# FINAL RCRA FACILITY INVESTIGATION REPORT

Former Bethlehem Steel Corporation Facility
Lackawanna, New York

PART VI - PROCESS AREA SWMU ASSESSMENT REPORTS

P-18 THROUGH P-73, TANK FARM

**October 2004**

*Submitted by:*
**TECUMSEH REDEVELOPMENT, INC.**
**4020 Kinross Lakes Parkway**
**Richfield, Ohio 44286-9000**

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# SWMU ASSESSMENT REPORT
# IRONMAKING BLAST FURNACE,
# SCRUBBER WATER COOLING TOWER:
# HOT AND COLD WELLS (SWMU P-18)
# WATER QUALITY CONTROL STATION NO. 9




**SEPTEMBER 2004**

**BETHLEHEM STEEL CORPORATION**
**2600 HAMBURG TURNPIKE**
**LACKAWANNA, NEW YORK 14218**

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## 1.0 INTRODUCTION

This report documents the results of an environmental assessment of the Scrubber Water Cooling Tower: Hot and Cold Wells at Bethlehem Steel Corporation's (BSC), Lackawanna, New York facility. The Hot and Cold Wells were designated by the United States Environmental Protection Agency (USEPA) as Solid Waste Management Unit (SWMU) P-18 in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA), (USEPA 1988). The RFA identified six SWMUs as part of Water Quality Control Station (WQCS) No. 9, the wastewater treatment system for the blast furnace operations' gas cleaning system. The wastewater treatment system is also known as the blast furnace recirculating scrubber water system. The six SWMUs were assigned numbers P-13 through P-18.

The USEPA required a RCRA Facility Investigation (RFI) of SWMU P-18 and other SWMUs at the BSC facility be completed in accordance with the Administrative Order of Consent (AOC) signed by BSC and the USEPA in 1990 (USEPA 1990). The RFI has been conducted in phases (Phase I, IIA, IIB, IIC, III, and Supplemental SWMU Investigation). Assessment activities for SWMU P-18 were conducted during Phases I, IIC, III and the Supplemental SWMU Investigation. The RFI included fieldwork consisting of the collection and analysis of environmental samples from SWMUs and other areas throughout the property.

A preliminary SWMU Assessment report was completed for SWMU P-18 and submitted to the USEPA on July 31, 1992 (BSC 1992b). Attachment A provides the USEPA comments regarding the preliminary SWMU assessment. This report evaluates SWMU data available to BSC as of November 2001.

### 1.1 Description

The Scrubber Water Cooling Tower: Hot and Cold Well complex is located at the south end of the Gateway Metroport Ship Canal (Ship Canal) as shown in Figure 1. The Hot Well area is located south of the canal and adjoins the former scrubber water pump house located to the west. The Cold Well is located southwest of the canal, immediately to the north of the former pump house control room.

The Hot and Cold Wells consist of water-filled pits with steel sheet pile, located at the southwestern corner of the Ship Canal. The piles were driven into bedrock and the interiors of the wells were excavated to a depth of about 39 feet below surrounding grade. A 16 feet to 50 feet wide area separates the wells from the Ship Canal. This area between the canal and wells was backfilled to surrounding grade with sand and slag gravel following construction of the wells.

The Hot Well outline is an irregular shape, about 130 feet across the longest dimension, 16 feet across the narrowest section, and water depth is approximately 10 feet.

The Cold Well is rectangular, about 173 long, 23 feet wide, and water depth is approximately 9 to 12 feet.

The bottom of the Hot and Cold wells were excavated to a glacial clay layer that is about 18 feet thick in this area. Undisturbed samples of the clay layer were obtained at various locations throughout the BSC Lackawanna property as part of the RFI groundwater-monitoring program. Laboratory permeability tests performed on these samples revealed that the mean vertical hydraulic conductivity of the clay unit is very low ($6.84 \times 10^{-8}$ cm/sec.). This study is discussed in more detail in Section 2.5.2 of the RFI. The low permeability of the clay layer acts as aquitard creating an effective barrier for the vertical migration of groundwater from the Hot and Cold Wells to the bedrock aquifer.

The Hot and Cold Wells have not received any wastewater since 1983. Water now contained in the wells is mostly from precipitation and possibly from groundwater seepage.

Groundwater is approximately 572 feet above mean sea level (amsl) in the area around SWMU P-18.

## 1.2 History

The Cooling Tower Hot and Cold Well complex went into service in 1978 and shut down in 1983 with the curtailment of plant operations. The purpose of the complex was to cool and recycle water received from the blast furnace gas scrubber water settling tanks called

thickeners (SWMU P-13 to P-17). The overflow water from the thickeners discharged into the Hot Well. From the Hot Well, the water was pumped to Cooling Towers, and then to the Cold Well. From the Cold Well, it was pumped back to the blast furnace wet scrubber system for reuse. Approximately 90 percent of the water in the system was reused; the other 10 percent, called "blow down," was treated and discharged to the Ship Canal.

The discharge point to the Ship Canal was a State Pollution Discharge Elimination System (SPDES) permitted monitoring location. The effluent was sampled and analyzed weekly for pH, total suspended solids (TSS), ammonia, cyanide, zinc, and oil and grease. In the course of the SPDES monitoring, no violations of the SPDES permit conditions were found attributable to discharge from WQCS No. 9, which includes the Hot and Cold Wells.

While WQCS No. 9 was in operation, Lake Erie (i.e., Ship Canal) water elevations and surrounding groundwater table elevations were typically equal to, or somewhat higher than, the water elevation maintained in the Hot and Cold wells. Therefore, the hydraulic driving force in the area was small, but potential water movement was toward the Hot and Cold Wells.

When WQCS No. 9 was shut down in 1983, the motors and pumps, used in conjunction with the Hot and Cold Wells, were placed in storage. The cooling towers were subsequently demolished in the late 1990's.

In March 1992, water level elevations were obtained in the Ship Canal and the Hot and Cold Wells. The water level elevations were 572.42 feet (amsl) for the Ship Canal and 577.75 feet (amsl) for the Hot and Cold Wells. Fill zone groundwater beneath the SWMUs ranged from 573 to 572 feet amsl. The higher water level in the Hot and Cold Wells was attributed to stored precipitation and the integrity of the Hot and Cold Well containment structures.

A site inspection was conducted in April 1992 by representatives of BSC. It consisted of a walkover and visual inspection of the entire SWMU area. No evidence of damage to the sheet piling walls of the complex was observed. The sheet piling appeared to be in excellent condition. During this time, the water levels in both the Hot and Cold Wells were determined to be approximately equal and about 5.25 feet higher than the water level in the adjacent Ship Canal.

SWMU P-18 was also inspected in 1996 and 2001. The 1996 inspection noted water levels of 4 feet and 6 feet below ground surface in the Hot and Cold Wells, respectively. The 2001 inspection noted the water levels were 4.5 and 5.2 feet below grade in the Hot and Cold Wells, respectively. The canal surface is approximately 11 feet below grade.

The higher water elevation in the wells compared to the Ship Canal and surrounding groundwater, following the shut down of the Hot and Cold Wells in 1983, demonstrates the integrity of the sheet piling and indicates that the potential for any historic releases from the wells would have likely been minimal. All these inspections found the wells to be structurally intact. Field notes for the 1996 and 2001 inspections can be found in Appendix A.

SWMU P-18 is located on Gateway property and, therefore is not under a deed restriction.

## 2.0 SAMPLING AND ANALYSIS

Samples of the water and sediment in SWMU P-18 were collected in 1992, as part of the Phase I of the RFI (BSC 1990). Additional sediment samples were collected in 1995 as part of Phase IIC (BSC 1994) and III (BSC 1995) of the RFI. Two upgradient and two downgradient monitoring wells (MWN-48A, MWN-46A and MWN-47A, MWN-45A, respectively) were installed as part of the Supplemental SWMU Investigation (BSC 2000). Monitoring well and other sample locations are shown in Figure 1. Field sample records for the Phase IIC, Phase III and Supplemental SWMU Investigation sampling events are provided in Appendix B of this report.

Groundwater was sampled from wells located near SWMU P-18. Groundwater sampling was conducted during the 2000 Supplemental SWMU Investigation. Groundwater sampling was conducted in accordance with Work Plans approved for the RFI and the Supplemental SWMU Investigation by USEPA (BSC 1989, 1990, 1992a, 1994, 1999a, and 2000). A complete list of site-specific compounds targeted for analysis in the site investigations is provided in Table 1, followed by data qualifiers. Laboratory analytical reports are provided in Section II of the RFI.

### 2.1 Surface Water

Pit water from SWMU P-18 was sampled and analyzed in April 1992 by Empire soil Investigation (ESI), for purposes of preparing a Preliminary SWMU Assessment Report (BSC, July 1992). The focus of the sampling and analytical program was to quantify lead concentrations in the surface water found in the Hot and Cold Wells. The water in the wells appeared to be mostly rain water that had accumulated since the decommissioning of the blast furnaces in 1983. As such, it had been in direct contact with the residual blast furnace sediment in the bottom of the wells. The water samples were field tested for pH and then laboratory analyzed for total lead.

### 2.1.1 Surface Water Results

Results of the water sampling detected total lead in both the Hot Well [0.007 milligrams per liter (mg/L)] and in the Cold Well [0.017 mg/L]. Analytical Results are provided in Appendix C.

## 2.2 Sediment Sampling Phases

### Phase I Investigation

In April 1992, four grab samples of the blast furnace sediment in the bottom of the Hot Well and four samples of the sediment in the bottom of the Cold Well were collected. Sample locations were spaced at approximately equal distances across each well, shown in Figure 1. The grab samples were composited to create one sample for each well. The composites were processed by the Toxicity Characteristic Leaching Procedure (TCLP) and the resulting liquid extracts were analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), lead and selenium. Lead was also analyzed for using Synthetic Precipitation Leaching Procedure (SPLP); and a TCLP analysis (using lake water from Lake Erie as the extraction fluid instead of an acetic acid solution).

### Phase IIC Investigation

In February 1995, two "push-tube" (core) samples (P18-1-[0-19.5] and P18-2-[0-8]) were collected from bottom sediments in the Hot Well. The cored material was primarily black to red-brown silt and clay that had a coke-like odor. The sediment accumulation in the bottom of the Hot Well was approximately 18 to 20 feet thick. Samples were sent to a laboratory where portions were processed by TCLP and SPLP methods. Both solid phase samples (total constituent analysis) and resulting liquid extracts (TCLP and SPLP) were analyzed for VOCs, base-neutral-acid extractables (BNA's), metals, and indicator parameters.

**Phase III Investigations**

In July 1995, two additional push-tube samples (P-18-1 and P-18-2) were collected from the sediments at the bottom of the Hot Well. In addition to total constituent analysis, samples were processed by TCLP and SPLP methods. Solid phases (total constituent analysis) and resulting liquid extracts (TCLP and SPLP) were analyzed for VOCs, SVOCs, metals, and cyanide.

In September 1995, two push-tube samples (P-18-3-[0-17 feet] and P-18-4-[0-26 feet]) were collected from sediments at the bottom of the Cold Well. The material, which had a petroleum-like or coke-like odor, was described as black silty clay with coke fines, having a trace of iron scale. The sediment accumulation in the bottom of the Cold Well was approximately 17 to 26 feet thick. For this sampling round, the samples were analyzed for total constituent and SPLP extraction methods, for VOCs, SVOCs, metals, and cyanide.

### 2.2.1 Sediment Samples Total Constituent Results

Total Constituent analysis of the Phase II core samples collected from the Hot and Cold Wells detected seven VOCs, 19 SVOCs, ten metals and cyanide. The VOCs concentrations ranged from 1 micrograms per kilogram (µg/kg) of toluene in P18-1 to 13 µg/kg of benzene in P18-2(DUP). The SVOCs concentrations ranged from 220ug/kg of naphthalene in P18-2 to 22,000 µg/kg of fluoranthene in P18-1. The metals concentrations ranged from 0.44 milligrams per kilogram (mg/kg) of mercury to 31,4000 mg/kg of calcium, both detected in P18-2(DUP). Cyanide was detected in all the samples ranging from 11 mg/kg in P18-2(DUP) to 314 mg/kg in P18-1. Analytical results for the Phase II sediment samples are presented in Table 2.

Total Constituent analysis of the Phase III core samples collected from the Hot Well bottom detected one VOC, eleven SVOCs, ten metals and cyanide. The VOC detected, carbon disulfide, ranged from 6 µg/kg in P-18-2 to 14 µg/kg in P-18-1. SVOCs ranged from 100 µg/kg of phenanthrene in P-18-2 to 680 µg/kg of pyrene in P-18-1. Metals ranged from 3.6 mg/kg of antimony in P-18-2 to 14,000 mg/kg of lead in P-18-1. Cyanide was detected at 84.4 mg/kg in P-18-1. Cyanide was not detected in P-18-2. Analytical results for the Phase III sediment samples are presented in Table 2a.

Total Constituent analysis of the Phase III core samples collected form the Cold Well bottom detected three VOCs, 17 SVOCs, eleven metals and cyanide. The VOCs detected ranged from 8 µg/kg of total xylenes in P-18-3 to 52 µg/kg of benzene in P-18-4. The SVOC concentrations ranged from 100 µg/kg of 2,4-dimethylphenol to 2,000 µg/kg of 4-methylphenol, both detected in P-18-4. Metals ranged from 0.58 mg/kg of mercury in P-18-4 to 12,000 mg/kg of lead in P-18-3. Cyanide was detected at 26.3 mg/kg in P-18-3 to 77.3 mg/kg in P-18-4. Analytical results for the Phase III sediment samples are presented in Table 2a.

### 2.2.2 Sediment Sampling SPLP Results

SPLP analyses were conducted to more closely mimic the effect of compounds leaching from soil due to rainwater infiltration. The SPLP results help evaluate what compounds can potentially leach from the soils and effect groundwater quality. The analyses were performed in accordance with the USEPA's SW 846 Method 1312 protocols.

Lead was detected in both samples 1992 sediment samples (Cold Well at 0.017 mg/L and Hot Well at 0.022 mg/L). The laboratory analytical data for the 1992 investigation are presented in Appendix C.

Of the samples collected in 1995 during Phases IIC and III, six VOCs, seven SVOCs, and eleven metals were detected in the samples. VOCs ranged from 0.001 milligrams per liter (mg/L) of ethylbenzene (P-18-4) to 0.034 mg/L of total xylenes (P-18-1). SVOCs ranged from 0.001 mg/L of fluoranthene (P-18-1) to 0.011 mg/L of 4-methyphenol (P-18-4). Metals ranged from 0.0017 mg/L of thallium (P-18-1) to 1.2 mg/L of lead (P-18-2). Cyanide was also detected in the samples with a maximum concentration of 1.6 mg/L (P-18-1). Analytical results for the Phase II sediment samples are presented in Table 2. Analytical results for the Phase III sediment samples are presented in Table 2a.

### 2.2.3 Sediment Sampling TCLP Results

TCLP results for the samples were compared to regulatory concentration levels listed in 40 CFR Part 261.

In the 1992 samples, lead was detected in both samples (Cold Well at 101 mg/L and Hot Well at 24 mg/L) above its guidance value of 5 mg/L. Selenium was not detected in either sample. No VOCs or SVOCs were detected. The laboratory report is provided in Appendix C.

The samples that were extracted and samples using lake water as an extraction fluid were also found to contain lead [Cold Well (0.013 mg/L) and Hot Well (0.025 mg/L)].

In the 1995 samples, lead was detected above regulatory values in P18-1 and P-18-2 (and P18-2 DUP). The comparative results for the 1995 samples are presented in Table 3.

Although samples from the Phase III sampling event were submitted, due to laboratory error, the samples were not analyzed for TCLP.

These results would indicate that the lead concentrations in SWMU P-18 sediments meet TCLP criteria. However, the lead results for the 1995 were flagged during data validation as estimated values due to calibration verification failures. Further, air pollution control dust/sludge from iron blast furnaces is specifically excluded from regulation under RCRA Subtitle C (ref. 40 CFR Part 261.4(b)7(ii)(L).

## 2.3 Groundwater Sampling

The primary zone for groundwater around SWMU P-18 is the fill unit. The Ship Canal is the discharge point for the groundwater within the fill, therefore, groundwater flows from the west and south toward the canal (east and north).

Four groundwater monitoring wells (MWN-45A, MWN-46A, MWN-47A, and MWN-48A) were installed in 2000 to evaluate groundwater conditions in the vicinity of SWMU P-18. The monitoring wells are screened in the fill unit that surrounds the SWMU.

Upgradient wells at SWMU P-18 include MWN-46A, and MWN-48A. Downgradient monitoring wells, MWN-45A and MWN-47A. The monitoring well locations are shown in Figure 2. The groundwater elevation contours for the fill unit (based on data collected prior to the installation of MWN-45A, MWN-46A, MWN-47A and MWN-48A) are shown in Figure 2. The direction of groundwater flow is toward the Ship Canal. Groundwater samples were submitted for VOC, SVOC, total metals, dissolved metals and general chemistry analysis.

### 2.3.1 Groundwater Results

Groundwater in the area west and adjacent to SWMU P-18 has been affected by past spills from underground piping and storage tanks associated with the Benzol Plant area. Because of the orientation of P-18 and the groundwater flow to the canal (Figure 2), groundwater well MWN-48A was compared to MWN-47A and MWN-46A was compared to MWN-45A.

**COLD WELL GROUNDWATER (MWN-48A AND MWN-47A)**

Five VOCs, three SVOCs, and 15 metals were detected in wells MWN-48A and MWN-47A. Concentrations of the detected VOCs ranged from 2.2 micrograms per liter (µg/L) of 1,1,2,2-tetrachloroethane (MWN-47A) to 100,000 µg/L of benzene (MWN-48A). Only one analyte, 1,1,2,2-tetrachloroethane, was detected at a higher concentration in the downgradient well, than in the upgradient well. The remaining three VOCs were detected at higher concentrations in the upgradient well (MWN-48A) than in the downgradient well (MWN-47A).

Concentrations of detected SVOCs ranged from 7.0 µg/L of acenaphthylene to 1,800 ug/L of naphthalene, both of which were only detected in upgradient well MWN-48A. Concentrations of detected total metals ranged from 1.8 µg/L of antimony in MWN-48A to 163,000 ug/L of calcium in downgradient well MWN-47A. Cyanide was detected at 0.085 mg/L in MWN-48A.

**HOT WELL GROUNDWATER (MWN-45A AND MWN-46A)**

One VOC, 13 metals, and 9 dissolved metals were detected in the well group MWN-47A and MWN-46A. No SVOCs were detected. The detected VOC, benzene, was detected in both wells but at a higher concentration (17 µ/L) in upgradient well MWN-46A. Concentrations of detected metals ranged from 0.068 µg/L of mercury in upgradient well MWN-46A to 1,200,000 ug/L of sodium in downgradient well MWN-45A. Cyanide was detected in the downgradient well MWN-45A at a higher concentration (0.29 mg/L) than in the upgradient well MWN-46A. A summary of groundwater analytical data is provided in Table 4.

## 2.4 Summary of Analytical Results

Review of the analytical results of the surface water, sediment, and groundwater sampling indicates the following:

- The 1992 data of the SWMU P-18 pit water indicated that material contains detectable concentrations of lead in both the Hot and Cold Wells.

- The 1992 and 1995 TCLP analytical results of the SWMU P-18 sediment indicated lead concentrations meet the TCLP criteria. Further, air pollution control dust/sludge from iron blast furnaces is specifically excluded from regulation under RCRA Subtitle C (ref. 40 CFR Part 261.4 (b)7 (ii) (L).

- The groundwater analytical results indicated that lead was detected in upgradient well MWN-46A only, but was not detected in the dissolved analysis.

- Analytical data from the sediment samples indicated the presence of VOCs, SVOCs, and metals. These compounds were also detected in subsequent SPLP analysis.

- Groundwater analytical data indicates that the majority of VOCs, SVOCs, and metals were detected at higher concentrations in the upgradient wells (specifically MWN-48A) than in the respective downgradient wells. It is unlikely that the materials stored in P-18 have had an additive effect on the groundwater beneath the SWMU.

Further evaluation of the groundwater and sediment conditions in and around SWMU P-18 is provided in Section 3.0 (Risk Assessment).

## 3.0 RISK ASSESSMENT

A human health risk assessment, as described in the *Human Health Risk Assessment Work Plan* (BSC 1997), was conducted for SWMU P-18, Blast Furnace Cooling Tower and Hot & Cold Wells. The results of the Tier 1 Human Health Risk Assessment (HHRA) are presented here and are organized into the following sections: Data Evaluation, Exposure Assessment, Toxicity Assessment, Risk Characterization and Uncertainty Analysis. The major components of this HHRA have previously been presented in Human Health Risk Assessment Report, Part IV of this RFI Report. Therefore, the following sections provide summary overviews of this previously presented information. This section, therefore, serves as a summary report, bringing together all associated and related work from previous risk assessment deliverables, and providing the conclusions of the SWMU-specific risk assessment.

### 3.1 Data Evaluation

A list of 96 constituents of potential interest (COPIs) was developed for the BSC Lackawanna, New York facility based on USEPA and industry studies (BSC 1998). The list contains hazardous constituents that could be present in the waste streams as a result of integrated iron and steel plant operations, such as those historically conducted at the Lackawanna facility. Human Health Risk Assessment ID No. 1 (BSC 1998) established the chemicals of potential concern (COPCs) for each SWMU at the Lackawanna Facility. The COPCs were determined by sequentially applying the following criteria to each COPI on a medium-by-medium basis for each SWMU and watercourse: 1) the chemical was detected in at least 5% of the samples, 2) the chemical was detected in at least one sample at a level above background (*i.e.*, the maximum concentration was above background concentration; for chemicals in surficial SWMU material only), and 3) the chemical was positively detected in at least one sample at a level above the applicable screening criterion [*i.e.,* the maximum concentration was greater than the screening criteria: USEPA Region III Risk Based Concentrations (RBCs), USEPA Soil Screening Levels (SSLs), or NYSDEC Ambient Water Quality Standards and Guidance values].

SWMU P-18 consists of two 15-foot deep pits (depth to top of sediment) covered by approximately 10 feet of standing water. Therefore, surface samples were not collected at this SWMU. In accordance with ID No. 1, subsurface SWMU material samples were not used to represent surface material (with the exception of the future utility/maintenance worker and future construction scenarios as specified in ID No. 2). Additionally, background comparisons were not made for constituents in sediment.

The sampling data for SWMU P-18 (as presented in Section 2.0 of this report) were evaluated in order to identify the site-related COPCs for the SWMU. The COPCs were originally determined in ID No. 1, however, as some screening criteria have been revised, and because additional USEPA Region 2 comments have been received (USEPA 2003) since ID No. 1 was submitted, and because new groundwater samples have also been collected, this screening process was updated (Tables 5 through 7). Screening criteria are current as of 2000. Table 5 presents the screening of the subsurface SWMU material, Table 6 presents the screening of groundwater, and Table 7 presents the screening of pit water. In SWMU material, five semivolatile organic chemicals (all PAHs) and three inorganic chemicals (arsenic, lead, and thallium) were identified as COPCs. SWMU P-18 is located in the Coke Oven groundwater zone. Thirty-four chemicals representing all parameter groups were identified as groundwater COPCs. One water sample each was collected from the cold and hot well (pits) and sampled for lead only. Lead was determined to be a COPC in the cold well.

Representative concentrations were determined for each COPC. For COPCs with data set sample sizes of ten or greater, the 95% upper confidence limit of the mean (95% UCL) was calculated and used as the representative concentration for that COPC. For COPCs with sample sizes of less than ten, the maximum concentration was used. Between three and seven samples were collected for subsurface material constituents in SWMU P-18, therefore, the maximum concentrations were used as representative concentrations. Most of the COPCs in the Coke Oven area groundwater have at least 10 samples; the 95% UCL was used as the representative concentration in such cases. The maximum concentration was used for one chemical, acenaphthene, with a dataset of only nine samples. The representative concentrations for the COPCs in this HHRA are presented in Table 8.

If a chemical's representative concentration exceeds its saturation limit in soil, or its solubility limit in groundwater, this is noted in Table 8, as this may indicate the presence of free phase material. Several chemicals exceed their solubility limits in water (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-c,d)pyrene).

**Exposure Assessment**

The exposure assessment conducted for SWMU P-18 included a review of current and future human receptor scenarios and potential exposure pathways, as related to COPCs. In general, exposure pathways by which a human receptor could come into contact with SWMU material are defined by four components (USEPA 1989):

- A source and mechanism of constituent release to the environment,
- An environmental transport mechanism,
- A point of potential human contact with the affected medium, and
- A route of entry into humans.

If any one of these components is missing, the pathway is considered incomplete and therefore does not contribute to receptor exposure.

Human Health Risk Assessment ID No. 2 (BSC 1999b) presented the current and future human receptor scenarios and potentially complete exposure pathways for each of the SWMUs identified at the Lackawanna Facility. Subsequent USEPA Region 2 comments identified additional potentially complete exposure pathways. The COPCs identified here and in ID No. 1 were also integral in determining potentially complete exposure pathways, based on their type and presence in each media (*e.g.,* there are no volatile COPCs in SWMU P-18 subsurface material, which precludes inhalation of volatile chemicals from subsurface SMWU material as a complete exposure pathway in this HHRA). Potential exposure pathways for SWMU P-18 are summarized in Table 9

For SWMU P-18, the potential receptor scenarios include a current non-BSC and a future commercial/industrial worker, a future construction worker, a future utility/maintenance worker and a trespasser. Potentially complete exposure pathways were established for each receptor. For the future commercial/industrial worker, ambient and indoor inhalation of vapors from groundwater were determined to be potentially complete exposure pathways.. For the trespasser, inhalation of ambient vapors was determined to be a potentially complete exposure pathway. As the future construction and the utility/maintenance workers may be involved in digging activities, the following pathways were determined to be potentially complete: direct contact (*i.e.*, particulate inhalation, ingestion and dermal contact) with surface/subsurface SWMU material, inhalation of vapors and dermal contact with Coke Oven groundwater, and dermal contact with pit water.

The construction and utility/maintenance workers have the potential to come into contact with the COPCs in surface SWMU material as the SWMU pits are covered with 20 feet of water. As specified in ID No. 1, subsurface SWMU material is used as a surrogate for surface SWMU material for these two scenarios only.

A detailed description of the potentially exposed receptor scenarios and pathways for SWMU P-18 can be found in ID No. 2 (BSC 1999b).

## 3.2 Toxicity Assessment

A toxicity assessment characterizes the relationship between the exposure to a COPC and the adverse health effects that may result from such an exposure (dose-response). The end result of the dose-response assessment is the determination of human uptake levels that provide an adequate measure of protection to exposed persons for carcinogenic and noncarcinogenic endpoints. The derivation of acceptable levels of exposure (*e.g.*, risk-based screening levels) and the manner in which these levels are used in this HHRA are discussed below.

Tier 1 risk-based screening levels (RBSLs) were calculated and compared to the representative SWMU P-18 COPC concentrations. The RBSLs are defined as concentrations of COPCs in relevant media that are not expected to produce any adverse health effects under

assumed exposure conditions. Tier 1 RBSLs were developed using information previously defined and described in detail in HHRA ID No. 2. The equations used to calculate the RBSLs follow basic USEPA risk assessment principles (USEPA 1989, 1996a). Conservative exposure parameters, as defined by the ASTM Standard (ASTM 1995) and USEPA guidance (USEPA 1989, 1991a, and 1991b), and USEPA toxicity criteria (USEPA 2000b), were inputs into these equations to develop the RBSLs. As some of the toxicity criteria have been revised by the USEPA since originally presented in ID No. 1, they are presented in Table 10 of this HHRA. Toxicity criteria are current as of 2000 (USEPA 2000b). The above information was used to calculate Tier 1 RBSLs for COPCs in SWMU material and groundwater, for each of the five receptor scenarios.

It should be noted that, for the future construction and utility/maintenance workers, an RBSL cannot be calculated for lead via groundwater or pit water pathways. This is because there is no appropriate biokinetic methodology available to address dermal exposures. The screening criterion (15 µg/L) was adopted as the RBSL even though this value is not risk-based and is more appropriately associated with an ingestion pathway.

Some of the RBSLs calculated were greater than the chemicals' solubility in water. This indicates that, based on the predicted amount of chemical volatilization, pure product in the groundwater would not pose an inhalation health threat from these chemicals. Detected concentrations of several chemicals in groundwater are greater than their respective solubility limits in water, which could be indicative that free product was sampled.

A comparison of the representative COPC concentrations to RBSLs for each of the exposure scenarios is presented in Table 11. This comparison provides a preliminary screening of potential risks to the specific receptor populations and exposure pathways identified for SWMU P-18. For both the current and future commercial/industrial worker scenarios, representative concentrations of benzene in groundwater exceed ambient air RBSLs. For the future commercial/industrial worker, the representative concentrations for benzene and naphthalene in groundwater exceed indoor air RBSLs.

For the future construction worker scenario, the representative concentrations of arsenic, lead, and benzo(a)pyrene in subsurface material exceed direct contact RBSLs. Also for this receptor, the representative concentrations of benzene, bis(2-ethylhexyl)phthalate, lead and naphthalene in groundwater exceed RBSLs for the inhalation of and dermal contact with groundwater. The concentration of lead in pit water exceeds the dermal contact RBSL for the construction worker population.

For the future utility/maintenance worker scenario, the representative concentrations of arsenic and lead in surface/subsurface SWMU material exceed the respective direct contact RBSLs, benzene in groundwater exceeds the inhalation of ambient vapors and dermal contact RBSLs, and lead in both groundwater and pit water exceeds the dermal contact RBSL.

The COPC representative concentrations do not exceed any trespasser RBSLs.

In accordance with Part IV of this RFI, those COPCs that do not exceed the Tier 1 RBSLs are not evaluated further. For those COPCs that exceed Tier 1 RBSLs, the risk to human health is evaluated further using a Tier 1 HHRA.

## 3.3 Risk Characterization

Risk characterization involves estimating the magnitude of potential adverse health effects of the COPCs, and summarizing the nature of the health impact to the defined receptor populations. It combines the results of the toxicity and exposure assessments to provide numerical estimates of health risk.

Those COPCs that exceed an RBSL were further evaluated in this Risk Characterization. The Risk Characterization, or Tier 1 HHRA, provides an estimate of risk and hazard based on a comparison of the RBSL (*i.e.*, health-protective levels) to the COPC concentrations (*i.e.*, site-specific levels). Specifically, for those COPCs that exceed an RBSL, a screening-level hazard index (SLHI) was calculated to evaluate noncarcinogenic health effects, and a total screening-level cancer risk ($SLCR_{total}$) was calculated to evaluate carcinogenic effects. The SLHI and $SLCR_{total}$ methodologies are based on USEPA guidance (USEPA 1989), and follow that utilized in

Part IV of the RFI.

### 3.3.1 Noncarcinogenic Hazards

The noncancer hazards were assessed in this HHRA using a hazard quotient approach (USEPA 1989). For each COPC, the noncarcinogenic RBSL was compared to the COPC's representative concentration to determine the screening level hazard quotient (SLHQ) for that chemical. The equation is as follows:

$$SLHQ = \frac{\text{Representative concentration}_{\text{COPC/medium}}}{\text{RBSL}_{\text{COPC/medium/receptor/pathway}}}$$

The SLHQ for all chemicals are summed to create a total Screening-Level Hazard Index ($SLHI_{total}$) for each pathway. The smaller the SLHQ/SLHI, the greater the degree of protection for that pathway. If the SLHI is less than 1, the risks are considered to be negligible (USEPA 1989). Those $SLHI_{total}$s that exceed 1 were further evaluated by developing target organ-specific SLHIs. This process is appropriate as only certain chemicals affect similar biological target endpoints, and it is only relevant to quantify the additive effects of these chemicals.

The SLHIs for each receptor scenario evaluated exceed the noncarcinogenic benchmark of 1.0 (Table 12).. The future commercial/industrial worker scenario was evaluated for both exposure to both indoor and ambient air. As a worker will not be exposed to both ambient and indoor air simultaneously during the day, the ambient and indoor air SLCRs were evaluated separately. The $SLHI_{total}$ for the future commercial/industrial worker scenario exposed to ambient air is 5.1, attributable solely to benzene in groundwater. The $SLHI_{total}$ for the indoor future commercial/industrial worker scenario is 273, attributable to both benzene and naphthalene in groundwater. For the future commercial/industrial worker scenario exposed to ambient air, the blood/immune system SLHI is 5.1 (attributable solely to benzene). For the indoor commercial/industrial worker scenario, the blood/immune system SLHI is 271 (attributable to benzene) and the upper respiratory system SLHI is 1.9 (attributable to naphthalene).

The $SLHI_{total}$ for the current non-BSC commercial/industrial worker is 5.1, attributable solely to benzene (blood/immune system) in groundwater.

The $SLHI_{total}$ for the future construction worker scenario is 580; it is a result of inhalation of benzene and naphthalene vapors from groundwater. The target organ SLHI for the blood and immune system is 570, due to benzene in groundwater; the upper respiratory system SLHI is 10, attributable to naphthalene in groundwater.

The $SLHI_{total}$ for the future utility worker scenario is 52; a result of inhalation of ambient vapors and dermal contact with benzene in groundwater. The blood/immune SLHI for this scenario is also 52, since benzene is the only COPC evaluated.

Lead is not evaluated as part of the SLHI because of its unique toxicological properties. However, lead exceeds the direct contact RBSL for subsurface SWMU material for the future construction worker and the future utility/maintenance worker as noted in Table 12. An RBSL for lead in either groundwater or pit water was not calculated. Representative concentrations of lead in both pit water (0.018 µg/L) and groundwater (0.017 µg/L), however, are slightly above the drinking water action level (0.015 µg/L) (USEPA 1991c), which was adopted as the RBSL in this risk assessment. These exceedances are also noted in Table 12.

### 3.3.2 Carcinogenic Risk

In a human health risk assessment, carcinogenic health risks are defined in terms of the probability of an individual developing cancer over a lifetime as the result of exposure to a given chemical at a given concentration (USEPA 1989). The incremental probability of developing cancer over a lifetime (*i.e.*, the theoretical excess lifetime cancer risk) is the additional risk above and beyond the cancer risk an individual would face in the absence of the exposures characterized in this risk assessment. In this Tier 1 HHRA, cancer risk was evaluated according to the following equation:

$$SLCR = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}} x \text{ Target Risk Level}$$

Cancer risks are summed regardless of the differences in target organ, weight-of-evidence for human carcinogenicity, or potential chemical interactions (*e.g.*, antagonistic or synergistic effects). This approach is consistent with USEPA's current approach to carcinogenic effects, which is to assume effects are additive unless adequate information to the contrary is available (USEPA 1989). If the total screening level cancer risk ($SLCR_{total}$) for each receptor/pathway is equal to or less than $1 \times 10^{-4}$, the risks are considered to be negligible (BSC 1997).

Only the $SLCR_{total}$ for the future indoor commercial/industrial worker exceeds the carcinogenic benchmark of $1 \times 10^{-4}$. As mentioned earlier, because the future industrial/commercial worker will not be exposed to both ambient and indoor air simultaneously during the day, a $SLCR_{total}$ for each scenario was developed. For the future commercial/industrial worker scenario, the ambient $SLCR_{total}$ is $2 \times 10^{-5}$ and the indoor $SLCR_{total}$ is $1 \times 10^{-3}$. Both of these $SLCR_{total}$s are attributable to inhalation of benzene vapors from groundwater.

For the current non-BSC commercial/industrial worker the $SLCR_{total}$ is $2 \times 10^{-5}$, attributable to the inhalation of benzene vapors from groundwater.

For the future construction worker scenario, the $SLCR_{total}$ is $2 \times 10^{-5}$ attributable to direct contact with arsenic and benzo(a)pyrene in subsurface SWMU material ($7 \times 10^{-6}$) and inhalation of ambient vapors from and dermal contact with benzene and bis(2-ethylhexyl)phthalate in groundwater ($2 \times 10^{-5}$). For the future utility/maintenance worker scenario, the $SLCR_{total}$ is $7 \times 10^{-6}$, attributable arsenic in subsurface SWMU material ($1 \times 10^{-6}$) and benzene in groundwater ($6 \times 10^{-6}$).

### 3.4 Conclusions

The results of the Tier 1 HHRA are that levels of benzene and naphthalene in Coke Oven groundwater are greater than carcinogenic and noncarcinogenic RBSLs and produce either a hazard index greater than the Tier 1 noncarcinogenic benchmark of 1.0, or a carcinogenic risk

greater than the carcinogenic benchmark of $1 \times 10^{-4}$.

For the future commercial/industrial worker scenario, the calculated noncarcinogenic hazard index generated by benzene (ambient and indoor vapor inhalation) and naphthalene (indoor vapor inhalation) in Coke Oven groundwater is greater than the Tier 1 hazard benchmark. Also, the calculated risk level for benzene (indoor vapor inhalation) in Coke Oven groundwater is greater than the Tier 1 carcinogenic risk benchmark.

For the future construction worker scenario, the calculated hazard index generated by benzene and naphthalene in Coke Oven groundwater (ambient vapor inhalation) is greater than the Tier 1 noncarcinogenic benchmark. Lastly, the concentration of lead in subsurface SWMU material is greater than RBSLs for the future current construction worker and future utility/maintenance worker scenarios.

Lead is also a COPC in pit water and groundwater, although no RBSLs have been calculated. Lead was selected as a COPC based on its detection in pit water and groundwater at levels above a drinking water standard. Representative concentrations of lead in these media (0.017 and 0.018 mg/L) are slightly above the lead drinking water action level (0.015 mg/L), which is not risk based. Dermal exposures to lead are generally not included in evaluating lead since dermal uptake is considered trivial. Furthermore, the assumed dermal exposures to the two worker populations are intermittent (i.e. limited frequency and duration), therefore, concentrations of lead in groundwater and pit water do not represent a health hazard.

Based on these results and in accordance with the work plan, further evaluation may be completed during the Corrective Measures Study (CMS) and could include a Tier 2 assessment or an evaluation of corrective measures.

With the exception of the construction worker and utility/maintenance worker scenarios, this HHRA did not include an evaluation of surficial SWMU material, as the SWMU pits are covered by 20 feet of standing water. The uncertainties inherent in these conclusions are presented in the following Uncertainty Analysis. It should be noted, as previously discussed in Section 2.0, that most of the elevated benzene (including the maximum concentration)

concentrations are related to the adjacent and upgradient benzol plant.

## 3.5 Uncertainty Analysis

There are multiple sources of uncertainty that can be identified for any risk assessment. These include, among others, uncertainty associated with the toxicity criteria used to derive dose-response factors, uncertainties associated with exposure parameters used in the exposure assessment, and uncertainties associated with combining exposure parameters and toxicity criteria to characterize risk.

In the development of any health assessment, some level of uncertainty is introduced each time an assumption is relied upon to describe a dynamic parameter. Some assumptions have a significant scientific basis while others do not, which can result in the selection and use of conservative, default exposure parameters in the exposure assessment. The selection of multiple conservative assumptions in the exposure assessment generally results in an overestimation of potential health risks associated with exposure to specific chemical constituents. The primary areas of uncertainty for this risk assessment are qualitatively discussed below.

### 3.5.1 Exposure Scenarios

The evaluation of exposure scenarios that are not necessarily representative of realistic exposures based on current and future land use creates uncertainty in the overall risk potential of the SWMU and the site. Some of the exposure scenarios evaluated in this risk assessment are not realistic in terms of planned redevelopment for the site. Evaluation of future construction worker and future industrial/commercial worker scenarios is required for every SWMU on the Lackawanna site (BSC 1999b). However, given the physical characteristics and current use (*i.e.*, waste management areas), many SWMUs cannot support construction of buildings that would cause exposures to future construction or industrial/commercial workers. Because SWMU P-18 is comprised of two below-ground, water and sediment-filled impoundments with sheet-pile walls that extend well above grade, construction could not occur until the pits are drained and the sediment and walls are removed. Thus, the elevated noncarcinogenic hazard and carcinogenic risk predicted in this Tier I risk characterization are not representative of a true hazard from

exposure to COPCs at this SWMU, as it is associated solely with the future industrial/commercial worker scenario.

### 3.5.2 Site Sampling and Representative Concentrations

For all COPCs in the SWMU material and for benzene in groundwater, the maximum concentration was used as the representative concentration in this HHRA. This was either because an insufficient number of observations are available to calculate a 95% UCL, or because the calculated 95% UCL exceeds the maximum concentration. The representative concentrations were used to compare to the RBSLs calculated for this HHRA, and ultimately determine the COPCs in this HHRA. Use of the maximum concentrations of the biased sampling is a very conservative methodology utilized in this HHRA.

### 3.5.3 COPC Selection Process

The COPCs evaluated for this SWMU were identified in the HHRA ID No. 1 (BSC 1998). These chemicals were selected in part because their representative concentrations exceeded the 2000 USEPA Region III RBCs for residential scenarios. Since no residential exposures are realistic for any of the on-site scenarios, some chemicals have been retained as COPCs that are not likely to pose a potential threat to most of the human receptors evaluated here.

### 3.5.4 Exposure Parameters

Several conservative default exposure parameters (*e.g.*, inhalation rates, exposure frequency, exposure duration) were incorporated into the exposure assessment to define general population behavior. For example, for the industrial/commercial worker scenarios, default exposure parameters are intended to be conservative and representative of an individual who is consistently present at the site 24 hours a day, 250 days a year, in the area of highest concentration. It is more likely that the exposure of an industrial worker to a *particular SWMU* (*i.e.*, SWMU material) on the Lackawanna site is limited to an average of only a few hours a day, 2 weeks year. Most parameters incorporated into the exposure assessment to define the receptor scenarios are conservative values and used to define a worst-case population behavior. The net effect of using multiple conservative exposure assumptions is the overestimation of potential

health risks.

Additionally, for a receptor population such as an industrial worker or a resident (*i.e.* where exposure duration is greater than 250 days/year), exposure frequency typically is corrected in site-specific health risk assessments for the fraction of the year when outdoor exposure to soil will be limited due to severe weather conditions such as snow, ice, rain, and freezing temperatures (USEPA 1989). This factor is called a meteorological factor. Because of the geographical location of the Lackawanna site, a correction factor for weather conditions would be reasonable. In this Tier 1 human health risk assessment, exposure did not exclude days when the temperature is less than 32°F, when there is snow cover, or the ground was wet from other forms of precipitation. For this SWMU, the Tier 1 RBSLs were exceeded for the future commercial/industrial worker scenarios. Thus, applying a more realistic exposure frequency and a meteorological factor would result in higher RBSLs.

### 3.5.5 Toxicity Assessment

*Noncarcinogenic Criteria-* Toxicity information for many of the COPCs is limited for humans. Consequently, depending on the quality and extent of toxicity information, varying degrees of uncertainty will be associated with the calculated toxicity values. The USEPA derives reference concentrations (RfC; inhalation exposures) and reference doses (RfDo; oral exposures) for chemicals using an uncertainty factor (UF) approach. The uncertainty factor for naphthalene, for instance, is 3000. This was derived by applying a UF of 10 to account for extrapolation of the mouse study to humans, another UF of 10 to account for sensitive humans, another UF of 10 to account for extrapolation from a LOAEL to a NOAEL, and a final UF of 3 to account for lack of an appropriate reproductive study. In general, the procedures used to extrapolate from animals to humans in toxicity studies include a conservative use of uncertainty factors so that potential effects on humans are likely overestimated rather than underestimated. It is widely accepted in the scientific community that low doses of toxicants may be detoxified by any one of several processes present in human organ systems (Ames *et al.* 1987). As a result, humans may not react to the same degree as the population of genetically homogeneous laboratory animal populations used in standard bioassays.

