APPROVED

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PRELIMINARY SITE ASSESSMENT REPORT
VOLUME I

Hanna Furnace Site and
Shenango Steel Mill
Buffalo, NY

Site No. 915029
Erie County

Prepared for:

New York State
Department of
Environmental Conservation

50 Wolf Road, Albany, New York 12233
Michael D. Zagata, *Commissioner*

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

By:
ABB Environmental Services
Portland, Maine

November 1995

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PRELIMINARY SITE ASSESSMENT REPORT
VOLUME I

HANNA FURNACE SITE (SITE NO. 915029) AND
SHENANGO STEEL MILL
CITY OF BUFFALO, NEW YORK

Submitted to:

New York State Department of Environmental Conservation
Albany, New York

Submitted by:

ABB Environmental Services
Portland, Maine

November 1995

Prepared by:

Brian K. Butler
Site Manager
ABB Environmental Services

Submitted by:

Cynthia J. Talbot
Project Manager
ABB Environmental Services

Approved by:

Robert E. Handy, Jr., P.E.
Program Manager
ABB Environmental Services

HANNA FURNACE SITE AND SHENANGO STEEL MILL
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EXECUTIVE SUMMARY

This report presents results of the Preliminary Site Assessments (PSAs) of the Hanna Furnace site (Site Number 915029) and the Shenango Steel Mill (an unregistered site), located in Buffalo, New York. The Hanna Furnace site is a suspected inactive hazardous waste site recognized by the New York State Department of Environmental Conservation (NYSDEC) in the Registry of Inactive Hazardous Waste Disposal Sites. The Hanna Furnace site is listed in the registry as a Class 2a site because insufficient information existed to establish whether hazardous waste had been disposed on-site or to assess the potential significant threat to public health and the environment posed by contamination at the site. The Shenango Steel Mill, located adjacent to the Hanna Furnace site, is being considered by NYSDEC for inclusion on the registry. The Shenango Steel Mill was recently the focus of a polychlorinated biphenyl (PCB) removal action by the NYSDEC.

HANNA FURNACE SITE

The purpose of the Hanna Furnace PSA was to collect sufficient information to establish whether materials remaining on-site are hazardous waste and whether the site poses a potential significant threat to public health and the environment as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375. The results of the PSA were used to recommend reclassification of the site and prepare a Hazard Ranking System (HRS) score.

Site History. The former Hanna Furnace facility is located at 1818 Fuhrman Boulevard in Buffalo, Erie County, New York and is currently owned by Jordan & Foster Scrap Company (Figure 1). For purposes of the investigation and data evaluation, the Hanna Furnace site was organized into three areas: (1) the filter cake/flue ash disposal area and debris landfill; (2) the oil shack area; and (3) the Union Ship Canal (Figure 2). The total site is approximately 113 acres in size. The filter cake/flue ash disposal area and debris landfill encompasses approximately 30 acres and consist of an area of uncovered filter cake and flue ash piles, a debris landfill, former railroad spurs, low areas and pits, and piles of iron ore and limestone. The oil shack area is approximately 40 acres and is composed of the ruins of four blast furnaces, iron ore storage areas, casting houses, and ancillary support buildings, former offices, a wastewater treatment plant, and a boiler plant. The

Union Ship Canal occupies approximately 10 acres and allowed ore ships access to the Hanna Furnace facilities from Lake Erie. The remaining 33 acres of the Hanna Furnace site consist of an extensive former railroad yard.

Hanna Furnace blast furnaces were used from 1902 to 1982 to produce pig iron. Waste materials from the production of pig iron were either disposed of on-site or were used by other industries in the Buffalo area. Wastes generated at the Hanna Furnace facility consisted of flue ash, flue ash filter cake, plant debris (including soil, brick, and scrap), and blast furnace slag. Slag, scrap metal, and some flue ash were transported off-site for commercial purposes such as metals recovery or use as railroad ballast. No records exist concerning chemical products used to maintain the facility, other than the raw materials used for actual pig iron production. The whole site is currently vacant. All but four buildings in the oil shack area are in ruins. Some large equipment used in pig iron casting remains in the basement levels of the ruined buildings. There is unrestricted public access to the Hanna Furnace site, and household garbage and other material has been dumped throughout the sites. The Hanna Furnace site is also used by the public for fishing at the Union Ship Canal and for off-road vehicle use at the filter cake/flue ash disposal area.

It should be noted that some waste materials from blast furnace operations potentially disposed of at the Hanna Furnace site are specifically defined in 6 NYCRR Part 375 as solid wastes and are excluded from being defined as a hazardous waste. These excluded solid wastes include air pollution control dust/smudge from iron blast furnaces and iron blast furnace slag (6 NYCRR Part 371.1[e][2][vi]['1' and 'm']). During the records review no documentation of hazardous waste deposition as a result of pig iron production at the Hanna Furnace site or pig iron milling at the Shenango Steel site was identified.

Previous Investigations. Previous investigations at the Hanna Furnace site include: (1) a Phase I Site Assessment; (2) a Site Characterization and Environmental Assessment; (3) PCB sampling; and (4) a site-wide Surface Soil Investigation. Previous sampling locations are summarized in Figure 3. The Phase I Site Assessment assigned a preliminary HRS score of 58.3 to the Hanna Furnace site. This was revised in the Site Characterization and Environmental Assessment to 62.28. The previous investigations showed that soil and blast furnace wastes disposed at the site contain concentrations of inorganics exceeding New York State (NYS) soil background (primarily lead, copper, chromium, arsenic, selenium, and cyanide), and

detected phenols, PCBs, and oil and grease. Results from composite samples analyzed for Extraction Procedure Toxicity (EPTOX) metals showed that inorganics are present in site materials at leachable concentrations, close to but not exceeding characteristic hazardous waste regulatory limits. Total cyanide concentrations were interpreted to be high enough to potentially cause exceedance of the reactivity characteristic definition for hazardous waste. Cyanide, phenols, and PCBs were detected in surface water samples during previous investigations at concentrations exceeding NYS Class C surface water quality standards. Arsenic, chromium, copper, cyanide, lead, phenols, and PCBs were detected in groundwater samples in previous investigations at concentrations exceeding NYS Class GA groundwater quality standards.

PSA Investigation. ABB-ES conducted PSA field investigation activities at the Hanna Furnace site in October and November 1994 to: (1) confirm previous analytical results; (2) characterize previously unsampled areas and structures; (3) assess whether materials on-site were hazardous waste; and (4) assess whether the site potentially poses a significant threat to public health and the environment. The PSA field activities included completion of a geophysical survey of the debris landfill, environmental sampling, a subsurface investigation, and site survey activities. Environmental sampling at the Hanna Furnace site consisted of collecting and analyzing: (1) eight subsurface landfill samples from test pits in the debris landfill; (2) 14 surface soil/fill samples throughout the site; (3) two drum samples from the oil shack area; (4) eight sump sediment/liquid sample pairs from the oil shack area; and (5) seven surface water and six sediment samples from the debris landfill and Union Ship Canal areas (Figure 4). The subsurface investigations included drilling seven soil borings completed as water table monitoring wells, collecting and analyzing seven subsurface soil samples from the soil borings and seven groundwater samples from the monitoring wells, and measuring water levels. All samples were analyzed for Target Compounds List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides/PCBs, and TCL inorganics. All surficial samples, sump sediment samples, canal sediment samples, drum samples, and one sump liquid sample were analyzed for EPTOX metals, ignitability, reactivity, and corrosivity. Liquid samples were also screened in the field for pH, temperature, specific conductance, dissolved oxygen, and salinity.

Filter Cake/Flue Ash Disposal Area and Debris Landfill Results. Soil, sediment, surface water, and groundwater samples from the filter cake/flue ash disposal area

and debris landfill contained SVOCs (naphtha compounds, phenols, and polynuclear aromatic hydrocarbons [PAHs]), PCBs (Aroclor-1260), and inorganics. EPTOX metals and ignitability, corrosivity, and reactivity test results do not show the materials to be characteristic hazardous wastes. The following analytes were detected in surface water samples from shallow pits adjacent to the debris landfill at concentrations above NYS Class C standards: acetone, aluminum, lead, and pH. Phenols (2,4-dimethylphenol; 4-methylphenol; and pentachlorophenol), cyanide, iron, selenium, sodium, and pH were detected in groundwater samples above NYS Class GA standards. One groundwater sample had a pH of 12.3, approaching the corrosive hazardous waste criterion of 12.5.

Oil Shack Area Results. Samples from the oil shack area contained SVOCs (naphtha compounds, phenols, and PAHs) and inorganics (primarily aluminum, copper, iron, lead, manganese, mercury, selenium, and zinc) in soil, fill, abandoned utilities (sumps) and abandoned equipment. Material spilled from one 55-gallon drum found near the oil shack contained VOCs (ethylbenzene, toluene, and xylenes); samples collected directly from a second 55-gallon drum contained SVOCs (PAHs). None of the soil, drum, or sump samples from the oil shack area meet the definition of a characteristic hazardous waste. One sump liquid sample from the oil shack area had a pH of 12.3, approaching the corrosive hazardous waste criterion of 12.5. The following analytes were detected in groundwater samples above NYS Class GA standards: cyanide, iron, magnesium, manganese, sodium, and pH.

Union Ship Canal Results. Union Ship Canal sediment and surface water samples were collected at discharge pipes entering the canal, adjacent to the filter cake/flue ash disposal area, and downstream between the site and the Buffalo Inner Harbor (Lake Erie). Sediment sampling from the canal detected SVOCs (PAHs and others), and inorganics (primarily aluminum and lead). The highest concentrations of SVOCs were detected in the downstream sample. Surface water samples contained 4-methylphenol, bis(2-ethylhexyl)phthalate (BEHP), and inorganics (primarily aluminum, chromium, copper, lead, vanadium, and zinc), with the highest concentrations generally in the sample collected adjacent to the filter cake/flue ash disposal area. The following analytes were detected in surface water samples at concentrations above NYS Class C standards: 4-methylphenol, BEHP, aluminum, copper, lead, mercury, vanadium, zinc, and pH.

Hanna Furnace Site PSA Conclusions and Recommendations. None of the soil, drum, or sump samples from the Hanna Furnace site meet the definition of a characteristic hazardous waste. Although low concentrations of PCBs are detected in surface soil samples at the site (up to approximately 0.5 mg/kg), concentrations are less than the hazardous waste criterion of 50 mg/kg and less than the typical PCB cleanup levels of 1 to 10 mg/kg. One sump liquid sample and one groundwater sample had pHs of 12.3, which is close to the corrosivity definition of a caustic hazardous waste of 12.5.

As disposal of hazardous waste is not identified at the Hanna Furnace site, according to site classification definitions set forth in 6 NYCRR Part 375, the Hanna Furnace site should be removed from the NYS Registry of Inactive Hazardous Waste Disposal Sites (Figure 5). Based on exceedances of NYS groundwater and surface water quality standards for SVOCs and inorganics, the site is interpreted to pose a potential threat to public health and the environment.

The results of the PSA were used to prepare an HRS score for the Hanna Furnace site using the USEPA's PREScore software (ABB-ES, 1995). Based on existing data generated during the PSA, an HRS score of 49.12 was calculated for the Hanna Furnace site.

SHENANGO STEEL MILL

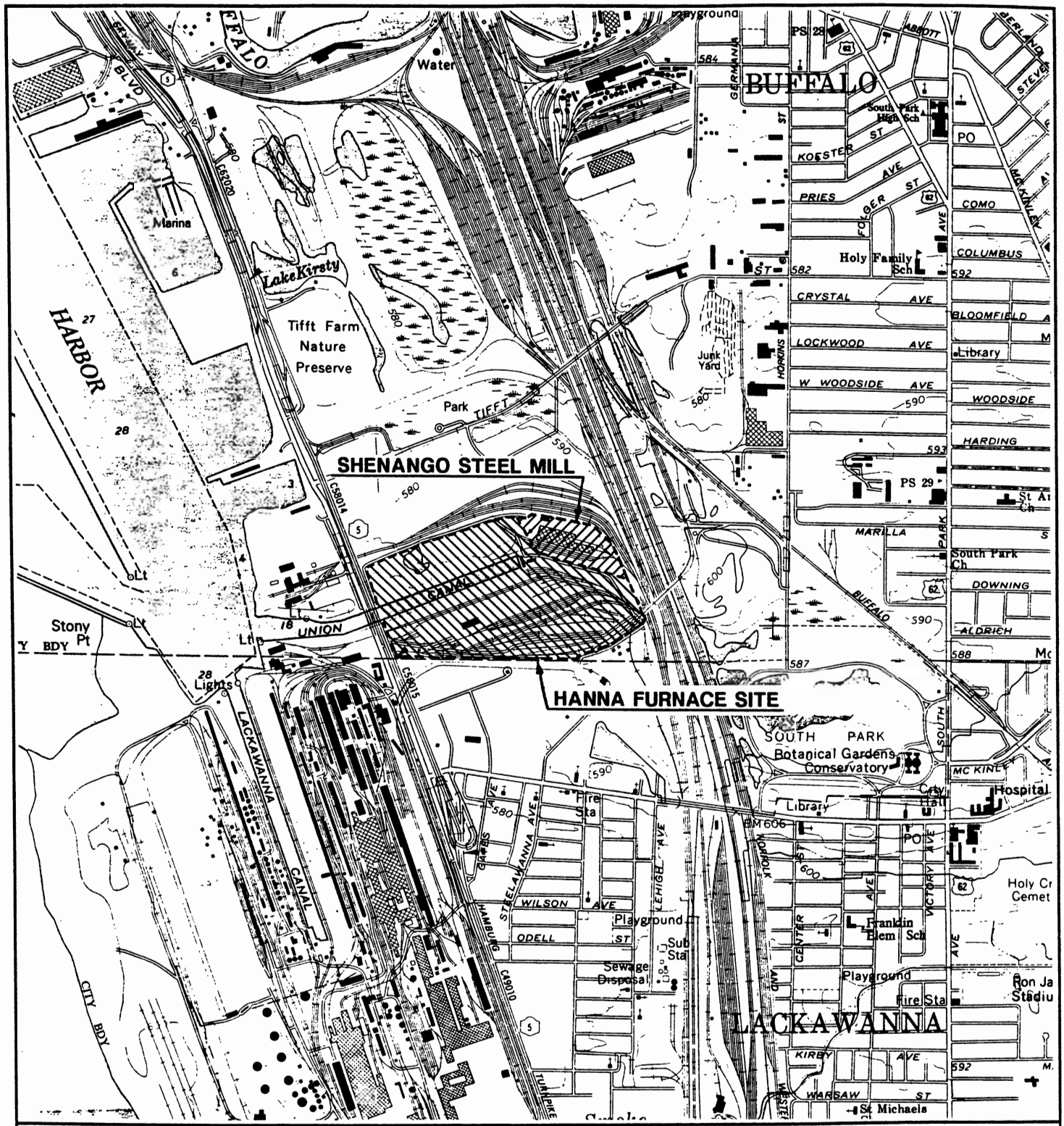
The Shenango Steel Mill is not a registered inactive hazardous waste disposal site, but was part of the Hanna Furnace property before 1962 and has confirmed PCB contamination. The Shenango Steel Mill PSA was performed by ABB-ES to confirm that materials remaining on-site were hazardous wastes and to establish whether the Shenango Steel Mill poses a potential significant threat to public health and the environment.

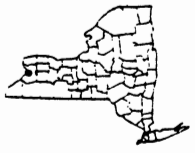
Site History. The Shenango Steel Mill is owned by Sherland, Incorporated and comprises 18-acres of developed land consisting of former mill building ruins and railroad spurs. No information is available concerning former Shenango Steel Mill operations other than that the mill processed pig iron produced by Hanna Furnace from approximately 1963 to 1982.

Previous Investigations. Previous investigations of the Shenango Steel Mill include: (1) PCB sampling by NYSDEC at a site of transformer salvaging; and (2) a site-wide Surface Soil Investigation. Sample locations are shown in Figure 3. Based on the Shenango Steel Mill PCB sampling, NYSDEC implemented a removal action of PCB-contaminated soil and debris, and also removed 17 55-gallon drums and 25 5-gallon pails of material found near the PCB-contaminated area. PCB screening by NYSDEC after the removal action was complete showed that surface soil concentrations exceeded 50 milligrams per kilogram (mg/kg), the regulatory level for defining PCB-contaminated materials as hazardous waste. Laboratory analyses performed to characterize the contents of the drums and pails for disposal purposes found some materials to be toxicity- and ignitability- characteristic hazardous wastes based on Toxicity Characteristic Leaching Procedure (TCLP) VOC, TCLP lead, and flashpoint analysis results.

PSA Investigation. Environmental sampling at the Shenango Steel Mill by ABB-ES consisted of one sump liquid/sediment sample pair and 11 surface soil samples (Figure 4). The subsurface investigation consisted of drilling three soil borings completed as water table monitoring wells; collecting and analyzing three subsurface soil samples from the soil borings and three groundwater samples from the monitoring wells; and measuring water levels. All samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides/PCBs, and TCL inorganics. The sump sediment sample and surface soil samples were analyzed for EPTOX metals, ignitability, reactivity, and corrosivity. The groundwater samples were screened in the field for pH, temperature, specific conductance, dissolved oxygen, and salinity.

Shenango Steel Mill Results. Laboratory analysis of samples from the Shenango Steel Mill in vicinity of the PCB spill area and samples from an adjacent abandoned utility (sump) detected the PCB Aroclor-1260, SVOCs (naphtha compounds, PAHs, phenols, and others), and inorganics (primarily aluminum, cobalt, lead, and zinc). A soil sample collected from the PCB removal action excavation contains Aroclor-1260 at 81 mg/kg, which confirms previous NYSDEC screening results and exceeds the regulatory limit of 50 mg/kg that defines the material as a listed hazardous waste (B007). Soil and groundwater sampling from the immediate area where drums and pails had been removed by NYSDEC detected VOCs (1,1,1-trichloroethane; 1,1-dichloroethane (DCA); 1,2-dichloroethene; carbon disulfide; tetrachloroethene; ethylbenzene; toluene; and xylenes). The following analytes were detected in





QUADRANGLE LOCATION

SOURCE: N.Y.S. DEPARTMENT OF TRANSPORTATION 7.5-MINUTE SERIES QUADRANGLE; BUFFALO SE, NEW YORK, DATED 1986.

SITE NO: 915029
LOCATION: CITY OF BUFFALO
ERIE COUNTY

N

SCALE IN FEET
0 2,000 4,000

FIGURE 1
SITE LOCATION MAP
HANNA FURNACE SITE
AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
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groundwater at concentrations above NYS Class GA groundwater quality standards: 1,1-DCA; benzene; chloroethane; iron; manganese; magnesium; sodium; and pH.

Shenango Steel Mill PSA Conclusions and Recommendations. Through data developed during the PSA investigation at the Shenango Steel Mill, ABB-ES confirmed that a listed hazardous waste (PCB-contaminated material - a B007 listed hazardous waste) remains at the removal action area. Because a listed hazardous waste remains on-site, it is recommended that this site be added to the Registry of Inactive Hazardous Waste Disposal Sites. Although the Shenango Steel Mill has concentrations of VOCs and inorganics exceeding NYS Class GA groundwater quality standards, the site is not interpreted to pose a potential significant threat to public health and the environment because groundwater in this area is not used for any purpose. In addition, these exceedances are not related to the listed hazardous waste (PCBs) disposed of at the site. There is the potential that PCB contamination may migrate from the site via the abandoned utility structure found in the PCB spill area. If this structure is found to discharge to a nearby surface water body, such as the Union Ship Canal, the discharge of PCBs may be considered a potential significant threat to public health and the environment.

The Shenango Steel Mill, if listed by NYS, would meet the definition of a Class 3 site (see Figure 6).

1.0 PURPOSE

ABB Environmental Services (ABB-ES) is submitting this Preliminary Site Assessment (PSA) Report to the New York State Department of Environmental Conservation (NYSDEC) for work performed on the PSA at the Hanna Furnace site and Shenango Steel Mill located in the City of Buffalo, Erie County, New York (see Figure 1). This report was prepared in response to Work Assignment No. D002472-14.1 (NYSDEC, 1993a), and in accordance with the requirements of the November 1989 NYSDEC Superfund Standby Contract No. D002472 and its July 1993 Supplemental Agreement No. 1 between NYSDEC and ABB-ES.

The Hanna Furnace site is a suspected inactive hazardous waste site recognized by NYSDEC in the Registry of Inactive Hazardous Waste Disposal Sites (NYSDEC, 1994a). Hanna Furnace, Site No. 915029 (U.S. Environmental Protection Agency [USEPA] Site No. D002103844), is a Class 2a site. Insufficient information existed for delisting or reclassification based on documented disposal of hazardous waste or contamination posing a significant threat to human health or the environment. At the commencement of the PSA for Hanna Furnace, NYSDEC expanded its scope to include assessment of the adjacent former Shenango Steel Mill, the property having been formerly part of Hanna Furnace and the focus of a recent polychlorinated biphenyl (PCB) removal action by NYSDEC in 1994.

ABB-ES completed preparation of a Site Work Plan for the Hanna Furnace site and Shenango Steel Mill in July 1994 (ABB-ES, 1994d). ABB-ES prepared a scope of work for the field investigation program to develop data necessary to reclassify the Hanna Furnace site according to guidelines set forth under Title 6 of the New York Codes, Rules, and Regulations (NYCRR) Part 375 (NYSDEC, 1992), to one of the following categories:

Class 2	Hazardous waste sites presenting a significant threat to public health or the environment; defined by NYSDEC as sites that had a release(s) resulting in violation of NYSDEC environmental quality standards and guidelines.
Class 3	Hazardous waste sites not presenting a significant threat to public health or the environment.

Delist Sites where hazardous waste disposal is not documented.

To develop the data necessary to recommend reclassification, environmental sampling and subsurface investigations were performed to:

- confirm the existence of documented on-site hazardous waste disposal, as defined in 6 NYCRR Part 371 (NYSDEC, 1995); and

- establish whether hazardous waste disposal at the site constitutes a significant threat to public health and the environment as defined in 6 NYCRR Part 375.

The scope of work for the Shenango Steel Mill investigation was designed to confirm NYSDEC PCB sampling results and develop a recommendation for listing and classification of the site. ABB-ES completed the following PSA field activities:

- Performed magnetometer and terrain conductivity surveys at a debris landfill on the Hanna Furnace site to provide data that might indicate the presence of ferrous materials (such as drum nests) or conductive wastes potentially representing hazardous waste.

- Collected and analyzed surface soil, subsurface soil, sediment, sump liquid, sump sediment, and drum samples from the Hanna Furnace site and Shenango Steel Mill to provide data to assess whether materials disposed of on-site are hazardous wastes as defined by 6 NYCRR Part 371 (NYSDEC, 1995).

- Collected and analyzed surface water samples from the Hanna Furnace site to provide data for comparison to New York State (NYS) Class C Surface Water Quality Standards, set forth under 6 NYCRR Parts 700-705 (NYSDEC, 1991a), to establish whether there has been a contravention of these standards and whether the site poses a significant threat to public health and the environment as defined in 6 NYCRR Part 375.

- Installed and sampled groundwater monitoring wells at the Hanna Furnace site and Shenango Steel Mill for comparison of analytical

results to NYS Class GA groundwater quality standards, set forth under 6 NYCRR Parts 700-705 (NYSDEC, 1991a), to establish whether there has been a contravention of these standards and whether the site poses a significant threat to public health and the environment as defined in 6 NYCRR Part 375.

- Developed a base map from a site survey presenting the location of environmental samples, test borings, monitoring wells, and major site features.

A summary of field investigations and the results of PSA activities are reported in two volumes. Volume I presents the project purpose, a summary of the site background and history for the Hanna Furnace site and Shenango Steel Mill, description of field investigation scope of work, the results of the field investigation activities, and a final recommendation for reclassification of the sites. Figures and tables included in Volume I are located at the back of the report section in which they are first referenced. Included in Volume I is Appendix A, USEPA Site Inspection Form 2070-13 for the Hanna Furnace site. Volume II contains field data records, laboratory analytical results, the data quality evaluation report, and the survey control report.

2.0 BACKGROUND INFORMATION

This section presents a description of the sites and the information gathered during the records search and assessment portion of the PSAs for the Hanna Furnace site and Shenango Steel Mill. Included is information on site histories and previous investigations, description of the site walkovers, file review information, and summaries of the records searches and assessments. This information was detailed previously in the Site Work Plan (ABB-ES, 1994d).

2.1 SITE DESCRIPTION

The former Hanna Furnace and Shenango Steel Mill facilities are located at 1818 Fuhrman Boulevard in the City of Buffalo, Erie County, New York. The two properties are estimated to total 131 acres (Figures 1 and 2). The site is bounded by Fuhrman Boulevard and the Hamburg Turnpike on the west, Conrail and Norfolk Southern railroad yards on the north and east, and property owned by the South Buffalo Railroad Company to the south (Recra, 1988). The area of Buffalo in which the sites are located is generally characterized as heavy industrial and commercial, with several railroad yards, steel mills, and concrete plants within 0.5 miles. The sites are within the City of Buffalo M-3 Zone (i.e., Heavy Industrial). One of the most prominent features of the Hanna Furnace site is the Union Ship Canal (see Figures 1 and 2), that essentially bisects the site from west to east, providing access to the site for barges and ships from nearby Lake Erie. The Union Ship Canal occupies 10 acres of the site. The Father Baker Bridge forms the elevated portion of the Hamburg Turnpike (NYS Route 5), and crosses the Union Ship Canal.

Hanna Furnace Site. The Hanna Furnace site was used in the production of pig iron from iron ore prior to 1982. During site operations, approximately 10 acres on the eastern border of the site and approximately 20 acres of the northern part of the site were used for raw material storage and landfilling waste generated on-site (Recra, 1988). Approximately 30 acres to the southeast of the canal were used for pig-iron storage in an extensive railroad yard, and 40 acres south of the canal were used for the production of pig iron and ancillary activities (e.g., the location of the four blast furnaces, pig iron casting mill, boiler house, and support buildings). The remaining acreage of the Hanna Furnace site was unused, or used for miscellaneous storage.

A variety of wastes were generated during operation of the Hanna Furnace facility. Blow down water from the Hanna Furnace boiler house and recirculating water used to cool the pig iron molds was discharged to an on-site separation basin system located at the boiler house and pig casting mill (Recra, 1988). Sludge dried at the separation basins was transported to the northern part of the site for landfilling. Effluent from the separation basins and wastewater generated from the blast furnace wet scrubbers were discharged to the wastewater thickener/filter facility located at the eastern end of the Union Ship Canal. At this facility, a thickener was added to the iron-laden water to increase its viscosity, and the water was then filtered. The iron-laden filter cake was then transported to the northern portion of the site for either landfilling or future sale. The filtered wastewater, potentially contaminated with phenols, cyanides, fluorides, and ammonia, was then discharged to the canal (Recra, 1988).

Shenango Steel Mill. The northeastern 18 acres of the site were later used by Shenango Steel Mill for further milling of pig iron produced by Hanna Furnace. Milling was performed in a single, large foundry building serviced from an unnamed road forming the northern boundary of the Hanna Furnace site and from railroad spurs also servicing Hanna Furnace. No information has been found detailing operations of Shenango Steel Mill.

2.1.1 Surrounding Land Use

The area in the vicinity of the Hanna Furnace site and the Shenango Steel Mill is principally devoted to heavy and light industrial development. Land immediately south of the southern site boundary is used for light industry by environmental service and construction corporations. Land east of the site is used extensively as a railroad yard. The area between the northern site boundary and Tifft Street is a wetland or open area with some electrical transmission lines. West of the site is NYS Route 5 (Hamburg Turnpike) and beyond that are steel mills, concrete storage facilities, inactive properties, and Lake Erie (Buffalo Inner Harbor).

The closest residential area is located approximately 0.25 miles to the south in the City of Lackawanna. The population within 1 mile of the sites is estimated to be 6,000 people (Recra, 1988). The Tifft Farm Nature Preserve is located approximately 0.5 miles north of the sites, and the South Park recreation area is

located 0.5 miles southeast (see Figure 1). South Park includes the Buffalo Botanical Gardens Conservatory.

2.1.2 Topography

The area in the vicinity of the Hanna Furnace site and the Shenango Steel Mill is generally flat, developed land or open fields. The topography of the Hanna Furnace site and Shenango Steel Mill properties itself is generally uneven and characterized by demolition debris from the blast furnaces and buildings, old foundations, earthen berms, discarded raw materials used in steel production (i.e., iron ore and dolomite), landfilled waste materials, and former railroad beds. Several of the buildings had extensive basements. Some of these basements are exposed as open pits, and some are only visible as open holes and pits. The sites are approximately 580 feet above mean sea level and 9 feet above Lake Erie (see Figure 1). Much of the land north of the Union Ship Canal was originally a swamp averaging 12 feet below the surrounding land surface (Recra, 1988). Flue ash and furnace debris from the Hanna Furnace operations were used to fill this area.

2.1.3 Surface Water Hydrology

Surface water runoff in the central and southern portion of the Hanna Furnace site either pools on the ground surface and infiltrates into the ground or flows through abandoned utility lines, into former building basements, or along the ground surface toward the Union Ship Canal and ultimately into Lake Erie. Surface water runoff in the northern portions of the Hanna Furnace site either pools on the ground surface in low areas or pits and infiltrates into the ground, or is diverted to a low area between the filter cake/flue ash disposal area and the debris landfill. Surface water runoff in the Shenango Steel Mill portion of the site either pools on the ground surface and infiltrates, is discharged to a storm sewer system, or discharges to ditches and wetland areas bordering the adjacent railroad yard.

The shore of Lake Erie is located approximately 0.5 miles west of the site. The following classified wetlands are located within 3 miles of the site: BU-1 (Class I), BU-7 (Class II), and BU-15 (Class I) which form part of the Tifft Nature Preserve (NYSDEC, 1984). Most of the Hanna Furnace site and Shenango Steel Mill is located within the 100-year flood plain (Zone A) as defined by the Federal Emergency Management Agency (Community Panel #360230-0020-B) (Recra, 1988;

NYSDEC, 1994b). The elevated portions of the sites (e.g., the debris landfill and railroad tracks along southern boundary of the Hanna Furnace site) are located within the 500-year flood plain (Zone B).

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 located more than 3 miles from the Union Ship Canal. Surface water in the Union Ship Canal and the immediate vicinity of Lake Erie (Buffalo Inner Harbor) is designated as NYS Surface Water Class C. Class C fresh surface waters are suitable for fish propagation and survival, and have qualities suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes (NYSDEC, 1991a). People access the Union Ship Canal at the Hanna Furnace site to fish.

2.1.4 Critical Habitats and Endangered Species

There are several known critical habitats and species of concern within 3 miles of the Hanna Furnace site and Shenango Steel Mill. Table 1 lists animal species of concern present at the Tifft Farm Nature Preserve, 0.5 miles north of the site, and along Lake Erie (Landsittle, 1994).

Endangered plant species within 3 miles of the site include woodland bluegrass (*poa sylvestris*), pink wintergreen (*pyrola asarifolia*), small skullcap (*scutellaria parvula var. leonardii*), and harbinger-of-spring (*erigenia bulbosa*) (NYSDEC, 1994c).

2.2 SITE HISTORY

The following subsections describe the operational histories of the Hanna Furnace and Shenango Steel Mill sites.

2.2.1 Hanna Furnace Site

Hanna Furnace Corporation (Hanna Furnace), a subsidiary of National Steel Corporation, conducted blast furnace operations at the site from 1902 to 1982 (Recra, 1988). The Hanna Furnace site is composed of approximately 113 acres of former industrial facilities, product storage, and disposal areas used by the blast

furnace operation for the production of pig iron. Hanna Furnace ceased operations in 1982. In 1983, the Hanna Furnace property (not including Shenango Steel) was sold by National Steel Corporation to the Jordan & Foster Scrap Company, which dismantled the blast furnaces and most other buildings on the site. More recently, Hallock Contracting Co., Inc. of Clarence, New York has worked at the site to scrap the remaining railroad tracks. The Hanna Furnace property is still owned by Jordan & Foster Scrap Company, which is in bankruptcy (Buffalo Tax Assessors Office, 1993). Recently, the Hanna Furnace site has been identified as the potential future location of a park and marina.

The Hanna Furnace blast furnace complex processed iron ore in four blast furnaces to produce pig iron ingots for other industries. Iron ore was brought to the site by barges. The site was also serviced by an extensive railroad network. Throughout the history of the facility, waste materials from the production of pig iron were either disposed of on-site or were used by other industries in the Buffalo area. No records detailing site operations from the period of 1902 to 1930 have been located by ABB-ES. From 1930 to 1982, Hanna Furnace's annual waste generation included approximately 7,200 tons of dry flue ash; 10,800 tons of flue ash filter cake; 5,000 tons of plant debris including soil, brick, and scrap metal; and 214,000 tons of slag (Engineering-Science, 1986). Slag, scrap metal, and some flue ash were transported off-site for commercial purposes such as metals recovery or use as railroad ballast.

2.2.2 Shenango Steel Mill

In 1962, an 18-acre parcel of the northeastern portion of the Hanna Furnace property was sold to Shenango Steel (also known as Shenango Furnace Company and Marlen Steel Corporation). Shenango Steel purchased pig iron produced by Hanna Furnace and conducted further milling operations. No records have been identified detailing the history, industrial processes, or waste materials generated by Shenango Steel, other than that further milling of pig iron produced by Hanna Furnace was performed there. The Shenango Steel property is listed as owned by Sherland, Incorporated (Buffalo Tax Assessors Office, 1993).

2.3 PREVIOUS INVESTIGATIONS

Several investigations and response actions have occurred at the Hanna Furnace site and Shenango Steel Mill property. These investigations are summarized in Table 2 and described in the following subsections. Approximate sampling locations from the previous investigations are shown in Figure 3.

2.3.1 Hanna Furnace Site

The following subsections address studies and investigations conducted at the Hanna Furnace site.

2.3.1.1 Hanna Furnace Corporation Waste Management Report. A solid waste study performed for Hanna Furnace in 1979 included analysis of flue ash filter cake, flue ash, surface water from the Union Ship Canal, and on-site ponded water in the northern part of the site adjacent to the flue ash/filter cake disposal area (Rupley, Bahler, and Blake, 1979a,b,c). Analytical results are summarized in Table 3.

Results from the study show that concentrations of cyanide and phenols in ponded surface water and Union Ship Canal samples exceeded NYS Class C surface water quality standards.

2.3.1.2 USGS Investigation. In August 1982, the U.S. Geological Survey (USGS) collected eight soil samples (including one duplicate) from 2.5 to 10 feet below ground surface (bgs) in seven on-site borings (USEPA, 1985). Approximate locations of the soil borings are shown in Figure 3. Laboratory results for the samples are summarized in the following table:

SUBSURFACE SOIL SAMPLE ANALYTICAL RESULTS
USGS INVESTIGATION

PARAMETER	RANGE OF CONCENTRATION IN SOIL (mg/kg)
Chromium	3 to 400
Copper	4 to 170
Iron	3,700 to 83,000
Lead	10 to 70

Notes:

mg/kg = milligrams per kilogram

2.3.1.3 Phase I Investigation. A Phase I Investigation was performed on the site for NYSDEC by Engineering-Science for the purpose of estimating Hazard Ranking System (HRS) scores based on existing data (Engineering-Science, 1986). Engineering-Science estimated that approximately 13 million tons of blast furnace process wastes were disposed of on the northern half of the site.

The 13 million tons was derived based on an estimated solid waste production rate of 214,000 tons/year blast furnace slag, 7,200 tons/year dry flue ash, 10,800 tons/year of fly ash filter cake, and 5,000 tons/year general plant refuse, disposed over a 55 year period.

The following HRS scores were calculated for the site:

- Potential for harm to public health or the environment from migration of hazardous substances (S_M) = 8.73
- Potential for harm from substances that can explode or cause flames (S_{FE}) = 0
- Potential for harm from direct contact with hazardous substances (S_{DC}) = 50

The total preliminary HRS score was 58.73. The Phase I Investigation recommended that a Phase II investigation (i.e., environmental sampling) be performed to more accurately assess the HRS scoring for the site. Because the S_M score was less than the USEPA guideline of 28.5, the site was not recommended for inclusion on the National Priorities List.

2.3.1.4 Site Characterization and Environmental Assessment. A site assessment was performed in 1988 for the New York State Department of Transportation (NYSDOT) for the purpose of identifying the presence/absence of chemical constituents that could effect the potential environmental liabilities associated with the property (Recra, 1988). The study was performed as part of reconstruction of NYS Route 5, including the construction of the new Father Baker Bridge over the Union Ship Canal, on the western edge of the site.

The site assessment included:

- collecting 29 surface soil samples (five from the oil shack area, 10 from the northern half of the site, and 14 from the southern half of the site);
- collecting a surface water/sediment sample pair from the pond area in the northern half of the site;
- collecting three surface water/sediment sample pairs from the Union Ship Canal;
- drilling seven test borings and collecting seven subsurface soil samples; and
- installing and sampling seven monitoring wells (see Figure 3).

Monitoring well locations were surveyed, and monitoring wells were tested by falling and rising head methods to determine overburden permeabilities. Water level measurements were also obtained from the wells and the Union Ship Canal.

Laboratory analytical results for 29 surface and seven subsurface soil samples are presented in Table 4.

Three composite surface soil samples were also collected for Extraction Procedure Toxicity (EPTOX) analysis to assess the leachability of wastes disposed on-site. The composite sample results indicate that lead was leachable from site soils and that grab soil samples from individual locations in the oil shack area could exceed EPTOX criteria for lead. If discrete samples had been collected, lead exceedances might identify the soil as a characteristic hazardous waste (Recra, 1988). The locations and laboratory analytical results of the samples analyzed for EPTOX metals are presented in Table 5.

Two composite subsurface soil samples from soil borings drilled at the site and one sediment sample from the Union Ship Canal were also analyzed for EPTOX metals. Arsenic, barium, cadmium, chromium, and lead were detected in the extract of the subsurface soil samples. Analytes detected in the sediment sample extract were

arsenic (0.007 milligrams per liter [mg/L]), barium (0.72 mg/L), cadmium (0.032 mg/L), and lead (1.3 mg/L).

Four sediment samples were also collected from the site for total metals analysis. Sediment sample results are presented in Table 6. Groundwater and surface water sample results are summarized in Table 7.

As a component of the environmental assessment, the HRS score for the Hanna Furnace site was revised, and a preliminary engineering assessment of remedial alternatives was performed. The HRS score factor representing potential for harm to public health or the environment from migration of hazardous substances (S_m) was increased to 12.28. The HRS score factor representing potential for harm from direct contact with hazardous substances (S_{DC}) remained at 50. The revised total HRS score was 62.28.

2.3.1.5 Hanna Furnace PCB Sampling. In 1990, NYSDEC Region 9 collected two surface soil samples (one composite and one discrete) from the Hanna Furnace Site (See Figure 3). The composite was collected from three locations in the vicinity of the oil shack building where it was identified that transformer salvaging had apparently been conducted (NYSDEC, 1990). The discrete sample was collected from "oil stained soil" in the vicinity of a suspected former transformer pen in the southwest corner of the site. PCBs were not detected in the two samples.

2.3.1.6 Father Baker Bridge/Tifft Street Sampling Event. In 1989, construction workers involved with the NYS Route 5 reconstruction at the Tifft Street ramp, northwest of the site, complained of symptoms possibly related to chemical exposure (New York State Department of Health [NYSDOH], 1990). Workers were exposed to black granular materials uncovered during excavation of soil to create ponds as part of a wetlands mitigation project. Sampling was performed for the NYSDOT by URS Consultants, Inc. to determine the degree of potential contamination in the construction work area. Two water samples, one soil/waste sample, and one sediment sample were collected for laboratory analysis. The waste sample contained semivolatile organic compounds (SVOCs) (phenols, phthalates, and polynuclear aromatic hydrocarbons [PAHs]) and inorganics including lead (1,100 milligrams per kilogram [mg/kg]), copper (1,280 mg/kg), arsenic (16 mg/kg), chromium (46 mg/kg), and cyanide (5 mg/kg) (URS, 1989). Based on the results of the samples, it was recommended that additional precautions to limit respiratory and dermal exposure

be taken for completion of the construction project. The soil results from the Tifft Street contamination are similar to results of the surface soil samples collected at the nearby Hanna Furnace site during the site assessment (Recra, 1988).

2.3.1.7 NYSDEC Surface Soil Sampling. NYSDEC collected 36 surface soil samples in May 1994 from the filter cake/flue ash disposal area, debris landfill, and oil shack area to assist in identifying areas of the Hanna Furnace site on which to focus the PSA (see Figure 3). Twenty of the samples were analyzed for PCBs by immunoassay, and all 36 samples were analyzed for arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and silver. PCBs were not detected in the surface soil samples. Metals results were similar to those reported in the 1988 site characterization (Table 8).

2.3.2 Shenango Steel Mill

The following subsections describe investigations and actions related to PCBs at the Shenango Steel Mill.

2.3.2.1 Shenango Steel Investigation. In 1993, NYSDEC Region 9 Spill Response received a call from an informant indicating a transformer near the Hanna Furnace property had been dismantled to salvage its copper, and transformer oil had been spilled (NYSDEC, 1993b). A site visit by NYSDEC located the transformer site on the foundation of the former Shenango Steel Mill, northeast of the Union Ship Canal. In addition to the transformer location, an adjacent former utility structure (sump) was found to contain oil floating on water. Soil at the transformer location (two samples) and the oil from the nearby subsurface structure (one sample) were tested on-site using a PCB immunoassay screening kit. One soil sample tested positive for PCBs and was shipped off-site for laboratory analysis for PCBs. The laboratory detected greater than 50 mg/kg of the PCB Aroclor-1260 in the sample.

In addition, 17 55-gallon drums and 25 5-gallon pails were observed in the weeds near the transformer area. The drums were removed during the PCB removal action (see Subsection 2.3.2.2).

2.3.2.2 PCB Removal Action from Shenango Steel Property. Based on the results of the PCB sampling in 1993 and the identification of floating oil product and several waste containers on the Shenango Steel property, NYSDEC initiated a removal

action to mitigate potential threats to human health and the environment from these materials. NYSDEC performed the removal action of the drums and PCB spill area in April 1994. The removal action consisted of excavation of visually-contaminated soil and debris in the PCB spill area, and collection and off-site disposal of drums and pails on the Shenango Steel property.

During the drum removal, five composite samples and four discrete samples were collected by NYSDEC to characterize the contents of the drums and pails for disposal purposes. Samples were analyzed for flashpoint, PCBs in oil (USEPA 4-81-045), Toxicity Characterstic Leaching Procedure (TCLP) VOCs, TCLP metals, petroleum hydrocarbon fingerprinting (NYSDOH 310.13), PCBs (USEPA 8080) and percent chlorine. PCB analyses detected PCB (Aroclor-1260) concentrations up to 16.6 μg/L. Petroleum hydrocarbon fingerprinting showed the material sampled was similar to lubricating oil. TCLP metals analysis detected barium (up to 3.4 mg/L) and lead (up to 151 mg/L); lead results exceeded the definition of a toxicity characteristic hazardous waste. TCLP VOCs detected were methyl ethyl ketone (MEK, also known as 2-Butanone) (up to 12.9 mg/L), tetrachloroethene (PCE) (up to 12.4 mg/L), tetrachloroethene (TCE) (up to 17 mg/L), and benzene (up to 6.1 mg/L); benzene, PCE, and TCE concentrations exceeded the definition of a toxicity characteristic. Flashpoints ranged from 74 to 127°F, identifying the materials as ignitability-characteristic hazardous wastes.

2.3.2.3 NYSDEC Surface Soil Sampling. NYSDEC collected a 27 surface soil samples. In May 1994 at the Shenango Steel Mill to assist in identifying areas of the Shenango Steel Mill on which to focus the PSA (NYSDEC, 1994d). Of these, 27 were analyzed for PCBs by immunoassay and eight were analyzed for arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and silver. Results for the 27 surface soil samples collected at the Shenango Steel Mill are summarized in Table 9.

Results from the Shenango Steel Mill samples indicated that PCBs remained in site soils at concentrations exceeding 50 mg/kg (the limit to define the material as hazardous waste), and show that metals concentrations in soil are present at concentrations similar to the results of surface soil at the Hanna Furnace site.

2.4 SITE WALKOVER

On December 14, 1993, the following ABB-ES and NYSDEC personnel conducted a site walkover of the Hanna Furnace site and the Shenango Steel Mill.

SITE WALKOVER ATTENDEES

NAME	TITLE	AFFILIATION/TELEPHONE
Cynthia J. Talbot	Project Manager	ABB Environmental Services (207) 775-5401
Brian K. Butler	Site Manager	ABB Environmental Services (207) 775-5401
Ralph T. Keating, P.E.	Environmental Engineer II	NYSDEC Division of Hazardous Waste Remediation (518) 457-9538
Dave Locey	Environmental Engineer I	NYSDEC Region 9 Division of Hazardous Waste Remediation (716) 851-7220
Kevin Glaser	Sanitary Construction Inspector I	NYSDEC Region 9 Division of Hazardous Waste Remediation (716) 851-7220

Due to the cold temperatures during the walkover, a photoionization detector (PID) brought to the site by ABB-ES for air monitoring did not work properly. The walkover was performed using a lower explosive limit (LEL)/oxygen (O_2) meter and radiation detector to monitor site conditions. Both instruments indicated background throughout the walkover. The site walkover consisted of visual inspection of the landfill areas and former building locations for the purpose of observing potential materials and locations to be sampled, and the location of the PCB removal action.

The walkover identified that at least one former underground utility (sump) contained oil-like liquids. Evidence of transformer wrecking (e.g., remains of transformer cases and transformer cooling fins) was observed on the both Shenango Steel Mill and Hanna Furnace site. Several empty or partially full 55-gallon containers were observed on the ground in the vicinity of the oil shack area in the center of the Hanna Furnace site and at a concrete and brick utility building located at the Shenango Steel Mill. The seven monitoring wells installed previously at the

Hanna Furnace site (see Figure 3) as part of the Site Characterization and Environmental Assessment by Recra Environmental Inc. in 1988 could not be found during the walkover and are presumed to have been destroyed.

