/A	1 A		10 U	1 U	10 U	10 U	10 U
Bromomethane	N/A	1 A		10 U	10 U	10 U	10 U	10 U
Vinyl chloride	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Chloroethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Methylene chloride	200	N/A		10 U	10 U	10 U	10 U	10 U
Acetone	N/A	N/A		23 J	10 UJ	10 UJ	10 UJ	10 UJ
Carbon disulfide	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (Total)	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Chloroform	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
2-Butanone	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Trichloroethene	40	N/A		10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Benzene	10	210		10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Bromoform	N/A	N/A		10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	N/A	N/A		10 U	10 U	10 U	10 U	10 U
2-Hexanone	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	N/A	1		10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Toluene	6000	100		10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	N/A		10 U	10 U	10 U	10 U	10 U
Ethylbenzene	N/A	17		10 U	10 U	10 U	10 U	10 U
Styrene	N/A	N/A		10 U	10 U	10 U	10 U	10 U
Xylene (total)	N/A	65		10 U	10 U	10 U	10 U	10 U
Sum of Constituents			23		0	0	0	0

Notes

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

N/A= Not available

Results are presented in ug/l

Shaded cells indicate exceedences of NYS Ambient Water Quality Standards And Guidance Values (AWQS&GV) for Class C water as listed in

TOGS 111 (June 1998)

TABLE 2-9
Summary of Surface Water Analytical Results - Semivolatile Organic Compounds
Surface Water Investigation
Shenango Steel Mold RI/FS, Buffalo New York
Nysdec Work Assignment No. D003970-03

CONSTITUENT	Class C Water Quality Standards	Class C Water Quality Guidance Values	SAMPLE ID DATE TIME	MH-1 11/15/00 11:15	MH-2 11/15/00 11:45	MH-3 11/15/00 12:15	UC-1 11/15/00 9:05	UC-2 11/15/00 9:45
Phenol	5	N/A		83 U	10 U	10 U	10 U	10 U
Bis(2-chloroethyl)ether	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2-Chlorophenol	1	N/A		83 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	5	N/A		83 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	5	N/A		83 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	5	N/A		83 U	10 U	10 U	10 U	10 U
2-Methylphenol	5	N/A		83 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	N/A	N/A		83 U	10 U	10 U	10 U	10 U
4-Methylphenol	5	N/A		83 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Hexachloroethane	0.6	N/A		83 U	10 U	10 U	10 U	10 U
Nitrobenzene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Isophorone	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2-Nitrophenol	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	1000	N/A		83 U	10 U	10 U	10 U	10 U
Bis(2-chloroethoxy)methane	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	1	N/A		83 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	5	N/A		180 U	10 U	10 U	10 U	10 U
Naphthalene	N/A	13		83 U	10 U	10 U	10 U	10 U
4-Chloroaniline	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	0.01	N/A		83 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	4.7	N/A		83 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	0.45	N/A		83 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	1	N/A		83 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	1	N/A		210 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2-Nitroaniline	N/A	N/A		210 U	25 U	25 U	25 U	25 U
Dimethylphthalate	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Acenaphthylene	5.3	N/A		83 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
3-Nitroaniline	N/A	N/A		210 U	25 U	25 U	25 U	25 U
Acenaphthene	N/A	5.3		83 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	400	N/A		210 U	25 U	25 U	25 U	25 U
4-Nitrophenol	5	N/A		210 U	25 U	25 U	25 U	25 U
Dibenzofuran	N/A	N/A		83 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Diethylphthalate	N/A	N/A		83 U	10 U	10 U	10 U	10 U
4-chlorophenyl-phenylether	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Fluorene	N/A	0.54		83 U	10 U	10 U	10 U	10 U
4-Nitroaniline	N/A	N/A		210 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	N/A	N/A		210 U	25 U	25 U	25 U	25 U
Nitrosodiphenylamine (I)	N/A	N/A		83 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	0.00003	N/A		83 U	10 U	10 U	10 U	10 U
Pentachlorophenol	1	N/A		210 U	25 U	25 U	25 U	25 U
Phenanthrene	N/A	5		83 U	10 U	10 U	10 U	10 U
Anthracene	N/A	3.8		83 U	10 U	10 U	10 U	10 U
Carbazole	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Fluoranthene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Pyrene	N/A	4.6		83 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	N/A	N/A		83 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	N/A	0.03		83 U	10 U	10 U	10 U	10 U
Chrysene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	0.6	N/A		83 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	N/A	0.0012		83 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	N/A	N/A		83 U	10 U	10 U	10 U	10 U
Sum of Constituents	N/A	N/A		180	0	0	0	0

Notes:

U= Analyzed for but not detected

I= Estimated value

UI= Not detected at estimated value

N/A= Not available

Results are presented in ug/l

Shaded cells indicate exceedences of NYS Ambient Water Quality Standards And Guidance Values (AWQS&GV)
for Class C water as listed in TOGS 1.1.1 (June 1998)

TABLE 2-10
Summary of Surface Water Analytical Results - Inorganic Compounds
Surface Water Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class C Water Quality Standards	SAMPLE ID DATE TIME	MH-1 11/15/00 11:15	MH-2 11/15/00 11:45	MH-3 11/15/00 12:15	UC-1 11/15/00 9:05	UC-2 11/15/00 9:45
Aluminum	100		10400	48.4 U	17200	48.4 U	48.4 U
Antimony	N/A		13.8 U	2.6 U	1.7 U	1.7 U	3.9 U
Arsenic	150 (1)		16.8 U	2.3 U	15.4 U	2.3 U	2.3 U
Barium	N/A		198	32.7	563	24.6	23.3
Beryllium	1100 (2)		1.1 U	0.2 U	3.5	0.2 U	0.2 U
Cadmium	2.6 (1)		2.3	0.3 U	2.6	0.3 U	0.3 U
Calcium	N/A		196000	106000	214000	40300	37100
Chromium	94 (1)		18	1.6 U	13.4	0.54 U	0.5 U
Cobalt	5 (1)		5	0.5 U	1.8 U	0.5 U	0.5 U
Copper	11 (1)		134	0.6 U	79.5	0.6 U	0.6 U
Copper	300		87300	191 U	87300	215 U	62.6 U
Iron	5 (1)		174	1.3 U	70.8	1.8 U	1.6 U
Lead	N/A		31900	23600	40600	9260	8650
Magnesium	N/A		1150	45	3470	27.3	11.6
Manganese	N/A		105	0.1 U	0.12	0.1 U	0.1 U
Mercury	0.0007 (1)		18.4	1.9 U	14.3	2.8 U	3.2 U
Nickel	66 (1)		24400	19100	48100	5290	4100
Potassium	N/A		4.3 J	4.4 J	3.1 U	3.1 UJ	3.1 UJ
Selenium	4.6 (1)		0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Silver	0.1 (1)		21600	16900	27000	16300	15800
Sodium	N/A		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Thallium	8		17	1.2	13.7	0.7 U	0.7 U
Vanadium	N/A		1750	15.4	1440	8.3	5.1
Zinc	105 (1)						

Notes:

UF=Analyzed for but not detected

J=Estimated value

UJ=Not detected at estimated value

N/A=Not available

Results are presented in ug/l

Shaded cells indicate exceedances of NYS Ambient Water Quality Standards And Guidance Values (AWQS&GV) for Class C water as listed in TOGS 1.1.1 (June 1998)

(1) Standard applies to dissolved form

(2) Standard applies to acid-soluble form

TABLE 2-11
Summary of Surface Water Analytical Results - Pesticides/PCBs
Surface Water Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class C Water Quality Standards	SITE DATE	MH-1		MH-2		MH-3		UC-1		UC-2	
			11/15/00		11/15/00		11/15/00		11/15/00		11/15/00	
Aldrin	0.01*		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
alpha-BHC	0.002		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
beta-BHC	0.007		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
delta-BHC	0.008		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
gamma-BHC (Lindane)	0.008		0.062	U	0.05	U	0.052	U	0.05	U	0.05	UJ
alpha-Chlordane	N/A		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
gamma-Chlordane	0.00002		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
Dieldrin	0.01*		0.12	U	0.1	U	0.1	U	0.1	U	0.1	UJ
4,4'-DDD	0.00008		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDE	0.000007		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDT	0.00001		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin	0.002		0.12	U	0.1	U	0.1	U	0.1	U	0.1	UJ
Endosulfan sulfate	N/A		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin aldehyde	N/A		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin ketone	N/A		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan-I	0.009		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
Endosulfan-II	N/A		0.12	U	0.1	U	0.1	U	0.1	U	0.1	U
Heptachlor	0.0002		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
Heptachlor epoxide	0.0003		0.062	U	0.05	U	0.052	U	0.05	U	0.05	U
Methoxychlor	0.03		0.62	U	0.5	U	0.52	U	0.5	U	0.5	U
Toxaphene	0.000006		6.2	U	5	U	5.2	U	5	U	5	U
Aroclor 1016	0.000001**		1.2	U	1	U	1	U	1	U	1	U
Aroclor 1221	0.000001**		2.5	U	2	U	2.1	U	2	U	2	U
Aroclor 1232	0.000001**		1.2	U	1	U	1	U	1	U	1	U
Aroclor 1242	0.000001**		1.2	U	1	U	1	U	1	U	1	U
Aroclor 1248	0.000001**		1.2	U	1	U	1	U	1	U	1	U
Aroclor 1254	0.000001**		1.2	U	1	U	1	U	1	U	1	U
Aroclor 1260	0.000001**		120	U	1	U	1	U	1	U	1	U

Notes:

U=Analyzed for but not detected

J=Estimated value

UJ=Not detected at estimated value

N/A=Not available

Results and standards presented in ug/l

Shaded cells indicate exceedences of NYS Ambient Water Quality Standards And Guidance Values (AWQS&GV) for Class C water as listed in TOGS 1.1.1 (June 1998)

*Standard applies to the sum of Aldrin and Dieldrin

**Standard applies to the sum of all polychlorinated biphenyls

TABLE 2-12
Summary of Surface Water Analytical Results - BOD, COD and TSS
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Sample ID Date	MH-2 12/7/00	MH-3 12/7/00	UC-1 12/7/00
Biological Oxygen Demand (BOD)		2 U	2 U	3.3 U
Chemical Oxygen Demand (COD)		20 U	20 U	20 U
Total Suspended Solids (TSS)		4 U	17	4 U

Notes:

Units are in mg/L

U - Analyzed for but not detected

BOD by Method 405.1

COD by Method 410.1

TSS by Method 160.2

TABLE 2-13

LNAFL Sampling Program - Summary of Laboratory Analyses
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDC Work Assignment No. D003970-03

CONSTITUENT	SAMPLE LOCATION SAMPLE ID DATE COLLECTED	Manhole MH-1 MH-1 12/5/00	Test Pit TP-2 (adjacent to MW-3) T-1 12/5/00	Monitoring Well MW-3 MW-3 12/5/00
GASOLINE (C4-C12)		No Match	No Match	No Match
TURPENTINE (C9-C11)		No Match	No Match	No Match
MINERAL SPIRITS (C9-C12)		No Match	No Match	No Match
KEROSENE (C9-C18)		No Match	No Match	No Match
DIESEL FUEL/ FUEL OIL #2(C9-C22)		No Match	No Match	No Match
FUEL OIL #4 (C11-C24)		No Match	No Match	No Match
FUEL OIL #6 (C11-C26)		No Match	No Match	No Match
OTHER PATTERNS		Unknown Hydrocarbon Range (C16-C38)	No Match	No Match

Notes:

GC fingerprint by method USEPA SW-846 8015 (modified)

No Match- No pattern match to a referenced standard

Other Patterns- Peaks within a specific range, however they do not match any specific pattern.