*Carcinogenic Criteria*- USEPA cancer SFs are developed using variations of the Linear Multistage Model (LMS) for carcinogenicity. The LMS is highly conservative as it assumes linearity between dose and effect to zero dose assuming no threshold for carcinogenicity. However, the human body has mechanisms to detoxify most chemicals particularly at low doses, and therefore many scientists believe that most, if not all carcinogens only cause cancer above a "threshold dose."

Benzene and arsenic are two of the carcinogenic COPCs evaluated for SWMU P-18, which presented potential risks. The inhalation slope factors for benzene and arsenic are based on human data from occupational exposure studies, and thus an extrapolation from animal data is not necessary, thereby reducing the some uncertainty in the slope factor. However, there is significant uncertainty associated with the low-dose extrapolation (environmental exposures are relevant in the low-dose range) used to generate the slope factors. The EPA has used its default linear model to estimate risks in the low-dose range citing lack of carcinogenic mode of action information. Thus, should this information become available, the low-dose carcinogenic risks for these chemicals could be evaluated differently.

*Absence of Inhalation Toxicity Criteria* - Although toxicity information is generally available for the most significant chemicals and exposure routes in this HHRA, there were some COPCs in this HHRA for which no inhalation toxicity criteria (RfDs or cancer slope factors) exist. In the absence of data, either the oral RfD or oral SF was used to evaluate inhalation exposures. The letter "R" in Table 10 notes these instances. This extrapolation assumes that the chemical is equitoxic by both routes of exposure (oral and inhalation). It is more conservative to evaluate these chemicals for inhalation exposures than to not evaluate them at all. Thus, this method potentially overestimates inhalation risks for COPCs evaluated as such. This uncertainty, however, is not applicable to the inhalation RfCs or slope factors for the COPCs which showed exceedances of their Tier 1 RBSLs at this SWMU.

The development of an RBSL for lead, based on pharmacokinetic modeling (the USEPA Adult Lead Model) is inherently uncertain. These uncertainties relate to whether the model is capable of fully accounting for all significant variables that affect blood lead levels and whether selected input values, that cannot be measured, are accurate, especially for future,

hypothetical populations. The adult lead model, however, addresses only soil exposures. Whether the lead in groundwater or pitwater represents any significant exposure to a worker is uncertain.

### 3.5.6 Risk Characterization

Uncertainties in the risk characterization portion of the risk assessment for the site are a combination of the uncertainties associated with both the dose-response assessment and the exposure assessment. As discussed above, the assumptions and parameters used for both the dose response and exposure assessments are extremely conservative. In addition, since the toxicity criteria and exposure parameters are combined in the risk characterization, the conservatism is compounded.

### 3.5.7 Uncertainty Analysis Summary

This Tier 1 HHRA includes uncertainties and conservative assumptions that, in general, effectively combine to overestimate the potential current and future exposures. The major sources of uncertainty contributing to the conservatisms in this HHRA are summarized below:

- Evaluation of an indoor industrial/commercial worker scenario
- Use of maximum concentrations as representative concentrations
- Use of subsurface SWMU material to represent surface SWMU material
- Compounding effect of multiple, conservative exposure parameters
- No meteorological factor adjustment
- Confidence in toxicity criteria

The net effect of the uncertainties of this HHRA is the generation of risk and hazard estimates that probably far exceed any true exposure conditions that currently exist or which could possibly exist in the future.

## 4.0 CONTAINMENT

The steel sheet piling provides lateral containment of water and sludge in the Hot and Cold Wells. In a vertical direction, over 30 feet of low permeability lacustrine clays and dense glacial till reside between the bottom sediments in the wells and the bedrock aquifer. Based on surface water levels of both SWMU P-18 and the adjacent groundwater elevations, the water is contained within the Hot and Cold Wells and is unlikely to be hydraulically connected to the groundwater.

Because the Hot and Cold Wells are structurally enclosed and the waters contained within them are at least six feet below the top of the steel pile walls, runoff from the units is not a concern. A site inspection conducted in September 1996 by Dames & Moore revealed no evidence of surface runoff from the units. However, since the wells are open to the atmosphere, rainwater can collect in the SWMU.

## 5.0 CONCLUSIONS

Based on review of the data, the following conclusions can be made:

- Based on the available data, the sediment and water remaining within SWMU P-18 has not had an additive affect on groundwater beneath the SWMU.

- The potential risk from the sediment may require further evaluation.

- The 1992 TCLP results indicate that sediment within SWMU P-18 contain leachable concentrations, which exceed the TCLP criteria. The 1995 TCLP results indicate that the lead concentrations in sediment exceed the TCLP criteria. The Blast Furnace sludge in the Hot and Cold Wells is explicitly excluded from hazardous waste regulations under RCRA Subtitle C and is codified in 40 CFR Part 261.4(b)7(ii) (L).

- Total analysis of the sediment indicates that VOCs, SVOCs, and metals are all present at detectable levels. SPLP analysis indicates detectable concentrations of VOCs, SVOCs, and metals as well.

- Water elevations within the Hot and Cold Wells are higher than the underlying fill unit groundwater and adjacent Shipping Canal, indicating that the water is unlikely to be hydraulically connected to groundwater within the fill unit.

- Upgradient wells contain higher concentrations of the majority of compounds detected in both the upgradient and downgradient wells.

- For the future commercial/industrial worker scenario, the calculated noncarcinogenic hazard index generated by benzene (ambient and indoor vapor inhalation) and naphthalene (indoor vapor inhalation) in Coke Oven groundwater is greater than the Tier 1 hazard benchmark. Also, the calculated risk level for benzene (indoor vapor

inhalation) in Coke Oven groundwater is greater than the Tier 1 carcinogenic risk benchmark.

- For the future construction worker scenario, the calculated hazard index generated by benzene in Coke Oven groundwater (ambient vapor inhalation) is greater than the Tier 1 noncarcinogenic benchmark.

- The concentration of lead in subsurface SWMU material is greater than RBSLs for the future current construction worker and future utility/maintenance worker scenarios.

Based on these results, further evaluation of the SWMU may be completed during a CMS and could include a Tier 2 assessment or an evaluation of corrective measures.

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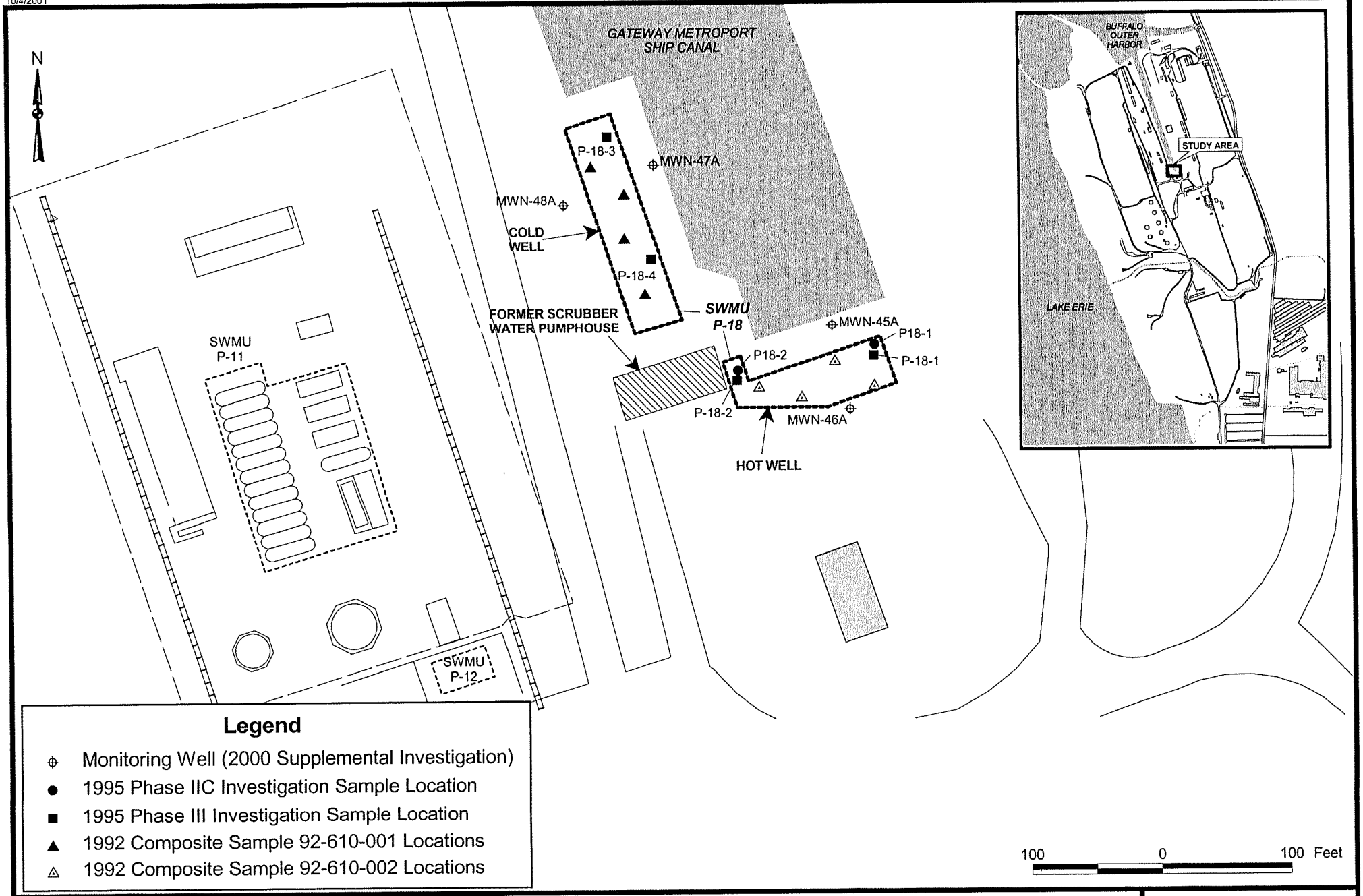
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J:\420008bsc.15\gis\PRESENT\swmu_report\p-18.apr SWMU P-18 SAMPLING LOCATIONS
10/4/2001

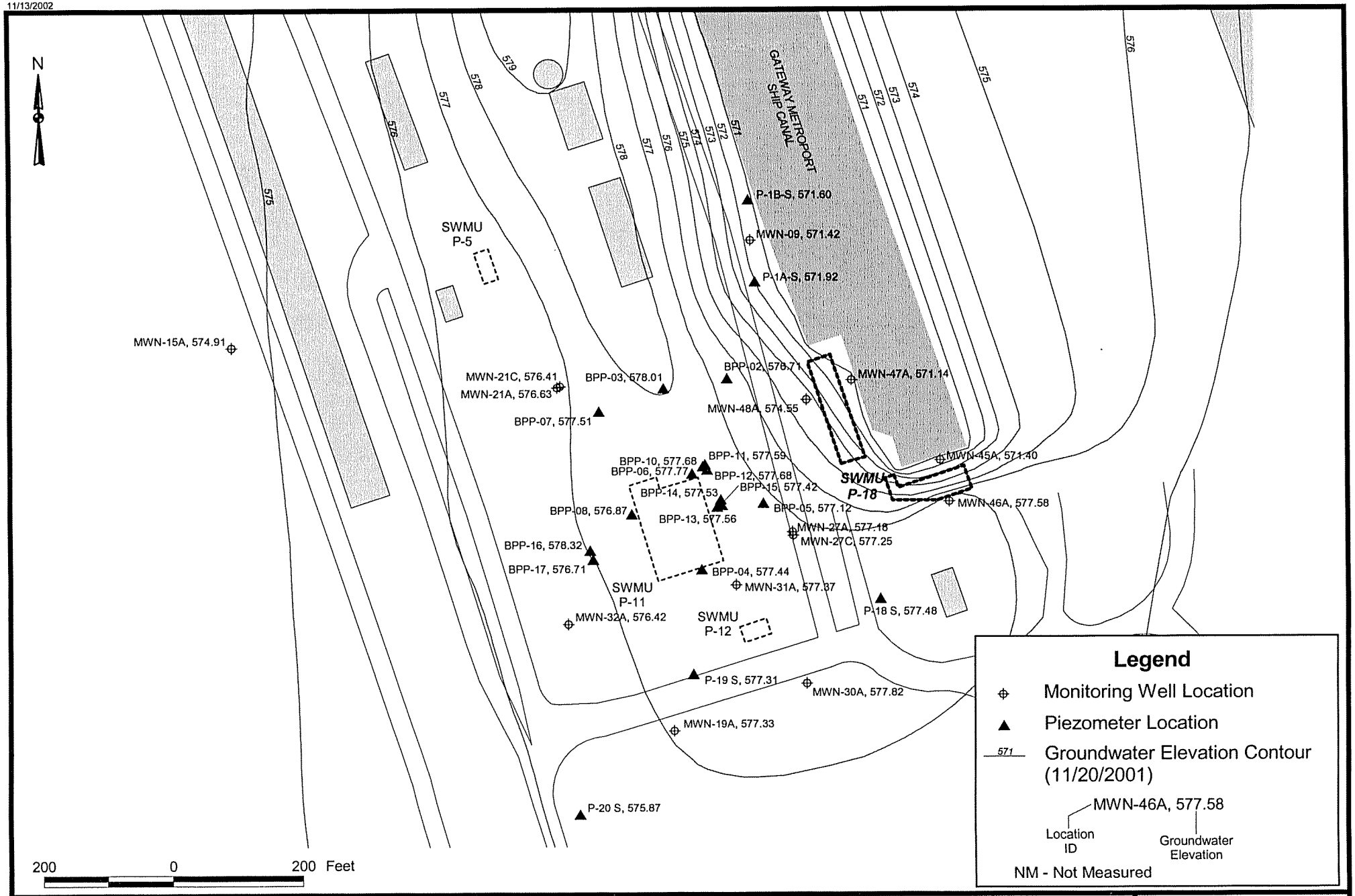



URS

BETHLEHEM STEEL CORPORATION
SITE LOCATION MAP SHOWING SAMPLE LOCATIONS FOR:
BLAST FURNACE COOLING TOWER AND HOT & COLD WELLS (SWMU P-18)

FIGURE 1

N:\11172630.00000\GIS\PRESENT\swmu_report\p-18.apr 11/01 FILL GROUNDWATER ELEVATIONS
11/13/2002




URS

BETHLEHEM STEEL CORPORATION
MONITORING WELL/PIEZOMETER LOCATION MAP WITH GROUNDWATER ELEVATION CONTOURS (FILL UNIT)

FIGURE 2

# TABLE 1
# SITE-SPECIFIC HAZARDOUS CONSTITUENTS AND INDICATOR PARAMETERS

| PARAMETER | | |
|---|---|---|
| **Volatile Organic Compounds** | **Semivolatile Organic Compounds** | **Metals** |
| Acrylonitrile | Acenaphthylene | Antimony |
| Benzene* | Anthracene | Arsenic |
| Bromochloromethane | Benzo(a)Anthracene | Barium |
| Bromodichloromethane | Benzo(a)Pyrene | Cadmium |
| Bromoform | Butyl benzyl phthalate | Calcium |
| Bromomethane | 4-Chloro-3-Methylphenol | Chromium* |
| Carbon tetrachloride | bis(2-Chloroethyl)ether | Lead* |
| Chlorobenzene | 2-Chloronaphthalene | Magnesium |
| Chloroethane | Chrysene | Mercury |
| 2-Chloroethyl vinyl ether | 1,2-Dichlorobenzene | Nickel |
| Chloroform | 1,3-Dichlorobenzene | Potassium |
| Chloromethane | 1,4-Dichlorobenzene | Selenium |
| Dibromochloromethane | Di-n-butyl phthalate | Silver |
| Dichlorodifluoromethane | Di-n-octyl phthalate | Sodium |
| 1,1-Dichloroethane | 2,4-Dichlorophenol | Thallium |
| 1,2-Dichloroethane | Diethyl phthalate | |
| 1,1-Dichloroethene | Dimethyl phthalate | |
| trans-1,2-Dichloroethene | 2,4-Dimethylphenol | **Indicator Parameters** |
| 1,2-Dichloropropane | 4,6-Dinitro-2-Methylphenol | Alkalinity (CaCO3 to pH 4.5) |
| cis-1,3-Dichloropropene | 2,4-Dinitrotoluene | Alkalinity Total |
| trans-1,3-Dichloropropene | 2,6-Dinitrotoluene | Chloride |
| Ethylbenzene | bis(2-Ethylhexyl)Phthalate | Cyanide |
| Methylene chloride | Fluoranthene | Sulfate |
| 1,1,1,2-Tetrachloroethane | Fluorene | Total Organic Carbon |
| 1,1,2,2-Tetrachloroethane | Hexachlorobenzene | Total Dissolved Solids |
| Tetrachloroethene | Hexachlorobutadiene | Total Organic Halogens |
| Toluene | Hexachlorocyclopentadiene | Total Recoverable Phenolics |
| 1,1,1-Trichloroethane | Hexachloroethane | |
| 1,1,2-Trichloroethane | Isophorone | |
| Trichloroethene | 3-Methylphenol & 4-Methylphenol | |
| Trichlorofluoromethane | 2-Methylphenol | |
| Vinyl chloride | Naphthalene* | |
| Xylenes, Total | Pentachlorophenol | |
| | Phenanthrene | |
| | Phenol | |
| | Pyrene | |
| | Pyridine | |
| | 2,3,4,6-Tetrachlorophenol | |
| | 1,2,4-Trichlorobenzene | |
| | 2,4,5-Trichlorophenol | |
| | 2,4,6-Trichlorophenol | |

Notes:

* Benzene, chromium, lead, naphthalene, and phenolic compounds represent hazardous metals and organic compounds that are generally prevalent in iron and steel industry wastes and which have been found at varying levels during previous groundwater monitoring studies at the Lackawanna site. These pollutants were also selected by EPA for regulation under 40 CFR 420 (EPA's effluent limitations specific for the iron and steel manufacturing point source category) and cover each major family of hazardous constituents—chromium and lead for metals; benzenes for volatile organics; naphthalene for base/neutral semi-volatile organics; and phenolics for acid extractable semi-volatile organics.

# DATA VALIDATION QUALIFYING FLAGS

U – Compound was analyzed for but not detected above the sample quantitation limit

J – Analyte was positively identified; associated numerical value is an approximation of the analyte concentration

N – Analysis indicates the presence of an analyte for which there is presumed evidence to make a tentative identification

NJ – Analysis indicates the presence of an analyte that has been " tentatively identified" and the numerical value represents the approximate concentration

UJ – Analyte was not detected above the reported samples quantitation limit

B – Metals only: The analyte was detected above instrument detection limits (IDL); the reported concentration is below the contract required detection limit (CRDL)

R – Sample results are rejected due to serious deficiencies in ability to analyze the sample and meet quality control criteria

D – The sample results are reported from a secondary dilution analysis.

Data validation qualifying flags are used in conjunction with reason codes summarized below[1].

| Organics | Metals |
|---|---|
| c – Calibration failure; poor or unstable response | a – Analytical sequence deficiency or omission |
| d – Matrix spike/matrix spike duplicate imprecision | c – Calibration verification failure |
| e – Laboratory duplicate control sample imprecision | d – Matrix duplicate imprecision |
| f – Field replicate or duplicate imprecision | e – Laboratory duplicate control sample imprecision |
| g – Poor chromatography | f – Field replicate or duplicate imprecision |
| h – Holding time violation | h – Holding time violation |
| i – Internal standard failure | k – Serial dilution imprecision |
| j – Poor mass spectrographic performance | l – Laboratory control sample recovery failure |
| l – Laboratory control sample recovery failure | m – Matrix spike recovery failure |
| m – Matrix spike/matrix spike duplicate recovery failure | n- Interference check sample recovery failure |
| r – Linearity failure in initial calibration | o – Calibration blank contamination |
| s – Surrogate spike recovery failure | p – Preparation blank contamination |
| t – Instrument tuning failure | r – Linearity failure in calibration or MSA analysis |
| w – Relative retention time failure | v – Post digestion spike failure |
| x – Field blank contamination | x – Field blank contamination |
| y – Trip blank contamination | z – Laboratory storage blank contamination |
| z – Method blank contamination | Q – Other – total/dissolved imprecision |
| Q - Other | -- |

Note: NA – Not analyzed for that compound

# TABLE 2
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# PHASE II SEDIMENT SAMPLES
# SWMU P-18

| Location ID | | P18-1 | P18-2 | P18-2 |
|---|---|---|---|---|
| Sample ID | | P18-1 | P18-2 | P18-2 DUP |
| Matrix | | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | 0.0-19.5 | 0.0-8.0 | 0.0-30.0 |
| Date Sampled | | 02/21/95 | 02/21/95 | 02/21/95 |
| Parameter | Units | | | FIELD DUPLICATE (1-1) |
| **Volatile Organic Compounds** | | | | |
| Benzene | UG/KG | 2 J | 10 | 13 |
| Carbon disulfide | UG/KG | 6 | 3 J | 2 J |
| Methylene chloride | UG/KG | 2 J | 4 J | 3 J |
| Toluene | UG/KG | 1 J | 4 J | 4 J |
| 1,1,1-Trichloroethane | UG/KG | 2 J | 3 J | 5 U |
| Trichlorofluoromethane | UG/KG | 3 J | 5 U | 5 U |
| Xylenes, Total | UG/KG | 5 U | 5 U | 1 J |
| **Volatile Organic Compounds - SPLP** | | | | |
| Toluene -SPLP | MG/L | 0.005 U | 0.005 U | 0.0014 J |
| **Semivolatile Organic Compounds** | | | | |
| Anthracene | UG/KG | 3,300 | 480 J | 280 J |
| Benzo(a)anthracene | UG/KG | 20,000 | 4,600 | 1,400 |
| Benzo(a)pyrene | UG/KG | 4,200 | 730 J | 600 J |
| Benzo(b)fluoranthene | UG/KG | 11,000 | 2,900 | 1,300 |
| Benzo(ghi)perylene | UG/KG | 6,700 | 1,400 | 380 J |
| Benzo(k)fluoranthene | UG/KG | 2,900 | 1,200 | 370 J |
| Chrysene | UG/KG | 7,700 | 2,500 | 270 J |
| Di-n-butyl phthalate | UG/KG | 1,700 J | 1,700 | 300 J |
| Dibenz(a,h)anthracene | UG/KG | 1,200 J | 1,100 U | 880 U |
| bis(2-Ethylhexyl)phthalate | UG/KG | 2,200 U | 2,100 | 600 J |
| Fluoranthene | UG/KG | 22,000 | 3,900 | 2,000 |
| Fluorene | UG/KG | 1,400 J | 280 J | 880 U |
| Indeno(1,2,3-cd)pyrene | UG/KG | 5,300 | 980 J | 240 J |
| 3-Methylphenol & 4-Methylphenol | UG/KG | 720 J | 1,100 U | 880 U |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

N:\11BAB2-1.000\DB\program\Program.mde
Printed: 11/13/02 3:45:58 PM
( [LOCID] LIKE 'P18-*') AND ([PRCCODE] NOT LIKE '*-TC'

# TABLE 2
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# PHASE II SEDIMENT SAMPLES
# SWMU P-18

| Location ID | | P18-1 | P18-2 | P18-2 |
|---|---|---|---|---|
| Sample ID | | P18-1 | P18-2 | P18-2 DUP |
| Matrix | | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | 0.0-19.5 | 0.0-8.0 | 0.0-30.0 |
| Date Sampled | | 02/21/95 | 02/21/95 | 02/21/95 |
| Parameter | Units | | | FIELD DUPLICATE (1-1) |
| **Semivolatile Organic Compounds** | | | | |
| 2-Methylphenol | UG/KG | 460 J | 1,100 U | 880 U |
| Naphthalene | UG/KG | 440 J | 220 J | 880 U |
| Phenanthrene | UG/KG | 17,000 | 2,800 | 1,200 |
| Phenol | UG/KG | 570 J | 1,100 U | 880 U |
| Pyrene | UG/KG | 20,000 | 4,400 | 2,300 |
| **Semivolatile Organic Compounds - SPLP** | | | | |
| Phenanthrene -SPLP | MG/L | 0 004 J | 0 01 U | 0 01 U |
| **Metals** | | | | |
| Antimony | MG/KG | 19 6 UR,m | 19.6 UR,m | 19 1 R,m |
| Arsenic | MG/KG | 54 3 J,m | 60 J,m | 51 8 J,m |
| Barium | MG/KG | 115 | 100 | 79 1 |
| Cadmium | MG/KG | 14.5 J,m | 12 4 J,m | 10 3 J,m |
| Calcium | MG/KG | 23,300 | 29,200 | 31,400 |
| Chromium | MG/KG | 25 3 | 26 8 | 23 6 |
| Lead | MG/KG | 8,670 J,m | 7,500 J,m | 6,110 J,m |
| Mercury | MG/KG | 0 33 U | 0 33 U | 0 44 |
| Silver | MG/KG | 10 4 R,m | 13 5 R,m | 10 2 R,m |
| Thallium | MG/KG | 8 8 J,ms | 10.1 J,m | 9.8 J,m |
| **Metals-SPLP** | | | | |
| Arsenic -SPLP | MG/L | 0 012 | 0 016 | 0 024 |
| Calcium -SPLP | MG/L | 17 6 | 20 | 21 |
| Lead -SPLP | MG/L | 0.009 | 0 007 | 0.008 |
| Potassium -SPLP | MG/L | 18 5 | 5 U | 5 U |
| Selenium -SPLP | MG/L | 0 025 | 0 015 | 0 016 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported

**Detection Limits shown are PQL**

# TABLE 2
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# PHASE II SEDIMENT SAMPLES
# SWMU P-18

| Location ID | | P18-1 | P18-2 | P18-2 |
|---|---|---|---|---|
| Sample ID | | P18-1 | P18-2 | P18-2 DUP |
| Matrix | | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | 0.0-19.5 | 0.0-8.0 | 0.0-30.0 |
| Date Sampled | | 02/21/95 | 02/21/95 | 02/21/95 |
| Parameter | Units | | | FIELD DUPLICATE (1-1) |
| **Metals-SPLP** | | | | |
| Sodium -SPLP | MG/L | 7.6 | 6.7 | 7 |
| **General Chemistry Parameters** | | | | |
| Chloride | MG/KG | 759 | 747 | 561 |
| Cyanide | MG/KG | 314 | 17.9 | 11 |
| PHSOL | S.U. | 9.7 J,h | 10.3 J,h | 10.2 J,h |
| Sulfate | MG/KG | 441 | 408 | 246 |
| Total Organic Carbon | MG/KG | 16,100 | 27,600 | 20,700 |
| Total Organic Halogens | MG/KG | 248 J,h | 101 J,h | 171 J,h |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

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Printed: 11/13/02 3:45:59 PM
( [LOCID] LIKE 'P18-*') AND [PRCCODE] NOT LIKE '*-TC'

# TABLE 2a
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## PHASE III SEDIMENT SAMPLES
## SWMU P-18

| Location ID | | P-18-1 | P-18-2 | P-18-3 | P-18-4 |
|---|---|---|---|---|---|
| Sample ID | | P-18-1 | P-18-2 | P-18-3 | P-18-4 |
| Matrix | | Sediment | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | 0.0-18.5 | 0.0-6.0 | 0.0-17.0 | 0.0-26.0 |
| Date Sampled | | 07/28/95 | 07/28/95 | 09/19/95 | 09/19/95 |
| Parameter | Units | | | | |
| **Volatile Organic Compounds** | | | | | |
| Benzene | UG/KG | 14 U | 14 U | 11 J | 52 |
| Carbon disulfide | UG/KG | 14 | 6 J | 16 U | 11 U |
| Toluene | UG/KG | 14 U | 14 U | 16 U | 5 J |
| Xylenes, Total | UG/KG | 14 U | 14 U | 8 J | 32 |
| **Volatile Organic Compounds - SPLP** | | | | | |
| Benzene -SPLP | MG/L | 0 005 U | 0 005 U | 0 005 U | 0 004 J |
| Ethylbenzene -SPLP | MG/L | 0 005 J | 0 005 U | 0 003 J | 0 001 J |
| Methylene chloride -SPLP | MG/L | 0.026 | 0 006 | 0.004 J | 0 001 J |
| 1,1,1-Trichloroethane -SPLP | MG/L | 0 017 | 0.003 J | 0 005 U | 0 005 U |
| Xylenes, Total -SPLP | MG/L | 0 034 | 0.003 J | 0 004 J | 0 003 J |
| **Semivolatile Organic Compounds** | | | | | |
| Anthracene | UG/KG | 92 J | 970 U | 230 J | 970 |
| Benzo(a)anthracene | UG/KG | 240 J | 970 U | 1,200 | 1,300 |
| Benzo(a)pyrene | UG/KG | 150 J | 970 U | 600 J | 620 J |
| Benzo(b)fluoranthene | UG/KG | 330 J | 140 J | 1,500 | 900 |
| Benzo(ghi)perylene | UG/KG | 120 J | 970 U | 420 J | 540 J |
| Benzo(k)fluoranthene | UG/KG | 940 U | 970 U | 1,100 U | 530 J |
| Chrysene | UG/KG | 330 J | 130 J | 1,300 | 1,100 |
| Di-n-butyl phthalate | UG/KG | 100 J | 110 J | 1,100 U | 730 U |
| Dibenz(a,h)anthracene | UG/KG | 940 U | 970 U | 180 J | 210 J |
| 2,4-Dimethylphenol | UG/KG | 940 U | 970 U | 1,100 U | 100 J |
| bis(2-Ethylhexyl)phthalate | UG/KG | 280 J | 200 J | 180 J | 730 U |
| Fluoranthene | UG/KG | 700 J | 190 J | 2,300 | 630 |
| Indeno(1,2,3-cd)pyrene | UG/KG | 940 U | 970 U | 400 J | 440 J |

Flags assigned during chemistry validation are shown

Only Detected Results Reported

**Detection Limits shown are PQL**

# TABLE 2a
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# PHASE III SEDIMENT SAMPLES
# SWMU P-18

| Location ID | | P-18-1 | P-18-2 | P-18-3 | P-18-4 |
|---|---|---|---|---|---|
| Sample ID | | P-18-1 | P-18-2 | P-18-3 | P-18-4 |
| Matrix | | Sediment | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | 0.0-18.5 | 0.0-6.0 | 0.0-17.0 | 0.0-26.0 |
| Date Sampled | | 07/28/95 | 07/28/95 | 09/19/95 | 09/19/95 |
| **Parameter** | **Units** | | | | |
| **Semivolatile Organic Compounds** | | | | | |
| 4-Methylphenol | UG/KG | 940 U | 970 U | 330 J | 2,000 |
| Naphthalene | UG/KG | 940 U | 970 U | 790 J | 1,800 |
| Phenanthrene | UG/KG | 440 J | 100 J | 870 J | 730 U |
| Phenol | UG/KG | 940 U | 970 U | 1,100 U | 1,000 |
| Pyrene | UG/KG | 680 J | 180 J | 2,300 | 1,700 |
| **Semivolatile Organic Compounds - SPLP** | | | | | |
| Di-n-butyl phthalate -SPLP | MG/L | 0.011 UJ,c | 0.003 J,c | 0.01 U | 0.01 U |
| Fluoranthene -SPLP | MG/L | 0.001 J | 0.013 U | 0.01 U | 0.01 U |
| 4-Methylphenol -SPLP | MG/L | 0.011 U | 0.013 U | 0.01 U | 0.011 |
| Naphthalene -SPLP | MG/L | 0.006 J,c | 0.001 J,c | 0.01 U | 0.003 J |
| Phenanthrene -SPLP | MG/L | 0.003 J | 0.013 U | 0.01 U | 0.01 U |
| Phenol -SPLP | MG/L | 0.011 U | 0.013 U | 0.01 U | 0.009 J |
| Pyrene -SPLP | MG/L | 0.001 J,c | 0.013 UJ,c | 0.01 U | 0.01 U |
| **Metals** | | | | | |
| Antimony | MG/KG | 10.4 J,m | 3.6 J,m | 13.9 | 5.6 |
| Arsenic | MG/KG | 91 | 59 | 87.4 | 26.1 |
| Barium | MG/KG | 123 | 84.7 | 202 | 76.6 |
| Cadmium | MG/KG | 20.3 | 4.7 | 7.3 J,m | 0.11 UJ |
| Chromium | MG/KG | 27.6 | 13.8 | 58.8 | 33.9 |
| Lead | MG/KG | 14,000 | 6,210 | 12,000 | 2,200 |
| Mercury | MG/KG | 0.28 UJ,m | 0.29 UJ,m | 0.41 U | 0.59 |
| Nickel | MG/KG | 39.5 | 20.5 | 31.7 | 15.1 |
| Selenium | MG/KG | 9.9 | 7.9 R,r | 2.3 R | 0.88 UR |
| Silver | MG/KG | 37.2 | 15.9 | 12.1 | 1.4 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 2a
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## PHASE III SEDIMENT SAMPLES
## SWMU P-18

| Location ID | | P-18-1 | P-18-2 | P-18-3 | P-18-4 |
|---|---|---|---|---|---|
| Sample ID | | P-18-1 | P-18-2 | P-18-3 | P-18-4 |
| Matrix | | Sediment | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | 0.0-18.5 | 0.0-6.0 | 0.0-17.0 | 0.0-26.0 |
| Date Sampled | | 07/28/95 | 07/28/95 | 09/19/95 | 09/19/95 |
| Parameter | Units | | | | |
| **Metals** | | | | | |
| Thallium | MG/KG | 26 5 | 12 8 | 12 2 | 0 95 U |
| **Metals-SPLP** | | | | | |
| Antimony -SPLP | MG/L | 0 054 R,r | 0 011 | 0 0072 | 0 0103 |
| Arsenic -SPLP | MG/L | 0 032 U | 0 032 U | 0 0049 | 0 0084 |
| Barium -SPLP | MG/L | 0 025 | 0 063 | 0 0929 | 0 178 |
| Chromium -SPLP | MG/L | 0 0073 | 0 0077 | 5 00E-04 U | 5 00E-04 U |
| Lead -SPLP | MG/L | 0 039 | 1 2 | 0 0027 U | 0 0027 U |
| Nickel -SPLP | MG/L | 0.01 U | 0 062 | 0 0013 U | 0.0013 U |
| Selenium -SPLP | MG/L | 0.079 U | 0.079 U | 0 0078 | 0 0056 |
| Thallium -SPLP | MG/L | 0 0017 J,v | 0 0036 J,v | 0 0043 U | 0 0043 U |
| **General Chemistry Parameters** | | | | | |
| Cyanide | MG/KG | 84 4 J,m | 1 5 UR,m | 26 3 | 77.3 |
| Total Solids | PERCENT | 35 | 34 | NA | NA |
| **Miscellaneous - SPLP** | | | | | |
| Cyanide -SPLP | MG/L | 1 6 | 0 01 U | 0 01 UJ,Q | 0.482 J,Q |

Flags assigned during chemistry validation are shown

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF DETECTED TCLP RESULTS
# PHASE II SEDIMENT SAMPLES
# SWMU P-18

| Location ID | | | P18-1 | P18-2 | P18-2 |
|---|---|---|---|---|---|
| Sample ID | | | P18-1 | P18-2 | P18-2 DUP |
| Matrix | | | Sediment | Sediment | Sediment |
| Depth Interval (ft) | | | 0.0-19.5 | 0.0-8.0 | 0.0-30.0 |
| Date Sampled | | | 02/21/95 | 02/21/95 | 02/21/95 |
| Parameter | Units | Criteria* | | | FIELD DUPLICATE (1-1) |
| **Volatile Organic Compounds - TCLP** | | | | | |
| Benzene -TCLP | MG/L | 0.5 | 0.0023 J | 0.007 | 0.026 |
| Methylene chloride -TCLP | MG/L | - | 0.004 J,c | 0.01 UJ,c | 0.01 UJ,c |
| Toluene -TCLP | MG/L | - | 0.005 U | 0.005 U | 0.028 |
| Xylenes, Total -TCLP | MG/L | - | 0.005 U | 0.005 U | 0.028 |
| **Semivolatile Organic Compounds - TCLP** | | | | | |
| Phenanthrene -TCLP | MG/L | - | 0.004 J | 0.02 U | 0.021 U |
| **Metals-TCLP** | | | | | |
| Arsenic -TCLP | MG/L | 5 | 0.033 | 0.02 | 0.03 |
| Barium -TCLP | MG/L | 100 | 0.68 | 0.85 | 0.9 |
| Calcium -TCLP | MG/L | - | 164 | 300 | 289 |
| Lead -TCLP | MG/L | 5 | 13 J,c | 14 J,c | 15 J,c |
| Potassium -TCLP | MG/L | - | 25.9 | 5 U | 5 U |
| Thallium -TCLP | MG/L | - | 0.015 U | 0.071 J,c | 0.3 U |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

N:\11BAB2~1.000\DB\program\Program.mde
Printed: 11/13/02 3:59:02 PM
( [LOCID] = 'P18-1' OR [LOCID] = 'P18-2' ) AND [PRCCODE] LIKE "-TC"

# TABLE 4
# SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
# COLD AND HOT WELLS
# SWMU P-18

| Location ID | | MWN-45A | MWN-46A | MWN-47A | MWN-48A |
|---|---|---|---|---|---|
| Sample ID | | MWN-45A | MWN-46A | MWN-47A | MWN-48A |
| Matrix | | Groundwater | Groundwater | Groundwater | Groundwater |
| Depth Interval (ft) | | - | - | - | - |
| Date Sampled | | 12/20/00 | 12/20/00 | 12/20/00 | 12/20/00 |
| Parameter | Units | | | | |
| **Volatile Organic Compounds** | | | | | |
| Benzene | UG/L | 7.2 | 17 | 37 | 100,000 D |
| Ethylbenzene | UG/L | 5.0 U | 5 0 U | 5.0 U | 510 J |
| 1,1,2,2-Tetrachloroethane | UG/L | 5 0 U | 5 0 U | 2.2 J | 50 UJ |
| Toluene | UG/L | 5 0 U | 5 0 U | 5.0 U | 1,800 J |
| Xylenes, Total | UG/L | 5 0 U | 5 0 U | 5 0 U | 1,990 J |
| **Semivolatile Organic Compounds** | | | | | |
| Acenaphthylene | UG/L | 10 U | 10 U | 10 U | 7 0 J |
| Naphthalene | UG/L | 10 U | 10 U | 10 U | 1,800 D |
| Phenol | UG/L | 10 U | 10 U | 10 U | 88 J |
| **Metals** | | | | | |
| Antimony | UG/L | 1.5 U | 1.5 U | 1.5 U | 1 8 B |
| Arsenic | UG/L | 2 6 U | 6 3 B | 2.6 U | 2.6 U |
| Barium | UG/L | 120 B | 42.9 B | 35.7 B | 171 B |
| Cadmium | UG/L | 0 49 U | 0 64 B | 0 49 U | 0 49 U |
| Calcium | UG/L | 204,000 | 68,700 | 163,000 | 143,000 |
| Chromium | UG/L | 12 3 | 6.2 | 4 2 B | 3 3 B |
| Iron | UG/L | 410 | 3,360 | 123 | 10,700 |
| Lead | UG/L | 1 9 U | 6.8 | 1.9 U | 1.9 U |
| Magnesium | UG/L | 1,230 B | 4,400 B | 858 B | 33,500 |
| Mercury | UG/L | 0 045 U | 0 068 B | 0 045 U | 0 045 U |
| Nickel | UG/L | 15 6 B | 6 1 U | 6 1 U | 6 1 U |
| Potassium | UG/L | 35,600 | 10,300 | 31,000 | 7,750 |
| Selenium | UG/L | 2 3 B | 2.1 U | 3 3 B | 2.1 U |
| Sodium | UG/L | 1,200,000 | 177,000 | 78,500 | 151,000 |

Flags assigned during chemistry validation are shown

Only Detected Results Reported

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
# COLD AND HOT WELLS
# SWMU P-18

| Location ID | | MWN-45A | MWN-46A | MWN-47A | MWN-48A |
|---|---|---|---|---|---|
| Sample ID | | MWN-45A | MWN-46A | MWN-47A | MWN-48A |
| Matrix | | Groundwater | Groundwater | Groundwater | Groundwater |
| Depth Interval (ft) | | - | - | - | - |
| Date Sampled | | 12/20/00 | 12/20/00 | 12/20/00 | 12/20/00 |
| **Parameter** | **Units** | | | | |
| **Metals** | | | | | |
| Thallium | UG/L | 3.9 U | 3.9 U | 3.9 U | 4.4 B |
| **Dissolved Metals** | | | | | |
| Antimony -DISS | UG/L | NA | 1.6 B | NA | NA |
| Arsenic -DISS | UG/L | NA | 6.6 B | NA | NA |
| Barium -DISS | UG/L | NA | 36.2 B | NA | NA |
| Calcium -DISS | UG/L | NA | 67,100 | NA | NA |
| Chromium -DISS | UG/L | NA | 1.3 B | NA | NA |
| Iron -DISS | UG/L | NA | 54.0 B | NA | NA |
| Magnesium -DISS | UG/L | NA | 3,610 B | NA | NA |
| Potassium -DISS | UG/L | NA | 10,600 | NA | NA |
| Sodium -DISS | UG/L | NA | 178,000 J | NA | NA |
| **General Chemistry Parameters** | | | | | |
| Alkalinity (as CaCO3) | MG/L | 46.6 | 25.4 | 59.4 | 5.0 U |
| Alkalinity (Total) | MG/L | 84.8 | 48.8 | 89.0 | 494 |
| Chloride | MG/L | 1,990 J | 326 J | 150 J | 225 J |
| Cyanide | MG/L | 0.29 J | 0.020 J | 0.010 UJ | 0.085 J |
| Field pH | S.U. | 11.28 | 9.55 | 11.41 | 7.06 |
| Sulfate | MG/L | 238 | 89.1 | 349 | 37.8 |
| Total Organic Carbon | MG/L | 2.7 | 2.6 | 1.8 | 12 |
| Total Dissolved Solids | MG/L | 3,850 | 671 | 821 | 847 |
| Total Organic Halogens | MG/L | 0.030 UJ | 0.020 BJ | 0.030 UJ | 0.018 BJ |
| Turbidity | NTU | 0 U | 13 | 4 | 4 |
| Redox Potential | Millivolts | -127 | 7 | -299 | -127 |
| Temperature | DEG C | 13.6 | 10.3 | 12.6 | 13.5 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
# COLD AND HOT WELLS
# SWMU P-18

| Location ID | | MWN-45A | MWN-46A | MWN-47A | MWN-48A |
|---|---|---|---|---|---|
| Sample ID | | MWN-45A | MWN-46A | MWN-47A | MWN-48A |
| Matrix | | Groundwater | Groundwater | Groundwater | Groundwater |
| Depth Interval (ft) | | - | - | - | - |
| Date Sampled | | 12/20/00 | 12/20/00 | 12/20/00 | 12/20/00 |
| Parameter | Units | | | | |
| **General Chemistry Parameters** | | | | | |
| Specific Conductance | UMHOS/CM | 6,450 | 1,260 | 1,350 | 1,640 |
| **Dissolved Gases** | | | | | |
| Carbon Dioxide | MG/L | 0 60 U | 0 60 U | 0 60 U | 44 |
| Methane | MG/L | 0.062 | 0 94 | 0 14 | 12 |
| Nitrogen | MG/L | 19 | 19 | 19 | 11 |
| Oxygen | MG/L | 1 4 | 1.0 | 0 83 | 1 2 |

Flags assigned during chemistry validation are shown

Only Detected Results Reported

**Detection Limits shown are PQL**

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Printed 11/13/02 4 02 38 PM
( [LOCID] = 'MWN-45A' OR [LOCID] = 'MWN-46A' OR [LOCID] = 'MWN-47A' OR [LOCID] = 'MWN-48A' ) AND [MATRIX] = 'WG

# TABLE 5
## SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
## SUBSURFACE SWMU MATERIAL
## SWMU P-18

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Soil Screening Criteria[a] (mg/kg) | Human Health COPC?[b] |
|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | |
| Trichlorofluoromethane | 7 | 1 | 14% | 0.003 | 1000[d] | No |
| 1,1,1-Trichloroethane | 7 | 2 | 29% | 0.003 | 1,200 | No |
| Benzene | 7 | 5 | 71% | 0.052 | 0.8 | No |
| Ethylbenzene | 7 | 5 | 71% | 0.014 | 400[c] | No |
| Methylene chloride | 7 | 3 | 43% | 0.004 | 13 | No |
| Toluene | 7 | 4 | 57% | 0.005 | 650[c] | No |
| Xylenes, Total | 7 | 3 | 43% | 0.032 | 410[c,e] | No |
| ***Volatile Semivolatiles*** | | | | | | |
| Anthracene | 7 | 6 | 86% | 3.3 | 6.8[c,d] | No |
| Fluorene | 7 | 2 | 29% | 1.4 | 89[c,d] | No |
| Naphthalene | 7 | 4 | 57% | 2 | 180[c,d] | No |
| Phenanthrene | 7 | 6 | 86% | 17 | 160[d] | No |
| ***Semivolatiles*** | | | | | | |
| 2,4-Dimethylphenol | 7 | 1 | 14% | 0.1 | 1,600 | No |
| 3-Methylphenol & 4-Methylphenol | 3 | 1 | 33% | 0.72 | 390 | No |
| 2-Methylphenol | 7 | 1 | 14% | 0.46 | 3,900 | No |
| 4-Methylphenol | 4 | 2 | 50% | 2 | 390 | No |
| Benzo(a)anthracene | 7 | 6 | 86% | 20 | 0.87 | **Yes** |
| Benzo(b)fluoranthene | 7 | 7 | 100% | 11 | 0.87 | **Yes** |
| Benzo(k)fluoranthene | 7 | 4 | 57% | 2.9 | 8.7 | No |
| Benzo(g,h,i)perylene | 7 | 6 | 86% | 6.7 | 2,300[f] | No |
| Benzo(a)pyrene | 7 | 6 | 86% | 4.2 | 0.087 | **Yes** |
| bis(2-Ethylhexyl)phthalate | 7 | 5 | 71% | 2.1 | 46 | No |
| Chrysene | 7 | 7 | 100% | 7.7 | 87 | No |
| Dibenz(a,h)anthracene | 7 | 3 | 43% | 1.2 | 0.087 | **Yes** |
| Di-n-butyl phthalate | 7 | 5 | 71% | 1.7 | 7,800 | No |
| Fluoranthene | 7 | 7 | 100% | 2.2 | 3,100 | No |
| Indeno(1,2,3-c,d)pyrene | 7 | 5 | 71% | 5.3 | 0.87 | **Yes** |
| Phenol | 7 | 2 | 29% | 1 | 47,000 | No |
| Pyrene | 7 | 7 | 100% | 20 | 2,300 | No |
| ***Metals*** | | | | | | |
| Antimony | 4 | 4 | 100% | 13.9 | 31 | No |
| Arsenic | 7 | 7 | 100% | 91 | 0.43 | **Yes** |
| Barium | 7 | 7 | 100% | 202 | 5,500 | No |
| Cadmium | 7 | 6 | 86% | 20.3 | 78 | No |
| Chromium | 7 | 7 | 100% | 59 | 230[g] | No |
| Lead | 7 | 7 | 100% | 14,000 | 400[h] | **Yes** |
| Mercury | 7 | 2 | 29% | 0.59 | 23[i] | No |
| Nickel | 7 | 4 | 57% | 39.5 | 1,600 | No |
| Selenium | 4 | 1 | 25% | 9.9 | 390 | No |
| Silver | 4 | 4 | 100% | 37.2 | 390 | No |
| Thallium | 7 | 6 | 86% | 26.5 | 5.5 | **Yes** |
| ***Miscellaneous*** | | | | | | |
| Cyanide | 6 | 6 | 100% | 314 | 1,600 | No |

a For volatile chemicals, USEPA Soil Screening Levels (Generic SSLs) for vapor inhalation were used (USEPA 1996a); for semivolatile chemicals and metals, USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA 2000a) were used.

b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than the screening criteria are retained as COPCs.

c Soil saturation concentration (Csat); the concentration at which soil pore air is saturated with a chemical, and volatile emissions reach their maximum (USEPA 1996a).

d SSL calculated per USEPA SSL guidance (USEPA 1996a).

e Most conservative value for xylene isomers (*o* -xylene).

f Screening values for pyrene are used as surrogate criteria for benz(g,h,i)perylene.

g Chromium is compared to the RBC for hexavalent chromium.

h Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).

i Mercury is compared to the RBC for mercuric chloride.