2.5 FILE REVIEW

ABB-ES reviewed files at various local, state, and federal agencies and offices to develop information to support a reclassification or delisting of the site and to help prepare the scope of work for this PSA field investigation.

On December 14, 1993, Cynthia Talbot and Brian Butler of ABB-ES and the NYSDEC project manager Ralph Keating met Dave Locey of NYSDEC Region 9 and reviewed the Region 9 files for the Hanna Furnace site. Region 9 files did not include any specific information on the Shenango Steel Mill.

On December 15, 1993, Brian Butler of ABB-ES visited the following offices in Buffalo and East Aurora to collect property ownership, aerial photograph, and soil information concerning the site:

- Buffalo Tax Assessor's Office
- Erie County Soil and Water Conservation District Office

Between March 14 and 17, 1994, Brian Butler and Sharon Secovich of ABB-ES and Mark Mecca and Robert Cunningham of YEC, Inc. (YEC) reviewed available records at the following offices in Albany, New York:

- NYSDOH
- NYSDOT Mapping Services Bureau
- NYSDEC Division of Hazardous Waste Remediation
- NYSDEC Division of Water Resources
- NYSDEC Division of Solid and Hazardous Waste

- NYSDEC Division of Air Resources
- NYSDEC Division of Fish and Wildlife, Natural Heritage Program Office
- NYSDEC Division of Environmental Enforcement
- NYS Library, State Archive Office
- State University of New York Library, Albany Campus

The information collected at these sources is summarized in the site history, site description, and previous investigations discussions presented earlier.

2.6 SUMMARY OF DATA RECORDS SEARCH AND ASSESSMENT FINDINGS

The following subsections summarize data gathered prior to PSA field investigations for the Hanna Furnace site and Shenango Steel Mill, and present assessments of hazardous waste deposition, significant threat, and reclassification.

2.6.1 Hanna Furnace Site

The purpose of the PSA for the Hanna Furnace site is to review all available information on the site and, if possible, recommend reclassification of the site from Class 2a, as described in Section 1.0. Assessment of available information focused on identification of hazardous waste deposition, and the assessment of any potential significant threats the site poses to public health and the environment.

2.6.1.1 Hazardous Waste Deposition. Under federal and NYS regulations for the identification and listing of hazardous wastes, a solid waste is regulated as a hazardous waste if it exhibits a characteristic of corrosivity, reactivity, ignitability, or toxicity. Federal and state regulations set forth specific criteria for determining if a material exhibits one of these characteristics. If a material exhibits one of the characteristics it is commonly referred to as a "characteristic hazardous waste." A solid waste may also be regulated as a hazardous waste if it is a material included in one of USEPA's or NYSDEC's lists of hazardous waste (6 NYCRR Part

371.4(a)(1)). If a material is regulated because of its inclusion on a federal or state list, it is commonly referred to as a "listed hazardous waste." No listed waste has been documented at the Hanna Furnace site.

The regulatory criteria for defining a material as a characteristic hazardous waste or a listed PCB-contaminated hazardous waste is summarized in Table 10. Analytical results of samples from the Hanna Furnace site and Shenango Steel Mill are compared to these criteria.

Previous investigations identified the potential for waste materials disposed on the Hanna Furnace site to be characteristic hazardous wastes (Recra, 1988). In particular, the total concentrations of barium, cadmium, lead, mercury, and selenium in surface soil and sediment in some areas of the site in the previous studies were high enough to be characteristic hazardous wastes by the EPTOX metals test. EPTOX lead concentrations in two composite samples (one surface soil composite from the oil shack area and one sediment composite from the Union Ship Canal) were 3.3 and 1.3 mg/L, respectively, showing the potential for individual, discrete locations to exceed the limit of 5 mg/L. Arsenic, barium, cadmium, and chromium were also detected in composite sample EPTOX analyses, but at concentrations less than 1 mg/L.

Previous studies also detected the presence of cyanide in site soil at concentrations up to 180 mg/kg (Recra, 1988). These results were interpreted in the previous studies to be high enough to exceed the reactivity test for characteristic hazardous waste.

It is worth noting that some materials potentially disposed of at the Hanna Furnace site are specifically defined in 6 NYCRR Part 375 as solid wastes and are excluded from being defined as a hazardous waste. These materials include solid wastes generated from the extraction, benification, and processing of ores and minerals, including air pollution control dust/smudge from iron blast furnaces and iron blast furnace slag (6 NYCRR Part 371.1(e)(2)(vi)('1'and 'm')].

Studies of waste disposal practices by the iron and steel industry have been completed by the USEPA (USEPA, 1979). These studies have shown that solid wastes from blast furnaces (e.g., ammonia still lime sludge, coke breeze, mine refuse, blast furnace slags, blast furnace sludges, blast furnace dusts, and precipitator

baghouse dusts), and groundwater affected by these wastes, typically have pHs in the range of 5 to 12.5, and that chemical analyses of these wastes typically contain oil, phenols, lead, cyanide, and chromium. The USEPA studies do not specifically identify any of these solid wastes as hazardous wastes.

2.6.1.2 Assessment of Significant Threat. Results of previous investigations, both during and since cessation of Hanna Furnace operations, indicate that the site poses potential for significant threat to human health and the environment. Significant threat is defined by exceedances of NYS Water Quality Standards and Guidance Values in accordance with 6 NYCRR Part 375. In particular, the following exceedances were identified for the Hanna Furnace site:

- Cyanide and phenolic concentrations reported in the Hanna Furnace Corporation Waste Management Report (Rupley, Bahler, and Blake, 1979a) exceed NYS Class C surface water standards for both the pond adjacent to the debris landfill and the Union Ship Canal.

- PCB concentrations reported in the Site Characterization and Assessment Report (Recra, 1988) for the pond adjacent to the debris landfill and potentially the Union Ship Canal exceed NYS Class C surface water standards.

- Arsenic, chromium, copper, cyanide, lead, and phenol concentrations and pH of groundwater reported in the Site Characterization and Assessment Report (Recra, 1988) exceed NYS Class GA groundwater standards.

2.6.1.3 Reclassification Assessment. Based on existing data, ABB-ES was unable to recommend reclassification of the Hanna Furnace site at completion of the records search and assessment portion of the PSA because (1) the presence of listed or characteristic hazardous waste had not been confirmed; and (2) potential threat to public health and the environment established for the Hanna Furnace site according to 6 NYCRR Part 375 could not be attributed to disposal of a hazardous waste. ABB-ES recommended that additional investigations (PSA Tasks 3 and 4) be performed to assess whether hazardous waste is present at the Hanna Furnace site, and whether the Hanna Furnace site poses a potential significant threat to human health and the environment.

2.6.2 Shenango Steel Mill

The purpose of the PSA for the Shenango Steel Mill is to review all information on the site and, if possible, recommend listing the Shenango Steel Mill on NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites. Assessment of available information focused on identification of hazardous waste deposition, and the assessment of any significant threat the site poses to human health or the environment.

2.6.2.1 Hazardous Waste Deposition. As discussed in Subsection 2.6.1.1, a solid waste may also be regulated as a hazardous waste if it is a material included in one of USEPA's or NYSDEC's list of hazardous waste. Materials on these lists are commonly referred to as "listed hazardous wastes". A summary of criteria for characteristic wastes and PCB-listed wastes is presented in Table 10.

According to 6 NYCRR Part 371.4(a)(1), PCB soil contamination, resulting from spills at concentrations exceeding 50 mg/kg, constitutes listed hazardous waste B007 (NYSDEC, 1995). PCB concentrations above 50 mg/kg have been detected in soil and debris on the Shenango Steel property. Contents of drums/pails removed from the site were identified as toxicity-characteristic and ignitability-characteristic hazardous wastes. These materials do not remain at the site.

2.6.2.2 Assessment of Significant Threat. No surface water or groundwater data are associated directly with the Shenango Steel property: therefore, ABB-ES cannot determine significant threat in accordance with 6 NYCRR Part 375 on this portion of the site.

2.6.2.3 Classification Assessment. The records search and assessment concludes that the Shenango Steel Mill remains contaminated with a listed hazardous waste (PCB - B007 listed hazardous waste) after the NYSDEC removal action and that there were no existing data on which to base determination of potential significant threat to public health and the environment. ABB-ES recommends that additional investigations (PSA Tasks 3 and 4) be performed to assess the extent of hazardous waste present at the Shenango Steel Mill and the degree to which it poses a significant threat.

TABLE 1

SPECIES OF CONCERN
TIFFT FARM NATURE PRESERVE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

SPECIES STATUS	COMMON NAME	SCIENTIFIC NAME
Special Concern	Common Loon	*Gavia immer*
	Least Bittern	*Ixobrychus exilis exilis*
	Cooper's Hawk	*Accipiter cooperii*
	Black Tern	*Chlidonias nigra surinam.*
	Common Nighthawk	*Chordeiles minor*
	Eastern Bluebird	*Sialia sialis*
	Blue Spotted Salamander	*Ambystoma laterale*
	Jefferson Salamander	*Am. jeffersonianum*
Threatened Species	Osprey	*Pandion halioetus carol.*
	Red-Shouldered Hawk	*Buteo lineatus*
	Northern Harrier	*Circus cyaneus hudsonius*
	Common Tern	*Sterna hirundo hirundo*
	Blandings Turtle	*Emys blandingii*
Endangered Species	Peregrine Falcon	*Falco perigrinus anatum*
	Bald Eagle	*Halioetus leucocephalus*

TABLE 2

SUMMARY OF PREVIOUS INVESTIGATIONS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

DATE OF STUDY	STUDY TITLE AND PURPOSE	SUMMARY OF FINDINGS
HANNA FURNACE SITE		
1970	Interagency Task Force Report	Identifies landfill on northern part of site as potentially containing "substantial quantities of hazardous materials." Detail is not provided.
1978	Erie County Department of Environment and Planning inspection (ECDEP, 1982)	Identifies solid waste disposal practices and locations of disposal.
1979	Hanna Furnace Corporation, Solid Waste Management Facility Report (Rupley, Bahler, and Blake, 1979a)	Identifies solid wastes disposed at facility and includes some analytical data. Supports solid waste management facility permit application.
1982	Inactive Site Profile Report (ECDEP, 1982)	Study consisted of review of existing data and recommended that no further monitoring of the site was warranted, and that the site has little to no hazard potential.
1983	Inactive Hazardous Waste Disposal Site Report (NYSDEC, 1983)	Identifies the Hanna Furnace landfill as Site No. 915029.
1983	Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites (USEPA, 1985)	Study included installation of seven test borings in landfill portion of site north of canal.
1986	Phase I Investigation (Engineering-Science, 1986)	Estimation of Hazard Ranking System score based on existing data (site scored at $S_M = 8.73$; $S_{FE} = 0$; and $S_{DC} = 50$). Review of SPDES permit obtained by Hanna Furnace for discharge of treated wastewater to canal. Recommended Phase II to be performed to characterize landfilled wastes, sample groundwater, surface water and sediment, and to estimate the volume of wastes on-site.

TABLE 2

SUMMARY OF PREVIOUS INVESTIGATIONS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

DATE OF STUDY	STUDY TITLE AND PURPOSE	SUMMARY OF FINDINGS
1988	Site Characterization and Environmental Assessment (Recra Environmental, Inc., 1988) - site characterization and an environmental assessment relative to the transfer of past Hanna Furnace property to the City of Buffalo, at the request of the NYSDOT	Detailed review of site history. Field sampling and analysis program including surface soil sampling, surface water sampling, sediment sampling, soil borings, monitoring well sampling, permeability testing, and surveying. Site soils and sediment found to contain elevated concentrations of oil and grease, arsenic, chromium, copper, lead, ammonia, and cyanide. Groundwater at the site exceeds class GA standards for arsenic, chromium, lead, phenols, cyanide, and pH. Hazard Ranking System score revised (site scored at 5_m = 12.23; S_{FE} = 0; and S_{DC} = 50).
1990	Hanna Furnace Fire Area Sampling (NYSDEC, 1990)	Two samples were collected for PCB analysis: one composite sample of soil from an area where a fire had occurred and believed to be the site of transformer wrecking; one sample of "oil stained soil" from near a suspected former transformer pen in the southwest corner of the site. Results for the samples were non-detect.
SHENANGO STEEL MILL		
1993	Transformer Wrecking Area Sampling (NYSDEC, 1993c)	Memorandum detailing PCB sampling results from reported transformer wrecking site, Shenango Steel Property.
1994	PCB Removal Action and Sampling (NYSDEC, 1994d)	Analysis of surface soil throughout Hanna Furnace and Shenango Steel for PCBs and selected inorganics. PCB concentrations are shown to exceed 50 mg/kg at Shenango Steel Property. PCBs not detected at Hanna Furnace. Surface soils contain elevated concentrations of lead, selenium, mercury, and barium.

Notes:

ECDEP = Erie County Department of Environmental Planning
mg/kg = milligrams per kilogram
NYSDEC = New York State Department of Environmental Conservation
NYSDOT = New York State Department of Transportation
PCB = polychlorinated biphenyls
SPDES = State Pollution Discharge Elimination System
USGS = U.S. Geological Survey

TABLE 3

ANALYTICAL RESULTS
1979 WASTE MANAGEMENT STUDY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	FLUE ASH FILTER CAKE	POND SAMPLE	UNION SHIP CANAL SAMPLE	NYS CLASS C SURFACE WATER QUALITY STANDARD
Total Iron as FeO3	43.57%	NA	NA	N/A
Iron, soluble	NA	5.2 mg/L	1.09 mg/L	0.3 mg/L
Phosphorous pentoxide	0.076%	NA	NA	N/A
Manganous oxide	0.34%	NA	NA	N/A
Silica	9.96%	NA	NA	N/A
Alumina	1.81%	NA	NA	N/A
Calcium oxide	3.45%	NA	NA	N/A
Magnesia (MgO)	2.05%	NA	NA	N/A
Carbon	30.10%	NA	NA	N/A
Cyanides, chlorine amenable	NA	<0.01 mg/L	<0.01 mg/L	0.0052 mg/L
Cyanides, total	NA	<0.01 mg/L	0.02 mg/L	0.0052 mg/L
Ammonia	NA	0.41 mg/L	0.13 mg/L	N/A
Phenolics	NA	0.004 mg/L	0.004 mg/L	0.001 mg/L
pH	8.7	NA	NA	$6.5 \leq pH \leq 8.5$

Notes: NA = not analyzed
N/A = not applicable
% = percent
mg/L = milligrams per liter

TABLE 4

SURFACE AND SUBSURFACE SOIL ANALYTICAL RESULTS
1988 SITE CHARACTERIZATION

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	SURFACE SOIL - OIL SHACK AREA (5 SAMPLES)	SURFACE SOIL - SOUTHERN HALF OF SITE (14 SAMPLES)	SURFACE SOIL - NORTHERN HALF OF SITE (10 SAMPLES)	SUBSURFACE SOIL (14 SAMPLES)
Arsenic	23 to 38	2.1 to 32	5.6 to 13	1.5 to 25
Chromium	22 to 120	7.1 to 4,700	14 to 75	4.2 to 46
Copper	640 to 2,600	15 to 640	25 to 260	ND to 66
Lead	410 to 6,500	21 to 3,300	39 to 6,020	ND to 260
PCBs	ND to 0.560 Aroclor-1260	ND to 0.074 Aroclor-1260; ND to 0.39 Aroclor-1242; ND to 1.3 Aroclor-1254	ND to 0.530 Aroclor-1254; ND to 0.23 Aroclor-1260	ND
Oil and Grease	3,900 to 271,000	320 to 81,000	340 to 21,000	180 to 1,960
Cyanide	12 to 180	ND (<0.6) to 370	ND to 63	ND (<0.6) to 220
Phenols	ND to 5.6	ND to 1.5	ND to 2.8	ND
Ammonia (μg NH_3-N/g)	25 to 94	ND(<16) to 110	ND(<16) to 68	30 to 380

Notes: All results are in milligrams per kilogram (mg/kg).
ND = Parameter not detected.

Sample Index Key: (Recra Environmental, Inc., 1988)
Oil Shack Area = Samples SS-25 through SS-29.
Southern Half = Samples SS-11 through SS-24.
Northern Half = Samples SS-1 through SS-10.
Subsurface Soil = From borings SB-2, SB-3, SB-4, SB-5, SB-6, and SB-9; saturated and unsaturated zone samples.

TABLE 5

EPTOX RESULTS FOR COMPOSITE SURFACE SOIL SAMPLES
1988 SITE CHARACTERIZATION

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	USEPA REGULATORY LIMIT	DEBRIS/ LANDFILL AREA COMPOSITE	OIL SHACK AREA COMPOSITE	ONE STORAGE AREA COMPOSITE	CANAL COMPOSITE
Arsenic	5.0	ND	ND	ND	0.007
Barium	100	0.12	0.61	0.19	0.72
Cadmium	1.0	0.023	0.085	0.015	0.032
Chromium	5.0	ND	0.005	ND	ND
Lead	5.0	0.31	3.3	0.14	1.3
Mercury	0.2	ND	ND	ND	ND
Selenium	1.0	ND	ND	ND	ND
Silver	5.0	ND	ND	ND	ND

Notes: All results are in milligrams per liter (mg/L)
ND = Parameter not detected

Sample Index Key: (Recra, Environmental, Inc., 1988)

Debris/Landfill Area	=	Sample Comp-1: SS-3 through SS-9
Oil Shack Area	=	Sample Comp-2: SS-25, 26, 27, 29
One Storage Area	=	Sample Comp-3: SS-11 through SS-17, SS-28
Canal Composite	=	Sample Canal Comp: Single Grab

TABLE 6

SEDIMENT ANALYTICAL RESULTS
1988 SITE CHARACTERIZATION

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	POND AREA SEDIMENT (1 SAMPLE)	CANAL SEDIMENT (3 SAMPLES)
Arsenic	11	22 to 33
Chromium	29	77 to 80
Copper	74	130 to 200
Lead	130	650 to 1,440
Cyanide	3.7	28 to 130
PCBs	170 µg/kg Aroclor-1260	230 to 470 µg/kg Aroclor-1248; 150 to 260 µg/kg Aroclor-1260
Oil and Grease	290	14,200 to 19,000
Ammonia	ND	ND to 110
Phenols	ND	ND to 2.1

Notes: All results are in milligrams per kilogram (mg/kg) unless indicated.
ND = Parameter not detected

Sample Key: (Recra, Environmental, Inc., 1988)
Pond Area Sediment: Sample SS-1
Canal Sediment: Composite of A,B,C

TABLE 7

SURFACE WATER AND GROUNDWATER ANALYTICAL RESULTS
1988 SITE CHARACTERIZATION

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	POND SURFACE WATER (1 SAMPLE)	CANAL SURFACE WATER (3 SAMPLES)	GROUNDWATER (7 SAMPLES)	NYS CLASS C	NYS CLASS GA
Arsenic	ND	ND	ND to 130	190	25
Chromium	ND	ND to 10	ND to 140	*	50
Copper	20	ND to 6	ND to 450	*	200
Lead	ND	ND	ND to 350	*	25
Phenols	ND	ND	ND to 20	1	1
PCBs	1.3 µg/L Aroclor-1248; 0.85 µg/L Aroclor-1254	Traces (≤0.01) Aroclor-1260 detected	Traces (≤0.01) Aroclor-1260, Aroclor-1242 detected	0.001	0.1
Cyanide	ND	ND	ND to 490	5.2	100
pH	NA	NA	8.93 to 9.56	6.5≤X≤8.5	6.5≤pH≤8.5
Ammonia	ND	ND	180 to 2,300	NA	NA
Oil and Grease	ND	ND	ND	NA	NA

Notes: All results (except pH) are in µg/L.
ND = Parameter not detected
NA = Parameter not analyzed
* = pH-dependant variable

TABLE 8

ANALYTICAL RESULTS
1994 NYSDEC SURFACE SOIL SAMPLING - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	FILTER CAKE/FLUE ASH AREA	LANDFILL	OIL SHACK AREA
No. of Samples	10	6	20
PCBs (immunoassay)	NA	NA	ND
Arsenic	39-77	48-62	44-80
Barium	2,680-4,760	2,300-3,400	2,600-11,800
Cadmium	23-34	12-28	11-39
Chromium	35-110	20-50	7-30
Copper	97-240	79-260	5-2,700
Lead	3,450-18,250	1,100-3,310	480-5,400
Mercury	ND-0.3	ND-0.3	ND-3.2
Nickel	28-110	32-80	14-79
Selenium	108-220	120-200	120-910
Silver	ND	ND	ND

Notes: All results are in mg/kg.
ND = Parameter not detected
NA = Parameter not analyzed

TABLE 9

ANALYTICAL RESULTS
1994 NYSDEC SURFACE SOIL SAMPLING
SHENANGO STEEL MILL

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	FOUNDRY AREA	POTENTIAL TRANSFORMER SITES	PCB SPILL AREA
No. of Samples	8 (3 for PCBs)	4 (PCBs only)	15 (PCBs only)
PCBs (immunoassay)	ND	ND	ND >500
Arsenic	25-58	NA	NA
Barium	650-11,390	NA	NA
Cadmium	3-40	NA	NA
Chromium	5-27	NA	NA
Copper	5-3,300	NA	NA
Lead	100-5,800	NA	NA
Mercury	ND-108	NA	NA
Nickel	6-49	NA	NA
Selenium	40-340	NA	NA
Silver	ND	NA	NA

Notes: All results are in mg/kg.
ND = Parameter not detected
NA = Parameter not analyzed

TABLE 10
HAZARDOUS WASTE CRITERIA SUMMARY

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PARAMETER	REGULATORY CRITERIA[1]	EPA HAZARDOUS WASTE NO.
EPTOX Metals		
Arsenic	5.0 mg/L	D004
Barium	100.0 mg/L	D005
Cadmium	1.0 mg/L	D006
Chromium	5.0 mg/L	D007
Lead	5.0 mg/L	D008
Mercury	0.2 mg/L	D009
Selenium	1.0 mg/L	D010
Silver	5.0 mg/L	D011
Ignitability	Flash Point < 60°C	D001
Corrosivity	2 ≤ pH ≥ 12.5 or corrodes steel as defined by test	D002
Reactivity	Explosive, reacts with water, forms toxic gases due to sulfide or cyanide	D003
PCBs	> 50 mg/kg	B007

Notes:

(1) Source: 6 NYCRR Part 371; "Identification and Listing of Hazardous Waste"; January 31, 1992.
mg/L = milligrams per liter
mg/kg = milligrams per kilogram
EPTOX = Extraction Procedure Toxicity
PCBs = polychlorinated biphenyls

3.0 SCOPE OF WORK

The field investigation program was designed to document the presence or absence of hazardous wastes on-site at the Hanna Furnace site and Shenango Steel Mill and assess whether or not the areas pose a significant threat to public health and the environment. The program included a geophysical survey, surface water/sediment sampling, surface soil sampling, subsurface soil sampling (from test pits and soil borings), sump and drum sampling, and groundwater sampling.

Soil borings, monitoring well installations, and test pit excavations were completed by Advanced Drilling Investigations (ADI) of Niagara Falls, New York under contract to, and under the supervision of, ABB-ES. Analytical samples were submitted for analysis to ABB-ES' subcontractor, NYTEST Environmental, Inc. (NYTEST), of Port Washington, New York, a NYS Environmental Laboratory Approval Program (ELAP)-approved analytical laboratory. All samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), SVOCs, pesticides/PCBs, and inorganics. Selected samples were also analyzed for EPTOX metals, and for ignitability, corrosivity, and reactivity.

ABB-ES performed the field investigation in accordance with the Quality Assurance Program Plan (QAPP) (ABB-ES, 1994c) and the site-specific Work Plan and Quality Assurance Project Plan (QAPjP) (ABB-ES, 1994d). Quality Control (QC) procedures for sample handling and sample shipment are presented in Section 5.0 of the QAPP; data validation requirements are presented in Section 8.0. QC sample frequencies are presented in the QAPjP. Health and safety procedures for all on-site activities are presented in the Program Health and Safety Plan (HASP) (ABB-ES, 1994b) and the site-specific HASP (ABB-ES, 1994d).

3.1 HANNA FURNACE SITE

The following subsections describe the activities performed during the field investigation portion of the PSA at the Hanna Furnace site. Locations of samples collected during this PSA are shown on Figure 4. A summary of the areas, types of samples collected, and the analytical program is included in Table 11. Field data sheets, including surface water/sediment sampling records, soil sampling records, drum sampling records, sump sampling records, boring logs, monitoring well installation diagrams, well development logs, and groundwater sampling records are presented in Volume II. The geophysical survey and elevation survey reports are also included in Volume II.

3.1.1 Environmental Sampling

Environmental sampling at the Hanna Furnace site consisted of remote sensing, air monitoring, drum sampling, sump liquid and sediment sampling, surface soil sampling, sampling of subsurface soil from test pits, and surface water and sediment sampling. The following subsections describe these activities.

3.1.1.1 Remote Sensing. A geophysical survey was performed as part of the field investigation of the debris landfill at the Hanna Furnace site. The geophysical survey consisted of magnetometer and terrain conductivity surveys at the debris landfill to evaluate whether metallic or conductivity anomalies were present that might be interpreted to indicate the presence of ferrous materials (such as drum nests) or conductive wastes which may represent potential hazardous waste. Test pits were located near anomalies indicated by the survey. Both of the geophysical surveys were conducted during the week of October 4, 1994 by ABB-ES. The surveys consisted of establishing a 10-by-10 foot grid over an approximate 1,100-foot by 300-foot area of the landfill. The magnetometer survey collected magnetic gradient and total magnetic field readings, and the terrain conductivity survey recorded quadrature and in-phase readings. See Volume II for a discussion of the geophysical surveys.

3.1.1.2 Air Monitoring. During environmental sampling at the Hanna Furnace site, air monitoring was performed with a Therm-Environmental Model 580B PID, with an ISC Model MX-241 LEL/O_2 meter, and with a MIE-PDM 3 respirable dust monitor to assess whether the concentrations present at the site during sampling posed a threat to health and safety.

PID results are presented for each sampling location, by medium, in the following subsections. During all sampling activities, LEL/O_2 and PID readings in the breathing zone at each location were background. That is, explosive, oxygen deficient, or volatile atmosphere conditions were not encountered at the site. Dust monitoring was performed during test pit excavation and drilling activities and did not show increases in dust levels at work areas due to site activities.

3.1.1.3 Drum Samples. Two samples (WT-101 and WT-102) were collected at drums located north of the oil shack area of the site on October 13, 1994 (Figure 4). At WT-101, the drum itself was not opened but a black to dark brown oil-like material was sampled that had oozed out and hardened beside the drum. PID readings of WT-101 were 0.5 to 1 parts per million (ppm). The sample was collected with a stainless-steel spoon and composited (except for the VOC sample) before being placed into the sample containers. The sample at WT-102, a brown to light brown, soft, viscous material, was of the drum contents itself and was also collected using a stainless-steel spoon. PID readings of WT-102 were background. The two spoons used to collect both drum samples were discarded rather than being decontaminated due to the gross contamination from the samples. The samples were submitted for laboratory analysis for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, and hazardous waste characteristics.

3.1.1.4 Sump Liquid and Sediment Samples. ABB-ES personnel collected eight co-located sump/structure liquid and sediment samples (CD/CL-101 through CD/CL-108) from the oil shack area during the week of October 10, 1994. Liquid samples were collected using a stainless Pack-bomb sampler, a Teflon® disposable bailer, or by filling the containers directly, depending on access to the sampling site and depth and thickness of the liquid. Sump sediment samples were collected with a bucket auger. Samples were submitted for laboratory analysis as detailed in Table 11. During characterization, sump liquid samples were screened for water quality parameters (temperature, pH, specific conductivity, dissolved oxygen (DO), turbidity, and salinity) with a Horiba® U-10 water quality monitor. Water quality parameters for sump liquid samples are summarized in the following table.

WATER QUALITY PARAMETERS - OIL SHACK AREA SUMPS

SUMP SAMPLE	TEMPERATURE (°C)	pH	SPECIFIC CONDUCTIVITY (mS/cm)	DO (mg/L)	TURBIDITY (NTUs)	SALINITY (%)
CL-101	10°	8.2	3.27	2.8	5	0.1
CL-102	7.3°	8.3	2.4	NA	2	0.1
CL-103	NA	8.1	3.13	NA	13	0.08
CL-104	NA	8.8	1.8	NA	49	0.04
CL-105	NA	7.8	0.805	6.1	8	0.01
CL-106	NA	9.9	1.81	NA	2	0.04
CL-107	NA	12.3	2.6	16.3	5	0.06
CL-108	NA	9.5	1.96	NA	17	0.05

Notes:

NA	=	not analyzed
°C	=	degrees centigrade
mS/cm	=	milliSeimens per centimeter
mg/L	=	milligrams per liter
NTUs	=	nephelometric turbidity units
%	=	percent

CD/CL-101 was collected from an open, oil/water separator-like structure along a former plant roadway between ruins of the former casting house and the boiler plant (Figure 4). The structure itself is 4 feet by 4 feet square and approximately 5 feet deep. The sediment layer was very thin (approximately 0.1 foot thick), and released a sheen when disturbed. The structure was full of black liquid. Probing with the bucket auger identified several protrusions along the sump walls potentially indicating the presence of piping. PID readings during sampling were at background levels.

CD/CL-102 was collected from an open manhole in a building ruin between former blast furnaces No. 3 and No. 4. The samples are believed to represent floodwaters from a building basement. The contents and extent of the basement are unknown. The "floor" of the basement is approximately 9 feet below the rim of the manhole; a deeper hole (sediment trap) was encountered beneath the manhole. Water in the basement was encountered at 8 feet below the rim of the manhole. PID readings of the liquid and sediment were at background levels.

CD/CL-103 was collected from the ruined basement of the former casting house. CD-103 was actually collected from an unknown piece of heavy machinery abandoned in the basement. Sample CD-103 consisted of a black, soft, fine-grained material with a sweet fuel-like odor and oily texture grabbed with the bucket auger from a hole cut in the machine. CL-103 consisted of water flooding the open basement in which several pieces of machinery (similar to the CD-103 sample) were standing. PID readings of the liquid and sediment were at background levels.

CD/CL-104 was collected from a concrete-walled open trench west of the casting house ruins and in line with CD/CL-101. The trench contained 0 to 1 feet of liquid (water) over approximately 1.5 to 2.5 feet of soil or sediment. The sediment was brown with a faint fuel-like odor. PID readings of the liquid and sediment were at background levels.

CD/CL-105 was collected from a 8- by 9-foot by 7-foot-deep structure believed to be a valve pit, located at a two-story brick building east of the casting house ruins. The structure contained approximately 1 foot of sediment covered by 3 feet of water. The structure is open to the surface, and contained piping and debris. The liquid was cloudy with some floating oil on the surface. The sediment was black with a fuel-like odor. PID readings of the liquid and sediment were at background levels.

CD/CL-106 was collected from a trench adjacent to a building ruin immediately south of former blast furnace No. 3. The trench contained approximately 1 foot of water over 0.5 feet of sediment. The liquid had a pH of 9.9, a specific conductivity of 1.81 mS/cm, and turbidity of 2 NTUs. The sediment was a black, fine-grained material. PID readings of liquid and sediment were at background levels.

CD/CL-107 was collected from an open structure on the south side of the former railroad car building south of the location of former blast furnace No. 4. The structure is 3 by 4 feet by 13 feet deep and is open to the surface. The liquid in the structure appeared to be flowing, entering and exiting through piping not visible from the ground surface. The structure contained approximately 6 feet of water over 1 foot of sediment. The liquid had a sour or bitter odor. The sediment was black, gave off a sheen when disturbed, and had a sweet, petroleum-like odor. PID readings of the liquid and sediment were at background levels.

CD/CL-108 was collected from an open trench at the ruins/foundation of the boiler plant, located south of the oil shack building. The trench is approximately 3 feet wide and 6 feet deep, and contains approximately 8 inches of water over 1.5 feet of sediment. PID readings of the liquid and sediment were at background levels.

3.1.1.5 Surface Soil Sampling. During the week of October 10, 1994, ABB-ES personnel collected 14 surface soil samples (SS-101 through SS-114) from the filter cake/flue ash disposal area and debris landfill, and the oil shack area portions of the site (see Figure 4). The surface soil samples were collected using stainless steel spoons and buckets. At each location, soil samples were collected from just below the soil surface to approximately 1 foot bgs. Soil for TCL VOC analysis was collected first and placed directly into VOC soil jars. Enough material for all other analyses was collected and homogenized in a bucket; soil was then placed into appropriate containers for analysis for TCL SVOCs, pesticides/PCBs, inorganics, and hazardous waste characteristics - ignitability, reactivity, corrosivity, and EPTOX metals (see Table 11). Samples were screened with a PID for the presence of VOCs during the sampling activities. The sample description, location, and additional observations were recorded on sample record sheets. PID readings greater than 0 ppm were not measured by ABB-ES personnel during the sampling activities. Sampling locations and sampling rationale for each area are discussed in the following subsections.

Filter Cake/Flue Ash Disposal Area and Debris Landfill. Samples SS-101 through SS-104 (and SS-101 duplicate) were collected to characterize filter cake/flue ash disposed at this portion of the Hanna Furnace site and to assess whether the material is a characteristic hazardous waste. The filter cake/flue ash is a black, dry, friable dust. The material is unvegetated and the area is crossed with off-road vehicle tracks. PID readings of the samples were at background levels (0 ppm).

Samples SS-105 through SS-108 were collected from the sloped sides of the landfill to characterize the shallow material. The material sampled was generally a black, sandy material with a metallic luster, with some scrap metal, slag, and organic matter (roots). PID readings of the samples were at background levels.

Oil Shack Area. Surface soil samples SS-109 through SS-114 were collected from the oil shack area to assess whether surficial soils were characteristic hazardous wastes and to confirm contaminant concentrations identified in previous investigations.

SS-111 was collected in duplicate. Sample SS-109 was collected in the vicinity of the boiler plant ruins. Samples SS-110 through SS-114 were collected between the ruins of blast furnace No. 2 and the oil shack where previous investigations had detected significant concentrations of inorganics and where transformer cooling fins, insulators, and other electrical components had been observed during the walkover (see Subsections 2.3 and 2.4 and Figure 2). Soil/material sampled consisted of gray to brown or black gravelly silt or fine sand with some slag and building debris (glass, concrete, and brick fragments). PID readings of the samples were at background levels.

3.1.1.6 Test Pits. Eight test pits (TP-101 through TP-108) were excavated by backhoe during the week of October 17, 1994 to investigate the debris landfill Area. The test pits were excavated to examine subsurface soils, assess horizontal and vertical distribution of shallow soil contamination, evaluate the nature of landfill materials, and determine whether hazardous waste was present. Excavations were placed at locations on the debris landfill to characterize anomalies that were detected during the geophysical survey (see Subsection 3.1.1.1). One sample from each test pit was collected and submitted for laboratory analysis for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, and hazardous waste characteristics. Samples from each test pit were selected from the most contaminated areas based on PID readings or visual evidence of contamination. Samples were collected directly from the backhoe bucket for VOC analysis; soils for all other analytical parameters were homogenized in a stainless-steel bucket before being placed into sample containers. Depths of the test pits ranged from 5 to 11 feet bgs. Field logs of the test pits were completed before backfilling and are included in Volume II. Soils encountered during the test pitting were in all cases fill material consisting of gravely sand, slag material, wood, bricks, and metal debris; natural in-place soils were not observed. Test pits TP-101 through TP-103 did not encounter groundwater, possibly because these were excavated in the thicker, higher, portions of the landfill. The remaining five test pits, excavated in the lower, more easterly and thinner portions of the landfill, encountered saturated (wet) conditions ranging from approximately 6 to 9 feet bgs. Elevated PID readings were not observed in any of the test pit excavations.

3.1.1.7 Surface Water and Sediment Samples. ABB-ES personnel collected seven surface water samples (SW-101 through SW-107) and six sediment samples (SD-101 through SD-105 and SD-107) during the week of October 10, 1994 (see Figure 4). At one location (SD-106), and despite numerous efforts, a sediment sample could not

be collected from the bottom of the canal. Similarly, sample SD-105 could not be collected from the canal; it was instead collected from a oil/water separator structure apparently discharging to the canal. Depending on each location's physical constraints, water samples were collected either by a Pack-bomb sampler or were directly collected into the sample containers. Surface waters were analyzed in the field for pH, temperature, conductivity, salinity, turbidity, and DO with a Horiba® Model U-10 water quality monitor. Sediment samples were collected either by stainless-steel spoons or by bucket auger, and were composited (except for the VOC sample) in the same manner as the surface soil samples. The water and sediment samples were submitted for laboratory analysis for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Additionally, the sediment samples were submitted for hazardous waste characteristics analysis. Sampling locations and rationale are discussed in the following subsections.

Debris Landfill. Surface water/sediment sample pairs SW/SD-101 and SW/SD-102 (and SW/SD-102 duplicates) were collected to characterize water and sediment in water-filled pits located along the southern edge of the debris landfill (Figure 4). These samples had been originally planned to be collected from the low area between the debris landfill and the filter cake/flue ash disposal area; however, this area was dry during the sampling event and the locations were moved to the pits with the approval of NYSDEC. The water-filled pits were sampled to characterize shallow groundwater/surface runoff migrating toward the Union Ship Canal from the debris landfill. PID readings of the samples were at background levels. Water quality parameters (pH, specific conductivity) were monitored in the field with the Horiba Model® U-10 water quality monitor. Results for SW-101 and SW-102 are presented in the following table.

SURFACE WATER QUALITY PARAMETERS - DEBRIS LANDFILL

PARAMETER	SW-101	SW-102
Temperature (°C)	13.3	11.6
pH	9.5	9.02
Specific Conductivity (mS/cm)	3.1	2.9
DO (mg/L)	8.5	8.9
Turbidity (NTUs)	5	117
Salinity (%)	0.13	0.23

Notes:

°C	=	degrees centigrade
mS/cm	=	milliSeimens per centimeter
mg/L	=	milligrams per liter
NTUS	=	nephelometric turbidity units
%	=	percent

Union Ship Canal. Surface water/sediment samples SW/SD-103 through SW/SD-105, SW-106, and SW/SD-107 were collected from along the periphery of the Union Ship Canal to confirm previous sampling results, identify if discharges to the canal from site storm sewers or other piping are contamination migration pathways, and to assess whether the site poses a potential significant threat to the environment. SW/SD-103 was collected at the southeastern corner of the canal at a discharge point believed to be the former outfall of the wastewater treatment plant. The outfall is an open trench leading from the treatment plant ruins and contains milky-white sediment. SW/SD-103 was collected to characterize water in the canal at the discharge and characterize a delta of the sediment deposited in the corner of the canal. SW/SD-104 was collected at the northeastern corner of the canal where outfall and water intake pipes are located.

SW/SD-105 was collected along the southern wall of the canal at a structure believed to be an oil/water separator. SW-105 was collected from the canal immediately at the outfall discharge. SD-105 was planned to have been collected from the canal; due to the depth of the canal, no sample of sediment could be collected. SD-105 was instead collected to characterize sediment contained within the separator structure. This sediment was a black, soft material and caused a sheen on the water when disturbed.

SW-106 was collected from along the northern wall of the canal adjacent to the filter cake/flue ash disposal area. A sediment sample could not be collected at this location.

SW/SD-107 was collected between the site and Buffalo Inner harbor (Lake Erie) on the west side of NYS Route 5 to characterize surface water and sediment downgradient of the site.

All PID readings of surface water and sediment samples were at background levels. Field screening of surface water samples for water quality parameters was performed. Results are summarized in the following table.

SURFACE WATER QUALITY PARAMETERS - UNION SHIP CANAL

PARAMETER	SW-103	SW-104	SW-105	SW-106	SW-107
Temperature (°C)	NA	12.1	8.2	8.7	8.4
pH	8.6	7.9	8.6	8.1	8.6
Specific Conductivity (mS/cm)	0.97	0.443	1.0	0.532	0.95
DO (mg/L)	NA	11.6	NA	NA	NA
Turbidity (NTUs)	20	14	2	3	2
Salinity (%)	0.03	0.01	0.03	0.03	0.03

Notes:

°C	=	degrees centigrade
mC/cm	=	milliSeimens per centimeter
mg/L	=	milligrams per liter
NTUS	=	nephelometric turbidity units
%	=	percent
NA	=	not analyzed

3.1.2 Subsurface Investigation

The subsurface investigation at the Hanna Furnace site included installation of soil borings and monitoring wells.

3.1.2.1 Soil Borings. Soil borings were drilled at three areas of the Hanna Furnace site. The purposes of the soil borings were to establish whether the subsurface soil was contaminated by previous disposal activities, to characterize subsurface geology, and to allow for monitoring well installation. Seven test borings (MW-101 through MW-107) were drilled using 4.25-inch inside diameter (ID) hollow-stem augers. Drill cuttings were not containerized, but were spread on the ground surface at each exploration location. The borings were sampled continuously to completion using a standard 2-inch outside diameter, 2-foot long split-spoon sampler driven by a 140-pound hammer dropped 30 inches, following the American Standard for Testing and Materials Standard D-1586. The borings were advanced to 15 feet bgs, approximately 8 feet below the water table.

ABB-ES personnel visually examined the soil as each split-spoon sampler was opened. Samples were described using the Unified Soil Classification System (USCS). A PID was used to screen the soil samples for the presence of VOCs as each split-spoon sampler was opened. The sample description and classification, PID split-spoon readings, split-spoon sampler blow counts, and drilling observations were recorded on the exploration boring logs (Volume II) and in the field boring notebook.

Seven subsurface soil samples were collected from the borings (one per boring) for laboratory analysis for TCL VOCs, SVOCs, and pesticides/PCBs. Samples were selected for laboratory analysis based on visual and olfactory observations, with priority to collect samples from below the water table. Soil boring details and sampling rationale are discussed in the following paragraphs.

Filter Cake/Flue Ash Disposal Area and Debris Landfill. Soil borings MW-101, MW-102, and MW-103 were drilled to characterize subsurface soils and fill at this portion of the Hanna Furnace site. MW-101 and MW-103 were drilled adjacent to the filter cake/flue ash disposal area and the debris landfill, respectively. MW-102 was drilled northeast of the debris landfill at a location believed to represent background conditions.

At MW-101, fill, composed of black, dark grey, light grey, and green/brown fine grained material with some slag and brick fragments, was encountered to 15 feet bgs. PID readings were not obtained from the material. No odors or other evidence of organic chemical contamination were observed. A sample of black-to-grey material was collected for chemical analysis from 4 to 6 feet bgs.

MW-102 was drilled along the paved Shenango Steel Mill access road to characterize upgradient/background soil conditions. Fill, composed of grey-to-brown and black gravelly sand and silt, was encountered to 8 feet bgs. Fill material from 4 to 8 feet bgs had elevated PID readings (up to 95 ppm) and sweet, fuel-like odors. Based on the PID readings and fuel odors, the material was homogenized for laboratory analysis. Soil, composed of gravelly silt to silty gravel, was encountered deeper than 8 feet bgs.

MW-103 was drilled immediately downgradient (south) of the highest portion of the debris landfill, near water-filled pits sampled as SW/SD-101 and SW/SD-102. Fill, similar to that encountered at MW-101 was observed to 8 feet bgs. Black to dark brown organic silt grading downward to grey-brown silt was encountered below the fill. A sample of the black to dark brown organic silt was collected at 8 to 10 feet bgs for off-site laboratory analysis. PID readings were not obtained from the boring.

Oil Shack Area. Soil borings MW-104 through MW-107 were drilled at the oil shack area to characterize subsurface soils and fill. MW-104 was drilled along the southern site boundary to characterize upgradient/background conditions. At MW-104, fill layers composed of coal ash, yellow-to-orange and black sand, and cemented white sand were encountered to 10 feet bgs. Peat (buried marsh deposits) were encountered to approximately 12.5 feet bgs. A grey sandy silt was encountered below the peat. A sample of fill was collected from 6 to 8 feet bgs for laboratory analysis. All PID readings were at background levels.

MW-105 was drilled at the ruins of the boiler plant. Fill, comprised of dark to light brown silty sand, brick and concrete rubble, and blue to white angular sand/slag, was observed to 10 feet bgs. Dark brown to black peat was encountered to approximately 13 feet bgs. Gray silt was encountered below 13 feet bgs. A sample of the blue and white angular material was collected from 8 to 10 feet bgs for laboratory analysis.

MW-106 was drilled between the ruins of blast furnace No. 2 and a two-story brick building where electrical components (transformer cooling fins and insulator debris) were observed on the ground surface. Fill, comprised of black, brown, rusty brown, blue, pinkish white, and chalky sand-like material containing gravel and slag, and ash-like material, was encountered to 15 feet bgs. A sample of pinkish white or tan material was collected from 10 to 12 feet bgs for laboratory analysis. PID readings were not obtained from the boring.

MW-107 was drilled in an open area between the oil shack and the iron ore storage area. Fill, comprised of black, dark brown, and reddish tan ash, sand, gravel, and metallic slag, was observed to approximately 4 feet bgs; peat was encountered from 4 to 10 feet bgs. Blue gray and brown silt and silty clay were observed deeper than 10 feet bgs. A sample of blue gray and brown dense silt was collected from 12 to 14 feet bgs to characterize subsurface soil at this location. PID readings were not obtained from the boring.

3.1.2.2 Monitoring Wells and Groundwater Sampling. The monitoring well installation and groundwater sampling program for the Hanna Furnace site was designed to provide groundwater data for comparison to NYS Class GA groundwater quality standards, set forth under 6 NYCRR Parts 700-705 (NYSDEC, 1991a; NYSDEC, 1993c), and to evaluate if the site poses a significant threat to public health and the environment, as defined by 6 NYCRR Part 375. Additionally, water levels measured from the newly installed wells were used to characterize the direction of groundwater flow at the site. Monitoring wells were installed in the borings as described in Subsection 3.3.

Monitoring Well Installation. A total of seven monitoring wells were installed in the soil borings (MW-101 through MW-107) at the Hanna Furnace site. The following table presents the completed well installation details.