TABLE 2-14
Summary of Well Development Measurements
Groundwater Investigation
Shenango Steel Mold RI/ FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

MW - 1 Date: 11/ 16/ 2000 DTB=17.90 ft.

Time	DTW (ft.)	pH (standard units)	Conductivity (uS)	Temperature (°C)	Turbidity (NTU)
10:15	5.23	7.80	991	12.0	1000.00
10:20	N.C.	7.80	1030	11.9	1000.00
10:25	N.C.	7.90	916	11.7	1000.00
10:30	14.81	7.80	1039	11.9	188.00
10:35	14.90	7.70	1056	11.8	344.00
10:40	16.73	7.80	1033	12.0	286.00
10:45	16.21	7.80	1048	12.0	115.00
10:50	15.28	7.70	1041	12.0	78.00

MW - 2 Date: 11/ 16/ 2000 DTB=17.90 ft.

Time	DTW (ft.)	pH (standard units)	Conductivity (uS)	Temperature (°C)	Turbidity (NTU)
11:00	13.48	7.50	1473	11.7	71000
11:05	14.56	7.40	1418	11.9	71000
11:10	15.21	7.40	1428	11.8	71000
11:15	15.31	7.40	1456	11.8	280
11:20	15.41	7.40	1448	11.8	174
11:25	15.41	7.40	1451	11.8	117
11:30	15.41	7.40	1440	11.8	72
11:35	14.42	7.40	1440	11.8	51.30
11:40	14.45	7.40	1451	11.8	37.70

MW - 3 Date: 11/ 16/ 2000 DTB=20.10 ft.

Time	DTW (ft.)	pH (standard units)	Conductivity (uS)	Temperature (°C)	Turbidity (NTU)
11:55	5.86	8.50	788	11.9	71000.00
12:00	6.91	8.50	785	11.9	71000.00
12:15	6.98	8.40	751	12.4	71000.00
12:25	7.34	8.40	786	12.3	421.00
12:40	7.36	8.40	722	12.1	286.00
12:50	7.36	8.40	731	12.1	285.00
13:00	7.36	8.40	732	12.1	101.00
13:10	7.38	8.40	738	11.8	88.60
13:20	7.38	8.40	746	11.8	77.30
13:35	7.38	8.40	780	11.6	61.40
13:40	7.39	8.40	744	11.6	46.10

Notes:

DTB = Depth to Bottom of Well. Presented in feet below measuring point.

DTW = Depth to Water. Presented in feet below measuring point.

N.C. = Measurement not collected.

TABLE 2-14
Summary of Well Development Measurements
Groundwater Investigation
Shenango Steel Mold RI/ FS, Buffalo, New York
NYSDEC Work Assignment # D003970-03

MW - 4 Date: 11/ 16/ 2000 DTB=19.22 ft.

Time	DTW (ft.)	pH (standard units)	Conductivity (uS)	Temperature (°C)	Turbidity (NTU)
8:01	6.22	7.00	1368	10.2	294.00
8:05	9.85	7.00	396	10.6	289.00
8:17	10.85	6.90	1643	12.1	895.00
8:20	18.20	7.10	836	11.6	824.00
8:35	18.50	7.10	1812	11.4	200.00
8:45	16.30	7.10	1541	11.2	128.00
8:50	16.20	7.00	1511	11.3	78.00
8:55	17.30	7.00	1622	11.2	48.00
9:00	18.30	7.60	1641	11.3	42.00

MW - 5 Date: 11/ 16/ 2000 DTB=19.30 ft.

Time	DTW (ft.)	pH (standard units)	Conductivity (uS)	Temperature (°C)	Turbidity (NTU)
9:20	8.30	7.90	425	11.2	1121.00
9:25	10.30	7.50	685	11.8	1000.00
9:30	12.20	7.40	816	10.8	850.00
9:35	12.50	7.40	897	10.9	258.00
9:40	14.89	7.20	282	12.0	674.00
9:45	N.C.	7.20	860	11.3	729.00
9:50	N.C.	7.20	222	10.6	174.00
9:55	N.C.	7.10	258	10.5	100.00
10:00	N.C.	7.10	925	11.1	56.00
10:05	N.C.	7.10	286	11.2	45.00

Notes:

DTB = Depth to Bottom of Well. Presented in feet below measuring point.

DTW = Depth to Water. Presented in feet below measuring point.

N.C. = Measurement not collected.

TABLE 2-15

Summary of Groundwater Elevation Data
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Monitoring Well Number	Top of Inner Riser	Date 12/4/00		Water Level Elevation	Date: 1/30/01		Water Level Elevation
		Depth to Water			Depth to Water		
MW-1	586.28	5.35		580.93	5.31		580.97
MW-2	591.68	11.12		580.56	12.55		579.13
MW-3	588.74	5.10		583.64	5.47		583.27
MW-4	582.94	5.41		577.53	5.74		577.20
MW-5	584.59	5.01		579.58	5.33		579.26
MW-102	582.21	5.92		576.29	6.32		575.89
MW-108	583.80	4.80		579.00	6.15		577.65
MW-109	568.87	6.90		579.97	7.80		579.07
MW-110	586.66	7.56		579.10	7.82		578.84
SG-01	574.18	3.58		570.60	N.R.		N.R.

Notes:

SG-1 = Staff Gauge - 1

Depth to Water measurements are in feet below Measuring Point.

N.R. = Not Recorded.

Water level elevations are in feet, based on NAVD 88 vertical datum.

TABLE 2-16
Summary of Groundwater Analytical Results-Volatile Organic Compounds
Groundwater Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class GA Water Quality Standards	Class GA Water Quality Guidance Values	Sample ID Date	MW-1 12/5/00	MW-102 12/5/00	MW-109 12/5/00	MW-110 12/5/00	MW-2 12/6/00	MW-3 12/6/00
Chloromethane	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	2	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	5	N/A		2 J	10 U	10 U	10 U	10 U	2 J
Acetone	N/A	50		8 J	10 U	10 U	10 U	10 U	10 U
Carbon disulfide	N/A	N/A		10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	5	N/A		10 U	10 U	10 U	10 U	10 U	1 J
1,1-Dichloroethane	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Dichloroethene (Total)	5*	N/A		10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (Total)	7	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	0.6	N/A		10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloromethane	N/A	50		2 J	10 U	10 U	10 U	10 U	10 U
2-Butanone	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	N/A	50		10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	1	N/A		10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	0.4**	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	N/A	50		10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	1	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Benzene	1	N/A		10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	0.4**	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	N/A	50		10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	N/A	N/A		10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	N/A	50		10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloromethane	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5	N/A		15	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	N/A		26	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	5	N/A		10 U	10 U	10 U	10 U	10 U	10 U
Styrene	5	N/A		120	10 U	10 U	10 U	10 U	10 U
Xylene (total)	5	N/A		173	0	0	0	0	3
Sum of Constituents	NA	NA							

Notes:

U=Analyzed for but not detected

J=Estimated value

UJ=Not detected at estimated value

N/A=Not available

Results are presented in ug/l

Shaded cells indicate exceedances of NYS Ambient Groundwater Quality Standards And Guidance Values (AWGSE&GV) for Class GA (potable) groundwater as listed in TUGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.

*Standard for cis- and trans-1,2-Dichloroethene <5 ug/l each

**Sum of cis- and trans-1,3-dichloropropene <0.4 ug/l is the Class GA Water Quality Standard

TABLE 2-1b
Summary of Groundwater Analytical Results-Volatile Organic Compounds
Groundwater Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDC Work Assignment No. D003970-03

CONSTITUENT	Class GA Water Quality Standards	Class GA Water Quality Guidance Values	MW-4 12/4/00	MW-5 12/4/00
Chloromethane	5	N/A	10 U	10 U
Bromomethane	5	N/A	10 U	10 U
Vinyl chloride	2	N/A	10 U	10 U
Chloroethane	5	N/A	10 U	10 U
Methylene chloride	5	N/A	10 U	10 U
Acetone	N/A	50	2 J	10 U
Carbon disulfide	N/A	N/A	10 U	10 U
1,1-Dichloroethene	5	N/A	10 U	10 U
1,1-Dichloroethane	5	N/A	10 U	10 U
1,2-Dichloroethene (Total)	5*	N/A	10 U	10 U
Chloroform	7	N/A	10 U	10 U
1,2-Dichloroethane	0.6	N/A	10 U	10 U
2-Butanone	N/A	50	10 U	10 U
1,1,1-Trichloroethane	5	N/A	10 U	10 U
Carbon tetrachloride	5	N/A	10 U	10 U
Bromodichloromethane	N/A	50	10 U	10 U
1,2-Dichloropropane	1	N/A	10 U	10 U
cis-1,3-Dichloropropene	0.4**	N/A	10 U	10 U
Trichloroethene	5	N/A	10 U	10 U
Dibromochloromethane	N/A	50	10 U	10 U
1,1,2-Trichloroethane	1	N/A	10 U	10 U
Benzene	1	N/A	10 U	10 U
trans-1,3-Dichloropropene	0.4**	N/A	10 U	10 U
Bromoform	N/A	50	10 U	10 U
4-Methyl-2-pentanone	N/A	N/A	10 U	10 U
2-Hexanone	N/A	50	10 U	10 U
Tetrachloroethene	5	N/A	10 U	10 U
1,1,2,2-Tetrachloroethane	5	N/A	10 U	10 U
Toluene	5	N/A	10 U	10 U
Chlorobenzene	5	N/A	10 U	10 U
Ethylbenzene	5	N/A	10 U	10 U
Styrene	5	N/A	10 U	10 U
Xylene (total)	5	N/A	10 U	10 U
Sum of Constituents	NA	NA	2	0

Notes:
U=Analyzed for but not detected
J=Estimated value
UJ=Not detected at estimated value
N/A=Not available
Results are presented in ug/l
Shaded cells indicate exceedences of NYS Ambient Groundwater Quality Sta-
GA (table) groundwater as listed in TOCS 1.1.1 (June 1998) and in 6 NYC
Standard for cis- and trans-1,2-Dichloroethene <5 ug/l each
**Sum of cis- and trans-1,3-dichloropropene <0.4 ug/l is the Class GA Water