NA Not available.

**TABLE 6**
**SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS**
**COKE OVEN AREA - GROUNDWATER**
**SWMU P-18**

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (µg/L) | Region III Tap Water RBC[a] (µg/L) | NYSDEC Standard[b] (µg/L) | Human Health COPC?[c] |
|---|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | | |
| 1,2-Dichloroethane | 93 | 1 | 1% | 39 | 0.12 | 0.6 | No |
| Benzene | 120 | 99 | 83% | 570,000 | 0.32 | 1 | Yes |
| Carbon disulfide | 18 | 2 | 11% | 5 | 1,000 | NA | No |
| Ethylbenzene | 109 | 34 | 31% | 25,000 | 1,300 | 5 | Yes |
| Methylene chloride | 93 | 1 | 1% | 3,400 | 4.1 | 5 | No |
| Toluene | 109 | 58 | 53% | 77,000 | 750 | 5 | Yes |
| Xylenes, Total | 95 | 58 | 61% | 390,000 | 12,000 | 5 | Yes |
| ***Volatile Semivolatiles*** | | | | | | | |
| Acenaphthene | 9 | 3 | 33% | 360 | 370 | 20 | Yes |
| Acenaphthylene | 90 | 25 | 28% | 90 | 370[d] | 20[d] | Yes |
| Anthracene | 90 | 8 | 9% | 270 | 1,800 | 50 | Yes |
| Fluorene | 90 | 37 | 41% | 1,700 | 240 | 50 | Yes |
| Naphthalene | 117 | 80 | 68% | 280,000 | 6.5 | 10 | Yes |
| Phenanthrene | 90 | 35 | 39% | 940 | NA | 50 | Yes |
| ***Semivolatiles*** | | | | | | | |
| 2,4-Dimethylphenol | 90 | 22 | 24% | 340 | 730 | 50 | Yes |
| 2-Methylphenol | 90 | 18 | 20% | 140 | 1,800 | 1 | Yes |
| 3-Methylphenol and 4-Methylphenol | 74 | 10 | 14% | 220 | 180[e] | 1[e] | Yes |
| 4-Methylphenol | 16 | 5 | 31% | 110 | 180 | 1 | Yes |
| Benzo(a)anthracene | 90 | 8 | 9% | 280 | 0.092 | 0.002 | Yes |
| Benzo(a)pyrene | 90 | 7 | 8% | 230 | 0.092 | NA | Yes |
| Benzo(b)fluoranthene | 9 | 2 | 22% | 69 | 0.092 | 0.002 | Yes |
| Benzo(g,h,i)perylene | 9 | 2 | 22% | 33 | 180[f] | 50[f] | No |
| Benzo(k)fluoranthene | 9 | 2 | 22% | 71 | 0 92 | 0 002 | Yes |
| bis(2-Ethylhexyl)phthalate | 90 | 16 | 18% | 110 | 4.8 | 5 | Yes |
| Butyl benzyl phthalate | 90 | 1 | 1% | 2.0 | 7,300 | 50 | No |
| Chrysene | 90 | 9 | 10% | 260 | 9.2 | 0.002 | Yes |
| Dibenz(a,h)anthracene | 10 | 2 | 20% | 22 | 0.0092 | NA | Yes |
| Fluoranthene | 90 | 20 | 22% | 760 | 1,500 | 50 | Yes |
| Indeno(1,2,3-cd)pyrene | 10 | 2 | 20% | 40 | 0.092 | 0.002 | Yes |
| Phenol | 90 | 46 | 51% | 560 | 21,900 | 1 | Yes |
| Pyrene | 90 | 17 | 19% | 410 | 180 | 50 | Yes |
| Pyridine | 81 | 6 | 7% | 200 | 37 | 50 | Yes |
| ***Metals*** | | | | | | | |
| Antimony | 63 | 10 | 16% | 4.0 | 15 | 3 | Yes |
| Arsenic | 63 | 38 | 60% | 740 | 0.045 | 25 | Yes |
| Barium | 63 | 60 | 95% | 1,790 | 2,600 | 1,000 | Yes |
| Cadmium | 63 | 5 | 8% | 1.1 | 18 | 5 | No |
| Chromium | 63 | 50 | 79% | 322 | 110[g] | 50[g] | Yes |
| Lead | 63 | 29 | 46% | 142 | 15[g] | 25 | Yes |
| Manganese | 16 | 16 | 100% | 89,900 | 730 | 300 | Yes |
| Mercury | 63 | 11 | 17% | 3.0 | 11 | 0.7 | Yes |
| Nickel | 63 | 22 | 35% | 82 | 730 | 100 | No |
| Selenium | 63 | 17 | 27% | 8 5 | 180 | 10 | No |
| Silver | 63 | 3 | 4.8% | 4.4 | 180 | 50 | No |
| Thallium | 63 | 1 | 2% | 4.4 | 2.6 | 0.5 | No |
| Zinc | 5 | 2 | 40% | 147 | 11,000 | 2,000 | No |
| ***Miscellaneous*** | | | | | | | |
| Cyanide | 71 | 58 | 82% | 800 | 730[i] | 200 | Yes |

a USEPA Region III Tapwater Risk Based Concentration (RBC) (USEPA 2000a).
b NYSDEC Ambient Water Quality Standard and Guidance (NYSDEC 1998).
c Chemical is a COPC if detection frequency exceeds 5% and the maximum detected concentration exceeds the lower of the RBC or NYSDEC Standard
d Screening values for acenaphthene are used as surrogate criteria for acenaphthylene
e The 3-methylphenol and 4-methylphenol mixture is compared to RBC and NYSDEC Standard for 4-methylphenol.
f Benzo(g,h,i)perylene is compared to the RBC for pyrene.
g Chromium is compared to RBC and NYSDEC Standard for hexavalent chromium.
h Lead lacks standard toxicity criteria. A value of 15 µg/L is used for screening purposes (USEPA 1991c).
i Cyanide is compared to RBC for free cyanide.
NA Not available

# TABLE 7
## SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
## HOT AND COLD WELL PIT WATER
## SWMU P-18

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (µg/L) | USEPA Screeing Criteria[a] (µg/L) | NYSDEC Standard[b] (µg/L) | Human Health COPC?[c] |
|---|---|---|---|---|---|---|---|
| **Hot Well** | | | | | | | |
| *Inorganics* | | | | | | | |
| Lead | 1 | 1 | 100% | 7 | 15[a] | 25 | No |
| **Cold Well** | | | | | | | |
| *Inorganics* | | | | | | | |
| Lead | 1 | 1 | 100% | 17 | 15[a] | 25 | **Yes** |

a Lead lacks standard toxicity criteria and RBCs. A value of 15 µg/L is used for screening purposes (USEPA 1991c).

b NYSDEC Ambient Water Quality Standard and Guidance (NYSDEC, 1998).

c Chemical is a COPC if detection frequency exceeds 5% and the maximum detected concentration exceeds the lower of the RBC or NYSDEC Standard.

TABLE 8

REPRESENTATIVE CONCENTRATIONS [a] OF CHEMICALS OF POTENTIAL CONCERN (COPCs)

SWMU P-18

| Subsurface SWMU Material COPCs | Representative Concentration (mg/kg) | Coke Oven Area Groundwater COPCs | Representative Concentration (mg/L) | Cold Well Pit | Representative Concentration (mg/L) |
|---|---|---|---|---|---|
| Benzo(a)anthracene | 20 | 2,4-Dimethylphenol | 0.046 | Lead | 0.017 |
| Benzo(b)fluoranthene | 11 | 2-Methylphenol | 0.040 | | |
| Benzo(a)pyrene | 4.2 | 3-Methylphenol and 4-Methylphenol | 0.067 | | |
| Dibenz(a,h)anthracene | 1.2 | 4-Methylphenol | 0.037 | | |
| Indeno(1,2,3-c,d)pyrene | 5.3[b] | Acenaphthene | 0.36 | | |
| Arsenic | 91 | Acenaphthylene | 0.030 | | |
| Lead | 14,000 | Anthracene | 0.030 | | |
| Thallium | 27 | Antimony | 0.0040 | | |
| | | Arsenic | 0.11 | | |
| | | Barium | 0.45 | | |
| | | Benzene | 570 | | |
| | | Benzo(a)anthracene* | 0.042 | | |
| | | Benzo(a)pyrene* | 0.039 | | |
| | | Benzo(b)fluoranthene* | 0.069 | | |
| | | Benzo(k)fluoranthene* | 0.071 | | |
| | | bis(2-Ethylhexyl)phthalate | 0.034 | | |
| | | Chromium[b] | 0.037 | | |
| | | Chrysene* | 0.041 | | |
| | | Cyanide | 0.16 | | |
| | | Dibenz(a,h)anthracene* | 0.015 | | |
| | | Ethylbenzene | 2.3 | | |
| | | Fluoranthene | 0.074 | | |
| | | Fluorene | 0.057 | | |
| | | Indeno(1,2,3-c,d)pyrene* | 0.040 | | |
| | | Lead | 0.018 | | |
| | | Manganese | 21 | | |
| | | Mercury | 0.00028 | | |
| | | Naphthalene | 21 | | |
| | | Phenanthrene | 0.045 | | |
| | | Phenol | 0.081 | | |
| | | Pyrene | 0.051 | | |
| | | Pyridine | 0.060 | | |
| | | Toluene | 20 | | |
| | | Xylenes, Total | 60 | | |

a For datasets greater than 10, the 95% UCL is used as the representative concentration. For datasets with less than 10 samples, the maximum concentration is used.

b The representative concentration for this chemical exceeds the chemical's soil saturation limit.

c Chromium is assumed to be in the hexavalent form.

* The representative concentration for this chemical is greater than its solubility limit in water.

# TABLE 9
# POTENTIAL EXPOSURE SCENARIOS[a]
# SWMU P-18

| Potential Receptor Scenario | Exposure Media | Potential Pathway of Exposure |
|---|---|---|
| Future Commercial/Industrial Worker | Coke Oven Area Groundwater | ambient and indoor vapor inhalation |
| Current Non-BSC Commercial/Industrial Worker | Coke Oven Area Groundwater | ambient vapor inhalation |
| Future Utility/Maintenance Worker | Subsurface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Coke Oven Area Groundwater | ambient vapor inhalation |
| | | dermal contact |
| | Pit Water | dermal contact |
| Trespasser | Coke Oven Area Groundwater | ambient vapor inhalation |
| Future Construction Worker | Subsurface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Coke Oven Area Groundwater | ambient vapor inhalation |
| | | dermal contact |
| | Pit Water | dermal contact |

a Potential exposure scenarios for SWMU P-18 are based on those determined in ID No. 2 (BSC 1999b), the chemicals of potential concern determined in ID No. 1 (BSC 1998) and this SWMU report, and USEPA Region 2 comments (USEPA 2003).

**TABLE 10**
**TOXICITY CRITERIA FOR COPCs**
**REFERENCE DOSES (RfDs) AND SLOPE FACTORS (SFs)**
**SWMU P-18 HHRA**

| | | Noncarcinogenic Toxicity Criteria | | | | Carcinogenic Toxicity Criteria | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Chemical | CAS | Oral RfD (mg/kg-d) | Source | Inhalation RfD (mg/kg-d) | Source | Weight of Evidence[a] | Oral SF $(mg/kg-d)^{-1}$ | Source | Inhalation SF $(mg/kg-d)^{-1}$ | Source |
| ***Inorganics*** | | | | | | | | | | |
| Antimony | 7440-36-0 | 4.00E-04 | H | 4.00E-04 | R | -- | -- | -- | -- | -- |
| Arsenic | 7440-38-2 | 3.00E-04 | I | -- | -- | A | 1.50E+00 | I | 1.51E+01 | I |
| Barium | 7440-39-3 | 7.00E-02 | | 1.40E-04 | -- | -- | -- | -- | -- | -- |
| Chromium[b] | 18540-29-9 | 3.00E-03[f] | I | 3.00E-05 | I | A | -- | -- | 4.10E+01 | H |
| Lead[c] | 7439-92-1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Manganese | 7439-96-5 | 2.00E-02 | I | 1.43E-05 | I | -- | -- | -- | -- | -- |
| Mercury[d] | 7487-94-7 | 3.00E-04 | I | 3.00E-04 | R | -- | -- | -- | -- | -- |
| Thallium | 7440-28-0 | 8.00E-05[f] | I, thallium chloride | 8.00E-05 | R | -- | -- | -- | -- | -- |
| Cyanide | 57-12-5 | 2.00E-02 | I | -- | -- | -- | -- | -- | -- | -- |
| ***Organics*** | | | | | | | | | | |
| 2,4-Dimethylphenol | 105-67-9 | 2.00E-02 | I | 2.00E-02 | R | -- | -- | -- | -- | -- |
| 2-Methylphenol | 95-48-7 | 5.00E-02 | I | 5.00E-02 | R | -- | -- | -- | -- | -- |
| 3-Methylphenol and 4-Methylphenol[e] | 108-39-4/ 106-44-5 | 5.00E-03 | I | 5.00E-03 | R | -- | -- | -- | -- | -- |
| 4-Methylphenol | 106-44-5 | 5.00E-03 | I | 5.00E-03 | R | -- | -- | -- | -- | -- |
| Acenaphthene | 83-32-9 | 6.00E-02 | H | 6.00E-02 | R | -- | -- | -- | -- | -- |
| Acenaphthylene | 208-96-8 | 6.00E-02 | I, acenaphthene surrogate | 6.00E-02 | R | -- | -- | -- | -- | -- |
| Anthracene | 120-12-7 | 3.00E-01 | I | 3.00E-01 | R | -- | -- | -- | -- | -- |
| Benzo(a)anthracene | 56-55-3 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Benzene | 71-43-2 | 3.00E-03 | E | 1.70E-03 | E | A | 5.50E-02 | I | 2.90E-02 | I |
| Benzo(a)pyrene | 50-32-8 | -- | -- | -- | -- | B2 | 7.30E+00 | I | 3.10E+00 | E |
| Benzo(b)fluoranthene | 205-99-2 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Benzo(ghi)perylene | 191-24-2 | 3.00E-02 | I, pyrene surrogate | 3.00E-02 | R | -- | -- | -- | -- | -- |
| Benzo(k)fluoranthene | 207-08-9 | -- | -- | -- | -- | B2 | 7.30E-02 | E | -- | -- |
| bis(2-Ethylhexyl)phthalate | 117-81-7 | 2.00E-02 | I | -- | -- | B2 | 1.40E-02 | I | 1.40E-02 | E |
| Chrysene | 218-01-9 | -- | -- | -- | -- | B2 | 7.30E-03 | E | -- | -- |
| Dibenz(a,h)anthracene | 53-70-3 | -- | -- | -- | -- | B2 | 7.30E+00 | E | 3.10E+00 | E |
| Ethylbenzene | 100-41-4 | 1.00E-01 | I | 2.90E-01 | I | -- | -- | -- | -- | -- |
| Fluoranthene | 206-44-0 | 4.00E-02 | I | -- | -- | -- | -- | -- | -- | -- |
| Fluorene | 86-73-7 | 4.00E-02 | I | 4.00E-02 | R | -- | -- | -- | -- | -- |
| Indeno(1,2,3-c,d)pyrene | 193-39-5 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Naphthalene | 91-20-3 | 2.00E-02 | I | 9.00E-04 | I | -- | -- | -- | -- | -- |
| Phenanthrene | 85-01-8 | 3.00E-02 | I, pyrene surrogate | 3.00E-02 | R | -- | -- | -- | -- | -- |
| Phenol | 108-95-2 | 6.00E-01 | I | -- | -- | -- | -- | -- | -- | -- |
| Pyrene | 129-00-0 | 3.00E-02 | I | 3.00E-02 | R | -- | -- | -- | -- | -- |
| Pyridine | 110-86-1 | 1.00E-03 | I | 1.00E-03 | R | -- | -- | -- | -- | -- |
| Toluene | 108-88-3 | 2.00E-01 | I | 1.14E-01 | I | -- | -- | -- | -- | -- |
| Xylenes, Total | 1130-20-7 | 2.00E+00 | I | 2.00E+00 | R | -- | -- | -- | -- | -- |

a Weight of Evidence: A - known human carcinogen, B2 - probable human carcinogen (sufficient animal/inadequate human evidence) (USEPA 2000b).
b The toxicity criteria for hexavalent chromium is conservatively used for chromium.
c Lead lacks standard toxicity criteria and was evaluated alternatively using the USEPA's Adult Lead Model (USEPA 1996b).
d The toxicity criteria for mercuric chloride is used for mercury.
e The toxicity criteria for 4-methylphenol is conservatively used for 3-methylphenol and 4-methylphenol.
f Subchronic RfD used for thallium (8E-05) and chromium (2E-02) for construction and utility/maintenance worker receptor scenarios.
-- There is no toxicity criterion for this pathway.
E Obtained from the USEPA National Center for Environmental Assessment as obtained from the Region III RBC Tables (USEPA 2000a).
H Health Effects Assessment Summary Tables (HEAST) (USEPA 1997).
I Integrated Risk Information System (IRIS) online database (USEPA 2000b).
R Route-to-route extrapolation; in absence of inhalation RfD, oral RfD was used for volatile C[illegible] which do not have carcinogenic inhalation toxicity criteria.

**TABLE 11**
**COMPARISON OF CHEMICALS OF POTENTIALCONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)**
**SWMU P-18**

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Future Commercial/Industrial Worker** | | | |
| *Inhalation of Ambient Vapors from Groundwater (mg/L)* | | | |
| Acenaphthene | 0.36 | -- | > sol (4.2) |
| Acenaphthylene | 0.030 | -- | > sol (16.1) |
| Anthracene | 0.030 | -- | > sol (0.043) |
| Benzene | 570 | 26 | 112 |
| Ethylbenzene | 2.3 | -- | > sol (169) |
| Fluorene | 0.057 | -- | > sol (2.0) |
| Naphthalene | 21 | -- | > sol (31) |
| Phenanthrene | 0.045 | -- | > sol (1.15) |
| Toluene | 20 | -- | > sol (526) |
| Xylenes, Total | 60 | -- | > sol (175) |
| *Inhalation of Indoor Vapors from Groundwater (mg/L)* | | | |
| Acenaphthene | 0.36 | -- | > sol (4.2) |
| Acenaphthylene | 0.030 | -- | > sol (16.1) |
| Anthracene | 0.030 | -- | > sol (0.043) |
| Benzene | 570 | 0.48 | 2.1 |
| Ethylbenzene | 2.3 | -- | > sol (169) |
| Fluorene | 0.057 | -- | > sol (2.0) |
| Naphthalene | 21 | -- | 11 |
| Phenanthrene | 0.045 | -- | > sol (1.15) |
| Toluene | 20 | -- | 127 |
| Xylenes, Total | 60 | -- | > sol (175) |
| **Current Non-BSC Commercial/Industrial Worker** | | | |
| *Inhalation of Ambient Vapors from Groundwater (mg/L)* | | | |
| Acenaphthene | 0.36 | -- | > sol (4.2) |
| Acenaphthylene | 0.030 | -- | > sol (16.1) |
| Anthracene | 0.030 | -- | > sol (0.043) |
| Benzene | 570 | 26 | 112 |
| Ethylbenzene | 2.3 | -- | > sol (169) |
| Fluorene | 0.057 | -- | > sol (2.0) |
| Naphthalene | 21 | -- | > sol (31) |
| Phenanthrene | 0.045 | -- | > sol (1.15) |
| Toluene | 20 | -- | > sol (526) |
| Xylenes, Total | 60 | -- | > sol (175) |

# TABLE 11
# COMPARISON OF CHEMICALS OF POTENTIALCONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# SWMU P-18

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Future Construction Worker** | | | |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Benzo(a)anthracene | 20 | 33 | -- |
| Benzo(b)fluoranthene | 11 | 33 | -- |
| Benzo(a)pyrene | 4.2 | **3.3** | -- |
| Dibenz(a,h)anthracene | 1.2 | 3.3 | -- |
| Indeno(1,2,3-c,d)pyrene | 5.3 | 33 | -- |
| Arsenic | 91 | **16** | 96 |
| Lead[a] | 14,000 | -- | **1,545** |
| Thallium | 27 | -- | 257 |
| *Inhalation of Ambient Vapors from and Dermal Contact with Groundwater (mg/L)* | | | |
| 2,4-Dimethylphenol | 0.046 | -- | 9.8 |
| 2-Methylphenol | 0.040 | -- | 36 |
| 3-Methylphenol and 4-Methylphenol | 0.067 | -- | 3.6 |
| 4-Methylphenol | 0.037 | -- | 3.6 |
| Acenaphthene | 0.36 | -- | 1.7 |
| Acenaphthylene | 0.030 | -- | 4.6 |
| Anthracene | 0.030 | -- | > sol (0.043) |
| Antimony | 0.0040 | -- | 2.6 |
| Arsenic | 0.11 | 0.19 | 1.1 |
| Barium | 0.45 | -- | 1,252 |
| Benzene | 570 | **42** | **1.0** |
| Benzo(a)anthracene | 0.042* | 259 | -- |
| Benzo(a)pyrene | 0.039* | 77 | -- |
| Benzo(b)fluoranthene | 0.069* | 638 | -- |
| Benzo(k)fluoranthene | 0.071* | 7,951 | -- |
| bis(2-Ethylhexyl)phthalate | 0.034 | **0.020** | 0.073 |
| Chromium | 0.037 | -- | 22 |
| Chrysene | 0.041* | 46,429 | -- |
| Cyanide | 0.16 | -- | 167 |
| Dibenz(a,h)anthracene | 0.015* | 221 | -- |
| Ethylbenzene | 2.3 | -- | 9.7 |
| Fluoranthene | 0.074 | -- | > sol (0.26) |
| Fluorene | 0.057 | -- | 1.2 |
| Indeno(1,2,3-c,d)pyrene | 0.04* | 1,665 | * |
| Lead[b] | 0.018 | -- | **0.015** |
| Manganese | 21 | -- | 113 |
| Mercury | 0.00028 | -- | 74 |
| Naphthalene | 21 | -- | **2.1** |
| Phenanthrene | 0.045 | -- | 0.80 |
| Phenol | 0.081 | -- | 782 |
| Pyrene | 0.051 | -- | > sol (0.14) |
| Pyridine | 0.060 | -- | 4.0 |
| Toluene | 20 | -- | 32 |
| Xylenes, Total | 60 | -- | 152 |
| *Dermal Contact with Pit Water (mg/L)* | | | |
| Lead[b] | 0.017 | -- | **0.015** |

TABLE 11
COMPARISON OF CHEMICALS OF POTENTIALCONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU P-18

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Future Utility/Maintenance Worker** | | | |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Benzo(a)anthracene | 20 | 140 | -- |
| Benzo(b)fluoranthene | 11 | 140 | -- |
| Benzo(a)pyrene | 4.2 | 14 | -- |
| Dibenz(a,h)anthracene | 1.2 | 14 | -- |
| Indeno(1,2,3-c,d)pyrene | 5.3 | 142 | -- |
| Arsenic | 91 | **69** | 420 |
| Lead | 14,000 | -- | **1,545** |
| Thallium | 27 | -- | 1,109 |
| *Inhalation of Ambient Vapors from and Dermal Contact with Groundwater (mg/L)* | | | |
| 2,4-Dimethylphenol | 0.046 | -- | 108 |
| 2-Methylphenol | 0.040 | -- | 393 |
| 3-Methylphenol and 4-Methylphenol | 0.067 | -- | 40 |
| 4-Methylphenol | 0.037 | -- | 40 |
| Acenaphthene | 0.36 | -- | > sol (4.2) |
| Acenaphthylene | 0.030 | -- | > sol (16.1) |
| Anthracene | 0.030 | -- | > sol (0.043) |
| Antimony | 0.0040 | -- | 29 |
| Arsenic | 0.11 | 2.1 | 12 |
| Barium | 0.45 | -- | 13,801 |
| Benzene | 570 | **99** | **11** |
| Benzo(a)anthracene | 0.042* | 2,851 | -- |
| Benzo(a)pyrene | 0.039* | 848 | -- |
| Benzo(b)fluoranthene | 0.069* | 7,037 | -- |
| Benzo(k)fluoranthene | 0.071* | 87,634 | -- |
| bis(2-Ethylhexyl)phthalate | 0.034 | 0.22 | > sol (0.27) |
| Chromium | 0.037 | -- | 238 |
| Chrysene | 0.041* | 511,700 | -- |
| Cyanide | 0.16 | -- | 1,835 |
| Dibenz(a,h)anthracene | 0.015* | 2,435 | -- |
| Ethylbenzene | 2.3 | -- | 107 |
| Fluoranthene | 0.074 | -- | > sol (0.26) |
| Fluorene | 0.057 | -- | > sol (2.0) |
| Indeno(1,2,3-c,d)pyrene | 0.04* | 18,346 | * |
| Lead[b] | 0.018 | -- | **0.015** |
| Manganese | 21 | -- | 1,241 |
| Mercury | 0.00028 | -- | 811 |
| Naphthalene | 21 | -- | 23 |
| Phenanthrene | 0.045 | -- | > sol (1.2) |
| Phenol | 0.081 | -- | 8,621 |
| Pyrene | 0.051 | -- | > sol (0.14) |
| Pyridine | 0.060 | -- | 44 |
| Toluene | 20 | -- | 352 |
| Xylenes, Total | 60 | -- | > sol (175) |
| *Dermal Contact with Pit Water (mg/L)* | | | |
| Lead[b] | 0.017 | -- | **0.015** |

# TABLE 11
# COMPARISON OF CHEMICALS OF POTENTIALCONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# SWMU P-18

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Trespasser** | | | |
| *Inhalation of Ambient Vapors from Groundwater (mg/L)* | | | |
| Acenaphthene | 0.36 | -- | > sol (4.2) |
| Acenaphthylene | 0.030 | -- | > sol (16.1) |
| Anthracene | 0.030 | -- | > sol (0.043) |
| Benzene | 570 | > sol (1,750) | > sol (1,750) |
| Ethylbenzene | 2.3 | -- | > sol (169) |
| Fluorene | 0.057 | -- | > sol (2.0) |
| Naphthalene | 21 | -- | > sol (31) |
| Phenanthrene | 0.045 | -- | > sol (1.15) |
| Toluene | 20 | -- | > sol (526) |
| Xylenes, Total | 60 | -- | > sol (175) |

| | |
|---|---|
| -- | Not evaluated as there is no toxicity criteria for this pathway. |
| > Sol | The RBSL exceeds the solubility limit indicated in parentheses. |
| > Sat | The RBSL exceeds the saturation limit indicated in parentheses. |
| | Shaded cell indicates value exceeds the RBSL. |
| >1,000,000 | Calculated RBSL is greater than 1,000,000 parts per million (mg/kg or mg/L). |
| NE | Not evaluated for this scenario. |
| a | RBSL for direct contact calculated using USEPA's Adult Lead Model (USEPA 1996b) and inputs summarized in ID No. 2 (BSC 1999b). |
| b | Action level from USEPA (1991) used; this value is not a calculated Tier 1 RBSL. |
| * | This chemical is present as a nonaqueous phase liquid (NAPL) because the representative concentration exceeds the solubility limit. The permeability coefficient for a NAPL is equal to the permeability coefficient for water divided by the octanol-water partition coefficient ($K_{ow}$) (USEPA 1992) EPA Dermal Exposure Assessment: As described in Part IV of the RFI, RBSLs wer derived for the dermal portion of this receptor scenario using this methodology. |

# TABLE 12
# TIER I RISK ASSESSMENT RESULTS
# SWMU P-18

| | Representative Concentration | Cancer RBSL | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **FUTURE COMMERCIAL/INDUSTRIAL WORKER** | | | | | | |
| *Inhalation of Ambient Vapors from Groundwater*[•] | | | | | | |
| Benzene | 570 | 26 | 2.2E-05 | 112 | 5.1 | blood/immune system |
| | | SLCR = | **2E-05** | SLHI= | **5.1** | |
| *Inhalation of Indoor Vapors from Groundwater*[•] | | | | | | |
| Benzene | 570 | 0.480 | 1.2E-03 | 2.1 | 271 | blood/immune system |
| Naphthalene | 21 | NA | NA | 11 | 1.9 | upper respiratory system |
| | | SLCR = | **1E-03** | SLHI= | **273** | |
| Total across all pathways: | | Ambient $SLCR_{total}$ = | **2E-05** | | Ambient | Indoor |
| | | Indoor $SLCR_{total}$ = | **1E-03** | Total SLHI= | **5.1** | **273** |
| | | | | Total upper respiratory system SLHI= | **NA** | **1.9** |
| | | | | Total blood/immune system SLHI= | **5.1** | **271** |
| **CURRENT NON-BSC COMMERCIAL/INDUSTRIAL WORKER** | | | | | | |
| *Inhalation of Ambient Vapors from Groundwater*[•] | | | | | | |
| Benzene | 570 | 26 | 2.2E-05 | 112 | 5.1 | blood/immune system |
| | | $SLCR_{total}$ = | **2E-05** | Total SLHI= | **5.1** | |

# TABLE 12
# TIER I RISK ASSESSMENT RESULTS
# SWMU P-18

| | Representative Concentration | Cancer RBSL | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **FUTURE CONSTRUCTION WORKER** | | | | | | |
| *Direct Contact with Subsurface SWMU Material*[•] | | | | | | |
| Arsenic | 91 | 16 | 5.7E-06 | NA | NA | NA |
| Lead[b] | 14,000 | NE | NE | NE[b] | NE | NE |
| Benzo(a)pyrene | 4.2 | 3.3 | 1.3E-06 | NA | NA | NA |
| | | SLCR = | **7E-06** | SLHI= | **NA** | |
| *Inhalation of Ambient Vapors from and Dermal Contact with Groundwater*[•] | | | | | | |
| Benzene | 570 | 42 | 1.3E-05 | 1.0 | 570 | blood/immune system |
| bis(2-Ethylhexyl)phthalate | 0.034 | 0.020 | 1.7E-06 | NA | NA | NA |
| Naphthalene | 21 | NA | NA | 2.1 | 10 | upper respiratory system |
| | | SLCR = | **2E-05** | SLHI= | **580** | |
| *Dermal Contact with Pit Water*[•] | | | | | | |
| Lead[b] | 0.017 | NE | NE | NE | NE | NE |
| | | | **NE** | | **NE** | |
| Total across all pathways: | | $SLCR_{total}$ = | **2E-05** | Total SLHI= | **580** | |
| | | | | Total blood/immune system SLHI= | **570** | |
| | | | | Total upper respiratory system SLHI= | **10** | |

# TABLE 12
# TIER I RISK ASSESSMENT RESULTS
# SWMU P-18

| | Representative Concentration | Cancer RBSL | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **FUTURE UTILITY/MAINTENANCE WORKER** | | | | | | |
| *Direct Contact with Subsurface SWMU Material*[*] | | | | | | |
| Arsenic | 91 | 69 | 1.3E-06 | NA | NA | NA |
| Lead[b] | 14,000 | NE | NE | NE[b] | NE | NE |
| | | SLCR = | **1E-06** | | **NA** | |
| *Inhalation of Ambient Vapors from and/or Dermal Contact with Groundwater*[*] | | | | | | |
| Benzene | 570 | 99 | 5.8E-06 | 11 | 52 | blood/immune system |
| | | SLCR = | **6E-06** | | **52** | |
| *Dermal Contact with Pit Water*[*] | | | | | | |
| Lead[b] | 0.017 | NE | NE | NE | NE | NE |
| | | | **NE** | | **NE** | |
| Total across all pathways: | | $SLCR_{total}$ = | **7E-06** | Total SLHI= | **52** | |
| | | | | Total blood/immune system SLHI= | **52** | |

a Primary Target Organ information obtained from IRIS (USEPA, 2000b).

b The RBSL for this scenario exceeded by the representative concentration. As lead is evaluated as neither a carcinogen or noncarcinogen, this exceedance is noted here.

* All concentrations in ppm (mg/kg or mg/L).

NA Not applicable as chemical does not exceed an RBSL for this effect.

NE Not evaluated as there is no toxicity criteria for this pathway.

SLHI Screening Level Hazard Index.

SLCR Screening Level Cancer Risk.

# APPENDIX A

# FIELD INPSECTION NOTES

**FIELD INSPECTION CHECKLIST**
**SWMU SURFACE WATER RUNOFF POTENTIAL EVALUATION**
**BETHLEHEM STEEL CORPORATION**
**LACKAWANNA, NEW YORK**

SWMU #: P-18

SWMU Name: Scrubber Water Cooling Tower: Hot & Cold wells

Date of Inspection: 9/13/96

Inspector(s): J. Harmon

TYPE OF SWMU (check type and configuration and add comments):

**Type:**

_____ Landfill  _X_ Impoundment (2) cold well / hot well

_____ Pit/sump/trench  _____ Pile

**Configuration:**

_X_ Level
_____ Above Grade - height_____ ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft,
depth_____ ft, height of top above grade_____ft
_____ Free board_____ft
_____ Other (describe)_____

Comments: Cold well on By-Products (Chemicals) west side of Lackawanna Canal

Hot Well at Southern most end of Lackawanna Canal

SWMU# P-18

Inspection Date: 9/13/96

**SURFACE OF SWMU** (check all that apply and add comments):

**Material:**

_____ Concrete/Asphalt
_____ Grass
_____ Slag
X Other (describe): SWMU IS constructed of steel piling at south end of Lackawanna Canal

_____ Unvegetated Soil
_____ Trees/Shrubs
X Liquid

Comments:

**SURROUNDING AREA** (Attach topography map and indicate features of interest, check all that apply and add comments):

**Features:**

_____ Buildings, direction _____, distance _____ ft
_____ Road, type _____, direction _____, distance _____ ft
_____ Railroad, direction _____, distance _____ ft
X Other (describe): LACKAWANNA CANAL 17 FT EAST of cold well AND 25 north of Hotwell

**Ground Surface:**

_____ Concrete/Asphalt
_____ Grass
X Slag
_____ Other (describe):

_____ Unvegetated Soil
X Trees/Shrubs
_____ Liquid

The ground surface around each of the units are slag covered with moderate vegetation

SWMU# P-18

Inspection Date: 9/13/96

Comments: _____

**Surrounding topography:**

X Level

_____ Sloped to _____ at _____ ft (vertical) per feet (horizontal)

Comments: Surface elevation ~ 583

**CONTAINMENT SYSTEM** (check all that apply and add comments):

_____ Cover - type _____

_____ Concrete sump/pit

_____ Concrete trench

_____ Wooden trench

X Berm or dike

height _____ ft

width _____ ft at crest

width _____ ft at base

Comments: Cold well 6' to water level from ground surface; Hot well 9' to top of wall 13 FT to water surface

**DISTANCE TO NEAREST SURFACE WATER BODY:** 13 ft, direction E

Name of water body: Lackawanna Ship Canal

SWMU# P-18

Inspection Date: 9/13/96

**VISUAL EVIDENCE OF RUN ON**

_____ No

X Yes, Description: SMALL Area at inlet to hot well area and con run in at north end of cold well

**VISUAL EVIDENCE OF RUN OFF:**

X No

_____ Yes, Description: _____

If Yes, which of following are present?