MONITORING WELL INSTALLATION DETAILS - HANNA FURNACE SITE

MONITORING WELL	TOTAL DEPTH/ DEPTH OF FILL[1]	SCREENED INTERVAL[1]	RATIONALE
MW-101	15/≥15	5-15	Located adjacent to the filter cake/flue ash disposal area to determine impact to groundwater quality.
MW-102	15/10.5	5-15	Located northeast of the debris landfill to assess background conditions.
MW-103	15/8	5-15	Located adjacent to the debris landfill to determine impact to groundwater quality.
MW-104 MW-105 MW-106 MW-107	15/10 15/10 15/≥15 15/4	5-15 5-15 5-15 5-15	Three of these four wells (MW-105, MW-106, MW-107) assess groundwater quality at potential source areas at the oil shack, boiler house, and segregation basins. MW-104 was placed to assess background groundwater quality.

Notes:

1 feet below ground surface

The monitoring wells were constructed using 2-inch ID, threaded, flush-joint, Schedule 40 polyvinyl chloride (PVC), with 10-foot lengths of 0.006-inch machine-slotted well screens. The well screens were installed with the intent of having the screens placed 2 feet above and 8 feet below the groundwater table. A silica sand filter pack of either 0 or 00-grade was placed around the well screen and extended a minimum of 1 foot above the top of the screen. A bentonite pellet seal was placed above the sand filter pack, saturated with water and allowed to swell before the final bentonite-cement grout was placed. The remaining annular space from the bentonite pellet seal to the ground surface was filled with bentonite-cement grout. Wells were completed with above-ground steel protective casings, locking caps, and protective bucking posts.

Monitoring Well Development. The monitoring wells were developed by the drilling subcontractor under the supervision of ABB-ES personnel by the pump- and surge-technique. Well development purge water was allowed to infiltrate the ground at each well location. Well development was considered complete when turbidity

measurements were 50 NTUs units or less, when alternative criteria and procedures presented in Subsection 4.7 of the QAPP were met, or when approved by NYSDEC.

Groundwater Sampling. ABB-ES personnel sampled the seven new monitoring wells at the Hanna Furnace site on November 29, 1994. Groundwater sampling activities followed the QC procedures for sample handling, tracking, and shipping presented in Section 5.0 of the QAPP. A minimum of three well volumes were purged from each well with a bailer or peristaltic pump before sampling. Field measurements of the water quality parameters pH, temperature, specific conductivity, turbidity, DO, and salinity were recorded for each volume purged and were recorded on field data records, included in Volume II. Groundwater samples were collected using a Teflon bailer and nylon bailer line (replaced for each well) following the procedures described in Subsection 4.6.1 of the QAPP (ABB-ES, 1994c). Groundwater samples were sent to the analytical laboratory for analysis of TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. The sampling and analysis program is summarized in Table 10. Water quality parameter results are summarized in the following table.

GROUNDWATER QUALITY PARAMETERS - HANNA FURNACE SITE

WELL	TEMPERATURE (°C)	pH	SPECIFIC CONDUCTIVITY (mS/cm)	DO (mg/L)	TURBIDITY (NTUs)	SALINITY (%)
MW-101	11.4	12.3	5.8	1.2	8	0.3
MW-102	11.5	7.5	0.6	1.1	0	0.02
MW-103	10.8	8.9	2.72	0.5	5	0.13
MW-104	11.3	11.3	0.832	0.6	2	0.03
MW-105	12.3	9.5	0.452	0.7	5	0.01
MW-106	10.3	10.6	0.79	1.2	9	0.03
MW-107	10.0	6.7	1.2	3.7	0	0.1

Notes:

°C = degrees centigrade
mS/cm = milliSeimens per centimeter
mg/L = milligrams per liter
NTUs = nephelometric turbidity units
% = percent

Water quality results show groundwater at the site is generally basic (has a pH greater than 7) with the highest groundwater pH in MW-101 adjacent to the filter cake/flue ash disposal area. The pH of groundwater in MW-101 is close to the limit of 12.5 that would classify the groundwater as a caustic hazardous waste. This well also had the highest specific conductivity and salinity.

3.1.3 HRS Score

ABB-ES completed an HRS score of the Hanna Furnace Site based on existing data. The score methodology and results are documented in a separate report titled "Hazard Ranking System Score - Hanna Furnace Site, Buffalo, New York: (ABB-ES, 1995).

3.2 SHENANGO STEEL MILL

The following subsections describe the activities performed during the field investigation portion of the PSA at the Shenango Steel Mill. Locations of samples collected during this PSA are shown on Figure 4. A summary of areas, types of samples collected, and the analytical program is included in Table 12. Field data sheets, including soil sampling records, sump sampling records, boring logs, monitoring well development logs, and groundwater sampling records are presented in Volume II.

3.2.1 Environmental Sampling

Environmental sampling at the Shenango Steel Mill consisted of air monitoring, sump liquid and sediment sampling, and surface soil sampling. The following subsections describe these activities.

3.2.1.1 Air Monitoring. Air monitoring at the Shenango Steel Mill was performed as described in Subsection 3.1.1.2 for the Hanna Furnace site.

3.2.1.2 Sump Liquid and Sediment. ABB-ES personnel collected one liquid/ sediment sample pair (CD/CL-109) from the Shenango Steel Mill property during the week of October 10, 1994. CD/CL-109 was collected from a 2.5-foot-diameter, 12.5-foot-deep open catch basin located adjacent to the Shenango Steel Mill building

ruins and at the location of the PCB-contaminated area sampled previously by NYSDEC. The structure is made of galvanized steel culvert pipe. Approximately 0.5 feet of oil product and 2 feet of water were found in the structure over approximately 0.5 feet of sediment. Water was believed to be entering and exiting the structure during sampling, based to the sound of running water in the structure. The liquid was not monitored for water quality parameters due to the presence of floating product. PID readings were not obtained.

3.2.1.3 Surface Soil Sampling. Surface soil samples SS-115 through SS-125 (and SS-115 duplicate) were collected from the Shenango Steel Mill to confirm recent NYSDEC metals and PCB sampling results and to assess whether surface materials were listed or characteristic hazardous wastes. SS-115 (and duplicate) were collected from a low area east of the PCB spill area and near where several drums of material were removed by NYSDEC (see Subsection 2.3.2.2). SS-116 was collected to characterize a patch of black oily soil where the drums of material had been removed. Sample SS-117 was collected from a low area between the PCB area and the railroad tracks (south of SS-115). Sample SS-118 was collected from the lowest point of the PCB removal action excavation to confirm PCB concentrations. SS-119 was collected to characterize soil within the ruins of the Shenango Steel Mill building. SS-120 was collected from a low area between two fenced areas believed to have been electrical substation locations or transformer pens. SS-121 and SS-123 were collected from soil in Shenango Steel Mill ruins west of the PCB spill area. SS-122 was collected to characterize surface soil at a steel storage building. SS-125 was collected in a portion of the Shenango Steel Mill where railroad tracks had been located. SS-124 was collected southeast of the mill ruins in an area of railroad tracks to potentially confirm site background conditions. All surface soil samples had PID readings at background levels.

3.2.2 Subsurface Investigation

The subsurface investigation at the Shenango Steel Mill consisted of the installation of soil borings and monitoring wells.

3.2.2.1 Soil Borings. The purposes of the test borings were to establish that the subsurface soil was contaminated by previous disposal activities, to characterize subsurface geology, and to allow for monitoring well installation. Three test borings

(MW-108 through MW-110) were installed and sampled as described in Subsection 3.1.2.1.

Three subsurface soil samples were collected from the borings (one per boring) for laboratory analysis for TCL VOCs, SVOCs, and pesticides/PCBs. Samples were selected for laboratory analysis based on visual and olfactory observations with priority to collect samples from below the water table. Soil boring details and rationale are discussed in the following paragraph.

Borings MW-108, MW-109, and MW-110 were drilled to assess subsurface conditions at Shenango Steel Mill in the vicinity of the PCB spill area. Boring MW-108 was drilled in the low area northeast of the PCB spill area (near surface soil sample SS-116) where drums had been removed by NYSDEC. Fill, consisting of black sandy silt, coal ash and slag, was observed to 8 feet bgs. Gray silty fine sand and gray silt were observed below the fill. A sample of black, fine-grained fill was collected from 6 to 8 feet bgs for laboratory analysis. PID readings were not obtained from the boring.

MW-109 was drilled within the ruins of the Shenango Steel Mill building where it was believed soil would be encountered from the ground surface (no foundation at depth); the boring encountered brown, gray, and black gravel, gravelly silt, and ash fill to 9 feet bgs. The initial boring met refusal, believed to be building foundation, at 9 feet bgs. The boring was offset 5 feet and redrilled and advanced through the 9-foot interval to a final depth of 25 feet bgs. Fill was encountered to approximately 14 feet bgs; brown-to-gray silt was encountered below 14 feet bgs. A sample of fill was collected at 5 to 7 feet bgs for laboratory analysis. PID readings from the boring were at background levels.

Boring MW-110 was drilled between the PCB spill area and the Union Ship Canal to assess subsurface conditions at a location believed to be downgradient of MW-108 and MW-109. Fill consisting of black-to-silver sandy and gravelly material was observed to 8 feet bgs. Dark gray to gray silt and silty fine sand was encountered below 8 feet to boring completion at 20 feet bgs. A sample of silt was composited from 8 to 12 feet bgs in duplicate for laboratory analysis. PID readings were not obtained from the boring.

3.2.2.2 Monitoring Wells and Groundwater Sampling. The monitoring well installation and groundwater sampling program for the Shenango Steel Mill is as described in Subsection 3.1.2.2 for the Hanna Furnace site.

Monitoring Well Installation. A total of three wells were installed in soil borings (MW-108 through MW-110). The following tables presents the completed well installation details.

MONITORING WELL INSTALLATION DETAILS - SHENANGO STEEL

MONITORING WELL	TOTAL DEPTH/ DEPTH OF FILL[1]	SCREENED INTERVAL[1]	RATIONALE
MW-108 MW-109 MW-110	15/8 25/9 20/8	5-15 8-23 10-20	MW-109 and MW-110 were located to assess groundwater quality at the PCB spill area. MW-108 was placed where drums had been removed by NYSDEC.

Notes:

1 feet below ground surface

The monitoring wells at the Shenango Steel Mill were constructed and installed as described in Subsection 3.1.2.2 for the Hanna Furnace site.

Monitoring Well Development. The monitoring wells at the Shenango Steel Mill were developed as described in Subsection 3.1.2.2 for the Hanna Furnace site.

Groundwater Sampling. ABB-ES personnel sampled the three new monitoring wells at the Shenango Steel Mill on November 29, 1994. Groundwater sampling activities followed the QC procedures for sample handling, tracking, and shipping presented in Section 5.0 of the QAPP.

A minimum of three well volumes were purged from each well with a bailer or peristaltic pump before sampling. Field measurements of the water quality parameters pH, temperature, specific conductivity, turbidity, DO, and salinity were recorded for each volume purged and were recorded on field data records, included in Volume II. Groundwater samples were collected using Teflon bailer and nylon

bailer line (preplaced for each well) following the procedures described in Subsection 4.6.1 of the QAPP (ABB-ES, 1994c). Groundwater samples were sent to the analytical laboratory for analysis of TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. The sampling and analysis program is summarized in Table 12. Water quality parameter results are summarized in the following table.

GROUNDWATER QUALITY PARAMETERS - SHENANGO STEEL MILL

WELL	TEMPERATURE (°C)	pH	SPECIFIC CONDUCTIVITY (mS/cm)	DO (mg/L)	TURBIDITY (NTUs)	SALINITY (%)
MW-108	11.1	7.4	0.85	0.5	8	0.03
MW-109	11.6	10.8	1.2	0.5	4	0.05
MW-110	11.1	6.9	1.5	1.8	6	0.06

Notes:

°C	=	degrees centigrade
mS/cm	=	milliSeimens per centimeter
mg/L	=	milligrams per liter
NTUs	=	nephelometric turbidity units
%	=	percent

3.3 LABORATORY ANALYSIS AND DATA VALIDATION

The laboratory analytical program, described in detail in the Site Work Plan (ABB-ES, 1994d), was designed to provide the data necessary to establish whether or not hazardous wastes, as defined by 6 NYCRR Part 371, are present at the Hanna Furnace site and Shenango Steel Mill. In addition, the collection and analysis of groundwater samples was designed to provide the data necessary to evaluate whether the wastes disposed on-site pose a significant threat to human health or the environment, as defined by 6 NYCRR Part 375. The analytical procedures comply with the NYSDEC Analytical Service Protocols (ASP) (NYSDEC, 1991b).

Subsurface soil, surface soil, surface water, sediment, drum, sump liquid, sump sediment, and groundwater samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganic analytes. Selected samples were also analyzed for EPTOX metals, ignitability, reactivity, and corrosivity. QC samples were field

duplicates, equipment rinsate blanks, trip blanks, and matrix spike/matrix spike duplicate samples. NYTEST generated analytical results in accordance with protocols specified by NYSDEC for the NYS Superfund Program. The QC procedures outlined in the NYSDEC ASP provided a preliminary level of data quality assurance.

Analytical data were validated following procedures set forth in Section 8.0 of the QAPP. Validation was performed on the laboratory deliverables by experienced data reviewers and reviewed by the project chemist. The analytical protocols generated data of USEPA Contract Laboratory Program (CLP) Level IV data quality, adequate to support risk assessment, site characterization, evaluations of remediation alternatives, and engineering design.

Analytical results are included in Volume II in three table formats:

- Table 1 - Laboratory Report of Analysis - presents analytical results and qualifiers as reported by the laboratory.
- Table 2 - Validation Summary Table - presents analytical results with the appropriate data validation qualifiers.
- Tentatively Identified Compounds (TIC) Tables - presents additional compounds not included on the TCL, with the appropriate data validation qualifiers.

Analytical data qualifiers appear on each data table in Volume II, as appropriate, and have been applied by the laboratory or data validator. Data Evaluation and Data Usability reports are included in Volume II. Analytical data developed by ABB-ES during the PSA field investigation meet the data quality objectives (DQOs) set forth in the QAPjP and are suitable for site reclassification.

3.4 Elevation Survey and Base Map Preparation

After completion of the field investigation activities, Om P. Popli P.C., Consulting Engineers and Land Surveyors, performed a horizontal and vertical survey at the Hanna Furnace site and the Shenango Steel Mill. The purpose of the site survey was

to produce a site map indicating the locations of the site explorations and major site characteristics, including location of property boundaries.

For this survey, vertical elevation accuracy is 0.01 foot and horizontal accuracy is 0.1 foot. Horizontal positions are tied to the NYS Plane Coordinate System. Vertical elevations are tied to mean sea level, 1929 General Adjustment.

The surveyed items are:

- horizontal locations of 10 new monitoring wells;
- vertical elevations of monitoring wells including top of riser, top of the protective casing, and the ground surface;
- major site characteristics including the edge of paved areas, building or foundation corners, and the outline of the Union Ship Canal;
- property boundaries based on tax map data; and
- locations of seven collocated surface water/sediment samples, nine sump samples, two drum samples, 25 surface soil samples, and eight test pits.

The survey map and accompanying survey Control Report are included in Volume II.

TABLE 11
SAMPLING AND LABORATORY ANALYSIS SUMMARY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL			
Surface Soil (SS-101 through SS-108)	8	Shovel, stainless-steel spoon and bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Subsurface Soil - Test Pits (PS-101 through PS-108)	8	Backhoe bucket, stainless-steel spoon and bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics
Subsurface Soil - Soil Borings (BS-101 through BS-103)	3	Split spoon sampler	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics
Surface Water/Sediment in Pits (Sample pairs SW/SD-101 and SW/SD-102)	2 Surface Water 2 Sediment	Surface water collected by filling containers directly: Sediment collected with bucket auger.	Surface water: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity. Sediment: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Groundwater (MW-101 through MW-103)	3	Bailer/peristaltic pump	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.

TABLE 11
SAMPLING AND LABORATORY ANALYSIS SUMMARY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
OIL SHACK AREA			
Surface Soil (SS-109 through SS-114)	5	Shovel, stainless-steel spoon/bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Sump liquid/sediment sample pairs (CL/CD-101 through CL/CD-108)	8 Liquid samples 8 Sediment samples	Liquid samples collected with bailer, Pack-bomb sampler, or by filling containers directly. Sediment samples collected with bucket auger, stainless-steel spoon, bucket.	Sump liquid: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity. One liquid sample (CL-107) analyzed for Ignitability, Reactivity, Corrosivity, EPTOX Metals. Sump sediment: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Drum Samples (WT-101 and WT-102)	2	Stainless-steel spoon	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Subsurface Soil - Soil Borings (BS-104 through BS-107)	4	Split-spoon sampler	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics
Groundwater (MW-104 through MW-107)	4	Bailer/peristaltic pump	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.

TABLE 11
SAMPLING AND LABORATORY ANALYSIS SUMMARY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
UNION SHIP CANAL			
Surface Water (SW-103 through SW-107)	5	Pack-bomb sampler or by filling containers directly	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.
Sediment (SD-103, SD-104, SD-107 collected from canal; SD-105 collected from oil/water separator)	4	Bucket auger, stainless steel	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.

Notes:

TCL	=	Target Compound List
VOC	=	volatile organic compound
SVOC	=	semivolatile organic compound
PCB	=	polychlorinated biphenyl
EPTOX	=	Extraction Procedure Toxicity
DO	=	dissolved oxygen

TABLE 12
SAMPLING AND LABORATORY ANALYSIS SUMMARY - SHENANGO STEEL MILL

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
Surface Soil (SS-115 through SS-125)	11	Shovel, stainless-steel spoon, bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Sump liquid/sediment sample pair (CL/CD-109)	1 Sump liquid sample 1 Sump sediment sample	Liquid - pack-bomb sampler. Sediment - bucket auger, stainless-steel spoon and bucket.	Sump liquid: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics. Sump sediment: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Subsurface soil - soil borings (BS-108 through BS-110)	3	Split-spoon sampler	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics.
Groundwater (MW-108 through MW-110)	3	Bailer/peristaltic pump	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.

Notes:

TCL	=	Target Compound List
VOC	=	volatile organic compound
SVOC	=	semivolatile organic compound
PCB	=	polychlorinated biphenyl
EPTOX	=	Extraction Procedure Toxicity
DO	=	dissolved oxygen

4.0 SITE ASSESSMENT

This section describes the geology and hydrogeology of the site, and presents the laboratory analytical results and a contamination assessment summary for the Hanna Furnace site and the Shenango Steel Mill.

4.1 GEOLOGY AND HYDROGEOLOGY

The geology and hydrogeology of the Hanna Furnace site and Shenango Steel Mill are discussed in this subsection.

4.1.1 Geology

The Hanna Furnace site and Shenango Steel Mill are located in the Erie-Ontario Lowlands physiographic province of NYS in the City of Buffalo. Overburden is mapped as lacustrine silt and clay (USGS, 1983). Seven test borings completed at the Hanna Furnace site by USGS encountered fill from the ground surface to 13 feet bgs. The fill consists of industrial waste (i.e., fly ash, cinders, etc.), fine-to-coarse sand and brown silty clay. Underlying the fill are a black-brown organic clayey silt (USCS Class OL) and a lacustrine grey-brown clay to silty clay (USCS Class CL). A discontinuous layer of sand and/or gravel is located between the lacustrine silt and bedrock.

Bedrock at the site is the Middle Devonian, Levanna Shale member of the Skaneateles Formation, Hamilton Group (Recra, 1988; Rickard and Fisher, 1970). The Levanna Shale overlies the Marcellus Formation and the Onondaga Limestone. Bedrock ranges from 22 to 48 feet bgs, based on results of soil borings completed during a previous site assessment (Recra, 1988).

During the Hanna Furnace site and Shenango Steel Mill PSA, 10 soil borings and eight test pit explorations were completed to further define the geology. The newly-installed soil borings were advanced up to 23 feet bgs. All of the borings either terminated in fill material or lacustrine silt. Generally, the fill materials were encountered 8 to 15 feet bgs and consist of gravel, sand, demolition debris, bricks,

ash and slag material. Below the fill is a discontinuous peat deposit (USCS Class Pt) overlying a gray brown lacustrine silt (USCS Class ML).

4.1.2 Groundwater Hydrology

Groundwater is present in fill, overburden, and bedrock at the sites. The depth to the water table (groundwater in fill) is approximately 5 feet bgs (Erie County Department of Environment and Planning [ECDEP], 1982; Recra, 1988). A previous investigation at the Hanna Furnace site shows groundwater in fill and overburden flows toward the Union Ship Canal which bisects the site (Recra, 1998). This investigation used measurements from seven monitoring wells and the Union Ship Canal to characterize the direction and characteristics of groundwater flow. Groundwater seepage velocities in the vicinity of the Union Ship Canal were estimated to be between 0.0017 to 0.93 feet per day based on an estimated average porosity of 0.35, a hydraulic gradient of 0.013 to 0.046 feet per foot, and hydraulic conductivities of 1.6×10^{-5} to 2.5×10^{-3} centimeters per second (cm/sec).

An interpretation of groundwater flow conditions at the Hanna Furnace site and Shenango Steel Mill in the PSA is based upon water level observations obtained on November 29, 1994 from the 10 new monitoring wells and survey data from the Union Ship Canal. Water level observations are presented in the following table and on Figure 4 in feet above mean sea level (msl). Monitoring wells were placed in the PSA to confirm groundwater conditions described in the previous investigation. At the oil shack area, monitoring wells MW-104, MW-105, and MW-106 were placed roughly in a line extending from the Hanna Furnace site southern boundary toward the Union Ship Canal. MW-108, MW-109, and MW-110 were placed similarly in a rough line from the eastern boundary of the Shenango Steel Mill towards the canal.

WATER LEVEL DATA

MONITORING WELL	RISER ELEVATION	DEPTH TO WATER[1]	WATER ELEVATION
HANNA FURNACE SITE			
MW-101	585.17	6.73	578.44
MW-102	582.98	6.35	576.63
MW-103	582.56	4.35	578.21
MW-104	586.90	8.71	578.19
MW-105	586.03	7.79	578.24
MW-106	585.67	7.37	578.30
MW-107	582.09	5.60	576.49
SW-104	N/A	N/A	571.60
SHENANGO STEEL MILL			
MW-108	584.88	6.07	578.81
MW-109	587.60	7.80	579.8
MW-110	587.38	8.05	579.33

Notes:

1 measured in feet below top of riser
N/A not applicable

The groundwater table is encountered in the monitoring wells at between 576.49 and 579.8 feet msl, and the water level in the canal is approximately 571.6 msl. the water levels show that groundwater is present in fill at both the Hanna Furnace site and the Shenango Steel Mill. Where wells had been installed at the oil shack area of the Hanna Furnace site and the Shenango Steel Mill in lines toward the canal, water levels do not show consistent decreases in elevation. For example, in the MW-108/MW-109/MW-110 line, MW-108 has the lowest water level and is located the furthest from the canal. Similarly, at line MW-104/MW-105/MW-106, water levels decrease with distance away from the canal. The data suggest that groundwater flow in the fill overburden is perched over the underlying peat and

lacustrine silt deposits. Groundwater elevations are potentially higher in the vicinity of the Hanna Furnace and Shenango Steel Mill building ruins due to restricted flow in these areas caused by the building foundations (which extend below the water table) and/or increased infiltration of precipitation. The data also suggest groundwater not only flows toward the canal, but may flow towards topographically lower areas surrounding the sites such as the wetland areas located to the north and east.

4.2 ANALYTICAL RESULTS AND CONTAMINATION ASSESSMENT SUMMARY - HANNA FURNACE SITE

The following subsections summarize the analytical results and contamination assessment of the PSA activities performed by ABB-ES for the Hanna Furnace site. The subsections present the analytical results by site area as follows: filter cake/Flue ash disposal area and debris landfill (Subsection 4.2.1); oil shack area (Subsection 4.2.2); and the Union Ship Canal (Subsection 4.2.3). The complete analytical data tables, data validation information, and data usability evaluation are presented in Volume II. Surface soil and subsurface soil results of inorganic analyses are compared to NYS background and background for the eastern U.S. (Table 13).

4.2.1 Filter Cake/Flue Ash Disposal Area and Debris Landfill

The filter cake/flue ash disposal area and debris landfill are located on the north side of the Union Ship Canal. Environmental sampling consisted of collection of surface soil and subsurface soil samples to characterize wastes and fill materials, collection of surface water and sediment samples from water-filled pits adjacent to the landfill, and collection of groundwater samples to characterize groundwater quality.

4.2.1.1 Surface Soil Analytical Results. Four surface soil samples (SS-101 through SS-104) and a duplicate were collected from four locations in the filter cake/flue ash disposal area, and from four locations (SS-105 through SS-108) along the edges of the debris landfill (see Figure 7). Surface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics; EPTOX metals; and ignitability, corrosivity, and reactivity. Results of surface soil samples are presented in Table 14.

Surface soil PCB, TCL inorganics, and EPTOX metals results are summarized in Figure 7.

Tetrachloroethene (PCE) was detected in surface soil samples SS-101 (and duplicate) through SS-106 at concentrations ranging from 3 micrograms per kilogram (μg/kg) to 14 μg/kg. Ethylbenzene was detected in SS-108 at 2J μg/kg. Several TCL SVOCs were detected in samples SS-101 (and duplicate), SS-102, and SS-104 through SS-108 including naphtha compounds (such as 2-methylnaphthalene) and PAHs (such as benzo(a)pyrene). Naphtha compounds were only detected in the SS-101 duplicate. The highest concentrations of PAHs were detected in SS-105 and SS-106 collected from the debris landfill.

The PCB Aroclor-1260 was detected in every surface soil sample from the filter cake/flue ash disposal area and the debris landfill, at concentrations ranging from 18 to 310J μg/kg (See Figure 6). The TCL pesticides detected in samples SS-101, SS-105, SS-106, and SS-108 are 4,4'-DDE; endosulfan I; heptachlor; and methoxychlor (see Table 13). Pesticides were not detected in samples SS-101 duplicate, SS-102, SS-103, SS-104, and SS-107.

Twenty-three TCL inorganic analytes were detected in the surface soil samples collected from the filter cake/flue ash disposal area and the debris landfill (see Table 14). Inorganic data were compared to literature values for background concentrations of inorganics found in soil of NYS and the eastern U.S. (Table 13). The inorganics antimony, thallium, and cyanide do not have established NYS or eastern U.S. background ranges, although these inorganics were detected in most of the surface soil samples. The following inorganics are present in surface soil at concentrations exceeding NYS background levels: arsenic; beryllium; cadmium; calcium; chromium; copper; iron; lead; manganese; magnesium; mercury; nickel; selenium; vanadium; and zinc. Of these inorganics, the following exceed background levels for the eastern U.S.: iron, lead, manganese, and zinc. In general, the inorganics cadmium, chromium, copper, iron, lead, nickel, selenium, vanadium, and zinc are present in samples from the filter cake/flue ash disposal area at higher concentrations than in samples from the debris landfill area.

Surface soil EPTOX metals analyses show concentrations of arsenic (at 52 micrograms per liter [μg/L] in one sample), cadmium (up to 144J μg/L), chromium (up to 8.4J μg/L), lead (up to 1,630J μg/L), and silver (up to 6.1J μg/L).

Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.1.2 Subsurface Soil Analytical Results. Subsurface soil samples PS-101 through PS-108 were collected from eight test pit excavations (TP-101 through TP-108) from 5 to 11 feet bgs to characterize debris landfill material. Subsurface soil samples BS-101 through BS-103 were collected from three soil borings (MW-101 through MW-103). Soil boring MW-102 was drilled to characterize background soil conditions and is located off the Hanna Furnace site at the western corner of the adjacent Shenango Steel Mill property. As described in Subsection 3.3.1, conditions encountered during drilling of MW-102 (fuel odors and PID readings greater than background) suggest this boring may not represent background as originally intended. Subsurface soil was collected from soil borings MW-101 and MW-103 to characterize fill material adjacent to the filter cake/flue ash disposal area and the debris landfill, respectively. All subsurface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Subsurface soil sample analytical results are presented in Table 15 (test pit samples) and Table 16 (soil boring samples), and analytical results are summarized in Figure 8.

Test Pit Sample Results. The TCL VOCs acetone (up to 6J μg/kg), benzene (up to 2J μg/kg), carbon disulfide (up to 2J μg/kg), ethylbenzene (up to 3J μg/kg), toluene (up to 2J μg/kg), and xylenes (up to 2J μg/kg) were detected sporadically in the test pit samples (see Table 15). Nineteen TCL SVOCs were detected in the test pit samples, with the highest concentrations and numbers of SVOCs in samples PS-104 and PS-104 duplicate. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates.

The PCBs Aroclor-1248 and Aroclor-1260 were detected in test pit samples PS-101, PS-102, PS-103, PS-105, PS-106, and PS-107, at concentrations ranging from 68J μg/kg to 260 μg/kg (See Figure 8). The only TCL pesticide detected was endrin ketone in samples PS-103 and PS-105, at concentrations up to 7.8J μg/kg (Table 15).

Twenty TCL inorganic analytes were detected in the test pit samples collected from the debris landfill. The following inorganics are present in debris landfill material at concentrations exceeding NYS background levels: beryllium, cadmium, calcium, chromium, copper, iron, lead, manganese, magnesium, mercury, nickel, vanadium,

and zinc (see Figure 8). Of these inorganics, the following exceed background levels for the eastern U.S.: iron and lead.

Soil Boring Sample Results. The TCL VOCs acetone (100J μg/kg) and 2-butanone (23J μg/kg) were detected in sample BS-103, and ethylbenzene (2J μg/kg) was detected in sample BS-102 (see Table 15). No VOCs were detected in sample BS-101 (see Table 16). Fifteen TCL SVOCs were detected in the soil boring samples with the highest concentrations and number of SVOCs in sample BS-102. The SVOCs detected are PAHs and naphtha compounds, similar to those in test pit samples. No TCL pesticides/PCBs were detected in soil boring samples at the filter cake/flue ash disposal area or the debris landfill.

Twenty-one TCL inorganic analytes were detected in the soil boring samples collected from the filter cake/flue ash disposal area and debris landfill (see Table 16). The following inorganics are present in soil boring samples at concentrations exceeding NYS background levels: aluminum, arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc (see Figure 8). Of these inorganics, the following exceed background levels for the eastern U.S.: aluminum, lead, manganese, potassium, and zinc.

4.2.1.3 Surface Water/Sediment Analytical Results. Two surface water/sediment sample pairs (SW/SD-101 and SW/SD-102) and a duplicate were collected from two open, water-filled pits at the southern limit of the debris landfill. The samples were collected to assess the nature and distribution of contaminants potentially migrating from the landfill via surface runoff or shallow groundwater movement. Several similar water-filled pits were observed in the landfill itself, and along the southern limit. Surface water and sediment samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Sediment samples were also analyzed for EPTOX metals and ignitability, corrosivity, and reactivity. Surface water results and sediment results are presented in Tables 17 and 18, respectively. Sample locations and interpretive analytical results are summarized in Figures 9 (surface water) and 7 (sediment).

Surface Water Results. The only TCL VOC detected in the surface water samples was acetone (see Table 17). TCL SVOCs, pesticides, and PCBs were not detected in the samples. TCL inorganics detected in the samples were aluminum, arsenic,

barium, calcium, copper, lead, magnesium, potassium, sodium, and zinc. Surface water results were compared to NYS Class C surface water quality standards and guidelines to assess whether concentrations in these pits pose a potential significant threat to human health or the environment. The following analytes were detected at concentrations exceeding Class C standards or guidelines:

- Acetone (at up to 21J μg/L in SW-102 and duplicate) exceeds the NYS Class C standard of 10 μg/L.
- Aluminum (at 148J μg/L in SW-101 and 225J μg/L in SW-102 duplicate) exceeds the NYS Class C standard of 100 μg/L.
- Lead (at 14.8J μg/L in SW-102 and 26.4J μg/L in SW-102 duplicate), exceeds the calculated NYS Class C standard of 13.5 μg/L (based on average hardness).
- pH (at 9.5 in SW-101 and 9.02 in SW-102) exceeds the NYS Class C standard of 8.5.

PCBs (Aroclor-1254 and Aroclor-1248) were detected in earlier surface water sampling in the low area (referred to as a "pond") near where SW-101 and SW-102 were collected (see Table 7) at concentrations exceeding the NYS Class C standard of 0.1 μg/L. ABB-ES was unable to collect surface water samples from this "pond" area during the PSA because it was dry. Instead, ABB-ES collected two samples (SW-101 and SW-102) from water-filled pits located along the base of the landfill, east of the "pond" area. A determination of whether PCBs are present in surface water from these pits is uncertain because the rinsate sample associated with the surface water samples contained detectable concentrations of PCBs (see Volume II, Section 5.0). However, the sediment samples, SD-101 and SD-102, collected from these pits were non-detect for PCBs.

Sediment Results. TCL VOCs, pesticides, and PCBs were not detected in the sediment samples. Fifteen TCL SVOCs were detected in samples SD-101, SD-102, and SD-102 duplicate, including naphtha compounds and PAHs (see Table 18). The highest concentrations and numbers of PAHs were detected in SD-102.

Twenty-one TCL inorganic analytes were detected in the sediment samples (see Table 18). Because the material was sampled from pits (e.g. holes) in the ground immediately adjacent to the landfill, and because the sediment visually appears to be the same as surface soil and fill at this part of the site, sediment inorganic data were compared to NYS and eastern U.S. background concentrations for soil (Table 13). The following inorganics are present in sediment at concentrations exceeding NYS soil background levels: arsenic; cadmium; calcium; chromium; copper; iron; lead; magnesium; mercury; nickel; and zinc (see Figure 7). Of these inorganics, the following exceed background levels for the eastern U.S.: iron and lead.

Sediment EPTOX metals analyses show leachable concentrations of barium (up to 549 μg/L), cadmium (up to 2.6J μg/L), chromium (up to 6.7J μg/L), and lead (up to 189J μg/L). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.1.4 Groundwater Analytical Results. Monitoring well MW-102 was sampled to assess background groundwater conditions at a location believed to be hydraulically upgradient of the debris landfill. As described in Subsection 3.1.2, conditions encountered during drilling of MW-102 (fuel odors and above background PID meter readings) may not represent background. MW-101 and MW-103 were installed at locations believed to be downgradient of the filter cake/flue ash disposal area and the debris landfill, respectively, to assess whether potential contamination identified in soil/fill materials was affecting groundwater quality. Results from groundwater samples were compared to NYS Class GA groundwater quality standards and guidelines to assess whether groundwater would pose a potential significant threat to human health or the environment. Groundwater analytical results are presented in Table 19 and Figure 9.

TCL VOCs and pesticides/PCBs were not detected in groundwater samples MW-101, MW-101 duplicate, samples MW-102 or MW-103. TCL SVOCs were not detected in MW-102 and MW-103. TCL SVOCs detected in sample MW-101 and duplicate were 2,4-dimethylphenol; 4-methylphenol; pentachlorophenol; naphthalene; and bis(2-ethylhexyl)phthalate (BEHP). TCL inorganics detected in the samples were aluminum, arsenic, barium, calcium, chromium, cyanide, iron, lead, magnesium, manganese, potassium, selenium, sodium, vanadium, and zinc. Of all of the analytes detected in groundwater from samples MW-101, MW-102, and MW-103, the

following analytes were detected at concentrations exceeding NYS Class GA groundwater quality standards or guidelines:

- Phenols (2,4-dimethylphenol; 4-methylphenol; and pentachlorophenol) in MW-101 and MW-101 duplicate exceed the NYS Class GA standard of 1 μg/L (total phenols).

- Cyanide (in MW-101 and MW-101 duplicate at up to 3,090 μg/L) exceeds the NYS Class GA standard of 100 μg/L.

- Iron (in MW-101, MW-101 duplicate, MW-102, and MW-103 at up to 1,730 μg/L) exceeds the NYS Class GA groundwater quality standard of 300 μg/L.

- Manganese (1,220 μg/L in MW-102) exceeds the NYS Class GA standard of 300 μg/L.

- The total concentration of iron and manganese in MW-101, MW-101 duplicate, MW-102, and MW-103 exceeds the combined NYS Class GA groundwater quality standard of 500 μg/L.

- Selenium (in MW-101 duplicate at 12.2J μg/L) exceeds the NYS Class GA groundwater quality standard of 10.0 μg/L.

- Sodium (in MW-101, MW-101 duplicate, and MW-103 at up to 191,000 μg/L) exceeds the NYS Class GA groundwater quality standard of 20,000 μg/L.

- pH (in 12.3 in MW-101 and 8.9 in MW-103) exceeds the NYS Class GA groundwater quality standard of 8.5.

4.2.1.5 Contamination Assessment Summary. The objectives of the PSA at the filter cake/flue ash disposal area and the debris landfill were to: (1) assess whether the filter cake/flue ash material was a characteristic hazardous waste and confirm previous analytical results; (2) characterize the contents of the debris landfill and assess whether the material was a characteristic hazardous waste or contained listed

waste; (3) characterize groundwater and surface water; and (4) assess whether the area posed a potential significant threat to human health or the environment.

Previous investigations (see Subsection 2.3.1) showed the following:

- Surface water ponded in a low area between the debris landfill and the filter cake/flue ash disposal area exceeded NYS Class C surface water criteria for iron, phenols, and cyanide (Rupley, Bahler, and Blake, 1979a,b,c).

- Subsurface soil (fill) exceeded NYS soil background levels for chromium, copper, iron, and lead (USGS, 1983).

- Surface soil (fill) exceeded NYS soil background levels for chromium, copper, and lead. The samples also contained PCBs, oil and grease, cyanides, and phenols. A composite soil sample analyzed for EPTOX metals from the filter cake/flue ash disposal area contained leachable concentrations of barium, cadmium, and lead, but all at less than regulatory limits for characteristic hazardous waste (Recra, 1988).

- Surface soil (fill) exceeded NYS soil background levels for arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and selenium (NYSDEC, 1994d).

The PSA investigation of the debris landfill showed that the landfill is comprised of fine-grained slag and other solid waste from blast furnace operations. The geophysical survey and test pitting did not detect any buried ferrous materials. PSA laboratory analysis of surface and subsurface samples from the filter cake/flue ash disposal area and debris landfill detected organic and inorganic contaminants including SVOCs (naphtha compounds, phenols, and PAHs), PCBs, and inorganics (see Tables 14 through 16). Inorganics detected at concentrations exceeding NYS background in PSA samples are arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, manganese, magnesium, mercury, nickel, selenium, vanadium, and zinc. EPTOX metals and ignitability, corrosivity, and reactivity test results do not indicate that characteristic hazardous wastes are at the filter cake/flue ash disposal area and debris landfill. In addition, PCB concentrations in soil/fill, and the pH of groundwater samples are less than hazardous waste regulatory criteria. The source

of the PCBs in surface soil samples has not been defined. The source of the alkaline pH (12.3 in MW-101) is believed to be interaction of the groundwater with the fill and/or filter cake/flue ash.

The filter cake/flue ash disposal area and the debris landfill may pose a potential threat to human health and the environment as: (1) groundwater analyses show several inorganic constituents (cyanide, iron, selenium, and sodium), phenols (2,4-dimethylphenol; 4-methylphenol; and pentachlorophenol), and pH in groundwater to exceed NYS Class GA groundwater quality standards; and (2) surface water analytical results from pits adjacent to the debris landfill show acetone, aluminum, and zinc concentrations to exceed Class C surface water quality standards. Additional Class C exceedances for phenols and inorganics are observed in the surface water sample (SW-106) collected from the edge of the Union Ship Canal adjacent to the filter cake/flue ash disposal area (see Subsection 4.2.3.1).

4.2.2 Oil Shack Area

The oil shack area is located on the south side of the Union Ship Canal and is composed of all of the former buildings, blast furnaces, and open areas surrounding the oil shack. Environmental sampling consisted of collection of wastes found in two drums, eight liquid/sediment sample pairs from underground structures and abandoned equipment, surface soil and subsurface soil samples to characterize soil and fill materials, and groundwater samples to characterize groundwater quality.

4.2.2.1 Drum, Sump Liquid, and Sump Sediment Analytical Results. Drum, sump sediment, and sump liquid sample results are presented in Tables 20, 21, and 22, and interpretive results are summarized in Figures 10 and 11. All samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. All drum and sump sediment samples, and sump liquid sample CL-107, were analyzed for EPTOX metals, ignitability, reactivity, and corrosivity.

Drum Sample Results. Samples from two drums (WT-101 and WT-102) were collected for laboratory analysis (see Table 20). Sample WT-101 (and duplicate) was actually collected from material that had flowed out of the drum and collected around the base of the drum on surface soil. The drum itself could not be sampled directly as the opening was too narrow for available sampling equipment. WT-102

was collected from a second drum nearby found lying on its side, open, and full of a viscous, brown, grease-like semisolid.

The TCL VOCs ethylbenzene (up to 170J μg/kg), toluene (up to 510J μg/kg), and xylenes (up to 3,000J μg/kg) were detected in WT-101 and duplicate (see Table 20). TCL VOCs were not detected in WT-102. TCL SVOCs were not detected in WT-101 and duplicate. The TCL SVOCs fluorene (1,400J μg/kg) and phenanthrene (8,700J μg/kg) were detected in sample WT-102. Endrin (160J μg/kg) was the only pesticide detected in the drum samples. PCBs were not detected. Twenty-two TCL inorganic analytes were detected in the drum samples collected from the oil shack area (see Table 20).

Drum sample EPTOX metals analyses show leachable concentrations of arsenic (up to 75J μg/L), barium (up to 431J μg/L), and lead (up to 1,380J μg/L) (see Figure 10). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

Sump Liquid Sample Results. Eight sump liquid samples (CL-101 through CL-108) and one duplicate were collected from the oil shack area for laboratory analysis (see Table 21). TCL VOCs, pesticides, and PCBs were not detected in any of the sump liquid samples. Seven TCL SVOCs detected in the samples were: isophorone, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, and diethylphthalate. Twenty-one TCL inorganic analytes were detected in the sump liquid samples collected from the oil shack area (see Table 21). In general, the samples with the highest concentrations and numbers of inorganics are CL-101 and its duplicate.

Sump liquid sample EPTOX metals analysis on CL-107 shows a leachable concentration of barium (22.8J μg/L). Concentrations are less than regulatory limits for characteristic hazardous waste. The liquid sample CL-107 was not determined to be ignitable, reactive, or corrosive, although the pH of the liquid was measured to be 12.3.

Sump Sediment Sample Results. Eight sump sediment samples (CD-101 through CD-108) and one duplicate were collected from the oil shack area for laboratory analysis (see Table 22). The TCL VOC ethylbenzene was detected in CD-105 at

4J μg/kg. TCL VOCs were not detected in any of the other sump sediment samples. Twenty-two TCL SVOCs were detected in the sump sediment samples, with the highest concentrations and numbers of SVOCs in CD-101 and CD-101 duplicate, CD-104, CD-105, and CD-106. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates. The TCL pesticides detected in sump sediment samples were 4,4'-DDT; aldrin; endosulfan I; endrin; endrin ketone; heptachlor epoxide; and gamma-chlordane. Twenty-two TCL inorganic analytes were detected in the sump sediment samples.

Sump sediment sample EPTOX metals analyses show leachable concentrations of barium (up to 1,480 μg/L), cadmium (up to 10.2J μg/L), chromium (up to 15.5J μg/L), lead (up to 714 μg/L), and mercury (0.33J μg/L) (see Figure 10). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.2.2 Surface Soil Analytical Results. Six surface soil samples (SS-109 through SS-114) and a duplicate were collected from locations in the oil shack area (see Figure 12). Surface soil samples were analyzed for TCL VOCs, SVOCs pesticides/PCBs, and inorganics, and EPTOX metals, and ignitability, corrosivity, and reactivity. Results of surface soil samples are presented in Table 23.

The TCL VOC toluene was detected in one sample (in SS-111 duplicate at 2J μg/kg). No other VOCs were detected. Twenty-one TCL SVOCs were detected, including naphtha compounds (such as 2-methylnaphthalene) and PAHs. Samples with the highest concentrations of SVOCs are SS-109 (from the boiler plant ruins) and SS-113 (from near the oil shack building).

The PCB Aroclor-1260 was detected in five of the six surface soil samples at the oil shack area at concentrations ranging from 15J μg/kg to 270J μg/kg. TCL pesticides detected in samples SS-111, SS-111 duplicate, and SS-112 were 4,4'-DDE; dieldrin; and endosulfan II. Pesticides were not detected in samples SS-109, SS-110, SS-113, and SS-114. Twenty-one TCL inorganic analytes were detected in the surface soil samples. The following inorganics are present in surface soil at concentrations exceeding NYS background levels: aluminum, arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, vanadium, and zinc (see Figure 12). Of these inorganics, aluminum, copper, iron, lead, manganese, mercury, and zinc also exceed background level for the eastern U.S.

Surface soil EPTOX metals analyses show leachable concentrations of barium (up to 724J μg/L), cadmium (up to 122 μg/L), chromium (up to 10.5J μg/L), lead (up to 809J μg/L), and silver (up to 13.3J μg/L) (see Figure 12). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.2.3 Subsurface Soil Analytical Results. Subsurface soil samples were collected from four soil borings, MW-104 through MW-107, to confirm the nature and distribution of PCB contamination at the oil shack area. MW-104 was designed to characterize background subsurface soil conditions. However, materials encountered during drilling (fill) do not represent background. Subsurface soil samples were collected from 8 to 14 feet bgs. All subsurface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Subsurface soil sample analytical results are presented in Table 24, and analytical results are summarized in Figure 12.

The TCL VOC 2-butanone was detected in one sample (at 18J μg/kg in sample BS-105). No TCL SVOCs or pesticides/PCBs were detected. Nineteen TCL inorganic analytes were detected in the subsurface soil samples. The following inorganics are present in subsurface soil at concentrations exceeding NYS background levels: aluminum, arsenic, beryllium, calcium, copper, iron, lead, magnesium, nickel, selenium, and zinc (see Figure 12). Of these inorganics, the following exceed background levels for the eastern U.S.: aluminum; beryllium; and selenium.