TABLE 2-17
Summary of Groundwater Analytical Results - Semivolatile Organic Compounds
Groundwater Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class GA Water Quality Standards	Class GA Water Quality Guidance Values	Sample ID DATE	MW-1 12/5/00	MW-102 12/5/00	MW-109 12/5/00	MW-110 12/5/00
Phenol	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Bis(2-chloroethyl)ether	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2-Chlorophenol	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
1,3-Dichlorobenzene	3	N/A		11 UJ	10 UJ	10 UJ	10 UJ
1,4-Dichlorobenzene	3	N/A		11 UJ	10 UJ	10 UJ	10 UJ
1,2-Dichlorobenzene	3	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2-Methylphenol	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2,2'-oxybis(1-Chloropropane)	N/A	N/A		11 UJ	10 UJ	2.1 J	10 UJ
4-Methylphenol	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
N-Nitroso-di-n-propylamine	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Hexachloroethane	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Nitrobenzene	0.4	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Isophorone	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2-Nitrophenol	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2,4-Dimethylphenol	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Bis(2-chloroethoxy)methane	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2,4-Dichlorophenol	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
1,2,4-Trichlorobenzene	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Naphthalene	N/A	10		11 UJ	10 UJ	10 UJ	10 UJ
4-Chloroaniline	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Hexachlorobutadiene	0.5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
4-Chloro-3-methylphenol	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2-Methylnaphthalene	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Hexachlorocyclopentadiene	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2,4,6-Trichlorophenol	1	N/A		27 UJ	25 UJ	25 UJ	26 UJ
2,4,5-Trichlorophenol	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2-Chloronaphthalene	N/A	10		27 UJ	25 UJ	25 UJ	26 UJ
2-Nitroaniline	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Dimethylphthalate	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Acenaphthylene	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2,6-Dinitrotoluene	5	N/A		27 UJ	25 UJ	25 UJ	26 UJ
3-Nitroaniline	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Acenaphthene	N/A	20		27 UJ	25 UJ	25 UJ	26 UJ
2,4-Dinitrophenol	N/A	10		27 UJ	25 UJ	25 UJ	26 UJ
4-Nitrophenol	1	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Dibenzofuran	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
2,4-Dinitrotoluene	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Diethylphthalate	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
4-chlorophenyl-phenylether	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Fluorene	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
4-Nitroaniline	5	N/A		27 UJ	25 UJ	25 UJ	26 UJ
4,6-Dinitro-2-methylphenol	N/A	N/A		27 UJ	25 UJ	25 UJ	26 UJ
Nitrosodiphenylamine (I)	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
4-Bromophenyl-phenylether	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Hexachlorobenzene	0.04	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Pentachlorophenol	1	N/A		27 UJ	25 UJ	25 UJ	26 UJ
Phenanthrene	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Anthracene	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Carbazole	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Di-n-butylphthalate	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Fluoranthene	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Pyrene	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Butylbenzylphthalate	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
3,3'-Dichlorobenzidine	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Benzo(a)anthracene	N/A	0.002		11 UJ	10 UJ	10 UJ	10 UJ
Chrysene	N/A	0.002		11 UJ	10 UJ	10 UJ	10 UJ
Bis(2-ethylhexyl)phthalate	5	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Di-n-octylphthalate	N/A	50		11 UJ	10 UJ	10 UJ	10 UJ
Benzo(b)fluoranthene	N/A	0.002		11 UJ	10 UJ	10 UJ	10 UJ
Benzo(k)fluoranthene	N/A	0.002		11 UJ	10 UJ	10 UJ	10 UJ
Benzo(a)pyrene	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Indeno(1,2,3-cd)pyrene	N/A	0.002		11 UJ	10 UJ	10 UJ	10 UJ
Dibenz(a,h)anthracene	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Benzo(g,h,i)perylene	N/A	N/A		11 UJ	10 UJ	10 UJ	10 UJ
Sum of Constituents	N/A	N/A		0.0	0.0	3.0	0.0

Notes:

U= Analyzed for but not detected

J= Estimated value

UJ= Not detected at estimated value

N/A= Not available

Results are presented in ug/l

Shaded cells indicate exceedences of NYS Ambient Groundwater Quality Standards And Guidance Values (AWGSG&V) for Class GA (potable)

TABLE 2-17
Summary of Groundwater Analytical Results - Semivolatile Organic Compounds
Groundwater Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class GA Water Quality Standards	Class GA Water Quality Guidance Values	Sample ID DATE	MW-2 12/6/00	MW-3 12/6/00	MW-4 12/4/00	MW-5 12/4/00
Phenol	1	N/A		10 U	10 U	10 UJ	10 UJ
Bis(2-chloroethyl)ether	1	N/A		10 U	10 U	10 UJ	10 UJ
2-Chlorophenol	1	N/A		10 U	10 U	10 UJ	10 UJ
1,3-Dichlorobenzene	3	N/A		10 U	10 U	10 UJ	10 UJ
1,4-Dichlorobenzene	3	N/A		10 U	10 U	10 UJ	10 UJ
1,2-Dichlorobenzene	3	N/A		10 U	10 U	10 UJ	10 UJ
2-Methylphenol	1	N/A		10 U	10 U	10 UJ	10 UJ
2,2'-oxybis(1-Chloropropane)	N/A	N/A		10 U	10 U	10 UJ	10 UJ
4-Methylphenol	1	N/A		10 U	10 U	10 UJ	10 UJ
N-Nitroso-di-n-propylamine	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Hexachloroethane	5	N/A		10 U	10 U	10 UJ	10 UJ
Nitrobenzene	0.4	N/A		10 U	10 U	10 UJ	10 UJ
Isophorone	N/A	N/A		10 U	10 U	10 UJ	10 UJ
2-Nitrophenol	N/A	N/A		10 U	10 U	10 UJ	10 UJ
2,4-Dimethylphenol	N/A	50		10 U	10 U	10 UJ	10 UJ
Bis(2-chloroethoxy)methane	5	N/A		10 U	10 U	10 UJ	10 UJ
2,4-Dichlorophenol	5	N/A		10 U	10 U	10 UJ	10 UJ
1,2,4-Trichlorobenzene	5	N/A		10 U	10 U	10 UJ	10 UJ
Naphthalene	N/A	10		10 U	10 U	10 UJ	10 UJ
4-Chloroaniline	5	N/A		10 U	10 U	10 UJ	10 UJ
Hexachlorobutadiene	0.5	N/A		10 U	10 U	10 UJ	10 UJ
4-Chloro-3-methylphenol	N/A	N/A		10 U	10 U	10 UJ	10 UJ
2-Methylnaphthalene	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Hexachlorocyclopentadiene	5	N/A		10 U	10 U	10 UJ	10 UJ
2,4,6-Trichlorophenol	1	N/A		10 U	10 U	10 UJ	10 UJ
2,4,5-Trichlorophenol	1	N/A		25 U	25 U	25 UJ	25 UJ
2-Chloronaphthalene	N/A	10		10 U	10 U	10 UJ	10 UJ
2-Nitroaniline	5	N/A		25 U	25 U	25 UJ	25 UJ
Dimethylphthalate	N/A	50		10 U	10 U	10 UJ	10 UJ
Acenaphthylene	N/A	N/A		10 U	10 U	10 UJ	10 UJ
2,6-Dinitrotoluene	5	N/A		10 U	10 U	10 UJ	10 UJ
3-Nitroaniline	5	N/A		25 U	25 U	25 UJ	25 UJ
Acenaphthene	N/A	20		2 U	10 U	10 UJ	10 UJ
2,4-Dinitrophenol	N/A	10		25 U	25 U	25 UJ	25 UJ
4-Nitrophenol	1	N/A		25 U	25 U	25 UJ	25 UJ
Dibenzofuran	N/A	N/A		0.6 J	10 U	10 UJ	10 UJ
2,4-Dinitrotoluene	5	N/A		10 U	10 U	10 UJ	10 UJ
Diethylphthalate	N/A	50		10 U	10 U	10 UJ	10 UJ
4-chlorophenyl-phenylether	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Fluorene	N/A	50		3 J	10 U	10 UJ	10 UJ
4-Nitroaniline	5	N/A		25 U	25 U	25 UJ	25 UJ
4,6-Dinitro-2-methylphenol	N/A	N/A		25 U	25 U	25 UJ	25 UJ
Nitrosodiphenylamine (1)	N/A	50		10 U	10 U	10 UJ	10 UJ
4-Bromophenyl-phenylether	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Hexachlorobenzene	0.04	N/A		10 U	10 U	10 UJ	10 UJ
Pentachlorophenol	1	N/A		25 U	25 U	25 UJ	25 UJ
Phenanthrene	N/A	50		10 U	10 U	10 UJ	10 UJ
Anthracene	N/A	50		10 U	10 U	10 UJ	10 UJ
Carbazole	N/A	N/A		0.6 J	10 U	10 UJ	10 UJ
Di-n-butylphthalate	N/A	50		10 U	10 U	10 UJ	10 UJ
Fluoranthene	N/A	50		0.6 J	10 U	10 UJ	10 UJ
Pyrene	N/A	50		0.5 J	10 U	10 UJ	10 UJ
Butylbenzylphthalate	N/A	50		10 U	10 U	10 UJ	10 UJ
3,3'-Dichlorobenzidine	5	N/A		10 U	10 U	10 UJ	10 UJ
Benzo(a)anthracene	N/A	0.002		10 U	10 U	10 UJ	10 UJ
Chrysene	N/A	0.002		10 U	10 U	10 UJ	10 UJ
Bis(2-ethylhexyl)phthalate	5	N/A		10 U	10 U	10 UJ	10 UJ
Di-n-octylphthalate	N/A	50		10 U	10 U	10 UJ	10 UJ
Benzo(b)fluoranthene	N/A	0.002		10 U	10 U	10 UJ	10 UJ
Benzo(k)fluoranthene	N/A	0.002		10 U	10 U	10 UJ	10 UJ
Benzo(a)pyrene	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Indeno(1,2,3-cd)pyrene	N/A	0.002		10 U	10 U	10 UJ	10 UJ
Dibenz(a,h)anthracene	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Benzo(g,h,i)perylene	N/A	N/A		10 U	10 U	10 UJ	10 UJ
Sum of Constituents	N/A	N/A		7.3	7.0	0.0	0.0

Notes

U=Analyzed for but not detected
J=Estimated value
UJ=Not detected at estimated value
N/A=Not available
Results are presented in ug/l

Shaded cells indicate exceedences of NYS Ambient Groundwater Quality Standards And Guidance Values (AWQS&GV) for Class GA (potable)

TABLE 2-18
Summary of Groundwater Analytical Results - PCBs
Groundwater Investigation
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class GA Water Quality Standards	SITE ID DATE	MW-1 12/5/00	MW-102 12/5/00	MW-109 12/5/00	MW-110 12/5/00	MW-2 12/6/00	MW-3 12/6/00	MW-4 12/4/00	MW-5 12/4/00
Color 1016	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Color 1221	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Color 1232	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Color 1242	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Color 1248	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Color 1254	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Color 1260	0.9*		0.5 U	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Notes:
 = Analyzed for but not detected
 E= Estimated value
 I= Not detected at estimated value
 /A= Not available
 Results are presented in ug/l
 Values indicate exceedences of NYS Ambient Groundwater Quality Standards And Guidance Values
 (WQS&GV) for Class GA (potable) groundwater as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.
 Standard applies to the sum of all constituents <0.9 ug/l

TABLE 2-19
Summary of Groundwater Analytical Results - Inorganic Compounds

Groundwater Investigation
Shenango Steel Mold R/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Class GA Water Quality Standards	Class GA Water Quality Guidance Values	MW-1 12/5/00 16:45	MW-2 12/6/00 10:45	MW-3 12/6/00 16:00	MW-4 12/4/00 14:45	MW-5 12/4/00 17:20	MW-102 12/5/00 11:00	MW-109 12/5/00 14:35	MW-110 12/6/00 13:00
Aluminum	N/A	N/A	73.2 U	32.4 U	114	32.4 U	94	163	335	32.4 U
Antimony	3	N/A	2.4 U	2.4 U	2.4 U	2.4 U	3.1	2.4 U	2.6	2.4 U
Arsenic	25	N/A	4.3 U	7.6 U	4.3 U	5.1 U	4.6 U	4.3 U	4.3 U	39.1 J
Barium	1000	N/A	83.5	132	31.9	162	20.3	82.4	37.3	455
Beryllium	N/A	3	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Cadmium	5	N/A	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Calcium	N/A	N/A	137000	248000	89200	237000	93200	145000	125000	181000
Chromium	50	N/A	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Chromium	N/A	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2
Cobalt	N/A	N/A	3.7 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U
Copper	200	N/A	4850	32700	322	1400	157	1130	181	12800
Iron	300*	N/A	4.4	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Lead	25	N/A	38000	74800	7360	37600	19200	17700	2820	64200
Magnesium	N/A	35000	1020	3140	32	1650	13.8	1810	10.1	181
Manganese	300*	N/A	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Mercury	0.7	N/A	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	3.3
Nickel	100	N/A	13400	24500	39400	21000	12100	14900	22000	8340
Potassium	N/A	N/A	4.6 U	4.6 U	4.6 U	4.6 U	5.2 J	4.6 U	4.8 J	4.6 U
Selenium	10	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Silver	50	N/A	17500	81000	43600	71300	8090	21700	23000	69000
Sodium	N/A	20000	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
Thallium	N/A	0.5	2.8	0.9 U	0.9 U	0.9 U	1.3	0.95	1.1	4.7
Vanadium	N/A	N/A	48.8	6.7 U	8.2	6.7 U	6.7 U	6.7 U	6.7 U	6.7 U
Zinc	N/A	2000								

Notes:
U=Analyzed for but not detected

J=Estimated value

UJ=Not detected at estimated value

N/A=Not available

Results are presented in ug/l

Shaded cells indicate exceedences of NYS Ambient Groundwater Quality Standards And Guidance Values (AWGSGV) for Class GA (potable) groundwater as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.