_____ Erosion scars on SWMU

_____ Sediments near SWMU in runoff areas

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

**DOES RUNOFF REACH SURFACE WATER BODY?** NO

If yes, provide description: _____

URS
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

# SWMU INSPECTION REPORT

SWMU - P:18

DATE 5/2/01

| DAY | S | M | T | W | TH | F | S |
|---|---|---|---|---|---|---|---|

| WEATHER | Bright Sun | Clear | Overcast | Rain | Snow |
|---|---|---|---|---|---|
| TEMP | To 32 | 32-50 | 50-70 | 70-85 | 85 up |
| WIND | Still | Moder | High | Report No. | |
| HUMIDITY | Dry | Moist | Humid | | |

PROJECT BSC - LACKAWANNA RFI
OWNER BSC
CONTRACT No.
URS CORP JOB No. 42.00008BSC.15
URS CORP PROJECT MANAGER J. Jacobi

| Name of Contractor | Non-manual | Manual | Remarks |
|---|---|---|---|
| | | | |

VISITORS: M. Colmerauer, J. Boyd, T. Burmeier

| Time | Representating | Representating | Remarks |
|---|---|---|---|
| 1100 5/2/01 | URS Corp. | | |

EQUIPMENT AT THE SITE : NONE

SWMU P-18 "Hot + Cold Wells"

INSPECTION NOTES

- SWMU consists of 2 adjacent water pits associated with former Pump House station on southern end of the Lackawanna Ship Canal

"Cold Well":

- water is generally clear - about 10 feet deep.
- steel sheeting (pilings) comprise a majority of the pit walls, with some concrete walls.
- no evidence of flow
- Depth to water is 5.2 ft, depth to water in canal (approx 15 to 20 ft away) is 11.3'

SHEET 1 OF 2

BY M. COLMERAUER TITLE Geologist

REVIEWED BY: JHB PROJECT ~~ENGINEER~~ GEOLOGIST

# SWMU INSPECTION REPORT (cont'd)

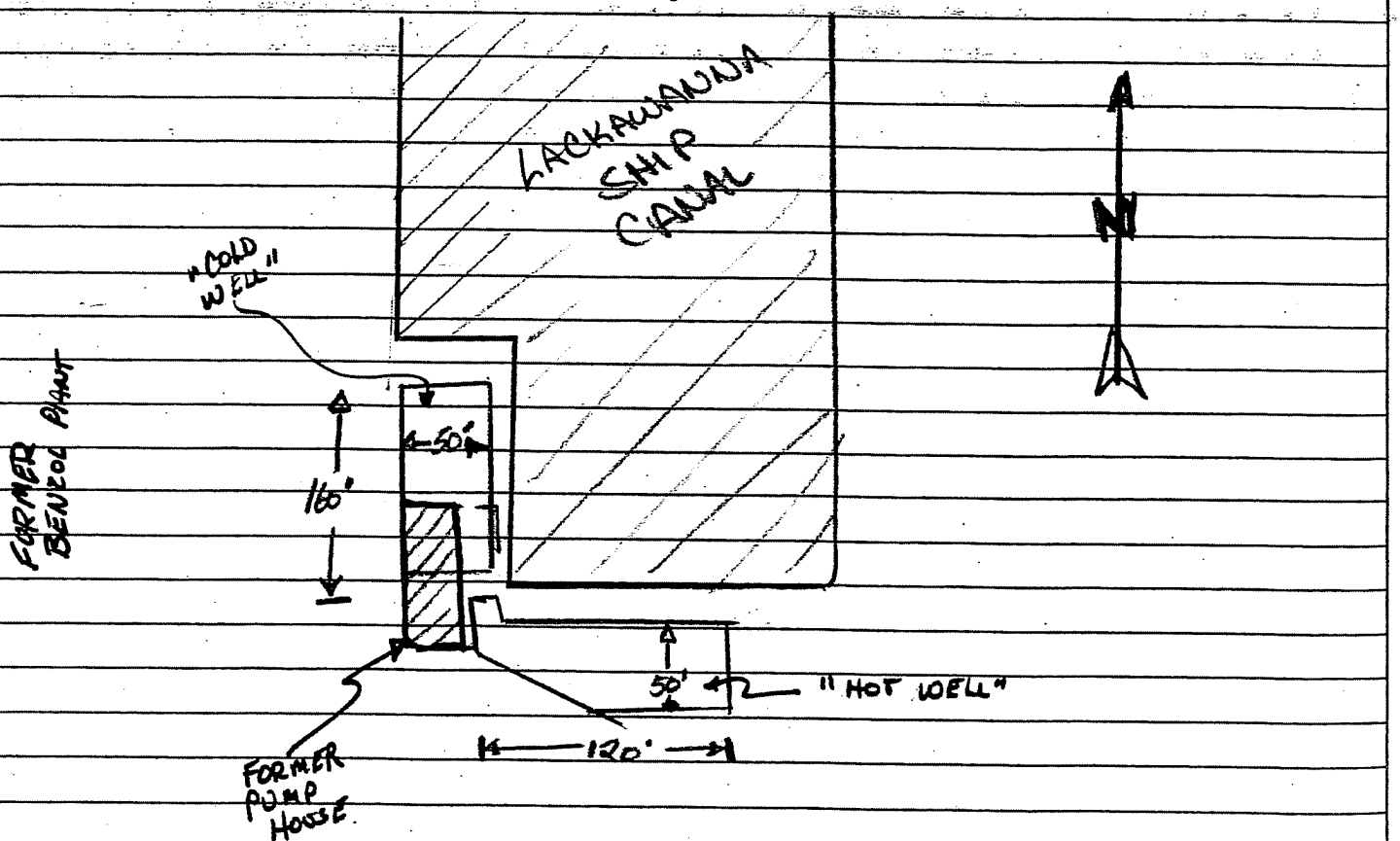
PROJECT BSC
URS CORP JOB No. 42.00008BSC.15

REPORT No. SWMU P-18
DATE

INSPECTION NOTES

"Hot Well":

- Pit consists of steel sheet piling in generally good condition.
- Water is generally clear with no visible evidence of flow.
- Depth of water is approx. 10ft. Water is 4.5ft from grade (canal surface is 11.3').
- Walls extend 4' above grade.




SHEET ____ OF ____

BY ____ TITLE ____

REVIEWED BY: ____ PROJECT ENGINEER

# APPENDIX B

# SAMPLE RECORDS

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-186-152 JOB NAME : BSC PHASE II-C DATE : 2/2/95
JOB LOCATION : LACKAWANNA, NY TIME : 11:00

SAMPLE ID : P18-2-(0-8)
SAMPLE LOCATION : SWMU P-18-2 WEST

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☐ SEDIMENT ☒ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☒
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

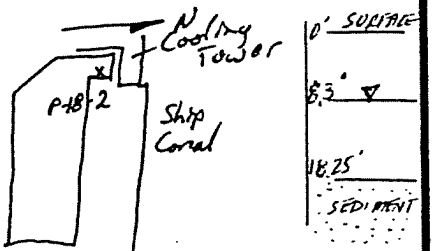
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black Silt + Clay
very soft layer of sediment above clay

## SAMPLE ANALYSIS

SAMPLE ID : P18-2-(0-8) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP + SRLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Silty, odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | NA |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : Overcast, some snow, 24° F, Winds from North at 15-20 mph
COMMENTS : DUPLICATE P18-3(0-30) COLLECTED AT THIS LOCATION

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-186-152 JOB NAME : BSC PHASE II-C DATE : 2/21/95
JOB LOCATION : LACKAWANNA, NY TIME : 11:50

SAMPLE ID : P18-1-(0-19.5)
SAMPLE LOCATION : SWMU P-18-1 EAST

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☐ SEDIMENT ☒ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☒
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

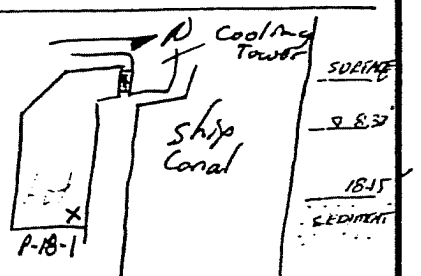
SAMPLE DESCRIPTION : Black → Red-brown Silt Clays
Coke odor

Above silty clay - alternating layers of hard, thin material and thick, very soft sediments

## SAMPLE ANALYSIS

SAMPLE ID : P18-1-(0-19.5) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SRLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Coke odor

FIELD TEST : VALUE :
TEMP. (°C/°F)
pH
SPEC. COND.(μMHOs/CM) N/A
OTHER (UNITS)




WEATHER : OVERCAST, SOME SNOW, 24°F, WIND FROM North 15-20 mph
COMMENTS : ~ 19.5' SEDIMENT

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-186 JOB NAME : Phase III DATE : 7/28/95

JOB LOCATION : BSC Kaikaweaaa TIME : 12:46

SAMPLE ID : P-18-1

SAMPLE LOCATION : SWMU P-18

SAMPLERS : H Mbirimi OF : Dames & Moore

AJ Nello Dames & Moore

SAMPLE CLASSIFICATION : SOIL ☐ SEDIMENT ☒ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☒

STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : DARK REDDISH BROWN TO BLACK, MEDIUM STIFF, SILTY CLAY. (W) SAND & GRAVEL TRACES

(Full Tube t)

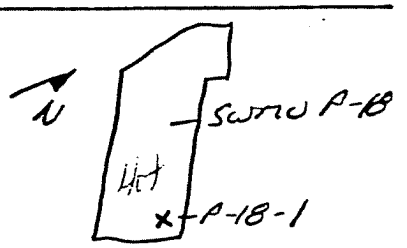
## SAMPLE ANALYSIS

SAMPLE ID : P-18-1 (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : VOC-8240, SVOC 8270, t. Metals Ca, TCLP/SPLP AVS/SEM

PHYSICAL APPEARANCE & ODOR : Coke Odor, See Above

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | NA |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | ≈ 18 → 18.5 ft sed. |




WEATHER : 87°F Sunny Lt. Winds.

COMMENTS : Sediment has multiple layers

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-186 JOB NAME : Phase III DATE : 7/28/95
JOB LOCATION : BSC Lackawanna TIME : 13:30

SAMPLE ID : P-18-2
SAMPLE LOCATION : SWMU-P-18

SAMPLERS : H.M Parish OF : Dames & Moore
A.J Nellis

SAMPLE CLASSIFICATION : SOIL ☐ SEDIMENT ☒ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☒
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

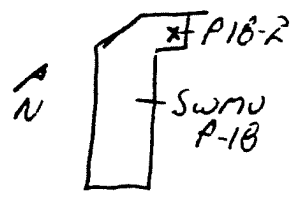
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : DARK REDDISH BROWN TO BLACK, MEDIUM STIFF, SILTY CLAY (TRACES OF SAND AND GRAVEL (½ Tube)

## SAMPLE ANALYSIS

SAMPLE ID : P-18-2 (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC-8240, SVOC-8270, T Metals, Cn, TCLP/SPLP AVS/SEM
PHYSICAL APPEARANCE & ODOR : Coke Odor (See Above)

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | N/A |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | ≈ 6' of sed. |




WEATHER : 87°F Sunny Lt. Winds
COMMENTS :

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-186 JOB NAME : BSC Lackawanna Phase III DATE : 09/19/95

JOB LOCATION : BSC Lackawanna TIME : 14:10

SAMPLE ID : P-18-3-(0-17')

SAMPLE LOCATION : SWMU P-18 (Coldwell)

SAMPLERS : H.M. Parish OF : Dames & Moore

J.R. Dabeski Dames & Moore

SAMPLE CLASSIFICATION : SOIL ☐ SEDIMENT ☒ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ Hand. CORE SAMPLER ☒

STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black Fine Silty Clay with Coke Fines, Some Petro "Odor + Coke Odor Some Sheens, A 3/4" Layer of Iron Scale ~~abo~~ In middle of Core

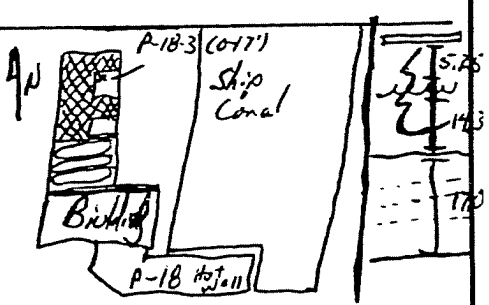
## SAMPLE ANALYSIS

SAMPLE ID : P-18-3-(0-17') (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : Total Metals, ~~TCLP~~ SPLP, Cn., SVOAs 8270, VOAs 8240

PHYSICAL APPEARANCE & ODOR : See Above

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | N/A |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | 0-17'/Sed. |




WEATHER : Sunny 15mph E, NE Wind.

COMMENTS : Multiple Horizons during Coring

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-186 JOB NAME : BSC Lackawanna Phase III DATE : 9/19/95

JOB LOCATION : BSC Lackawanna TIME : 13:40

SAMPLE ID : P-18-4-(0-26') sw/no P-18

SAMPLE LOCATION : (Coldwell)

SAMPLERS : HM Parish OF : Dames & Moore

JR Gabreski Dames & Moore

SAMPLE CLASSIFICATION : SOIL ☐ SEDIMENT ☒ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ Hand. CORE SAMPLER ☒

STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black Fine Silty Clay with Coke Fines, Some "Petro" Odor + Coke Odor, Some Sheens

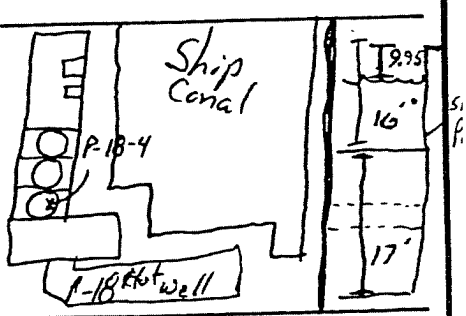
## SAMPLE ANALYSIS

SAMPLE ID : P-18-4-(0-26') (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : Total Metals, SPLP, CN, SVOA's 8270, VOA's 8240

PHYSICAL APPEARANCE & ODOR : See Above

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | NA |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | (0-26') of Sediment |




WEATHER : Sunny ~5mph ENE wind.

COMMENTS : Multiple Horizons during Coring

# APPENDIX C

# SUMMARY OF ANALYTICAL RESULTS

# (1992 RESULTS)

Huntingdon

Analytical Services Division

140 Creekside Drive
Box 240
Middleport, New York 14105
(716) 735-3400
Fax (716) 735-3611

July 21, 1992

Mr. Michael Hanchak
Dames & Moore
3065 Southwestern Boulevard
Orchard Park, NY 14127

Re: HAS Analytical Report 92-610, dated May 4, 1992

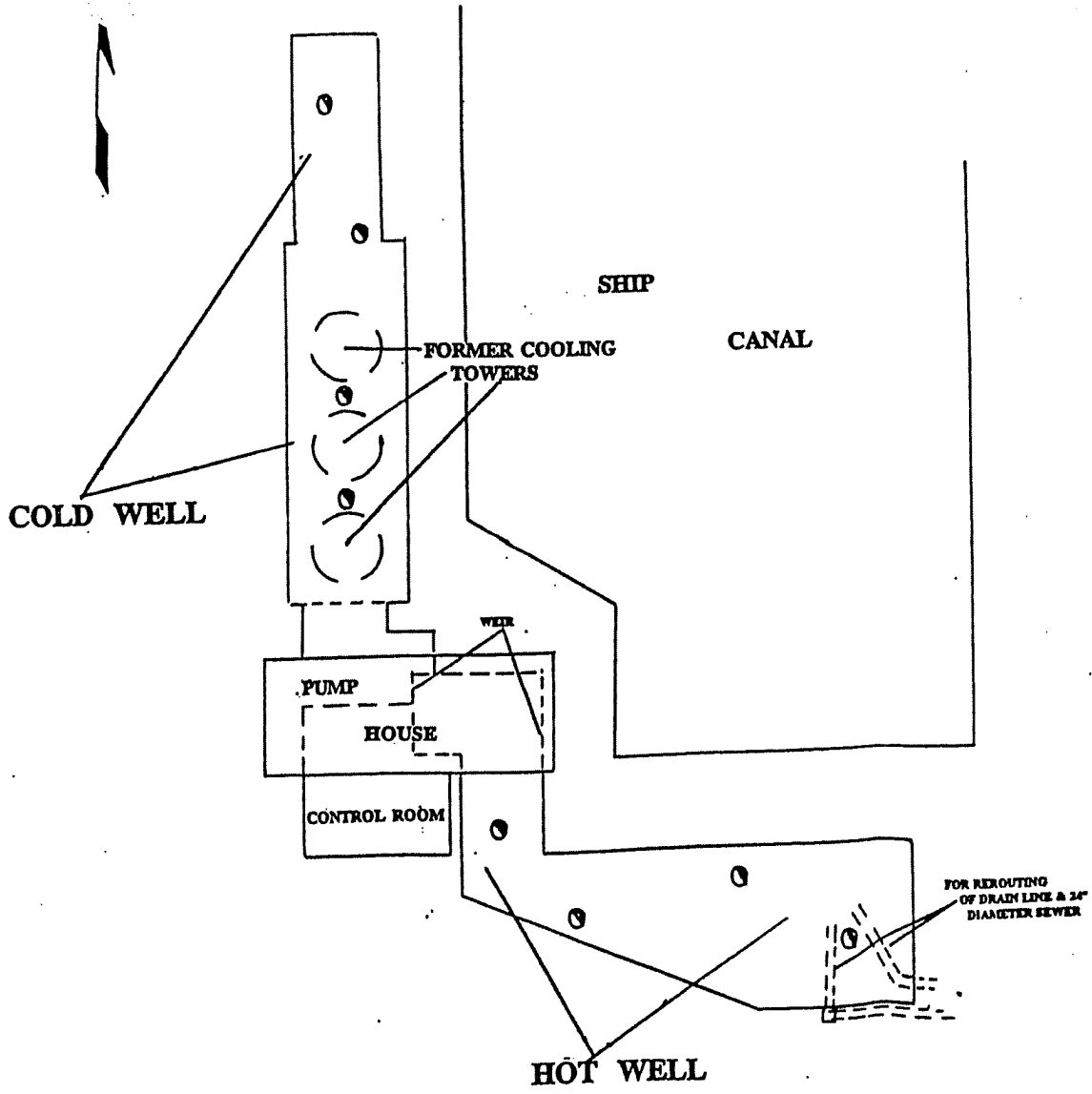
Dear Mr. Hanchak:

Per your request, I have reviewed the above referenced report issued by us. I can confirm that the TCLP (Toxicity Characteristic Leaching Procedure) analysis was carried out according to the EPA Methods Manual "Test Methods for Evaluating Solid Waste" EPA-SW-846.

Sincerely

Andrew P. Clifton
General Manager
Environmental Laboratory Director

/lbr




LEGEND:

● ILLUSTRATES SUB-SAMPLE LOCATIONS WITHIN EACH WELL FOR COMPOSITE SAMPLES.

NOTE:

THIS PLAN WAS ADAPTED FROM A DRAWING SUPPLIED BY BETHLEHEM STEEL CORP. (No. 288 702) AND IS FOR ILLUSTRATIVE PURPOSES ONLY.

EMPIRE SOILS INVESTIGATIONS INC

SAMPLE LOCATION PLAN

SEDIMENT SAMPLING/ANALYSIS HOT/COLD WELLS
BETHLEHEM STEEL CORP.-LACKAWANNA, NY FACILITY
LACKAWANNA, NEW YORK 14218

| | | | | | |
|---|---|---|---|---|---|
| DR. BY: | JJC | SCALE: | NTS | PROJ. NO.: | ETA-92-87 |
| REV'D. BY: | WJ | DATE: | APRIL 1992 | DRWG. NO.: | 1 |

# HUNTINGDON ANALYTICAL SERVICES
# ENVIRONMENTAL

EPA METHOD 8240
TCLP VOLATILE ORGANICS

| SAMPLE IDENTIFICATION : | COLD WELL | HOT WELL | METHOD BLANK | |
|---|---|---|---|---|
| HAS SAMPLE #92-610- | 001 | 002 | — | |
| **COMPOUND** | **RESULT ug/l** | **RESULT ug/l** | **RESULT ug/l** | **MDL ug/l** |
| VINYL CHLORIDE | <50 | <50 | <50 | <50 |
| 1,1-DICHLOROETHENE | <25 | <25 | <25 | <25 |
| CHLOROFORM | <25 | <25 | <25 | <25 |
| 1,2-DICHLOROETHANE | <25 | <25 | <25 | <25 |
| 2-BUTANONE | <50 | <50 | <50 | <50 |
| CARBON TETRACHLORIDE | <25 | <25 | <25 | <25 |
| TRICHLOROETHENE | <25 | <25 | <25 | <25 |
| BENZENE | <25 | <25 | <25 | <25 |
| TETRACHLOROETHENE | <25 | <25 | <25 | <25 |
| CHLOROBENZENE | <25 | <25 | <25 | <25 |
| 1,4-DICHLOROBENZENE | <50 | <50 | <50 | <50 |
| DATE SAMPLED: | 4-14-92 | 4-14-92 | — | |
| DATE RECEIVED: | 4-15-92 | 4-15-92 | — | |
| TCLP DATE: | 4-17-92 | 4-17-92 | 4-17-92 | |
| DATE ANALYZED: | 4-20-92 | 4-20-92 | 4-20-92 | |

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8270
TCLP SEMI-VOLATILE ORGANICS

| SAMPLE IDENTIFICATION: | COLD WELL | HOT WELL | TCLP METHOD BLANK | |
|---|---|---|---|---|
| HAS SAMPLE #92-610- | 001 | 002 | --- | |
| COMPOUND | RESULT ug/L | RESULT ug/L | RESULT ug/L | MDL ug/L |
| CRESOL (TOTAL) | <50 | <50 | <50 | <50 |
| 1,4-DICHLOROBENZENE | <50 | <50 | <50 | <50 |
| 2,4-DINITROTOLUENE | <50 | <50 | <50 | <50 |
| HEXACHLOROBENZENE | <50 | <50 | <50 | <50 |
| HEXACHLOROBUTADIENE | <50 | <50 | <50 | <50 |
| HEXACHLOROETHANE | <50 | <50 | <50 | <50 |
| NITROBENZENE | <50 | <50 | <50 | <50 |
| PENTACHLOROPHENOL | <250 | <250 | <250 | <250 |
| 2,4,5-TRICHLOROPHENOL | <250 | <250 | <250 | <250 |
| 2,4,6-TRICHLOROPHENOL | <50 | <50 | <50 | <50 |
| PYRIDINE | <50 | <50 | <50 | <50 |
| DATE SAMPLED: | 4-14-92 | 4-14-92 | --- | |
| DATE RECEIVED: | 4-15-92 | 4-15-92 | --- | |
| TCLP DATE: | 4-17-92 | 4-17-92 | 4-17-92 | |
| DATE EXTRACTED: | 4-20-92 | 4-20-92 | 4-20-92 | |
| DATE ANALYZED: | 4-23-92 | 4-23-92 | 4-23-92 | |

ANALYST: _____ 4-24-92

# ENVIRONMENTAL ANALYTICAL REPORT

REPORT NUMBER: 92-737-A

PREPARED FOR:

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 S. PARK AVENUE
HAMBURG, NEW YORK 14075

RE: BTA-92-87; BSC-WQCS #9

PREPARED BY:

HUNTINGDON ANALYTICAL SERVICES
DIVISION OF EMPIRE SOILS INVESTIGATIONS, INC.
P.O. BOX 250
MIDDLEPORT, NEW YORK 14105

JUNE 30, 1992



Huntingdon
Analytical Laboratory
Analytical Services Division

HUNTINGDON ANALYTICAL SERVICES
LAP #10833
ENVIRONMENTAL REPORT

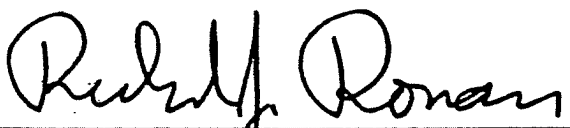
REPORT NUMBERS: 92-610

STATEMENT OF WORK PERFORMED

I HEREBY DECLARE THAT THE WORK WAS PERFORMED UNDER MY SUPERVISION ACCORDING TO THE PROCEDURES OUTLINED BY THE FOLLOWING REFERENCES AND THAT THIS REPORT PROVIDES A CORRECT AND FAITHFUL RECORD OF THE RESULTS OBTAINED.

- 40 CFR PART 136, "GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS UNDER THE CLEAN WATER ACT", OCTOBER 26, 1984 (FEDERAL REGISTER) U. S. ENVIRONMENTAL PROTECTION AGENCY.

- NEW YORK STATE DEPARTMENT OF HEALTH, ANALYTICAL TOXICOLOGY LABORATORY HANDBOOK, AUGUST 1982.



RICHARD J. RONAN, PH.D. MAY 4, 1992
LABORATORY DIRECTOR, ENVIRONMENTAL

REPORT CODE LEGEND:

| | |
|---|---|
| <DL | = LESS THAN DETECTION LIMIT |
| ND | = NOT DETECTED |
| NA | = NOT APPLICABLE |
| INP | = INFORMATION NOT PROVIDED |

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

REPORT NUMBER: 92-737-A

STATEMENT OF WORK PERFORMED

I HEREBY DECLARE THAT THE WORK WAS PERFORMED UNDER MY SUPERVISION ACCORDING TO THE PROCEDURES OUTLINED BY THE FOLLOWING REFERENCES AND THAT THIS REPORT PROVIDES A CORRECT AND FAITHFUL RECORD OF THE RESULTS OBTAINED.

- 40 CFR PART 136, "GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS UNDER THE CLEAN WATER ACT", OCTOBER 26, 1984 (FEDERAL REGISTER) U. S. ENVIRONMENTAL PROTECTION AGENCY.

R. Clifton 6/30/92

ANDREW P. CLIFTON JUNE 30, 1992
ENVIRONMENTAL LABORATORY DIRECTOR

REPORT CODE LEGEND:

| | |
|---|---|
| <DL | = LESS THAN DETECTION LIMIT |
| ND | = NOT DETECTED |
| NA | = NOT APPLICABLE |
| INP | = INFORMATION NOT PROVIDED |

Huntingdon
Analytical Laboratory

Analytical Services Division

Client Name: BSC

Client Contact: Jeff Conlino

Phone: (716) 649-8110

Address:

NAS Quote #:

P.O. #:

Project No.: BTA-92-87

Project/Site Name: BSC-WQCS#9

Samplers (Signature): [signature] / KS

NAS Ref.: 237

| Sample I.D. | Date | Time | Comp | Grab | Sample Description | NAS Matrix | # of Containers | Analysis Requested / Remarks |
|---|---|---|---|---|---|---|---|---|
| Hot well | 4/14/92 | 1216 | | X | Water from Hot Well 001 | W | 1 | Pb(T) |
| Cold well | " | 1107 | | X | Water from Cold Well 002 | W | 1 | Pb(T) |

Relinquished by: [signature]

Date/Time: 4/14/92 1413

Received by: BST Cooler

Relinquished by: BST Cooler

Date/Time: 5/11/92 0900

Received by: [signature]

Relinquished by:

Date/Time: 5/11/92

Received by:

Relinquished by:

Date/Time:

Received by:

Disp: 5/14/92

HUNTINGDON ANALYTICAL SERVICES

Analyte: LEAD

Date Sampled: 4/14/92 11:07 to 12:16
Date Prepared: 6/25/92 10:00

| SAMPLE ID: HAS # | CLIENT | EPA METHOD | DATE ANALYZED | DETECTION LIMIT | RESULT mg/l | QC |
|---|---|---|---|---|---|---|
| 0737-001 | HOT WELL | 239.2 | 6/26/92 18:28 | 0.005 | 0.007 | *95 |
| 0737-002 | COLD WELL | 239.2 | 6/26/92 18:34 | 0.005 | 0.017 | *95 |
| 0737-MB | METHOD BLANK | 239.2 | 6/26/92 18:14 | 0.005 | <DL | *95 |

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

Elaine C. Gawron

ANALYST
ELAINE C. GAWRON

Since 1938

WADSWORTH/
LABORATORIES
Sampling. testing. mobile labs
450 William Pitt Way
Pittsburgh, PA 15238

# ANALYTICAL REPORT

## WADSWORTH/ALERT PROJECT NUMBER 5611

Presented to :

Jim Scherer

BETHLEHEM STEEL

WADSWORTH/ALERT LABORATORIES, INC.

Thomas Tomayko
Project Manager

Renee' Gigliotti
Quality Assessment Group Leader - Pittsburgh

June 24, 1992

CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Pittsburgh, Pennsylvania (412) 826-5477
LABORATORY: Tampa, Florida (813) 621-0784
24-HOUR ALERT LINE (216) 497-9338

# NARRATIVE

The following report contains the analytical results for samples submitted to Wadsworth/Alert Laboratories, Inc. The samples were received into the laboratory in accordance with documented sample acceptance procedures.

Wadsworth/Alert Laboratories, Inc. utilizes USEPA approved methods and instrumentation in all analytical work. The methods used for the analyses presented in this study can be found on the following pages. A summary of QC data for these analyses is included at the rear of the report.

## ANALYTICAL METHODS

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved analytical methods and instrumentation. The analytical methods used in the analyses of these samples are listed below.

| Parameters | Methods |
|---|---|
| Metals: | |
| TCLP Extraction: | SW846 1311 |
| Lead | SW846 7421 |
| Selenium | SW846 7740 |
| Acid Rain Extraction (modified) | SW846 1312 |
| Lead | SW846 7421 |
| Lake Water Extraction (modified) | SW846 1311 |
| Lead | SW846 7421 |

SW: SW846-Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, EPA, September, 1986.

COMPANY : BETHLEHEM STEEL
LAB #: 5611-54717
MATRIX : WATER

DATE RECEIVED: 6/17/92

SAMPLE ID : WQCS NO.9 COLD WELL 4-14-92

## METALS ANALYTICAL REPORT
## TOXICITY CHARACTERISTIC LIST

---

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311(55 FR 26986)

TCLP EXTRACTION DATE: 5/28/92

| ELEMENT | PREPARATION - ANALYSIS DATE | RESULT | DETECTION LIMIT | |
|---|---|---|---|---|
| Lead | 6/18- 6/22/92 | 101 | 30 | mg/l |
| Selenium | 6/18- 6/19/92 | ND | 0.025 | mg/l |

NOTE: ND (None Detected) as rec'd

COMPANY: BETHLEHEM STEEL
LAB #: 5611-54717
MATRIX : WATER

DATE RECEIVED: 6/17/92

SAMPLE ID : WQCS NO.9 COLD WELL 4-14-92

METALS ANALYTICAL REPORT
SYNTHETIC PRECIPITATION LIST

---

Analysis performed in accordance with USEPA Synthetic Precipitation Characteristic Leaching Procedure Method 1312.

SPLP EXTRACTION DATE: 5/28/92

| ELEMENT | PREPARATION-ANALYSIS DATE | RESULT | DETECTION LIMIT |
|---|---|---|---|
| Lead | 6/18- 6/20/92 | 0.017 | 0.003 mg/l |

NOTE: ND (None Detected) as rec'd

COMPANY : BETHLEHEM STEEL
LAB #: 5611-54717
MATRIX : WATER

DATE RECEIVED: 6/17/92

SAMPLE ID : WQCS NO.9 COLD WELL 4-14-92

## METALS ANALYTICAL REPORT
## SELECTED LIST

---

Lakewater Leachate

| ELEMENT | PREPARATION - ANALYSIS DATE | RESULT | DETECTION LIMIT | |
|---|---|---|---|---|
| Lead | 6/18- 6/20/92 | 0.013 | 0.003 | mg/l |

NOTE: ND (None Detected)

COMPANY : BETHLEHEM STEEL
LAB #: 5611-54718
MATRIX : WATER

DATE RECEIVED: 6/17/92

SAMPLE ID : WQCS NO.9 HOT WELL 4-14-92

## METALS ANALYTICAL REPORT
## TOXICITY CHARACTERISTIC LIST

---

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311(55 FR 26986)

TCLP EXTRACTION DATE: 5/28/92

| ELEMENT | PREPARATION - ANALYSIS DATE | RESULT | DETECTION LIMIT | |
|---|---|---|---|---|
| Lead | 6/18- 6/22/92 | 24 | 1.5 | mg/l |
| Selenium | 6/18- 6/19/92 | ND | 0.025 | mg/l |

NOTE: ND (None Detected) as rec'd

COMPANY : BETHLEHEM STEEL
LAB #: 5611-54718
MATRIX : WATER

DATE RECEIVED: 6/17/92

SAMPLE ID : WQCS NO.9 HOT WELL 4-14-92

## METALS ANALYTICAL REPORT
## SYNTHETIC PRECIPITATION LIST

---

Analysis performed in accordance with USEPA Synthetic Precipitation Characteristic Leaching Procedure Method 1312.

SPLP EXTRACTION DATE: 5/28/92

| ELEMENT | PREPARATION - ANALYSIS DATE | RESULT | DETECTION LIMIT | |
|---|---|---|---|---|
| Lead | 6/18- 6/22/92 | 0.022 | 0.003 | mg/l |

NOTE: ND (None Detected) as rec'd

COMPANY : BETHLEHEM STEEL
LAB #: 5611-54718
MATRIX : WATER

DATE RECEIVED: 6/17/92

SAMPLE ID : WQCS NO.9 HOT WELL 4-14-92

## METALS ANALYTICAL REPORT
## SELECTED LIST

---

Lakewater Leachate

| ELEMENT | PREPARATION - ANALYSIS DATE | RESULT | DETECTION LIMIT | |
|---|---|---|---|---|
| Lead | 6/18- 6/20/92 | 0.025 | 0.003 | mg/l |

NOTE: ND (None Detected)

# QUALITY CONTROL SECTION

CASE NARRATIVE

LOT NUMBER: 5611

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. The leachate matrix spike and matrix spike duplicate recoveries for Selenium were out of advisory QC limits.

## MATRIX SPIKE DATA

| LAB ID | PARAMETER | SPIKE PERCENT RECOVERY | SPK/DUP PERCENT RECOVERY | SPIKE MATRIX | QC CONTROL LIMITS |
|---|---|---|---|---|---|
| | TCLP LEACHATE METALS | | | | |
| 54715 | Lead | 116 | 110 | LEACHATE | (78-120) |
| 54715 | Selenium | 66 | 68 | LEACHATE | (78-137) |

## MATRIX SPIKE DATA

| LAB ID | PARAMETER | SPIKE PERCENT RECOVERY | SPK/DUP PERCENT RECOVERY | SPIKE MATRIX | QC CONTROL LIMITS |
|---|---|---|---|---|---|
| | ACID RAIN LEACHATE METALS | | | | |
| 54715 | Lead | 116 | 110 | LEACHATE | (78-120) |

## MATRIX SPIKE DATA

| LAB ID | PARAMETER | SPIKE PERCENT RECOVERY | SPK/DUP PERCENT RECOVERY | SPIKE MATRIX | QC CONTROL LIMITS |
|---|---|---|---|---|---|
| | LAKE WATER LEACHATE METALS | | | | |
| 54715 | Lead | 116 | 110 | LEACHATE | (78-120) |

## CHECK SAMPLE DATA

| LAB ID | PARAMETER | SPIKE PERCENT RECOVERY | SPIKE MATRIX | QC CONTROL LIMITS |
|---|---|---|---|---|
| | TCLP LEACHATE METALS | | | |
| 54714 | Lead | 85 | LEACHATE | (84-115) |
| 54714 | Selenium | 90 | LEACHATE | (85-135) |

## CHECK SAMPLE DATA

| LAB ID | PARAMETER | SPIKE PERCENT RECOVERY | SPIKE MATRIX | QC CONTROL LIMITS |
|---|---|---|---|---|
| | ACID RAIN LEACHATE METALS | | | |
| 54714 | Lead | 85 | LEACHATE | (84-115) |

CHECK SAMPLE DATA

| LAB ID | PARAMETER | SPIKE PERCENT RECOVERY | SPIKE MATRIX | QC CONTROL LIMITS |
|---|---|---|---|---|
| | LAKE WATER LEACHATE METALS | | | |
| 54714 | Lead | 85 | LEACHATE | (84-115) |

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9092-90618
MATRIX : LEACHATE

SAMPLE ID : INTRA-LAB BLANK, 6/18/92

## METALS ANALYTICAL BLANK REPORT
## LAKE WATER LEACHATE

| ELEMENT | PREPARATION-ANALYSIS DATE | RESULT | DETECTION LIMIT |
|---|---|---|---|
| Lead | 6/20/92 | ND | 0.003 mg/l |

NOTE: ND (None Detected)

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9092-90618
MATRIX : LEACHATE

SAMPLE ID : INTRA-LAB BLANK, 6/18/92

## METALS ANALYTICAL BLANK REPORT
## ACID RAIN LEACHATE

| ELEMENT | PREPARATION-ANALYSIS DATE | RESULT | DETECTION LIMIT |
|---|---|---|---|
| Lead | 6/20/92 | ND | 0.003 mg/l |

NOTE: ND (None Detected)

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9092-90618
MATRIX : LEACHATE

SAMPLE ID : INTRA-LAB BLANK, 6/18/92

## METALS ANALYTICAL BLANK REPORT
## TOXICITY CHARACTERISTIC LIST

| ELEMENT | PREPARATION-ANALYSIS DATE | RESULT | DETECTION LIMIT |
|---|---|---|---|
| Lead | 6/20/92 | ND | 0.003 mg/l |
| Selenium | 6/19/92 | ND | 0.005 mg/l |

NOTE: ND (None Detected)

# WADSWORTH/ALERT LABORATORIES

450 William Pitt Way, Pittsburgh, PA 15238
(412) 826-5477

Chain-of Custody Record

3434

| PROJ. NO. | PROJECT NAME/LOCATION |
|---|---|
| | WQCS No.9 SWMU Assessment |

SAMPLERS: (Signature)
EMPIRE SOILS

| STA. NO. | DATE | TIME | COMP. | GRAB. | STATION LOCATION | NO. OF CONTAINERS | PARAMETER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | 4/14/92 | — | X | | WQCS No.9 Hot Well Sludge | 1 | | EPA Method 1311 TCLP Metals & EPA Method 1312 Lead & EPA Method 1311 Lead with Lake Erie $H_2O$ leaching medium |
| 1 | 4/14/92 | — | X | | WQCS No.9 Cold Well Sludge | 1 | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
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| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | Date / Time | Remarks | |
| | | [signature] | 5/21/92 10:30 | | |

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# ATTACHMENT A

# USEPA COMMENTS

RECEIVED
Dames & Moore
JUN 4 1994

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278-0012

JUN 01 1994

Mr. Robert B. Allen
Environmental Manager
Lackawanna Area
Bethlehem Steel Corporation
Box 310
Lackawanna, New York 14218

Re: Bethlehem Steel Corporation - EPA ID No.: NYD002134880
Administrative Order on Consent
Docket No. II RCRA-90-3008(h)-0201

Dear Mr. Allen:

The U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) have reviewed the Response to Agencies Comments on the RFI Phase I Draft Final Report and nine (9) Preliminary Solid Waste Management Unit (SWMU) Assessment Reports:

1. Rubble Landfills N & O (SWMUs S-14 & S-15);
2. Sludge Storage Area (SWMU S-21);
3. Landfill/Impoundment Under North End of Coal Pile (SWMU S-25);
4. Fill Area Near Coke Battery No. 8 (SWMU S-26);
5. Quench Water Pit, B Station (SWMU P-5);
6. Spill Clean Up Storage Area (SWMU P-12);
7. Cooling Tower Hot and Cold Well Complex (SWMU P-18);
8. Waste Storage Piles (SWMU P-74); and
9. Zone 5 of the Slag Fill Area.

Overall, BSC has concurred and adequately responded to most of the comments on the RFI Phase I Draft Final Report. However, there are several outstanding issues. These issues are discussed in the Agencies' reviews of the Phase II-A Draft Final Report and Phase II Work Plan transmitted to BSC on October 13, 1993 and October 1, 1993, respectively. Additional comments are provided in this review only where appropriate.

The Agencies do not request that a revised RFI Phase I Report be submitted to the Agencies, however, BSC should address these comments in subsequent RFI reports and in the final RFI report, where appropriate. BSC should use its best efforts to ensure that future RFI reports be submitted in an approvable form and do not require extensive EPA and NYSDEC comments.

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## 1.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Agencies have reviewed the following Preliminary Solid Waste Management Unit (SWMU) Assessment Reports:

1. Rubble Landfills N & O (SWMUs S-14 & S-15); report dated 1/5/93.
2. Sludge Storage Area (SWMU S-21); report dated 12/30/92.
3. Landfill/Impoundment Under North End of Coal Pile (SWMU S-25); report dated 7/31/92.
4. Fill Area Near Coke Battery No. 8 (SWMU S-26); report dated 7/31/92.
5. Quench Water Pit, B Station (SWMU P-5); report dated 10/29/92.
6. Spill Clean Up Storage Area (SWMU P-12); report dated 7/31/92.
7. Cooling Tower Hot and Cold Well Complex (SWMU P-18); report dated 7/31/92.
8. Waste Storage Piles (SWMU P-74); report dated 1/29/93.
9. Zone 5 of the Slag Fill Area; report dated 10/92.

In each of the Preliminary SWMU Assessment Reports, BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials stored in the SWMUs and recommends "no further action" for each SWMU.

The Agencies conclude that the subject SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, P-18, P-74) as well as Zone 5 require further investigation based on the following:

- Data exist which indicate that hazardous wastes and or constituents were disposed in SWMUs S-21, P-5, P-12, P-18, and P-74. The RCRA Facility Assessment and technical references on steel industry wastes document that the material disposed in these SWMUs contain hazardous constituents.

  Additionally, the analytical results presented in the Preliminary SWMU Assessment Reports, which consisted primarily of EP Toxicity and Toxicity Characteristic Leaching Procedure (TCLP) data, verify the presence of hazardous constituents in SWMUs S-21, P-5, P-12, P-18, and P-74. Additionally, the lead levels in the TCLP extract of samples collected from SWMU P-18 exceeded the TCLP regulatory level of 5.0 mg/L.

  The RCRA Facility Assessment states that SWMUs S-14, S-15, S-25, S-26, and Zone 5 are suspected to contain hazardous wastes or constituents. BSC has not provided sufficient data/documentation to demonstrate that these units do not contain or have never contained hazardous wastes or constituents.

- BSC has not adequately characterized the material in any of the SWMUs or in Zone 5. Thus, conclusions regarding the hazardous nature of the SWMUs are

In each of the Preliminary SWMU Assessment Reports, BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials stored in the SWMUs and recommends "no further action" for each SWMU.

The Agencies conclude that all the subject SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, P-18, P-74) as well as Zone 5 require further investigation based on the following:

- Data exist which indicate that hazardous wastes and or constituents were disposed in SWMUs S-21, P-5, P-12, P-18, and P-74. The RCRA Facility Assessment and technical references on steel industry wastes document that the material disposed in these SWMUs contain hazardous constituents.

Additionally, the analytical results presented in the Preliminary SWMU Assessment Reports, which consisted primarily of EP Toxicity and Toxicity Characteristic Leaching Procedure (TCLP) data, verify the presence of hazardous constituents in SWMUs S-21, P-5, P-12, P-18, and P-74. Additionally, the lead levels in the TCLP extract of samples collected from SWMU P-18 exceeded the TCLP regulatory level of 5.0 mg/L.

- BSC has not adequately characterized the material in any of the SWMUs or in Zone 5 and has not provided sufficient data/documentation to demonstrate that these units do not contain or have never contained hazardous wastes or constituents. Thus, conclusions regarding the hazardous nature of the SWMUs are premature. For SWMUs S-21, P-12, P-18, P-74, and Zone 5, BSC has only conducted EP Toxicity or TCLP analysis on a limited number of samples.

  No analytical data were provided for SWMUs S-14, S-15, S-25, and S-26.

  Additionally, the ground water monitoring data indicate that the materials in Zone 5 and SWMU P-74 may be impacting ground water quality.

Whether or not the remaining SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, and P-18) may be impacting ground water quality cannot be evaluated, due to the absence of ground water monitoring wells downgradient from these SWMUs.

Specific comments on each report are provided in the attachment. BSC should develop SWMU characterization/sampling plans, separately, or as part of the Phase II-C Work Plan, which address the comments provided in the attachment. The sampling plans need to provide adequate justification and rationale for the number, location, and depths of samples to be collected at each SWMU. The sample locations need to be biased towards the areas of highest contamination, based on field screening, visual observation, and waste history of each SWMU.

Some SWMUs undergoing characterization, based on the results of preliminary sampling, may require to be fully investigated in the RFI process. Therefore, BSC must ensure that all the SWMU characterizations and the investigations of those SWMUs that require an RFI be completed by the February 1995 RFI completion date.

If you have any questions, please contact Maria Jon of the EPA at (212) 264-9397 or Mr. Larry Thomas of the NYSDEC at (518) 457-9255.