4.2.2.4 Groundwater Analytical Results. Monitoring well MW-104 was sampled to assess background groundwater conditions along the southern Hanna Furnace site boundary. As MW-104 was installed in fill similar to that encountered at other monitoring wells installed in this part of the Hanna Furnace site, it is likely that MW-104 does not adequately represent background conditions. MW-105 through MW-107 were installed to assess whether potential contamination identified in soil and the sumps was impacting groundwater quality. All samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results from groundwater samples were compared to NYS Class GA groundwater quality standards and guidelines to assess whether groundwater would pose a potential significant threat to human health or the environment. Groundwater analytical results are presented in Table 25 and Figure 13.

Oil Shack Area Groundwater Quality. TCL VOCs, SVOCs, and pesticides/PCBs were not detected in MW-104, MW-105, MW-106, or MW-107. TCL inorganics detected in the samples were aluminum, barium, calcium, cyanide, iron, lead, magnesium, manganese, potassium, selenium, silver, sodium, and zinc.

The following analytes were detected at concentrations exceeding NYS Class GA groundwater quality standards or guidelines:

- Cyanide (in MW-104 at 240 μg/L and in MW-106 at 190 μg/L) exceeds the NYS Class GA standard of 100 μg/L.
- Iron (in MW-106 at 836 μg/L) exceeds the NYS Class GA standard of 300 μg/L.
- Magnesium (in MW-107 at 46,800 μg/L) exceeds the NYS Class GA guidance value of 35,000 μg/L.
- Manganese (in MW-107 at 371 μg/L) exceeds the NYS Class GA standard of 300 μg/L.
- The total concentration of iron and manganese (in MW-106 and MW-107) exceeds the NYS Class GA standard of 500 μg/L.
- Sodium (in all wells at up to 45,100 μg/L) exceeds the NYS Class GA standard of 20,000 μg/L.
- pH (in MW-104 at 11.3; in MW-105 at 9.57; and in MW-106 at 10.6) exceeds the NYS Class GA standard of 8.5.

4.2.2.5 Contamination Assessment Summary. The objectives of the PSA at the oil shack area were to: (1) confirm results of previous investigations; (2) assess whether discrete soil sampling locations would meet the definition of listed hazardous waste due to leachable lead concentrations; (3) characterize the contents of abandoned utility structures and equipment; (4) assess the contents of isolated drums disposed on-site; and (5) characterize groundwater.

Results of previous investigations (see Subsection 2.3) showed the following:

- Surface soil (fill) at the oil shack area exceeded NYS soil background for arsenic, chromium, copper, and lead. The materials sampled also contained PCBs, phenols, and oil and grease. A composite sample analyzed for EPTOX metals showed leachable concentrations of lead at 3.3 mg/L, close to but not exceeding the regulatory limit for lead of 5 mg/L (Recra, 1988).

- Surface soil was shown to exceed NYS soil background levels for arsenic, cadmium, copper, lead, mercury, nickel, and selenium (NYSDEC, 1994d).

PSA environmental sampling shows that the numerous abandoned structures (sumps) associated with the building ruins and surface and subsurface fill contain contaminants similar to those identified in previous investigations. Organic and inorganic contaminants including SVOCs (naphtha compounds, phenols, and PAHs), and inorganics (primarily aluminum, copper, iron, lead, manganese, mercury, selenium, and zinc) are present in soil, fill, and abandoned utilities (sumps) and equipment. Material spilled from a 55-gallon drum found near the oil shack contained VOCs (ethylbenzene, toluene, and xylenes); samples from another 55-gallon drum contained SVOCs (PAHs). The PSA results show the presence of PCBs in surface soil. None of the soil, drum, or sump samples meet the definition of a characteristic hazardous waste. One sump liquid sample (CL-107) from the oil shack area had a pH of 12.3 which is close to the pH limit of 12.5 that would have defined the liquid as a hazardous waste.

The oil shack area may pose a potential threat to public health and the environment as groundwater analyses show several inorganic constituents (cyanide, iron, manganese, magnesium, and sodium) and pH in groundwater exceed NYS Class GA groundwater quality standards. However, groundwater in the area is not used for any purpose and the only threat it may pose is via discharge to surface waters.

4.2.3 Union Ship Canal

The Union Ship Canal runs through the middle of the Hanna Furnace site in a southwest to northeast orientation. South of the Union Ship Canal lies the oil shack

area, north of the canal lies the filter cake/flue ash disposal area and debris landfill, and northeast of the canal lies the Shenango Steel Mill. Environmental sampling consisted of collecting surface water and sediment samples from the canal or adjacent to the canal to confirm the nature and distribution of PCB contamination in surface water and sediment.

4.2.3.1 Surface Water Analytical Results. Five surface water samples (SW-103 through SW-107) were collected from the Union Ship Canal. The surface water samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results of the surface water samples are summarized in Table 26 and Figure 14.

No TCL VOCs or pesticides/PCBs were detected in the Union Ship Canal surface water samples. Two SVOCs were detected in surface water samples: 4-methylphenol was detected at 2J μg/L in SW-106; and BEHP was detected at 1J μg/L in SW-104. TCL inorganics detected in the samples were aluminum, arsenic, barium, calcium, chromium, copper, lead, magnesium, mercury, nickel, potassium, sodium, vanadium, and zinc. The highest concentrations and numbers of inorganics were detected in sample SW-106, collected from the side of the canal adjacent to the filter cake/flue ash disposal area.

Surface water results were compared to NYS Class C surface water quality standards and guidelines to assess whether the concentrations pose a potential significant threat to human health or the environment. The following analytes were detected at concentrations exceeding Class C standards or guidelines:

- 4-methylphenol (at 2J μg/L in SW-106) exceeds the NYS Class C standard of 1 μg/L (for total chlorinated phenols).
- BEHP (at 1J μg/L in SW-104) exceeds the NYS Class C standard of 0.6 μg/L.
- Aluminum (at 289J μg/L in SW-104 and 21,700J μg/L in SW-106) exceeds the NYS Class C standard of 100 μg/L.
- Copper (at 127 μg/L in SW-106) exceeds the NYS Class C hardness-specific standard of 20 μg/L (based on the average hardness of surface water samples).

- Lead (at 9.4J μg/L in SW-104 and 455 μg/L in SW-106) exceeds the NYS Class C hardness-specific standard of 7.0 μg/L (based on the average hardness of surface samples).

- Mercury (at 0.54 μg/L in SW-106) exceeds the NYS Class C guidance value of 0.2 μg/L.

- Vanadium (at 60.7 μg/L in SW-106) exceeds the NYS Class C standard of 14 μg/L.

- Zinc (at 1,180J μg/L in SW-106) exceeds the NYS Class C standard of 138 μg/L (based on the average hardness of surface water samples).

PCBs (traces of Aroclor-1260) were detected in earlier canal surface water sampling (see Table 7) at concentrations below the NYS Class C standard of 0.1 μg/L. These results were not reproduced in the PSA.

4.2.3.2 Sediment Analytical Results. Four sediment samples (SD-103, SD-104, SD-105, and SD-107) were collected from the Union Ship Canal (see Figure 15). SD-106 (paired with SW-106) could not be collected due to the depth of the canal at that location. Due to the depth of the canal at SW-105, sample SD-105 could not be collected from within the canal itself and was instead collected from a oil/water separator structure on the edge of the canal with an outfall that discharged to the canal. The sediment samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, and EPTOX metals. Results of the sediment samples are summarized in Table 27 and Figure 15.

Three VOCs were detected in sediment samples: 2-butanone was detected in SD-104 at a concentration of 3J μg/kg; and acetone and PCE were detected in SD-107 at 12J μg/kg and 3J μg/kg, respectively.

Twenty TCL SVOCs were detected in sediment samples, with the highest concentrations and numbers of SVOCs in SD-105 and SD-107. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates. One pesticide compound, 4,4'-DDT, was detected in SD-103. PCBs were not detected. Nineteen TCL inorganics were detected in sediment samples (see Table 27). Samples SD-103, SD-104, and SD-105 tended to have higher

concentrations of inorganics than SD-107, which was located between the site and the Buffalo Inner Harbor.

Sediment EPTOX metals analyses show leachable concentrations of barium (up to 1,520 μg/L), cadmium (up to 5.2J μg/L), chromium (up to 11.6 μg/L), lead (up to 153 μg/L), and silver (up to 6.8J μg/L) (see Figure 15). Concentrations are less than regulatory limits for characteristic hazardous waste. Samples were not determined to be ignitable, reactive, or corrosive.

4.2.3.3 Contamination Assessment Summary. The objectives of the PSA at the Union Ship Canal were to: (1) identify discharge locations from site sources to the canal; (2) confirm previous sampling results and assess whether sediment in the canal met the definition of a characteristic hazardous waste; and (3) characterize surface water quality and assess whether surface water in the canal poses a potential significant threat to public health and the environment.

Previous investigations (see Subsection 2.3) showed the following:

- Surface water in the canal exceeded NYS Class C surface water criteria for iron, phenols, and cyanide (Rupley, Bahler, and Blake, 1979a,b,c).

- Surface water in the canal also contained chromium, copper, and traces of PCBs (Recra, 1988).

- Sediment contained arsenic, chromium, copper, lead, and cyanide, PCBs, oil and grease, and phenols (Recra, 1988).

PSA Union Ship Canal sediment and surface water samples were collected at discharge locations entering the canal (SW-103, SW-104, SW-105), adjacent to the filter cake/flue ash disposal area (SW-106), and downstream between the site and the Buffalo Inner Harbor (Lake Erie) (SW-107). Sediment samples from the canal and an oil/water separator were found to contain SVOCs (PAHs and others), and inorganics (primarily aluminum and lead). The highest concentrations of SVOCs were found in the downstream sample. Surface water in the canal contained 4-methylphenol and inorganics (primarily aluminum, chromium, copper, lead, vanadium, and zinc), with the highest concentrations generally in the sample

collected adjacent to the filter cake/flue ash disposal area (SW-106). The detections of 4-methylphenol and inorganics in SW-106 are interpreted to result from discharge of groundwater affected by the nearby filter cake/flue ash disposal area to the canal. The detection of PCBs in sediment and surface water samples in previous investigations was not confirmed in the PSA. The exceedances of Class C standards for 4-methylphenol, BEHP, aluminum, copper, lead, mercury, vanadium, zinc, and pH may pose a threat to public health and the environment. The sediment samples collected do not meet the definition of a hazardous waste.

4.3 ANALYTICAL RESULTS AND CONTAMINATION ASSESSMENT SUMMARY - SHENANGO STEEL MILL

The following subsections summarize the analytical results and contamination assessment of the PSA activities performed by ABB-ES at the Shenango Steel Mill property. The complete analytical data tables, data validation information, and data useability evaluation are presented in Volume II.

The Shenango Steel Mill is located northeast of the Union Ship Canal and east of the debris landfill of the Hanna Furnace site. Environmental sampling consisted of collecting surface soil and subsurface soil samples to confirm the nature and distribution of PCB contamination in soil, collecting one liquid and one sediment sample from a sump structure to assess whether PCB contamination was migrating through this structure, and collecting groundwater samples to characterize area groundwater quality. Surface soil and subsurface soil results of inorganic analyses are compared to NYS background and eastern U.S. background (Table 13).

4.3.1 Sump Liquid and Sump Sediment Analytical Results

A structure believed to be a storm sewer catch basin is located at the PCB spill area adjacent to the Shenango Steel Mill building ruins. This structure was sampled to determine whether the contents of the structure were a hazardous waste and whether the structure is a contaminant migration pathway.

Sump Liquid Sample Results. The sump liquid sample (CL-109) was analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results of the sump liquid sample are summarized in Table 28 and Figure 16. No TCL VOCs or pesticides

were detected in sample CL-109. Two TCL SVOCs (1,2,4-trichlorobenzene at 10J μg/L and pyrene at 4J μg/L) and one PCB compound (Aroclor-1260 at 28J μg/L) were detected in CL-109. Sixteen TCL inorganic analytes were detected in the sump liquid sample. The inorganics detected were aluminum, arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, potassium, sodium, vanadium, and zinc.

Sump Sediment Sample Results. The sump sediment sample (CD-109) was analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, EPTOX metals and ignitability, corrosivity, and reactivity. Results of the sump sediment sample are summarized in Table 29 and Figure 16.

One TCL VOC (toluene at 3J μg/kg) was detected in sample CD-109. Three TCL SVOCs (1,2,4-trichlorobenzene at 9,200J μg/kg; dimethylphthalate at 1,200J μg/kg; and chrysene at 1,800J μg/kg), and one PCB compound (Aroclor-1260 at 7,770J μg/kg), were detected. No pesticide compounds were detected in the sample. Eighteen TCL inorganic analytes were detected in the sump sediment sample.

The sump sediment sample EPTOX metals analysis shows leachable concentrations of barium (449 μg/L) and silver (15.5 μg/L) (see Figure 16). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). The sample was not determined to be ignitable, reactive, or corrosive.

4.3.2 Surface Soil Analytical Results

Eleven surface soil samples (SS-115 to SS-125) and one duplicate were collected from the Shenango Steel Mill. Sample SS-124 was collected from a former railroad yard; the remaining samples were collected around the mill building ruins and PCB spill area. The surface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, EPTOX metals, and ignitability, corrosivity, and reactivity. Results of the surface soil samples are summarized in Table 30 and Figure 17.

TCL VOCs were detected in only two of the 11 surface soil samples. Eight VOCs were detected in SS-116, and one VOC (2-butanone at 2J μg/kg) was detected in SS-125. Twenty-nine TCL SVOCs were detected in the surface soil samples collected, with the greatest numbers of SVOCs generally detected in samples SS-117 and SS-

118. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates.

Three pesticide compounds were detected in surface soil samples: endosulfan II (up to 26J μg/kg); endrin aldehyde (up to 37J μg/kg); and methoxychlor (up to 180J μg/kg). The PCB Aroclor-1260 was detected in 10 of the 12 surface soil samples, ranging from 49J μg/kg to 81,000J μg/kg (in SS-118). The concentration of Aroclor-1260 in SS-118 exceeds the regulatory limit of 50,000 μg/kg, identifying the soil as listed hazardous waste (B007 - other PCB wastes).

Twenty-two TCL inorganic analytes were detected in the surface soil samples collected from the Shenango Steel Mill (see Table 30). The following inorganics are present in surface soil at concentrations exceeding NYS background levels: aluminum, beryllium, cadmium, calcium, cobalt, copper, iron, lead, magnesium, mercury, nickel, selenium, and zinc (see Figure 17). Of these inorganics, the following also exceed background levels for the eastern U.S.: aluminum, cobalt, lead, and zinc.

Surface soil EPTOX metals analyses show leachable concentrations of arsenic (82.3J μg/L), barium (up to 443 μg/L), cadmium (up to 28.6J μg/L), chromium (up to 11.6 μg/L), lead (up to 2,080J μg/L), and silver (up to 12.2J μg/L) (see Figure 17). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.3.3 Subsurface Soil Analytical Results

Three subsurface soil samples plus a duplicate (BS-108, BS-109, BS-110, and BS-110 duplicate) were collected from soil borings TB-108 through TB-110. The subsurface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results of the subsurface soil samples are summarized in Table 31 and Figure 18.

The TCL VOCs detected in subsurface soil were 1,1-dichloroethane (DCA) (31 μg/kg), 2-butanone (9J μg/kg), and benzene (3J μg/kg) in samples BS-108 collected at 6 to 8 feet bgs. No VOCs were detected in the other subsurface soil samples. TCL SVOCs were detected in two of the subsurface soil samples: 11 SVOCs were detected in sample BS-108 and BEHP was detected at a concentration

of 960J μg/kg in sample BS-110. No TCL pesticides/PCBs were detected in subsurface soil.

Twenty-one TCL inorganic analytes were detected in the soil boring samples. The following inorganics are present in soil boring samples at concentrations exceeding NYS background levels: arsenic, calcium, copper, iron, lead, magnesium, nickel, and zinc (see Figure 18). Of the inorganics detected, the following also exceed background levels for the eastern U.S.: aluminum and lead.

4.3.4 Groundwater Analytical Results

Three groundwater samples (MW-108, MW-109, and MW-110) were collected from the Shenango Steel Mill. A fourth monitoring well, MW-102 is also located on Shenango Steel Mill; results for MW-102 were presented with the filter cake/flue ash disposal area and debris landfill area (see Subsection 4.2.1.4). The groundwater samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results of the groundwater samples are summarized in Table 32 and Figure 19.

Four TCL VOCs (1,1,1-trichloroethane [TCA] at 2J μg/L; 1,1-DCA at 95 μg/L; benzene at 5J μg/L; and chloroethane at 26 μg/L) were detected in MW-108; no VOCs were detected in either MW-109 or MW-110. No TCL SVOCs or pesticides/PCBs were detected in any of the groundwater samples. TCL inorganics detected in the samples were aluminum, arsenic, barium, calcium, cyanide, iron, magnesium, manganese, potassium, and sodium. Of these analytes detected in groundwater at the Shenango Steel Mill, the following analytes were detected at concentrations exceeding NYS Class GA groundwater quality standards or guidelines:

- 1,1-DCA (in MW-108 at 95 μg/L) exceeds the NYS Class GA standard of 5 μg/L.
- Benzene (in MW-108 at 5J μg/L) exceeds the NYS Class GA standard of 0.7 μg/L.
- Chloroethane (in MW-108 at 26 μg/L) exceeds the NYS Class GA standard of 5 μg/L.

- Iron (in all three samples, ranging from 940 μg/L to 13,600 μg/L) exceeds the NYS Class GA groundwater quality standard for iron alone of 300 μg/L.

- Manganese (in MW-108 at 1,730 μg/L; and MW-110 at 430 μg/L) exceeds the NYS Class GA groundwater quality standard for manganese alone of 300 μg/L.

- When iron and manganese are both present, the NYS Class GA standard is 500 μg/L for the total concentration of both compounds in the sample. This standard is exceeded in all three samples.

- Magnesium (in MW-110 at 51,700 μg/L) exceeds the NYS Class GA groundwater guidance value of 35,000 μg/L.

- Sodium (in MW-109 and MW-110 at up to 54,500 μg/L) exceeds the NYS Class GA groundwater quality standard of 20,000 μg/L.

- pH (in MW-109 at 10.8) exceeds the NYS Class GA groundwater quality standard of 8.5.

4.3.5 Contamination Assessment Summary

The objectives of the PSA at the Shenango Steel Mill were to: (1) confirm NYSDEC PCB screening results showing PCB-contaminated soil remaining on-site was a listed hazardous waste; (2) characterize soil and groundwater at the PCB spill area and the area where drums and pails of material were removed by NYSDEC; and (3) characterize the contents of a former utility structure (sump) located near the PCB spill and containing floating oil product.

Previous investigations (see Subsection 2.3) showed the following:

- A soil sample collected by NYSDEC in 1993 where a transformer had been salvaged and transformer oil spilled showed a concentration greater than 50 mg/kg PCBs (the limit to define the material as hazardous waste) (NYSDEC, 1993b).

- NYSDEC performed a removal action in 1994 in which 17 55-gallon drums and 25 5-gallon pails were observed near the PCB spill area collected for off-site disposal, and visually-contaminated soil and debris from the PCB spill area were excavated and disposed off-site. Surface soil sampling conducted after the removal action indicate that PCBs remained at the Shenango Steel Mill at concentrations exceeding 50 mg/kg, and levels of metals in soil exceed NYS background (NYSDEC, 1994d).

PSA laboratory analytical results show surface soil samples in the vicinity of the PCB spill area and samples from an adjacent abandoned utility (sump) contain the PCB Aroclor-1260, SVOCs (naphtha compounds, PAHs, phenols, and others), and inorganics (primarily aluminum, cobalt, lead, and zinc). The soil sample collected from the PCB removal action excavation contains Aroclor-1260 at 81,000J μg/kg, which exceeds the regulatory limit of 50,000 μg/kg, defining the material as a listed hazardous waste (B007). Soil samples (SS-116, BS-108) and a groundwater sample (MW-108) from the immediate area where drums and pails had been removed by NYSDEC also contain trace concentrations of VOCs (1,1,1-TCA; 1,1-DCA; 1,2-dichloroethane (DCE); carbon disulfide; PCE; ethylbenzene; toluene; and xylenes). This may represent concentrations of waste constituents that may have been released from the drums or pails. The drums and pails removed earlier by NYSDEC contained toxicity-characteristic hazardous waste due to concentrations of lead, benzene, TCE, and PCE. The VOCs 1,1,1-TCA; PCE; ethylbenzene; toluene; and xylenes detected in soil and groundwater where the drums were removed are constituents of F-listed (non-specific source) hazardous wastes.

The Shenango Steel Mill may pose a potential threat to public health and the environment as groundwater analyses show several organic and inorganic constituents (1,1-DCA, benzene, chloroethane, iron, magnesium, manganese, sodium, and pH) exceed NYS Class GA standards. However, groundwater in the area is not used for any purpose. There is the potential that PCB contamination may migrate from site via the abandoned utility structure found at the PCB spill area. It is not known where this structure discharges; if this structure is found to discharge to a nearby surface water body, such as the Union Ship Canal, the discharge of PCBs may be considered a potential significant threat to public health and the environment.

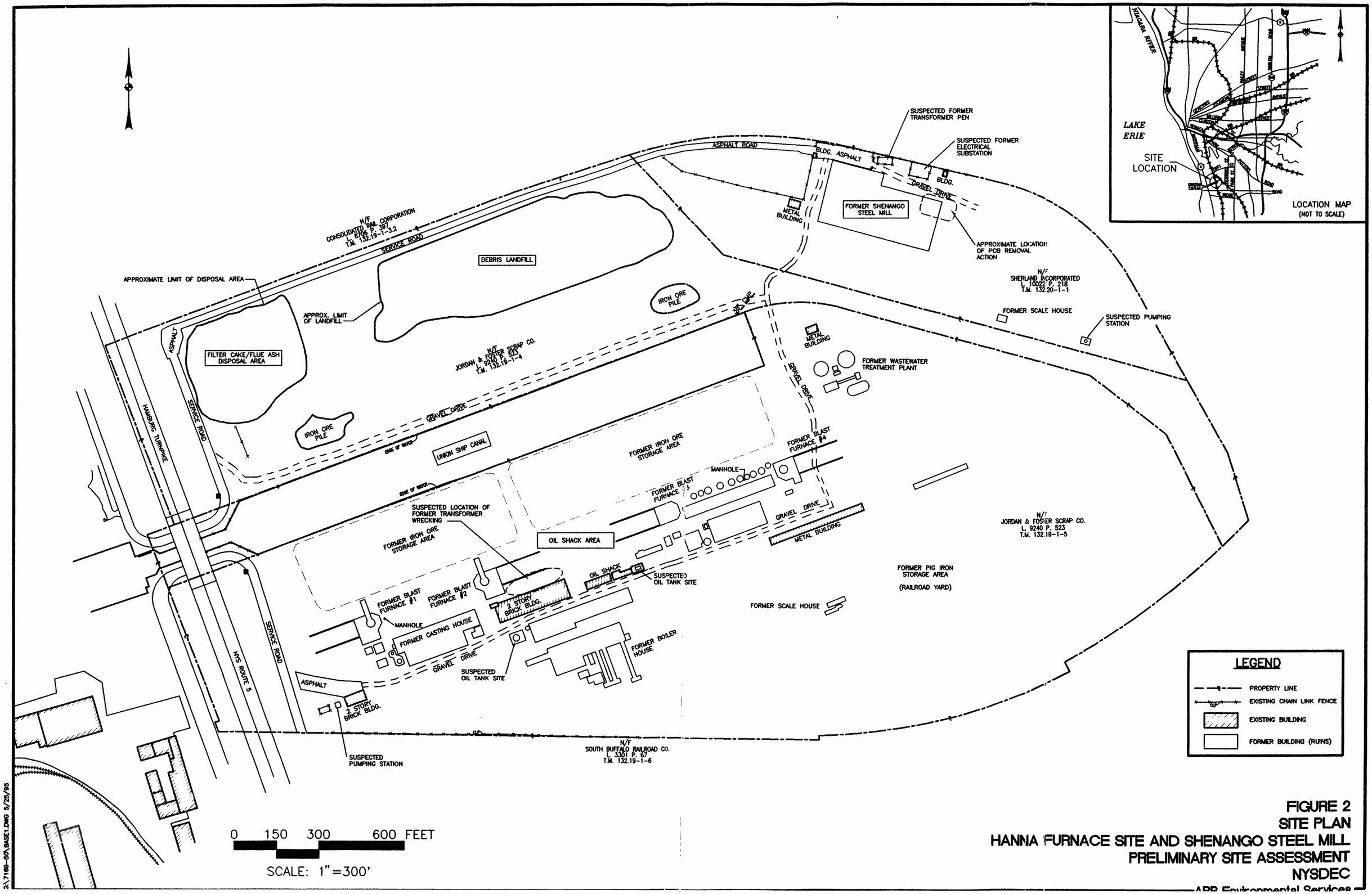

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FIGURE 2
SITE PLAN
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ARR Environmental Services

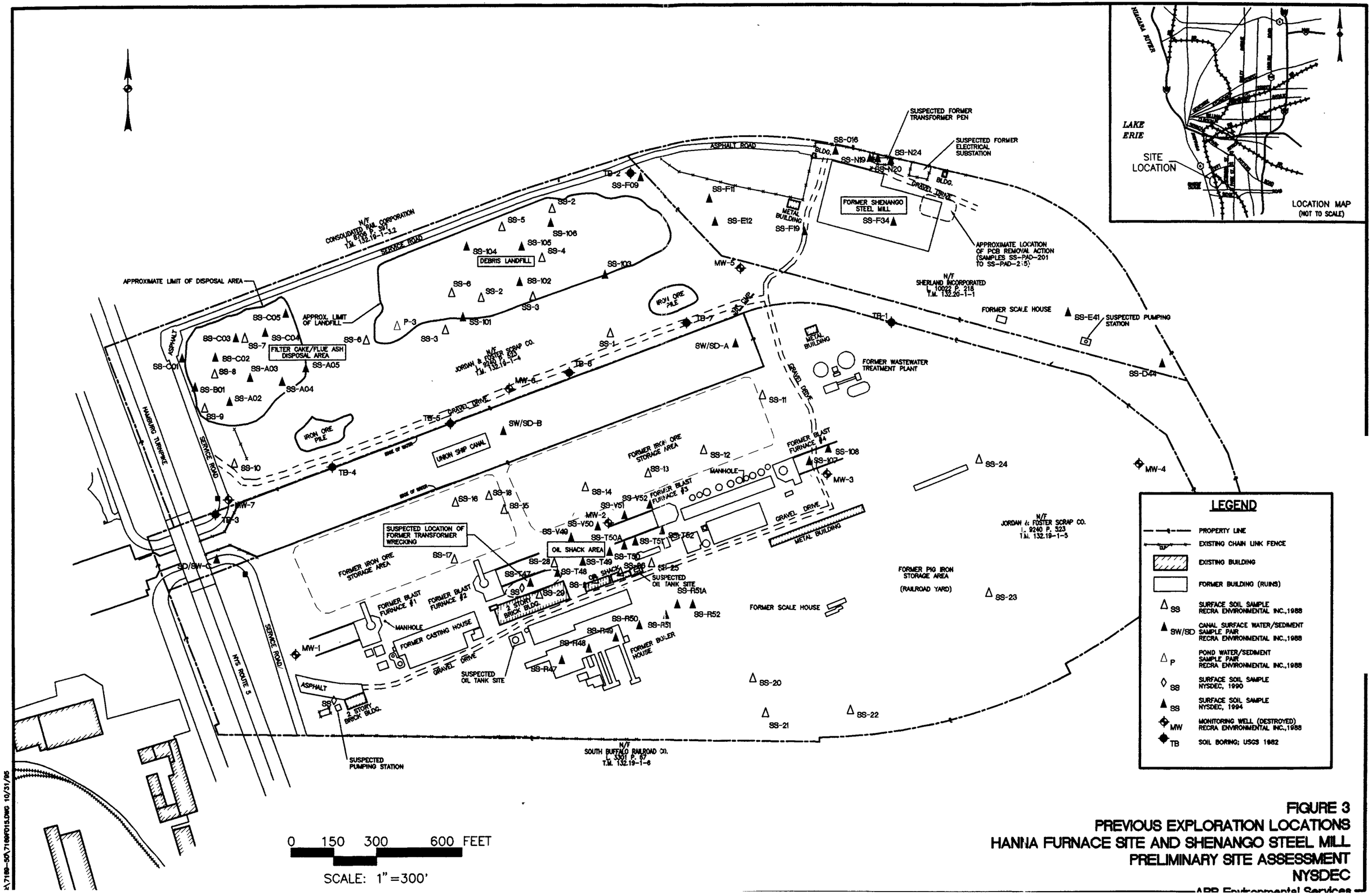

FIGURE 3
PREVIOUS EXPLORATION LOCATIONS
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ARR Environmental Services

A:\7189-50\7189FD15.DWG 10/31/95

E 1,075,500
N 1,034,000

N/F CONSOLIDATED RAIL CORPORATION L. 8706 P. 397 T.M. 132.19-1-3.2

ASPHALT ROAD

SERVICE ROAD

APPROXIMATE LIMIT OF DISPOSAL AREA

APPROX. LIMIT OF LANDFILL

DEBRIS LANDFILL

FILTER CAKE/FLUE ASH DISPOSAL AREA

HAMBURG TURNPIKE

NYS ROUTE 5

UNION SHIP CANAL

IRON ORE PILE

FORMER IRON ORE STORAGE AREA

SUSPECTED LOCATION OF FORMER TRANSFORMER WRECKING

SUSPECTED FORMER TRANSFORMER PEN

SUSPECTED FORMER ELECTRICAL SUBSTATION

FORMER SHENANGO STEEL MILL

APPROXIMATE LOCATION OF PCB REMOVAL ACTION

N/F SHERLAND INCORPORATED L. 10022 P. 218 T.M. 132.20-1-1

FORMER SCALE HOUSE

SUSPECTED PUMPING STATION

FORMER WASTEWATER TREATMENT PLANT

N/F JORDAN & FOSTER SCRAP CO. L. 9240 P. 523 T.M. 132.19-1-5

FORMER PIG IRON STORAGE AREA (RAILROAD YARD)

E 1,078,000
N 1,032,500

FORMER BLAST FURNACE #1

FORMER BLAST FURNACE #2

FORMER BLAST FURNACE #3

FORMER BLAST FURNACE #4

FORMER CASTING HOUSE

2 STORY BRICK BLDG.

OIL SHACK AREA

OIL SHACK

SUSPECTED OIL TANK SITE

FORMER BOILER HOUSE

METAL BUILDING

GRAVEL DRIVE

MANHOLE

SUSPECTED PUMPING STATION

N/F SOUTH BUFFALO RAILROAD CO. L. 3301 P. 67 T.M. 132.19-1-6

MW-101 578.44
MW-102 576.63
MW-103 578.21
MW-104 578.19
MW-105 578.24
MW-106 578.30
MW-107 576.49
MW-108 578.81
MW-109 579.80
MW-110 579.33

SW/SD-101
SW/SD-102
SW/SD-103
SW/SD-104 571.60
SW/SD-105
SW/SD-106

TP-101
TP-102
TP-103
TP-104
TP-105
TP-106
TP-107
TP-108

SS-101
SS-102
SS-103
SS-104
SS-105
SS-106
SS-107
SS-108
SS-109
SS-110
SS-111
SS-112
SS-113
SS-114
SS-115
SS-116
SS-117
SS-119
SS-120
SS-121
SS-122
SS-123
SS-124
SS-125

CD/CL-101
CD/CL-102
CD/CL-103
CD/CL-104
CD/CL-105
CD/CL-106
CD/CL-107
CD/CL-108
CD/CL-109

WT-101
WT-102

0 150 300 600 FEET

SCALE: 1"=300'

LAKE ERIE

NIAGARA RIVER

SITE LOCATION

LOCATION MAP (NOT TO SCALE)

LEGEND

- PROPERTY LINE
- EXISTING CHAIN LINK FENCE
- EXISTING BUILDING
- FORMER BUILDING (RUINS)
- MW — MONITORING WELL LOCATION
- SS — SURFACE SOIL SAMPLE LOCATION
- SW/SD — SURFACE WATER/ SEDIMENT SAMPLE LOCATION
- TP — TEST PIT LOCATION
- WT — DRUM SAMPLE LOCATION
- CD/CL — STRUCTURE SEDIMENT/ LIQUID SAMPLE
- 578.19 — GROUNDWATER ELEVATIONS (MSL) MEASURED ON 11/29/94

G:\7169-50\BASE.DWG 4/7/95

FIGURE 4
PSA SAMPLING LOCATIONS
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ARR Environmental Services

NOTE:

TCL VOC, TCL SVOC, AND TCL PESTICIDE RESULTS ARE NOT SHOWN. TCL INORGANICS DATA PRESENTED ARE ONLY CONCENTRATIONS OF ANALYTES EXCEEDING NYS BACKGROUND CONCENTRATIONS.

Exploration:	SS-101	SS-101 (DUP)
Date Sampled:	10-Oct-94	10-Oct-94
Depth:	0-1.0'	0-1.0'
TCL-PCBs (ug/kg)		
Aroclor-1260	250 J	310 J
TCL-INORs (mg/kg)		
Antimony	23.3 J	28.8 J
Arsenic	15.4 J	--
Beryllium	2.1	1.9
Cadmium	14.9	16.5
Calcium	42400	42100
Chromium	285	164
Copper	228 J	191 J
Cyanide	4.1 J	11.4 J
Lead	4460	4460
Magnesium	10600	10800
Mercury	0.14	0.12
Nickel	82.7	95.4
Selenium	2.2 J	-
Thallium	7.3	6.2
Vanadium	62.2	67.2
Zinc	4500	4710
Iron	156000 J	181000 J
EP-Toxicity-Metals (ug/L)		
Arsenic	52 J	--
Cadmium	52.4 J	50.4 J
Lead	410 J	352 J

Exploration:	SS-102
Date Sampled:	10-Oct-94
Depth:	0-1.0'
TCL-PCBs (ug/kg)	
Aroclor-1260	190 J
TCL-INORs (mg/kg)	
Antimony	12.1 J
Arsenic	14.4
Beryllium	2.9
Cadmium	12.7
Calcium	54700
Chromium	81.9
Copper	79.3 J
Cyanide	8.7 J
Lead	3240
Magnesium	13200
Mercury	0.12
Nickel	37.7
Selenium	2.6 J
Thallium	8.1
Zinc	3290
Iron	114000 J
EP-Toxicity-Metals (ug/L)	
Cadmium	96.6 J
Chromium	6.5 J
Lead	732 J

Exploration:	SS-103
Date Sampled:	10-Oct-94
Depth:	0-1.0'
TCL-PCBs (ug/kg)	
Aroclor-1260	28 J
TCL-INORs (mg/kg)	
Antimony	39.5 J
Arsenic	20.5
Cadmium	6.2
Chromium	251
Copper	689 J
Lead	523
Manganese	7540
Nickel	182
Vanadium	85.2
Zinc	942
Iron	343000 J
EP-Toxicity-Metals (ug/L)	
Chromium	6.0 J
Lead	49.8 J

Exploration:	SS-104
Date Sampled:	10-Oct-94
Depth:	0-1.0'
TCL-PCBs (ug/kg)	
Aroclor-1260	210 J
TCL-INORs (mg/kg)	
Antimony	22.9 J
Arsenic	15.9
Cadmium	17.6
Chromium	149
Copper	290 J
Cyanide	5.8 J
Lead	5880
Magnesium	7800
Mercury	0.27
Nickel	87.6
Selenium	2.3 J
Thallium	7.7
Zinc	4860
Iron	186000 J
EP-Toxicity-Metals (ug/L)	
Cadmium	144 J
Chromium	7.7 J
Lead	1630 J
Silver	6.1 J

Exploration:	SS-105
Date Sampled:	10-Oct-94
Depth:	0.5 to 0.8'
TCL-PCBs (ug/L)	
Aroclor-1260	79 J
TCL-INORs (mg/kg)	
Antimony	15.8 J
Arsenic	15.4
Cadmium	5.2
Calcium	50500
Chromium	85.1
Copper	178 J
Lead	500
Magnesium	11800
Mercury	0.13
Nickel	62.4
Zinc	1010
Iron	159000 J
EP-Toxicity-Metals (ug/L)	
Cadmium	5.0 J
Chromium	8.4 J
Lead	91.2 J

Exploration:	SS-107
Date Sampled:	10-Oct-94
Depth:	0.5-0.8'
TCL-PCBs (ug/kg)	
Aroclor-1260	18
TCL-INORs (mg/kg)	
Antimony	15.1 J
Arsenic	14.9
Cadmium	3.1 J
Calcium	38900
Copper	52.1 J
Lead	222
Magnesium	10200
Mercury	0.25
Zinc	457
Iron	124000 J
EP-Toxicity-Metals (ug/L)	
Lead	85.4 J
Chromium	7.9 J

Exploration:	SS-106
Date Sampled:	10-Oct-94
Depth:	0.3-0.5'
TCL-PCBs (ug/kg)	
Aroclor-1260	50 J
TCL-INORs (mg/kg)	
Antimony	17.4 J
Arsenic	13.7
Cadmium	3.9 J
Chromium	40.2
Copper	92.9 J
Lead	294
Magnesium	7670
Mercury	0.26
Nickel	28.8
Thallium	1.5 J
Zinc	780
Iron	124000 J
EP-Toxicity-Metals (ug/L)	
Cadmium	2.9 J

Exploration:	SS-108
Date Sampled:	10-Oct-94
Depth:	0.5-0.8'
TCL-PCBs (ug/kg)	
Aroclor-1260	71 J
TCL-INORs (mg/kg)	
Arsenic	19.1
Cadmium	4.3 J
Calcium	78600
Copper	156 J
Lead	337
Magnesium	11400
Zinc	729
Iron	116000 J
EP-Toxicity-Metals (ug/L)	
Lead	55.7 J

Exploration:	SD-101
Date Sampled:	11-Oct-94
Depth:	2'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Antimony	33.5 J
Arsenic	14.3 J
Cadmium	4.0 J
Calcium	114000 J
Chromium	98.6 J
Copper	212 J
Cyanide	1.4 J
Lead	754 J
Magnesium	10600 J
Mercury	0.44 J
Nickel	61.2 J
Zinc	1470 J
Iron	131000 J
EP-Toxicity-Metals (ug/L)	
Barium	549
Cadmium	2.6 J
Lead	132

Exploration:	SD-102	SD-102 (DUP)
Date Sampled:	11-Oct-94	11-Oct-94
Depth:	3'	3'
TCL-PCBs (ug/kg)	-	-
TCL-INORs (mg/kg)		
Antimony	27.9 J	19.8 J
Arsenic	15.8 J	14.8 J
Cadmium	1.9 J	3.9 J
Calcium	81800 J	60500 J
Chromium	50.2 J	43.5 J
Copper	120 J	106 J
Lead	731 J	716 J
Magnesium	14900 J	10500 J
Mercury	0.37 J	0.41 J
Nickel	27.6 J	29.4 J
Zinc	1360 J	1140 J
Iron	118000 J	96200 J
EP-Toxicity-Metals (ug/L)		
Barium	471	466
Chromium	--	6.7 J
Lead	144 J	189 J

N/F CONSOLIDATED RAIL CORPORATION L. 8706 P. 397 T.M. 132.19-1-3.2

N/F JORDAN & FOSTER SCRAP CO. L. 9240 P. 523 T.M. 132.19-1-4

SERVICE ROAD

ASPHALT ROAD

CLF

DEBRIS LANDFILL

APPROX. LIMIT OF LANDFILL

FILTER CAKE/FLUE ASH DISPOSAL AREA

SS-101

SS-102

SS-103

SS-104

SS-105

SS-106

SS-107

SS-108

SW/SD-101

SW/SD-102

36" CMP

0 75 150 300 FEET

SCALE: 1"=150'

LEGEND

SS — SURFACE SOIL SAMPLE LOCATION

SW/SD — SURFACE WATER/ SEDIMENT SAMPLE LOCATION

SS = SURFACE SOIL SAMPLE

SD = SEDIMENT SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/kg = MICROGRAMS PER KILOGRAM

mg/Kg = MILLIGRAMS PER KILOGRAM

ug/L = MICROGRAMS PER LITER

FIGURE 7
SURFACE SOIL (SS) AND SEDIMENT (SD) RESULTS
FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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LEGEND

MW — MONITORING WELL LOCATION

TP — TEST PIT LOCATION

PS = TEST PIT SOIL SAMPLE

BS = BORING SOIL SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/kg = MICROGRAMS PER KILOGRAM

mg/Kg = MILLIGRAMS PER KILOGRAM

N

Exploration:	PS-104	PS-104 (DUP)
Date Sampled:	17-Oct-94	17-Oct-94
Depth:	9'	9'
TCL-INORs (mg/kg)	No TCL-INORs above background	
TCL-PCBs (ug/kg)	-	-

Exploration:	PS-102
Date Sampled:	18-Oct-94
Depth:	5'
TCL-PCBs (ug/kg)	
Aroclor-1248	88 J
Aroclor-1260	120
TCL-INORs (mg/kg)	
Antimony	21.8
Beryllium	2.3
Cadmium	3.8 J
Calcium	68000
Chromium	84.1
Copper	163
Lead	330
Magnesium	15300
Mercury	0.37
Nickel	55.3
Zinc	459
Iron	93300

Exploration:	PS-101
Date Sampled:	18-Oct-94
Depth:	9'
TCL-PCBs (ug/kg)	
Aroclor-1248	68 J
Aroclor-1260	150
TCL-INORs (mg/kg)	
Antimony	10.3 J
Cadmium	4.8 J
Calcium	40700
Copper	210
Lead	217
Magnesium	9350
Manganese	5110
Mercury	0.40
Zinc	1440
Iron	163000

Exploration:	PS-106
Date Sampled:	17-Oct-94
Depth:	11'
TCL-PCBs (ug/kg)	
Aroclor-1248	180
Aroclor-1260	260
TCL-INORs (mg/kg)	No TCL-INORs above background

Exploration:	BS-102
Date Sampled:	20-Oct-94
Depth:	4-8'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Antimony	21.1
Beryllium	2.0
Calcium	77500
Lead	47.8
Zinc	69.3
Iron	87600

Exploration:	PS-103
Date Sampled:	18-Oct-94
Depth:	7'
TCL-PCBs (ug/kg)	
Aroclor-1248	100
Aroclor-1260	49 J
TCL-INORs (mg/kg)	
Antimony	11.8 J
Cadmium	3.6 J
Chromium	112
Copper	120
Lead	669
Magnesium	9910
Mercury	0.13
Nickel	39.2
Zinc	417
Iron	124000

Exploration:	PS-108
Date Sampled:	18-Oct-94
Depth:	10'
TCL-PCBs (ug/kg)	-
TAL-INORs (mg/kg)	No TCL-INORs above background

Exploration:	PS-105
Date Sampled:	17-Oct-94
Depth:	7'
TCL-PCBs (ug/kg)	
Aroclor-1248	140
Aroclor-1260	120
TCL-INORs (mg/kg)	
Cadmium	4.4
Calcium	42100
Chromium	98.8
Copper	136
Lead	318
Magnesium	11300
Mercury	0.23
Nickel	39.4
Zinc	1230
Iron	121000

Exploration:	BS-103
Date Sampled:	20-Oct-94
Depth:	8-10'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Antimony	31.7
Arsenic	36.9
Beryllium	2.0
Cadmium	17.4
Calcium	60600
Copper	86.4
Cyanide	17.5 J
Lead	1830
Magnesium	12500
Manganese	7560
Nickel	49.7
Thallium	5.0
Vanadium	95.1
Zinc	8750
Iron	53300

Exploration:	BS-101
Date Sampled:	20-Oct-94
Depth:	4-6'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	29900 J
Arsenic	35.1 J J
Beryllium	2.4 J J
Cadmium	2.4 J
Calcium	249000 J J
Chromium	53.4 J J
Copper	31.7 J J
Lead	144 J J
Nickel	25.6 J J
Potassium	53600 J J
Thallium	4.2 J J
Vanadium	62.2 J J
Zinc	491 J

Exploration:	PS-107
Date Sampled:	18-Oct-94
Depth:	6'
TCL-PCBs (ug/kg)	
Aroclor-1248	85
Aroclor-1260	120
TCL-INORs (mg/kg)	
Antimony	16.5
Arsenic	12.8
Cadmium	5.1 J
Chromium	82.7
Copper	214
Lead	414
Manganese	5220
Nickel	136
Vanadium	64.9
Zinc	941
Iron	227000

ASPHALT ROAD

SERVICE ROAD

N/F CONSOLIDATED RAIL CORPORATION L. 8706 P. 397 T.M. 132.19-1-3.2

DEBRIS LANDFILL

APPROX. LIMIT OF LANDFILL

FILTER CAKE/FLUE ASH DISPOSAL AREA

ASPHALT

SERVICE ROAD

CLF

IRON ORE PILE

36" CMP

GRAVEL DRIVE

EDGE OF WATER

N/F JORDAN & FOSTER SCRAP CO. L. 9240 P. 523 T.M. 132.19-1-4

TP-101 TP-102 TP-103 TP-104 TP-105 TP-106 TP-107 TP-108

BS-101 BS-102 BS-103

NOTE:

TCL VOC, TCL SVOC, AND TCL PESTICIDE RESULTS ARE NOT SHOWN. TCL INORGANICS DATA PRESENTED ARE ONLY CONCENTRATIONS OF ANALYTES EXCEEDING NYS BACKGROUND CONCENTRATIONS.