*Standard applies to the sum of iron and manganese

TABLE 3-1
Summary of Hydraulic Conductivity Values
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

MONITORING WELL	HYDRAULIC CONDUCTIVITY, K (FT/DAY)
MW-1	6.2
MW-2	4.5
MW-4	0.05
MW-5	14.6
MW-102	8.6
Average	6.8
Average (Excluding MW-4)	8.5

TABLE 3-2
 Chemicals of Potential Concern
 Shenango Steel Mold RI/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

FRACTION	MEDIUM	SOIL	GROUNDWATER	SURFACE WATER
Volatle Organic Compounds		1,1-Dichloroethane	Ethylbenzene Toluene Xylene	None
Semivolatle Organic Compounds		Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene	2-Methylphenol 4-Methylphenol	None
Pesticides/PCBs		PCB-1248 PCB-1260	None	None
Inorganics		Arsenic Beryllium Cadmium Calcium Chromium Copper Iron Lead Magnesium Mercury Nickel Selenium Zinc	Antimony Arsenic Iron Magnesium Manganese Sodium	None

TABLE 3-3
Comparison of Maximum Detected Concentrations
of Chemicals of Potential Concern in Soil
To Direct Contact and Groundwater Protection Criteria
(Organic Compounds)
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CHEMICAL	Maximum Detected Concentration (ug/kg)	Direct Contact Criteria (ug/kg)	Groundwater Protection Criteria (ug/kg)
1,1-Dichloroethane	310	N/A	200
PCB-1248	1460	1000	10000
PCB-1260	138000	1000	10000
Benzo(a)anthracene	11000	224	3000
Chrysene	9200	N/A	400
Benzo(b)fluoranthene	9300	N/A	1100
Benzo(k)fluoranthene	6600	N/A	1100
Benzo(a)pyrene	9000	61	11000
Indeno(1,2,3-cd)pyrene	4300	N/A	3200
Dibenz(a,h)anthracene	1500	14	165000000

N/A=Not Available

TABLE 3-4
Comparison of Maximum Detected Concentrations
of Chemicals of Potential Concern in Soil
to Background Concentrations
(Inorganic Compounds)
Shenango Steel Mold RI/FS, Buffalo, NY
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Maximum Detected Concentration (mg/kg)	Eastern US Background ¹ (mg/kg)	New York Region ² (mg/kg)	NYSDEC RSCO (mg/kg)
Arsenic	53.9	<0.1 - 73	3 - 12	7.5 or SB
Beryllium	5.8J	<1 - 7	0 - 1.75	0.16 or SB
Cadmium	5.5	N/A	0.1 - 1	1 or SB
Calcium	258000	100 - 280000	130 - 35000	SB
Chromium	121	1 - 1000	1.5 - 40	10 or SB
Copper	526	<1 - 700	<1 - 50	25 or SB
Iron	213000	100 - >100000	2000 - 550000	2,000 or SB
Lead	1150	<10 - 300	200 - 500	SB
Magnesium	43400J	50 - 50000	100 - 5000	SB
Mercury	0.64	0.01 - 3.4	0.001 - 0.2	0.1
Nickel	61.5	<5 - 700	0.5 - 25	13 or SB
Selenium	5.7J	<0.1 - 3.9	<0.1 - 3.9	2 or SB
Zinc	1470	<5 - 2900	9 - 50	20 or SB

Shaded cells represent chemicals detected above both Eastern US Background and New York Region Background.
¹ - Shacklette, HT and JG Boerngen, 1984. *Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States*, USGS Professional Paper 1270
² - *Background Concentrations of 20 Elements in Soils with Special Regard for New York State*, E. Carol McGovern, NYSDEC Wildlife Resources Center. These values are the same as the background concentrations listed in TAGM 4046.

Notes:

J=Estimated value

SB=Site Background

N/A = Not available

Table 3-5
Comparison of Maximum Detected Concentrations
of Chemicals of Potential Concern in Groundwater
to Class GA and Class C Water Quality Standards and Guidance
Shenango Steel Mold RI/FS, Buffalo, NY
NYSDEC Work Assignment No. D003970-03

	Maximum Detected Concentration (ug/l)	NYSDEC Class GA Water Quality Standards and Guidance (1) (ug/l)	NYSDEC Class C Water Quality Standards and Guidance (1,2) (ug/l)
Volatile Organic Compounds			
Toluene	15	5	6000
Ethylbenzene	26	5	N / A
Xylene	120	5	N / A
Semivolatile Organic Compounds			
2-Methylphenol	2J	1	5
4-Methylphenol	3J	1	5
Inorganics			
Antimony	3.1	3	N / A
Arsenic	39.1J	25	N / A
Iron	32700	300	N / A
Magnesium	74800	35000	N / A
Manganese	3140	300	N / A
Sodium	81000	20000	N / A

Notes:

J=Estimated value

N/A = Not available

(1) Source: TOGS 1.1.1 dated June 1998

(2) Human health and aesthetic impacts only

Table 3-6
 Contaminants of Concern in Union Ship Canal Sediment Identified from USACE Study
 Shenango Steel Mold RF/FS, Buffalo, New York
 NYSDEC Work Assignment No. D003970-03

Chemical	Units	Maximum Concentration	Sediment Screening Level	
			LEL	SEL
Total PCBs	ug/kg	1341	84.7 *	Not applicable
Cadmium	mg/kg	4.1	0.6	9
Copper	mg/kg	122	16	110
Lead	mg/kg	857	31	110
Mercury	mg/kg	0.409	0.15	1.3
Zinc	mg/kg	2480	120	270

USACE= U.S. Army Corps of Engineers

LEL = Lowest Effect Level

SEL = Severe Effect Level

* PCB Screening Level is for wildlife bioaccumulation, and is based on an assumed 6% total organic carbon content.

Note: For sediment screening levels see: NYSDEC Division of Fish, Wildlife and Marine Resources, Technical Guidance for Screening Contaminated Sediments, January 1999.

Table 3-7
Sediment Analytical Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Units	SAMPLE ID/DATE	SED-1 7/31/01	SED-2 7/31/01	SED-3 7/31/01	SED-4 7/31/01	SED-5 7/31/01	SED-6 7/31/01	SED-7 7/31/01	USC-1 7/31/01	USC-2 7/31/01	USC-3 7/31/01	USC-4 7/31/01	USC-5 7/31/01	USC-6 7/31/01
Total Organic Carbon (TOC)	mg./kg		122000	103000	118000	63900	76800	60500	94400	NA	NA	NA	NA	NA	NA
pH	SU		7.3	7.6	7.6	7.6	7.4	7.5	7.6	NA	NA	NA	NA	NA	NA
Metals															
Aluminum	mg./kg		15600	13900	13700	14700	15300	14200	13800	7430	7680	9410	10500	8450	5250
Antimony	mg./kg		17 UJ	14 UJ	13 UJ	13 UJ	16 UJ	15 UJ	14 UJ	13.2 UJ	15.7 J	11.7 UJ	13.8 UJ	12.5 UJ	4.2 UJ
Arsenic	mg./kg		20.6	18.6	19.2	13.5	18.1	16.1	21.1	8.9	12.8	11.9	14.1	13.6	23.9
Barium	mg./kg		120	101	152	124	103	85.8	96.8	81.2	94.4	79.6	81.2	66.5	108
Beryllium	mg./kg		1.3 U	1.2	1.7	1.1 U	1.2	1.1	1.4	0.93	1.7	1.1	1.1	0.87	0.52
Cadmium	mg./kg		4.9	4.4	7.4	3.9	4.5	4	5.4	2.8	4.9	3.3	3.4	3	1.1
Calcium	mg./kg		60000 J	50100 J	92500 J	57500 J	72200 J	48100 J	62700 J	50500	57000 J	57800 J	56500 J	46400 J	204000 J
Chromium	mg./kg		50.5	45	55.1	47.2	52.9	49.6	60.3	27.5	34.4	40.5	44.6	41.7	14.6
Cobalt	mg./kg		12.7	12	9.9	11.7	12.3	11.9	12.4	9.1	6.6	10.2	11.9	10.2	5.5
Copper	mg./kg		101	101	161	83.9	91.7	85	98.3	79.7	145	81.1	85.8	71.8	31.8
Iron	mg./kg		74600	69700	81500	55500	65900	54100	74100	38700	45900	37400	43100	38500	14600
Lead	mg./kg		288	283	253	253	316	294	509	262	883	407	475	362	80
Magnesium	mg./kg		9550	8950	10200	8790	9070	8770	9580	6080	10100	7830	8060	6870	5670
Manganese	mg./kg		1240	1160	1700	866	1150	962	1440	1060 J	1780 J	885 J	1130 J	889 J	764 J
Mercury	mg./kg		0.23 UJ	0.44 J	0.27 J	0.46 J	0.5 J	0.35 J	0.2 UJ	0.68	2.1	0.4	0.77	0.62	0.35
Nickel	mg./kg		43.4	39.3	41.2	39.1	43.4	40.7	44.4	22.7	26.9	29	30.9	27.9	12.9
Potassium	mg./kg		2310	1790	1960	2190	2520	2070	1880	961	708	949	1040	914	676
Selenium	mg./kg		2 UJ	1.6 UJ	1.7 J	1.5 UJ	1.9 UJ	1.7 UJ	1.7 J	2.3 UJ	2.1 UJ	2.6 UJ	2.2 UJ	2.5 UJ	2.1 UJ
Silver	mg./kg		0.77	0.5	1.9	0.6	0.61	0.85	1.1	0.7	3	0.53	0.66	0.67	0.73
Sodium	mg./kg		68.7 U	187 U	488 U	92.4 U	638 U	59.5 U	402 U	234	206	177	235	128 U	283
Thallium	mg./kg		3.2 U	2.6 U	2.4 U	2.4 U	3 U	2.8 U	2.7 U	3.5 J	2.9 UJ	3.8 J	6 J	5.4 J	2.9 UJ
Vanadium	mg./kg		40.1	35.2	33.7	34.6	37.9	33.8	35.9	1	0.24 UJ	4.8	5	4.5	3.7
Zinc	mg./kg		1090	1060	1860	873	1060	974	1470	859 J	1510 J	1170 J	1270 J	983 J	190 J