Sincerely yours,

Andrew Bellina, P.E.
Chief, Hazardous Waste Facilities Branch
Air and Waste Management Division
U.S. Environmental Protection Agency, Region II

Paul R. Counterman, P.E.
Chief, Bureau of Western Hazardous Waste Programs
Division of Hazardous Substances Regulation
New York State Department of Environmental Conservation

Attachments

cc: L. Thomas, NYSDEC, w/attachments
S. Radon, NYSDEC - Region 9, w/attachments
Mike Hanchak, Dames and Moore, w/attachments

April 28, 1994

U.S. ENVIRONMENTAL PROTECTION AGENCY
AND
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

# TECHNICAL REVIEW
# PRELIMINARY SWMU ASSESSMENT REPORTS
# (SWMUs S-14, S-15, S-21, S-25, S-26, P-5, P-12, P-18, P-74, and Zone 5)
# BETHLEHEM STEEL CORPORATION
# LACKAWANNA, NEW YORK

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premature. For SWMUs S-21, P-12, P-18, P-74, and Zone 5, BSC has only conducted EP Toxicity or TCLP analysis on a limited number of samples.

No analytical data were provided for SWMUs S-14, S-15, S-25, and S-26.

- There is evidence to indicate that several SWMUs have released hazardous constituents to the environment. It is documented that waste materials from SWMUs P-5 and P-18 were discharged to the Ship Canal during the period the units were in operation. TCLP data of sediment samples collected from the Ship Canal show elevated levels of cyanide and lead, which have also been detected in the samples collected from SWMUs P-5 and P-18.

  Additionally, the ground water monitoring data indicate that the materials in Zone 5 and SWMU P-74 may be impacting ground water quality.

  Whether or not the remaining SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, and P-18) may be impacting ground water quality cannot be evaluated, due to the absence of ground water monitoring wells downgradient from these SWMUs.

Specific comments on each report are provided in the following sections. Since all of the SWMUs and Zone 5 require further investigation, most of the assessment reports will need to be substantially revised or rewritten. Therefore, the comments on each assessment report point out *only* the most significant issues associated with each SWMU.

BSC should develop SWMU characterization/sampling plans, separately, or as part of the Phase II-C Work Plan, which address the comments provided herein. The sampling plans need to provide adequate justification and rationale for the number, location, and depths of samples to be collected at each SWMU. The sample locations need to be biased towards the areas of highest contamination, based on field screening, visual observation, and waste history of each SWMU.

## 2.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - LANDFILLS N & O (SWMUs S-14 & S-15)

### 2.1 General Comments

BSC concludes that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials stored in SWMUs S-14 and S-15, and therefore recommends "no further action." The Agencies conclude that these SWMUs require further investigation for the following reasons:

- The RCRA Facility Assessment indicates that SWMUs S-14 and S-15 received discarded materials from plant operations that could have included waste oils, solvents, chemicals containing hazardous constituents, and listed hazardous

Page 3, ¶6 Although the materials were placed on a plastic liner while stored in this area and a leachate collection system was utilized, sampling and analysis of the underlying soils are needed to confirm that contaminants did not leach from the piles into the soils.

## 8.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - IRONMAKING BLAST FURNACE SCRUBBER WATER COOLING TOWER, HOT AND COLD WELLS (SWMU P-18)

### 8.1 General Comments

BSC concludes that there have been no releases of hazardous wastes or hazardous constituents to the environment from the Water Quality Control Station (WQCS) No. 9 hot and cold wells (SWMU P-18), and therefore recommends "no further action." The Agencies conclude that SWMU P-18 requires further investigation based on the following:

- From 1978 to 1983, BSC states that SWMU P-18 received blast furnace scrubber water from the overflow of the blast furnace thickeners. The RCRA Facility Assessment and other technical references on the steel industry indicate that blast furnace scrubber water contains hazardous constituents, including cyanide, lead, benzo(a)pyrene, and phenol.

- BSC has not adequately characterized the material in SWMU P-18. BSC has analyzed samples collected from the hot and cold wells for lead, selenium, and TCLP organic compounds only.

- TCLP and Synthetic Precipitation Leaching Procedure (SPLP) testing of sludge samples from the hot and cold wells demonstrate the presence of lead as high as 101 mg/L in the extract, which exceeds the TCLP regulatory level of 5.0 mg/L.

- Wastewater from SWMU P-18 was discharged into the Ship Canal during its period of operation, which indicates there may have been a release of hazardous constituents from SWMU P-18 to the Ship Canal. Although the sediment samples from the Ship Canal have not been fully characterized, the Phase I RFI data presented in the Draft Final Report, show up to 0.037 mg/L of lead in the TCLP extract of sediment samples collected from the Ship Canal in 1991. A source of this lead could have been from SWMU P-18.

### 8.2 Page-Specific Comments

Page 3, ¶3 Bevill materials are subject to *corrective action* under the Hazardous and Solid Waste Amendments (HSWA) to RCRA.

Page 4, ¶3 The text states that lead is the only constituent of concern in blast furnace waste. Based on other technical references on steel industry wastes, there are other hazardous constituents of concern including cyanide, benzo(a)pyrene, and phenol.

Page 4, ¶4 Contrary to what is stated in this paragraph, the analytical data presented in Appendix A for the standing water samples of the hot and cold wells show that lead was detected above method detection limits (0.007 mg/L for the hot well and 0.017 mg/L for the cold well, the latter of which is greater than the MCL of 0.015 mg/L).

Pages 4, ¶5 BSC needs to further evaluate this SWMU. This evaluation should include better definition of the extent of the unit, content of the unit, and impacts to areas outside the unit. The evaluation of areal extent of any impacts can be accomplished by executing soil borings or trenches. The content of the material in the SWMU must be assessed by analytical testing for total inorganic and organic constituents. Additional soil borings, ground water monitoring wells, and analyses should be performed for areas potentially impacted by the SWMU outside of the footprint of the unit.

Page 5, ¶2 The TCLP volatile organic compound data presented in Appendix A are questionable and may be underestimates since the samples were composited.

Page 6, ¶4 Contrary to what is stated in this paragraph, the SPLP analytical results for the two composite sludge samples from SWMU P-18 indicate that lead was detected (0.017 and 0.022 mg/L) above the laboratory's listed detection limit of 0.003 mg/L.

Page 7, ¶2 Again, contrary to what is stated in this paragraph, lead was detected in the modified TCLP extracts of both composite samples (0.013 mg/L and 0.025 mg/L for the cold well and hot well samples, respectively) above detection limits (0.003 mg/L).

Page 7, ¶3 BSC has not included the TCLP analytical results for arsenic, barium, cadmium, chromium, mercury, or silver. The only TCLP analytical results presented in Appendix A are for lead and selenium.

Page 8, ¶1 The table should indicate that lead was detected in the TCLP extract at concentrations of 101 and 24 mg/L in sludge samples from the hot and cold wells via standard TCLP analyses.

Page 9, ¶7 Although present water level elevations may indicate that ground water levels are higher in the hot and cold wells than in the Lackawanna Ship Canal, it does not preclude the possibility that water from the wells was

discharged to the canal. It is not possible to conclude that releases of water from the hot well/cold well to the Lackawanna Ship Canal are not occurring or have not occurred based only on water level elevation data.

## 9.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - WASTE STORAGE PILES (SWMU P-74)

### 9.1 General Comments

BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of the waste fuel piles (SWMU P-74) stored in the area known as the Tank Farm, and is recommending "no further action" for this SWMU. The Agencies conclude that SWMU P-74 requires further investigation due to the following:

- SWMU P-74 was identified in the RCRA Facility Assessment because mixtures of tar and fuel tank residues, coke breeze, and coal fines were stored directly on the ground in the Tank Farm area. The RCRA Facility Assessment states that these materials potentially contain organic hazardous constituents (including benzene, cresol, naphthalene, phenolic compounds, and toluene), which may have leached into the subsurface and ground water. No sampling of the underlying soils has been conducted.

- With the exception of an earthen berm, no containment devices were used to prevent the leaching of contaminants into the subsurface. Furthermore, it does not appear that any cover materials (e.g., plastic sheeting) were placed on the piles to prevent the infiltration of precipitation.

- The December 1992 ground water monitoring data show elevated levels of several hazardous constituents in ground water samples obtained from monitoring wells located downgradient from SWMU P-74 (i.e., MWN-16A, MWN-16B, MWN-17A, and MWN-17B). The hazardous constituents that were detected include, but are not limited to, benzene, toluene, cresol, phenol, and mercury, all of which are believed to be (or to have been) present in the materials stored in SWMU P-74.

### 9.2 Page-Specific Comments

Page 2, ¶3 This paragraph indicates that each fuel tank was surrounded by an earthen berm to contain any spills. However, no indication is provided as to whether any type of impermeable liner, concrete pad, etc. was present to prevent any spills from contaminating the underlying soils/slag. The lack of discussion regarding spill controls beyond the earthen berm suggests that no other controls were in place. Thus, there

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# SWMU ASSESSMENT REPORT
# MILL SCALE STORAGE AREA NO. 2
# (SWMU P-63)

## BETHLEHEM STEEL CORPORATION
## LACKAWANNA, NEW YORK

**SEPTEMBER 2004**

**BETHLEHEM STEEL CORPORATION**
**2600 HAMBURG TURNPIKE**
**LACKAWANNA, NEW YORK 14218**

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**(Following Text)**

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Figure 3 Subsurface Cross-Section, P-P (About 150ft. West of Western End of SWMU P-63)
Figure 4 Subsurface Cross-Section Q-Q and Q1-Q1 (About 400 ft. West of Western End of SWMU P-63)

**TABLES**
**(Following Figures)**

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## APPENDICES


Appendix A Field Inspection Records

Appendix B Analyte Tables, Work Plan (BSC 1995A)

Appendix C Test Pit Logs and Sample Records

Appendix D March 12, 1986, Analytical Results

Appendix E July 1987 Analytical Results


## ATTACHMENTS


Attachment A USEPA Comments

# 1.0 INTRODUCTION

This report documents the results of an environmental assessment of the Mill Scale Storage Area No. 2 at Bethlehem Steel Corporation's (BSC's) Lackawanna facility, East Plant area. Mill Scale Storage Area No. 2 was designated by the United States Environmental Protection Agency (USEPA) in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (USEPA 1988) as Solid Waste Management Unit (SWMU) P-63 because oily mill scale was stored in the area. In addition, the USEPA has required that a RCRA Facility Investigation (RFI) of this and other SWMUs at the BSC facility be completed in accordance with the Administrative Order on Consent (AOC) signed by BSC and the USEPA in 1990 (USEPA 1990b). The RFI has been conducted in phases (Phases I, IIA, IIB, IIC, and III), and included field work consisting of the collection and analysis of environmental samples from SWMUs and other areas throughout the property. This report evaluates SWMU data available to BSC as of November 2001.

In 1991, BSC submitted a Preliminary SWMU Assessment Report for SWMU P-63. Attachment A provides the USEPA comments regarding the preliminary SWMU Assessment. This report provides additional information to further address the USEPA's comments.

## 1.1 Description

SWMU P-63 is a 400- by 200-foot storage area located in an open field east of BSC's former 13-inch Bar Mill complex (Figure 1). It is situated between asphalt roadways to the west and east, and two sets of railroad spurs to the north and south, which connect to a rail line farther to the east (Figure 2). The ground generally slopes to the center of the SWMU, limiting surface water runoff from the area. Rainwater, which is contained within the SWMU area, either evaporates or infiltrates the ground surface. In general, standing water is not present within the SWMU area.

Stratigraphic information for the SWMU P-63 area, illustrated in Figures 3 and 4, is based on data from logs of test holes that were drilled in 1940, prior to construction of the 13-inch Bar Mill complex. The distance from the test holes to the west end of SWMU P-63 ranges

from about 150 feet to 425 feet. Figures 3 and 4 show that this area is continuously underlain by about 20 to 25 feet of yellow and blue clays, which overlie about 2 to 4 feet of dense glacial till that is deposited above a shale bedrock. About 5 feet of slag fill was placed over the native clay throughout this area to provide a stable base and uniform grade level [about 583 feet above mean sea level (amsl)] for construction and operation of the 13-inch Bar Mill complex, its roadways, rail work, and storage yards (including the storage field in which SWMU P-63 is situated). According to the 1940 boring (testhole) and 1989 and 1995 test pit logs, perched water appears to be present in the fill material above the clay and groundwater is approximately 30 feet below grade in the East Plant area.

## 1.2 History of Use

SWMU P-63 was used to store mill scale from 1984 to 1992 (when the 13-inch Bar Mill manufacturing operations were terminated). Prior to 1984, the oily mill scale was recycled through the blast furnaces without storage.

Mill scale is the oxidized surface of steel that is produced during the hot rolling of steel. At BSC's 13-inch Bar Mill operation, where steel billets were heated and rolled into bar sections, the scale produced in these operations was blasted off the steel surface with high-pressure water sprays that were positioned immediately "upstream" of the roll stands. The scale was then sluiced to a concrete settling basin (scale pit) using inclined wastewater flumes that were located beneath the rolling mill. The scale pit was 42,000 cubic feet in volume and contained mostly wash water. The mill scale produced in hot forming operations was frequently oily because lubrication oils from the heavy machinery were washed into the mill scale sluices by the water sprays. The scale periodically was removed from the scale pit and either directly recycled into blast furnaces or stored in piles at or near the rolling mill pending recycling.

The scale pit was identified as SWMU P-34 by the USEPA (USEPA 1988). A SWMU assessment was completed on P-34 in April 1989 (BSC 1989a). On December 7, 1990, the USEPA determined no further assessment was required on SWMU P-34, based largely on the scale material analytical results (USEPA, 1990a).

BSC shut down the blast furnaces in late 1983. Consequently, from 1984 to 1992, about 1,300 tons of oily mill scale from SWMU P-34 was stored temporarily in the SWMU P-63. The 1,300 tons of oily mill scale was reportedly shipped to the CID Landfill in Chaffee, New York.

SWMU P-63 has been inspected numerous times over the years, and field inspection reports are available for Dames & Moore's September 1996 and URS's June 2000 site visits (Appendix A). According to documentation of URS's June 2000 visit, approximately 60 to 70% of the area is covered with building demolition debris piles and miscellaneous equipment, which has been placed there by the current property owner (Republic Industries). Republic Industries purchased the property from Bar Technology who in turn purchased the property from BRW Steel Corp. (BRW). BRW purchased the property from BSC in 1994. There are no surface water runoff containment structures in place, although the SWMU surface is slightly lower than the adjacent roads and rail spurs. Surface water run-off would be directed towards the central SWMU area. Surface water was not present during the 2000 inspection.

## 2.0 SAMPLING AND ANALYSIS

From 1986 through 1995, several investigations were performed of SWMU P-63 and adjacent areas. In 1986 and 1987, material was collected from the 13-inch Bar Mill scale pit (SWMU P-34) and analyzed to determine its content. In 1989, the oily mill scale storage area (SWMU P-63) was investigated to determine the extent (if any) of contamination; however, because the materials from SWMU P-34 were analyzed in 1986 and 1987 prior to their being deposited in SWMU P-63, no additional sampling was done at this time. Analytical testing was performed on the surface and subsurface material within SWMU P-63 in 1995, when a subsequent investigation was performed at SWMU P-63 as part of the facility RFI. The work was completed in accordance with the Phase I Work Plan, the Data Quality Assurance Plan, and the Supplemental Preliminary SWMU Assessment for Former Oily Mill Scale Storage Area No. 2, SWMU P-63 (BSC 1989b; 1990; 1994a; 1994b). A complete list of SWMU-specific compounds targeted for analysis in the site investigations is provided in Appendix B. Laboratory analytical reports are provided in Section II of the RFI. Sample records and test pit logs are included in Appendix C.

### 2.1 March 1986 Waste Sampling

The earliest testing of the mill scale that was stored at SWMU P-63 was conducted on March 12, 1986. A sample of the mill scale in SWMU P-34, the 13-inch Bar Mill scale pit, was collected and analyzed for hazardous characteristics, including EP Toxicity metals, cyanide, and oil and grease.

### 2.2 March 1986 Analysis

Based on the analysis of the March 12, 1986 samples, the EP extract concentration indicates that the oily mill scale in SWMU P-34 does not exceed the toxicity characteristic criteria for a RCRA hazardous waste. Results are provided in Appendix D. Metals, including lead and selenium, were present above method detection levels. Cyanide, oil, and grease were also present.

## 2.3 July 1987 Waste Sampling

In July 1987, a sample of the remaining mill scale from the 13-inch Bar Mill scale pit was again analyzed prior to shipment of the material to a nonhazardous landfill. The sample was analyzed using USEPA methods, including Test Methods for Evaluating Solid Waste (SW-846).

## 2.4 July 1987 Analysis

Like the previous analysis, the July 1987 analyses showed that the oily mill scale does not exceed the toxicity characteristic criteria for a RCRA hazardous waste. Results are provided in Appendix E. The only metal present above method detection limits was arsenic. Cyanide, oil, and grease were also present.

## 2.5 November 1989 Test Pit Investigation

On November 8, 1989, SWMU P-63 was investigated as required by the AOC. The purpose of the investigation was to determine the presence and vertical extent of oil staining. Four test pits [TP-6 (89), TP-7 (89), TP-8 (89), and TP-9 (89)] were excavated in SWMU P-63 (Figure 2). Test pits were excavated 3 to 5 feet below natural grade. Mill scale and stained soils were typically present in the 0- to 12-inch interval in the test pits. Coarse sand was present in the 12- to 18-inch interval. Below the sand was a layer of cobbles, brick, and gravel. Native clay was present approximately 4 to 4.5 feet below ground surface (bgs) in the two pits excavated to that depth. Possible staining was observed at about 2.5 feet bgs in TP-7 (89) and TP-8 (89) and at about 3.5 feet bgs in TP-9 (89). Perched groundwater was encountered at depths of from 2.5 to 4 feet bgs. No evidence of an oily sheen was present on the perched groundwater. Test pit excavation logs are provided in Appendix C.

## 2.6 November 1989 Analysis

No analytical tests were performed on the excavated materials.

## 2.7 January/February 1995 Test Pit Investigation

On January 31 and February 1, 1995, an additional investigation of SWMU P-63 was performed as part of the RFI. Three test pits [TP-5 (95), TP-6 (95) and TP-7 (95)] were excavated at locations selected by the local NYSDEC representative, Mr. Stanley Radon, during a site visit on January 24, 1995. Test pit locations were determined based upon Mr. Radon's knowledge of the location of the former oily mill scale stockpiles. The test pits were excavated to the top of native clay, which was encountered at between 3.5 to 4.0 feet bgs. Three horizons at each test pit were determined: near-surface or Vertical Horizon I (0- to 0.5-foot interval); subsurface horizon or Vertical Horizon II (approximately 0.5- to 3-foot interval); and Clay Base horizon (3.5 to 4.0 foot interval). A composite and a grab sample were collected from each of the three horizons of each pit. Sample records are presented in Appendix C.

Both the grab and composite samples were analyzed for compounds specific to SWMU P-63 (presented in Appendix B), using the total constituent analysis. If analytes were detected, the samples then underwent Synthetic Precipitation Leaching Procedure (SPLP) test methods. In some cases, for example metals, SPLP tests were conducted whether or not the given parameter was found in the sample that was tested by total constituent analysis. For ease of reference, soil analytical results have been summarized in Tables 1 and 2 (analytes not detected are not shown).

### 2.7.1 Total Constituent Results

The total constituent analysis revealed that numerous volatile organic compounds (VOCs) including benzene, methylene chloride, tetrachloroethene, toluene, and total xylenes were present in all but one (TP-6-3 [3.5-4.5]) of the nine samples analyzed for VOCs.

Of the nine samples collected, only two (TP-6-1 [0.0-0.5] and TP-6-2 [2.0-3.0]) were analyzed for semivolatile organic compounds (SVOCs) other than di-n-butyl phthalate. TP-6-1 [0.0-0.5] contained detectable concentrations of numerous SVOCs including benzo(a)anthracene, and benzo(b)fluoranthene. Although bis(2-ethylexyl)phthalate was detected in the SPLP analysis, it was not detected in the total constituent analysis. The only SVOCs detected in TP-6-2 [2.0-3.0] were benzo(a)anthracene, benzo(b) fluoranthene, and fluoranthene.

Numerous metals were detected in all nine samples, including arsenic, barium, chromium, lead, and selenium. Total constituent analytical results are presented in Table 1.

### 2.7.2 SPLP Analytical Results

SPLP analysis was conducted to more closely mimic the effect of compounds leaching from the soil due to rainwater infiltration. The analyses were performed in accordance with SW-846 methods. The SPLP results help evaluate what compounds can potentially leach from the soils into the subsurface.

The SPLP analysis detected no VOCs above laboratory detection limits. Analytical results indicated that a detectable concentration of one SVOC, bis(2-ethylexyl)phthalate, was present in TP-6-1 [0.0-0.5]. Arsenic was present in three (TP-5-1 [0.0-0.5], TP-6-2 [2.0-3.0], and TP-7-1 [0.0-0.5]) of the nine samples analyzed for metals, while selenium (TP-5-2 [2.0-3.0]) and lead (TP-6-2 [2.0-3.0]) were each present once in the nine samples analyzed. The SPLP results are summarized in Table 2.

## 2.8 Summary of Analytical Results

The total constituent analytical data indicates that VOCs, SVOCs, and metals are present in the surface and subsurface soils. However, the SPLP analyses indicate that only one SVOC and three metals appear to be leaching from the surface and subsurface samples at levels above method detection limits. The compounds present in the soils as identified by total constituent analysis were further evaluated in the risk assessment (Section 3.0).

## 3.0 RISK ASSESSMENT

A baseline human health risk assessment, as described in the *Human Health Risk Assessment Work Plan (BSC 1997)*, was conducted for SWMU P-63. The results of the Tier 1 Human Health Risk Assessment (HHRA) are presented here, and are organized into the following sections: Data Evaluation, Exposure Assessment, Toxicity Assessment, Risk Characterization and Uncertainty Analysis. The major components of this HHRA have previously been presented in Human Health Risk Assessment Report, Part IV of this RFI Report. Therefore, the following sections provide summary overviews of previously presented information. This section, therefore, serves as a summary report, bringing together all associated and related work from previous risk assessment deliverables, and providing the conclusions of the SWMU-specific risk assessment.

### 3.1 Data Evaluation

A list of 96 constituents of potential interest (COPIs) was developed for the BSC Lackawanna, New York facility based on the USEPA and industry studies (BSC 1998). The list contains hazardous constituents that could be present in the waste streams as a result of integrated iron and steel plant operations, such as those historically conducted at the BSC Lackawanna facility. Human Health Risk Assessment ID No. 1 established the chemicals of potential concern (COPCs) for each SWMU at the BSC Lackawanna facility (BSC 1998). The COPCs were determined by sequentially applying the following criteria, as applicable, to each COPI on a medium-by-medium basis for each SWMU and watercourse: 1) the chemical was detected in at least 5% of the samples, 2) the chemical was detected in at least one sample at a level above background (i.e., the maximum concentration was above background, for chemicals in surficial SWMU material only), and 3) the chemical was positively detected in at least one sample at levels above applicable screening criteria [i.e., USEPA Region III Risk Based Concentrations (RBCs), USEPA Soil Screening Levels (SSLs), or NYSDEC Ambient Water Quality Standards and Guidance values]. In accordance with ID No. 1, a background comparison was not made for the subsurface SWMU material.

The sampling data for SWMU P-63 (as presented in Section 2.0 of this report) were

evaluated in order to identify the site-related COPCs for the SWMU. The COPCs were determined in ID No. 1, however, as some screening criteria were revised since ID No. 1 was submitted, thus potentially changing the COPC list, the screening process was updated (Table 3 and 4). Table 3 presents the screening process for surficial SWMU material; and Table 4 presents the screening process for subsurface SWMU material.

Three inorganic COPCs (arsenic, chromium, and lead) were identified in surficial SWMU material, and one inorganic COPC (arsenic) was identified in subsurface SWMU material. No organic COPCs were identified. Since SWMU P-63 is not located within any of the BSC groundwater zone designations (it is appointed as "other" in ID No. 1), groundwater is not evaluated in this HHRA.

Representative concentrations were determined for each COPC. As neither of the surface nor subsurface data sets had samples sizes ten or greater, the maximum concentration was used as the representative concentration for each COPC. The COPCs and their representative concentrations are presented in Table 5; these concentrations are used in the SWMU P-63 risk characterization.

## 3.2 Exposure Assessment

The exposure assessment conducted for SWMU P-63 included a review of current and future human receptor scenarios and potential exposure pathways, as related to the COPCs. In general, exposure pathways by which a human receptor could come into contact with SWMU material are defined by four components (USEPA 1989):

- A source and mechanism of constituent release to the environment,
- An environmental transport mechanism,
- A point of potential human contact with the affected medium, and
- A route of entry into humans.

If any one of these components is missing, the pathway is considered incomplete and does not contribute to receptor exposure.

Human Health Risk Assessment ID No. 2 (BSC 1999) presented the current and future human receptor scenarios and potentially complete exposure pathways for each of the SWMUs identified at the Lackawanna Site. The COPCs identified here and in ID No. 2 were also integral in determining complete exposure pathways, based on their type and presence in each media (e.g., there are no volatile COPCs in SWMU P-63, and zonal groundwater is not a media of interest, which precludes inhalation of volatile chemicals as a complete exposure pathway in this HHRA). Potential exposure pathways for SWMU P-63 are presented in Table 6 and below.

For SWMU P-63, the potential receptor scenarios include a current non-BSC commercial/industrial worker, a future commercial/industrial worker, a future construction worker, a future utility/maintenance worker, a trespasser, a future marina worker, a future greenway user, a future fenceline resident, and a present fenceline resident. For the purposes of this HHRA, the current and future residents, and future marina worker represent potential exposure scenarios that are located off site; all other exposure scenarios are assumed to be on site. On-site receptors are assumed to spend their entire exposure duration on, or in a building, at SWMU P-63.

For the future commercial/industrial worker scenario, the future utility/maintenance worker scenario, the future construction worker scenario and the trespasser scenario, direct contact (i.e., ingestion and dermal contact) with surface SWMU material, including inhalation of airborne particulates from surface SWMU material were determined to be complete exposure pathways. The future construction worker scenario and future utility/maintenance worker scenario may additionally be exposed via direct contact with subsurface SWMU material during potential future digging activities. For the current non-BSC commercial/industrial worker scenario, future marina worker scenario, future greenway user scenario, and present and future residential scenario, inhalation of particulates in surficial SWMU material is the only potentially complete exposure pathway evaluated in this SWMU-specific HHRA. A more detailed description of the potentially exposed receptor scenarios and pathways for SWMU P-63 can be found in ID No. 2 (BSC 1999).

## 3.3 Toxicity Assessment

A toxicity assessment characterizes the relationship between the exposure to a COPC and the frequency of adverse health effects that may result from such an exposure (dose-response). The end result of the dose-response assessment is the determination of human uptake levels that provide an adequate measure of protection to exposed persons for carcinogenic and noncarcinogenic endpoints. The derivation of acceptable levels of exposure (e.g., risk-based screening levels; RBSLs) and the manner in which these levels are used in this HHRA are discussed below.

Tier 1 RBSLs were calculated and compared to the representative SWMU P-63 COPC concentrations. RBSLs are defined as concentrations of COPCs in media that are not expected to produce any adverse health effects under assumed exposure conditions. Tier 1 RBSLs were developed using information previously defined and described in detail in the Work Plan and ID No. 2. This information is summarized here. The equations used to calculate the RBSLs follow basic USEPA risk assessment principles (USEPA 1989; 1996). Conservative exposure parameters, as defined by the ASTM Standard (ASTM 1995) and USEPA guidance (USEPA, 1989; 1991a, and 1991b), as well as USEPA toxicity criteria (USEPA 2000a); were inputs into these equations to develop the RBSLs. As some toxicity criteria were revised by the USEPA since originally presented in ID No. 1, they are re-presented in Table 7 of this HHRA. The above information was used to calculate Tier 1 RBSLs for COPCs in SWMU material for each of the nine exposure scenarios (Table 8).

Certain items should be discussed in reference to the RBSL calculations. First, the future commercial/industrial worker scenario RBSL for direct contact with arsenic (0.94 mg/kg) is below the arsenic background level established the site (12 mg/kg). As the background level was deemed an appropriate screening value in selection of COPCs, it was also used as a default RBSL in lieu of the future commercial/industrial worker scenario RBSL. It should also be noted that the chromium in surface SWMU material was conservatively assumed to be hexavalent chromium in the absence of data indicating the valence state. This is considered to be a conservative measure as hexavalent chromium is more toxic than other forms of chromium, and it is unlikely that all of the chromium found in SWMU P-63 surface material is hexavalent.

Lastly, some of the RBSLs for COPCs in SWMU material were determined to be health protective at levels that are greater than 1,000,000 parts per million (mg/kg); they are noted by the following indicator ">1,000,000" in Table 8.

A comparison of the representative COPC concentrations to calculated RBSLs for each of the exposure scenarios is presented in Table 8. This comparison provides a preliminary screening of potential risk to the specific receptor populations and exposure pathways identified for this SWMU.

As presented in Table 8, the concentration of arsenic in surface SWMU material exceeds both the noncancer and cancer direct contact RBSLs (including particulate inhalation) for the future commercial/industrial worker scenario. For the future construction worker scenario, arsenic in both surface and subsurface SWMU material exceeds the cancer direct contact RBSLs (including particulate inhalation). As per ID No. 2, lead was not evaluated for the residential, greenway user, or marina worker scenarios) via the inhalation route. For all other scenarios, chemicals, and pathways, the representative concentrations are below the respective RBSLs and, therefore, are not evaluated further.

In accordance with Part IV of this RFI report, COPCs that do not exceed the Tier 1 RBSLs are not evaluated further. For those COPCs that exceed Tier 1 RBSLs, the risk to human health is evaluated further using a Tier 1 HHRA.

### 3.4 Risk Characterization

Risk characterization involves estimating the magnitude of potential adverse health effects of the COPCs, and summarizing the nature of the health impact to the defined receptor populations. It combines the results of the toxicity and exposure assessments to provide numerical estimates of health risk. The COPCs that exceed an RBSL were further evaluated in a Tier 1 HHRA. A Tier 1 HHRA provides an estimate of risk and hazard based on a comparison of the RBSL (i.e., health-protective levels) to the COPC concentrations (i.e., site-specific levels). Specifically, a screening-level hazard index (SLHI) was calculated to evaluate noncarcinogenic health effects, and a total screening-level cancer risk ($SLCR_{total}$) was calculated to evaluate

carcinogenic effects. The SLHI and $SLCR_{total}$ methodologies are presented in the Work Plan (BSC 1997). The Tier 1 HHRA results are presented in Table 9.

### 3.4.1 Noncarcinogenic Hazards

Noncancer hazards were assessed in this HHRA using a hazard quotient approach (USEPA 1989). For each COPC, the noncarcinogenic RBSL was compared to the COPCs representative concentration to determine the screening level hazard quotient (SLHQ) for that chemical. The equation is as follows:

$$SLHQ = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}}$$

The SLHQs for each chemical are summed to create a total Screening Level Hazard Index ($SLHI_{total}$) for each pathway. In accordance with USEPA methodology (USEPA 1989) and as discussed in the Work Plan, if the SLHI is less than 1, the risks are considered to be negligible. Since there is only one COPC that exceeds an RBSL, the SLHQ and SLHI are equal and there is no need to segregate chemicals by toxicological end point.

The SLHQs and SLHIs for SWMU P-63 are presented in Table 9. The only SLHI calculated for SWMU P-63 was for the commercial/industrial worker scenario. For this receptor, the SLHI is 1.4. In accordance with the USEPA (1989), the SLHI value is reported as one significant figure that results in a SLHI of 1, which is not in exceedance of the non-cancer benchmark of 1.

### 3.4.2 Carcinogenic Risk

In a human health risk assessment, carcinogenic health risks are defined in terms of the probability of an individual developing cancer over a lifetime as the result of exposure to a given chemical at a given concentration (USEPA 1989). The incremental probability of developing cancer over a lifetime (*i.e.*, the theoretical excess lifetime cancer risk) is the additional risk above and beyond the cancer risk an individual would face in the absence of the exposures

characterized in this risk assessment. In this Tier 1 HHRA, cancer risk was evaluated according to the following equation:

$$SLCR = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}} x \text{ Target Risk Level}$$

Cancer risks for different chemicals are summed regardless of the differences in target organ, weight-of-evidence for human carcinogenicity, or potential chemical interactions (*e.g.*, antagonistic or synergistic effects). This approach is consistent with USEPA's current approach to carcinogenic effects, which is to assume effects are additive unless adequate information to the contrary is available (USEPA 1989). Based on USEPA methodology (USEPA 1989) and as discussed in the Work Plan, if the total screening level cancer risk ($SLCR_{total}$) for each receptor/pathway is less than $1 \times 10^{-4}$, the risks are considered negligible.

All calculated SLCRs are less than $1 \times 10^{-4}$ (Table 9). For the future commercial/industrial worker scenario, the $SLCR_{total}$ is $6 \times 10^{-5}$, and is a result of direct contact with arsenic in surficial SWMU material. It should be noted that this cancer risk calculation was developed using the RBSL based on risk. For the future construction worker scenario, it was necessary to calculate SLCRs for direct contact with arsenic in surface and in subsurface SWMU material. It is not appropriate to add the SLCRs for these two media together, as a worker will be exposed to one or the other, either surface SWMU material or subsurface SWMU material, during his or her exposure. The SLCR for surficial SWMU material is $3 \times 10^{-6}$, and the SLCR for surficial SWMU material is $4 \times 10^{-6}$. Each of these SLCRs is below the acceptable risk benchmark of $1 \times 10^{-4}$.

## 3.5 Conclusion

The results of the HHRA are that none of the chemicals in SWMU material exceed Tier 1 noncarcinogenic or carcinogenic benchmarks for any of the scenarios.

Based on these results and in accordance with the work plan, further evaluation is not warranted during the Corrective Measures Study (CMS). The uncertainties inherent in these

conclusions are presented in the following Uncertainty Analysis.

## 3.6 Uncertainty Analysis

There are multiple sources of uncertainty that may be identified for any risk assessment. These include, among others, uncertainty associated with the toxicity criteria used to derive dose-response factors, uncertainties associated with exposure parameters used in the exposure assessment, and uncertainties associated with combining exposure parameters and toxicity criteria to characterize risk.

In the development of any health assessment, some level of uncertainty is introduced each time an assumption is relied upon to describe a dynamic parameter. Some assumptions have a significant scientific basis while others do not, which may result in the selection and use of conservative, default exposure parameters in the exposure assessment. The selection of multiple conservative assumptions in the exposure assessment generally results in an overestimation of potential health risks associated with exposure to specific chemical constituents. The primary areas of uncertainty for this risk assessment are qualitatively discussed below.

### 3.6.1 Site Sampling and Representative Concentrations

SWMU samples were selected in an attempt to identify the highest concentrations of chemicals at the site. Sample biasing was accomplished based on visual observations and photoionization detector readings. Thus, the sampling activities are thought to have characterized the most highly impacted areas of the SWMU, and not an average. This is conservative, as a potential receptor is not expected to remain on, or inhale particulates from, one portion of the SWMU for his or her entire exposure duration. Therefore, it is believed that the maximum concentrations used in this HHRA are likely to represent the true maximum site concentrations.

It should also be noted that, for all of the COPCs in surface and subsurface SWMU material, the maximum concentration was used as the representative concentration in this HHRA.

This is because an insufficient number of observations are available to calculate a 95% UCL. Also, the maximum concentration of arsenic in surface SWMU material is an estimated value. Thus, the confidence in risk calculations involving this concentration is somewhat less than for other calculations. Representative concentrations were used to compare to the RBSLs calculated for this HHRA, and ultimately determine the COPCs in this HHRA. Use of the maximum concentrations of the biased sampling is a very conservative methodology utilized in this HHRA.

### 3.6.2 COPC Selection Process

The COPCs evaluated for SWMU P-63 were identified in the Human Health Risk Assessment Interim Deliverable (ID) No. 1 (BSC 1998). These chemicals were selected in part because of their representative concentrations exceeded Region III RBCs (USEPA 2000b) for residential scenarios. Since no residential exposures are realistic for any of the on-site scenarios, some chemicals have been retained as COPCs, which are not likely to pose a potential threat to most of the human receptors, evaluated here.

### 3.6.3 Exposure Parameters

Several conservative default exposure parameters (*e.g.*, inhalation rates, exposure frequency, exposure duration) were incorporated into the exposure assessment to define general population behavior. For example, for the industrial/commercial worker scenarios, default exposure parameters are intended to be conservative and representative of an individual who is consistently present at the site 24 hours a day, 250 days a year, in the area of highest concentration. It is more likely that the exposure of an industrial worker to a *particular SWMU* (i.e., SWMU material) on the Lackawanna site is limited to an average of only a few hours a day, 2 weeks year. Most parameters incorporated into the exposure assessment to define the receptor scenarios are conservative values and used to define a worst-case population behavior. The net effect of using multiple conservative exposure assumptions is the overestimation of potential health risks.

Additionally, for a receptor population such as an industrial worker or a resident (*i.e.* where exposure duration is greater than 250 days/year), exposure frequency typically is corrected

in site-specific health risk assessments for the fraction of the year when outdoor exposure to soil will be limited due to severe weather conditions such as snow, ice, rain and freezing temperatures (USEPA 1989). This factor is called a meteorological factor. Because of the geographical location of the Lackawanna site, a correction factor for weather conditions would be reasonable. In this Tier 1 human health risk assessment, exposure did not exclude days when the temperature is less than 32°F and not when there is snow cover or the ground was wet from other forms of precipitation. For this SWMU, the Tier 1 RBSLs were exceeded for the future commercial/industrial worker scenarios. Thus, applying a more realistic exposure frequency and a meteorological factor would result in higher RBSLs.

Lastly, when calculating the inhalation RBSLs for the current and future residential scenario, and future marina worker scenario, particulate emission factors were developed as if these receptors were located on site. In fact, these potential receptors are located off site, and thus the RBSLs are considered conservative.

### 3.6.4 Toxicity Assessment

*Noncarcinogenic Criteria-* Toxicity information for many of the COPCs is limited for humans. Consequently, depending on the quality and extent of toxicity information, varying degrees of uncertainty will be associated with the calculated toxicity values. The USEPA derives reference concentrations (RfC; inhalation exposures) and reference doses (oral exposures) for chemicals using an uncertainty factor (UF) approach. The UF for arsenic, for instance, is 3. This was applied to account for both the lack of data to preclude reproductive toxicity as a critical effect and to account for some uncertainty in whether the NOAEL of the critical study accounts for all sensitive individuals. The UF for chromium, however, is 300. The uncertainty factor of 300 represents two 10-fold decreases in dose to account for both the expected interhuman and interspecies variability in the toxicity of the chemical in lieu of specific data, and an additional factor of 3 to compensate for the less-than-lifetime exposure duration of the principal study.

*Carcinogenic Criteria-* USEPA cancer SFs are developed using variations of the Linear Multistage Model (LMS) for carcinogenicity. The LMS is highly conservative as it assumes linearity between dose and effect to zero dose assuming no threshold for carcinogenicity.

However, the human body has mechanisms to detoxify most chemicals particularly at low doses, and therefore many scientists believe that most, if not all carcinogens, only cause cancer above a "threshold dose."

The carcinogenic COPCs evaluated for this SWMU include arsenic. The inhalation slope factor for arsenic is based on human data from occupational exposure studies, and thus an extrapolation from animal data is not necessary, thereby reducing the some uncertainty in the slope factors. However, there is significant uncertainty associated with the low-dose extrapolation (environmental exposures are relevant in the low-dose range) used to generate the slope factor. The EPA uses its default linear model to estimate risks in the low-dose range, citing lack of carcinogenic mode of action information. Thus, should this information become available, the low-dose carcinogenic risks for arsenic could be evaluated differently.

### 3.6.5 Risk Characterization

Uncertainties in the risk characterization portion of the risk assessment for the site are a combination of the uncertainties associated with both the dose-response assessment and the exposure assessment. As discussed above, the assumptions and parameters used for both the dose response and exposure assessments are extremely conservative. In addition, since the toxicity criteria and exposure parameters are combined in the risk characterization, the conservatism is compounded.

### 3.6.6 Uncertainty Analysis Summary

This Tier 1 HHRA includes uncertainties and conservative assumptions that, in general, effectively combine to overestimate the potential current and future exposures. The major sources of uncertainty contributing to the conservatisms in this HHRA are summarized below:

- Biased SWMU sample collection
- Use of maximum concentrations as representative concentrations
- Compounding effect multiple conservative exposure parameters
- No meteorological factor assumption

The net effect of the uncertainties of this HHRA is the generation of risk and hazard estimates that probably far exceed any true exposure conditions that currently exist or which could possibly exist in the future.

## 4.0 CONTAINMENT

Currently the current owner of the property, Republic Steel, uses SWMU P-63 as a stockpile area for concrete debris. It is bounded by rail lines to the north and south, and by asphalt roadways to the east and west. The ground generally slopes to the center of the SWMU, limiting surface water runoff from the area. Surface water that ponds on the SWMU surface either remains in place and evaporates, or infiltrates into the fill above the native clay soils.

Historically, the mill scale was stored in low piles within the SWMU area. There was no engineering containment such as liners or covers. The material was removed from this location in 1992.

## 5.0 CONCLUSIONS

Based on review of the data, the analyses of oily mill scale in 1986 and 1987 showed that the material in SWMU P-63 does not exceed the toxicity characteristic criteria for a RCRA hazardous waste. Mill scale waste has not been stored in this area since 1992.

Although the formerly stored oily mill scale does not appear to have leached into the subsurface, the results of the Tier I risk assessment indicate that the presence of arsenic in the surface soils requires further evaluation. This conclusion is based on the following:

- The total constituent analytical data indicate that VOCs, SVOCs, and metals are present in the surface and subsurface soils. However, the SPLP analyses indicate that only 1 SVOC and 3 metals appear to be leaching from the surface and subsurface soils above method detection limits.

- The results of the HHRA are that none of the chemicals in SWMU material exceed Tier 1 noncarcinogenic or carcinogenic benchmarks for any of the scenarios.

Based on these results and in accordance with the work plan, further evaluation is not warranted during the Corrective Measures Study (CMS).