0 75 150 300 FEET

SCALE: 1" = 150'

FIGURE 8
SUBSURFACE SOIL (PS AND BS) RESULTS
FILTER CAKE/FLUE ASH DISPOSAL AREA
AND DEBRIS LANDFILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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Exploration:	MW-101	MW-101 (DUP)
Date Sampled:	29-Nov-94	29-Nov-94
PH:	12.3	NA
TCL-VOAs (ug/L)	-	-
TCL-SVOAs (ug/L)		
2,4-Dimethylphenol	-	1.0 J
4-Methylphenol	2.0 J	3.0 J
Naphthalene	-	2.0 J
Pentachlorophenol	1.0 J	-
bis(2-Ethylhexyl)phthalate	-	2.0 J
TCL-PESTs/PCBs (ug/L)	-	-
TCL-INORs (ug/L)		
Aluminum	797	881
Barium	100 J	104 J
Calcium	110000	114000
Chromium	12.9 J	17.7
Cyanide	3090	2960
Potassium	823000	861000
Selenium	8.0 J	12.2 J
Sodium	64800	65800
Vanadium	24.1 J	25.6 J
Iron	1100	1180

Exploration:	SW-102	SW-102 (DUP)
Date Sampled:	11-Oct-94	11-Oct-94
PH:	12.3	NA
TCL-VOAs (ug/L)		
Acetone	21 J	16 J
TCL-SVOAs (ug/L)	-	-
TCL-PESTs/PCBs (ug/L)	-	-
TCL-INORs (ug/L)		
Aluminum	83.9 J	225 J
Barium	27.0 J	27.0 J
Calcium	114000	112000
Copper	-	6.4 J
Lead	14.8 J	26.4 J
Magnesium	5840	5820
Potassium	361000	354000
Sodium	201000	192000
Zinc	35.4 J	47.9 J

Exploration:	SW-101
Date Sampled:	11-Oct-94
PH:	9.5
TCL-VOAs (ug/l)	
Acetone	9.0 J
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/l)	
Aluminum	148 J
Arsenic	8.6 J
Barium	14.8 J
Calcium	125000
Copper	14.7 J
Lead	4.3 J
Magnesium	2070 J
Potassium	375000
Sodium	146000
Zinc	16.1 J

Exploration:	MW-102
Date Sampled:	29-Nov-94
PH:	7.5
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Barium	60.4 J
Calcium	97800
Magnesium	10900
Manganese	1220
Potassium	13500
Sodium	14900
Iron	505

Exploration:	SW-106
Date Sampled:	11-Oct-94
PH:	8.06
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	
4-Methylphenol	2.0 J
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	21700 J
Arsenic	16.6
Barium	212
Beryllium	2.5 J
Cadmium	2.0 J
Calcium	134000
Chromium	59.8
Cobalt	18.4 J
Copper	127
Lead	453
Magnesium	22800
Mercury	0.54
Nickel	79.9
Potassium	6140
Sodium	13000
Vanadium	60.7
Zinc	1180 J

Exploration:	MW-103
Date Sampled:	29-Nov-94
PH:	8.9
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	184 J
Arsenic	5.7 J
Barium	61.3 J
Calcium	78500
Cyanide	510
Lead	3.3 J
Magnesium	7840
Manganese	137
Potassium	467000
Sodium	191000
Zinc	15.4 J
Iron	1730

ASPHALT ROAD

MW-102

576.63

CLF

SERVICE ROAD

N/F
CONSOLIDATED RAIL CORPORATION
L. 8706 P. 397
T.M. 132.19-1-3.2

DEBRIS LANDFILL

578.19

APPROX. LIMIT
OF LANDFILL

SW/SD-101

SW/SD-102

IRON ORE
PILE

36" CMP

MW-103
578.21

N/F
JORDAN & FOSTER SCRAP CO.
L. 9240 P. 523
T.M. 132.19-1-4

FILTER CAKE/FLUE ASH
DISPOSAL AREA

ASPHALT

SERVICE ROAD

GRAVEL DRIVE

EDGE OF WATER

CLF

MW-101
578.44

SW/SD-106

0 75 150 300 FEET

SCALE: 1"=150'

LEGEND

- MW — MONITORING WELL LOCATION
- SW/SD — SURFACE WATER/SEDIMENT SAMPLE LOCATION
- 578.19 — GROUNDWATER ELEVATIONS (MSL) MEASURED ON 11/29/94
- SW = SURFACE WATER SAMPLE
- MW = GROUNDWATER SAMPLE
- J = ESTIMATED
- – = NON-DETECT
- ug/L = MICROGRAMS PER LITER
- NA = NOT ANALYZED

FIGURE 9
SURFACE WATER (SW) AND GROUNDWATER (MW) RESULTS
FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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Exploration:	CD-101	CD-101 (DUP)
Date Sampled:	12-Oct-94	12-Oct-94
[Oil/Water Separator]		
TCL-VOAs (ug/kg)	-	-
TCL-SVOAs (ug/kg)		
2-Methylnaphthalene	42000 J	17000 J
4-Methylphenol	5000 J	5300 J
Acenaphthene	9300 J	3600 J
Acenaphthylene	2600 J	1800
Anthracene	4600 J	3900 J
Benzo(a)Anthracene	9200	12000 J
Benzo(a)Pyrene	7600	10000 J
Benzo(b)Fluoranthene	8300	11000 J
Benzo(g,h,i)perylene	5000 J	5900 J
Benzo(k)Fluoranthene	6500	10000 J
Carbazole	1300 J	1400 J
Chrysene	12000	16000 J
Dibenzofuran	3400 J	-
Fluoranthene	14000	19000 J
Fluorene	9700	6400 J
Indeno(1,2,3-c,d)Pyrene	5000 J	6500 J
Phenanthrene	29000	24000 J
Phenol	3300 J	3800 J
Pyrene	18000 J	22000 J
TCL-PESTs/PCBs (ug/kg)		
Aldrin	R	280 J
Endosulfan I	R	79 J
Endrin	.23 JN	R
Heptachlor Epoxide	11 JN	R
Gamma-Chlordane	R	130 JN
TCL-INORs (mg/kg)		
Aluminum	15100	16000 J
Arsenic	9.7	10.2 J
Barium	222	249 J
Beryllium	2.8	3.4 J
Cadmium	9.4 J	11.3 J
Calcium	89500	109000 J
Chromium	37.0	43.1 J
Cobalt	10.2 J	8.7 J
Cyanide	-	4.0 J
Lead	591 J	676 J
Magnesium	15200	17200 J
Manganese	1960	2320 J
Mercury	1.1 J	1.9 J
Nickel	42.3	48.4 J
Potassium	2830	3060 J
Sodium	711 J	820 J
Thallium	1.7 J	2.3 J
Vanadium	42.6	45.4 J
Zinc	1170 J	1350 J
Iron	59200	61800 J
EP-TOXICITY-METALS (ug/L)		
Barium	765	814
Cadmium	10.2 J	3.1 J
Chromium	15.5 J	9.9 J
Lead	292	179

Exploration:	WT-101	WT-101 (DUP)
Date Sampled:	13-Oct-94	13-Oct-94
[Soil at Drum]		
TCL-VOAs (ug/kg)		
Ethylbenzene	170 J	-
Toluene	310 J	510 J
Total Xylenes	3000 J	840 J
TCL-SVOAs (ug/kg)	-	-
TCL-PESTs/PCBs (ug/kg)	-	-
TCL-INORs (mg/kg)		
Aluminum	11300	14500
Antimony	-	12.9
Arsenic	3.6 J	3.4 J
Barium	119	142
Beryllium	2.2	3.2
Cadmium	3.6	2.9
Calcium	60900	75000
Chromium	51.6	39.2
Cobalt	4.3 J	4.6 J
Copper	80.1 J	93.7 J
Cyanide	-	0.80 J
Lead	182	229 J
Magnesium	12400	15000
Manganese	1870	1420
Mercury	-	0.12
Nickel	26.1	18.6
Potassium	555 J	734 J
Sodium	481 J	511 J
Thallium	-	1.6 J
Vanadium	19.3	15.8
Zinc	1330	1060
Iron	45000	40000
EP-Toxicity-Metals (ug/L)		
Barium	386 J	431 J
Lead	--	34.1 J

Exploration:	WT-102
Date Sampled:	13-Oct-94
[Drum Contents]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
Fluorene	1400 J
Phenanthrene	8700 J
TCL-PESTs/PCBs (ug/kg)	
Endrin	160 J
TCL-INORs (mg/kg)	
Aluminum	360
Antimony	826
Arsenic	4.9 J
Barium	4.8 J
Calcium	2320
Copper	8.9 J
Lead	6050 J
Magnesium	439 J
Manganese	48.6
Sodium	135 J
Zinc	29.5
Iron	668
EP-Toxicity-Metals (ug/L)	
Arsenic	75 J
Barium	330 J
Lead	1380 J

Exploration:	CD-102
Date Sampled:	12-Oct-94
[Basement]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
Benzo(a)Anthracene	180 J
Benzo(a)Pyrene	120 J
Benzo(b)Fluoranthene	400 J
Benzo(g,h,i)perylene	140 J
Benzo(k)Fluoranthene	330 J
Chrysene	730
Fluoranthene	1000
Indeno(1,2,3-c,d)Pyrene	170 J
Phenanthrene	600
Pyrene	870
TCL-PESTs/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	6750
Arsenic	21.0
Barium	34.7 J
Cadmium	7.1 J
Calcium	105000
Chromium	97.4
Cobalt	12.9 J
Lead	256 J
Magnesium	1900
Manganese	737
Nickel	34.8
Potassium	754 J
Sodium	714 J
Thallium	1.6 J
Vanadium	58.1
Zinc	729 J
Iron	101000
EP-TOXICITY-METALS (ug/L)	
Barium	367
Cadmium	7.6 J
Chromium	12.4
Lead	714

Exploration:	CD-103
Date Sampled:	12-Oct-94
[Abandoned Equipment]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
2-Methylnaphthalene	3000 J
Chrysene	3700 J
Fluorene	2100 J
Phenanthrene	6000 J
Pyrene	3700 J
TCL-PESTs/PCBs (ug/kg)	
Endrin	18 JN
Heptachlor Epoxide	27 J
TCL-INORs (mg/kg)	
Aluminum	5700 J
Antimony	15.3 J
Arsenic	8.3 J
Barium	219 J
Cadmium	6.7 J
Calcium	126000 J
Chromium	39.5 J
Cobalt	8.0 J
Lead	631 J
Magnesium	5730 J
Manganese	1450 J
Mercury	2.2 J
Nickel	40.9 J
Potassium	642 J
Selenium	3.9 J
Sodium	230 J
Vanadium	28.7 J
Zinc	1550 J
Iron	45500 J
EP-TOXICITY-METALS (ug/L)	
Barium	797
Chromium	7.4
Lead	273

Exploration:	CD-104
Date Sampled:	12-Oct-94
[Trench]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
Acenaphthene	1000 J
Acenaphthylene	3100
Anthracene	4800
Benzo(a)Anthracene	16000
Benzo(a)Pyrene	10000
Benzo(b)Fluoranthene	15000
Benzo(g,h,i)perylene	4400
Benzo(k)Fluoranthene	7400
Carbazole	1800 J
Chrysene	17000
Dibenz(a,h)Anthracene	2000 J
Dibenzofuran	1400 J
Fluoranthene	30000
Fluorene	2000 J
Indeno(1,2,3-c,d)Pyrene	5200
Phenanthrene	19000
Pyrene	27000
TCL-PESTs/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	16200
Arsenic	15.3
Barium	193
Beryllium	2.6
Cadmium	4.8 J
Calcium	79500
Chromium	45.4
Cobalt	13.3 J
Cyanide	3.6
Lead	379 J
Magnesium	12200
Manganese	3170
Mercury	0.75 J
Nickel	24.2
Potassium	1740
Selenium	2.3
Sodium	511 J
Vanadium	53.5
Zinc	650 J
Iron	106000
EP-TOXICITY-METALS (ug/L)	
Barium	849
Chromium	6.2
Lead	38.9

Exploration:	CD-105
Date Sampled:	13-Oct-94
[Valve Pit]	
TCL-VOAs (ug/kg)	
Ethylbenzene	4.0 J
TCL-SVOAs (ug/kg)	
2-Methylnaphthalene	110 J
Acenaphthene	120 J
Acenaphthylene	180 J
Anthracene	320 J
Benzo(a)Anthracene	1400 J
Benzo(a)Pyrene	170 J
Benzo(b)Fluoranthene	1000 J
Benzo(k)Fluoranthene	680 J
Carbazole	93 J
Chrysene	1400 J
Dibenzofuran	140 J
Fluoranthene	2400 J
Fluorene	300 J
Indeno(1,2,3-c,d)Pyrene	170 J
Naphthalene	100 J
Phenanthrene	1800 J
Pyrene	1300 J
TCL-PESTs/PCBs (ug/kg)	
4,4'-DDT	14 J
Endrin Ketone	16 J
TCL-INORs (mg/kg)	
Aluminum	14400
Barium	162
Beryllium	3.6
Cadmium	1.3 J
Calcium	105000
Chromium	11.8
Cobalt	2.4 J
Cyanide	1.2
Lead	138 J
Magnesium	21000
Manganese	1300
Mercury	0.81 J
Potassium	578 J
Sodium	728 J
Vanadium	9.8 J
Zinc	207 J
Iron	14300
EP-Toxicity-Metals (ug/L)	
Barium	1480
Cadmium	6.6 J
Chromium	6.3 J
Lead	200

Exploration:	CD-108
Date Sampled:	13-Oct-94
[Trench]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
Chrysene	31 J
Fluoranthene	65 J
TCL-PESTs/PCBs (ug/kg)	
4,4'-DDT	17 JN
TCL-INORs (mg/kg)	
Aluminum	9290
Antimony	20.7
Arsenic	8.8
Barium	96.6
Beryllium	0.86 J
Cadmium	6.5 J
Calcium	73600
Chromium	30.8
Cobalt	12.8 J
Lead	256 J
Magnesium	13900
Manganese	3820
Mercury	0.39 J
Nickel	38.3
Potassium	1480 J
Sodium	657 J
Vanadium	53.6
Zinc	1790 J
Iron	97600
EP-Toxicity-Metals (ug/L)	
Barium	779
Cadmium	7.4 J
Chromium	7.4 J

Exploration:	CD-106
Date Sampled:	13-Oct-94
[Trench]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
2-Methylnaphthalene	49 J
Acenaphthene	180 J
Acenaphthylene	48 J
Anthracene	320 J
Benzo(a)Anthracene	940 J
Benzo(a)Pyrene	560 J
Benzo(b)Fluoranthene	600 J
Benzo(g,h,i)perylene	200 J
Benzo(k)Fluoranthene	480 J
Carbazole	150 J
Chrysene	990 J
Dibenz(a,h)Anthracene	67 J
Dibenzofuran	140 J
Fluoranthene	2000 J
Fluorene	200 J
Indeno(1,2,3-c,d)Pyrene	220 J
Naphthalene	140 J
Phenanthrene	1600 J
Pyrene	1800 J
TCL-PESTs/PCBs (ug/kg)	
4,4'-DDT	6.7 J
TCL-INORs (mg/kg)	
Aluminum	5510
Antimony	30.1
Arsenic	5.0
Barium	90.0
Beryllium	0.79 J
Cadmium	5.5 J
Calcium	31900
Chromium	136
Cobalt	21.1
Lead	342 J
Magnesium	3320
Manganese	3600
Mercury	1.1 J
Nickel	66.8
Potassium	574 J
Sodium	256 J
Vanadium	75.5
Zinc	1240 J
Iron	186000
EP-Toxicity-Metals (ug/L)	
Barium	726
Cadmium	8.9 J
Chromium	6.2 J
Lead	115

Exploration:	CD-107
Date Sampled:	13-Oct-94
[Sump]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
2-Methylnaphthalene	320 J
Acenaphthene	130 J
Anthracene	95 J
Benzo(a)Anthracene	170 J
Benzo(b)Fluoranthene	110 J
Benzo(k)Fluoranthene	110 J
Chrysene	260 J
Dibenzofuran	77 J
Fluoranthene	310 J
Fluorene	300 J
N-Nitrosodiphenylamine	220 J
Phenanthrene	830 J
Pyrene	260 J
TCL-PESTs/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	4820
Arsenic	6.7
Barium	101
Cadmium	5.0 J
Calcium	198000
Chromium	47.2
Cobalt	16.1 J
Lead	231 J
Magnesium	10200
Manganese	7770
Mercury	1.1 J
Nickel	25.1
Potassium	619 J
Sodium	407 J
Vanadium	65.5
Zinc	831 J
Iron	110000
EP-Toxicity-Metals (ug/L)	
Barium	1120
Chromium	8.6 J

LEGEND

- 578.19 — GROUNDWATER ELEVATIONS (MSL) MEASURED ON 11/29/94
- MW ⊕ — MONITORING WELL LOCATION
- SS △ — SURFACE SOIL SAMPLE LOCATION
- CD/CL ⊕ — STRUCTURE SEDIMENT/ LIQUID SAMPLE
- WT Ⓐ — DRUM SAMPLE LOCATION

CD = SUMP SEDIMENT SAMPLE

WT = DRUM SAMPLE

J = ESTIMATED

R = REJECTED

- = NON-DETECT

ug/L = MICROGRAMS PER LITER

ug/kg = MICROGRAMS PER KILOGRAM

mg/Kg = MILLIGRAMS PER KILOGRAM

FORMER IRON ORE STORAGE AREA
FORMER BLAST FURNACE #4
FORMER BLAST FURNACE #3
FORMER BLAST FURNACE #2
FORMER BLAST FURNACE #1
MANHOLE
CD/CL-102
(DRUM SAMPLE) WT-102
MW-107 576.49
(SOIL ADJACENT TO DRUM) WT-101
GRAVEL DRIVE
METAL BUILDING
CD/CL-106
CD/CL-107
SS-113
SS-112
SS-114
TRENCH
SUSPECTED LOCATION OF FORMER TRANSFORMER WRECKING
MW-106 578.30
SS-111
SS-110
OIL SHACK
SUSPECTED OIL TANK SITE
2 STORY BRICK BLDG.
CD/CL-108
TRENCH
CD/CL-105
MANHOLE
FORMER CASTING HOUSE
SERVICE ROAD
CD/CL-103
CD/CL-104
GRAVEL DRIVE
CD/CL-101
TRENCH

0 75 150 300 FEET

SCALE: 1"=150'

FIGURE 10
DRUM SAMPLE (WT) AND SUMP SEDIMENT (CD) RESULTS
OIL SHACK AREA
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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Exploration:	CL-103
Date Sampled:	12-Oct-94
pH:	8.1
[Basement]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Barium	36.0 J
Calcium	77100
Lead	4.0
Magnesium	8740
Manganese	119 J
Mercury	0.74
Potassium	16600
Sodium	28800
Zinc	50.5
Iron	319 J

Exploration:	CL-105
Date Sampled:	13-Oct-94
pH:	7.9
[Valve Pit]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	4260
Barium	273
Calcium	69400
Copper	189
Lead	189 J
Magnesium	10600
Manganese	1150 J
Mercury	0.46
Nickel	36.2 J
Potassium	5300
Sodium	6210
Zinc	972
Iron	18800 J

Exploration:	CL-106
Date Sampled:	13-Oct-94
pH:	9.9
[Trench]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
Benzo(a)Anthracene	1.0 J
Chrysene	2.0 J
Fluoranthene	3.0 J
Phenanthrene	2.0 J
Pyrene	3.0 J
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	311
Barium	24.4 J
Calcium	87000
Copper	6.4 J
Cyanide	50.0
Lead	44.7
Magnesium	3030 J
Manganese	113 J
Potassium	39300
Sodium	20400
Zinc	82.2
Iron	1060 J

Exploration:	CL-102
Date Sampled:	12-Oct-94
pH:	8.3
[Basement]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	88.0 J
Barium	21.0 J
Calcium	128000
Copper	9.1 J
Cyanide	140
Lead	18.1
Magnesium	7720
Manganese	55.9 J
Nickel	27.5 J
Potassium	42900
Sodium	30100
Zinc	81.0
Iron	1090 J

Exploration:	CL-107
Date Sampled:	13-Oct-94
pH:	12.3
[Sump]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	222
Barium	34.1 J
Calcium	111000
Cyanide	70.0
Magnesium	1840 J
Manganese	13.5 J
Potassium	37000
Sodium	19900
Iron	56.8 J
EP-Toxicity-Metals (ug/L)	
Barium	28.8 J

Exploration:	CL-108
Date Sampled:	13-Oct-94
pH:	9.5
[Trench]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
Diethylphthalate	3.0 J
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	1210
Barium	60.2 J
Calcium	112000
Copper	14.9 J
Lead	24.6
Magnesium	4430
Manganese	915 J
Potassium	31700
Sodium	34100
Zinc	135
Iron	3940 J

Exploration:	CL-104
Date Sampled:	12-Oct-94
pH:	8.8
[Trench]	
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
Fluoranthene	1.0 J
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	522
Barium	21.0 J
Calcium	48600
Copper	22.2 J
Lead	22.8
Magnesium	7600
Manganese	191 J
Potassium	6750
Sodium	12100
Zinc	37.0
Iron	1660 J

Exploration:	CL-101	CL-101 (DUP)
Date Sampled:	12-Oct-94	12-Oct-94
pH:	8.2	8.2
[Oil/Water Separator]		
TCL-VOAs (ug/L)	-	-
TCL-SVOAs (ug/L)		
Isophorone	13 J	4.0 J
TCL-PESTs/PCBs (ug/L)	-	-
TCL-INORs (ug/L)		
Aluminum	25100	35200
Antimony	65.0 J	70.1 J
Arsenic	14.1 J	R
Barium	602 J	824 J
Beryllium	6.8 J	8.2 J
Cadmium	30.6 J	46.7 J
Calcium	377000	491000
Chromium	187	223
Cobalt	19.1 J	28.7 J
Copper	380 J	722 J
Lead	740 J	1570 J
Magnesium	71900	87500
Manganese	7110 J	10500 J
Mercury	1.6	2.0
Nickel	70.4 J	98.4 J
Potassium	70200	67300
Sodium	30300	29300
Vanadium	360	378
Zinc	2230	3680
Iron	88400 J	134000 J

LEGEND

CD/CL STRUCTURE SEDIMENT/ LIQUID SAMPLE

J = ESTIMATED

– = NON–DETECT

ug/L = MICROGRAMS PER LITER

R = REJECTED

0 75 150 300 FEET

SCALE: 1"=150'

FIGURE 11
SUMP LIQUID (CL) RESULTS
OIL SHACK AREA
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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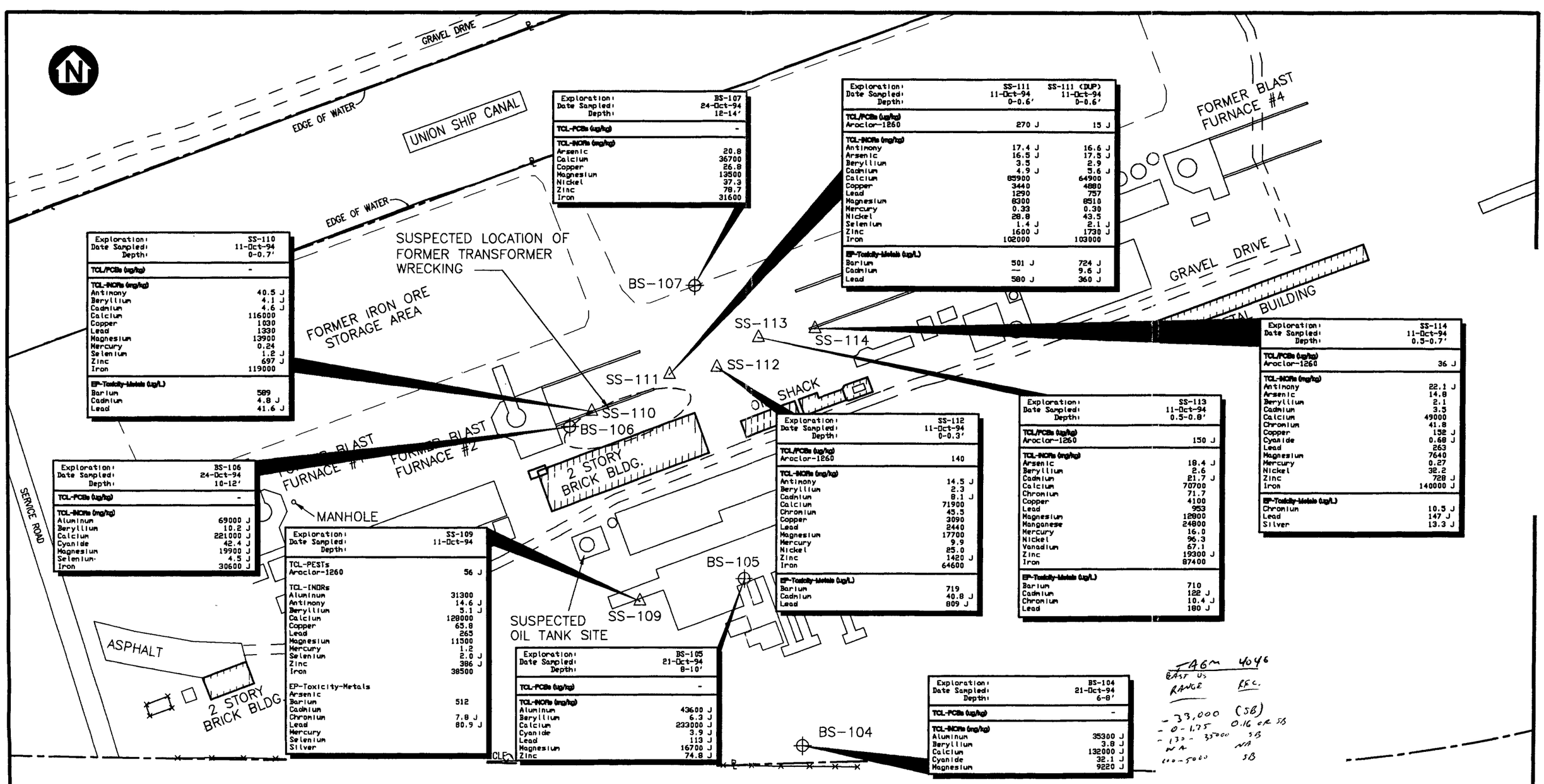

Exploration:	BS-107
Date Sampled:	24-Oct-94
Depth:	12-14'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Arsenic	20.8
Calcium	36700
Copper	26.8
Magnesium	13500
Nickel	37.3
Zinc	78.7
Iron	31600

Exploration:	SS-110
Date Sampled:	11-Oct-94
Depth:	0-0.7'
TCL/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Antimony	40.5 J
Beryllium	4.1 J
Cadmium	4.6 J
Calcium	116000
Copper	1030
Lead	1330
Magnesium	13900
Mercury	0.24
Selenium	1.2 J
Zinc	697 J
Iron	119000
EP-Toxicity-Metals (ug/L)	
Barium	589
Cadmium	4.8 J
Lead	41.6 J

Exploration:	SS-111	SS-111 (DUP)
Date Sampled:	11-Oct-94	11-Oct-94
Depth:	0-0.6'	0-0.6'
TCL/PCBs (ug/kg)		
Aroclor-1260	270 J	15 J
TCL-INORs (mg/kg)		
Antimony	17.4 J	16.6 J
Arsenic	16.5 J	17.5 J
Beryllium	3.5	2.9
Cadmium	4.9 J	5.6 J
Calcium	85900	64900
Copper	3440	4880
Lead	1290	757
Magnesium	8300	8510
Mercury	0.33	0.30
Nickel	28.8	43.5
Selenium	1.4 J	2.1 J
Zinc	1600 J	1730 J
Iron	102000	103000
EP-Toxicity-Metals (ug/L)		
Barium	501 J	724 J
Cadmium	—	9.6 J
Lead	580 J	360 J

Exploration:	SS-114
Date Sampled:	11-Oct-94
Depth:	0.5-0.7'
TCL/PCBs (ug/kg)	
Aroclor-1260	36 J
TCL-INORs (mg/kg)	
Antimony	22.1 J
Arsenic	14.8
Beryllium	2.1
Cadmium	3.5
Calcium	49000
Chromium	41.8
Copper	152 J
Cyanide	0.68 J
Lead	263
Magnesium	7640
Mercury	0.27
Nickel	32.2
Zinc	728 J
Iron	140000 J
EP-Toxicity-Metals (ug/L)	
Chromium	10.5 J
Lead	147 J
Silver	13.3 J

Exploration:	SS-113
Date Sampled:	11-Oct-94
Depth:	0.5-0.8'
TCL/PCBs (ug/kg)	
Aroclor-1260	150 J
TCL-INORs (mg/kg)	
Arsenic	18.4 J
Beryllium	2.6
Cadmium	21.7 J
Calcium	70700
Chromium	71.7
Copper	4100
Lead	953
Magnesium	12800
Manganese	24800
Mercury	16.0
Nickel	96.3
Vanadium	67.1
Zinc	19300 J
Iron	87400
EP-Toxicity-Metals (ug/L)	
Barium	710
Cadmium	122 J
Chromium	10.4 J
Lead	180 J

Exploration:	SS-112
Date Sampled:	11-Oct-94
Depth:	0-0.3'
TCL/PCBs (ug/kg)	
Aroclor-1260	140
TCL-INORs (mg/kg)	
Antimony	14.5 J
Beryllium	2.3
Cadmium	8.1 J
Calcium	71900
Chromium	45.5
Copper	3090
Lead	2440
Magnesium	17700
Mercury	9.9
Nickel	85.0
Zinc	1420 J
Iron	64600
EP-Toxicity-Metals (ug/L)	
Barium	719
Cadmium	40.8 J
Lead	809 J

Exploration:	BS-106
Date Sampled:	24-Oct-94
Depth:	10-12'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	69000 J
Beryllium	10.2 J
Calcium	221000 J
Cyanide	42.4 J
Magnesium	19900 J
Selenium	4.5 J
Iron	30600 J

Exploration:	SS-109
Date Sampled:	11-Oct-94
Depth:	
TCL-PESTs	
Aroclor-1260	56 J
TCL-INORs	
Aluminum	31300
Antimony	14.6 J
Beryllium	3.1 J
Calcium	128000
Copper	65.8
Lead	265
Magnesium	11500
Mercury	1.2
Selenium	2.0 J
Zinc	386 J
Iron	38500
EP-Toxicity-Metals	
Arsenic	
Barium	512
Cadmium	
Chromium	7.8 J
Lead	80.9 J
Mercury	
Selenium	
Silver	

Exploration:	BS-105
Date Sampled:	21-Oct-94
Depth:	8-10'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	43600 J
Beryllium	6.3 J
Calcium	233000 J
Cyanide	3.9 J
Lead	113 J
Magnesium	16700 J
Zinc	74.8 J

Exploration:	BS-104
Date Sampled:	21-Oct-94
Depth:	6-8'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	35300 J
Beryllium	3.8 J
Calcium	132000 J
Cyanide	32.1 J
Magnesium	9220 J

TAGM 4046

EAST US RANGE	REC.
- 33,000	(SB)
- 0 - 1.75	0.16 OR SB
- 130 - 33000	SB
NA	NA
100 - 5000	SB

LEGEND

SS
SURFACE SOIL SAMPLE LOCATION

SS = SURFACE SOIL SAMPLE

BS = SUBSURFACE SOIL SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/kg = MICROGRAMS PER KILOGRAM

mg/Kg = MILLIGRAMS PER KILOGRAM

ug/L = MICROGRAMS PER LITER

NOTE:

TCL VOC, TCL SVOC, AND TCL PESTICIDE RESULTS ARE NOT SHOWN. TCL INORGANICS DATA PRESENTED ARE ONLY CONCENTRATIONS OF ANALYTES EXCEEDING NYS BACKGROUND CONCENTRATIONS.

0 75 150 300 FEET

SCALE: 1"=150'

FIGURE 12
SURFACE SOIL (SS) AND SUBSURFACE SOIL (BS) RESULTS
OIL SHACK AREA
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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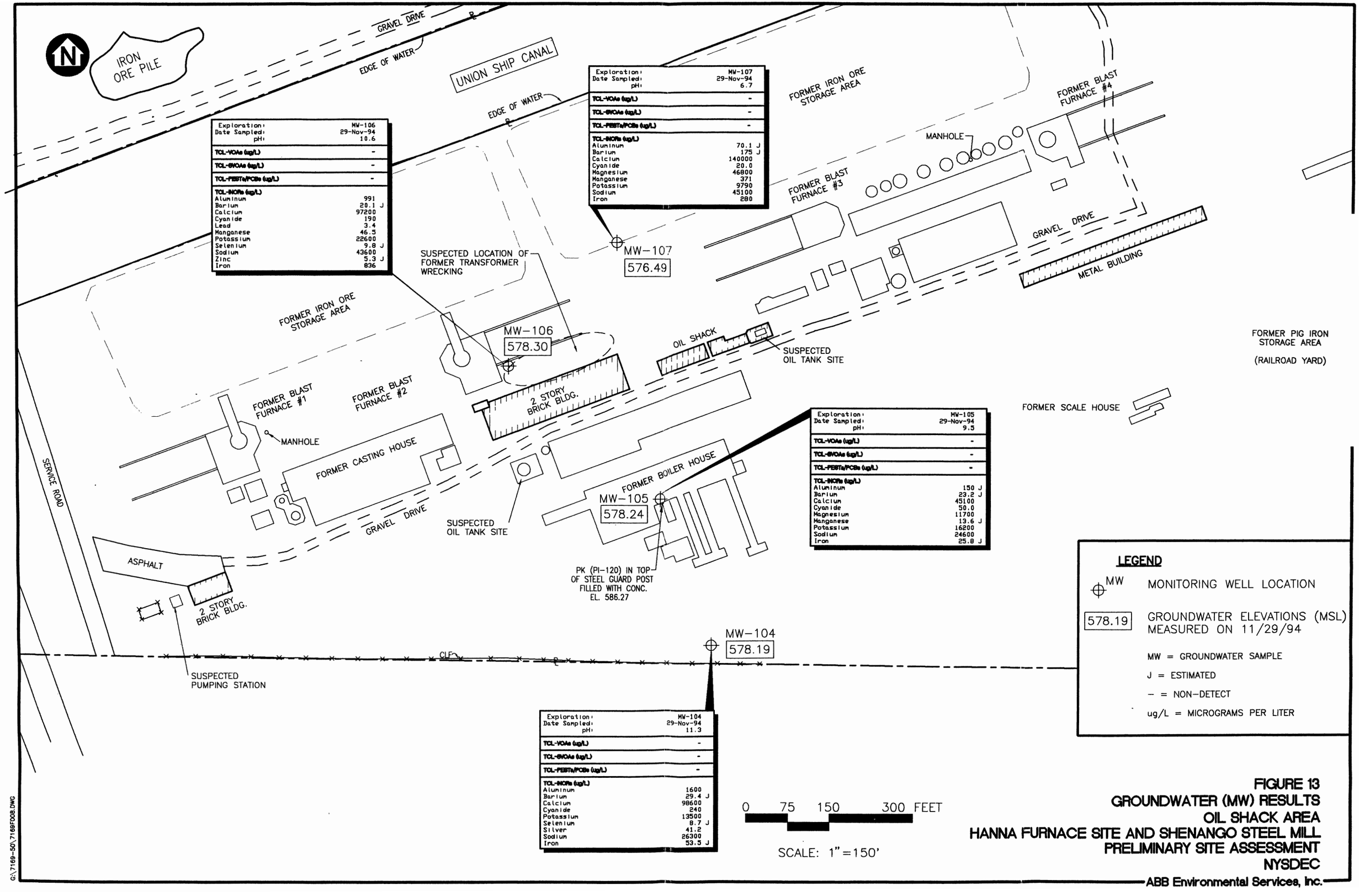

Exploration:	MW-106
Date Sampled:	29-Nov-94
pH:	10.6
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	991
Barium	20.1 J
Calcium	97200
Cyanide	190
Lead	3.4
Manganese	46.5
Potassium	22600
Selenium	9.8 J
Sodium	43600
Zinc	5.3 J
Iron	836

Exploration:	MW-107
Date Sampled:	29-Nov-94
pH:	6.7
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	70.1 J
Barium	175 J
Calcium	140000
Cyanide	20.0
Magnesium	46800
Manganese	371
Potassium	9790
Sodium	45100
Iron	280

Exploration:	MW-105
Date Sampled:	29-Nov-94
pH:	9.5
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	150 J
Barium	23.2 J
Calcium	45100
Cyanide	50.0
Magnesium	11700
Manganese	13.6 J
Potassium	16200
Sodium	24600
Iron	25.8 J

Exploration:	MW-104
Date Sampled:	29-Nov-94
pH:	11.3
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	1600
Barium	29.4 J
Calcium	98600
Cyanide	240
Potassium	13500
Selenium	8.7 J
Silver	41.2
Sodium	26300
Iron	53.5 J

LEGEND

MW — MONITORING WELL LOCATION

578.19 — GROUNDWATER ELEVATIONS (MSL) MEASURED ON 11/29/94

MW = GROUNDWATER SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/L = MICROGRAMS PER LITER

FIGURE 13
GROUNDWATER (MW) RESULTS
OIL SHACK AREA
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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DEBRIS LANDFILL

APPROX. LIMIT OF LANDFILL

FLUE ASH/FILTER CAKE DISPOSAL AREA

ASPHALT

SERVICE ROAD

SERVICE ROAD

SUSPECTED FMR WATER INTAKES

JB COMP

SW/SD-104
571.60

TRENCH

SW/SD-103

N/F
JORDAN & FOSTER SCRAP CO.
L. 9240 P. 523
T.M. 132.19-1-4

GRAVEL DRIVE

UNION SHIP CANAL

EDGE OF WATER

SW-105

SD-105

EDGE OF WATER

OIL/WATER SEPARATOR

SW/SD-106

TO BUFFALO INNER HARBOR/LAKE ERIE

CLF

CLF

SW/SD-107

642'± WEST

SERVICE ROAD

Exploration:	SW-104
Date Sampled:	11-Oct-94
pH:	7.9
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	
bis(2-Ethylhexyl)phthalate	1.0 J
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	289 J
Barium	21.6 J
Calcium	37900
Lead	9.4 J
Magnesium	8220
Potassium	4270 J
Sodium	12500
Zinc	65.2 J

Exploration:	SW-106
Date Sampled:	11-Oct-94
pH:	8.1
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	
4-Methylphenol	2.0 J
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	21700 J
Arsenic	16.6
Barium	212
Beryllium	2.5 J
Cadmium	2.0 J
Calcium	134000
Chromium	59.8
Cobalt	18.4 J
Copper	127
Lead	455
Magnesium	22800
Mercury	0.54
Nickel	79.9
Potassium	6140
Sodium	13000
Vanadium	60.7
Zinc	1180 J

Exploration:	SW-103
Date Sampled:	12-Oct-94
pH:	8.6
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Barium	21.0 J
Calcium	36000
Magnesium	8770
Potassium	3510 J
Sodium	14100

Exploration:	SW-107
Date Sampled:	12-Oct-94
pH:	8.6
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs	
Barium	18.0 J
Calcium	30700
Magnesium	8710
Potassium	911 J
Sodium	12000

Exploration:	SW-105
Date Sampled:	12-Oct-94
pH:	8.6
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Barium	21.0 J
Calcium	34700
Magnesium	8670
Potassium	3000 J
Sodium	14100

0 75 150 300 FEET

SCALE: 1" = 150'

LEGEND

△ SW/SD — SURFACE WATER/SEDIMENT SAMPLE LOCATION

578.19 — SURFACE WATER ELEVATION (MSL) MEASURED ON 11/29/94

SW = SURFACE WATER SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/L = MICROGRAMS PER LITER

FIGURE 14
SURFACE WATER (SW) RESULTS
UNION SHIP CANAL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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N

SERVICE ROAD

DEBRIS LANDFILL

APPROX. LIMIT OF LANDFILL

FLUE ASH/FILTER CAKE DISPOSAL AREA

N/F JORDAN & FOSTER SCRAP CO. L. 9240 P. 523 T.M. 132.19-1-4

GRAVEL DRIVE

IRON ORE PILE

UNION SHIP CANAL

EDGE OF WATER

SERVICE ROAD

SW-106 (NO SEDIMENT COLLECTED)

SW-105

SD-105

OIL/WATER SEPARATOR

EDGE OF WATER

SUSPECTED FMR WATER INTAKES

IRON ORE PILE

36" CMP

SW/SD-104

571.60

TRENCH

SW/SD-103

CLF

TO BUFFALO INNER HARBOR/LAKE ERIE

CLF

SW/SD-107

642'± WEST

SERVICE ROAD

0 75 150 300 FEET

SCALE: 1"=150'

Exploration:	SD-107
Date Sampled:	12-Oct-94
TCL-VOAs (ug/kg)	
Acetone	12 J
Tetrachloroethene	3.0 J
TCL-SVOAs (ug/kg)	
1,2,4-Trichlorobenzene	760
4-Methylphenol	80 J
Acenaphthene	85 J
Acenaphthylene	630
Anthracene	1800
Benzo(a)Anthracene	2700
Benzo(a)Pyrene	1600
Benzo(b)Fluoranthene	1600
Benzo(g,h,i)perylene	340 J
Benzo(k)Fluoranthene	1100
Carbazole	96 J
Chrysene	2800
Dibenzofuran	330 J
Fluoranthene	4000
Fluorene	680
Indeno(1,2,3-c,d)Pyrene	440 J
Phenanthrene	3600
Pyrene	4800
bis(2-Ethylhexyl)phthalate	220 J
TCL-PESTs/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	4870
Arsenic	6.1
Barium	70.8
Calcium	154000
Chromium	38.8 J
Copper	14.1
Lead	45.4
Magnesium	7320
Manganese	420
Potassium	591 J
Sodium	260 J
Vanadium	11.9 J
Zinc	161
Iron	11000
EP-Toxicity-Metals (ug/L)	
Barium	1430
Cadmium	2.3 J
Chromium	11.6
Lead	31.5

Exploration:	SD-104
Date Sampled:	11-Oct-94
TCL-VOAs (ug/kg)	
2-Butanone	3.0 J
TCL-SVOAs (ug/kg)	
2-Methylnaphthalene	86 J
Benzo(a)Anthracene	430 J
Benzo(a)Pyrene	690 J
Benzo(b)Fluoranthene	790 J
Benzo(g,h,i)perylene	130 J
Benzo(k)Fluoranthene	770 J
Chrysene	700 J
Fluoranthene	590 J
Indeno(1,2,3-c,d)Pyrene	290 J
Phenanthrene	240 J
Pyrene	710 J
TCL-PESTs/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	7260
Arsenic	3.0 J
Barium	81.2
Beryllium	0.55
Cadmium	2.2 J
Calcium	72500
Chromium	48.6
Cobalt	8.6 J
Copper	30.7
Lead	132
Magnesium	6260
Manganese	1270
Mercury	0.13
Nickel	17.1
Potassium	1410
Sodium	496 J
Vanadium	20.2
Zinc	846
Iron	46600
EP-Toxicity-Metals (ug/L)	
Barium	588
Chromium	9.2 J
Lead	153
Silver	6.8 J

Exploration:	SD-105
Date Sampled:	12-Oct-94
[Oil/Water Separator]	
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
Acenaphthylene	410 J
Anthracene	330 J
Benzo(a)Anthracene	2000 J
Benzo(a)Pyrene	2400 J
Benzo(b)Fluoranthene	2300 J
Benzo(g,h,i)perylene	940 J
Benzo(k)Fluoranthene	2200 J
Chrysene	3100
Fluoranthene	1800 J
Phenanthrene	440 J
Pyrene	4800
bis(2-Ethylhexyl)phthalate	720 J
TCL-PESTs/PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Aluminum	6230
Arsenic	21.4
Barium	77.3
Cadmium	2.8 J
Calcium	42500
Chromium	37.3 J
Cobalt	9.3 J
Copper	82.4
Lead	333
Magnesium	16900
Manganese	3020
Nickel	28.8
Potassium	335 J
Vanadium	34.8
Zinc	799
Iron	82300
EP-Toxicity-Metals (ug/L)	
Barium	834

Exploration:	SD-103
Date Sampled:	12-Oct-94
TCL-VOAs (ug/kg)	-
TCL-SVOAs (ug/kg)	
Benzo(a)Anthracene	120 J
Benzo(a)Pyrene	46 J
Benzo(b)Fluoranthene	100 J
Benzo(k)Fluoranthene	75 J
Chrysene	220 J
Fluoranthene	280 J
Phenanthrene	160 J
Pyrene	290 J
bis(2-Ethylhexyl)phthalate	87 J
TCL-PESTs/PCBs (ug/kg)	
4,4'-DDD	2.7 JN
TCL-INORs (mg/kg)	
Aluminum	19600
Arsenic	9.0
Barium	188
Beryllium	3.5
Cadmium	1.8 J
Calcium	159000
Chromium	10.8
Cobalt	5.0 J
Copper	23.4
Lead	84.2
Magnesium	18200
Manganese	2500
Nickel	11.2
Potassium	1640
Sodium	530 J
Vanadium	20.6
Zinc	392
Iron	43400
EP-Toxicity-Metals (ug/L)	
Barium	1520
Cadmium	5.2 J
Chromium	9.7