Table 3-7
Sediment Analytical Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Units	SAMPLE ID	SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	SED-7	USC-1	USC-2	USC-3	USC-4	USC-5	USC-6
SVOCs															
Benzaldehyde	ug/kg		NA	NA	NA	NA	NA	NA	NA	890 U	780 U	880 U	900 U	770 U	700 U
Phenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	220 J	120 J	880 U	900 U	770 U	700 U
bis(2-Chloroethyl)ether	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2-Chlorophenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
1,3-Dichlorobenzene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
1,4-Dichlorobenzene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
1,2-Dichlorobenzene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2-Methylphenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2,2'-oxybis(1-chloropropane)	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Acetophenone	ug/kg		NA	NA	NA	NA	NA	NA	NA	620 J	780 U	880 U	900 U	770 U	700 U
4-Methylphenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
N-Nitroso-di-n-propylamine	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Hexachloroethane	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Nitrobenzene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Isophorone	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2-Nitrophenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2,4-Dimethylphenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
bis(2-Chloroethoxy)methane	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2,4-Dichlorophenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
1,2,4-Trichlorobenzene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Naphthalene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
4-Chloroaniline	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Hexachlorobutadiene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
4-Chloro-3-methylphenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2-Methylnaphthalene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Hexachlorocyclopentadiene	ug/kg		NA	NA	NA	NA	NA	NA	NA	98 J	780 U	110 J	900 U	770 U	700 U
2,4,6-Trichlorophenol	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2,4,5-Trichlorophenol	ug/kg		14000 U	12000 U	13000 U	12000 U	12000 U	13000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
1,1'-Biphenyl	ug/kg		NA	NA	NA	NA	NA	NA	NA	890 U	780 U	880 U	900 U	770 U	700 U
2-Chloronaphthalene	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2-Nitroaniline	ug/kg		14000 U	12000 U	13000 U	12000 U	12000 U	13000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
Dimethylphthalate	ug/kg		5700 U	5000 U	5200 U	4900 U	4700 U	5200 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U

Table 3-7

Sediment Analytical Results

Shenango Steel Mold RI/FS, Buffalo, New York

NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Units	SAMPLE ID DATE	SED-1 7/31/01	SED-2 7/31/01	SED-3 7/31/01	SED-4 7/31/01	SED-5 7/31/01	SED-6 7/31/01	SED-7 7/31/01	USC-1 7/31/01	USC-2 7/31/01	USC-3 7/31/01	USC-4 7/31/01	USC-5 7/31/01	USC-6 7/31/01
Acenaphthylene	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	520 U	250 J	780 U	880 U	900 U	770 U	700 U
2,6-Dinitrotoluene	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
3-Nitroaniline	ug/kg		14000 U	12000 U	13000 U	12000 U	15000 U	12000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
Acenaphthene	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2,4-Dinitrophenol	ug/kg		14000 U	12000 U	13000 U	12000 U	15000 U	12000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
4-Nitrophenol	ug/kg		14000 U	12000 U	13000 U	12000 U	15000 U	12000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
Dibenzofuran	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
2,4-Dinitrotoluene	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Diethylphthalate	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
4-Chlorophenyl-phenylether	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Fluorene	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
4-Nitroaniline	ug/kg		14000 U	12000 U	13000 U	12000 U	15000 U	12000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
4,6-Dinitro-2-methylphenol	ug/kg		14000 U	12000 U	13000 U	12000 U	15000 U	12000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
Nitrosodiphenylamine (1)	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
4-Bromophenyl-phenylether	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Hexachlorobenzene	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Atrazine	ug/kg		NA	NA	NA	NA	NA	NA	NA	890 U	780 U	880 U	900 U	770 U	700 U
Pentachlorophenol	ug/kg		14000 U	12000 U	13000 U	12000 U	15000 U	12000 U	13000 U	2200 U	2000 U	2200 U	2300 U	1900 U	1800 U
Phenanthrene	ug/kg		790 J	800 J	1100 J	740 J	630 J	610 J	860 J	460 J	290 J	220 J	240 J	190 J	97 J
Anthracene	ug/kg		330 J	290 J	430 J	330 J	260 J	300 J	470 J	290 J	130 J	110 J	99 J	770 U	700 U
Carbazole	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Di-n-butylphthalate	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Fluoranthene	ug/kg		1700 J	1800 J	2900 J	1800 J	1400 J	1600 J	2700 J	1400 U	780 J	620 J	480 J	360 J	240 J
Pyrene	ug/kg		1900 J	1800 J	2700 J	1800 J	1500 J	1600 J	3000 J	1100 U	620 J	540 J	420 J	320 J	200 J
Butylbenzylphthalate	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
3,3'-Dichlorobenzidine	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Benzo(a)anthracene	ug/kg		1100 J	1100 J	1600 J	1000 J	870 J	920 J	1800 J	820 J	310 J	360 J	250 J	190 J	120 J
Chrysene	ug/kg		1400 J	1200 J	2000 J	1200 J	1000 J	1100 J	2100 J	1000 U	440 J	170 J	310 J	240 J	150 J
bis(2-Ethylhexyl)phthalate	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Di-n-octylphthalate	ug/kg		5700 U	5000 U	5200 U	4900 U	6000 U	4700 U	5200 U	890 U	780 U	880 U	900 U	770 U	700 U
Benzo(b)fluoranthene	ug/kg		2200 J	2100 J	2800 J	2000 J	1900 J	2000 J	3600 J	820 J	310 J	400 J	260 J	210 J	150 J
Benzo(k)fluoranthene	ug/kg		740 J	720 J	870 J	600 J	520 J	620 J	1100 J	730 J	260 J	430 J	300 J	200 J	130 J
Benzo(a)pyrene	ug/kg		1400 J	1400 J	1700 J	1300 J	1100 J	1300 J	2400 J	840 J	280 J	420 J	280 J	220 J	140 J
Indeno(1,2,3-cd)pyrene	ug/kg		1100 J	980 J	1100 J	980 J	850 J	980 J	1600 J	700 J	250 J	390 J	300 J	220 J	92 J
Dibenz(a,h)anthracene	ug/kg		310 J	5000 U	5200 U	4900 U	6000 U	4700 U	440 J	280 J	97 J	140 J	13 J	96 J	700 J
Benzo(g,h,i)perylene	ug/kg		1300 J	1200 J	1600 J	1200 J	1100 J	1200 J	2200 J	750 J	270 J	420 J	280 J	230 J	78 J

Table 3-7
Sediment Analytical Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Units	SAMPLE ID DATE	SED-1 7/31/01	SED-2 7/31/01	SED-3 7/31/01	SED-4 7/31/01	SED-5 7/31/01	SED-6 7/31/01	SED-7 7/31/01	USC-1 7/31/01	USC-2 7/31/01	USC-3 7/31/01	USC-4 7/31/01	USC-5 7/31/01	USC-6 7/31/01
VOCs															
Chloromethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	ug/kg		33 U	NA	5 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/kg		26 J	NA	33 U	NA	11 J	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	ug/kg		33 U	NA	3 J	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	ug/kg		33 U	NA	27 U	NA	29 UJ	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	ug/kg		33 U	NA	27 U	NA	29 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/kg		33 U	NA	27 U	NA	29 UJ	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ug/kg		33 U	NA	27 U	NA	29 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ug/kg		33 U	NA	27 U	NA	29 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ug/kg		33 U	NA	27 U	NA	29 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (total)	ug/kg		33 U	NA	27 U	NA	29 U	NA	NA	NA	NA	NA	NA	NA	NA

Notes

Table 3-7
Sediment Analytical Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

CONSTITUENT	Units	SAMPLE ID	SED-1 7/31/01	SED-2 7/31/01	SED-3 7/31/01	SED-4 7/31/01	SED-5 7/31/01	SED-6 7/31/01	SED-7 7/31/01	USC-1 7/31/01	USC-2 7/31/01	USC-3 7/31/01	USC-4 7/31/01	USC-5 7/31/01	USC-6 7/31/01
PCBs															
Aroclor 1016	ug/kg		340 U	260 U	250 U	1300 U	290 U	270 U	300 U	52.5 U	44.9 U	54.6 U	55.6 U	51.3 U	41.1 U
Aroclor 1221	ug/kg		340 U	260 U	250 U	1300 U	290 U	270 U	300 U	105 U	89.7 U	109 U	111 U	103 U	82.1 U
Aroclor 1232	ug/kg		340 U	260 U	250 U	1300 U	290 U	270 U	300 U	52.5 U	44.9 U	54.6 U	55.6 U	51.3 U	41.1 U
Aroclor 1242	ug/kg		340 U	260 U	250 U	1300 U	290 U	270 U	300 U	43.5 J	44.9 U	54.6 U	55.6 U	51.3 U	41.1 U
Aroclor 1248	ug/kg		340 U	260 U	250 U	1300 U	290 U	270 U	300 U	52.5 U	44.9 U	54.6 U	55.6 U	51.3 U	41.1 U
Aroclor 1254	ug/kg		340 U	260 U	250 U	1300 U	290 U	270 U	300 U	44.5 J	44.9 U	54.6 U	55.6 U	51.3 U	41.1 U
Aroclor 1260	ug/kg		6780	10200	1330	3980	818	470	300	85.7	15 J	18.6 J	67.3	56.4	52.4 J

Notes
 U= Analyzed for but not detected
 J= Estimated Value

Table 3-8
Summary of Sediment Sampling Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Constituent	Number of Positive Detections	Total Number of Samples	Frequency of Detection	Maximum Detected Concentration	Location of Maximum Concentration	Maximum Detection Limit for Nondetects
<i>Metals (mg/kg)</i>						
Aluminum	13	13	100%	15600	SED-1	na
Antimony	6	13	46%	15.7	USC-2	na
Arsenic	13	13	100%	23.9	USC-6	na
Barium	13	13	100%	152	SED-3	na
Beryllium	13	13	100%	1.7	SED-3/USC-2	na
Cadmium	13	13	100%	7.4	SED-3	na
Calcium	13	13	100%	204000	USC-6	na
Chromium	13	13	100%	60.3	SED-7	na
Cobalt	13	13	100%	12.7	SED-1	na
Copper	13	13	100%	161	SED-3	na
Iron	13	13	100%	83800	SED-3	na
Lead	13	13	100%	883	USC-2	na
Magnesium	13	13	100%	10200	SED-3	na
Manganese	13	13	100%	1780	USC-2	na
Mercury	11	13	85%	2.1	USC-2	na
Nickel	13	13	100%	44.4	SED-7	na
Potassium	13	13	100%	2520	SED-5	na
Selenium	2	13	15%	187	SED-2	na
Silver	12	13	92%	3	USC-2	na
Sodium	11	13	85%	638	SED-5	na
Thallium	4	13	31%	6	USC-4	na
Vanadium	12	13	92%	40.1	SED-1	na
Zinc	13	13	100%	1860	SED-3	na
<i>SVOCs (µg/kg)</i>						
Benzaldehyde	0	6	0%	--	na	900
Phenol	2	13	15%	220	USC-1	na
bis(2-Chloroethyl)ether	0	13	0%	--	na	6000
2-Chlorophenol	0	13	0%	--	na	6000
1,3-Dichlorobenzene	0	13	0%	--	na	6000
1,4-Dichlorobenzene	0	13	0%	--	na	6000
1,2-Dichlorobenzene	0	13	0%	--	na	6000
2-Methylphenol	0	13	0%	--	na	6000
2,2'-oxybis(1-chloropropane)	0	13	0%	--	na	6000
Acetophenone	5	6	83%	620 *	USC-1	na
4-Methylphenol	0	13	0%	--	na	6000
N-Nitroso-di-n-propylamine	0	13	0%	--	na	6000
Hexachloroethane	0	13	0%	--	na	6000
Nitrobenzene	0	13	0%	--	na	6000
Isophorone	0	13	0%	--	na	6000
2-Nitrophenol	0	13	0%	--	na	6000
2,4-Dimethylphenol	0	13	0%	--	na	6000
bis(2-Chloroethoxy)methane	0	13	0%	--	na	6000
2,4-Dichlorophenol	0	13	0%	--	na	6000
1,2,4-Trichlorobenzene	0	13	0%	--	na	6000
Naphthalene	8	13	62%	470	SED-7	na
4-Chloroaniline	0	13	0%	--	na	6000
Hexachlorobutadiene	0	13	0%	--	na	6000
4-Chloro-3-methylphenol	0	13	0%	--	na	6000
2-Methylnaphthalene	0	13	0%	--	na	6000