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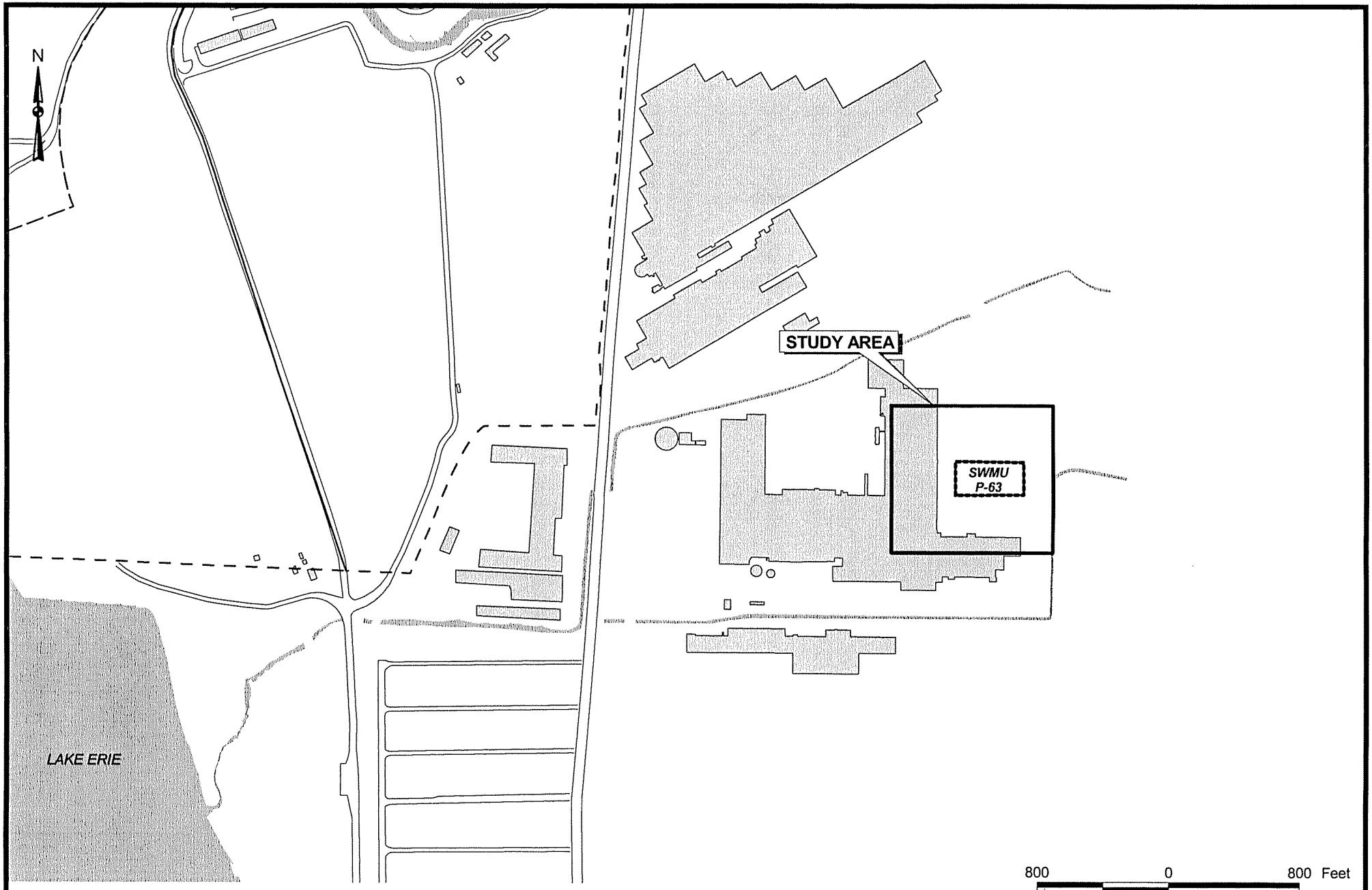
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J:\4200008bsc.15\gis\PRESENT\swmu_report\p-63.apr P-63 SITE LOCATION
4/13/2001

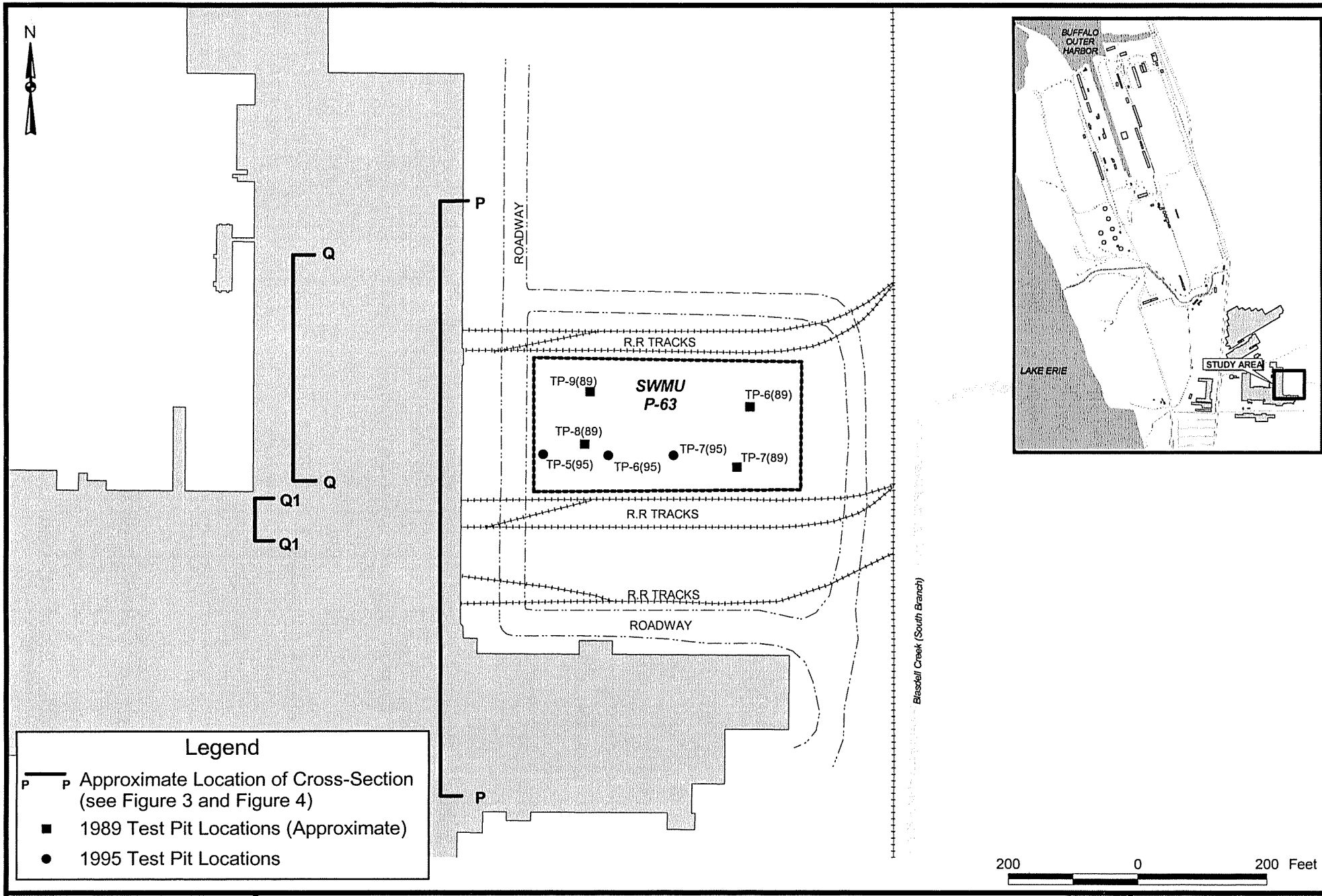



URS

BETHLEHEM STEEL CORPORATION
SITE LOCATION OF SWMU P-63

FIGURE 1

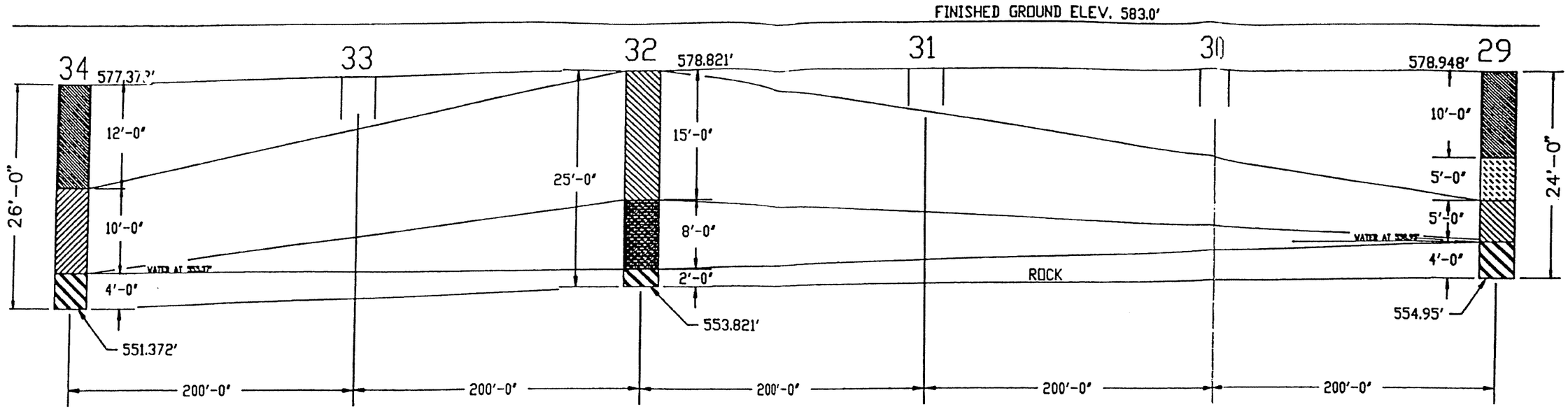
J:\4200008bsc.15\gis\PRESENT\swmu_report\p-63.apr P-63 SAMPLING LOCATIONS
4/13/2001




URS

BETHLEHEM STEEL CORPORATION
FORMER "OILY" MILL SCALE STORAGE AREA NO. 2, SWMU P-63
SHOWING TEST PIT LOCATIONS

FIGURE 2




SECTION P-P

LEGEND

- YELLOW AND BLUE CLAY
- SOFT BLUE CLAY
- STONE AND BLUE CLAY (HARD PAN)
- YELLOW CLAY AND LOAM
- CLAY AND GRAVEL
- HARD YELLOW AND BLUE CLAY
- BLUE CLAY
- YELLOW CLAY
- HARD BLUE CLAY
- BLACK MUCK
- GRAVEL, CLAY AND SAND
- HARD YELLOW CLAY
- VERY SOFT BLUE CLAY

NOTE: Cross-section and stratigraphic legend are extracted from Bethlehem Steel Corporation. Lackawanna Plant Dwg. No. 118106 ("Merchant Bar Mill, Test Holes"), dated 4/30/40. Test holes were drilled prior to construction of Bar Mill Complex. Cross-section P-P transects site of Bar Mill Finishing and Shipping Building #3 (building immediately west of SWMU P-63, see Figure 2). Boring logs indicate 20 to 23 feet of yellow clay (oxidized, generally nearer surface) and soft blue clay (unoxidized, generally at lower depths) overlying 2 to 4 feet of hard glacial till (above bedrock). Preconstruction surface elevations ranged from about 577 to 579 feet AMSL. These ground elevations were uniformly raised to 583 feet AMSL with the emplacement of slag fill. (test hole locations for which detailed stratigraphy is not shown, i.e., hole nos. 30, 31, and 33, were not drilled.)

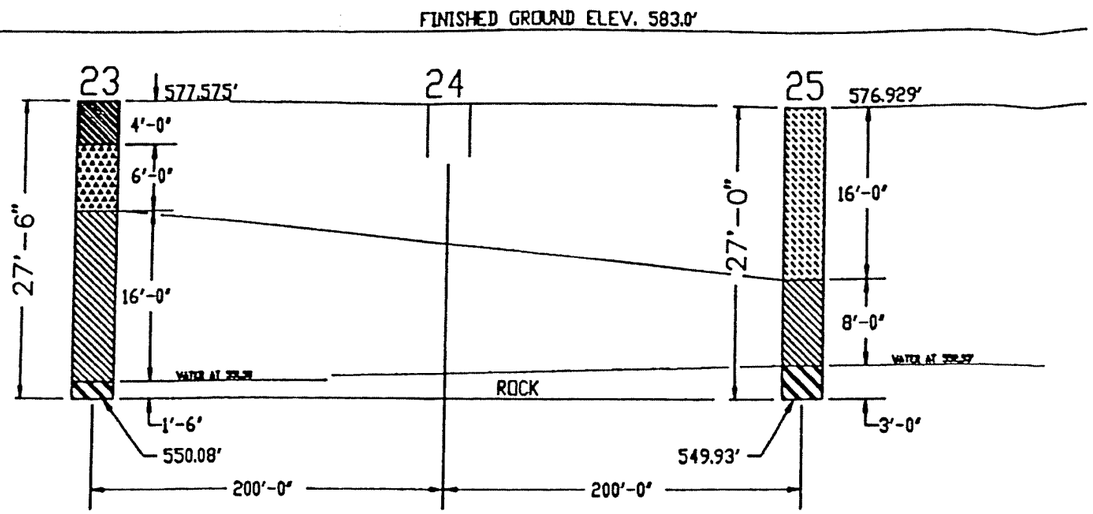
Source: Industrial Environmental Management Consultants, Inc., Chesterton, Indiana, 8/3/94, *"Subsurface Cross Section (About 150 ft west of western end of SWMU P-63), Bethlehem Steel Corporation, Lackawanna, New York"*

URS

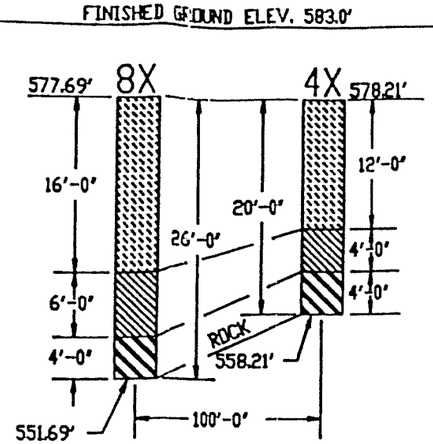
SUBSURFACE CROSS SECTION P-P
(ABOUT 150 FT WEST OF
WESTERN END OF SWMU P-63)

FIGURE 3

AG15676-420000885C.15-101000-NPV




SECTION Q-Q




SECTION Q1-Q1

## LEGEND

- YELLOW AND BLUE CLAY
- SOFT BLUE CLAY
- STONE AND BLUE CLAY (HARD PAN)
- YELLOW CLAY AND LOAM
- CLAY AND GRAVEL
- HARD YELLOW AND BLUE CLAY
- BLUE CLAY
- YELLOW CLAY
- HARD BLUE CLAY
- BLACK MUCK
- GRAVEL, CLAY AND SAND
- HARD YELLOW CLAY
- VERY SOFT BLUE CLAY

NOTE: Cross-sections and stratigraphic legend are extracted from Bethlehem Steel Corporation. Lackawanna Plant Dwg. No. 118106 ("Merchant Bar Mill, Test Holes"), dated 4/30/40. Test holes were drilled prior to construction of Bar Mill Complex. Cross-sections Q-Q and Q1-Q1 transect site of Bar Mill Finishing and Shipping Building #1 (see Figure 2). Boring logs indicate 16 to 26 feet of yellow clay (oxidized, generally nearer surface; only at one test hole) and soft blue clay (unoxidized, generally at lower depths; predominant clay type in all test holes) overlying about 2 to 4 feet of hard glacial till (above bedrock). Preconstruction surface elevations ranged from about 577 to 578 feet AMSL. These ground elevations were uniformly raised to 583 feet AMSL with the emplacement of slag fill. (test hole locations for which detailed stratigraphy is not shown, i.e., hole no. 24, was not drilled.)

Source: Industrial Environmental Management Consultants, Inc., Chesterton, Indiana, 8/3/94, *"Subsurface Cross Sections (About 400 ft west of western end of SWMU P-63), Bethlehem Steel Corporation, Lackawanna, New York"*

URS

SUBSURFACE CROSS SECTIONS Q-Q AND Q1-Q1
(ABOUT 400 FT WEST OF
WESTERN END OF SWMU P-63)

FIGURE 4

AG15677-4200008BSC.15-101000-NPV

# DATA VALIDATION QUALIFYING FLAGS

U – Compound was analyzed for but not detected above the sample quantitation limit

J – Analyte was positively identified; associated numerical value is an approximation of the analyte concentration

N – Analysis indicates the presence of an analyte for which there is presumed evidence to make a tentative identification

NJ – Analysis indicates the presence of an analyte that has been " tentatively identified" and the numerical value represents the approximate concentration

UJ – Analyte was not detected above the reported samples quantitation limit; associated numerical value is an approximation of the quantitation limit

B – Metals only: The analyte was detected above instrument detection limits (IDL); the reported concentration is below the contract required detection limit (CRDL)

R – Sample results are rejected due to serious deficiencies in ability to analyze the sample and meet quality control criteria

D – The sample results are reported from a secondary dilution analysis.

Data validation qualifying flags are used in conjunction with reason codes summarized below.

| Organics | Metals |
|---|---|
| c – Calibration failure; poor or unstable response | a – Analytical sequence deficiency or omission |
| d – Matrix spike/matrix spike duplicate imprecision | c – Calibration verification failure |
| e – Laboratory duplicate control sample imprecision | d – Matrix duplicate imprecision |
| f – Field replicate or duplicate imprecision | e – Laboratory duplicate control sample imprecision |
| g – Poor chromatography | f – Field replicate or duplicate imprecision |
| h – Holding time violation | h – Holding time violation |
| i – Internal standard failure | k – Serial dilution imprecision |
| j – Poor mass spectrographic performance | l – Laboratory control sample recovery failure |
| l – Laboratory control sample recovery failure | m – Matrix spike recovery failure |
| m – Matrix spike/matrix spike duplicate recovery failure | n- Interference check sample recovery failure |
| r – Linearity failure in initial calibration | o – Calibration blank contamination |
| s – Surrogate spike recovery failure | p – Preparation blank contamination |
| t – Instrument tuning failure | r – Linearity failure in calibration or MSA analysis |
| w – Relative retention time failure | v – Post digestion spike failure |
| x – Field blank contamination | x – Field blank contamination |
| y – Trip blank contamination | z – Laboratory storage blank contamination |
| z – Method blank contamination | Q – Other – total/dissolved imprecision |
| Q - Other | -- |

Note: NA – Not analyzed for that compound

# TABLE 1
# SUMMARY OF DETECTED TOTAL CONSTITUENT ANALYTICAL RESULTS
# TEST PITS
# SWMU P-63

| Location ID | | TP-5-1 | TP-5-2 | TP-5-3 | TP-6-1 | TP-6-2 |
|---|---|---|---|---|---|---|
| Sample ID | | TP-5-1 | TP-5-2 | TP-5-3 | TP-6-1 | TP-6-2 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 2.0-3.0 | 4.0-4.5 | 0.0-0.5 | 2.0-3.0 |
| Date Sampled | | 01/31/95 | 01/31/95 | 01/31/95 | 01/31/95 | 01/31/95 |
| **Parameter** | **Units** | | | | | |
| **Volatile Organic Compounds** | | | | | | |
| Benzene | UG/KG | 5.5 U | 7.4 U | 11 | 7.7 U | 5.9 U |
| Ethylbenzene | UG/KG | 5.5 U | 5.5 J | 4.3 J | 7.7 U | 5.9 U |
| Methyl ethyl ketone | UG/KG | NA | NA | NA | 41 J | 59 U |
| Methylene chloride | UG/KG | 11 U | 15 U | 11 J | 15 U | 12 U |
| Tetrachloroethene | UG/KG | 5.5 UJ,c | 7.4 UJ,c | 6.9 U | 7.7 U | 5.9 U |
| Toluene | UG/KG | 7.4 | 7.4 U | 18 | 7.7 U | 2.9 J |
| Xylenes, Total | UG/KG | 13.3 | 5 U | 20.4 | 5 U | 5 U |
| **Semivolatile Organic Compounds** | | | | | | |
| Benzo(a)anthracene | UG/KG | NA | NA | NA | 780 | 510 J |
| Benzo(a)pyrene | UG/KG | NA | NA | NA | 550 | 1,900 U |
| Benzo(b)fluoranthene | UG/KG | NA | NA | NA | 670 | 690 J |
| Benzo(ghi)perylene | UG/KG | NA | NA | NA | 250 J,l | 1,900 U |
| Benzo(k)fluoranthene | UG/KG | NA | NA | NA | 130 J | 1,900 U |
| Chrysene | UG/KG | NA | NA | NA | 390 J | 1,900 U |
| Di-n-butyl phthalate | UG/KG | 1,800 U | 2,400 U | 450 U | 510 U | 1,900 U |
| Fluoranthene | UG/KG | NA | NA | NA | 880 | 430 J |
| Indeno(1,2,3-cd)pyrene | UG/KG | NA | NA | NA | 340 J,l | 1,900 U |
| Phenanthrene | UG/KG | NA | NA | NA | 230 J | 1,900 U |
| Pyrene | UG/KG | NA | NA | NA | 730 | 1,900 U |
| **Metals** | | | | | | |
| Arsenic | MG/KG | 13.1 | 22.5 | 4.1 | 16.4 | 58.1 |
| Barium | MG/KG | 74.8 | 35.1 | 136 | 368 | 138 |
| Cadmium | MG/KG | 0.55 U | 0.74 U | 0.69 U | 0.77 U | 0.79 J,c |
| Chromium | MG/KG | 296 J,k | 15.4 J,k | 20.8 J,k | 53.2 J,k | 41.2 J,k |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 1
# SUMMARY OF DETECTED TOTAL CONSTITUENT ANALYTICAL RESULTS
# TEST PITS
# SWMU P-63

| Location ID | | TP-5-1 | TP-5-2 | TP-5-3 | TP-6-1 | TP-6-2 |
|---|---|---|---|---|---|---|
| Sample ID | | TP-5-1 | TP-5-2 | TP-5-3 | TP-6-1 | TP-6-2 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 2.0-3.0 | 4.0-4.5 | 0.0-0.5 | 2.0-3.0 |
| Date Sampled | | 01/31/95 | 01/31/95 | 01/31/95 | 01/31/95 | 01/31/95 |
| Parameter | Units | | | | | |
| **Metals** | | | | | | |
| Lead | MG/KG | 63 7 J,m | 34.5 J,m | 12 9 J,m | 78 5 J,m | 108 J,m |
| Mercury | MG/KG | 0 15 R,c | 0 15 U | 0.14 R,c | 1 2 J,m | 0 2 R,c |
| Nickel | MG/KG | 95.5 J,m | 12 2 J,m | 21 2 J,m | 22 9 J,m | 36 4 J,m |
| Selenium | MG/KG | 5.2 J,c | 1 8 J,c | 0 88 J,c | 2 8 J,c | 2 4 J,c |
| Silver | MG/KG | 1 1 UJ,m | 1.5 UJ,m | 1.4 UJ,m | 1.5 UJ,m | 1.2 UJ,m |
| **General Chemistry Parameters** | | | | | | |
| Cyanide | MG/KG | 2 8 U | 4 2 | 3 4 U | 3 8 U | 2 9 U |
| O&G | MG/KG | 17,600 | 14,100 | 4,630 | 11,900 | 8,220 |
| PHSOL | S U. | 9 4 | 7 4 | 6 8 | 7 7 | 8.4 |

Flags assigned during chemistry validation are shown

Only Detected Results Reported

**Detection Limits shown are PQL**

# TABLE 1
# SUMMARY OF DETECTED TOTAL CONSTITUENT ANALYTICAL RESULTS
# TEST PITS
# SWMU P-63

| Location ID | | TP-6-3 | TP-7-1 | TP-7-2 | TP-7-3 |
|---|---|---|---|---|---|
| Sample ID | | TP-6-3 | TP-7-1 | TP-7-2 | TP-7-3 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 3.5-4.5 | 0.0-0.5 | 2.0-3.0 | 3.5-4.0 |
| Date Sampled | | 01/31/95 | 02/01/95 | 02/01/95 | 02/01/95 |
| **Parameter** | **Units** | | | | |
| **Volatile Organic Compounds** | | | | | |
| Benzene | UG/KG | 6.4 U | 5.5 U | 5.1 J | 6 U |
| Ethylbenzene | UG/KG | 6.4 U | 5.5 U | 3.4 J,i | 6 U |
| Methyl ethyl ketone | UG/KG | NA | NA | NA | NA |
| Methylene chloride | UG/KG | 13 U | 11 U | 12 U | 12 U |
| Tetrachloroethene | UG/KG | 6.4 UJ,c | 4.2 J | 6.1 UJ,i | 6 U |
| Toluene | UG/KG | 6.4 U | 5.5 U | 12 J,i | 4.1 J |
| Xylenes, Total | UG/KG | 5 U | 5 U | 12.6 | 4.7 |
| **Semivolatile Organic Compounds** | | | | | |
| Benzo(a)anthracene | UG/KG | NA | NA | NA | NA |
| Benzo(a)pyrene | UG/KG | NA | NA | NA | NA |
| Benzo(b)fluoranthene | UG/KG | NA | NA | NA | NA |
| Benzo(ghi)perylene | UG/KG | NA | NA | NA | NA |
| Benzo(k)fluoranthene | UG/KG | NA | NA | NA | NA |
| Chrysene | UG/KG | NA | NA | NA | NA |
| Di-n-butyl phthalate | UG/KG | 420 U | 96 J | 400 U | 85 J |
| Fluoranthene | UG/KG | NA | NA | NA | NA |
| Indeno(1,2,3-cd)pyrene | UG/KG | NA | NA | NA | NA |
| Phenanthrene | UG/KG | NA | NA | NA | NA |
| Pyrene | UG/KG | NA | NA | NA | NA |
| **Metals** | | | | | |
| Arsenic | MG/KG | 6.7 | 51.5 J,m | 28.3 J,m | 2.1 J,m |
| Barium | MG/KG | 124 | 37.3 | 42 | 90.6 |
| Cadmium | MG/KG | 0.64 U | 11.8 | 4.1 | 0.6 U |
| Chromium | MG/KG | 21 J,k | 99.2 J,m | 33.8 J,m | 14.3 J,m |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 1
# SUMMARY OF DETECTED TOTAL CONSTITUENT ANALYTICAL RESULTS
# TEST PITS
# SWMU P-63

| Location ID | | TP-6-3 | TP-7-1 | TP-7-2 | TP-7-3 |
|---|---|---|---|---|---|
| Sample ID | | TP-6-3 | TP-7-1 | TP-7-2 | TP-7-3 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 3.5-4.5 | 0.0-0.5 | 2.0-3.0 | 3.5-4.0 |
| Date Sampled | | 01/31/95 | 02/01/95 | 02/01/95 | 02/01/95 |
| **Parameter** | **Units** | | | | |
| **Metals** | | | | | |
| Lead | MG/KG | 16 5 J,m | 458 J,m | 153 J,m | 11.6 J,m |
| Mercury | MG/KG | 0 17 R,c | 0.11 U | 0 12 U | 0 12 U |
| Nickel | MG/KG | 28 J,m | 71.7 J,m | 39 2 J,m | 15 5 J,m |
| Selenium | MG/KG | 0 64 UJ,c | 1 2 J,c | 1 1 J,c | 0 81 J,c |
| Silver | MG/KG | 1 3 UJ,m | 1 6 J,c | 1 2 UJ,c | 1 2 UJ,c |
| **General Chemistry Parameters** | | | | | |
| Cyanide | MG/KG | 3 2 U | 2 8 U | 3 0 U | 3 0 U |
| O&G | MG/KG | 10,300 | 13,000 | 28,200 | 6,750 |
| PHSOL | S U. | 8 3 | 8 2 | 7 6 | 9 7 |

Flags assigned during chemistry validation are shown

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 2
# SUMMARY OF DETECTED SPLP ANALYTICAL RESULTS
# TEST PITS
# SWMU P-63

| Location ID | | TP-5-1 | TP-5-2 | TP-5-3 | TP-6-1 | TP-6-2 |
|---|---|---|---|---|---|---|
| Sample ID | | TP-5-1 | TP-5-2 | TP-5-3 | TP-6-1 | TP-6-2 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 2.0-3.0 | 4.0-4.5 | 0.0-0.5 | 2.0-3.0 |
| Date Sampled | | 01/31/95 | 01/31/95 | 01/31/95 | 01/31/95 | 01/31/95 |
| Parameter | Units | | | | | |
| **Semivolatile Organic Compounds - SPLP** | | | | | | |
| bis(2-Ethylhexyl)phthalate -SPLP | MG/L | NA | NA | NA | 0.003 J | 0.010 U |
| **Metals-SPLP** | | | | | | |
| Arsenic -SPLP | MG/L | 0.013 | 0.010 U | 0.010 U | 0.010 U | 0.013 |
| Lead -SPLP | MG/L | 0.0030 UJ,c | 0.0030 UJ,c | 0.004 J,c | 0.0030 UJ,c | 0.01 J,c |
| Selenium -SPLP | MG/L | 0.0050 U | 0.008 | 0.0050 U | 0.0050 U | 0.0050 U |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 2
# SUMMARY OF DETECTED SPLP ANALYTICAL RESULTS
# TEST PITS
# SWMU P-63

| Location ID | | TP-6-3 | TP-7-1 | TP-7-2 | TP-7-3 |
|---|---|---|---|---|---|
| Sample ID | | TP-6-3 | TP-7-1 | TP-7-2 | TP-7-3 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 3.5-4.5 | 0.0-0.5 | 2.0-3.0 | 3.5-4.0 |
| Date Sampled | | 01/31/95 | 02/01/95 | 02/01/95 | 02/01/95 |
| **Parameter** | **Units** | | | | |
| **Semivolatile Organic Compounds - SPLP** | | | | | |
| bis(2-Ethylhexyl)phthalate -SPLP | MG/L | NA | 0 01 U | 0.01 U | 0.02 U |
| **Metals-SPLP** | | | | | |
| Arsenic -SPLP | MG/L | 0.010 U | 0.016 | 0 01 U | 0 01 U |
| Lead -SPLP | MG/L | 0 0030 UJ,c | 0.003 U | 0.003 U | 0.003 U |
| Selenium -SPLP | MG/L | 0 0050 U | 0 005 U | 0 005 U | 0 005 U |

Flags assigned during chemistry validation are shown

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
# SURFACE SWMU MATERIAL
# SWMU P-63

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Maximum Background Concentration (mg/kg) | Region III Residential Soil RBC (mg/kg)[a] | Human Health COPC?[b] |
|---|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | | |
| Methyl ethyl ketone | 1 | 1 | 100% | 0.041 | NA | 47,000 | No |
| Xylene | 3 | 1 | 33% | 0.004 | NA | 60,000[c] | No |
| Tetrachloroethene | 3 | 1 | 33% | 0.004 | NA | 12 | No |
| Toluene | 3 | 1 | 33% | 0.007 | 0.006 | 16,000 | No |
| ***Semivolatiles*** | | | | | | | |
| Benzo(g,h,i)perylene | 1 | 1 | 100% | 0.25 | 5.9 | 2,300[f] | No |
| Phenanthrene | 1 | 1 | 100% | 0.23 | 8.1 | 2,300[f] | No |
| Benzo(a)anthracene | 1 | 1 | 100% | 0.78 | 6.7 | 0.87 | No |
| Benzo(b)fluoranthene | 1 | 1 | 100% | 0.67 | 12 | 0.87 | No |
| Benzo(k)fluoranthene | 1 | 1 | 100% | 0.13 | 3.3 | 8.7 | No |
| Chrysene | 1 | 1 | 100% | 0.39 | 4.9 | 87 | No |
| Di-n-butyl phthalate | 3 | 1 | 33% | 0.1 | 0.49 | 7,800 | No |
| Fluoranthene | 1 | 1 | 100% | 0.88 | 12 | 3,100 | No |
| Indeno(1,2,3-c,d)pyrene | 1 | 1 | 100% | 0.34 | 6 | 0.87 | No |
| Pyrene | 1 | 1 | 100% | 0.73 | 10 | 2,300 | No |
| Benzo(a)pyrene | 1 | 1 | 100% | 0.55 | 6 | 0.087 | No |
| ***Metals*** | | | | | | | |
| Cadmium | 3 | 1 | 33% | 11.8 | NA | 78 | No |
| Silver | 3 | 1 | 33% | 1.6 | NA | 390 | No |
| Barium | 3 | 3 | 100% | 368 | 84.3 | 5,500 | No |
| Mercury | 2 | 1 | 50% | 12 | 0.32 | 23 | No |
| Nickel | 3 | 3 | 100% | 95.5 | 28 | 1600 | No |
| Selenium | 3 | 3 | 100% | 5.2 | 0.6 | 390 | No |
| Arsenic | 3 | 3 | 100% | 51.5 | 12 | 0.43 | **Yes** |
| Chromium | 3 | 3 | 100% | 296 | 27.1 | 230[d] | **Yes** |
| Lead | 3 | 3 | 100% | 458 | 30 | 400[e] | **Yes** |

a USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA 2000b).

b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than background and the screening criteria are retained as COPCs.

c Most conservative value for xylene isomers (o-xylene).

d Chromium is compared to the RBC for hexavalent chromium.

e Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).

f Pyrene selected as a surrogate for screening purposes.

NA Indicates not available.

# TABLE 4
# SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
# SUBSURFACE SWMU MATERIAL
# SWMU P-63

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Soil Screening Criteria[a] (mg/kg) | Human Health COPC?[b] |
|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | |
| Benzene | 6 | 2 | 33% | 0.011 | 0.8 | No |
| Ethylbenzene | 6 | 3 | 50% | 0.006 | 400[c] | No |
| Methylene chloride | 6 | 1 | 17% | 0.011 | 13 | No |
| Toluene | 6 | 4 | 67% | 0.018 | 650[c] | No |
| Xylenes, Total | 6 | 2 | 33% | 0.02 | 410[c] | No |
| ***Semivolatiles*** | | | | | | |
| Benzo(a)anthracene | 1 | 1 | 100% | 0.51 | 0.87 | No |
| Benzo(b)fluoranthene | 1 | 1 | 100% | 0.69 | 0.87 | No |
| Di-n-butyl phthalate | 6 | 1 | 17% | 0.09 | 7,800 | No |
| Fluoranthene | 1 | 1 | 100% | 0.43 | 3,100 | No |
| ***Metals*** | | | | | | |
| Barium | 6 | 6 | 100% | 138 | 3,500 | No |
| Cadmium | 6 | 2 | 33% | 4 | 78 | No |
| Chromium | 6 | 6 | 100% | 41 | 230 | No |
| Lead | 6 | 6 | 100% | 153 | 400[d] | No |
| Nickel | 6 | 6 | 100% | 39 | 1,600 | No |
| Selenium | 6 | 5 | 83% | 2 | 391 | No |
| Arsenic | 6 | 6 | 100% | 58 | 0.43 | **Yes** |
| Cyanide | 6 | 1 | 17% | 4 | 1,600 | No |

a For volatile chemicals, USEPA Soil Screening Levels (SSLs) for vapor inhalation were used (USEPA 1996); for semivolatile chemicals and metals, USEPA Region III residential soil risk based concentrations (RBCs) were used (USEPA 2000b).

b Chemical with a detection frequency of greater than 5% and a maximum concentration greater than the screening criteria are retained as COPCs.

c Soil saturation concentration ($C_{sat}$); the concentration at which soil pore air is saturated with a chemical, and volatile emissions reach their maximum (USEPA 1996a).

d Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).

# TABLE 5
# REPRESENTATIVE CONCENTRATIONS OF CHEMICALS OF POTENTIAL CONCERN (COPCs)
# SWMU P-63

| Surface SWMU Material COPCs | Representative Concentration (mg/kg)[a] | Subsurface SWMU Material COPCs | Representative Concentration (mg/kg)[a] |
|---|---|---|---|
| Arsenic | 51.5 | Arsenic | 58.1 |
| Chromium[b] | 296 | | |
| Lead | 458 | | |

a All concentrations are maximum concentrations as the datasets have less than 10 samples.

b Chromium is assumed to be in the hexavalent form.

## TABLE 6
## POTENTIAL EXPOSURE SCENARIOS[a]
## SWMU P-63

| Potential Receptor Scenario | Exposure Media | Potential Pathway of Exposure |
|---|---|---|
| Future Commercial/Industrial Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Current Non-BSC Commercial/Industrial Worker | Surface SWMU Material | particulate inhalation |
| Future Utility/Maintenance Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Trespasser | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Future Construction Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Future Marina Worker | Surface SWMU Material | particulate inhalation |
| Future Greenway User | Surface SWMU Material | particulate inhalation |
| Future Fenceline Resident | Surface SWMU Material | particulate inhalation |
| Present Fenceline Resident | Surface SWMU Material | particulate inhalation |

a Potential exposure scenarios for SWMU P-63 are based on those determined in ID No. 2 (BSC 1999) and the chemicals of potential interest determined in ID No. 1 (BSC 1998).

# TA 7
# TOXICITY CRITERIA FOR COPCs
# REFERNCE DOSES (RfDs) AND SLOPE FACTORS (SFs)
# SWMU P-63

| | | Noncarcinogenic Toxicity Criteria | | | | Carcinogenic Toxicity Criteria | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Chemical | CAS | Oral RfD (mg/kg-d) | Source | Inhalation RfD (mg/kg-d) | Source | Weight of Evidence[a] | Oral SF $(mg/kg-d)^{-1}$ | Source | Inhalation SF $(mg/kg-d)^{-1}$ | Source |
| ***Inorganics*** | | | | | | | | | | |
| Arsenic | 7440-38-2 | 3.00E-04 | I | -- | -- | A | 1.50E+00 | I | 1.51E+01 | I |
| Chromium[b] | 18540-29-9 | 3.00E-03 | I | 3.00E-05 | I | A | -- | -- | 4.10E+01 | H |
| Lead[c] | 7439-92-1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

H Health Effects Assessment Summary Tables (HEAST) (USEPA 1997).

I Integrated Risk Information System (IRIS) (USEPA 2000).

-- There is no toxicity criteria for this pathway.

a Weight of Evidence: A - known human carcinogen

b The toxicity criteria for hexavalent chromium are conservatively used for chromium.

c Toxicity criteria not available for lead. Lead evaluated for direct contact pathways using USEPA's Adult Lead Model (USEPA 1996b).

# TABLE 8
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs) RESULTS
# SWMU P-63

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Noncancer RBSL |
|---|---|---|---|
| **Current Non-BSC Commercial/Industrial Worker** | | | |
| *Inhalation of Particles from Surface SWMU material (mg/kg)* | | | |
| Arsenic | 51.5 | >1,000,000 | -- |
| Chromium[b] | 296 | 477,000 | >1,000,000 |
| Lead | 458 | -- | not evaluated |
| **Future Commercial/Industrial Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51.5 | [redacted] | [redacted] |
| Chromium[b] | 296 | >1,000,000 | 373 |
| Lead | 458 | -- | 1,545 |
| **Future Construction Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51.5 | [redacted] | 96.4 |
| Chromium[b] | 296 | >1,000,000 | 964 |
| Lead | 458 | -- | 1,545 |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Arsenic | 58.1 | [redacted] | 96.4 |
| **Future Utility/Maintenance Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51.5 | 69 | 416 |
| Chromium[b] | 296 | >1,000,000 | 4,160 |
| Lead | 458 | -- | 1,545 |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Arsenic | 58.1 | 69 | 416 |
| **Trespasser** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51.5 | 212 | 5,080 |
| Chromium[b] | 296 | >1,000,000 | 50,800 |
| Lead | 458 | -- | 1,545 |
| **Future Marina Worker** | | | |
| *Inhalation of Particles from Surface SWMU material (mg/kg)* | | | |
| Arsenic | 51.5 | >1,000,000 | -- |
| Chromium[b] | 296 | 611,000 | >1,000,000 |
| Lead | 458 | -- | not evaluated |
| **Future Greenway User** | | | |
| *Inhalation of Particles from Surface SWMU material (mg/kg)* | | | |
| Arsenic | 51.5 | >1,000,000 | -- |
| Chromium[b] | 296 | >1,000,000 | >1,000,000 |
| Lead | 458 | -- | not evaluated |
| **Present/Future Fenceline Resident** | | | |
| *Inhalation of Particles from Surface SWMU material (mg/kg)* | | | |
| Arsenic | 51.5 | 148,201 | -- |
| Chromium[b] | 296 | 54,581 | >1,000,000 |
| Lead | 458 | -- | not evaluated |

-- Not evaluated as there is no toxicity criteria for this pathway.
>1,000,000 Calculated RBSL is greater than 1,000,000 parts per million (mg/kg).
a This RBSL for arsenic is less than background, therefore, background was used as the RBSL.
b All chromium is conservatively considered to be hexavalent chromium; RBSLs are for hexavalent chromium.
[redacted] Shaded cell indicates RBSL that is exceeded.

# TABLE 9
# TIER I RISK ASSESSMENT RESULTS
# SWMU P-63

| | Representative Concentration (mg/kg) | Cancer RBSL (mg/kg) | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL (mg/kg) | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **FUTURE COMMERCIAL/INDUSTRIAL WORKER** | | | | | | |
| *Direct Contact (including ambient particulate inhalation) with Surficial SWMU Material* | | | | | | |
| Arsenic | 51.5 | 0.94[b] | 5.5E-05 | 37.3 | 1.4 | blood/immune system |
| | | Total= | **6E-05** | SLHI= | **1.4** | |
| **FUTURE CONSTRUCTION WORKER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material* | | | | | | |
| Arsenic | 51.5 | 16.1 | 3.2E-06 | NA | NA | |
| | | Total= | **3E-06** | | **NA** | |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material* | | | | | | |
| Arsenic | 58.1 | 16.1 | 3.6E-06 | NA | NA | |
| | | Total= | **4E-06** | | **NA** | |

NA Not applicable as chemical does not exceed the RBSL for this effect.
SLHI Screening Level Hazard Index
SLCR Screening Level Cancer Risk
a Primary Target Organ information obtained from IRIS (USEPA 2000a)
b Risk-based screening level for arsenic. Background value is 12 mg/kg.

# APPENDIX A

# FIELD INSPECTION RECORDS

# URS Greiner

282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

# SWMU INSPECTION REPORT

DATE 6/30/00

DAY: S | M | T | W | TH | F | S

PROJECT _____

OWNER _____

CONTRACT No. _____

URS GREINER JOB No. 42000888C.15

URS GREINER PROJECT MANAGER _____

| | | | | | |
|---|---|---|---|---|---|
| WEATHER | Bright Sun | Clear | Overcast | Rain | Snow |
| TEMP | To 32 | 32-50 | 50-70 | 70-85 | 85 up |
| WIND | Still | Moder | High | Report No. | |
| HUMIDITY | Dry | Moder | Humid | | |

AVERAGE FIELD FORCE

| Name of Contractor | Non-manual | Manual | Remarks |
|---|---|---|---|
| | | | |

VISITORS

| Time | Representating | Representating | Remarks |
|---|---|---|---|
| 11:00am | Mark Culmeraver - URS | | |

EQUIPMENT AT THE SITE

None

FIELD OBSERVATIONS

SWMU P-63 is located east of the Bar Mill (Republic Steel). The "oil scale" mill stock piles are no longer on the site. They were removed in either the 1980's or 1990's. The SWMU is a flat area between rail spurs with some vegetation. There is a gravel access road on the northern end of the area. The area is 60-70% covered with building demolition debris piles. There are no containments as the mill stock piles were removed. Surface water is not present on the actual SWMU. Surface water runoff is contained in the building area and rail spurs. See the attached sheet for a diagram of SWMU P-63.