LEGEND

SW/SD — SURFACE WATER/SEDIMENT SAMPLE LOCATION

578.19 — SURFACE WATER ELEVATION (MSL) MEASURED ON 11/29/94

SD = CANAL SEDIMENT SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/kg = MICROGRAMS PER KILOGRAM

mg/Kg = MILLIGRAMS PER KILOGRAM

ug/L = MICROGRAMS PER LITER

FIGURE 15
SEDIMENT (SD) RESULTS
UNION SHIP CANAL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINEARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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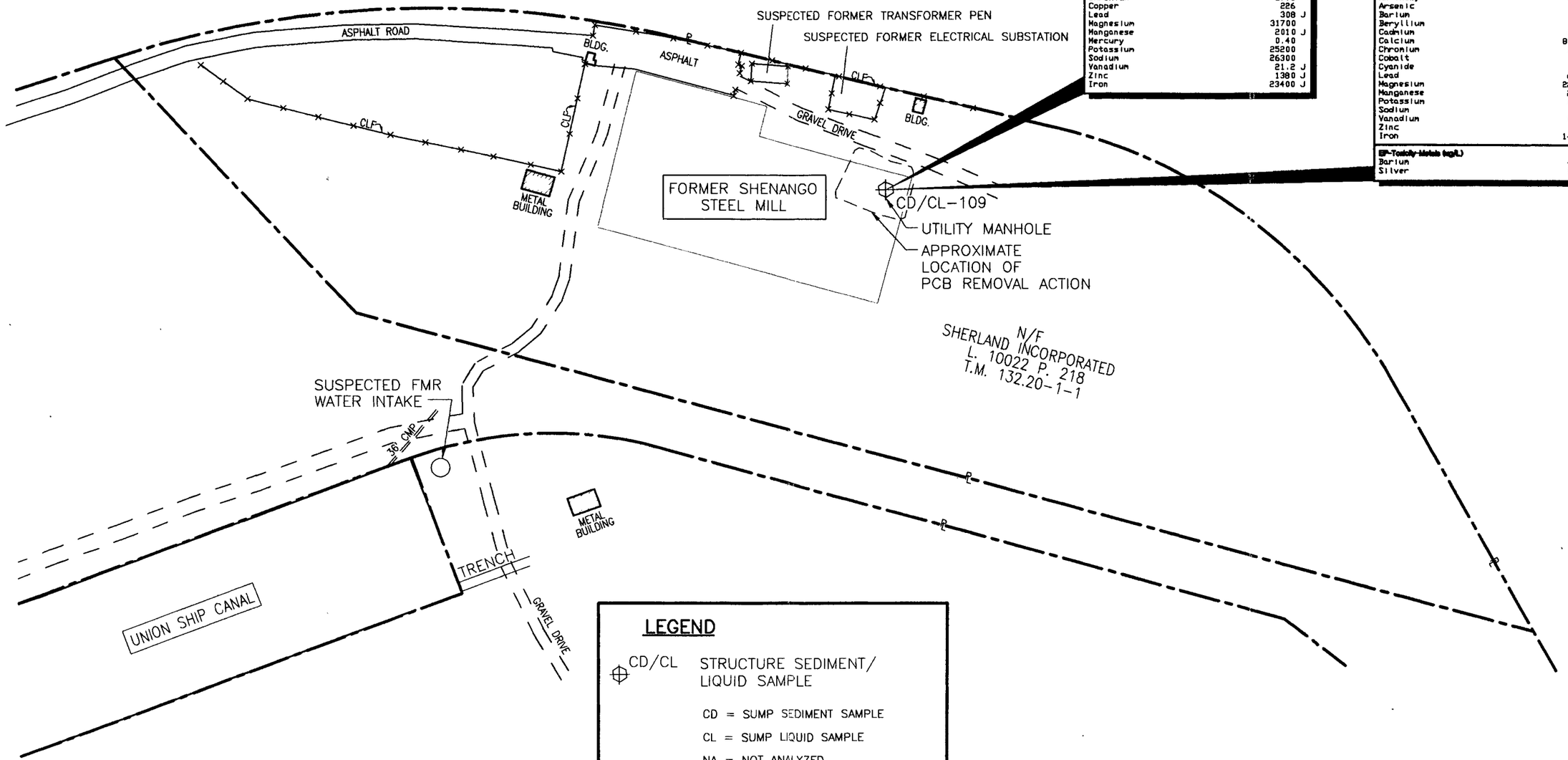
Exploration:	CL-109
Date Sampled:	11-Oct-94
pH:	NA
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	
1,2,4-Trichlorobenzene	10 J
Pyrene	4.0 J
TCL-PESTs/PCBs (ug/L)	
Aroclor-1260	28 J
TCL-INORGs (ug/L)	
Aluminum	15400 J
Arsenic	6.0 J
Barium	236
Cadmium	2.1 J
Calcium	171000
Chromium	27.8
Copper	226
Lead	308 J
Magnesium	31700
Manganese	2810 J
Mercury	0.40
Potassium	25200
Sodium	26300
Vanadium	21.2 J
Zinc	1380 J
Iron	23400 J

Exploration:	CD-109
Date Sampled:	11-Oct-94
TCL-VOAs (ug/kg)	
Toluene	3.0 J
TCL-SVOAs (ug/kg)	
1,2,4-Trichlorobenzene	9200 J
Chrysene	1800 J
Dimethylphthalate	1200 J
TCL-PESTs/PCBs (ug/kg)	
Aroclor-1260	7700 J
TCL-INORGs (mg/kg)	
Aluminum	15400
Antimony	13.3 J
Arsenic	2.4 J
Barium	151
Beryllium	2.8 J
Cadmium	0.87 J
Calcium	81900
Chromium	17.1
Cobalt	2.3 J
Cyanide	1.2
Lead	62.6 J
Magnesium	22300
Manganese	2120
Potassium	1370
Sodium	879 J
Vanadium	13.3
Zinc	311 J
Iron	14000
EP-Toxicity-Metals (mg/L)	
Barium	449
Silver	15.5



LEGEND

CD/CL — STRUCTURE SEDIMENT/ LIQUID SAMPLE

CD = SUMP SEDIMENT SAMPLE

CL = SUMP LIQUID SAMPLE

NA = NOT ANALYZED

J = ESTIMATED

– = NON–DETECT

ug/L = MICROGRAMS PER LITER

ug/kg = MICROGRAMS PER KILOGRAM

mg/Kg = MILLIGRAMS PER KILOGRAM

0 75 150 300 FEET

SCALE: 1"=150'

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FIGURE 16
SUMP SEDIMENT (CD) AND SUMP LIQUID (CL) RESULTS
SHENANGO STEEL MILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

Exploration:	SS-119
Date Sampled:	10-Oct-94
Depth:	0.5-0.6'
TCL-PCBs (ug/kg)	
Aroclor-1260	84 J
TCL-INORs (mg/kg)	
Beryllium	3.4
Calcium	125000
Copper	26.4 J
Lead	89.9
Magnesium	25600
Zinc	239
Iron	22900 J
EP-Toxicity-Metals (ug/L)	
Chromium	5.0 J
Lead	53.9 J

Exploration:	SS-120
Date Sampled:	10-Oct-94
Depth:	0-0.5'
TCL-PCBs (ug/kg)	
Aroclor-1260	730 J
TCL-INORs (mg/kg)	
Aluminum	36200
Beryllium	5.6
Calcium	161000
Copper	19.0 J
Lead	63.5
Magnesium	38800
Mercury	0.23
Zinc	143
Iron	16200 J
EP-Toxicity-Metals (ug/L)	
Cadmium	2.9 J
Chromium	9.3 J
Lead	166 J

Exploration:	SS-116
Date Sampled:	10-Oct-94
Depth:	0-0.5'
TCL-PCBs (ug/kg)	
Aroclor-1260	450 J
TCL-INORs (mg/kg)	
Beryllium	3.0
Calcium	121000
Copper	23.1 J
Lead	1830
Magnesium	30400
Selenium	1.6 J
Zinc	141
Iron	10800 J
EP-Toxicity-Metals (ug/L)	
Lead	2080 J
Silver	12.2 J

Exploration:	SS-115	SS-115 (DUP)
Date Sampled:	10-Oct-94	10-Oct-94
Depth:	0-0.5'	0-0.5'
TCL-PCBs (ug/kg)		
Aroclor-1260	78 J	76 J
TCL-INORs (mg/kg)		
Copper	21.0 J	21.7 J
Lead	157	141
Magnesium	6640	8480
Zinc	785	801
Iron	20400 J	20800 J
EP-Toxicity-Metals (ug/L)		
Cadmium	6.5 J	5.0 J
Chromium	7.3 J	5.0 J
Lead	121 J	142 J
Silver	6.1 J	--

Exploration:	SS-117
Date Sampled:	10-Oct-94
Depth:	0.2-0.3'
TCL-PCBs (ug/kg)	
Aroclor-1260	33000 J
TCL-INORs (mg/kg)	
Beryllium	2.2
Cadmium	6.2 J
Calcium	80400
Copper	307 J
Lead	398
Magnesium	20200
Mercury	1.1
Zinc	812
Iron	55300 J
EP-Toxicity-Metals ug/L)	
Cadmium	28.6 J
Chromium	8.6 J
Lead	75.3 J

Exploration:	SS-122
Date Sampled:	10-Oct-94
Depth:	0-0.5'
TCL-PCBs (ug/kg)	
Aroclor-1260	49 J
TCL-INORs (mg/kg)	
Aluminum	31700
Beryllium	6.8
Calcium	144000
Copper	215 J
Cyanide	1.4 J
Lead	248
Magnesium	37600
Mercury	0.52
Selenium	2.2 J
Zinc	371
EP-Toxicity-Metals (ug/L)	-

Exploration:	SS-118
Date Sampled:	11-Oct-94
Depth:	0-0.5'
TCL-PCBs (ug/kg)	
Aroclor-1260	81000 J
TCL-INORs (mg/kg)	
Antimony	14.2 J
Cadmium	5.0 J
Calcium	75700
Lead	167
Cobalt	77.7
Copper	76.4
Zinc	7900 J
Magnesium	10100
Iron	47400
Nickel	34.5 J
EP-Toxicity-Metals (ug/L)	
Barium	424

Exploration:	SS-124
Date Sampled:	10-Oct-94
Depth:	0.5-0.8'
TCL-PCBs (ug/kg)	
Aroclor-1260	80 J
TCL-INORs (mg/kg)	
Calcium	66700
Copper	40.6 J
Lead	163
Magnesium	12900
Zinc	175
Iron	27300 J
EP-Toxicity-Metals (ug/L)	
Cadmium	2.2 J
Chromium	8.0 J
Lead	48.0 J

Exploration:	SS-123
Date Sampled:	11-Oct-94
Depth:	0-1.0'
TCL-PCBs (ug/kg)	-
TCL-INORs	NO TCL INORs above NYS Background
EP-Toxicity-Metals (ug/L)	
Barium	390
Chromium	5.3 J
Lead	96.0 J
Silver	11.1 J

Exploration:	SS-125
Date Sampled:	10-Oct-94
Depth:	0.5-0.6'
TCL-PCBs (ug/kg)	
Aroclor-1260	1100 J
TCL-INORs (mg/kg)	
Aluminum	25400
Beryllium	3.8
Calcium	119000
Copper	68.5 J
Lead	128
Magnesium	25000
Mercury	1.7
Zinc	259
Iron	30900 J
EP-Toxicity-Metals (ug/L)	
Arsenic	82.3 J
Chromium	11.6
Lead	87.4 J

Exploration:	SS-121
Date Sampled:	11-Oct-94
Depth:	0-0.5'
TCL-PCBs (ug/kg)	-
TCL-INORs (mg/kg)	
Copper	28.4
EP-Toxicity-Metals (ug/L)	
Barium	443
Cadmium	3.2 J
Lead	83.9 J

ASPHALT ROAD
BLDG.
ASPHALT
CLF
SUSPECTED FORMER TRANSFORMER PEN
SUSPECTED FORMER ELECTRICAL SUBSTATION
SS-120
SS-115
BLDG.
GRAVEL DRIVE
SS-116
SS-117
SS-122
SS-119
METAL BUILDING
FORMER SHENANGO STEEL MILL
APPROXIMATE LOCATION OF PCB REMOVAL ACTION
SS-118
SS-125
SS-121
SS-123
N/F SHERLAND INCORPORATED L. 10022 P. 218 T.M. 132.20-1-1
SUSPECTED FMR WATER INTAKE
36" CMP
SS-124
METAL BUILDING
TRENCH
GRAVEL DRIVE
UNION SHIP CANAL

NOTE:

TCL VOC, TCL SVOC, AND TCL PESTICIDE RESULTS ARE NOT SHOWN. TCL INORGANICS DATA PRESENTED ARE ONLY CONCENTRATIONS OF ANALYTES EXCEEDING NYS BACKGROUND CONCENTRATIONS.

LEGEND

SS SURFACE SOIL SAMPLE LOCATION

SS = SURFACE SOIL SAMPLE
J = ESTIMATED
- = NON-DETECT
ug/kg = MICROGRAMS PER KILOGRAM
mg/Kg = MILLIGRAMS PER KILOGRAM
ug/L = MICROGRAMS PER LITER

0 75 150 300 FEET

SCALE: 1"=150'

FIGURE 17
SURFACE SOIL (SS) RESULTS
SHENANGO STEEL MILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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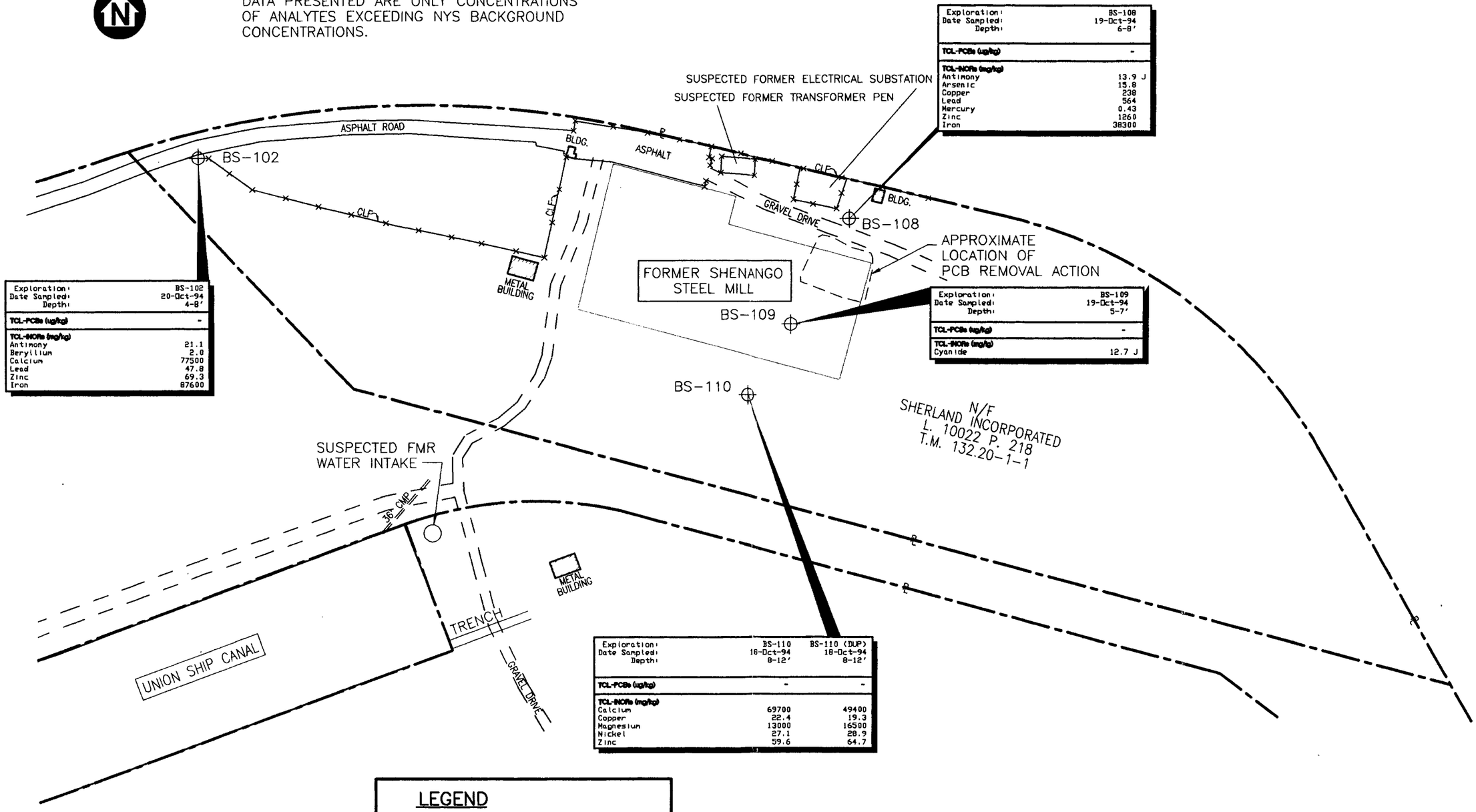
NOTE:

TCL VOC, TCL SVOC, AND TCL PESTICIDE RESULTS ARE NOT SHOWN. TCL INORGANICS DATA PRESENTED ARE ONLY CONCENTRATIONS OF ANALYTES EXCEEDING NYS BACKGROUND CONCENTRATIONS.



Exploration:	BS-102
Date Sampled:	20-Oct-94
Depth:	4-8'
TCL-PCBs (ug/kg)	-
TCL-INORGs (mg/kg)	
Antimony	21.1
Beryllium	2.0
Calcium	77500
Lead	47.8
Zinc	69.3
Iron	87600

Exploration:	BS-108
Date Sampled:	19-Oct-94
Depth:	6-8'
TCL-PCBs (ug/kg)	-
TCL-INORGs (mg/kg)	
Antimony	13.9 J
Arsenic	15.8
Copper	238
Lead	564
Mercury	0.43
Zinc	1260
Iron	38300

Exploration:	BS-109
Date Sampled:	19-Oct-94
Depth:	5-7'
TCL-PCBs (ug/kg)	-
TCL-INORGs (mg/kg)	
Cyanide	12.7 J

Exploration:	BS-110	BS-110 (DUP)
Date Sampled:	16-Oct-94	18-Oct-94
Depth:	8-12'	8-12'
TCL-PCBs (ug/kg)	-	-
TCL-INORGs (mg/kg)		
Calcium	69700	49400
Copper	22.4	19.3
Magnesium	13000	16500
Nickel	27.1	28.9
Zinc	59.6	64.7

0 75 150 300 FEET

SCALE: 1"=150'

LEGEND

BS BORING LOCATION

BS = BORING SOIL SAMPLE

J = ESTIMATED

mg/Kg = MILLIGRAMS PER KILOGRAM

ug/Kg = MICROGRAMS PER KILOGRAM

FIGURE 18
SUBSURFACE SOIL (BS) RESULTS
SHENANGO STEEL MILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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Exploration:	MW-102
Date Sampled:	29-Nov-94
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Barium	60.4 J
Calcium	97800
Magnesium	10900
Manganese	1220
Potassium	13500
Sodium	14900
Iron	505

Exploration:	MW-108
Date Sampled:	29-Nov-94
pH:	7.4
TCL-VOAs (ug/L)	
1,1,1-Trichloroethane	2.0 J
1,1-Dichloroethane	95
Benzene	5.0 J
Chloroethane	26
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Arsenic	5.6 J
Barium	101 J
Calcium	129000
Magnesium	23800
Manganese	1730
Potassium	10000
Sodium	17300
Iron	13600

Exploration:	MW-109
Date Sampled:	29-Nov-94
pH:	10.8
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	1240
Barium	52.6 J
Calcium	181000
Cyanide	20.0
Manganese	35.8
Potassium	26500
Sodium	45300
Iron	1370

Exploration:	MW-110
Date Sampled:	29-Nov-94
pH:	6.9
TCL-VOAs (ug/L)	-
TCL-SVOAs (ug/L)	-
TCL-PESTs/PCBs (ug/L)	-
TCL-INORs (ug/L)	
Aluminum	71.3 J
Arsenic	7.4 J
Barium	297
Calcium	148000
Magnesium	51700
Manganese	430
Potassium	4270 J
Sodium	54500
Iron	940

ASPHALT ROAD
MW-102
576.63
CLF
BLDG.
ASPHALT
SUSPECTED FORMER TRANSFORMER PEN
SUSPECTED FORMER ELECTRICAL SUBSTATION
GRAVEL DRIVE
MW-108
578.81
METAL BUILDING
FORMER SHENANGO STEEL MILL
APPROXIMATE LOCATION OF PCB REMOVAL ACTION
MW-109
579.80
MW-110
579.33
N/F SHERLAND INCORPORATED L. 10022 P. 218 T.M. 132.20-1-1
SUSPECTED FMR WATER INTAKE
36" CMP
SS-124
UNION SHIP CANAL
TRENCH
GRAVEL DRIVE

LEGEND

MW — MONITORING WELL LOCATION

578.19 — GROUNDWATER ELEVATIONS (MSL) MEASURED ON 11/29/94

MW = GROUNDWATER SAMPLE

J = ESTIMATED

– = NON-DETECT

ug/L = MICROGRAMS PER LITER

0 75 150 300 FEET

SCALE: 1"=150'

FIGURE 19
GROUNDWATER (MW) RESULTS
SHENANGO STEEL MILL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT
NYSDEC

ABB Environmental Services, Inc.

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EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES	I. IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: UNKNOWN

II. PAST RESPONSE ACTIVITIES (Continued)

01 _ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 _ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 11 - ENFORCEMENT INFORMATION	I. IDENTIFICATION	
		01 STATE New York	01 SITE NUMBER UNKNOWN

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION _ YES _ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

In 1993, NYSDEC Region 9 Spill Response received a call from an informant indicating that a transformer near the Hanna Furnace property had been dismantled to salvage copper and that transformer oil had been spilled. A site visit by NYSDEC located the transformer site on the foundation of the former Shenango Steel Mill. In addition to the transformer location, an adjacent former utility structure (sump) was found to contain oil floating on water and NYSDEC observed 17 55-gallon drums and 25 5-gallon pails. NYSDEC Region 9 Spill Response performed a removal action comprised of disposal of the transformer casing, removal of visibly contaminated building foundation material and soil, and removal of all 55-gallon containers and 5-gallon pails in September - October 1994. Later immunoassay screening by NYSDEC and site assessment analytical results show PCB concentrations at the spill area continue to exceed 50 mg/kg after the removal action. Drum/pail contents were combined/overpacked for disposal. Laboratory analysis of discrete and composite samples collected for disposal purposes detected the following: Aroclor-1260 (16.6 mg/L); TCLP barium (up to 3.4 mg/L); TCLP lead (up to 151 mg/L); TCLP benzene (up to 6.1 mg/L); TCLP MEK (up to 12.9 mg/L); TCLP PCE (up to 12.4 mg/L); TCLP TCE (up to 17 mg/L). Materials had flashpoints of 74° to 127° F. Petroleum hydrocarbon fingerprinting characterized some sampled material as lubricating oil. The materials were disposed of as toxicity-characteristic and ignitability-characteristic hazardous wastes.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

TABLE 14
FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL SURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SS-101	SS-101 D	SS-102	SS-103	SS-104	SS-105	SS-106	SS-107	SS-108
Cyanide	1	4.1 J	11.4 J	8.7 J	--	5.8 J	--	--	--	--
Iron	20	156000 J	181000 J	114000 J	343000 J	186000 J	159000 J	124000 J	124000 J	116000 J
Lead	0.6	4460	4460	3240	523	5880	500	294	222	337
Magnesium	1000	10600	10800	13200	5700	7800	11800	7670	10200	11400
Manganese	3	4720	4860	4220	7540	3670	4940	4310	4430	4260
Mercury	0.1	0.1	0.1	0.1	--	0.3	0.1	0.3	0.3	--
Nickel	8	82.7	95.4	37.7	183	87.6	62.4	28.8	15.9	24.5
Potassium	1000	1220	1180	3730	691 J	818 J	4250	1330	805 J	2650
Selenium	1	2.2 J	--	2.6 J	--	2.3 J	--	--	--	--
Sodium	1000	353 J	542 J	764 J	301 J	272 J	535 J	404 J	916 J	656 J
Thallium	2	7.3	6.2	8.1	--	7.7	--	1.5 J	--	--
Vanadium	10	62.2	67.2	44.1	85.2	55.5	52.6	45.6	44.4	39.8
Zinc	4	4500	4710	3290	942	4860	1010	780	457	729
EPTOX Metals (µg/L)	RL									
Arsenic	52	52 J	--	--	--	--	--	--	--	--
Cadmium	2	52.4 J	50.4 J	96.6 J	--	144 J	5 J	2.9 J	--	--
Chromium	5	--	--	6.5 J	6 J	7.7 J	8.4 J	--	7.9 J	--
Lead	26	410 J	352 J	752 J	49.8 J	1630 J	91.2 J	--	85.4 J	55.7 J
Silver	5	--	--	--	--	6.1 J	--	--	--	--

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
D = Duplicate
-- = Non Detect
J = Estimated
RL = Reporting Limit
µg/L = micrograms per liter
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
R = Rejected result
EPTOX = Extraction Procedure Toxicity
TCL = Target Compound List

TABLE 15
DEBRIS LANDFILL TEST PIT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	PS-101 9' bgs	PS-102 5' bgs	PS-103 7' bgs	PS-104 9' bgs	PS-104 D 9'bgs	PS-105 7' bgs	PS-106 11' bgs	PS-107 6' bgs	PS-108 10' bgs
TCL Volatile Organic Compounds[1] (µg/kg)										
Acetone	10	--	--	5 J	5 J	--	4 J	--	6 J	--
Benzene	10	--	--	--	2 J	--	--	--	--	--
Carbon Disulfide	10	--	--	2 J	--	--	--	--	--	--
Ethylbenzene	10	3 J	--	--	--	--	--	--	--	--
Toluene	10	2 J	--	--	--	--	--	--	--	--
Total Xylenes	10	2 J	--	--	--	--	--	--	--	--
TCL Semivolatile Organic Compounds[1] (µg/kg)										
Acenaphthylene	330	--	110 J	--	--	--	--	--	--	--
2-Methylnaphthalene	330	87 J	200 J	220 J	--	--	60 J	--	--	--
Acenaphthene	330	340 J	250 J	150 J	--	--	72 J	67 J	--	150 J
Anthracene	330	130 J	270 J	140 J	--	--	53 J	75 J	--	49 J
Benzo(a)Anthracene	330	1000 J	1700 J	760 J	13000 J	5000 J	400 J	3300	99 J	3800 J
Benzo(a)Pyrene	330	1200 J	1900 J	790 J	16000 J	6600 J	450	4400	--	3000 J
Benzo(b)Fluoranthene	330	990 J	1900 J	830 J	17000 J	6600 J	520	5000	71 J	4900 J
Benzo(g,h,i)perylene	330	420 J	680 J	290 J	6100 J	2000 J	190 J	1200	--	1100 J
Benzo(k)Flouranthene	330	1100 J	1100 J	550 J	11000 J	4900 J	350 J	2200	--	1500 J
Carbazole	330	48 J	--	--	--	--	--	87 J	--	--
Chrysene	330	1100 J	2100 J	1000 J	17000 J	6700 J	530	5200	180 J	6300 J
Dibenz(a,h)Anthracene	330	46 J	58 J	--	540 J	--	--	90 J	--	98 J
Dibenzofuran	330	70 J	180 J	100 J	--	--	--	--	--	--
Fluoranthene	330	1200 J	1400 J	1100 J	14000 J	5400 J	480	4200	320 J	3700 J
Fluorene	330	83 J	210 J	92 J	--	--	49 J	--	--	--
Indeno(1,2,3-c,d)Pyrene	330	570 J	910 J	350 J	7800 J	2900 J	240 J	1600	--	1400 J
Naphthalene	330	110 J	220 J	140 J	--	--	110 J	53 J	67 J	--
Phenanthrene	330	580 J	1200 J	700 J	1800 J	660 J	240 J	610	310 J	470 J
Pyrene	330	1300 J	2500 J	1400 J	15000 J	6000 J	530	3800	330 J	3200 J
bis(2-Ethylhexyl)phthalate	330	140 J	210 J	74 J	--	--	60 J	--	86 J	--
Di-N-butylphthalate	330	--	--	--	--	--	--	53 J	--	--
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)										
Aroclor-1248	33	68 J	88 J	100	R	--	140	180	85	--
Aroclor-1260	33	150	120	49 J	R	--	120	260	120	--
Endrin Ketone	3.3	--	--	7.8 J	R	--	6 J	--	--	--

TABLE 15
DEBRIS LANDFILL TEST PIT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	PS-101 9' bgs	PS-102 5' bgs	PS-103 7' bgs	PS-104 9' bgs	PS-104 D 9'bgs	PS-105 7' bgs	PS-106 11' bgs	PS-107 6' bgs	PS-108 10' bgs
TCL Inorganic Analytes[1] (mg/kg)										
Aluminum	40	8310	11300	4100	7560	6110	19600	6500	5010	5290
Antimony	12	10.3 J	21.8	11.8 J	--	--	9.4 J	--	16.5	--
Arsenic	2	11.5	7.7	6.7	2.2 J	2.0 J	10.6	3.9	12.8	4.8
Barium	40	87.8	155	65.4	17.1 J	12.4 J	109	17.5 J	74.1	33.2 J
Beryllium	1	1.3	2.3	0.5 J	--	--	1.3	--	0.9 J	--
Cadmium	1	4.8 J	3.8 J	3.6 J	R	--	4.4	--	5.1 J	1.5 J
Calcium	1000	40700	68000	32500	772 J	473 J	42100	1080 J	24800	4680
Chromium	2	33.6	84.1	112	7.7	6.1	98.8	6.4	82.7	8
Cobalt	10	14.3	11.9	12.4	--	--	12.3	--	21.3	2.6 J
Copper	5	210	163	120	2.0 J	--	136	2.3 J	214	6.4 J
Iron	20	163000	93300	124000	9890	8350	121000	8630	227000	6810
Lead	0.6	217	330	669	7.6 J	5.9 J	318	18.6 J	414	11.2 J
Magnesium	1000	9350	15300	9910	725 J	496 J	11300	--	5800	995 J
Manganese	3	5110	4290	3720	146	106	3150	102	5220	130
Mercury	0.1	0.4	0.4	0.1	--	--	0.2	--	--	--
Nickel	8	23	55.3	39.2	--	--	39.4	--	136	--
Potassium	1000	2920	1390	1470	868 J	814 J	13300	955 J	1270 J	725 J
Sodium	1000	550 J	835 J	463 J	324 J	279 J	749 J	431 J	406 J	451 J
Vanadium	10	55.2	39.7	50.2	10.8	8.8 J	45.6	10.3 J	64.9	9.8 J
Zinc	4	1440	459	417	6.2	6.4	1230	13.8	941	23.9

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
D = Duplicate
J = Estimated
mg/kg = milligrams per kilogram
R = Rejected Result
TCL = Target Compound List
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

TABLE 16

FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL SOIL BORING SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	BS–101 4–6' bgs	BS–102 4–8' bgs	BS–103 8–10' bgs
TCL Volatile Organic Compounds[1] (µg/kg)				
2–Butanone	10	--	--	23 J
Acetone	10	--	--	100 J
Ethylbenzene	10	--	2 J	--
TCL Semivolatile Organic Compounds[1]				
2–Methylnaphthalene	330	110 J	1600 J	120 J
Acenaphthene	330	--	390 J	--
Anthracene	330	--	160 J	--
Benzo(a)Anthracene	330	--	400 J	100 J
Benzo(a)Pyrene	330	--	430 J	62 J
Benzo(b)Fluoranthene	330	--	450 J	87 J
Benzo(g,h,i)perylene	330	--	93 J	--
Benzo(k)Fluoranthene	330	--	470 J	80 J
Fluoranthene	330	--	710 J	230 J
Fluorene	330	--	380 J	--
Indeno(1,2,3–c,d)Pyrene	330	--	270 J	--
Naphthalene	330	110 J	340 J	84 J
Phenanthrene	330	81 J	1200 J	370 J
Pyrene	330	--	580 J	260 J
Chrysene	330	--	470 J	160 J
TCL Pesticide/Polychlorinated Biphenyl Compounds				
Pesicide/Polychlorinated Biphenyl Compounds were not detected in any samples.				
TCL Inorganic Analytes[1] (mg/kg)				
Aluminum	40	29900 J	15700	11800
Antimony	12	--	21.1	31.7
Arsenic	2	35.1 J	7.7	36.9
Barium	40	224 J	106	146
Beryllium	1	2.4 J	2.0	2.0
Cadmium	1	2.4 J	1.3	17.4
Calcium	1000	249000 J	77500	60600
Chromium	2	53.4 J	15.5	38.6
Cobalt	10	13.7 J	9.7 J	28.7
Copper	5	31.7 J	11.5	86.4
Cyanide	1	--	--	17.5 J
Iron	20	19300 J	87600	53300
Lead	0.6	144 J	47.8	1830
Magnesium	1000	5360 J	16900	12500
Manganese	3	216 J	2260	7560
Nickel	8	25.6 J	9.2	49.7
Potassium	1000	53600 J	902 J	4990
Sodium	1000	2090 J	906 J	992 J
Thallium	2	4.2 J	--	5.0
Vanadium	10	62.2 J	36.6	95.1
Zinc	4	491 J	69.3	8750

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non–detect in all samples are not listed.

-- = Non Detect

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

J = Estimated

mg/kg = milligrams per kilogram

TCL = Target Compound List

µg/kg = micrograms per kilogram

TABLE 17
DEBRIS LANDFILL AREA SURFACE WATER SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSEMENT

COMPOUND/ANAYLTE	CRQL/ CRDL	CLASS C[2] SURFACE WATER QUALTIY STANDARD	SW-101	SW-102	SW-102 D
TCL Volatile Organic Compounds[1] (µg/L)					
Acetone	10	--	9 J	21 J	16 J
TCL Semivolatile Organic Compounds[1] (µg/L)					
Semivolatile Organic Compounds were not detected in any samples					
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/L)					
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples.					
TCL Inorganic Analytes[1] (µg/L)					
Aluminum	200	100	148 J	83.9 J	225 J
Arsenic	10	190[3]	8.6 J	--	--
Barium	200	NS	14.8 J	27 J	27 J
Calcium	5000	NS	125000	114000	112000
Copper	25	e	14.7 J	--	6.4 J
Lead	3	g	4.3 J	14.8 J	26.4 J
Magnesium	5000	NS	2070 J	5840	5820
Potassium	5000	NS	375000	361000	354000
Sodium	5000	NS	146000	201000	192000
Zinc	20	h	16.1 J	35.4 J	47.9 J
pH	NA	8.5	9.5	9.0	NA

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detect in all samples are not listed.

[2] Class C Surface Water Quality Standards 6 NYCRR Parts 700-705.

[3] NYS Surface Water Quality Standards for arsenic are for dissolved arsenic.

-- = Non Detect

e = exp (0.8545[ln(ppm Hardness)]-1.465) apply to acid-soluble form = 31.2 (based on Average Hardnesss)

g = exp (1.266[ln(ppm Hardness)]-4.661) apply to acid-soluble form = 13.5 (based on Average Hardness)

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

D = Duplicate

h = exp (0.85[Ln(ppm Hardness)] + 0.50) = 217 (based on Average Hardness)

Hardness = 2.497 [Ca] + 4.116 [Mg]

J = Estimated

NA = not analyzed

NS = No standard has been promulgated

TCL = Target Compound List

µg/L = micrograms per liter

TABLE 18
DEBRIS LANDFILL AREA SEDIMENT RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SD-101	SD-102	SD-102 D
TCL Volatile Organic Compounds[1] (µg/kg)				
Volatile Organic Compounds were not detected in any samples.				
TCL Semivolatile Organic Compounds[1] (µg/kg)				
2-Methylnaphthalene	330	430 J	360 J	--
Acenaphthene	330	--	370 J	--
Anthracene	330	--	310 J	--
Benzo(a)Anthracene	330	810 J	1500 J	440 J
Benzo(a)Pyrene	330	1000 J	2000 J	590 J
Benzo(b)Fluoranthene	330	1300 J	2000 J	600 J
Benzo(g,h,i)perylene	330	480 J	800 J	180 J
Benzo(k)Fluoranthene	330	690 J	1800 J	590 J
Chrysene	330	1100 J	1900 J	680 J
Fluoranthene	330	1200 J	2100 J	780 J
Fluorene	330	--	340 J	--
Indeno(1,2,3-c,d)Pyrene	330	660 J	1100 J	310 J
Naphthalene	330	880 J	570 J	210 J
Phenanthrene	330	910 J	1400 J	500 J
Pyrene	330	1400 J	2600 J	920 J
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)				
Pesticide\Polychlorinated Biphenyl Compounds were not detected in any samples.				
TCL Inorganic Analytes[1] (mg/kg)				
Aluminum	40	8600 J	11200 J	7800 J
Antimony	12	33.5 J	27.9 J	19.8 J
Arsenic	2	14.3 J	15.8 J	14.8 J
Barium	40	76.6 J	97 J	60.9 J
Beryllium	1	0.9 J	1.6 J	1.0 J
Cadmium	1	4.0 J	1.9 J	3.9 J
Calcium	1000	114000 J	81800 J	60500 J
Chromium	2	98.6 J	50.2 J	43.5 J
Cobalt	10	19.7 J	15 J	13.7 J
Copper	5	212 J	120 J	106 J
Cyanide	1	1.4 J	--	--
Iron	20	131000 J	118000 J	96200 J
Lead	0.6	754 J	731 J	716 J
Magnesium	1000	10600 J	14900 J	10500 J
Manganese	3	4160 J	4150 J	3050 J
Mercury	0.1	0.4 J	0.4 J	0.4 J
Nickel	8	61.2 J	27.6 J	29.4 J
Potassium	1000	4390 J	4010 J	3320 J
Sodium	1000	843 J	912 J	826 J
Vanadium	10	50.1 J	50.9 J	40.3 J
Zinc	4	1470 J	1360 J	1140 J
EPTOX[1] Metals (µg/L)	**RL**			
Barium	11	549	471	466
Cadmium	2	2.6 J	--	--
Chromium	5	--	--	6.7 J
Lead	26	132	144 J	189 J

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
D = Duplicate
J = Estimated
mg/kg = milligrams per kilogram
RL = Reporting Limit
TCL = Target Compound List
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
EPTOX = Extraction Procedure Toxicity

TABLE 19
DEBRIS LANDFILL AREA GROUNDWATER SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	NYS CLASS GA[2]	MW-101	MW-101 D	MW-102	MW-103
TCL Volatile Organic Compounds[1] (µg/L)						
Volatile Organic Compounds were not detected in any samples.						
TCL Semivolatile Organic Compounds[1] (µg/L)						
2,4-Dimethylphenol	10	1[3]	--	1.0 J	--	--
4-Methylphenol	10	1[3]	2.0 J	3.0 J	--	--
Naphthalene	10	10	--	2.0 J	--	--
Pentachlorophenol	25	1[3]	1.0 J	--	--	--
bis(2-Ethylhexyl)phthalate	10	50	--	2.0 J	--	--
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/L)						
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples						
TCL Inorganic Analytes[1] (µg/L)						
Aluminum	200	NS	797	881	--	184 J
Arsenic	10	25	--	--	--	5.7 J
Barium	200	1000	100 J	104 J	60.4 J	61.3 J
Calcium	5000	NS	110000	114000	97800	78500
Chromium	10	50	12.9 J	17.7	--	--
Cyanide	10	100	3090	2960	--	510
Iron	100	300[4]	1100	1180	505	1730
Lead	3	25	--	--	--	3.3 J
Magnesium	5000	35000G	--	--	10900	7840
Manganese	15	300[4]	--	--	1220	137
Potassium	5000	NS	823000	861000	13500	467000
Selenium	5	10	8.0 J	12.2 J	--	--
Sodium	5000	20000	64800	65800	14900	191000
Vanadium	50	NS	24.1 J	25.6 J	--	--
Zinc	20	300	--	--	--	15.4 J
pH	NA	6.5	12.3	NA	7.5	8.2

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.

[2] Class GA Groundwater Quality Standards 6 NYCRR parts 700-705.

[3] NYS Groundwater Phenol Standard of 1.0 µg/L is for total phenolic compounds

[4] When iron and manganese are both present, NYS Class GA Standard is 500 µg/L for the total concentration of both compounds.

-- = Non Detect

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

G = Guidance Value

J = Estimated

NA = not analyzed

NS = No standard has been promulgated for this compound.

TCL = Target Compound List

µg/L = micrograms per liter

TABLE 20
OIL SHACK AREA DRUM SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	WT--101	WT--101 D	WT--102
TCL Volatile Organic Compounds[1] (µg/kg)				
Ethylbenzene	1200	170 J	--	--
Toluene	1200	310 J	510 J	--
Total Xylenes	1200	3000 J	840 J	--
TCL Semivolatile Organic Compounds[1] (µg/kg)				
Fluorene	10000	--	--	1400 J
Phenanthrene	10000	--	--	8700 J
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)				
Endrin	3.3	R	R	160 J
TCL Inorganic Analytes[1] (mg/kg)				
Aluminum	40	11300	14500	360
Antimony	12	--	12.9	826
Arsenic	2	3.6 J	3.4 J	4.9 J
Barium	40	119	142	4.8 J
Beryllium	1	2.2	3.2	--
Cadmium	1	3.6	2.9	--
Calcium	1000	60900	75000	2320
Chromium	2	51.6	39.2	--
Cobalt	10	4.3 J	4.6 J	--
Copper	5	80.1 J	93.7 J	8.9 J
Cyanide	1	--	0.8 J	--
Iron	20	45000	40000	668
Lead	0.6	182	229 J	6050 J
Magnesium	1000	12400	15000	439 J
Manganese	3	1870	1420	48.6
Mercury	0.1	--	0.1	--
Nickel	8	26.1	18.6	--
Potassium	1000	555 J	734 J	--
Sodium	1000	481 J	511 J	135 J
Thallium	2	--	1.6 J	--
Vanadium	10	19.3	15.8	--
Zinc	4	1330	1060	29.5
EPTOX Metals[1] (µg/L)	RL			
Arsenic	52	--	--	75 J
Barium	11	386 J	431 J	330 J
Lead	26	--	34.1 J	1380 J

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
D = Duplicate
J = Estimated
mg/kg = milligrams per kilogram
R = Rejected Result
RL = Reporting Limit
TCL = Target Compound List
µg/L = micrograms per liter
µg/kg = micrograms per kilogram
EPTOX = Extraction Procedure Toxicity

TABLE 21
OIL SHACK AREA SUMP LIQUID SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	CL-101	CL-101 D	CL-102	CL-103	CL-104	CL-105	CL-106	CL-107	CL-108
TCL Volatile Organic Compounds[1] (µg/L)										
Volatile Organic Compounds were not detected in any samples.										
TCL Semivolatile Organic Compounds[1]										
Isophorone	10	13 J	4 J	--	--	--	--	--	--	--
Diethylphthalate	10	R	--	--	--	--	--	--	--	3 J
Phenanthrene	10	--	--	--	--	--	--	2 J	--	--
Fluoranthene	10	--	--	--	--	1J	--	3 J	--	--
Pyrene	10	--	--	--	--	--	--	3 J	--	--
Benzo(a)Athracene	10	--	--	--	--	--	--	1 J	--	--
Chrysene	10	--	--	--	--	--	--	2 J	--	--
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/L)										
Pesticide/Polychlorinated Biphenyls were not detected in any samples.										
TCL Inorganic Analytes[1] (µg/L)										
Aluminum	200	25100	35200	88 J	--	522	4260	311	222	1210
Antimony	60	65 J	70.1 J	--	--	--	--	--	--	--
Arsenic	10	14.1 J	R	--	--	--	--	--	--	--
Barium	200	602 J	824 J	21 J	36 J	21	273	24.4 J	34.1 J	60.2 J
Beryllium	5	6.8 J	8.2 J	--	--	--	--	--	--	--
Cadmium	5	30.6 J	46.7 J	--	--	--	--	--	--	--
Calcium	5000	377000	491000	128000	77100	48600	69400	87000	111000	112000
Chromium	10	187	223	--	--	--	--	--	--	--
Cobalt	50	19.1 J	28.7 J	--	--	--	--	--	--	--
Copper	25	380 J	722 J	9.1 J	--	22.2 J	189	6.4 J	--	14.9 J
Cyanide	10	--	--	140	--	--	--	50	70	--
Iron	100	88400 J	134000 J	1890 J	319 J	1660 J	18800 J	1060 J	56.8 J	3940 J
Lead	3	740	1570 J	18.1	4	22.8	189 J	44.7	--	24.6
Magnesium	5000	71900	87500	7720	8740	7600	10600	3030	1840	4430
Manganese	15	7110 J	10500 J	55.9 J	119 J	191 J	1150 J	113 J	13.5 J	915 J
Mercury	0.2	1.6	2	--	0.74	--	0.46	--	--	--
Nickel	40	70.4	98.4 J	27.5	--	--	36.2 J	--	--	--
Potassium	5000	70200	67300	42900	16600	6750	5300	39300	37000	31700
Sodium	5000	30300	29300	30100	28800	12100	6210	20400	19900	34100
Vanadium	50	360	378	--	--	--	--	--	--	--
Zinc	20	2230	3680	81	50.5	37	972	82.2	--	135

TABLE 21
OIL SHACK AREA SUMP LIQUID SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	CL-101	CL-101 D	CL-102	CL-103	CL-104	CL-105	CL-106	CL-107	CL-108
EPTOX Metals[1] (µg/L)	RL									
Barium	11	NA	NA	NA	NA	NA	NA	NA	22.8	NA
pH		8.16	NA	8.28	8.1	8.8	7.89	9.89	12.3	9.5

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detect in all samples are not listed.
-- = Non detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
EPTOX = Extraction Procedure Toxicity
D = Duplicate
J = Estimated
µg/L = micrograms per liter
R = Rejected
RL = Reporting Limit
TCL = Target Compound List
NA = Not analyzed

TABLE 22
OIL SHACK AREA SUMP SEDIMENT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	CD-101	CD-101 D	CD-102	CD-103	CD-104	CD-105	CD-106	CD-107	CD-108
TCL Volatile Organic Compounds[1] (µg/kg)										
Ethylbenzene	10	--	--	--	--	--	4 J	--	--	--
TCL Semivolatile Organic Compounds[1] (µg/kg)										
2-Methylnaphthalene	330	42000 J	17000 J	--	3000 J	--	110 J	49 J	320 J	--
4-Methylphenol	330	5000 J	5300 J	--	--	--	--	--	--	--
Acenaphthene	330	9300 J	5600 J	--	--	1000 J	120 J	180 J	130 J	--
Acenaphthylene	330	2600 J	1800	--	--	3100	180 J	48 J	--	--
Anthracene	330	4600 J	3900 J	--	--	4800	320 J	320 J	95 J	--
Benzo(a)Anthracene	330	9200	12000 J	180 J	--	16000	1400 J	940 J	170 J	--
Benzo(a)Pyrene	330	7600	10000 J	120 J	--	10000	170 J	560 J	--	--
Benzo(b)Fluoranthene	330	8300	11000 J	400 J	--	15000	1000 J	600 J	110 J	--
Benzo(g,h,i)perylene	330	5000 J	5900 J	140 J	--	4400	--	200 J	--	--
Benzo(k)Fluoranthene	330	6500	10000 J	330 J	--	7400	680 J	480 J	110 J	--
Carbazole	330	1300 J	1400 J	--	--	1800 J	93 J	150 J	--	--
Chrysene	330	12000	16000 J	730	3700 J	17000	1400 J	990 J	260 J	51 J
Dibenz(a,h)Anthracene	330	--	--	--	--	2000 J	--	67 J	--	--
Dibenzofuran	330	3400 J	--	--	--	1400 J	140 J	140 J	77 J	--
Fluoranthene	330	14000	19000 J	1000	--	30000	2400 J	2000 J	310 J	65 J
Fluorene	330	9700	6400 J	--	2100 J	2000 J	300 J	200 J	300 J	--
Indeno(1,2,3-c,d)Pyrene	330	5000 J	6500 J	170 J	--	5200	170 J	220 J	--	--
N-Nitrosodiphenylamine	330	--	--	--	--	--	--	--	220 J	--
Naphthalene	330	--	--	--	--	--	100 J	140 J	--	--
Phenanthrene	330	29000	24000 J	600	6000 J	19000	1800 J	1600 J	830 J	--
Phenol	330	3300 J	3800 J	--	--	--	--	--	--	--
Pyrene	330	18000 J	22000 J	870	3700 J	27000	1300 J	1800 J	260 J	--
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)										
4,4'-DDT	3.3	R	R	R	R	R	14 J	6.7 J	--	17 J
Aldrin	1.7	R	280 J	R	R	R	--	--	--	--
Endosulfan I	1.7	R	79 J	R	R	R	--	--	--	--
Endrin	3.3	23 JN	R	R	18 JN	R	--	--	--	--
Endrin Ketone	3.3	R	R	R	R	R	16 J	--	--	--
Heptachlor Epoxide	1.7	11 JN	R	R	27 J	R	--	--	--	--
gamma-Chlordane	1.7	R	130 JN	R	R	R	--	--	--	--

TABLE 22
OIL SHACK AREA SUMP SEDIMENT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	CD-101	CD-101 D	CD-102	CD-103	CD-104	CD-105	CD-106	CD-107	CD-108
TCL Inorganic Analytes[1] (mg/kg)										
Aluminum	40	15100	16000 J	6750	5700 J	16200	14400	5510	4820	9290
Antimony	12	--	--	--	15.3 J	--	--	30.1	--	20.7
Arsenic	2	9.7	10.2 J	21	8.3 J	15.3	--	5.0	6.7	8.8
Barium	40	222	249 J	34.7 J	219 J	193	162	90	101	96.6
Beryllium	1	2.8	3.4 J	--	--	2.6	3.6	0.8 J	--	0.9 J
Cadmium	1	9.4 J	11.3 J	7.1 J	6.7 J	4.8 J	1.3 J	5.5 J	5.0 J	6.5 J
Calcium	1000	89500	109000 J	105000	126000 J	79500	105000	31900	198000	73600
Chromium	2	37	43.1 J	97.4	39.5 J	45.4	11.8	136	47.2	30.8
Cobalt	10	10.2 J	8.7 J	12.9 J	8.0 J	13.3 J	2.4 J	21.1	16.1 J	12.8 J
Cyanide	1	--	4 J	--	--	3.6	1.2	--	--	--
Iron	20	59200	61800 J	101000	45500 J	106000	14300	186000	110000	97600
Lead	0.6	591 J	676 J	256 J	631 J	379 J	138 J	342 J	231 J	256 J
Magnesium	1000	15200	17200 J	1900	5730 J	12200	21000	3320	10200	13900
Manganese	3	1960	2320 J	737	1450 J	3170	1300	3600	7770	3820
Mercury	0.1	1.1 J	1.9 J	--	2.2 J	0.8 J	0.8 J	1.1 J	1.1 J	0.4 J
Nickel	8	42.3	48.4 J	34.8	40.9 J	24.2	--	66.8	25.1	38.3
Potassium	1000	2830	3060 J	754 J	642 J	1740	578 J	574 J	619 J	1480 J
Selenium	1	--	--	--	3.9 J	2.3	--	--	--	--
Sodium	1000	711 J	820 J	714 J	230 J	511 J	728 J	256 J	407 J	657 J
Thallium	2	1.7 J	2.3 J	1.6 J	--	--	--	--	--	--
Vanadium	10	42.6	45.4 J	52.1	28.7 J	53.5	9.8 J	75.5	65.5	53.6
Zinc	4	1170 J	1350 J	729 J	1550 J	650 J	207 J	1240 J	831 J	1790 J
EPTOX Metals[1] (µg/L)	RL									
Barium	11	765	814	367	797	849	1480	726	1120	779
Cadmium	2	10.2 J	3.1 J	7.6 J	--	--	6.6 J	8.9 J	--	7.4 J
Chromium	5	15.5 J	9.9 J	12.4	7.4	6.2	6.3 J	6.2 J	8.6 J	7.4 J
Lead	26	292	179	714	273	38.9	200	115	--	--
Mercury	0.2	--	--	--	--	--	0.33 J	R	R	R

Notes:

[1] Only compounds and anlaytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.