Table 3-8
Summary of Sediment Sampling Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Constituent	Number of Positive Detections	Total Number of Samples	Frequency of Detection	Maximum Detected Concentration	Location of Maximum Concentration	Maximum Detection Limit for Non-detects
Hexachlorocyclopentadiene	0	13	0%	--	na	6000
2,4,6-Trichlorophenol	0	13	0%	--	na	6000
2,4,5-Trichlorophenol	0	13	0%	--	na	15000
1,1'-Biphenyl	0	6	0%	--	na	900
2-Chloronaphthalene	0	13	0%	--	na	6000
2-Nitroaniline	0	13	0%	--	na	15000
Dimethylphthalate	0	13	0%	--	na	6000
Acenaphthylene	1	13	8%	250	USC-1	na
2,6-Dinitrotoluene	0	13	0%	--	na	6000
3-Nitroaniline	0	13	0%	--	na	15000
Acenaphthene	0	13	0%	--	na	6000
2,4-Dinitrophenol	0	13	0%	--	na	15000
4-Nitrophenol	0	13	0%	--	na	15000
Dibenzofuran	0	13	0%	--	na	6000
2,4-Dinitrotoluene	0	13	0%	--	na	6000
Diethylphthalate	0	13	0%	--	na	6000
4-Chlorophenyl-phenylether	0	13	0%	--	na	6000
Fluorene	1	13	8%	230	SED-3	na
4-Nitroaniline	0	13	0%	--	na	15000
4,6-Dinitro-2-methylphenol	0	13	0%	--	na	15000
Nitrosodiphenylamine (1)	0	13	0%	--	na	6000
4-Bromophenyl-phenylether	0	13	0%	--	na	6000
Hexachlorobenzene	0	13	0%	--	na	6000
Atrazine	0	13	0%	--	na	900
Pentachlorophenol	0	13	0%	--	na	15000
Phenanthrene	13	13	100%	1100	SED-3	na
Anthracene	11	13	85%	470	SED-7	na
Carbazole	0	13	0%	--	na	6000
Di-n-butylphthalate	0	13	0%	--	na	6000
Fluoranthene	13	13	100%	2900	SED-3	na
Pyrene	13	13	100%	3000	SED-7	na
Butylbenzylphthalate	1	13	8%	80 *	USC-6	na
3,3'-Dichlorobenzidine	0	13	0%	--	na	6000
Benzo(a)anthracene	13	13	100%	1800	SED-7	na
Chrysene	13	13	100%	2100	SED-7	na
bis(2-Ethylhexyl)phthalate	11	13	85%	950	SED-3	na
Di-n-octylphthalate	0	13	0%	--	na	6000
Benzo(b)fluoranthene	13	13	100%	3600	SED-7	na
Benzo(k)fluoranthene	13	13	100%	1100	SED-7	na
Benzo(a)pyrene	13	13	100%	2400	SED-7	na
Indeno(1,2,3-cd)pyrene	13	13	100%	1600	SED-7	na
Dibenz(a,h)anthracene	8	13	62%	700	USC-6	na
Benzo(g,h,i)perylene	13	13	100%	2200	SED-7	na

Table 3-8
Summary of Sediment Sampling Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Constituent	Number of Positive Detections	Total Number of Samples	Frequency of Detection	Maximum Detected Concentration	Location of Maximum Concentration	Maximum Detection Limit for Nondetects
VOCs ($\mu\text{g/kg}$)						
Chloromethane	0	3	0%	--	na	33
Vinyl chloride	0	3	0%	--	na	33
Bromomethane	0	3	0%	--	na	33
Chloroethane	0	3	0%	--	na	33
Methylene chloride	1	3	33%	5 *	SED-2	na
Acetone	2	3	67%	26	SED-1	na
Carbon disulfide	1	3	33%	3	SED-2	na
1,1-Dichloroethene	0	3	0%	--	na	33
1,1-Dichloroethane	0	3	0%	--	na	33
cis-1,2-Dichloroethene	0	3	0%	--	na	33
trans-1,2-Dichloroethene	0	3	0%	--	na	33
Chloroform	0	3	0%	--	na	33
1,2-Dichloroethane	0	3	0%	--	na	33
2-Butanone	0	3	0%	--	na	33
1,1,1-Trichloroethane	0	3	0%	--	na	33
Carbon tetrachloride	0	3	0%	--	na	33
Bromodichloromethane	0	3	0%	--	na	33
1,2-Dichloropropane	0	3	0%	--	na	33
cis-1,3-Dichloropropene	0	3	0%	--	na	33
Trichloroethene	0	3	0%	--	na	33
Dibromochloromethane	0	3	0%	--	na	33
1,1,2-Trichloroethane	0	3	0%	--	na	33
Benzene	0	3	0%	--	na	33
trans-1,3-Dichloropropene	0	3	0%	--	na	33
Bromoform	0	3	0%	--	na	33
4-Methyl-2-pentanone	0	3	0%	--	na	33
2-Hexanone	0	3	0%	--	na	33
Tetrachloroethene	0	3	0%	--	na	33
1,1,2,2-Tetrachloroethane	0	3	0%	--	na	33
Toluene	0	3	0%	--	na	33
Chlorobenzene	0	3	0%	--	na	33
Ethylbenzene	0	3	0%	--	na	33
Styrene	0	3	0%	--	na	33
Xylene (total)	0	3	0%	--	na	33
PCBs ($\mu\text{g/kg}$)						
Aroclor 1016	0	13	0%	--	na	1300
Aroclor 1221	0	13	0%	--	na	1300
Aroclor 1232	0	13	0%	--	na	1300
Aroclor 1242	1	13	8%	43.5	USC-1	na
Aroclor 1248	0	13	0%	--	na	1300
Aroclor 1254	1	13	8%	44.5	USC-1	na
Aroclor 1260	13	13	100%	10200	SED-2	na

Notes:

" -- " indicates that the constituent was not positively detected in any sample

na = not applicable

* = Results for this constituent were reported with laboratory qualifiers "JB". Qualification of these results may change following data validation.

Table 3-9
Summary of Sediment Screening Results
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Constituent	Maximum Detected Concentration	NYSDEC Sediment Criteria*	Organic Carbon Content ** (g OC/kg)	Does Maximum Concentration Exceed NYSDEC Criteria?
Metals (mg/kg)				
Aluminum	15600	--	na	na
Antimony	15.7	2	na	Yes
Arsenic	23.9	6	na	Yes
Barium	152	--	na	na
Beryllium	1.7	--	na	na
Cadmium	7.4	0.6	na	Yes
Calcium	204000	--	na	na
Chromium	60.3	26	na	Yes
Cobalt	12.7	--	na	na
Copper	161	16	na	Yes
Iron	83800	20000	na	Yes
Lead	883	31	na	Yes
Magnesium	10200	--	na	na
Manganese	1780	460	na	Yes
Mercury	2.1	0.15	na	Yes
Nickel	44.4	16	na	Yes
Potassium	2520	--	na	na
Selenium	187	--	na	na
Silver	3	1	na	Yes
Sodium	638	--	na	na
Thallium	6	--	na	na
Vanadium	40.1	--	na	na
Zinc	1860	120	na	Yes
SVOCs (µg/kg)				
Phenol	220	30	60.5	Yes
Acetophenone	620 ***	--	60.5	na
Naphthalene	470	2,832	94.4	No
Acenaphthylene	250	--	60.5	na
Fluorene	230	944	118	No
Phenanthrene	1100	14,160	118	No
Anthracene	470	10,101	94.4	No
Fluoranthene	2900	120,360	118	No
Pyrene	3000	90,718	94.4	No
Butylbenzylphthalate	80 ***	--	60.5	na
Benzo(a)anthracene	1800	1,133	94.4	Yes
Chrysene	2100	--	94.4	na
bis(2-Ethylhexyl)phthalate	980	23,541	118	No
Benzo(b)fluoranthene	3600	--	94.4	na
Benzo(k)fluoranthene	1100	--	94.4	na
Benzo(a)pyrene	2400	--	94.4	na
Indeno(1,2,3-cd)pyrene	1600	--	94.4	na
Dibenz(a,h)anthracene	700	--	60.5	na
Benzo(g,h,i)perylene	2200	--	94.4	na
VOCs (µg/kg)				
Methylene chloride	5 ***	na	103	na
Acetone	26	na	122	na
Carbon disulfide	3	na	103	na
PCBs (µg/kg)				
Aroclor 1242	43.5	1,168	60.5	No
Aroclor 1254	44.5	1,168	60.5	No
Aroclor 1260	10200	1,988	103	Yes

Notes:

* = Criteria for metals are based on Lowest Effect Level concentrations. Criteria for organics are site-specific and were derived using NYSDEC criteria based on chronic toxicity to aquatic life and sample-specific results for organic carbon content.

** = The organic carbon contents shown correspond to sample in which the maximum constituent concentration was reported. The lowest reported organic carbon concentration was utilized for "USC" sample locations.

*** = Results for this constituent were reported with laboratory qualifiers "JB". Qualification of these results may change following data validation.

-- indicates that there is no NYSDEC criteria available for this constituent based on toxicity to aquatic life.

Table 3-10
Comparison of Maximum Inorganic Constituent Concentrations with SELs
Shenango Steel Mold RI/FS, Buffalo, New York
Work Assignment No. D003970-03

Constituent	Maximum Detected Concentration	NYSDEC SEL Sediment Criteria	Does Maximum Concentration Exceed NYSDEC Criteria?	Number of Exceedances (of 13 samples)
Aluminum	15600	--	na	na
Antimony	15.7	25	No	na
Arsenic	23.9	33	No	na
Barium	152	--	na	na
Beryllium	1.7	--	na	na
Cadmium	7.4	9	No	na
Calcium	204000	--	na	na
Chromium	60.3	110	No	na
Cobalt	12.7	--	na	na
Copper	161	110	Yes	2
Iron	83800	40000	Yes	9
Lead	883	110	Yes	12
Magnesium	10200	--	na	na
Manganese	1780	1100	Yes	7
Mercury	2.1	1.3	Yes	1
Nickel	44.4	50	No	na
Potassium	2520	--	na	na
Selenium	187	--	na	na
Silver	3	2.2	Yes	1
Sodium	638	--	na	na
Thallium	6	--	na	na
Vanadium	40.1	--	na	na
Zinc	1860	270	Yes	13

Notes:

SEL = Severe Effect Level

Concentrations expressed in mg/kg

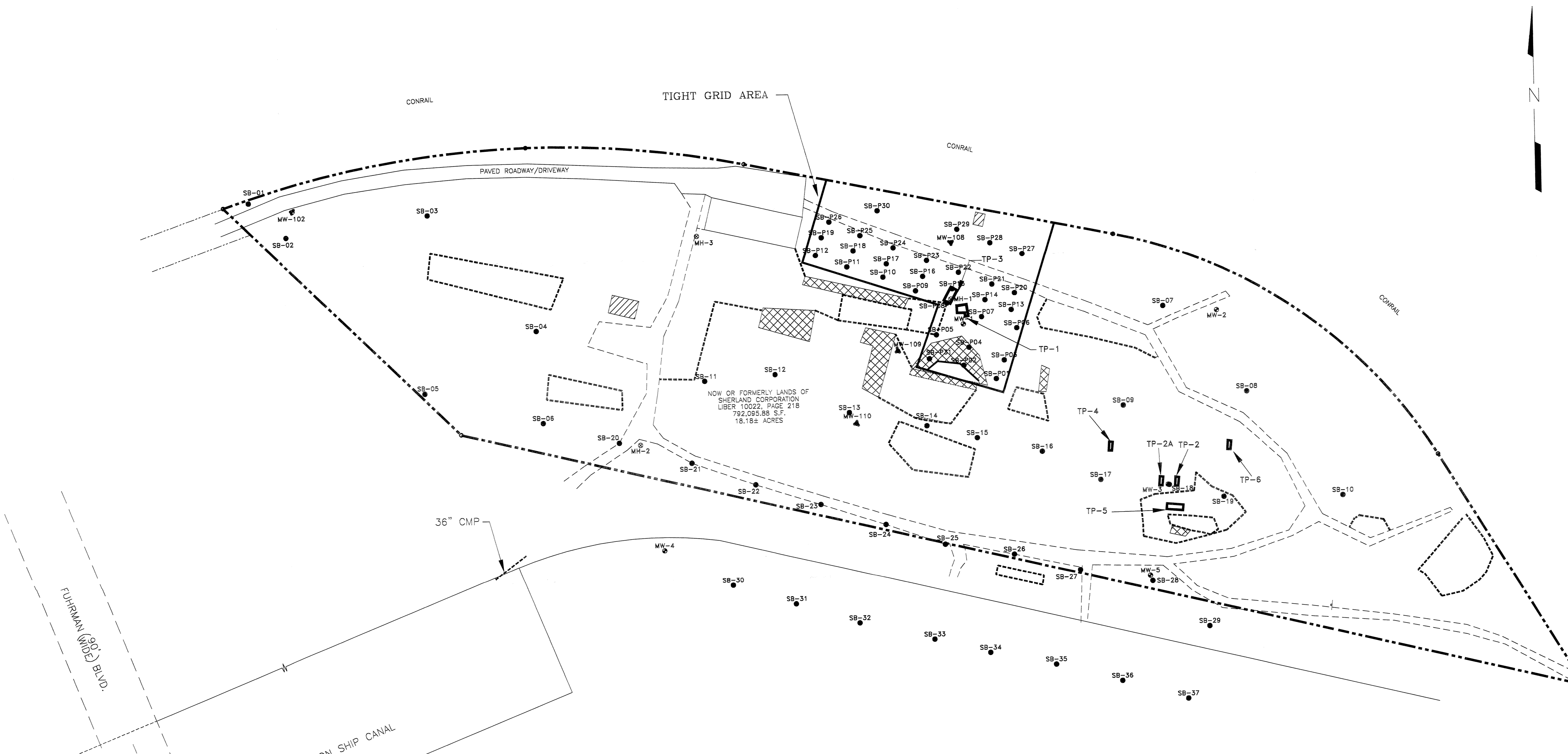
Table 3-11
Summary of Sample-Specific Screening Results for Aroclor 1260
Shenango Steel Mold RI/FS, Buffalo, New York
NYSDEC Work Assignment No. D003970-03

Sampling Station	Aroclor 1260 Concentration µg/kg	Fraction of Organic Carbon (g OC/kg)	NYSDEC Benthic Life Criteria* µg/kg	Does Sediment Concentration Exceed Criteria?	NYSDEC Wildlife Bioaccumulation Criteria* µg/kg	Does Sediment Concentration Exceed Criteria?
SED-1	6780	122	2,355	Yes	171	Yes
SED-2	10200	103	1,988	Yes	144	Yes
SED-3	1330	118	2,277	No	165	Yes
SED-4	3980	63.9	1,233	Yes	89	Yes
SED-5	818	76.8	1,482	No	108	Yes
SED-6	470	60.5	1,168	No	85	Yes
SED-7	300	94.4	1,822	No	132	Yes
USC-1	85.7	60.5	1,168	No	85	Yes
USC-2	15	J 60.5	1,168	No	85	No
USC-3	18.6	J 60.5	1,168	No	85	No
USC-4	67.3	60.5	1,168	No	85	No
USC-5	56.4	60.5	1,168	No	85	No
USC-6	52.4	60.5	1,168	No	85	No

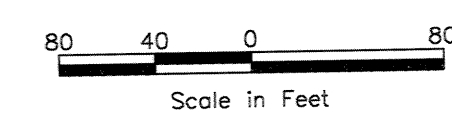
Notes:

* = NYSDEC Criteria are site-specific and were derived using sample-specific results for organic carbon content.

Sample-specific organic carbon concentrations were not available for the "USC" samples; therefore, the lowest measured organic carbon content from the "SED" samples was conservatively used.



- Legend:**
- Property Line
 - Existing Structure/Building
 - Dirt Road
 - Inaccessible Area
 - Concrete Slab/Debris
 - TP-2
 - Test Pit Location
 - Soil Boring
 - Monitoring Well (Installed 2000)
 - Manhole
 - Monitoring Well Installed by ABB Environmental (1995)



Notes:
1. Elevations are referenced to the NAVD 88 vertical datum.
2. Coordinates are referenced to an assumed horizontal datum.

REVISION				REVISION			
NO.	DATE	APPR.		NO.	DATE	APPR.	

SHENANGO STEEL MOLD RI/FS
WORK ASSIGNMENT NO. D003970-03
BUFFALO, NEW YORK

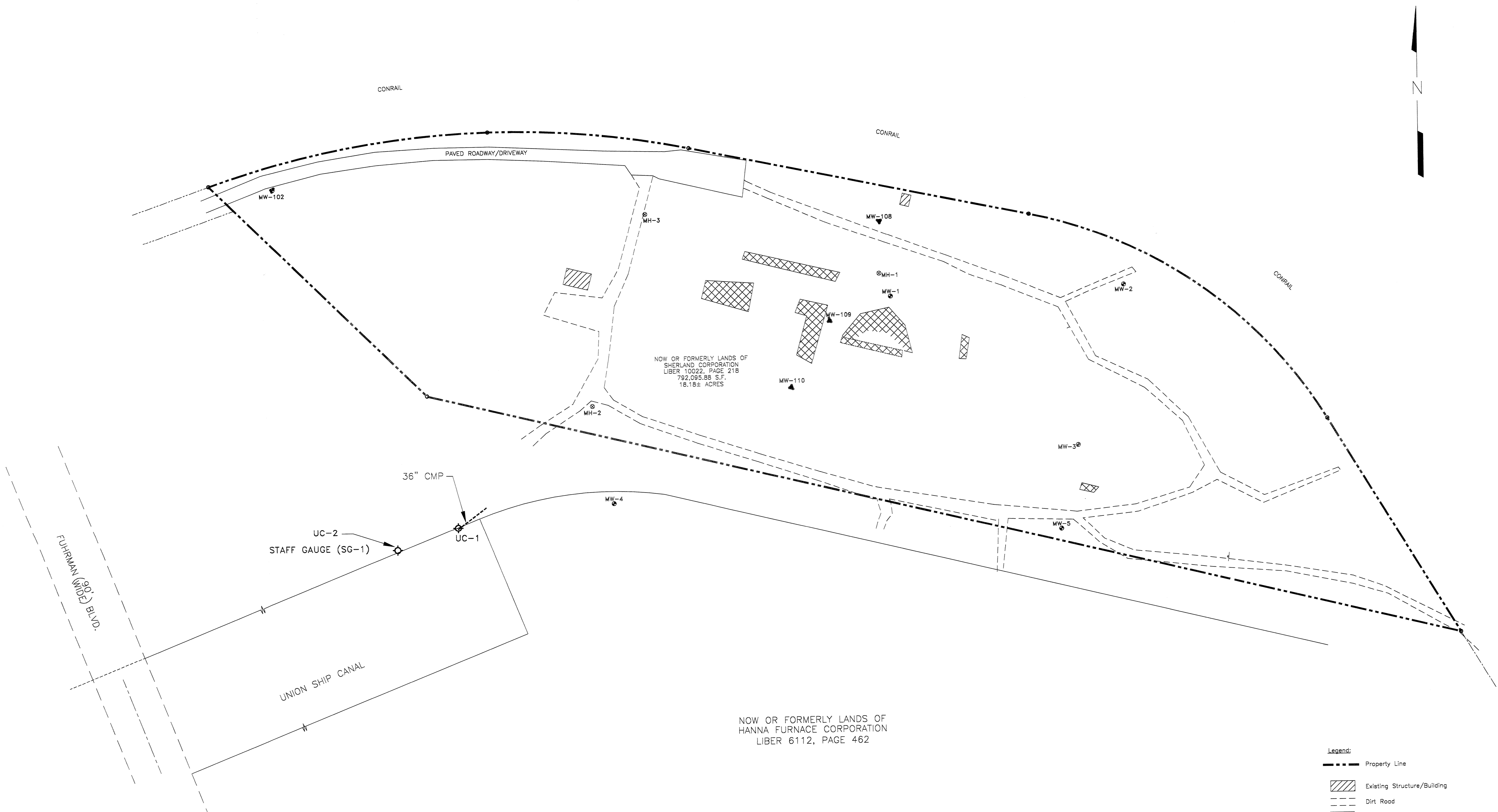
 Environmental Resources Management
Melville, New York 11747

CHECKED	DATE
DESIGN ENGINEER	
PROJECT ENGINEER	
PROJECT MANAGER	
APPROVED	
APPROVED	

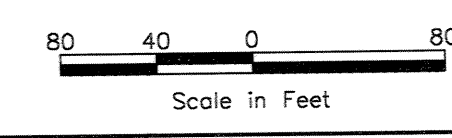
**FIGURE 2-1
SOIL BORING SAMPLE
LOCATION MAP**

DRAWN MKR	DATE 1/25/02	REVISION DATE:
SCALE 1"=80'	JOB NO. 72703	FILE NAME: 72703026

DRAWING NO.	REV. NO.
SHEET	OF

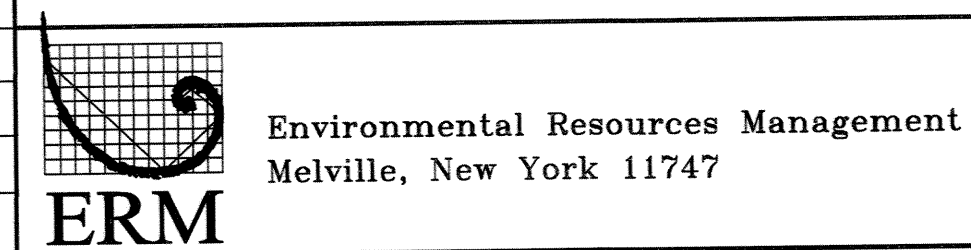


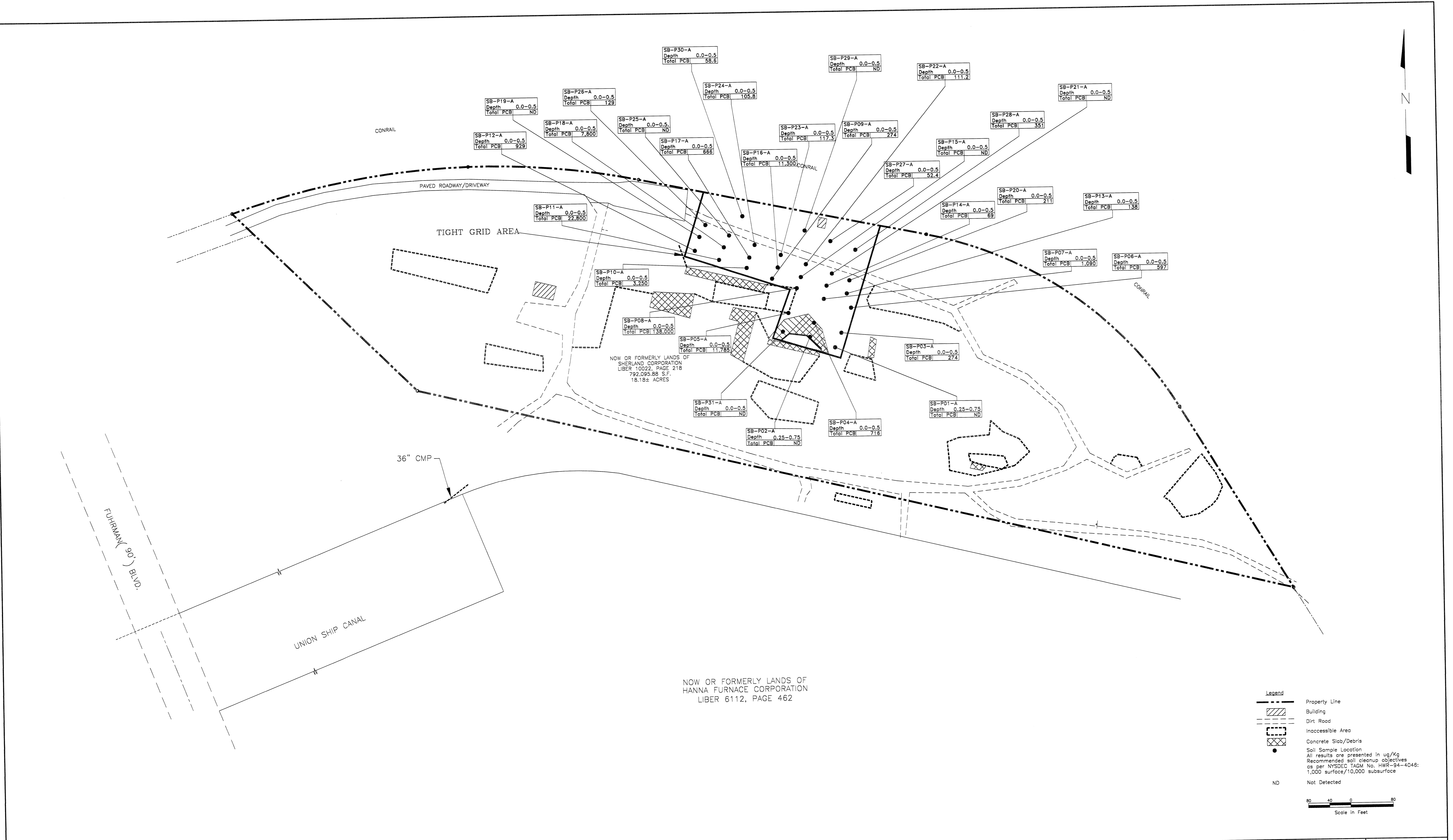
- Legend:
- Property Line
 - Existing Structure/Building
 - Dirt Road
 - Concrete Slab/Debris
 - Monitoring Well (installed 2000)
 - Manhole
 - Monitoring Well installed by ABB Environmental (1995)



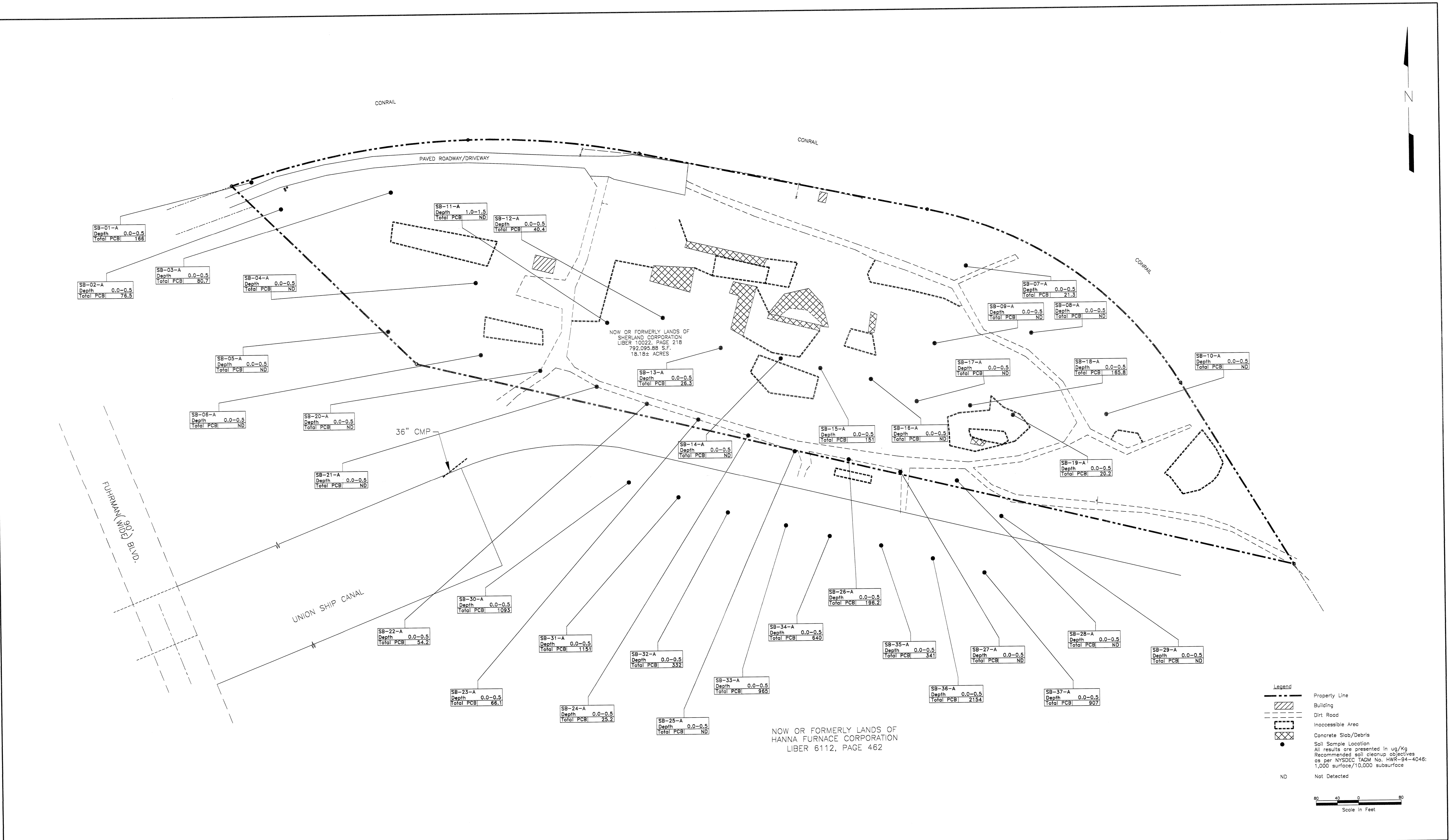
Notes:
1. Elevations are referenced to the NAVD 88 vertical datum.
2. Coordinates are referenced to an assumed horizontal datum.

NO.				DATE				APPR.				REVISION				SHENANGO STEEL MOLD RI/FS WORK ASSIGNMENT NO. D003970-03				CHECKED				DATE				FIGURE 2-2 MONITORING WELL/MANHOLE/SURFACE WATER SAMPLE LOCATION MAP				DRAWING NO.																																			
																BUFFALO, NEW YORK				DESIGN ENGINEER												REV. NO.																																			
																				PROJECT ENGINEER																																															
																				PROJECT MANAGER																																															
																								APPROVED								DRAWN				MKR				DATE				1/3/02				REVISION DATE:																			
																												APPROVED								SCALE				1"=80'				JOB NO.				72703				FILE NAME:				72703025				SHEET				OF			





								SHENANGO STEEL MOLD RI/FS WORK ASSIGNMENT NO. D003970-03				CHECKED DESIGN ENGINEER PROJECT ENGINEER PROJECT MANAGER APPROVED APPROVED				DATE DRAWN MKR DATE 1/14/02 JOB NO. 72703 FILE NAME: 72703017				FIGURE 2-3 TOTAL PCBS IN SURFACE SOILS TIGHT GRID AREA				DRAWING NO.			
								BUFFALO, NEW YORK																REV. NO.			
								 Environmental Resources Management Melville, New York 11747																SHEET OF			
NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION																				



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SB-03	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 7.5-8.0
SVOC	224	3800
Benz(a)Anthracene	400	4900
Chrysene	1100	4900
Benz(b)Fluoranthene	61	2900
Benz(k)Fluoranthene	8100	6200
Dibenz(a,h)Anthracene	14	1500

SB-P29	Recommended Soil Cleanup Objectives	Depth 3.0-4.0 5.0-8.0
VOC	200	310
1,1-Dichloroethane	924	9500
Benz(a)Anthracene	400	8500
Benz(b)Fluoranthene	1100	9300
Benz(k)Fluoranthene	61	6600
Benz(o)Pyrene	81	4500
Indeno(1,2,3-cd)Pyrene	340	4500
Dibenz(a,h)Anthracene	14	64

SB-12	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 2.0-4.0
SVOC	224	290
Benz(a)Anthracene	400	1300
Chrysene	61	1700
Benz(b)Fluoranthene	14	100
Dibenz(a,h)Anthracene	1100	2100

SB-04	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 4.5-5.5
SVOC	224	890
Benz(a)Anthracene	400	2000
Chrysene	1100	2000
Benz(b)Fluoranthene	61	1800
Dibenz(a,h)Anthracene	14	570

SB-02	Recommended Soil Cleanup Objectives	Depth 5.0-6.0
SVOC	61	120
Benz(a)Pyrene	14	57

SB-P05	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 5.0-5.5
SVOC	224	320
Benz(a)Anthracene	400	620
Chrysene	14	140

SB-16	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 5.0-5.5
SVOC	224	1400
Benz(a)Anthracene	400	1500
Chrysene	1100	1500
Benz(b)Fluoranthene	61	960
Benz(o)Pyrene	14	250

SB-08	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 5.5-6.5
SVOC	224	2000
Benz(a)Anthracene	400	3200
Chrysene	1100	1200
Benz(b)Fluoranthene	61	4400
Dibenz(a,h)Anthracene	14	1100

SB-18	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 5.5-6.0
SVOC	224	240
Benz(a)Anthracene	400	470
Chrysene	61	250
Benz(b)Fluoranthene	14	67

SB-10	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 5.5-6.0
SVOC	224	420
Benz(a)Anthracene	400	430
Chrysene	61	470
Benz(o)Pyrene	14	74

SB-20	Recommended Soil Cleanup Objectives	Depth 0.0-0.5
SVOC	61	130
Benz(a)Pyrene	14	23

SB-24	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 1.5-3.0
SVOC	61	88
Benz(a)Pyrene	14	22

SB-22	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 2.0-3.5
SVOC	224	370
Benz(a)Anthracene	400	480
Chrysene	1100	740
Benz(b)Fluoranthene	61	1500
Benz(k)Fluoranthene	8100	1400
Dibenz(a,h)Anthracene	14	270

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LIBER 6112, PAGE 462

SB-34	Recommended Soil Cleanup Objectives	Depth 0.0-0.5
SVOC	61	48
Benz(a)Pyrene	14	45

SB-26	Recommended Soil Cleanup Objectives	Depth 0.0-0.5
SVOC	61	220
Benz(a)Pyrene	14	48

SB-36	Recommended Soil Cleanup Objectives	Depth 0.0-0.5
SVOC	61	100

SB-28	Recommended Soil Cleanup Objectives	Depth 0.0-0.5 1.5-2.5
SVOC	224	330
Benz(a)Pyrene	61	230
Benz(b)Fluoranthene	14	660
Dibenz(a,h)Anthracene	14	200

Legend

- Property Line
- Building
- Dirt Road
- Inaccessible Area
- Concrete Slab/Debris
- Soil Sample Location
- Recommended Soil Cleanup Objectives as per NYSDC TAGN No. HWR-94-4046; Estimated Value

Scale in Feet

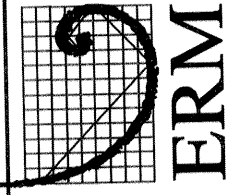
80 40 0 80

FIGURE 2-7
VOC AND SVOC EXCEEDANCES IN SOIL

SHENANGO STEEL MOLD R/FS
WORK ASSIGNMENT NO. D003970-03

BUFFALO, NEW YORK

Environmental Resources Management
Melville, New York 11747



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