-- = Non Detect
CRDL = Contract Required Detection Limits (Inorganics)
CRQL = Contract Required Quanititation Limits (Organics)
D = Duplicate
J = Estimated
mg/kg = milligrams per kilogram
R = Rejected Result
RL = Reporting Limit
TCL = Target Compound List
µg/L = micrograms per liter
µg/kg = micrograms per kilogram
EPTOX = Extraction Procedure Toxicity

TABLE 23
OIL SHACK AREA SURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SS-109	SS-110	SS-111	SS-111 D	SS-112	SS-113	SS-114
TCL Volatile Organic Compounds [1] (µg/kg)								
Toluene	10	--	--	--	2.0 J	--	--	--
TCL Semivolatile Organic Compounds [1] (µg								
2-Methylnaphthalene	330	--	51 J	140 J	97 J	140 J	--	180 J
Acenaphthene	330	3600 J	--	51 J	--	83 J	1500 J	--
Acenaphthylene	330	--	39 J	46 J	--	120 J	--	120 J
Anthracene	330	920 J	--	150 J	92 J	200 J	3300 J	--
Benzo(a)Anthracene	330	7800	150 J	500 J	290 J	540 J	4900 J	200 J
Benzo(a)Pyrene	330	11000	140 J	410	260 J	260 J	1600 J	210 J
Benzo(b)Fluoranthene	330	12000	220 J	610 J	360 J	380 J	2000 J	330 J
Benzo(g,h,i)perylene	330	5200 J	88 J	100 J	58 J	120 J	--	320 J
Benzo(k)Fluoranthene	330	3800 J	150 J	350 J	290 J	400 J	1800 J	330 J
Carbazole	330	--	--	63 J	--	--	1200 J	--
Chrysene	330	8100	230 J	630	380 J	700 J	5400 J	370 J
Di-n-octylphthalate	330	--	--	--	58 J	--	--	150 J
Dibenz(a,h)Anthracene	330	2000 J	--	41 J	--	--	--	R
Dibenzofuran	330	--	--	78 J	53 J	110 J	1100 J	64 J
Fluoranthene	330	7300	230 J	980	640	940	12000	94 J
Fluorene	330	630 J	--	75 J	49 J	95 J	2100 J	--
Indeno(1,2,3-c,d)Pyrene	330	6700	110 J	150 J	92 J	180 J	950 J	310 J
Naphthalene	330	--	60 J	110 J	85 J	140 J	1100 J	150 J
Nitrobenzene	330	--	--	--	39 J	--	--	--
Phenanthrene	330	3500 J	160 J	790	490	790	14000	220 J
Pyrene	330	8200	300 J	1700 J	1000 J	2000	24000	880 J
TCL Pesticide/Polychlorinated Biphenyl Compounds [1] (µg/kg)								
4,4'-DDE	3.3	R	--	14 J	--	--	R	R
Aroclor-1260	33	56 J	--	270 J	15 J	140	150 J	36 J
Dieldrin	3.3	R	--	R	5.6 J	--	R	R
Endosulfan II	3.3	R	--	5.1 JN	--	5 J	R	R
TCL Inorganic Analytes [1] (mg/kg)								
Aluminum	40	31300	19900	19400	17200	12500	14100	13900
Antimony	12	14.6 J	40.5 J	17.4 J	16.6 J	14.5 J	--	22.1 J
Arsenic	2	--	8.8 J	16.5 J	17.5 J	8.7 J	18.4 J	14.8

TABLE 23
OIL SHACK AREA SURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SS-109	SS-110	SS-111	SS-111 D	SS-112	SS-113	SS-114
Barium	40	191	234	272	308	300	311	170
Beryllium	1	5.1 J	4.1 J	3.5	2.9	2.3	2.6	2.1
Cadmium	1	0.9 J	4.6 J	4.9 J	5.6 J	8.1 J	21.7 J	3.5
Calcium	1000	128000	116000	85900	64900	71900	70700	49000
Chromium	2	23.9	26.6	38.6	38	45.5	71.7	41.8
Cobalt	10	7.3 J	12.7	14.6	14.9	7.9 J	17.4	15.7
Copper	5	65.8	1030	3440	4880	3090	4100	152 J
Iron	20	38500	119000	102000	103000	64600	87400	140000 J
Lead	0.6	265	1330	1290	757	2440	953	263
Magnesium	1000	11500	13900	8300	8510	17700	12800	7640
Manganese	3	1860	4780	2550	2840	3600	24800	4160
Mercury	0.1	1.2	0.2	0.3	0.3	9.9	16	0.3
Nickel	8	19.9 J	19.9 J	28.8	43.5	25	96.3	32.2
Potassium	1000	1410	1790	1430	1260	985 J	1010 J	972 J
Selenium	1	2.0 J	1.2 J	1.4 J	2.1 J	--	--	--
Sodium	1000	423 J	810 J	512 J	404 J	670 J	575 J	527 J
Vanadium	10	37.1	44	45.4	44.4	25.1	67.1	49.9
Zinc	4	386 J	697 J	1600 J	1730 J	1420 J	19300 J	728 J
EPTOX Metals[1] (µg/L)	RL							
Barium	11	512	589	501 J	724 J	719	710	R
Cadmium	2	--	4.8 J	--	9.6 J	40.8 J	122 J	--
Chromium	5	7.8 J	--	--	--	--	10.4 J	10.5 J
Lead	26	80.9 J	41.6 J	580 J	360 J	809 J	180 J	147 J
Silver	5	--	--	--	--	--	--	13.3 J

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detect in all samples are not listed.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
D = Duplicate
J = Estimated
mg/kg = milligrams per kilogram

R =Rejected Result
RL =Reporting Limit
TCL =Target Compound List
µg/L =microgram per liter
µg/kg =microgram per kilogram
EPTOX =Extraction Procedure Toxicity

TABLE 24
OIL SHACK AREA SUBSURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	BS–104 6'– 8' bgs	BS–105 8'– 10'bgs	BS–106 10'– 12' bgs	BS–107 12'– 14' bgs
TCL Volatile Organic Compounds[1] (µg/kg)					
2–Butanone	10	––	18 J	––	––
TCL Semivolatile Organic Compounds[1] (µg/kg)					
Semivolatile Organic Compounds were not detected in any samples					
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)					
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples.					
TCL Inorganic Analytes[1] (mg/kg)					
Aluminum	40	35300 J	43600 J	69000 J	16600
Arsenic	2	––	––	––	20.8
Barium	40	188 J	464 J	263 J	91.2
Beryllium	1	3.8 J	6.3 J	10.2 J	0.5 J
Calcium	1000	132000 J	233000 J	221000 J	36700
Chromium	2	––	9.6 J	15.1 J	24.4
Cobalt	10	––	––	5.3 J	15.1
Copper	5	––	7.3 J	13.9 J	26.8
Cyanide	1	32.1 J	3.9 J	42.4 J	––
Iron	20	1780 J	9450 J	30600 J	31600
Lead	0.6	1.9 J	113 J	3.0 J	11.4 J
Magnesium	1000	9220 J	16700 J	19900 J	13500
Manganese	3	2710 J	2690 J	2040 J	524
Nickel	8	––	––	––	37.3
Potassium	1000	655 J	1230 J	1330 J	3010
Selenium	1	––	––	4.5 J	––
Sodium	1000	522 J	1400 J	445 J	151 J
Vanadium	10	––	13.8 J	30 J	39
Zinc	4	5.4 J	74.8 J	22.5 J	78.7

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non–detect in all samples are not listed.

–– = Non Detect

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

J = Estimated

mg/kg = milligrams per kilogram

TCL = Target Compound List

µg/kg = micrograms per kilogram

TABLE 25
OIL SHACK AREA GROUNDWATER SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	NYS CLASS GA[2] GROUNDWATER QUALITY STANDARDS	MW-104	MW-105	MW-106	MW-107
TCL Volatile Organic Compounds[1] (µg/L)						
Volatile Organic Compounds were not detected in any samples.						
TCL Semivolatile Organic Compounds[1] (µg/L)						
Semivolatile Organic Compounds were not detected in any samples.						
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/L)						
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples.						
TCL Inorganic Analytes[1] (µg/L)						
Aluminum	200	NS	1600	150 J	991	70.1 J
Barium	200	1000	29.4 J	23.2 J	20.1 J	175 J
Calcium	5000	NS	98600	45100	97200	140000
Cyanide	10	100	240	50	190	20
Iron	100	300[3]	53.5 J	25.8 J	836	280
Lead	3	25	--	--	3.4	--
Magnesium	5000	35000G	--	11700	--	46800
Manganese	15	300[3]	--	13.6 J	46.5	371
Potassium	5000	NS	13500	16200	22600	9790
Selenium	5	10	8.7 J	--	9.8 J	--
Silver	10	50	41.2	--	--	--
Sodium	5000	20000	26300	24600	43600	45100
Zinc	20	300	--	--	5.3 J	--
pH	N/A	6.5	11.3	9.5	10.6	6.7

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detect in all samples are not listed.
[2] Class GA Groundwater Quality Standards: 6 NYCRR Parts 700-705
[3] When iron and manganese are both present, NYS Class GA Standard is 500 µg/L for the total concentration of both compounds.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
J = Estimated
mg/kg = milligrams per kilogram
NA = not applicable
TCL = Target Compound List
µg/L = micrograms per liter
G = Guidance value
N/A = not applicable
NS = No standard has bee promulgated for this compound.

TABLE 26
UNION SHIP CANAL SURFACE WATER SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	NYS CLASS C[2] SURFACE WATER QUALITY STANDARDS	SW-103	SW-104	SW-105	SW-106	SW-107
TCL Volatile Organic Compounds[1] (µg/L)							
Volatile Organic Compounds were not detected in any samples.							
TCL Semivolatile Organic Compounds[1] (µg/L)							
4-Methylphenol	10	1[3]	--	--	--	2.0 J	--
bis(2-Ethylhexyl)phthalate	10	0.6	--	1.0 J	--	--	--
TCL Total Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/L)							
Pesticide or Polychlorinated Biphenyl Compounds were not detected in any samples.							
TCL Total Inorganic Analytes[1] (µg/L)							
Aluminum	200	100	--	289 J	--	21700 J	--
Arsenic	10	190[4]	--	--	--	16.6	--
Barium	200	NS	21 J	21.6 J	21 J	212	18 J
Calcium	5000	NS	36000	37900	34700	134000	30700
Chromium	--	h	--	--	--	59.8	--
Copper	25	e	--	--	--	127	--
Lead	3	g	--	9.4 J	--	455	--
Magnesium	5000	NS	8770	8220	8670	22800	8710
Mercury	--	0.20G	--	--	--	0.54	--
Nickel	--	NS	--	--	--	79.9	--
Potassium	5000	NS	3510 J	4370 J	3000 J	6140	911 J
Sodium	5000	NS	14100	12500	14100	13000	12000
Vanadium	50	14[5]	--	--	--	60.7	--
Zinc	20	K	--	65.2 J	--	1180 J	--
pH	N/A	6.5	8.6	7.8	8.6	8.1	8.6

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detect in all samples are not listed.
[2] Class C Surface Water Quality Standards 6 NYCRR Parts 700-705.
[3] NYS Surface Water Standard of 1.0 µg/L is for the total chlorinated phenols.
[4] NYS Surface Water Quality Standards for arsenic are for dissolved arsenic.
[5] NYS Class C Surface Water Standards for vanadium apply to acid-soluble form.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
e = exp (0.8545[ln(ppm hardness)]-1.465) applied to acid-soluble form = 20 (based on average hardness)
g = exp (1.266[ln(ppm hardness)]-4.661) applied to acid-soluble form = 7.0 (based on average hardness)
G = Guidance Value
h = exp (0.819)[ln(ppm hardness)] + 1.561) = 340 (based on average hardness)
Hardness = 2.497 [Ca] + 4.116 [Mg]
J = Estimated
K = exp (0.85[ln(ppm hardness)] + 0.50) = 138 (based on average hardness)
NA = not analyzed
N/A = not applicable
TCL = Target Compound List
µg/L = micrograms per liter
NS = No standard has been promulgated for this compound.

TABLE 27
UNION SHIP CANAL SEDIMENT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SD-103	SD-104	SD-105	SD-107
TCL Volatile Organic Compounds[1] (µg/kg)					
2-Butanone	10	--	3 J	--	--
Acetone	10	--	--	--	12 J
Tetrachloroethene	10	--	--	--	3 J
TCL Semivolatile Organic Compounds[1] (µg/kg)					
1,2,4-Trichlorobenzene	330	--	--	--	760
2-Methylnaphthalene	330	--	86 J	--	--
4-Methylphenol	330	--	--	--	80 J
Acenaphthene	330	--	--	--	85 J
Acenaphthylene	330	--	--	410 J	630
Anthracene	330	--	--	330 J	1800
Benzo(a)Anthracene	330	120 J	430 J	2000 J	2700
Benzo(a)Pyrene	330	46 J	690 J	2400 J	1600
Benzo(b)Fluoranthene	330	100 J	790 J	2300 J	1600
Benzo(g,h,i)perylene	330	--	130 J	940 J	340 J
Benzo(k)Fluoranthene	330	75 J	770 J	2200 J	1100
Carbazole	330	--	--	--	96 J
Chrysene	330	220 J	700 J	3100	2800
Dibenzofuran	330	--	--	--	330 J
Fluoranthene	330	280 J	590 J	1800 J	4000
Fluorene	330	--	--	--	680
Indeno(1,2,3-c,d)Pyrene	330	--	290 J	--	440 J
Phenanthrene	330	160 J	240 J	440 J	3600
Pyrene	330	290 J	710 J	4800	4800
bis(2-Ethylhexyl)phthalate	330	87 J	--	720 J	220 J
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)					
4,4'-DDD	3.3	2.7 JN	--	R	R
TCL Inorganics[1] (mg/kg)					
Aluminum	40	19600	7260	6230	4870
Arsenic	2	9.0	3.0 J	21.4	6.1
Barium	40	188	81.2	77.3	70.8
Beryllium	1	3.5	1.0	--	--
Cadmium	1	1.8 J	2.2 J	2.8 J	--
Calcium	1000	159000	72500	42500	154000
Chromium	2	10.8	48.6	37.3 J	38.8 J
Cobalt	10	5 J	8.6 J	9.3 J	--
Copper	5	23.4	30.7	82.4	14.1
Iron	20	43400	46600	82300	11000
Lead	0.6	84.2	132	333	45.4
Magnesium	1000	18200	6200	16900	7320
Manganese	3	2500	1270	3020	420
Mercury	0.1	--	0.1	--	--
Nickel	8	11.2	17.1	28.8	--
Potassium	1000	1640	1410	335 J	591 J
Sodium	1000	530 J	496 J	--	260 J
Vanadium	10	20.6	20.2	34.8	11.9 J
Zinc	4	392	846	799	161

TABLE 27
UNION SHIP CANAL SEDIMENT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SD-103	SD-104	SD-105	SD-107
EPTOX Metals[1] (µg/L)	RL				
Barium	11	1520	588	834	1430
Cadmium	2	5.2 J	--	--	2.3 J
Chromium	5	9.7	9.2 J	--	11.6
Lead	26	--	153	--	31.5
Silver	5	--	6.8 J	--	--

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non-detect in all samples are not listed.

-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
J = Estimated
mg/kg = milligrams per kilogram
R = Rejected Result
RL = Reporting Limit
TCL = Target Compound List
µg/L = micrograms per liter
µg/kg = micrograms per kilogram
EPTOX = Extraction Procedure Toxicity

TABLE 28
SHENANGO STEEL SUMP LIQUID SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	CL–109	
TCL Volatile Organic Compounds[1] (µg/L)			
Volatile Organic Compounds were not detected in the sample.			
TCL Semivolatile Organic Compounds[1] (µg/L)			
1,2,4–Trichlorobenzene	10	10	J
Pyrene	10	4	J
TCL Pesticides/Polychlorinated Biphenyl Compounds[1] (µg/L)			
Aroclor–1260	1	28	J
TCL Inorganic Analytes[1] (µg/L)			
Aluminum	200	15400	J
Arsenic	10	6	J
Barium	200	236	
Cadmium	5	2.1	J
Calcium	5000	171000	
Chromium	10	27.8	
Copper	25	226	
Iron	100	23400	J
Lead	3	38	J
Magnesium	5000	31700	
Manganese	15	2010	J
Mercury	0.2	0.4	
Potassium	5000	25200	
Sodium	5000	26300	
Vanadium	50	21.2	J
Zinc	20	1380	J
pH	N/A	NA	

Notes:
[1] Only compounds and analytes that were detected in the sample are listed.
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
J = Estimated
NA = not analyzed
N/A = not applicable
µg/L = micrograms per liter
TCL = Target Compound List

TABLE 29
SHENANGO STEEL SUMP SEDIMENT SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	CD–109
TCL Volatile Organic Compounds[1] (µg/kg)		
Toluene	10	3 J
TCL Semivolatile Organic Compounds[1] (µg/kg)		
1,2,4–Trichlorobenzene	330	9200 J
Chrysene	330	1800 J
Dimethylphthalate	330	1200 J
TCL Pesticides/Polychlorinated Biphenyl Compounds[1] (µg/kg)		
Aroclor – 1260	33	7700 J
TCL Inorganic Analytes[1] (mg/kg)		
Aluminum	40	15400
Antimony	12	13.3 J
Arsenic	2	2.4 J
Barium	40	151
Beryllium	1	2.8 J
Cadmium	1	0.87 J
Calcium	1000	81900
Chromium	2	17.1
Cobalt	10	2.3 J
Cyanide	1	1.2
Iron	20	14000
Lead	0.6	62.6 J
Magnesium	1000	22300
Manganese	3	2120
Potassium	1000	1370
Sodium	1000	879 J
Vanadium	10	13.3
Zinc	4	311 J
EPTOX Metals[1] (µg/L)	**RL**	
Barium	11	449
Silver	5	15.5

Notes:
[1] Only compounds and analytes that were detected in the sample are listed.
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)
J = Estimated
R = Rejected Result
RL = Reporting Limits
TCL = Target Compound List
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
µg/kg = micrograms per kilogram
EPTOX = Extraction Procedure Toxicity

TABLE 30
SHENANGO STEEL SURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
RELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SS-115	SS-115 D	SS-116	SS-117	SS-118	SS-119	SS-120	SS-121	SS-122	SS-123	SS-124	SS-125
TCL Volatile Organic Compounds[1] (µg/kg)													
1,1,1-Trichloroethane	10	--	--	3 J	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	10	--	--	4 J	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene (total)	10	--	--	1 J	--	--	--	--	--	--	--	--	--
2-Butanone	10	--	--	--	--	--	--	--	--	--	--	--	2 J
Carbon Disulfide	10	--	--	1 J	--	--	--	--	--	--	--	--	--
Ethylbenzene	10	--	--	3 J	--	--	--	--	--	--	--	--	--
Tetrachloroethene	10	--	--	6 J	--	--	--	--	--	--	--	--	--
Toluene	10	--	--	5 J	--	--	--	--	--	--	--	--	--
Total Xylenes	10	--	--	3 J	--	--	--	--	--	--	--	--	--
TCL Semivolatile Organic Compounds[1] (µg/kg)													
1,2,4-Trichlorobenzene	330	--	--	--	570 J	4500	--	--	--	--	--	--	--
2-Methylnaphthalene	330	91 J	62 J	250 J	100 J	440 J	--	--	--	79 J	51 J	--	55 J
3,3'-Dichlorobenzidine	330	--	--	R	--	1800 J	--	--	--	R	--	--	--
4-Methylphenol	330	--	--	--	250 J	94 J	--	--	--	--	--	--	--
Acenaphthene	330	--	--	--	120 J	200 J	--	--	130 J	--	60 J	90 J	--
Acenaphthylene	330	--	--	--	--	84 J	--	--	--	--	46 J	--	--
Anthracene	330	40 J	--	--	250 J	--	--	--	52 J	100 J	42 J	--	--
Benzo(a)Anthracene	330	520	400 J	R	930 J	430 J	54 J	76 J	1800 J	440 J	380	180 J	140 J
Benzo(a)Pyrene	330	700 J	460 J	R	820 J	460 J	52 J	70 J	2900 J	410 J	390	260 J	150 J
Benzo(b)Fluoranthene	330	780 J	630 J	270 J	1200 J	580 J	88 J	140 J	5300	650 J	540	280 J	270 J
Benzo(g,h,i)perylene	330	320 J	180 J	R	270 J	520 J	--	39 J	1400 J	420 J	160 J	93 J	71 J
Benzo(k)Fluoranthene	330	630 J	440 J	R	780 J	340 J	86 J	110 J	2800 J	610 J	390 J	300 J	220 J
Butylbenzylphthalate	330	--	--	R	110 J	R	--	--	--	180 J	--	--	--
Carbazole	330	--	--	--	110 J	--	--	--	52 J	--	--	--	--
Chrysene	330	740	580 J	290 J	1200 J	730 J	90 J	140 J	2800 J	580 J	550	220 J	220 J
Di-n-butylphthalate	330	--	--	--	--	81 J	--	--	--	--	--	--	--
Di-n-octylphthalate	330	--	--	R	--	120 J	--	R	R	R	--	--	--
Dibenz(a,h)Anthracene	330	--	40 J	R	71 J	90 J	--	R	520 J	65 J	49 J	--	--
Dibenzofuran	330	39 J	--	--	94 J	63 J	--	--	--	40 J	--	--	--
Diethylphthalate	330	--	--	--	--	99 J	--	--	--	--	--	--	--
Fluoranthene	330	610	500 J	270 J	1400 J	240 J	85 J	130 J	1600	570 J	490	200 J	210 J
Fluorene	330	--	--	--	130 J	160 J	--	--	37 J	45 J	45 J	--	--
Indeno(1,2,3-c,d)Pyrene	330	330 J	210 J	220 J	310 J	420 J	--	39 J	1800 J	380 J	190 J	120 J	82 J
N-Nitrosodiphenylamine	330	--	--	790 J	--	--	--	--	--	--	--	--	--
Naphthalene	330	160 J	69 J	--	140 J	490 J	--	--	53 J	56 J	210 J	--	51 J
Phenanthrene	330	260 J	200 J	510 J	1100 J	240 J	62 J	81 J	410	490 J	290 J	120 J	140 J
Phenol	330	--	--	--	--	160 J	--	--	--	--	--	--	--
Pyrene	330	860	670 J	660 J	2800 J	1900 J	110 J	220 J	2900	1900 J	600	290 J	320 J
bis(2-Ethylhexyl)phthalate	330	93 J	82 J	270 J	550 J	1000 J	80 J	94 J	--	210 J	--	--	140 J

TABLE 30
SHENANGO STEEL SURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
RELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SS-115	SS-115 D	SS-116	SS-117	SS-118	SS-119	SS-120	SS-121	SS-122	SS-123	SS-124	SS-125
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)													
Aroclor-1260	33	78 J	76 J	450 J	33000 J	81000 J	84 J	730 J	--	49 J	--	80 J	1100 J
Endosulfan II	3.3	R	3.9 JN	26 J	--	R	--	--	--	--	--	--	--
Endrin Aldehyde	3.3	--	--	--	--	R	--	27 J	--	--	--	--	37 J
Methoxychlor	17	13 J	180 J	--	--	R	--	--	--	--	--	--	--
TCL Inorganic Analytes[1] (mg/kg)													
Aluminum	40	4470	6150	17200	22200	12800	22800	36200	6230	31700	8190	14700	25400
Antimony	12	--	--	--	--	14.2 J	--	--	--	--	--	--	--
Arsenic	2	6.5	8.3	2.0 J	--	6.6 J	2.3 J	2.3 J	2.8 J	5.8 J	1.7 J	6.2	9.8
Barium	40	30.4 J	39.8 J	132	238	165	165	243	19.8 J	313	22.1 J	131	196
Beryllium	1	0.8 J	0.8 J	3.0	2.2	1.0 J	3.4	5.6	--	6.8	--	1.5	3.8
Cadmium	1	1.4 J	0.7 J	--	6.2 J	5.0 J	--	0.7 J	0.7 J	1.8 J	--	0.9 J	1.6 J
Calcium	1000	19000	30800	121000	80400	75700	125000	161000	2420	144000	3500	66700	119000
Chromium	2	20.9	20.6	10.1	37.8	29.8	13.3	20.4	11.2	37.4	7.7	17.9	25
Cobalt	10	1.8 J	2.1 J	1.4 J	8.8 J	77.7	1.7 J	1.9 J	1.9 J	2.2 J	--	3.2 J	5.3 J
Copper	5	21 J	21.7 J	23.1 J	307 J	76.4	26.4 J	19 J	28.4	215 J	5.1 J	40.6 J	68.5 J
Cyanide	1	--	--	--	--	R	--	--	R	1.4 J	R	--	--
Iron	20	20400 J	20800 J	10800 J	55300 J	47400	22900 J	16200 J	16300	16500 J	9860	27300 J	30900 J
Lead	0.6	157	141	1830	398	167	89.9	63.5	33.2	248	9.9	163	128
Magnesium	1000	6640	8480	30400	20200	10100	25600	38800	819 J	37600	520 J	12900	25000
Manganese	3	982	1120	1670	1900	1830	2230	2630	280	2220	127	1830	2850
Mercury	0.1	--	--	--	1.1	--	--	0.2	--	0.5	--	--	1.7
Nickel	8	16.3	13.2	5.8 J	23.6	34.5 J	7.5 J	8.8 J	7.1 J	7 J	6.0 J	10.6	14.8
Potassium	1000	363 J	603 J	1170	1500 J	1700	1430	1670	601 J	1800	542 J	1170	1780
Selenium	1	--	--	1.6 J	--	--	--	--	--	2.2 J	--	--	--
Sodium	1000	246 J	295 J	765 J	719 J	597 J	833 J	1050 J	323 J	1140	335 J	560 J	818 J
Vanadium	10	16.4	16.1	10.4	35.8	26.2	16	16	10.3	15.6	12.9	18.9	25
Zinc	4	785	801	141	812	7900 J	239	143	53 J	371	18.7 J	175	259
EPTOX Metals[1] (µg/L)	RL												
Arsenic	52	--	--	--	--	--	--	--	--	--	--	--	82.3 J
Barium	11	R	R	R	R	424	R	R	443	R	390	R	--
Cadmium	2	6.5 J	5 J	--	28.6 J	--	--	2.9 J	3.2 J	--	--	2.2 J	--
Chromium	5	7.3 J	5 J	--	8.6 J	--	5 J	9.3 J	--	--	5.3 J	8 J	11.6
Lead	26	121 J	142 J	2080 J	75.3 J	--	53.9 J	166 J	83.9 J	--	96 J	48 J	87.4 J
Silver	5	6.1 J	--	12.2 J	--	--	--	--	--	--	11.1 J	--	--

Notes:
[1] Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detect in any samples are not listed.
-- = Non Detect
CRDL = Contract Required Detection Limit (Inorganics)
CRQL = Contract Required Quantitation Limit (Organics)

D =Duplicate
J =Estimated
mg/kg =miligrams per kilogram
R =Rejected Result
RL =Reporting Limit

TCL =Target Compound List
µg/L =microgram per liter
µg/kg =microgram per kilogram
EPTOX =Extraction Procedure Toxicity

TABLE 31
SHENANGO STEEL SUBSURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	BS–108 6'– 8' bgs	BS–109 5'– 7' bgs	BS–110 6'– 12' bgs	BS–110D 6'– 12' bgs[2]
TCL Volatile Organic Compounds[1] (µg/kg)					
1,1–Dichloroethane	10	31	--	--	--
2–Butanone	10	9 J	--	--	--
Benzene	10	3 J	--	--	--
TCL Semivolatile Organic Compounds[1] (µg/kg)					
2–Methylnaphthalene	330	560 J	--	--	--
Benzo(a)Anthracene	330	180 J	--	--	--
Benzo(a)Pyrene	330	79 J	--	--	--
Benzo(b)Fluoranthene	330	140 J	--	--	--
Benzo(k)Fluoranthene	330	120 J	--	--	--
Chrysene	330	260 J	--	--	--
Dibenzofuran	330	290 J	--	--	--
Fluoranthene	330	280 J	--	--	--
Naphthalene	330	450 J	--	--	--
Phenanthrene	330	550 J	--	--	--
Pyrene	330	250 J	--	--	--
bis(2–Ethylhexyl)phthalate	330	--	--	960 J	--
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)					
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples.					
TCL Inorganic Analytes[1] (mg/kg)					
Aluminum	40	6100	7790	10100	12400
Antimony	12	13.9 J	--	--	--
Arsenic	2	15.8	2.0	7.8	4.7
Barium	40	138	17 J	81.9	94.1
Beryllium	1	--	--	0.6 J	0.6 J
Cadmium	1	1.9	--	0.8 J	0.8 J
Calcium	1000	19100	805 J	69700	49400
Chromium	2	26.5	--	17.8	20.9
Cobalt	10	7.5 J	1.7 J	11.7 J	12.8
Copper	5	238	2.9 J	22.4	19.3
Cyanide	1	--	12.7 J	--	--
Iron	20	38300	9710	23100	23600
Lead	0.6	564	7.1 J	10.7 J	24 J
Magnesium	1000	4550	--	13000	16500
Manganese	3	800	90.5	493	492
Mercury	0.1	0.4	--	--	--
Nickel	8	22.6	--	27.1	28.9
Potassium	1000	610 J	416 J	1870	2450
Sodium	1000	380 J	249 J	308 J	288 J
Vanadium	10	20.1	13.2	26.1	31.5
Zinc	4	1260	6.2	59.6	64.7

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non–detect in all samples are not listed.

-- = Non Detect

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

D = Duplicate

J = Estimated

mg/kg = milligrams per kilogram

TCL = Target Compound List

µg/kg = micrograms per kilogram

TABLE 32
SHENANGO STEEL GROUNDWATER SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRDL	NYS CLASS GA[2] GROUNDWATER QUALITY STANDARDS	MW–108	MW–109	MW–110
TCL Volatile Organic Compounds[1] (µg/L)					
1,1,1–Trichloroethane	10	5	2 J	--	--
1,1–Dichloroethane	10	5	95	--	--
Benzene	10	0.7	5 J	--	--
Chloroethane	10	5	26	--	--
TCL Semivolatile Organic Compounds[1] (µg/L)					
Semivolatile Organic Compounds were not detected in any samples.					
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/L)					
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples.					
TCL Inorganics Analytes[1] (µg/L)					
Aluminum	200	NS	--	1240	71.3 J
Arsenic	10	25	5.6 J	--	7.4 J
Barium	200	1000	101 J	52.6 J	297
Calcium	5000	NS	129000	181000	148000
Cyanide	10	100	--	20	--
Iron	100	300[3]	13600	1370	940
Magnesium	5000	35000G	23800	--	51700
Manganese	15	300[3]	1730	35.8	430
Potassium	5000	NS	10000	26500	4270 J
Sodium	5000	20000	17300	45500	54500
pH	N/A	6.5	7.4	10.8	6.9

Notes:

[1] Only compounds and analytes that were detected in one or more samples are listed. Compounds non–detect in all samples are not listed.

[2] Class GA Groundwater Quality Standards 6 NYCRR Parts 700–705.

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

[3] When iron and manganese are both present, NYS Class GA Standard is 500 µg/L for the total concentration of both compounds

-- = non–detect

J = Estimated

G = Guidance value

N/A = not applicable

NS = No standard has been promulgated for this compound.

µg/L = micrograms per liter .

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the PSA performed for the Hanna Furnace site and the adjacent Shenango Steel Mill are summarized in this section. In addition, a recommendation for reclassification of the Hanna Furnace site is made based on the definitions of site classes presented previously in Section 1.0. Results for the Shenango Steel Mill are evaluated to recommend whether and under what class the property should be listed in the NYS Registry of Inactive Hazardous Waste Disposal Sites. For the Hanna Furnace site and the Shenango Steel Mill, the overall purposes of the PSA are to determine whether there is documented presence of a listed or characteristic hazardous waste and whether constituents of the hazardous waste pose a potential significant threat to public health and the environment. Summaries of the issues and findings of the PSA for the Hanna Furnace site and the Shenango Steel Mill are presented in Tables 33 and 34, respectively.

5.1 HANNA FURNACE SITE

The following subsections present conclusions about hazardous waste deposition and significant threat determinations, and make recommendations for the Hanna Furnace site.

HAZARDOUS WASTE DEPOSITION

Based on the results of the PSA, the disposal of a listed or characteristic hazardous waste at investigated portions of the Hanna Furnace site is not documented.

Surface soil samples from the Hanna Furnace site collected during the PSA and in previous investigations detected PCBs (Aroclor-1260 and others); however, the concentrations detected (generally less than 0.5 mg/kg) are less than the hazardous waste regulatory criterion of 50 mg/kg. The pH of one groundwater sample and one sump liquid sample is 12.3, close to but less than the corrosive hazardous waste criterion of 12.5.

5.1.2 Significant Threat Determination

NYSDEC regulations pertaining to Inactive Hazardous Waste Disposal Sites, 6 NYCRR Part 375, set forth several definitions of significant threat (NYSDEC, 1995). The mere presence of hazardous waste at a site or in the environment is a necessary but not sufficient basis for finding that a hazardous waste disposed of at a site constitutes a significant threat to public health and the environment. Significant threat was evaluated by comparing groundwater analytical results from the Hanna Furnace site to NYS Class GA groundwater quality standards and by comparing surface water results from the Hanna Furnace site to NYS Class C surface water quality standards as set forth in 6 NYCRR Parts 700-705 (NYSDEC, 1993c). Exceedances of these standards are presented in Section 4.0 and summarized in Table 32. In particular, Hanna Furnace site surface water and groundwater results show exceedances of several standards for SVOCs, inorganics, and pH; however, the exceedances are not known to result from a hazardous waste as summarized in Subsection 5.1.1. There are no groundwater receptors in the vicinity of the Hanna Furnace site. Groundwater discharges to the Union Ship Canal and possibly to surrounding wetland and low-lying areas. The Union Ship Canal is used for fishing and discharges to Lake Erie/Buffalo Inner Harbor and has human ecological receptors.

5.1.3 Recommendations

Information was collected during the PSA to recommend reclassification of the Hanna Furnace site. The results of environmental sampling at the Hanna Furnace site (Site number 915029) did not document the presence of a listed or characteristic hazardous waste based on the definitions of hazardous waste site classes set forth in 6 NYCRR Part 375 (NYSDEC, 1992). ABB-ES recommends that the Hanna Furnace site be delisted from the Registry of Inactive Hazardous Waste Disposal Sites (see Figure 5). Based on the data collected in the PSA confirming exceedances of NYS groundwater and surface water standards, and exceedance of USEPA lead guidance values for soil (see Table 32), the HRS score for the Hanna Furnace site was recalculated to assess the potential hazards posed by the site to human trespassers who frequent the area and ecological receptors. The HRS score of 49.12 was calculated using the USEPA's PREScore software (ABB-ES, 1995).

5.2 SHENANGO STEEL MILL

The following subsections present conclusions about hazardous waste deposition and significant threat determinations, and make recommendations for the Shenango Steel Mill.

5.2.1 Hazardous Waste Deposition

The disposal of hazardous waste at the Shenango Steel Mill has been confirmed. Previous sampling by NYSDEC using immunoassay test kits (see Section 2.0) showed surface soil/debris at the PCB spill location to contain concentrations of PCBs exceeding 50,000 μg/kg. Sampling during the PSA and analysis for TCL pesticides/PCBs confirms that soil/debris in the removal action excavations contains PCBs (81,000J μg/kg in SS-118) exceeding the listed hazardous waste definition (B007 - Other PCB Waste) of 50,000 μg/kg (NYSDEC, 1995). Note that data available for the drums and pails of material also removed from the Shenango Steel Mill by NYSDEC showed those materials were toxicity-characteristic and ignitability-characteristic hazardous waste. Because surface soil, subsurface soil, and groundwater from the drum removal area contain chlorinated solvents, such as 1,1-DCA and benzene (which are also listed waste constituents), it is possible that the drums were the sources of these contaminants.

5.2.2 Significant Threat Determination

Significant threat was evaluated by comparing groundwater analytical results from the Shenango Steel Mill to NYS Class GA groundwater quality standards as set forth in 6 NYCRR Parts 700-705 (NYSDEC, 1993c). Exceedances of these standards are presented in Section 4.0 and summarized in Table 33.

Results for the Shenango Steel Mill show several exceedances of groundwater standards for VOCs, inorganics, and pH; however, none of the exceedances appear to be related to the disposal of B007 (PCB) hazardous waste at the site. Because PCBs were not detected in on-site groundwater or in off-site surface water from the nearby Union Ship Canal (see Subsection 4.2) the Shenango Steel Mill is not interpreted to pose a potential significant threat to public health or the environment.

5.2.3 Recommendations

The PSA at the Shenango Steel Mill was conducted to confirm the results of the removal action and assess whether the Shenango Steel Mill should be listed on the NYS Registry of Inactive Hazardous Waste Disposal Sites.

The results for the Shenango Steel Mill confirm that soil and debris on-site is a listed hazardous waste due to PCB contamination. Because PCB hazardous waste remains at the site, ABB-ES recommends that the site be considered for listing in the NYS Registry of Inactive Hazardous Waste Disposal Sites. In addition, because the hazardous waste present (PCBs) has not been shown to pose a potential significant threat, the Shenango Steel Mill, if listed on the registry, would meet the definition of a Class 3 site (see Figure 6). It is recommended that the abandoned utility structure (sump) at the PCB spill area be investigated further to determine where the structure discharges. This structure was shown in the PSA to contain floating oil product and PCBs, and the structure is believed to be a contaminant migration pathway.

TABLE 33
SUMMARY OF FINDINGS AND RECOMMENDATION
FOR RECLASSIFICATION - HANNA FURNACE SITE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PSA ISSUE	FILTER CAKE/FLUE ASH DISPOSAL AREA AND LANDFILL/DEBRIS DISPOSAL AREA	OIL SHACK/BLAST FURNACE AREA	UNION SHIP CANAL
Is there documented disposal of a listed hazardous waste at the area?	No	No	No
Is there a characteristic hazardous waste disposed of at the area (based on EPTOX metals, PCB, ignitability, reactivity, corrosivity data) or confirmation of the presence of a listed Hazardous Waste?	Potentially - PCBs detected in surface soil; groundwater at filter cake/flue ash disposal area has pH of 12.3 which is close to the Regulatory Limit of 12.5.	No. One sump liquid sample has pH of 12.3 which is close to the Regulatory Limit of 12.5	No
Is there a potential direct contact threat at the area due to concentrations of contaminants in soil?	Yes - Lead is present in surface soil/exposed wastes at up to 4,460 µg/kg, which exceeds USEPA guidance for direct contact for soil of 400 µg/kg.	Yes - Lead is present in surface soil at up to 2,440 µg/kg, which exceeds USEPA guidance for soil of 400 µg/kg.	Not applicable.
Is there a potential significant threat from the area to nearby surface water bodies (exceedance of NYS Class C Surface Water Standards)?	Yes - On-site surface water samples adjacent to landfill show exceedances of the following Class C Standards: acetone, aluminum, lead, zinc, and pH.	None known.	Yes - Surface water samples from canal show exceedances of the following Class C Standards: 4-methylphenol, BEHP, aluminum, copper, lead, vanadium, zinc, and pH. Exceedances occur in sample collected adjacent to filter cake/flue ash disposal area.

(continued)

TABLE 33
SUMMARY OF FINDINGS AND RECOMMENDATION
FOR RECLASSIFICATION - HANNA FURNACE SITE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PSA ISSUE	FILTER CAKE/FLUE ASH DISPOSAL AREA AND LANDFILL/DEBRIS DISPOSAL AREA	OIL SHACK/BLAST FURNACE AREA	UNION SHIP CANAL
Is there a potential significant threat from the area to groundwater (exceedance of NYS Class GA Groundwater Quality Standards)?	Yes - Well samples exceed Class GA standards for pentachlorophenol; 4-methylphenol; 2,4-dimethylphenol; cyanide; iron; selenium; and sodium. Also exceedance of pH criteria of 8.5.	Yes - Well samples exceed Class GA standards for cyanide, iron, magnesium, manganese, and sodium.	Not applicable
Summary - Does the Area Contain Hazardous Waste?	No	No	No
Does the Area Pose a Potential Significant Threat Directly Attributable to Hazardous Waste?	No	No	No
Reclassification Recommendation	Delist	Delist	Delist

TABLE 34
SUMMARY OF FINDINGS AND RECOMMMENDATION
FOR RECLASSIFICATION - SHENANGO STEEL MILL

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PSA ISSUE	SHENANGO STEEL MILL
Is there documented disposal of a listed hazardous waste at the area?	Yes - PCB spill area. NYSDEC data show soil/debris meet definition of listed B007 Hazardous Waste. Sample SS-118 collected in PSA has 81,000 µg/kg Aroclor-1260, which exceeds the listed waste PCB-contamination criteria of 50,000 µg/kg. SS-118 was collected in the spill area; all other samples were collected near to but outside the spill area and contain lesser concentrations of PCBs. Data confirms previous NYSDEC results.
Is there a characteristic hazardous waste disposed at the area (based on EPTOX, TCLP, ignitability, reactivity, corrosivity data) or confirmation of the presence of a listed Hazardous Waste?	No. Drums/pails containing toxicity-characteristic and ignitability-characteristic hazardous wastes were removed from the site by NYSDEC in 1994.
Is there a potential direct contact threat at the area due to concentrations of contaminants in soil?	Yes - Lead is present in one surface soil sample (at 1,830 µg/kg), which exceeds USEPA guidance for soil of 400 µg/kg. PCBs in surface soil exceed 1,000 µg/kg, which is the USEPA guidance for soil.
Is there a potential significant threat from the area to nearby surface water bodies (exceedance of NYS Class C Surface Water Standards)?	Unknown - although there is a utility structure at the PCB spill area known to contain PCBs, the location at which it discharges is unknown.
Is there a potential significant threat from the area to groundwater (exceedance of NYS Class GA Groundwater Quality Standards)?	Although groundwater samples exceed Class GA standards for 1,1-DCA, benzene, chloroethane, iron, magnesium, manganese, sodium, and pH there are no users of groundwater in the area.
Summary - Does the Area Contain Hazardous Waste?	Yes (B007 PCB Waste)
Does the Area Pose a Potential Significant Threat Directly Attributable to Hazardous Waste?	No - PSA data does not show PCBs in groundwater or in nearby Union Ship Canal.
Reclassification Recommendation	Recommend Listing. Shenango Steel Mill meets definition of Class 3 Hazardous Waste Site.

ABB-ES	ABB Environmental Services
ADI	Advanced Drilling Investigation
ASP	Analytical Services Protocol
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BS	soil boring sample
CD	sump sediment sample
CL	sump liquid sample
CLP	Contract Laboratory Program
cm/sec	centimeters per second
DCA	dichloroethane
DCE	dichloroethene
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
DQO	Data Quality Objective
ELAP	Environmental Laboratory Approval Program
ECDEP	Erie County Department of Environmental Planning
EPTOX	Extraction Procedure Toxicity
HASP	Health and Safety Plan
HRS	Hazard Ranking System
ID	inside diameter
LEL	lower explosive limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mS/cm	milliSiemens per centimeter
msl	mean sea level
MW	soil boring completed as a monitoring well

NA	not analyzed
N/A	not applicable
NTP	notice-to-proceed
NTU	nephelometric turbidity units
NYCRR	New York Codes, Rules, and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	State of New York Department of Health
NYSDOT	New York State Department of Transportation
NYTEST	NYTEST Environmental, Inc.
O_2	oxygen
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
ppm	parts per million
PS	test pit soil sample
PSA	Preliminary Site Assessment
PVC	polyvinyl chloride
QAPP	Quality Assurance Program Plan
QAPjP	Quality Assurance Project Plan
QC	Quality Control
SD	sediment sample
S_{DC}	Score (direct contact)
S_{FE}	Score (fire explosion)
S_M	Score (migration)
SVOC	semivolatile organic compound
SS	surface soil sample
SW	surface water sample
TCA	trichloroethane
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure

TIC	tentatively identified compounds
TP	test pit
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
USEPA	U.S. Environmental Protection Agency
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
VOCs	volatile organic compounds
WT	drum sample
YEC	YEC, Inc.

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APPENDIX A
SITE INSPECTION REPORT - USEPA FORM 2070-13
HANNA FURNACE (DIVISION OF NATIONAL STEEL)
AND SHENANGO STEEL MILL

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Hanna Furnace, Division of National Steel Corporation	1818 Fuhrman Blvd.

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG. DIST
Buffalo	New York	14024	Erie	29	37

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
42° 50' 15"	78° 50' 59"	X A. PRIVATE _ B. FEDERAL _____ _ C. STATE _ D. COUNTY _ E. MUNICIPAL _ F. OTHER _____ _ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
12/ 14/ 93 (MONTH DAY YEAR)	ACTIVE / X INACTIVE	1902 (BEGINNING YEAR) 1982 (ENDING YEAR) _____ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
_ A. EPA _ B. EPA CONTRACTOR _____ (Name of firm) _ C. MUNICIPAL _ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
_ E. STATE X F. STATE CONTRACTOR ABB Environmental Services (Name of firm) _ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Brian K. Butler	Environmental Scientist	ABB Environmental Services	(207) 775-5401
09 OTHER INSPECTORS Ralph T. Keating, P.E.	10 TITLE Environmental Engineer II	11 ORGANIZATION NYSDEC	12 TELEPHONE NO. (518) 457-9538
Dave Locey	Environmental Engineer I	NYSDEC Region 9	(716) 851-7220
Kevin Glaser	Sanitary Construction Inspector I	NYSDEC - Region 9	(716) 851-7220
Cynthia Talbot	Project Manager	ABB Environmental Services	(207) 775-5401

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
X PERMISSION ☐ WARRANT	1300	Cold, Overcast

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Ralph Keating	New York State Department of Environmental Conservation	(518) 457-9538

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	03 DATE
Brian K. Butler	Not Applicable	ABB Environmental Services	(207) 775-5401	05/31/95 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A. SOLID
- [X] B. POWDER, FINES
- [X] C. SLUDGE
- [ ] D. OTHER _____ (Specify)
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS >200,000 (est)
CUBIC YARDS UNK
NO. OF DRUMS 2

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [X] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [ ] D. PERSISTENT
- [ ] Unknown
- [X] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	Unknown		Site used for disposal of blast furnace wastes:
OLW	OILY WASTE	Unknown		filter cake, flue ash, blast furnace slag, plant
SOL	SOLVENTS	Unknown		debris, (including soil, brick, and scrap).
PSD	PESTICIDES			Contaminated soils, liquids, sludges remain in and
OCC	OTHER ORGANIC CHEMICALS	Unknown		around former plant building ruins. No materials
IOC	INORGANIC CHEMICALS	Unknown		on-site known to be listed or characteristic
ACD	ACIDS			hazardous wastes.
BAS	BASES	Unknown		
MES	HEAVY METALS	Unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers) Partial list - See reference below for additional substances.

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04/STORAGE/DISPOSAL METHOD	05 CONCENTRATION (MAXIMUM)	06 MEASURE OF CONCENTRATION
OCC	2-methylnaphthalene	91-57-6	Soil/landfill/sumps	42,000	µg/kg
OCC	4-methylphenol	106-44-5	Soil/landfill/sumps	5,300	µg/kg
OCC	benzo(a) anthracene	56-55-3	Soil/landfill/sumps	16,000	µg/kg
OCC	benzo(a)pyrene	50-32-8	Soil/landfill/sumps	16,000	µg/kg
OCC	benzo(b)flouranthene	205-99-2	Soil/landfill/sumps	17,000	µg/kg
OCC	benzo(k)flouranthene	207-08-9	Soil/landfill/sumps	11,000	µg/kg
OCC	chrysene	218-01-9	Soil/landfill/sumps	17,000	µg/kg
OCC	flouranthene	206-44-0	Soil/landfill/sumps	30,000	µg/kg
OCC	phenanthrene	85-01-8	Soil/landfill/sumps	29,000	µg/kg
OCC	pyrene	129-00-0	Soil/landfill/sumps	27,000	µg/kg
MES	antimony	7440-36-0	Soil/landfill/sumps	826	mg/kg
MES	chromium	7440-47-3	Soil/landfill/sumps	285	mg/kg
IOC	copper	7440-50-8	Soil/landfill/sumps	4,880	mg/kg
IOC	cyanide	57-12-5	Soil/landfill/sumps	17.5	mg/kg
IOC	iron	7439-89-6	Soil/landfill/sumps	227,000	mg/kg
MES	lead	7439-92-1	Soil/landfill/sumps	18,250	mg/kg
MES	mercury	7439-97-6	Soil/landfill/sumps	16	mg/kg
MES	selenium	7782-49-2	Soil/landfill/sumps	910	mg/kg
OCC	Aroclor-1260	1336-36-3	Soil/landfill/sumps	1.3	µg/kg

V. FEEDSTOCKS (See Appendix for CAS Numbers) NOT APPLICABLE

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION — 02 X OBSERVED (DATE: 11/29/94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

Ten groundwater samples were collected on 11/29/94 and the samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. The following contaminants were detected in groundwater exceeding NYS Class GA groundwater quality standards or guidance values: 4-Methylphenol, 2,4-Dimethylphenol, Pentachlorophenol, Cyanide, Iron, Magnesium, Manganese, Selenium, Sodium, and pH.

01 X B. SURFACE WATER CONTAMINATION — 02 X OBSERVED (DATE: 10/10/94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Seven surface water samples were collected from two locations at Hanna Furnace. Two were collected from the Debris Landfill and five were collected from the Union Ship Canal. Samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. The following contaminants were detected in surface water exceeding NYS Class C surface water quality standards: Acetone, 4-Methylphenol, bis(2-Ethylhexyl)phthalate, Aluminum, Copper, Lead, Mercury, Vanadium, Zinc, and pH.

01 _ C. CONTAMINATION OF AIR — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 X D. FIRE/EXPLOSIVE CONDITIONS — 02 X OBSERVED (DATE: 6/10/90) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

Tire and rubbish fire at site of transformer wrecking adjacent to brick building on-site. NYSDEC Spill Report No. 9002873. No PCBs found at this fire site in samples by NYSDEC.

01 X E. DIRECT CONTACT — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

See Part F Below. Surface soil contamination, surface water contamination in accessible portions of site used for fishing and off-road vehicle use. Potential for exposure through direct contact with soil and water.

01 X F. CONTAMINATION OF SOIL — 02 X OBSERVED (DATE: 10/10/94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Twenty-five surface soil samples were collected from the Filter Cake/Flue Ash Disposal Area, the Debris Landfill, the Oil Shack Area, and Shenango Steel portions of the site. Samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, inorganics, and hazardous waste characteristics - ignitability, reactivity, corrosivity, and EPTOX metals. Eight subsurface test pit samples were collected from the Debris Landfill Area and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, inorganics, and hazardous waste characteristics. Ten subsurface soil samples were collected from the soil borings and analyzed for TCL VOCs, SVOCs, and pesticides/PCBs. Results show soil throughout the site is contaminated with SVOCs (phthalates, PAHs, naptha compounds, and phenols), and inorganics (primarily antimony, chromium, copper, cyanide, iron, lead, mercury, selenium, and zinc. Surface soil also contains PCBs.

01 _ G. DRINKING WATER CONTAMINATION — 02 _ OBSERVED (DATE: _____) POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 _ H. WORKER EXPOSURE/INJURY — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 X I. POPULATION EXPOSURE/INJURY — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Filter Cake/Flue Ash Disposal Area used by off-road recreational vehicles. Potential for exposure of riders to dust contaminated with heavy metals (including lead) and SVOCs

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS	I. IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: DOO21038442

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 _ J. DAMAGE TO FLORA — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 _ K. DAMAGE TO FAUNA — 02 X OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

Fish in Union Ship Canal have visible sores, lesions.

01 X L. CONTAMINATION OF FOOD CHAIN — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

Site contaminants include heavy metals and PCBs which can bioaccumulate. Site near Tifft Farm Nature Preserve and Lake Erie.

01 X M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 X OBSERVED (DATE: 11/28/94) POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

All structures (sumps, basements, utilities) open to surface. Some flow to discharges unknown. Drums open and in areas with unrestricted access.

01 _ N. DAMAGE TO OFFSITE PROPERTY — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 X O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 X OBSERVED (DATE: 11/28/94) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Structures on-site discharge to locations unknown. NYS Hazardous Waste Survey dated 12/76 indicates industrial sewer discharges to Lackawanna Sewer Treatment Plant.

01 X P. ILLEGAL/UNAUTHORIZED DUMPING — 02 X OBSERVED (DATE: 11/28/94) _ POTENTIAL X ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Site used for unauthorized dumping of household wastes and construction debris.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

The site includes potentially unsafe buildings. Buildings are of brick or steel construction. The buildings contain open, water filled pits and debris.

III. TOTAL POPULATION POTENTIALLY AFFECTED: UNKNOWN

IV. COMMENTS

NONE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. PERMIT INFORMATION NONE DOCUMENTED

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
_ A. NPDES				
_ B. UIC				
_ C. AIR				
_ D. RCRA				
_ E. RCRA INTERIM STATUS				
_ F. SPCC PLAN				
_ G. STATE (specify) Part 360	NY0001597	unknown	5/87	Part 360 solid waste management facility permit
_ H. LOCAL (specify)				
_ I. OTHER (specify)				
_ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
_ A. SURFACE IMPOUNDMENT		
X B. PILES	unknown	
X C. DRUMS, ABOVE GROUND	2 +	
_ D. TANK, ABOVE GROUND		
_ E. TANK, BELOW GROUND		
X F. LANDFILL	unknown	
_ G. LANDFARM		
_ H. OPEN DUMP		
X I. OTHER (specify) sump, abandoned equipment	unknown	

04 TREATMENT (check all that apply)	05 OTHER
_ A. INCINERATION	X A. BUILDINGS ONSITE
_ B. UNDERGROUND INJECTION	
X C. CHEMICAL/PHYSICAL	
_ D. BIOLOGICAL	06 AREA OF SITE
_ E. WASTE OIL PROCESSING	
_ F. SOLVENT RECOVERY	
X G. OTHER RECYCLING/RECOVERY	113 (acres)
_ H. OTHER (specify)	

07 COMMENTS

The site is abandoned. Buildings and foundation ruins are present throughout the southern half of the site. A debris landfill and filter cake/flue ash disposal area is located on northern half of site. Abandoned underground utilities believed to continue to discharge from site to Union Ship Canal (Lake Erie/Buffalo Inner Harbor).

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (check one)

_ A. ADEQUATE, SECURE _ B. MODERATE X C. INADEQUATE, POOR _ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

All structures are open to the atmosphere. All waste piles/disposal areas have unrestricted access.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: X YES _ NO

02 COMMENTS

Buildings found open during site visits; all areas of site have unrestricted access.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

EPA

I. IDENTIFICATION

01 STATE	01 SITE NUMBER
New York	D002103844

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (check as applicable)	SURFACE	WELL
COMMUNITY	A. X	A. _
NON-COMMUNITY	B. _	B. _

02 STATUS		
ENDANGERED	AFFECTED	MONITORED
A. _	B. _	C. X
D. _	E. _	F. _

03 DISTANCE TO SITE
A. Greater than 3 (mi)
B. _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (check one)

_ A. ONLY SOURCE FOR DRINKING
_ B. DRINKING (other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)
_ C. COMMERCIAL INDUSTRIAL IRRIGATION (Limited other sources available)
X D. NOT USED, UNUSABLE

02 POPULATION SERVED BY GROUNDWATER NONE

03 DISTANCE TO NEAREST DRINKING WATER WELL Unknown (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
7 (ft)	Toward Canal/Lake Erie	7 (ft)	Unknown (gpd)	_ YES X NO

09 DESCRIPTION OF WELLS (including usage, depth, and location relative to population and buildings)

Ten groundwater table monitoring wells were installed on-site during the PSA field investigation (Oct./Nov. 1994). The wells are constructed of 2-inch ID PVC and are approximately 15 to 20 feet deep.

10 RECHARGE AREA		11 DISCHARGE AREA	
X YES _ NO	COMMENTS The aquifer is recharged principally through infiltration from precipitation.	X YES _ NO	COMMENTS The aquifer is believed to discharge to on-site Union Ship Canal.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

X A. RESERVOIR, RECREATION DRINKING WATER SOURCE (Lake Erie)
_ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
_ C. COMMERCIAL INDUSTRIAL
_ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Union Ship Canal	Y	On-Site
Buffalo Inner Harbor	Unknown	>0.25 mi
Lake Erie	Unknown	>0.25 mi

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE: A. 6000 (NO. OF PERSONS)
TWO (2) MILES OF SITE: B. >10,000 (NO. OF PERSONS)
THREE (3) MILES OF SITE: C. >100,000 (NO. OF PERSONS)

02 DISTANCE TO NEAREST POPULATION
0.25 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE
1,000 - 10,000

04 DISTANCE TO NEAREST OFF-SITE BUILDING
0 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

The surrounding area of the site is generally heavy industrial/commercial with several railroad yards, steel mills, and light industrial facilities within one-half mile of the site.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

EPA

I. IDENTIFICATION

01 STATE	01 SITE NUMBER
New York	D002103844

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

_ A. 10^{-6} - 10^{-8} cm/sec X B. 10^{-4} - 10^{-6} cm/sec _ C. 10^{-4} - 10^{-3} cm/sec _ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) Unknown

_ A. IMPERMEABLE (less than 10^{-6} cm/sec) _ B. RELATIVELY IMPERMEABLE (10^{-4} - 10^{-6} cm/sec) _ C. RELATIVELY PERMEABLE (10^{-2} - 10^{-4} cm/sec) 4 _ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL Ph	
22-48 (ft)	15 (ft)	UNKNOWN	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
42 (estimated) (in)	2.1 (in)	0-2 %	NOT APPLICABLE	0-2 %

09 FLOOD POTENTIAL
SITE IS IN 100 YEAR FLOODPLAIN

10
_ SITE IS ON RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE	OTHER
A. _____ (mi)	B. 0 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

0.5 (mi) (Tifft Farm)

ENDANGERED SPECIES: Peregrine Falcon, Bald Eagle

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A. 0 (mi)	B. 0.5 (mi)	C. N/A (mi)	D. N/A (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

In general, the site, adjacent properties, and the surrounding areas are flat. However, the ground surface of site is covered with rubble or elevated at location of landfill and piles.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. SAMPLES TAKEN (Preliminary Site Assessment only - other previous samples also available)

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	10	NYTEST	1/95
SURFACE WATER	7		1/95
WASTE	9	NYTEST	1/95
AIR	0	On-Site Screening with Bruel and kjaer multigas monitor	10/94
RUNOFF	0		
SPILL	0		
SOIL	43	NYTEST	1/95
VEGETATION	0		
OTHER-Drums	2	NYTEST	1/95

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Photoionization Detector	Measurements collected while collecting waste, soil, and groundwater samples. Measurements of 0 ppm in breathing zone observed during waste sampling.
Conductivity	Measurements collected while sampling liquids, developing wells and collecting groundwater samples.
pH	Measurements collected while sampling liquids, developing wells and collecting groundwater samples. Groundwater, liquids with pH up to 12.3.
Temperature	Measurements collected while sampling liquids, developing wells and collecting groundwater samples.
Explosive Limit/oxygen concentration	Measurements collected for health and safety purposes during drilling. No explosive of oxygen deficient atmospheres observed.

IV. PHOTOGRAPHS AND MAPS

01 TYPE	02 IN CUSTODY OF
X GROUND X AERIAL	Ralph Keating, NY State Dept. of Environmental Conservation (Name of organization or individual)

03 MAPS	04 LOCATION OF MAPS
X YES _ NO	NY State Dept. of Environmental Conservation

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Other field data collected: groundwater, surface water, sump liquid, dissolved oxygen content, turbidity, and salinity. Collected during sampling

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. CURRENT OWNER(S)			PARENT COMPANY (If applicable) NOT APPLICABLE		
01 NAME Jordan & Foster Scrap Company		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 1818 Liberty Bank Bldg		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY Buffalo	06 STATE New York	07 ZIP CODE 14075	12 CITY	13 STATE	14 ZIP CODE
01 NAME Jordan & Foster Association		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) P.O. Box 1207		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY Buffalo	06 STATE NY	07 ZIP CODE 14240	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)			IV. REALTY OWNER(S) (If applicable; list most recent first)		
01 NAME The Hanna Furnace Corporation		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) P.O. Box 1207		04 SIC CODE 3312	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY Buffalo	06 STATE NY	07 ZIP CODE 14240	05 CITY	06 STATE	07 ZIP CODE
01 NAME The Hanna Furnace Corporation		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 1818 Fuhrman Blvd		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY Buffalo	06 STATE NY	07 ZIP CODE 14203	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. CURRENT OPERATOR (Provide if different from owner) Not Applicable

OPERATOR'S PARENT COMPANY (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATOR'S PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Hanna Furnace Corporation	D002103844	National Steel Corp.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
1818 Furhman Blvd	3312		

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
Buffalo	NY	14203			

08 YEARS OF OPERATION	09 NAME OF OWNER
1902-1982	National Steel Corp.

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D002103844

II. ON-SITE GENERATOR NOT APPLICABLE

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S) NOT APPLICABLE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME: Buffalo Slag Company	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 11 Steelawanna Ave	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY: Lackawanna / 06 STATE: NY	07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	D002103844

II. PAST RESPONSE ACTIVITIES

01 _ A. WATER SUPPLY CLOSED	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ B. TEMPORARY WATER SUPPLY PROVIDED	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ C. PERMANENT WATER SUPPLY PROVIDED	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ D. SPILLED MATERIAL REMOVED	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ E. CONTAMINATED SOIL REMOVED	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ F. WASTE REPACKAGED	02 DATE 1989 to 1992	03 AGENCY USEPA
04 DESCRIPTION		
NOT APPLICABLE		
01 _ G. WASTE DISPOSED ELSEWHERE	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ H. ON SITE BURIAL	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ I. IN SITU CHEMICAL TREATMENT	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ J. IN SITU BIOLOGICAL TREATMENT	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ K. IN SITU PHYSICAL TREATMENT	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ L. ENCAPSULATION	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ M. EMERGENCY WASTE TREATMENT	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ N. CUTOFF WALLS	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ O. EMERGENCY DIKING/SURFACE WATER DIVERSION	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ P. CUTOFF TRENCHES/SUMP	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		
01 _ Q. SUBSURFACE CUTOFF WALL	02 DATE	03 AGENCY
04 DESCRIPTION		
NOT APPLICABLE		

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES	I. IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: D002103844

II. PAST RESPONSE ACTIVITIES (Continued)

01 _ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 X 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY USEPA
04 DESCRIPTION

See report referenced below for summary of previous HRS scoring, Phase I Site Assessment, NYSDEC soil sampling efforts, USGS sampling.

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 11 - ENFORCEMENT INFORMATION	I. IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: D002103844

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION _ YES X NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

Using PREScore software and existing data gathered during the PSA and previous investigations, a Hazardous Ranking System Score of 49.12 was calculated for the site. See Hazard Ranking System Score, October 1995, prepared for NYSDEC by ABB Environmental Services.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Shenango Steel Mill	1818 Fuhrman Blvd

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG. DIST
Buffalo	NY	14024	Erie	29	37

09 COORDINATES		10 TYPE OF OWNERSHIP (Check one)
LATITUDE: 42 48' 59"	LONGITUDE: 78 49' 55"	X A. PRIVATE _ B. FEDERAL _____ _ C. STATE _ D. COUNTY _ E. MUNICIPAL _ F. OTHER _____ _ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
12 / 14 / 95 (MONTH DAY YEAR)	_ ACTIVE X INACTIVE	1963 (BEGINNING YEAR) | 1982 (ENDING YEAR)

04 AGENCY PERFORMING INSPECTION (Check all that apply)
_ A. EPA _ B. EPA CONTRACTOR _____ (Name of firm) _ C. MUNICIPAL _ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
_ E. STATE X F. STATE CONTRACTOR ABB Environmental Services (Name of firm) _ G. _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Brian K. Butler	Environmental Scientist	ABB Environmental Services	207-775-5401
09 OTHER INSPECTORS Ralph T. Keating, P.E.	10 TITLE Environmental Engineer II	11 ORGANIZATION NYSDEC	12 TELEPHONE NO. 518-457-9538
Dave Locey	Environmental Engineer I	NYSDEC Region 9	716-851-7220
Kevin Glaser	Sanitary Construction Inspector I	NYSDEC Region 9	716-851-7220
Cynthia Talbot	Project Manager	ABB Environmental Services	207-775-5401

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	09 WEATHER CONDITIONS
X PERMISSION ☐ WARRANT	1300	45°, OVERCAST, WINDY

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Ralph Keating	New York State Dept of Environmental Conservation	518-457-9538

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	03 DATE
Brian K Butler	Not Applicable	ABB Environmental Services	207-775-5401	09/06/95 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: Unknown

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- X A. SOLID
- _ B. POWDER, FINES
- X C. SLUDGE
- _ D. OTHER _____ (Specify)
- _ E. SLURRY
- X F. LIQUID
- _ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS: Unknown
CUBIC YARDS: Unknown
NO. OF DRUMS: 17 55-gal, 25 5-gal

03 WASTE CHARACTERISTICS (Check all that apply)

- X A. TOXIC
- _ B. CORROSIVE
- _ C. RADIOACTIVE
- X D. PERSISTENT
- _ Unknown
- X E. SOLUBLE
- F. INFECTIOUS
- X G. FLAMMABLE
- _ H. IGNITABLE
- _ I. HIGHLY VOLATILE
- _ J. EXPLOSIVE
- _ K. REACTIVE
- _ L. INCOMPATIBLE
- _ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	UNKNOWN		Site was used for steel production and milling.
OLW	OILY WASTE	UNKNOWN		Contaminated soils, liquids, and sludges remain in
SOL	SOLVENTS	UNKNOWN		and around former plant building ruins.
PSD	PESTICIDES			Transformer scrapping on site resulted in PCB
OCC	OTHER ORGANIC CHEMICALS	UNKNOWN		contamination. Drums removed from site contained
IOC	INORGANIC CHEMICALS	UNKNOWN		lubricating oil, VOCs (benzene, TCE, PCE, MEK),
ACD	ACIDS			metals (barium and lead); some materials removed
BAS	BASES	UNKNOWN		had flashpoints between 74° and 127° F.
MES	HEAVY METALS	UNKNOWN		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04/STORAGE/DISPOSAL METHOD	05 CONCENTRATION (MAXIMUM)	06 MEASURE OF CONCENTRATION
OCC	1,2,4-Trichlorobenzene	120 821	soil/sump	9200	µg/kg in soil/sump
OCC	3,3-Dichlorobenzidine	919 41	soil/sump	1800	µg/kg in soil
OCC	Benzo(a) anthracene	56-55-3	soil/sump	1800	µg/kg in soil
OCC	Benzo(a) pyrene	50-32-5	soil/sump	2900	µg/kg in soil
OCC	Benzo (b) fluoranthene	205-99-2	soil/sump	5300	µg/kg in soil
OCC	Benzo (k) fluoranthene	207-08-9	soil/sump	2800	µg/kg in soil
OCC	Chrysene	218-01-9	soil/sump	2800	µg/kg in soil/sump
OCC	Fluoranthene	206-44-0	soil/sump	1600	µg/kg in soil
OCC	Phenanthrene	85-01-8	soil/sump	1100	µg/kg in soil
OCC	Pyrene	129-00-0	soil/sump	2900	µg/kg in soil
MES	Antimony	7440-36-0	soil/sump	14.2	mg/kg in soil
MES	Chromium	7440-47-3	soil/sump	37.8	mg/kg in soil
IOC	Copper	7440-50-8	soil/sump	307	mg/kg in soil
IOC	Cyanide	57-12-5	soil/sump	12.7	mg/kg in soil
IOC	Iron	7439-89-6	soil/sump	55300	mg/kg in soil
MES	Lead	7439-92-1	soil/sump	1830	mg/kg in soil
MES	Mercury	7439-97-6	soil/sump	1.7	mg/kg in soil
MES	Selenium	7782-49-2	soil/sump	2.2	mg/kg in soil
OCC	Aroclor-1260	1336-36-3	soil/sump	81000	µg/kg in soil/sump

V. FEEDSTOCKS (See Appendix for CAS Numbers) NOT APPLICABLE

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS	I. IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: UNKNOWN

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION — 02 X OBSERVED (DATE: 11-29-94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

Three groundwater samples were collected on 11/29/94 and analyzed for TCL VOCs, SVOCs, Pest/PCBs and inorganics. The following contaminants were detected in groundwater exceeding NYS Class GA Groundwater Quality Standards or guidance values: benzene; 1,1-dichloroethane; chloroethane; iron; magnesium; manganese; sodium, and pH.

01 X B. SURFACE WATER CONTAMINATION — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 10,000 — 04 NARRATIVE DESCRIPTION

Surface run-off from the site is diverted to drainage ditches potentially discharging to nearby wetlands. Abandoned subsurface utilities also potentially discharge to nearby Union Ship Canal (Buffalo Inner Harbor).

01 _ C. CONTAMINATION OF AIR — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 X D. FIRE/EXPLOSIVE CONDITIONS — 02 X OBSERVED (DATE: April 1994) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: N/A — 04 NARRATIVE DESCRIPTION

NYSDEC sampling of drum and pail contents showed materials with flashpoints of 74° to 127° F. These materials were removed and disposed of as hazardous waste.

01 X E. DIRECT CONTACT — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 1,000 — 04 NARRATIVE DESCRIPTION

Surface soil contamination was documented in sampling and analysis (see F, below). Potential for exposure exists through direct contact with soil and water. The site is used for off-road recreational vehicles.

01 X F. CONTAMINATION OF SOIL — 02 X OBSERVED (DATE: 11/29/94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 1,000 — 04 NARRATIVE DESCRIPTION

Twelve surface soil samples were collected from the Shenango Steel Mill area and analyzed for TCL VOCs, SVOCs, PEST/PCBs, inorganics, and EPTOX Metals. Four subsurface soil samples were collected from the Shenango Steel Mill area and analyzed for TCL, VOCs, SVOCs, PEST/PCBs, and inorganics.

Results show most soils contain PCBs (Aroclor-1260) as well as SVOCs and inorganics (primarily aluminum, iron, magnesium, lead and zinc)

01 _ G DRINKING WATER CONTAMINATION — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 _ H. WORKER EXPOSURE/INJURY — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 X I. POPULATION EXPOSURE/INJURY — 02 X OBSERVED (DATE: 11/29/94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 1,000 — 04 NARRATIVE DESCRIPTION

Shenango Steel Mill area is used by off-road recreational vehicles. Potential for exposure of riders to dust contaminated with heavy metals (including lead) and PCBs.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 _ J. DAMAGE TO FLORA — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 _ K. DAMAGE TO FAUNA — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

NOT APPLICABLE

01 X L. CONTAMINATION OF FOOD CHAIN — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

Site contaminants include heavy metals and PCBs which can bioaccumulate. The site is near the Tifft Farm Nature Preserve and Lake Erie (Union Ship Canal/Buffalo Inner Harbor).

01 X M. UNSTABLE CONTAINMENT OF WASTES — 02 X OBSERVED (DATE: 11-28-94) POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

All structures (sumps, basements, utilities) are open to the surface. Discharge locations of underground utilities are unknown but may include the nearby Union Ship Canal.

01 _ N. DAMAGE TO OFFSITE PROPERTY — 02 _ OBSERVED (DATE: _____) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

NOT APPLICABLE

01 X O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

Structures on-site discharge to locations unknown. NYS Hazardous Waste Survey dated 12/76 indicates that the on-site industrial sewer discharges to the Lackawanna Sewage Treatment Plant.

01 X P. ILLEGAL/UNAUTHORIZED DUMPING — 02 X OBSERVED (DATE: 11-28-94) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

The site is used for unauthorized dumping of household wastes and construction debris. Transformers observed in various states of dismantling may have been illegally brought to and left on-site.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

The site contains potentially unsafe buildings and ruins and is not secured. The building and ruins contain open, water filled pits and debris.

III. TOTAL POPULATION POTENTIALLY AFFECTED: UNKNOWN

IV. COMMENTS

NONE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. PERMIT INFORMATION NONE ISSUED

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
_ A. NPDES				
_ B. UIC				
_ C. AIR				
_ D. RCRA				
_ E. RCRA INTERIM STATUS				
_ F. SPCC PLAN				
_ G. STATE (specify)				
_ H. LOCAL (specify)				
_ I. OTHER (specify)				
_ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
_ A. SURFACE IMPOUNDMENT		
_ B. PILES		
X C. DRUMS, ABOVE GROUND	17(55-gal)	25(5gal)
_ D. TANK, ABOVE GROUND		
_ E. TANK, BELOW GROUND		
_ F. LANDFILL		
_ G. LANDFARM		
_ H. OPEN DUMP		
X I. OTHER (specify) sump, abandoned equip	Unknown	

04 TREATMENT (check all that apply)

- _ A. INCINERATION
- _ B. UNDERGROUND INJECTION
- X C. CHEMICAL/PHYSICAL
- _ D. BIOLOGICAL
- _ E. WASTE OIL PROCESSING
- _ F. SOLVENT RECOVERY
- X G. OTHER RECYCLING/RECOVERY
- _ H. OTHER (specify) _____

05 OTHER

X A. BUILDINGS ONSITE

06 AREA OF SITE

18 (acres)

07 COMMENTS The site is abandoned and unsecured. 55-gallon drums and 5-gallon containers may have been deposited on-site by unauthorized sources. Transformer salvaging resulted in PCB oil spill.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (check one)

_ A. ADEQUATE, SECURE _ B. MODERATE X C. INADEQUATE, POOR _ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Drums were overpacked and removed in 1994.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: X YES _ NO

02 COMMENTS

Buildings were found open during site visits; all areas of site have unrestricted access.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	01 SITE NUMBER
New York	UNKNOWN

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (check as applicable)	SURFACE	WELL
COMMUNITY	A. X	A. _
NON-COMMUNITY	B. _	B. _

02 STATUS	ENDANGERED	AFFECTED	MONITORED
	A. _	B. _	C. X
	D. _	E. _	F. _

03 DISTANCE TO SITE
A. greater than 3 (mi)
B. _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (check one)

_ A. ONLY SOURCE FOR DRINKING
_ B. DRINKING (other sources available)
COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)
_ C. COMMERCIAL INDUSTRIAL IRRIGATION (Limited other sources available)
X D. NOT USED, UNUSABLE

02 POPULATION SERVED BY GROUNDWATER NONE

03 DISTANCE TO NEAREST DRINKING WATER WELL UNKNOWN (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
7 (ft)	Toward canal/Lake Erie	7 (ft)	Unknown (gpd)	_ YES X NO

09 DESCRIPTION OF WELLS (including usage, depth, and location relative to population and buildings)

Four groundwater table monitoring wells were installed on-site during the PSA field investigation (Oct/Nov 1994). The wells are constructed of 2-inch ID PVC and are approximately 15-20 feet deep.

10 RECHARGE AREA		11 DISCHARGE AREA	
X YES _ NO	The aquifer is recharged principally by infiltration from precipitation.	X YES _ NO	COMMENTS The aquifer is believed to discharge to nearby Union Ship Canal.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

X A. RESERVOIR, RECREATION DRINKING WATER SOURCE (Lake Erie)
_ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
_ C. COMMERCIAL INDUSTRIAL
_ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Union Ship Canal	unknown	adjacent property
Buffalo Inner Harbor	unknown	<0.25 miles
	unknown	<0.25 miles

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 6000	B. >10,000	C. >100,000
NO. OF PERSONS	NO. OF PERSONS	NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION
0.25 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE	04 DISTANCE TO NEAREST OFF-SITE BUILDING
1,000 - 10,000	0 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Land east of the site is used extensively as a railroad yard. Land west of the site is the former Hanna Furnace site (USEPA ID No. D002103844). The closest residential area is 0.25 miles to the south in the City of Lackawanna, characterized as a densely populated urban area. The population within one mile of the site is estimated to be 6,000 people. Areas north of the site are wetlands and the Tifft Farm Nature Preserve.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

EPA

I. IDENTIFICATION

01 STATE	01 SITE NUMBER
New York	UNKNOWN

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

_ A. 10^{-6} to 10^{-8} cm/sec X B. 10^{-4} to 10^{-6} cm/sec _C. 10^{-4} to 10^{-3} cm/sec _ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) Unknown

_ A. IMPERMEABLE (less than 10^{-6} cm/sec) _ B. RELATIVELY IMPERMEABLE (10^{-4} - 10^{-6} cm/sec) _ C. RELATIVELY PERMEABLE (10^{-2} - 10^{-4} cm/sec) 4 _ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL Ph	
22-48 (ft)	15 (ft)	Unknown	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
42 (est.) (in)	2.1 (in)	0-2 %	Generally Northeast	0-2 %

09 FLOOD POTENTIAL

SITE IS IN 100 YEAR FLOODPLAIN

10

_ SITE IS ON RIVERLINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. _____ (mi) OTHER: B. 0 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

0.5 (mi) (Tifft Farm)

ENDANGERED SPECIES: Peregrine Falcon, Bald Eagle

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A. 0 (mi)	B. .5 (mi)	C. N/A (mi)	D. N/A (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

In general, the site, adjacent properties, and the surrounding areas are flat. However, the ground surface of the site is covered with rubble creating localized changes in slope. Slope in general is slightly to the northeast (toward the adjacent railroad yard) or flat.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	3	NYTEST	1/95
SURFACE WATER	0		
WASTE - Sump Sediment/liquid	2	NYTEST	11/94
AIR	0		
RUNOFF	0		
SPILL	0		
SOIL	15	NYTEST	11/94
VEGETATION	0		
OTHER-DRUMS	Unknown	NYSDEC Region 9	9/94

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Photoionization Detector	Measurement collected while collecting waste, soil, and groundwater samples. Measurement of 0 ppm in breathing zone observed during waste sampling.
Conductivity	Measurements collected while sampling liquids, developing wells and collecting groundwater samples.
Ph	Measurements collected while sampling liquids, developing wells and collecting groundwater samples. Groundwater pH up to 10.8.
Temperature	Measurements collected while sampling liquids, developing wells and collecting groundwater samples.
Explosive Limit/oxygen concentration	Measurements collected for health and safety purposes during drilling. Nonexplosive of oxygen deficient atmospheres observed.

IV. PHOTOGRAPHS AND MAPS

01 TYPE X GROUND X AERIAL

02 IN CUSTODY OF: Ralph Keating, NY State Dept. of Environmental Conservation (Name of organization or individual)

03 MAPS
X YES
_ NO

04 LOCATION OF MAPS
NY State Dept of Environmental Conservation

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Other field data collected; Sampling of surface soil by NYSDEC for PCB screening and metals analysis was performed prior to site assessment PCB immunoassay screening (22 samples) detected PCBs up to 500 mg/kg. Metals screening detected arsenic (up to 58 mg/kg), cadmium (up to 40 mg/kg), chromium (up to 27 mg/kg), copper (up to 3300 mg/kg), lead (up to 5800 mg/kg), mercury (up to 108 mg/kg), nickel (up to 49 mg/kg), and selenium (up to 340 mg/kg).

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analyses, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. CURRENT OWNER(S)			PARENT COMPANY (If applicable) NOT APPLICABLE		
01 NAME Sherland Incorporated (Attn: Mr. Nicholas Sherwood)		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS 27 Forestview Drive		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY Depew	06 STATE NY	07 ZIP CODE 14043	12 CITY	13 STATE	14 ZIP CODE
01 NAME Sherland Incorporated		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 1951 Hamburg Turnpike		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY Lackawanna	06 STATE NY	07 ZIP CODE 14218	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)			IV. REALTY OWNER(S) (If applicable; list most recent first)		
01 NAME Shenango Steel Corporation		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) Unknown		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY Buffalo	06 STATE NY	07 ZIP CODE Unknown	05 CITY	06 STATE	07 ZIP CODE
01 NAME Marlen Steel Corporation		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) Unknown		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY Buffalo	06 STATE NY	07 ZIP CODE Unknown	05 CITY	06 STATE	07 ZIP CODE
01 NAME Hanna Furnace Corporation		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 1818 Fuhrman Blvd		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY Buffalo	06 STATE NY	07 ZIP CODE Unknown	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. CURRENT OPERATOR (Provide if different from owner) Not Applicable

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME Hanna Furnace Corporation	02 D+B NUMBER D002103844
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 1818 Fuhrman Blvd	04 SIC CODE
05 CITY Buffalo	06 STATE NY / 07 ZIP CODE 14203
08 YEARS OF OPERATION	09 NAME OF OWNER

PREVIOUS OPERATOR'S PARENT COMPANIES (If applicable)

10 NAME National Steel Corp	11 D+B NUMBER
12 STREET ADDRESS (P.O. Box, RFD #, etc.) Unknown	13 SIC CODE
14 CITY Unknown	15 STATE / 16 ZIP CODE

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER

10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER

10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 9 - GENERATOR/TRANSPORTER INFORMATION	I. IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: UNKNOWN

II. ON-SITE GENERATOR NOT APPLICABLE

01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE / 07 ZIP CODE	

III. OFF-SITE GENERATOR(S) NOT APPLICABLE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, e	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S) NOT APPLICABLE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Preliminary Site Assessment Report, November 1995, ABB Environmental Services, and references cited therein.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: UNKNOWN

II. PAST RESPONSE ACTIVITIES

01 _ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 X D. SPILLED MATERIAL REMOVED — 02 DATE Sept - Oct 1994 — 03 AGENCY NYSDEC Spill Response
04 DESCRIPTION

NYSDEC completed removal of soil and foundation debris at the PCB spill area, and removal of all 55-gallon containers/pails. Total quantities removed are unknown.

01 _ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

See Above

01 _ F. WASTE REPACKAGING
04 DESCRIPTION

NOT APPLICABLE

01 _ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

01 _ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

NOT APPLICABLE

TABLE 13
RANGES OF BACKGROUND INORGANIC CONCENTRATIONS IN SOIL

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

ANALYTE	NEW YORK REGION[1] (mg/kg)	EASTERN UNITED STATES[2] (mg/kg)
Aluminum	1,000 – 25,000	7,000 – > 10,000
Antimony	NA	NA
Arsenic	3 – 12	<0.1 – 73
Barium	15 – 600	10 – 1,500
Beryllium	0 – 1.75	<1 – 7
Cadmium	0.01 – 2	NA
Calcium	130 – 35,000	100 – 280,000
Chromium	1.5 – 40	1 – 1,000
Cobalt	2.5 – 60	<0.3 – 70
Copper	< 1 – 15	<1 – 700
Cyanide	NA	NA
Iron	17,500 – 25,000	10 – >100,000
Lead	10 – 37	<10 – 300
Magnesium	1,700 – 6,000	50 – 50,000
Manganese	50 – 5,000	<2 – 7,000
Mercury	0.042 – 0.066	0.01 – 3.4
Nickel	0.5 – 25	<5 – 700
Potassium	8,500 – 43,000	50 – 37,000
Selenium	<0.1 – 0.125	<0.1 – 3.9
Silver	NA	NA
Sodium	6,000 – 8,000	< 50 – 50,000
Vanadium	25 – 60	<7 – 300
Zinc	37 – 60	<20 – 2,900

NOTES:

[1] Concentrations obtained from "Background Concentrations of 20 Elements in Soils with Special Regard for New York State" (no date). Paper prepared by E. Carol McGovern, NYSDEC Wildlife Resouces Center.

[2] Shacklette, M.T. and J.G. Boerngen, 1984. "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States"; USGS Professional Paper 1270.

mg/kg = milligrams per kilogram
NA = Not Available
< = less than
> = greater than

TABLE 14
FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL SURFACE SOIL SAMPLE RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SS-101	SS-101 D	SS-102	SS-103	SS-104	SS-105	SS-106	SS-107	SS-108
TCL Volatile Organic Compounds[1] (µg/kg)										
Ethylbenzene	10	--	--	--	--	--	--	--	--	2 J
Tetrachloroethene	10	3 J	3 J	9 J	5 J	9 J	8 J	14	--	--
TCL Semivolatile Organic Compounds[1] (µg/kg)										
2-Methylnaphthalene	330	--	41 J	--	--	--	--	--	--	R
Anthracene	330	--	--	60 J	--	49 J	62 J	42 J	--	R
Benzo(a)Anthracene	330	110 J	120 J	150 J	--	110 J	400 J	360 J	190 J	170 J
Benzo(a)Pyrene	330	52 J	53 J	85 J	--	60 J	420 J	490 J	270 J	150 J
Benzo(b)Fluoranthene	330	190 J	290 J	320 J	--	230 J	540 J	540 J	340 J	230 J
Benzo(g,h,I)perylene	330	70 J	70 J	94 J	--	61 J	240 J	230 J	120 J	82 J
Benzo(k)Fluoranthene	330	120 J	140 J	120 J	--	73 J	370 J	450 J	190 J	180 J
Chrysene	330	240 J	260 J	300 J	--	220 J	500 J	490 J	260 J	260 J
Dibenz(a,h)Anthracene	330	--	--	--	--	--	--	--	40 J	R
Fluoranthene	330	190 J	180 J	240 J	--	170 J	640 J	480 J	290 J	250 J
Indeno(1,2,3-c,d)Pyrene	330	60 J	55 J	66 J	--	42 J	240 J	220 J	140 J	81 J
Naphthalene	330	--	46 J	--	--	--	--	--	--	R
Phenanthrene	330	160 J	160 J	160 J	--	200 J	290 J	200 J	130 J	210 J
Pyrene	330	210 J	230 J	270 J	--	210 J	600 J	490 J	240 J	340 J
TCL Pesticide/Polychlorinated Biphenyl Compounds[1] (µg/kg)										
4,4'-DDE	3.3	4.5 J	--	--	--	--	--	--	--	--
Aroclor-1260	33	250 J	310 J	190 J	28 J	210 J	79 J	50 J	18	71 J
Endosulfan II	3.3	8.3 J	--	--	--	--	--	R	--	--
Heptachlor	1.7	--	--	--	--	--	--	--	--	2.1 J
Methoxychlor	17	17 J	--	--	--	--	17 J	16 J	--	26 J
TCL Inorganic Analytes[1] (mg/kg)										
Aluminum	40	8500	8670	12600	4010	6450	10100	7330	8440	6590
Antimony	12	23.3 J	28.8 J	12.1 J	39.5 J	22.9 J	15.8 J	17.4 J	15.1 J	--
Arsenic	2	15.4 J	10.4 J	14.4	20.5	15.9	15.4	13.7	14.9	19.1
Barium	40	112	109	178	52.6	89.5	113	84	77	77.8
Beryllium	1	2.1	1.9	2.9	0.9 J	1.2	1.4	0.9 J	0.9 J	0.9 J
Cadmium	1	14.9	16.5	12.7	6.2	17.6	5.2	3.9 J	3.1 J	4.3 J
Calcium	1000	42400	42100	54700	27500	33400	50500	34500	38900	78600
Chromium	2	285	164	81.9	251	149	85.1	40.2	22.4	23.2
Cobalt	10	18.4	19.8	10.2	33.4	18.1	16.1	12.2	11.5	11 J
Copper	5	228 J	191 J	79.3 J	689 J	290 J	178 J	92.9 J	52.1 J	156 J