SHEET 1 OF 2

BY Kyle Jackson TITLE _____

REVIEWED BY: _____ PROJECT ENGINEER

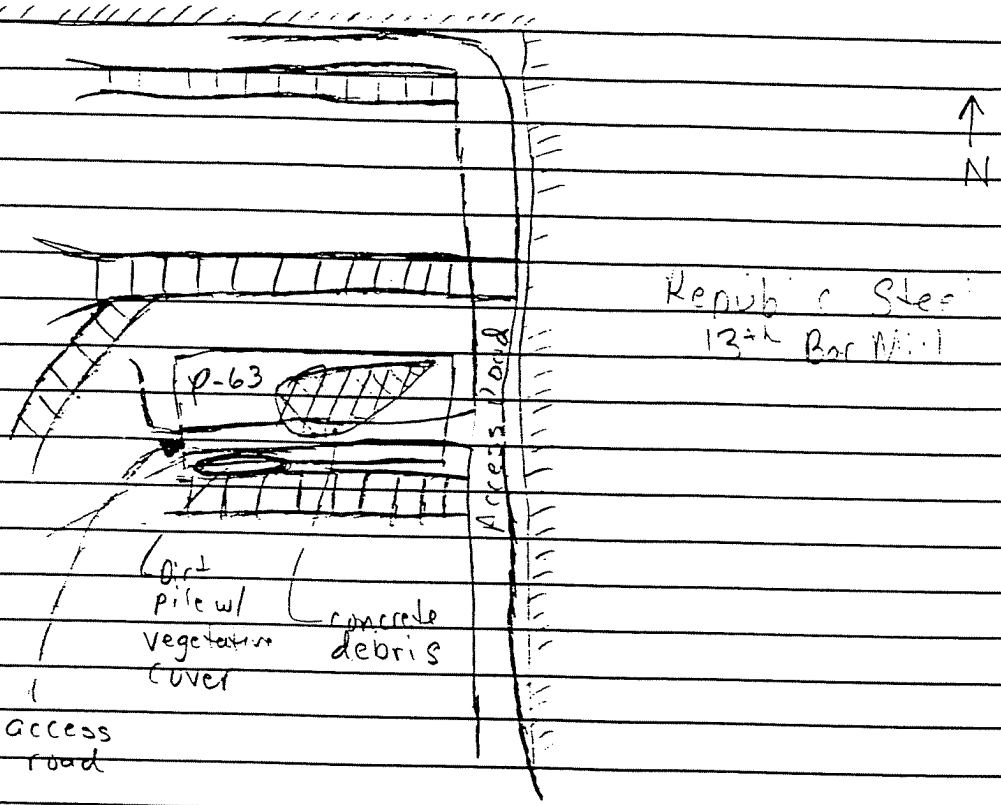
# SWMU INSPECTION REPORT (cont'd)

PROJECT _____ REPORT No. _____

URS GREINER JOB No. 42000828SC.15 DATE 6/30/00

FIELD OBSERVATIONS (cont'd)

SWMU P-63




SHEET 2 OF 2

BY Kyle Jackson TITLE _____

REVIEWED BY: _____ PROJECT ENGINEER

URSF-011/2 OF 3/GDCONREP

**FIELD INSPECTION CHECKLIST**
**SWMU SURFACE WATER RUNOFF POTENTIAL EVALUATION**
**BETHLEHEM STEEL CORPORATION**
**LACKAWANNA, NEW YORK**

SWMU #: P-63

SWMU Name: Mill Scale Storage Area No. 2

Date of Inspection: 9/5/96

Inspector(s): Don Porterfield & Jim Hannan

**TYPE OF SWMU** (check type and configuration and add comments):

**Type:**

_____ Landfill _____ Impoundment

_____ Pit/sump/trench __X__ Pile

**Configuration:**

__X__ Level
_____ Above Grade - height_____ ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft, depth_____ ft, height of top above grade_____ft
_____ Free board_____ft
_____ Other (describe)_____

Comments: SW Mass slightly below surrounding Area,

SWMU# P-63

Inspection Date: 9/5/96

**SURFACE OF SWMU** (check all that apply and add comments):

**Material:**

_____ Concrete/Asphalt
X Grass (sparse
X Slag
_____ Other (describe): blacktop

_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

Comments: Surface is black in color

**SURROUNDING AREA** (Attach topography map and indicate features of interest, check all that apply and add comments):

**Features:**

X Buildings, direction West, distance _____ ft
X Road, type gravel, direction West + North, distance _____ ft
X Railroad, direction South, distance adjacent ft
_____ Other (describe):

**Ground Surface:**

_____ Concrete/Asphalt
X Grass
_____ Slag
_____ Other (describe):

_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

SWMU# P-63

Inspection Date: 9/5/96

Comments: _____

**Surrounding topography:**

X Level

_____ Sloped to _____ at _____ ft (vertical) per feet (horizontal)

Comments: _____

**CONTAINMENT SYSTEM** (check all that apply and add comments):

_____ Cover - type _____
_____ Concrete sump/pit
_____ Concrete trench
_____ Wooden trench
_____ Berm or dike
height_____ ft
width_____ ft at crest
width_____ ft at base

Comments: No Containment

**DISTANCE TO NEAREST SURFACE WATER BODY:** ~~1200~~ 600 (DP) ft, direction S

Name of water body: ~~North~~ South Branch, Bladell Creek (DP)

SWMU# P-63

Inspection Date: 9/5/96

**VISUAL EVIDENCE OF RUN ON**

_____ No

X Yes, Description: white stains from runon on NE of N.-th side of swmu

**VISUAL EVIDENCE OF RUN OFF:**

X No

_____ Yes, Description: _____

If Yes, which of following are present?

_____ Erosion scars on SWMU

_____ Sediments near SWMU in runoff areas

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

**DOES RUNOFF REACH SURFACE WATER BODY?** No

If yes, provide description: _____

SWMU# P-63

Inspection Date: 9/5/96

## PHOTO LOG Roll D-1

| Direction | Description | |
|---|---|---|
| N E S W | ID P-63 | 1 |
| (N) (E) S W | SWMU area | 2 |
| N (E) S W | South side of SWMU | 3 |
| (N) E S W | West side of SWMU | 4 |
| N (E) S W | Ground Surface | 5 |
| N E (S) (W) | Stairs from Runon | 6 |
| (N) E S W | Source of Runon Stairs | 7 |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |

# APPENDIX B

# ANALYTE TABLES, WORK PLAN (BSC 1995A)

# TABLE 2

## ANALYTE LIST I
## for
## Soils/Fill at Former "Oily" Mill Scale Storage Area No. 2 (SWMU P-63)
## Bethlehem Steel Corporation (BSC); Lackawanna, New York

### A. Waste/SWMU-Specific Hazardous Constituents of Potential Concern (HzCOPCs)[1,2] for Total Constituent and/or SPLP (EPA Method 1312) Extract Analyses

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| Antimony | Benzene | Naphthalene |
| Arsenic | Ethylbenzene | 2-Methylnaphthalene[3] |
| Barium | Toluene | 2,4-Dimethylphenol |
| Cadmium | m-Xylene | 2,4-Dinitrophenol |
| Chromium | o-Xylene | 4-Nitrophenol |
| Lead | p-Xylene | Pentachlorophenol |
| Mercury | Chloroform | Phenol |
| Nickel | Methylene chloride | Benzyl butyl phthalate |
| Selenium | Tetrachloroethylene | Bis(2-ethylhexyl)phthalate |
| Silver | | Di-n-butyl phthalate |
| Thallium | | Di-n-octyl phthalate |
| Cyanide | | |

### B. Miscellaneous Parameters for Total Constituent Analyses

| |
|---|
| Oil & Grease |
| Percent Water |
| pH |

[1,2,3] Endnotes are provided on following page.

## TABLE 2 (Concluded)

## ANALYTE LIST I for SWMU P-63
## Endnotes

1. Only secondary material managed at SWMU P-63 was "oily" mill scale from BSC's 13" Bar Mill. This mill scale was periodically removed from the Bar Mill's wastewater scale pit (SWMU P-34) and placed in piles at SWMU P-63 for storage prior to recycle. These operations were conducted from 1984 (after shut-down of BSC's local Sinter Plant, where the mill scale had been recycled) to 1992 (termination of 13" Bar Mill manufacturing operations).

HzCOPCs for "oily" mill scale are based on EPA and industry studies regarding hazardous constituents potentially present in the steel industry's hot forming scale pit wastewaters, scale pit oil skimmings and mill scale. See Table 6 in Appendix I, Attachment 1 for "Matrix of Criteria for Identification of Hazardous Constituents of Potential Concern" for soils/fill at SWMU P-63. This table, and background materials from the EPA and industry studies referenced therein, were provided to and reviewed with EPA-II in an 8/4/93 meeting at agency offices. Identification and use of waste/SWMU-specific HzCOPCs is encouraged by EPA guidance for the RCRA corrective action program. Agency guidance states that the investigations should focus on those hazardous constituents that are "*likely to have been released at a particular site, based on the available information.*" 55 Fed. Reg. 30,809 (7/27/90) (proposed "Subpart S" rule).

Agreement on Analyte List I, and its application in this supplemental Preliminary SWMU Assessment (PSA), was reached in 9/1/93 and 9/16/93 teleconferences with EPA-II. Pursuant to this agreement, half of the soils/fill samples from vertical horizons I and II in the SWMU P-63 test pits (see Figure 5) will be tested for the HzCOPCs on this SWMU-specific analyte list. (The other half will be tested for constituents on a generic analyte list. See Table 3.) In addition, any soils/fill samples from vertical horizon III which require hazardous constituent testing (based on results from an oil & grease screening protocol, i.e., if potential vertical migration is indicated), will also be tested for the HzCOPCs on this analyte list. See Table 1 for further description of sampling/testing protocols.

2. "Hazardous constituents" are defined in the RCRA Section 3008(h) Administrative Order on Consent (AOC) between EPA-II and BSC as those constituents which are listed as such in 40 CFR 261, Appendix VIII. See "EPA Statement of Purpose," AOC Section III. The legislative history for the RCRA corrective action program shows that Congress also explicitly defined "hazardous constituents" to be "*those constituents listed in Appendix VIII of the RCRA regulations.*" H.Rep. No. 98-198, 98th Cong., 1st Sess. 60-61 (1983). In addition, case law on the subject states: "*'Hazardous constituent' is a term of art referring to a list of chemical compounds compiled at 40 C.F.R. Part 261, Appendix VIII.*" National Resources Defense Counsel v. U.S. EPA, 907 F.2d 1146, 1159 (D.C.Cir. 1990). See also U.S. v. Clow Water Systems, 701 F.Supp. 1345, 1355 (S.D.Ohio 1988) ("*Hazardous constituents are those toxic constituents listed by the Administrator in Appendix VIII of Part 261*"). Also, final EPA rules in various parts of the RCRA regulations specify the same thing, e.g., see 40 CFR 261.11(a), 40 CFR 264.93(a) and 40 CFR 268.2(b).

3. Compound is not listed as hazardous constituent in 40 CFR 261, Appendix VIII. Nevertheless, without prejudice or precedent for future action at the site, BSC agreed, in 9/16/93 teleconference with EPA-II, to add compound to this analyte list (as agency stated it would prefer) so as to cooperatively reach full agreement on technical scope of work for this supplemental PSA.

# TABLE 3

## ANALYTE LIST II
## for
## Soils/Fill at Former "Oily" Mill Scale Storage Area No. 2 (SWMU P-63)
## Bethlehem Steel Corporation (BSC); Lackawanna, New York

### A. Generic (Non-Waste/SWMU-Specific) Hazardous Constituents of Potential Interest (HzCOPIs)[1,2] for Total Constituent and/or SPLP (EPA Method 1312) Extract Analyses

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| Antimony | Benzene | Naphthalene |
| Arsenic | Ethylbenzene | Acenaphthene |
| Barium | Toluene | Acenaphthylene |
| Cadmium | m-Xylene | Anthracene |
| Chromium | o-Xylene | Benzo(a)anthracene |
| Lead | p-Xylene | Benzo(a)pyrene |
| Mercury | Acrylonitrile | Benzo(b)fluoranthene |
| Nickel | Bromodichloromethane | Benzo(k)fluoranthene |
| Selenium | Bromoform | Benzo(g,h,i)perylene |
| Silver | Bromomethane | Benzyl alcohol |
| Thallium | 2-Butanone (Methyl ethyl ketone) | Benzyl butyl phthalate |
| Cyanide | Carbon disulfide | Bis(2-chloroethyl)ether |
| | Carbon tetrachloride | Bis(2-chloroethoxy)methane |
| | Chlorobenzene | Bis(2-chloroisopropyl)ether |
| | Chloroethane | Bis(2-ethylhexyl)phthalate |
| | 2-Chloroethylvinyl ether | 4-Bromophenyl phenyl ether |
| | Chloroform | 4-Chloroaniline |
| | Chloromethane | p-Chloro-m-cresol |
| | Dibromochloromethane | 2-Chloronaphthalene |
| | Dichlorodifluoromethane | 2-Chlorophenol |
| | 1,1-Dichloroethane | Chrysene |
| | 1,2-Dichloroethane | m-Cresol |
| | 1,1-Dichloroethylene | o-Cresol |
| | trans-1,2-Dichloroethylene | p-Cresol |

[1,2] Endnotes are provided on 4th page of this table.

## TABLE 3 (Continued)

## ANALYTE LIST II for SWMU P-63

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| | 1,2-Dichloropropane | Dibenz(a,h)anthracene |
| | cis-1,3-Dichloropropene | 1,2-Dichlorobenzene |
| | trans-1,3-Dichloropropene | 1,3-Dichlorobenzene |
| | Methylene chloride | 1,4-Dichlorobenzene |
| | Styrene | 3,3´-Dichlorobenzidine |
| | 1,1,1,2-Tetrachloroethane | 2,4-Dichlorophenol |
| | 1,1,2,2-Tetrachloroethane | Diethyl phthalate |
| | Tetrachloroethylene | 2,4-Dimethylphenol |
| | 1,1,1-Trichloroethane | Dimethyl phthalate |
| | 1,1,2-Trichloroethane | Di-n-butyl phthalate |
| | Trichloroethylene | 4,6-Dinitro-o-cresol |
| | Trichlorofluoromethane | 2,4-Dinitrophenol |
| | Vinyl chloride | 2,4-Dinitrotoluene |
| | | 2,6-Dinitrotoluene |
| | | Di-n-octyl phthalate |
| | | Fluoranthene |
| | | Fluorene |
| | | Hexachlorobenzene |
| | | Hexachlorobutadiene |
| | | Hexachlorocyclopentadiene |
| | | Hexachloroethane |
| | | Indeno(1,2,3-cd)pyrene |
| | | Isophorone |
| | | 2-Methylnaphthalene[3] |
| | | 4-Nitroaniline |
| | | Nitrobenzene |
| | | 4-Nitrophenol |
| | | N-Nitrosodiphenylamine |
| | | N-Nitrosodi-n-propylamine |

[3] Endnote is provided on last page of this table.

## TABLE 3 (Continued)

## ANALYTE LIST II for SWMU P-63

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| | | Pentachlorophenol |
| | | Phenanthrene |
| | | Phenol |
| | | Pyrene |
| | | Pyridine |
| | | 2,3,4,6-Tetrachlorophenol |
| | | 1,2,4-Trichlorobenzene |
| | | 2,4,5-Trichlorophenol |
| | | 2,4,6-Trichlorophenol |

### B. Miscellaneous Parameters for Total Constituent Analyses

| |
|---|
| Oil & Grease |
| Percent Water |
| pH |

## TABLE 3 (Continued)

## ANALYTE LIST II for SWMU P-63
## Endnotes

1. Pursuant to agreement between BSC and agency (see next paragraph), HzCOPIs for SWMU P-63 are defined as all compounds in Superfund Target Compound List (TCL) minus herbicides, pesticides, PCBs and TCL compounds not identified as hazardous constituents in 40 CFR 261, Appendix VIII[2] plus all constituents in agency-approved site-wide hazardous constituent list for BSC's Lackawanna site that are not otherwise included in above modified Superfund TCL. See Tables 2 and 3 in RCRA Section 3008(h) Administrative Order on Consent (AOC) Final Work Plan for Phased Site Investigation (AOC Attachment I) (1990) and expanded Table 5-2(b) in AOC Work Plan for Phased Site Investigation, Phase II-B (1994) for agency-approved site-wide hazardous constituent list.[4]

Generic HzCOPI list, and its application in this supplemental Preliminary SWMU Assessment (PSA), is consistent with discussions and agreement reached in 9/1/93 and 9/16/93 teleconferences with EPA-II. Pursuant to this agreement, half of the soils/fill samples from vertical horizons I and II in the SWMU P-63 test pits (see Figure 5) will be tested for the HzCOPIs on this analyte list. (The other half will be tested for constituents on a waste/SWMU-specific analyte list. See Table 2 for that list.) See Table 1 for further description of sampling/testing protocols.

BSC's agreement to use this broad, non-waste/SWMU-specific analyte list was strictly in interest of cooperatively reaching full agreement on all aspects of the technical scope of work for this supplemental PSA. Use of this generic analyte list sets no precedent beyond this work plan, and is without prejudice to BSC's position that RCRA corrective action program analyte lists should be focused on those hazardous constituents that are reasonably expected to be present in and released from the particular SWMU(s) under investigation. See also footnote 1 in Table 2 regarding available information on hazardous constituents potentially present in "oily" mill scale from steel industry hot forming operations (only secondary material managed at SWMU P-63) and EPA guidance on targeting RCRA investigations on hazardous constituents that are "*likely to have been released at a particular site, based on the available information.*"

2. "Hazardous constituents" are defined in the AOC as those constituents which are listed as such in 40 CFR 261, Appendix VIII. See "EPA Statement of Purpose," AOC Section III. The legislative history for the RCRA corrective action program shows that Congress also explicitly defined "hazardous constituents" to be "*those constituents listed in Appendix VIII of the RCRA regulations.*" H.Rep. No. 98-198, 98th Cong., 1st Sess. 60-61 (1983). In addition, case law on the subject states: "*'Hazardous constituent' is a term of art referring to a list of chemical compounds compiled at 40 C.F.R. Part 261, Appendix VIII.*" National Resources Defense Counsel v. U.S. EPA, 907 F.2d 1146, 1159 (D.C.Cir. 1990). See also U.S. v. Clow Water Systems, 701 F.Supp. 1345, 1355 (S.D.Ohio 1988) ("*Hazardous constituents are those toxic constituents listed by the Administrator in Appendix VIII of Part 261*"). Also, final EPA rules in various parts of the RCRA regulations specify the same thing, e.g., see 40 CFR 261.11(a), 40 CFR 264.93(a) and 40 CFR 268.2(b).

Endnotes are concluded on next page.

## TABLE 3 (Concluded)

## ANALYTE LIST II for SWMU P-63
## Endnotes

3. Compound is not listed as hazardous constituent in 40 CFR 261, Appendix VIII. Nevertheless, without prejudice or precedent for future action at the site, BSC agreed, in 9/16/93 teleconference with EPA-II, to add compound to this analyte list (as agency stated it would prefer) so as to cooperatively reach full agreement on technical scope of work for this supplemental PSA.

4. One compound in original (1990) site-wide hazardous constituent list has since been deleted. The compound is bromochloromethane, an internal laboratory quality control standard specified for SW-846 method 8240. For additional information, see BSC's 6/30/93 response to EPA-II's 3/4/93 comment # 43 on BSC's 8/15/92 Phased Site Investigation, Phase I report.

# APPENDIX C

# TEST PIT LOGS AND SAMPLE RECORDS

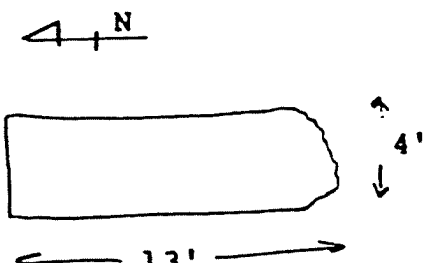
DAMES & MOORE
A PROFESSIONAL LIMITED PARTNERSHIP

# TEST PIT LOG SHEET

PROJECT : Bethlehem Steel SWMU — PROJECT No. :
WEATHER CONDITIONS : Overcast - 45° F — DATE : 11/8/89
CLIENT : Bethlehem Steel — CONTRACTOR :
INSPECTOR : Britt Quinby — EQUIPMENT : Backhoe

TEST PIT No. : #6-Mill Scale Storage #2 — ELEVATION :
START TIME : 12:00 pm — STOP TIME : 12:10 pm — GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 1 | | Stained-(Bl) Mill Scale-(SW) | w/rubble & brick (6-12") |
| 2 | 6B+6C+6D | | |
| 3 (▽) | | Tn-Bn- Coarse sand (poorly graded) - uniform (SP) (1' to 2.5') and (2.5' to 3.5') | dry layer until gr. water |
| 4 | | | |
| 5 | 6E+6F 6A | Rubble-Brick-Backfill mixed with sand & gravel (mill scale?) (3.5' to 4.5') | |
| 10 | | - Groundwater @ 8' | - filled up when we reached this level and stabilized. |
| 15 | | Hit sandy clay @ 4' to 4.5' | |
| 20 | | - Sample 6A | |
| 25 | | Note: Samples of sand and lower stained layers were taken<br>-6B, C, D = Sand<br>-6E, F = Stained layer (lower)<br>-6A = Clay | |




- see photos

COMMENTS : This pit was left open for B.S. personnel (client) to see.

ZONES OF SEEPAGE : None

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) — SHEET ___ OF ___

DAMES & MOORE
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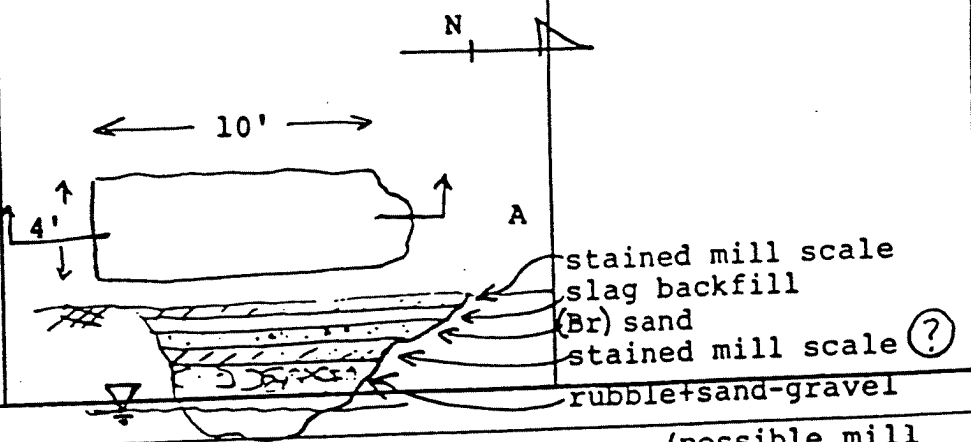
# TEST PIT LOG SHEET

PROJECT : Bethlehem Steel
PROJECT No. :
WEATHER CONDITIONS : Overcast - 45°F
DATE : 11/8/89
CLIENT : Bethlehem Steel
CONTRACTOR :
INSPECTOR : Britt Quinby
EQUIPMENT : Backhoe

TEST PIT No. : #7-Mill Scale Storage #2
ELEVATION :
START TIME : 12:15 pm
STOP TIME : 12:25 pm
GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 1 | 7A | Top 3" stained - compacted mill scale-sandy-gravelly (Bl) | |
| 2 | | Next 6" - slag backfill - (wh-Bl)-(Gy)-layered | |
| 3 | | Next 3-6"(Br) sand - coarse uniform gradation | |
| 4 | | | |
| 5 | | 18" to 32" - looks like (Bl)-mill scale + rubble-gravelly sand + bricks (?) | |
| 10 | | Gr. water @ 32" | sand / stained / rubble-bricks / mixture |
| 15 | | | |
| 20 | | | |
| 25 | | | |

Note: Sample 7A taken from lower "stained mill scale" (?)




COMMENTS :

ZONES OF SEEPAGE :

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... )

SHEET ____ OF ____

TP-7 [89]

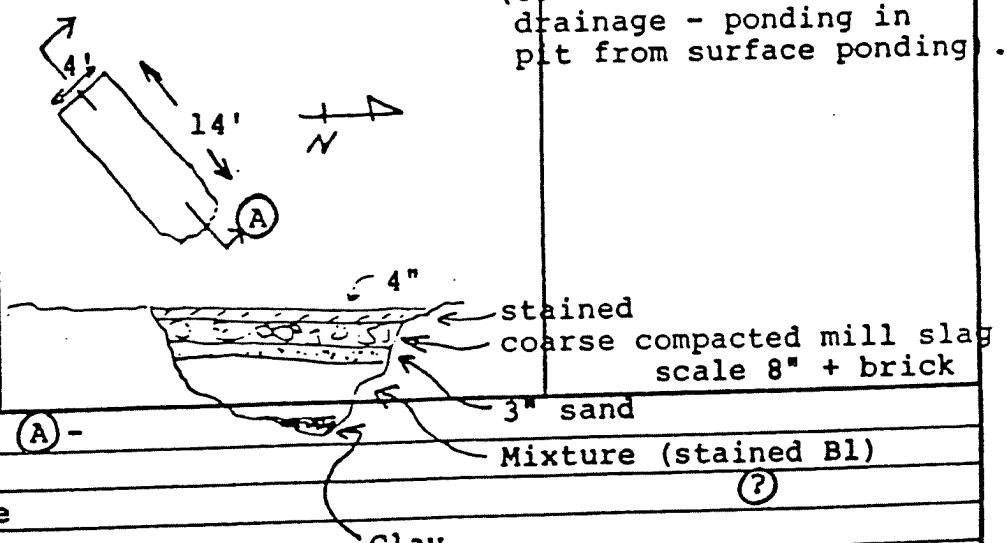
DAMES & MOORE
A PROFESSIONAL LIMITED PARTNERSHIP

# TEST PIT LOG SHEET

PROJECT : Bethlehem Steel SWMU
PROJECT No. :
WEATHER CONDITIONS : Overcast - 45°F
DATE : 11/8/89
CLIENT : Bethlehem Steel
CONTRACTOR :
INSPECTOR : Britt Quinby
EQUIPMENT : Backhoe

TEST PIT No. : #8-Mill scale storage #2
ELEVATION :
START TIME : 12:40 pm
STOP TIME : 12:50 pm
GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 1 | | -Upper 4" - stained- mill scale (Bl) | |
| 2 | | -Next 8" - Bl-Gy - coarse sandy compacted mill scale + brick | |
| 3 | | -Next 3" - Br - sand - uniform (coarse sand) | |
| 4 | | | |
| 5 | | down to 44" (depth from surface) | |
| | | - mixture of slag-stained with mill scale ? -some iron -(Rd) + rubble | |
| 10 | | | |
| | | @ 44" clay was encountered | |
| | | -(Gy)- same as what was found in test pit #1 - | |
| 15 | | Gr. water possibly hit at 46" | |
| | | | (Could be due to surface drainage - ponding in pit from surface ponding). |
| 20 | | | |
| 25 | | | |




COMMENTS : (A) -

ZONES OF SEEPAGE : None

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... )

SHEET ____ OF ____

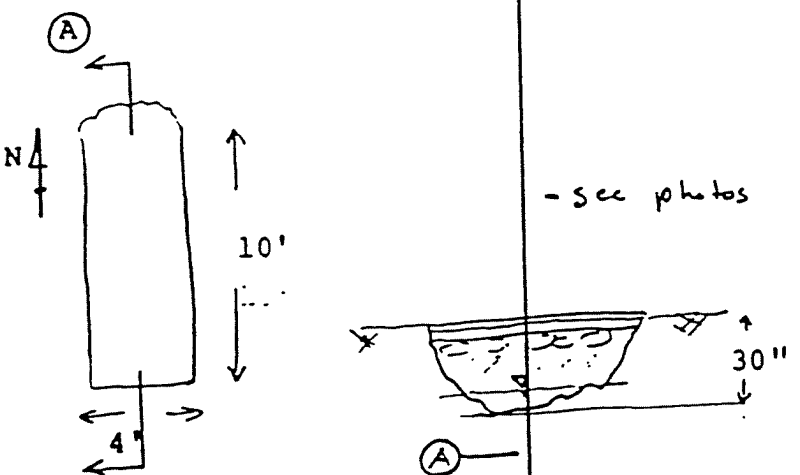
DAMES & MOORE
A PROFESSIONAL LIMITED PARTNERSHIP

# TEST PIT LOG SHEET

PROJECT : Bethlehem Steel SWMU Assessment — PROJECT No. :
WEATHER CONDITIONS : Overcast - 45°F — DATE : 11/8/89
CLIENT : Bethlehem Steel — CONTRACTOR :
INSPECTOR : Britt Quinby — EQUIPMENT : Backhoe

TEST PIT No. : #9-Mill Scale Storage #2 — ELEVATION :
START TIME : 1:05 pm — STOP TIME : — GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 1<br>2<br>▽ @30"<br>4<br>5 | | Upper 3" stained - mill scale (B1)<br>- next 3"(gy) mill scale - slag<br>Down to 30" - slag - bricks & cobbles backfill<br>-not as dark as stained material<br>-dry to slightly moist (oil stained??? | |
| ~~10~~ | | Here too, the water could be due to drainage from ponding - | Groundwater was not as "obvious" |
| ~~15~~ | | | |
| ~~20~~ | | | - see photos |
| 25 | | | |




COMMENTS :

ZONES OF SEEPAGE : None

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... )

SHEET ____ OF ____

TP-9 [89]

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU #63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 11:00

SAMPLE ID : TP-5-1
SAMPLE LOCATION : TP-5
Horizon #1, 6 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

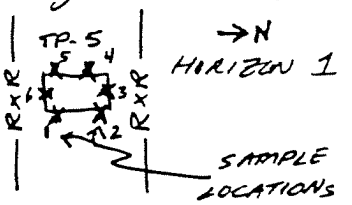
SAMPLE DESCRIPTION : DARK GRAY FINE TO COARSE GRAINED SILTY SAND, some 2-INCH sands (dry) (loose) oily residue and slight oil odor noted

SOIL DESCRIPTION FROM 6 SUB-SAMPLING LOCATION SAME

## SAMPLE ANALYSIS

SAMPLE ID : TP-5-1 (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Specific Analyte List I Compds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : oily residue and slight oil odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | — |
| pH | — |
| SPEC. COND.(μMHOs/CM) | — |
| OTHER (UNITS) HEADSPACE | 1.0 - 1.2 ppm * SUSPECT READINGS FROM 11.7 eV HNu |




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SOIL COLLECTED FROM SURFACE TO APPROX. .5 FEET DEPTH

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 14:30

SAMPLE ID : TP-5-IV
SAMPLE LOCATION : TP-5
HORIZON 1, # 5

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

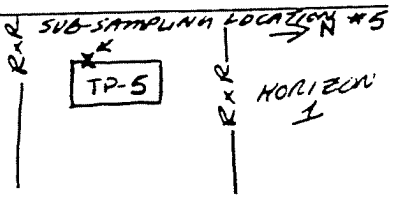
SAMPLE DESCRIPTION : DARK GRAY FINE TO COARSE GRAINED SILTY SAND, some 2-INCH sands (dry) (100%) oily residue and slight oil odor

## SAMPLE ANALYSIS

SAMPLE ID : TP-5-IV (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Specific Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : oily residue and slight oil odor

FIELD TEST : VALUE :

TEMP. (°C/°F) /
pH /
SPEC. COND.(μMHOs/CM) /
OTHER (UNITS) Headspace 1.2 ppm *SUSPECT READING FROM 11.7eV HNu.




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SOIL COLLECTED FROM SURFACE TO APPROX. .5' DEPTH AT SUB-SAMPLING LOCATION # 5.

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 14 : 45

SAMPLE ID : TP-5-2V
SAMPLE LOCATION : TP-5
HORIZON 2, #3

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

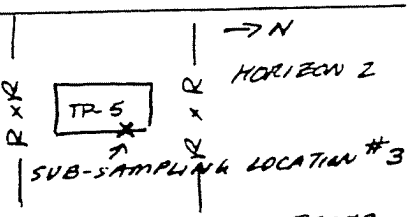
SAMPLE DESCRIPTION : DARK GRAY COARSE 1-2-INCH SAND AND GRAVEL (WET) (LOOSE) STRONG PETROLEUM ODOR, VERY OILY

## SAMPLE ANALYSIS

SAMPLE ID : TP-5-2V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Specific Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : very oily and strong petroleum odor

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND.(µMHOs/CM) —
OTHER (UNITS) Headspace 1.6 ppm * SUSPECT READINGS FROM 11.7eV UNIT




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SOIL COLLECTED FROM ~2' TO 3' DEPTH AT SUB-SAMPLING LOCATION #3

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95

JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 12:30

SAMPLE ID : TP-5-3

SAMPLE LOCATION : TP-5
CLAY BASE, 3 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE

B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : DARK GRAY-BROWN FINE SILTY CLAY, trace roots (dry)(hard) GRADES TO GREEN-GRAY FINE SILTY CLAY, trace roots (dry)(hard) AT LOCATIONS 2 AND 3, SEE SKETCH.

SILTY CLAY GRADES TO GREEN-GRAY AT MID-POINT OF TP-5

## SAMPLE ANALYSIS

SAMPLE ID : _____ (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Specific Analyte List I Compound Oil + Grease 9071, Percent Water, pH

PHYSICAL APPEARANCE & ODOR : —

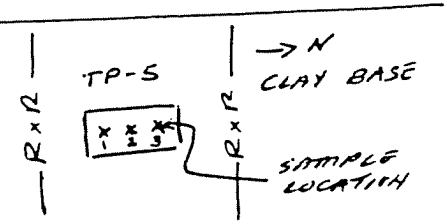
FIELD TEST : VALUE :

TEMP. (°C/°F) —

pH —

SPEC. COND.(μMHOs/CM) —

OTHER (UNITS) HEADSPACE 1.0 PPM * SUSPECT READINGS FROM 11.7eV HNU.




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH

COMMENTS : SAMPLE COLLECTED FROM APPROX. 4' TO 4.5' DEPTH

# DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 14:00

SAMPLE ID : TP-6-2
SAMPLE LOCATION : TP-6
HORIZON #2, 6 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

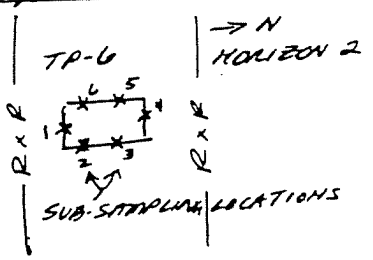
SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : DARK GRAY AND BROWN FINE TO COARSE GRAINED SAND AND GRAVEL, SOME GREY CLAY (WET) (WOOD) oily, strong petroleum odor.

## SAMPLE ANALYSIS

SAMPLE ID : TP-6-2 (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Generic Analyte List II Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : oily, strong petroleum odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | |
| SPEC. COND.(μMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SAMPLES COLLECTED FROM APPROX. 2' TO 3' DEPTH

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 16 : 10

SAMPLE ID : TP-6-2V
SAMPLE LOCATION : TP-6
HORIZON 2, #6

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

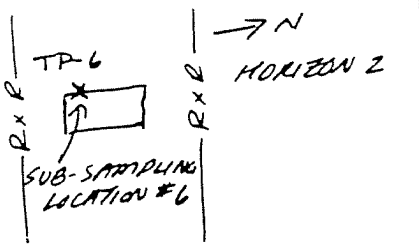
SAMPLE DESCRIPTION : DARK GRAY AND BROWN FINE TO COARSE GRAINED SAND AND GRAVEL, SOME GREY CLAY (WET) (100%) oily, strong petroleum odor.

## SAMPLE ANALYSIS

SAMPLE ID : TP-6-2V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Generic Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : oily, strong petroleum odor

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND.(µMHOs/CM) —
OTHER (UNITS) Headspace — ppm




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SAMPLE COLLECTED FROM APPROX. 2' TO 3' DEPTH FROM SUB-SAMPLING LOCATION #6.

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95

JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 15:15

SAMPLE ID : TP-6-3

SAMPLE LOCATION : TP-6
CLAY BASE, 3 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE

B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : GRAY AND GREENISH-GRAY MOTTLED SILTY CLAY (dry) (hard)

## SAMPLE ANALYSIS

SAMPLE ID : TP-6-3 (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Specific Analyte List Compounds Oil + Grease 9071, Percent Water, pH

PHYSICAL APPEARANCE & ODOR : —

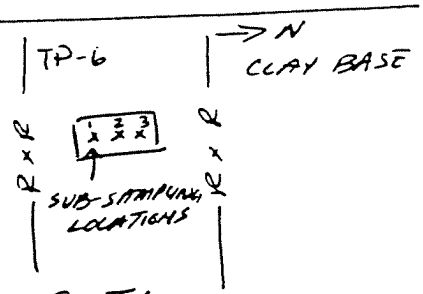
FIELD TEST : VALUE :

TEMP. (°C/°F) —

pH —

SPEC. COND.(µMHOs/CM) —

OTHER (UNITS) —




WEATHER : LOW 30'S, OVERCAST, GUSTS FROM SOUTH.

COMMENTS : SAMPLES COLLECTED FROM APPROX. 3.5-4.5' DEPTH.

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 07:00

SAMPLE ID : TP-7-1
SAMPLE LOCATION : Test Pit #7
HORIZON #1 6 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

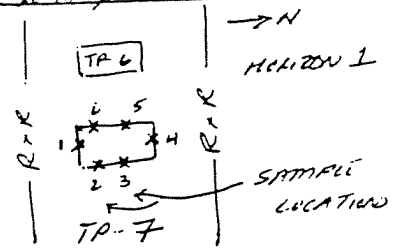
SAMPLE DESCRIPTION : DARK GRAY AND DARK BROWN FINE GRAINED SILTY SAND, some tan and red brick debris, slight oily residue, faint petroleum odor (dry) (loose)

SOIL DESCRIPTION FROM 6 SUB SAMPLING LOCATIONS SAME

## SAMPLE ANALYSIS

SAMPLE ID : TP-7-1 (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Specific Analyte List I Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : slight oily residue and petroleum odor

FIELD TEST : VALUE :
TEMP. (°C/°F)
pH
SPEC. COND.(µMHOs/CM)
OTHER (UNITS)




WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : SAMPLES COLLECTED FROM SURFACE TO APPROX. .5 FOOT DEPTH

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 12:40

SAMPLE ID : TP-7-1V
SAMPLE LOCATION : TP-7
Horizon #1, location #1

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☐

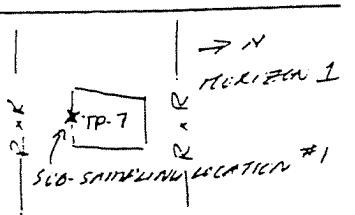
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : DARK GRAY AND DARK BROWN FINE GRAINED SILTY SAND, Some tar and red brick debris, Slight oily residue, faint petroleum odor (dry) (loose)

## SAMPLE ANALYSIS

SAMPLE ID : TP-7-1V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Specific Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : slight oily residue and faint petroleum odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) Headspace | 1.2 ppm * |




* SUSPECT READINGS FROM 11.7 eV HNU.

WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : SAMPLE COLLECTED FROM SURFACE TO APPROX. .5' DEPTH AT SUB-SAMPLING LOCATION #1.

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 09:30

SAMPLE ID : TP-7-2
SAMPLE LOCATION : TP-7
HORIZON 2, 6 Locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

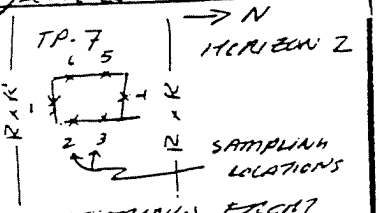
SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : DARK GRAY FINE TO COARSE GRAINED SILTY SAND, some light brown brick debris, (moist) loose oily and strong petroleum odor
ALSO ~ 10 FEET SECTIONS OF STEEL W-BEAMS REMOVED FROM THIS HORIZON

## SAMPLE ANALYSIS

SAMPLE ID : TP-7-2 (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Specific Analyte List I Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : oily and strong petroleum odor

FIELD TEST : VALUE :
TEMP. (°C/°F) /
pH /
SPEC. COND.(µMHOs/CM) /
OTHER (UNITS) HEAD-SPACE 0.4 ppm * SUSPECT READINGS FROM 11.7eV UNIT.




WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : SAMPLES COLLECTED FROM APPROX. 2 TO 3 FEET DEPTH

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 12:00

SAMPLE ID : TP-7-2V
SAMPLE LOCATION : TP-7
HORIZON 2, LOCATION #6

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

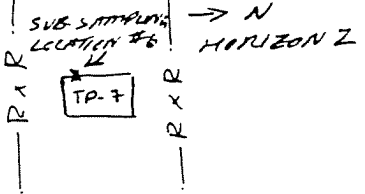
SAMPLE DESCRIPTION : DARK GRAY FINE TO COARSE GRAINED SILTY SAND, some light brown brick debris (moist) (loose) oily and strong petroleum odor

## SAMPLE ANALYSIS

SAMPLE ID : TP-7-2V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Specific Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : oily and strong petroleum odor

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND.(μMHOs/CM) —
OTHER (UNITS) Headspace 0.4 ppm * SUSPECT READINGS FROM 11.7eV LAMP.




WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : SAMPLES COLLECTED FROM APPROX. 2 TO 3 FOOT DEPTH AT SUB-SAMPLING LOCATION #6.

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 10:00

SAMPLE ID : TP-7-3
SAMPLE LOCATION : TP-7
CLAY BASE, 3 locations

TRIPLICATE SET OF SAMPLES OBTAINED. SAMPLE IDs: TP-7-3 MS TP-7-3 MS/MSD

SAMPLERS : E. FUATA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : GRAY AND GREENISH GRAY, YELLOWISH-BROWN MOTTLED SILTY CLAY (dry) (hard)

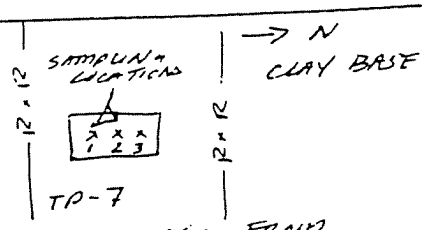
## SAMPLE ANALYSIS

SAMPLE ID : TP-7-3, TP-7-3 MS, TP-7-3 MSD (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Specific Analyte List Compounds
Oil + Grease 9071, Percent Water, pH

PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND.(µMHOs/CM) —
OTHER (UNITS) HEADSPACE 0.4 PPM + SUSPECT READINGS FROM 11.7 eV PID.




WEATHER : LOW 30's, OVERCAST MODERATE WIND FROM WEST.
COMMENTS : SAMPLES COLLECTED FROM APPROX 3.5 TO 4.0 FEET DEPTH.

# DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 10:40

SAMPLE ID : TP 7-3V
SAMPLE LOCATION : TP-7
CLAY BASE, LOCATION #2

TRIPLICATE SOIL / SEDIMENT SAMPLE ID :
TP-7-3V MS
TP-7-3V MSD

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

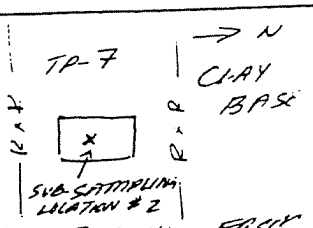
SAMPLE DESCRIPTION : GRAY, GREENISH-GRAY AND YELLOWISH-BROWN MOTTLED SILTY CLAY (dry) (hard)

## SAMPLE ANALYSIS

SAMPLE ID : TP-7-3V, TP-7-3V MS, TP-7-3V MSD (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Specific Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND. (µMHOs/CM) —
OTHER (UNITS) Headspace 0.4 ppm* SUSPECT READING FROM 11.7 eV PID.




WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : SAMPLE COLLECTED FROM APPROX. 3.5 TO 4 FOOT DEPTH FROM SUB-SAMPLING LOCATION #2.

DAMES & MOORE

# TEST PIT LOG SHEET

PROJECT : SWMU P-63 PROJECT No. : 00120-188-12

WEATHER CONDITIONS : Low 30's, overcast, gusts to 50 DATE : 1-31-95

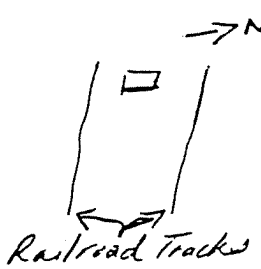
CLIENT : Bethlehem Steel Corp. CONTRACTOR : A. Miller SJB Services

INSPECTOR : E. FUJITA, B PHILLIPS EQUIPMENT : Ford 555

TEST PIT No. : TP-5 ELEVATION :

START TIME : 10:25 STOP TIME : 12:0 GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 5 | | Top 1" DARK GRAY FINE GRAINED SILTY SAND - OILY (DRY) (100%) - MILL SCALE | |
| | | AT 2"-4" GRADES TO LIGHT BROWN FINE GRAINED SILTY SAND OILY (DRY) (LOOSE), OIL ODOR | |
| | | MILL SCALE - 1/4" THICK WHITE, HARD SEAM OF CEMENT-LIKE MATERIAL | |
| | | - SOME WIRE DEBRIS, RED-BROWN SAND-BRICK? | |
| 10 | | - SOME 2-INCH SAND TO COARSE GRAINED | |
| | | -1' DARK GRAY FINE SILTY SAND, 2-INCH COARSE SAND AND GRAVEL | |
| | | -2' DARK GRAY AND REDDISH BROWN COARSE GRAINED SAND AND GRAVEL (NO FINES) (WET) (100%) VERY OILY, STRONG PETROLEUM ODOR | |
| 15 | | -4' DARK GRAY-BROWN FINE SILTY CLAY WITH MAT OF ROOTS (DRY) (HARD) - GREEN-GRAY COLOR AT NORTH LOCATIONS | |
| 20 | | | |
| 25 | | | |




COMMENTS : Black oily globules noted on water surface, also iridescent sheen observed.

ZONES OF SEEPAGE : Water filling pit at approx. 2' BGS

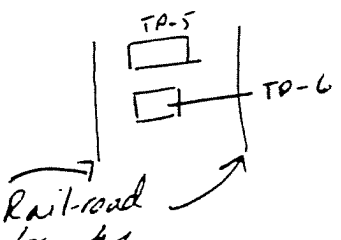
INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) SHEET ____ OF ____

DAMES & MOORE

# TEST PIT LOG SHEET

PROJECT : SWMU P-63 PROJECT No. : 0120-188-152
WEATHER CONDITIONS : Low 30's, overcast, gusts to 35 mph DATE : 1-31-95
CLIENT : Bethlehem Steel Corp. CONTRACTOR : A. Miller SJB Services
INSPECTOR : E. FUJITA, B. PHILLIPS EQUIPMENT : Ford 555

TEST PIT No. : TP-6 ELEVATION :
START TIME : 1310 STOP TIME : 1500 GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 5 | | 0-6" Dark GRAY AND DARK BROWN FINE-GRAINED SILTY SAND, some coarse sand, tan brick debris, slight oily residue (dry) (loose) [MILL SCALE] | |
| 10 | | 1' LARGE BRICK RED OR TAN COLOR DEBRIS STEEL BARS, WIRE - Move/extend South end of pit further, South, since can't excavate past 1.5' | |
| 15 | | 2'-3' DARK GRAY AND BROWN FINE TO COARSE GRAINED SAND + GRAVEL, some clay (wet) (loose) oily, strong petroleum-like odor | |
| 20 | | 3.5' ~~DARK~~ GRAY AND GREEN-GRAY MOTTLED SILTY CLAY (dry) (hard) | |
| 25 | | 4'-3' x 9' x 4.5' W L D → N   | |

COMMENTS : Strong petroleum like odor noted

ZONES OF SEEPAGE : WATER OBSERVED APPROX. 2' BGS

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) SHEET ____ OF ____

DAMES & MOORE

# TEST PIT LOG SHEET

PROJECT : SUMU P-63 PROJECT No. : 0020-188-152
WEATHER CONDITIONS : 30's OVERCAST MOD. S. WIND DATE : 2-1-95
CLIENT : Bethlehem Steel Corp. CONTRACTOR : A. MILLER - S.F.B.
INSPECTOR : E. FUJITA, B. PHILLIPS EQUIPMENT : FORD 555

TEST PIT No. : TP-7 ELEVATION :
START TIME : 8:25 STOP TIME : 10:00 GROUNDWATER DEPTH : -3' BGS

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 5 | | 0-2" Dark GRAY FINE GRAINED SILTY SAND - LIKE ASPHALT | |
| | | -TO 6" DARK BROWN AND DARK GRAY FINE SILTY SAND, tan and red brick debris, some coarse sand-size material oily-slight, faint petrol. odor | [MILL SCALE] |
| 10 | | -1'-2' LARGE STEEL DEBRIS I-BEAMS BRICK (TAN/YELLOW) DEBRIS | |
| | | -2' DARK GRAY FINE TO COARSE GRAINED SILTY SAND, some silty sand [BRICK] light brown fine (moist) (loose) | |
| 15 | | strong petrol. odor, more oily | |
| | | 2.75'-3' WET - water filling pit | |
| | | ✓3' Dark Gray Fine to coarse grained silty sand (coarse 1-2-INCH DARK GRAY GRAVEL (wet) (loose) oily, strong petrol. odor | |
| 20 | | -3.5' GRAY AND GREEN-GRAY AND YELLOW-BROWN MOTTLED SILTY CLAY (dry) (hard) | |
| 25 | | → N 4' x 8' x 3.5' W L D | |
| | | TP-5 TP-6 TP-7 | |

COMMENTS : iridescent sheen noted on water surface

ZONES OF SEEPAGE : 2.75' - 3' BGS

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) SHEET ____ OF ____

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 14:15

SAMPLE ID : TP-5-3V
SAMPLE LOCATION : TP-5
CLAY BASE, #1

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

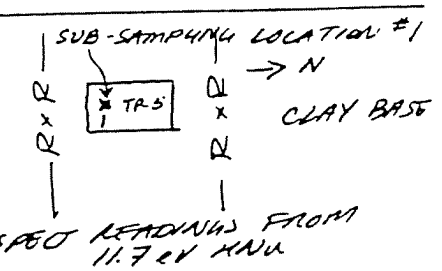
SAMPLE DESCRIPTION : DARK GRAY-BROWN FINE SILTY CLAY, trace roots (dry) (hard)

## SAMPLE ANALYSIS

SAMPLE ID : TP-5-3V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Specific Analyte List I VOCs
PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND.(μMHOs/CM) —
OTHER (UNITS) Headspace 1.0 ppm* SUSPECT READINGS FROM 11.7 eV HNu




WEATHER : LOW 30'S, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SAMPLE COLLECTED FROM APPROX. 4' TO 4.5' DEPTH AT LOCATION #1.

DAMES & MOORE

SOIL/SEDIMENT
SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 13:30

SAMPLE ID : TP-6-1
SAMPLE LOCATION : TP-6
HORIZON #1, 6 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

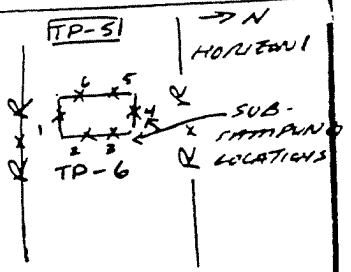
SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : DARK GRAY AND DARK BROWN FINE GRAINED SILTY SAND, SOME COARSE SAND, SLIGHT OILY RESIDUE, ALSO SOME TAN BRICK DEBRIS

## SAMPLE ANALYSIS

SAMPLE ID : TP-6-1 (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 P-63 Generic Analyte List II Compounds
Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : slight oily residue

FIELD TEST : VALUE :
TEMP. (°C/°F)
pH
SPEC. COND.(μMHOs/CM)
OTHER (UNITS) HEADSPACE




WEATHER : LOW 30'S, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SAMPLES COLLECTED FROM SURFACE TO APPROX. .5 FEET DEPTH

DAMES & MOORE

# SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-171-152 JOB NAME : SWMU P-63 DATE : 1/31/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 16:05

SAMPLE ID : TP-6-IV
SAMPLE LOCATION : TP-6
HORIZON I, # 2

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : DARK GRAY AND DARK BROWN FINE GRAINED SILTY SAND, some coarse sand, slight oily residue, also some tan brick debris

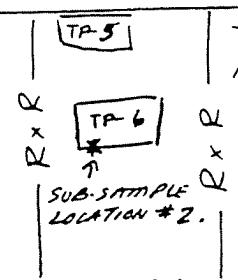
DESCRIPTION FROM 6 SUB-SAMPLING LOCATIONS SAME

## SAMPLE ANALYSIS

SAMPLE ID : TP-6-IV (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 P-63 Generic Analyte List II VOCs
PHYSICAL APPEARANCE & ODOR : slight oily residue

FIELD TEST : VALUE :

TEMP. (°C/°F)
pH
SPEC. COND.(μMHOs/CM)
OTHER (UNITS)




WEATHER : LOW 30's, OVERCAST, GUSTS FROM SOUTH
COMMENTS : SAMPLE COLLECTED FROM SURFACE TO APPROX. 5 FOOT DEPTH AT SUB-SAMPLING LOCATION #2.

# APPENDIX D

# MARCH 12, 1986, ANALYTICAL RESULTS

From WQCS No 2
April 1989
App A

# SUMMARY LAB REPORTS FOR SCALE SAMPLES 13" BAR MILL

SWMU P-34
13" Mill Scale Pit

**LAB** - ACTS TESTING LABS INC.

**REPORT 6-1305** **DATE: MARCH 12, 1986**

The sample was evaluated for one or more of the Hazardous Waste Characteristics of Ignitability, Corrosivity, Reactivity and EP Toxicity as defined in Title 40, Code of Federal Regulations, Part 261. All analyses were conducted according to "Test Methods for the Evaluation of Solid Waste Physical/Chemical Methods", EPA.

RESULTS:

A - IGNITABILITY 261.21

Not Applicable

B - CORROSIVITY 261.22

Not Applicable

C - REACTIVITY 261.23

| | Cyanide at pH2 | Sulfide at pH2 |
|---|---|---|
| 13" Mill Scale | 0.2 | LT 5.0 |

LT = Less Than

In addition the sample **IS** stable, **DOES NOT** react with water, and **IS NOT** capable of detonation. Cyanide and sulfide results are reported in micrograms per gram.

D - EP TOXICITY (261.24)

| | 13" Mill Scale |
|---|---|
| Arsenic | LT 0.002 |
| Barium | LT 0.1 |
| Cadmium | LT 0.01 |
| Chromium | LT 0.01 |
| Lead | 0.5 |
| Mercury | LT 0.002 |
| Selenium | 0.003 |
| Silver | LT 0.01 |

LT = Less Than
EP Toxicity results are reported as milligrams of contaminant per liter of leachate.

ALL BELOW REGULATORY LIMITS MATERIAL NON HAZARDOUS

# ACTS TESTING LABS, INC.

3916 Broadway • Buffalo, N.Y. 14227-1192 • (716) 684-3300
120 West 41st Street • New York, N.Y. 10036 • (212) 302-6780

March 12, 1986

TECHNICAL REPORT 6-1305
P.O. #500-102-9576F

Mr. Larry Bugman
BETHLEHEM STEEL CORPORATION

SUBJECT:

Hazardous Waste Evaluation of one sample received on February 5, 1986.

INTRODUCTION:

The sample was evaluated for one or more of the Hazardous Waste Characteristics of Ignitability, Corrosivity, Reactivity and EP Toxicity as defined in Title 40, Code of Federal Regulations, Part 261. All analyses were conducted according to "Test Methods for the Evaluation of. Solid Waste Physical/Chemical Methods", EPA.

SAMPLE IDENTIFICATION:

| ACTS # | SAMPLE ID |
|---|---|
| 1305 | 13" Mill Scale |

EXECUTIVE SUMMARY:

The submitted sample DOES NOT EXHIBIT the Hazardous Waste Characteristics of EP Toxicity (Metals Only), Ignitability, Corrosivity, or Reactivity.

ACTS TESTING LABS, INC.

Daniel P. Murtha

Daniel P. Murtha, Ph.D.
Laboratory Director

DPM/sms

Our reports and letters are for the exclusive use of the client to whom/which they are addressed. Communication of ACTS Testing Labs, Inc. reports and letters to any others and/or use of the name of ACTS Testing Labs, Inc. requires our prior written approval. Our letters and reports are limited solely (I) to standards and procedures identified in them and (II) to the sample(s) tested. Test results are not necessarily indicative nor representative (I) of the quality of the lot from which the sample was taken or (II) of apparently similar or identical products. Unless otherwise stated, it is the responsibility of the client to insure the representativeness of the samples submitted to ACTS Testing Labs, Inc. for testing.

RESULTS:

A) IGNITABILITY 261.21

Not Applicable

B) CORROSIVITY 261.22

Not Applicable

C) REACTIVITY 261.23

| | Cyanide at pH2 | Sulfide at pH2 |
|---|---|---|
| 13" Mill Scale | 0.2 | LT 5.0 |

LT = Less Than

In addition the sample IS stable, DOES NOT react with water, and IS NOT capable of detonation. Cyanide and sulfide results are reported in micrograms per gram.

| D) EP TOXICITY (261.24) | 13" Mill Scale | EPA Limit |
|---|---|---|
| Arsenic | LT 0.002 | 5.0 |
| Barium | LT 0.1 | 100.00 |
| Cadmium | LT 0.01 | 1.0 |
| Chromium | LT 0.01 | 5.0 |
| Lead | 0.5 | 5.0 |
| Mercury | LT 0.002 | 0.2 |
| Selenium | 0.003 | 1.0 |
| Silver | LT 0.01 | 5.0 |

LT = Less Than
EP Toxicity results are reported as milligrams of contaminant per liter of leachate.

| ADDITIONAL PARAMETERS: | 13" Scale Mill |
|---|---|
| Oil & Grease | 23,000 micrograms per gram (parts per million) or 2.3% |

# APPENDIX E

# JULY 1987 ANALYTICAL RESULTS

SWMU-P-34 13" Mill Scale Pit
Analysis done for BSC. JULY 1987 ? which date
could ship scale to an approved landfill NOVEMBER 1987
REPORT CHJ

**ADVANCED ENVIRONMENTAL SERVICES**

**SUMMARY ANALYSIS SCALE SAMPLES**

| ANALYTICAL PARAMETERS | METHOD NO. | REF. NO. | RESULTS |
|---|---|---|---|
| BTU (PER POUND) | 240D-64 | 14 | 851 |
| CYANIDE (mg/kg) | 9010/335.35 | 3 | .38 |
| CYANIDE SULFIDE REACTIVITY | 2.1.3 | 3 | NEG |
| CORROSIVITY pH | 150.1 | 3 | 6.83 |
| FLORIDE (mg/L) | 340.2 | 3 | .66 |
| IGNITABILITY | AGSTM | --NOV.1987 | NEG |
| NITRATE (mg/L) | 353.2 | 3 | .21 |
| OIL & GREASE (PCT) | 503D | 6 | 2.0 |
| pH (STD. UNITS) | 423 | 6 | 6.83 |
| SULFIDE (mg/L) | 427D | 6 | BQL |
| SOLIDS (PCT) | 209F | 6 | 100% |
| LINDANE | 1310/608 | 5/1 | BQL |
| ENDRIN | " | " | BQL |
| METHOXYCHLOR | " | " | BQL |
| TOXAPHENE | " | " | BQL |
| 2, 4-D | 1310/509B | 5/6 | BQL |
| SILVEX | " | " | BQL |

| ANALYTICAL PARAMETERS | METHOD NO. | REF. NO. | RESULTS |
|---|---|---|---|
| PCB 1260 | 8080 | 5 | BQL |
| PCB 1254 | " | " | BQL |
| PCB 1248 | " | " | BQL |
| PCB 1242 | " | " | BQL |
| ARSENIC | 7060 | 5 | .019 |
| BARIUM | 7080 | 5 | BQL |
| CADIUM | 7130 | 5 | " |
| CHROMIUM | 7190 | 5 | " |
| LEAD | 7420 | 5 | " |
| MERCURY | 7471 | 5 | " |
| SELENIUM | 7740 | 5 | " |
| SILVER | 7760 | 5 | " |

COMMENT: - BELOW QUANTIFIED LIMITS

# ATTACHMENT A

# USEPA COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

JUL 01 1992

Mr. Robert B. Allen
Environmental Manager
Lackawanna Area
Bethlehem Steel Corporation
Box 310
Lackawanna, New York 14218

Re: Bethlehem Steel Corporation - EPA ID #NYD002134880
Administrative Order on Consent
Docket No. II RCRA-90-3008(h)-0201
Preliminary SWMU Assessment Report

Dear Mr. Allen:

The U.S. Environmental Protection Agency (EPA) and the New York State Department of Enyironmental Conservation (NYSDEC) have reviewed the Preliminary Solid Waste Management Unit (SWMU) Assessment Report dated August 8, 1991, submitted by Bethlehem Steel Corporation (BSC). This assessment report covers the following nine (9) SWMUs located at the East Plant Area:

1. Mill Scale Storage Area No. 2 (P-63)
2. Drum Storage Area (P-73)
3. Runout Table Spray Water Pit (P-54)
4. Main Settling Basin (P-56)
5. Twenty-four Sand Filters (P-57)
6. Bar Mill East Acid Pump (Coil Pickling Area) (P-58)
7. Bar Mill Acid Sump (Billet Prep Area) (P-59)
8. Hot Strip Mill Acid Pit (P-61)
9. Pump Station Wet Well for Old Acid Sewer Line from Galvanizing Mill (P-71)

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e Agencies provide the following comments:

SWMU No.1 - Mill Scale Storage Area No.2 (P-63):

According to the assessment report, the Mill Storage Area No. 2 is an area being used for the interim storage of mill scale for purposes of beneficial recycling. The area is an open field (100 yards x 150 yards in dimension) storing a pile of mill scale approximately 100 yards long, 40 yards wide and 12 feet in height. The pile is at grade level and there are no artificial containment barriers. The mill scale is composed of iron with some oil. Analyses of the scale using the EP Toxicity Testing procedure has demonstrated that the material does not exhibit the RCRA hazardous waste characteristic for toxicity.

During site inspections conducted by BSC in October 1989 and by EPA and NYSDEC personnel on April 28, 1992, it was noted that ponded rainwater was in direct contact with the scale pile, and surface sheens of oil were observed on the ponded water. Also during the April 1992 inspection, a reddish color was observed at the bottom of the pile and in contact with the ponded rainwater. This is an indication of iron and possibly other metals leaching into the environment. Inspections of test pits excavated in 1989 by BSC in this area revealed "oil and grease" staining in the upper six to twelve inches of soil. No sampling of the soils or the groundwater in this area has been conducted.

BSC indicated in the assessment report that following the planned removal of the mill scale, the EPA will be provided a final inspection report describing the final actions taken to close this unit.

The Agencies disagree with BSC's conclusions in the report that there have not been releases of hazardous constituents to the soils and groundwater from the Mill Scale Storage Area No. 2, and that no further investigatory action is necessary.

Although the mill scale and the oil/grease contained in the mill scale are not RCRA hazardous wastes, oil/grease may contain hazardous constituents (organics and metals) that may be of concern. Also, the assessment report does not provide sufficient evidence to conclude that the groundwater in the vicinity of the stained soils has not been impacted.

The closure plan for this unit should include sampling and analysis of soil and groundwater to define the hazardous constituents present, if any, the extent of the contamination, and any impact to the groundwater. The closure plan should be provided to the Agencies for approval prior to its implementation. Please provide a sampling plan for EPA and NYSDEC review and approval within 45 days of receipt of this letter.

# SWMU ASSESSMENT REPORT
# DRUM STORAGE AREA EAST OF COLD STRIP MILL AND FLANDER'S FIELD
# (SWMU P-73)

## BETHLEHEM STEEL CORPORATION
## LACKAWANNA, NEW YORK




**SEPTEMBER 2004**

**BETHLEHEM STEEL CORPORATION**
**2600 HAMBURG TURNPIKE**
**LACKAWANNA, NEW YORK 14218**

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| | |
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# 1.0 INTRODUCTION

This report documents the results of an environmental assessment at the Former Drum Storage Area east of the Cold Strip Mill and at Flander's Field both located at the Bethlehem Steel Corporation (BSC) facility in Lackawanna, New York. The Former Drum Storage Area east of the Cold Strip Mill was designated by the United States Environmental Protection Agency (USEPA) in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (USEPA 1988) as Solid Waste Management Unit (SWMU) P-73 because it was used to store drums. Flander's Field is also included in this SWMU as the area where excavated soil from the Former Drum Storage Area was placed. The USEPA has required that a RCRA Facility Investigation (RFI) of this and other SWMUs at the BSC facility be completed in accordance with the Administrative Order on Consent (AOC) signed by BSC and USEPA in 1990 (USEPA 1990). The RFI has been conducted in phases and includes field work consisting of the collection and analysis of environmental samples from SWMUs and other areas throughout the property.

A preliminary SWMU assessment was completed and submitted to the USEPA on January 5, 1993. Attachment A provides USEPA and New York Department of Environmental Conservation (NYSDEC) comments regarding the Preliminary SWMU Assessment. This report evaluates SWMU data available to BSC as of November 2001.

## 1.1 Description

SWMU P-73 consists of two distinct areas: the Former Drum Storage Area and Flanders Field (Figure 1). The Former Drum Storage Area is located immediately east of the Strip and Plate Mill Buildings in the northeast corner of the East Plant Area. The Former Drum Storage Area is bounded by a fence on the east side and by roads along the other perimeters. This area is shown in detail on Figure 2.

The Former Drum Storage Area consists of several discontinuous areas where drums were stored. All stored materials were removed from the site in 1983. A portion of this area is

now covered by a hydrogen gas plant (Linde Plant) that was constructed in 1990 and is now owned by BOC GASES, Inc.

The second area, Flander's Field, is located south of the Galvanizing Mill in the southeast corner of the East Plant Area (Figure 3). This area is the location of the excavated material from the Former Drum Storage Area and is approximately 3,700 feet south of the Former Drum Storage Area.

In anticipation of construction of the Linde gas plant in 1989, soil borings were advanced at three locations (B-1, B-2, and B-3) at Former Drum Storage Area as shown on Figure 2. The borings were drilled approximately 40 feet to evaluate geotechnical conditions of the subsurface soils. A thin fill layer was encountered underlain by silty clay at a depth about 4 to 5 feet below ground surface. During the construction, the upper layer of fill was excavated and stockpiled in the area southeast of the Bar Mill and the Galvanizing Mill (Flander's Field portion of SWMU P-73).

Boring logs from the 1989 borings for the Linde gas plant are provided in Appendix C. They indicate sand and slag (fill) from the surface to four or five feet below grade, and predominantly silty, clayey, and sandy materials below the surface fill to about 40 feet below grade. No samples were collected for laboratory analysis.

## 1.2 History

SWMU P-73 was once a receiving area for drummed products utilized by the Strip Mill Division from the late 1940's through 1983. Typical materials received were lubricants, oils, grease, soap, and chemical additives. The area also served as a transfer point for empty drums, which were returned to vendors for deposit or sent to the steel making division to be scrapped. Throughout much of the operational history of the storage area, periodic inventories of the drums were taken to control the volume of drums stored in the area. However, these inventories were temporary in nature, and these records were not retained.

In 1982, a program was implemented to discontinue use of this area for drum storage. Individual operating units within BSC were directed to have the drummed materials directly delivered and stored within their respective operating areas. Starting in 1983, outside contractors were hired to inventory and properly dispose of the drummed materials. If the materials could not be readily identified, the contractor was required to analyze the materials. Waste manifest records were reportedly reviewed which showed that no hazardous wastes were shipped from this area during the review period of 1982 and 1983. These records were not available for inclusion in this report.

After storage operations ceased in 1983, the area remained vacant until 1989 at which time construction of a new hydrogen gas plant (Linde Plant) began. The Linde Plant currently occupies approximately 30% of the Former Drum Storage Area. All surface soils within the former Drum Storage Area were removed during construction of this plant (BSC, 1992). During site operations, approximately 525 cubic yards of soil and fill was excavated and subsequently removed from the drum storage area and placed in a series of discontinuous piles in an open field (Flander's Field) south of the galvanizing mill (Figure 3).

The stockpiles consisted of 17 separate piles of material with an estimated total volume of about 525 cubic yards. On September 5, 1996, these piles were leveled by a contractor installing a buried pipeline in the nearby vicinity. On December 22, 1996, a bulldozer scraped the original stockpile area and a single pile of soil was created. The resulting new pile contains approximately 100 cubic yards of soil and is located just west of the original soil stockpile area (Figure 3).

In May and November 1991, an inspection of SWMU P-73 (Former Drum Storage only at the time of the 1991 inspections) was conducted by Dames & Moore. The site was free of material, including drums and product. Some older surface staining of oil was noted. The test pits dug in 1989 for a RFI soil sampling program were still open. Water had collected in the test pits within two feet of the surface. No surface oil sheen or odor was noted in the collected water.

By February 1991, the construction of the Linde Plant was complete and the plant was operational. Dames & Moore again inspected the site in September 1996.

Personnel from URS inspected the site in June 2000. The Flanders Field area consists of a heavily vegetated pile of soil located between rail spurs. The pile is not covered nor is it contained. Surface water in this area that flows from the pile to the surrounding grade is contained within the rail spurs until it infiltrates or evaporates.

The Former Drum Storage Area consists of the Linde Plant, which appears to occupy 30% of the SWMU surface with the remaining area observed to be covered with asphalt and concrete. Areas to the northwest, east and southeast are covered in a slag surface bounded by rail lines. Surface water runs off asphalt into the slag gravel along the tracks. No drums were observed during the 2000 site visit. Field notes for the 1996 and 2000 inspections are provided in Appendix A. Notes for the previous inspections were not available.

On February 20, 1996, BSC filed two declarations in the Erie County, New York Clerk's office limiting future use of the property including both portions of SWMU P-73. Under the deed restrictions, future use of the property shall be limited to industrial use only. Industrial use includes manufacturing, assembling, warehousing, and related railroad, port, and shipping activities. The deed restriction also prevents installation and operation of extraction or water wells for purposes other than environmental remediation use. A copy of the Declaration of Conditions, Covenants, and Restrictions is included as Attachment B and C, for the Former Drum Storage Area and Flander's Field, respectively.

## 2.0 SAMPLING AND ANALYSIS

Samples of SWMU P-73 were collected in May 1989, August 1989, February 1995, and in 2000. All sampling was conducted in accordance with the Preliminary SWMU Assessment Plan (BSC 1989), Work Plan – supplemental Preliminary SWMU Assessment For SWMU P-73 (BSC 1994) and Supplemental SWMU Investigation Work Plan (BSC 2000). A complete list of site-specific compounds targeted for analysis in the 1995 investigations are provided in Appendix B. A list of targeted compounds for the 2000 sampling event is provided in Table 1 followed by a list of data qualifiers. Laboratory analytical reports are provided in Section II of the RFI.

### 2.1 1989 Preliminary SWMU Assessment Investigations

SWMU P-73 was investigated in 1989 during the Preliminary SWMU Assessment. The preliminary assessment of SWMU P-73 was conducted in two sampling stages. In the first stage, initial sampling was conducted in five locations in May 1989. The second stage consisted of additional deeper sampling from two additional sample locations. A summary of each sampling stage is provided below. An October 26, 1989 BSC memorandum detailing the investigation and analytical results is provided in Appendix B.

#### 2.1.1 May 1989 preliminary SWMU Assessment Investigation

BSC collected twenty soil grab samples from five locations (A, B, C, D, and E) where oil stained soil was observed in the area identified as P-73 (Note this location is the Former Drum Storage Area). At each location, samples to be analyzed for oil and grease were collected at four depth intervals; 0 to 4 inches, 4 to 8 inches, 8 to 12 inches, and 12 to 16 inches. The two locations having the highest average oil and grease content were selected for additional composite testing (Locations A and E, respectively). Sample locations A and E are shown on Figure 2; sample locations B, C, and D were not documented.

#### 2.1.1.1 May 1989 Results

Oil and Grease Results

Analysis of the twenty samples indicates the highest oil and grease concentrations were found in locations A and E. Aliquots from each distinct sampling layer (0-4 inches, 4-8 inches, 8-12 inches, and 12-16 inches) from locations A and E were composited for additional analysis. Oil and grease analytical results are provided in Appendix B, Table 2.

Oil and grease concentrations for location E ranged from 0.6% (0 to 4 inch interval) to 9.1% (4 to 8 inch interval). Oil and grease concentrations for location A ranged from 2.5% (0 to 4 inch interval) to 6.7% (12 to 16 inch interval).

Locations A and E Composite Samples Results

Aliquots from each distinct sampling layer (0 to 4 inches, 4 to 8 inches, 8 to 12 inches and 12 to 16 inches) from locations A and E were composited for additional analysis. These samples were analyzed for oil and grease, EP Extract Metals, and total hazardous organic constituents. Oil and grease ranged from 1.5% (composite of 0 to 4 inch interval) to 6.6% (composite of 4 to 8 inch interval).

Of the eight metals analyzed by EP extraction, three metals were detected (arsenic, chromium and lead). The metals concentrations ranged from 0.01 milligrams per liter (mg/L) of lead from the 4 to 8 inch, 8 to 12 inch and 12 to 16 inch intervals to 0.07 mg/L from the 4 to 8 inch and 12 to 16 inch intervals.

The four composite samples were analyzed for forty-three analytes. Ten of the forty-three analytes were detected in at least one of the four composite samples. Concentrations ranged from 0.007 milligrams per kilogram (mg/kg) of ethylbenzene from the 4 to 8 inch interval to 3.7 mg/kg of m- and p- cresol from the 12 to 16 inch interval.

The composite sample analytical results are provided in Appendix B (Table 1 of the 1989 sample summary memorandum).

### 2.1.2 August 1989 Preliminary SWMU Assessment Investigation

Based on the May 1989 results, additional sampling was completed. From the two selected locations (A-02 and B-02), four composite samples (one per depth interval) were collected and analyzed for hazardous organic constituents, polychlorinated biphenyls (PCBs), and metals.

Two test pits (A-02 and B-02) were excavated at SWMU P-73 (Former Drum Storage Area). Each test pit was dug to depths of approximately 54 inches below surface grade. At each test pit, a sample was collected at the following depths below grade: 26 inches, 40 inches, and 54 inches. Three composite samples (one per depth interval) were collected from the aliquots of both test pits and analyzed for oil and grease, hazardous organic constituents, PCBs, and EP Extract metals. Test pit logs are not available.

#### 2.1.2.1 August 1989 Results

The two sample locations (A-01 and B-01) were composited into three separate samples: 28 inches below grade (bg), 40 inches bg and 54 inches bg, and analyzed for oil and grease, EP Extractable metals and total hazardous organic constituents. Oil and grease ranged from not detected (<0.05%) at 54-inches bg to 2.3% at 26 inches bg.

Of the eight EP Extractable metals analyzed, only chromium (0.07 mg/L) and arsenic (0.13 mg/L) were detected. Both were detected at 29 inches bg. Based on these results, the soil does not meet 40 CFR part 261 metals toxicity criteria for a RCRA Hazardous Waste.

Of the forty-three hazardous organic analytes analyzed, only four were detected (chloroform, methylene chloride, methyl ethyl ketone and total xylenes). All four analytes were detected at 26 inches bg and ranged in concentration from 0.007 mg/L of methylene chloride to 0.15 mg/kg of methyl ethyl ketone. No analytes were detected at the 40 inches bg or 54 inches bg depths.

Analysis of the deeper samples (26 inches to 54 inches) collected in August 1989 indicated a decreased amount of oil and grease as compared to the surface samples (surface to 16 inches) collected in May 1989. In general, both hazardous constituents and metals were either not detected or had significantly decreased in concentration with respect to the surficial samples. Analytical results are provided in Appendix B (Table 1 of the Sample Summary Memorandum).

## 2.2 February 1995 Investigation

As mentioned in Section 1.2, soil from the Former Drum Storage Area was excavated and placed in an area south of the Galvanizing Mill, about ½-mile southwest of the Former Drum Storage Area (original P-73). This area is now known as Flander's Field.

Four test pits were dug (TP-1, TP-2, TP-3, and TP-4) in the Former Drum Storage Area and five piles of stockpiled soil were sampled (SP-A, SP-B, SP-C, SP-D, and SP-E) in Flanders Field as shown in Figures 2 and 3, respectively. Sample records are provided in Appendix D.

**FORMER DRUM STORAGE AREA**

The test pits were dug to the top of the native clay unit, which occurred from 3.5 to 4.5 feet below the surface. Each test pit was approximately 4 feet wide by 8 feet long. A clean backhoe excavator was used to excavate the test pits. The excavator bucket was steam-cleaned on-site prior to the start of excavation work and between test pit locations.

Soil samples were collected from the floor of each pit using a clean stainless-steel trowel and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, cyanide, oil and grease, percent water and pH. For all but VOC analysis, three equal weight samples were collected from three uniformly spaced points along the centerline of the test pit floor and composited by the laboratory. Four composite samples (one per test pit) were formed. Samples for VOC analyses consisted of a grab sample collected from the bottom of each test pit. The location of the sample was determined based on headspace analysis using a photoionization detector (PID). Total constituent analyses were requested for each of the specified analytes. Additionally, Synthetic Precipitation Leaching Procedure (SPLP) analysis

was requested for any VOC and SVOC, which were present in the total constituent analyses. For metals, both total and SPLP analyses were requested.

**FLANDER'S FIELD**

Three soil samples (SP-ACE, SP-B and SP-D) were collected from the soil/fill stockpiles associated with P-73. Sample "SP-ACE" is a composite sample from three piles, samples SP-B and SP-D are composite samples from individual piles. The locations of the samples are shown on Figure 3.

A single excavation was completed in stockpiles A1, C3, E1, and the middle 1-foot interval of each excavation were sampled. These three samples were composited to form the sample (SP-ACE) and were analyzed for SVOCs, metals, cyanide, PCBs, oil and grease, percent water and pH. The laboratory conducted sample compositing. By random selection of the three sample locations, one grab sample (SP-ACEV) was collected from pile A1 and submitted for VOC analysis. The selected sample location for VOC analysis could not be selected by headspace screening as the PID had malfunctioned and visual and olfactory inspection failed to identify a location with potentially elevated VOCs.

Samples were also collected from stockpiles B and D. Three locations (B1, B2, and B3) were excavated in pile B and two (D1 and D2) were excavated in pile D. The top, middle and bottom of each pile was sampled for a total of nine sampling locations from pile B and six samples from pile D. Composite samples representative of piles B (SP-B) and D (SP-D) were analyzed for SVOCs, metals, cyanide, PCBs, oil and grease, percent water and pH. The laboratory performed sample compositing. The composite sample for pile B was formed from nine equal sized aliquots of material collected from the nine sampling locations. The composite sample from pile D was formed from six equal sized aliquots of material from the six sampling locations.

Grab samples, one each from piles B and D were collected and analyzed for VOCs. The selected VOC sample collected from pile B (SP-BV) was chosen by field screening with a PID. The VOC sample from pile D (SP-DV) as chosen using a random number generator table as provided in the work plan, as the PID was determined to be malfunctioning and visual and olfactory inspection failed to identify a location with potentially elevated VOCs.

### 2.2.1 February 1995 Total Constituent Results

**FORMER DRUM STORAGE AREA**

Total Constituent analysis of the samples collected from the test pits detected five VOCs, one SVOC, six metals and oil and grease. PCBs were not detected in any of the test pit samples. VOCs ranged from 1.8 micrograms per kilogram (ug/kg) of bromoform (TP-1 [3.8-4.0 feet]) to 3.3 ug/kg of 1,1,2,2-tetrachloroethane (TP-1 [3.8-4.0 feet]). These values were estimated. No VOCs were detected in TP-3 (3.0-3.5 feet). One SVOC, di-n-butylphthalate, was detected at 120 ug/kg (TP-4 [2.5-3.5 feet]). Six metals were detected ranging from 3.3 mg/kg of arsenic (TP-4 [2.5 to 3.5 feet)] to 130 mg/kg of barium (TP-1 [3.8-4.0 feet]). These values are estimated. Oil and grease were detected in all the samples ranging from 910 mg/kg (TP-3 [3.0-5.0 feet]) to 2,500 mg/kg (TP-2 [4.0-4.5 feet]). Table 2 summarizes the detected analytes from the February 1995 sampling event.

**FLANDER'S FIELD**

Total Constituent analysis of the samples collected from the stockpiles detected nine VOCs, nineteen SVOCs, one PCB, eight metals, oil, and grease. VOCs ranged from 2.8 ug/kg of ethylbenzene (SP-ACEV) to 27 ug/kg of toluene (SP-BV [8-9 feet]). SVOCs ranged from 160 ug/kg of 3 methylphenol and 4-methylphenol (SP-D [5.5-6.5 feet]) to 12,000 ug/kg of pyrene (SP-B [8-9 feet]). The PCB detected was Aroclor 1260 at 40 ug/kg (SP-ACE). Metals ranged from 0.68 mg/kg of cadmium (SP-ACE) to 94.3 mg/kg of chromium (SP-ACE). Oil and grease ranged from 6,770 mg/kg (SP-D [5.5-6.5 feet]) to 10,300 mg/kg (SP-B [8-9 feet]).

Analytical results are provided in Table 3.

### 2.2.2 February 1995 SPLP Results

SPLP analyses were conducted to more closely mimic the effect of compounds leaching from the soil due to rainwater infiltration. The SPLP results help evaluate what compounds can potentially leach from the soils. The analyses were performed in accordance with the USEPA's SW846 Method 1312 protocols.

**FORMER DRUM STORAGE AREA**

SPLP extraction of the samples detected one VOC, one SVOC, and one metal. The VOC, methylene chloride, was detected in TP-1 (3.8-4.0 feet) at a concentration of 0.006 mg/L; however, the analyte was not detected in the Total Constituent analysis. The SVOC, naphthalene, was detected in TP-3 (3.0-3.5 feet) at a concentration of 0.002 mg/L. It should be noted that naphthalene was not detected in the Total Constituent analysis. One metal, lead was detected in TP-1 (3.8-4.0) and TP-3 (3.0-3.5) at 0.0004 mg/L and 0.0031 mg/L, respectively. Table 2 summarizes the detected SPLP analytes.

**FLANDER'S FIELD**

SPLP extraction of the samples detected one VOC, two SVOCs, and two metals. The VOC detected was methyl ethyl ketone at 0.0023 mg/L (SP-BV). SVOCs detected were phenol at 0.003 mg/L (SP-B) and bis (2-ethylhexyl) phthalate (SP-ACE). Metals detected were selenium at 0.007 mg/L (SP-D) to arsenic at 0.037 mg/L (SP-B).

A summary of analytical results is provided in Table 3.

### 2.3 December 2000 Investigation

In December 2000, five surface soil samples were collected from Flander's Field. These five locations (SS-01, SS-02, SS-03, SS-04 and SS-05) are shown on Figure 3. Samples were collected from the 0 to 6 inches interval for VOCs, SVOCs, metals, and general chemistry parameters including Total Organic Carbon (TOC) and Toxicity (TOX). In addition, sample

processing by the Toxicity Characteristic Leaching Procedure (TCLP) and the SPLP was conducted. Sample records are provided in Appendix D.

### 2.3.1 December 2000 Total Constituent Results

Total constituent analysis of the samples detected eleven SVOCs, and fifteen metals. No VOCs were detected in the samples. SVOCs ranged from 31 ug/kg of bis(2-ethylhexyl) phthalate (SS-04) to 2,700 ug/kg of fluoranthene (SS-05). Metals ranged from 0.018 mg/kg of mercury (SS-01) to 409 mg/kg of chromium (SS-02). Results are provided in Table 4.

### 2.3.2 December 2000 SPLP Results

SPLP extract of the samples detected five VOCs, and eight metals. No SVOCs were detected. VOCs ranged from 0.005 mg/L of ethylene benzene in SS-03 to 0.021 mg/L of methylene chloride in SS-05. Metals ranged from 0.0099 mg/L of barium in SS-05 to 62.8 mg/L of calcium in SS-01. Results are provided in Table 4.

### 2.3.3 December 2000 TCLP Results

TCLP results were compared to regulatory concentration levels as listed in the 40 CFR Part 261. The TCLP extract concentrations indicate that the materials stored in SWMU P-73 do no meet TCLP criteria. Results are provided in Table 5.

## 2.4 Summary of Analytical Results

Based on the 1989 analytical results, the soil contained concentrations of oil and grease; however, these materials were removed by BSC in the early 1990's and placed in Flanders Field. The subsequent sampling of the soil in P-73 indicated a lower concentration of oil and grease in samples collected from the remaining soils.

The 1995 analytical results indicated the presence of VOCs, SVOCs and metals in both the Former Drum Storage and Flander's Field areas. In the Former Drum Storage Area, five VOCs, one SVOC, and six metals were detected by the Total Constituent analysis. Subsequent SPLP analysis, however, detected one VOC, one SVOC and one metals. In the Flander's Field area, nine VOCs, nineteen SVOCs, eight metals, and one PCB Aroclor were detected. Subsequent SPLP analysis of these samples detected only one VOC, two SVOCs and two metals. The SPLP analysis of the 1995 samples indicates the detected constituents have a low potential for leaching.

The year 2000 surface samples from Flander's Field indicate concentrations of several SVOCs and metals in the samples in the Total Constituent analysis. No VOCs were detected. SPLP extraction of the samples detected concentrations of metals and VOCs. No SVOCs were detected. This indicates that SVOCs are unlikely to leach from the SWMU material.

The TCLP extract concentrations indicate that the materials stored in SWMU P-73 do not meet TCLP criteria.

Further evaluation of the compounds detected in the SWMU material is presented in the following Human Health Risk Assessment in Section 3.0.

## 3.0 RISK ASSESSMENT

A human health risk assessment, as described in the *Human Health Risk Assessment Work Plan* (BSC 1997), was conducted for SWMU P-73, Former Drum Storage Area East of the Cold Strip Mill. The results of the Tier 1 Human Health Risk Assessment (HHRA) are presented here and are organized into the following sections: Data Evaluation, Exposure Assessment, Toxicity Assessment, Risk Characterization and Uncertainty Analysis. The major components of this HHRA have previously been presented in Human Health Risk Assessment Report, Part IV of this RFI Report. Therefore, the following sections provide summary overviews of previously presented information. This section, therefore, serves as a summary report, bringing together all associated and related work from previous risk assessment deliverables, and providing the conclusions of the SWMU-specific risk assessment.

### 3.1 Data Evaluation

A list of 96 constituents of potential interest (COPIs) was developed for the BSC Lackawanna, New York facility based on USEPA and industry studies (BSC 1998). The list contains hazardous constituents that could be present in the waste streams as a result of integrated iron and steel plant operations, such as those historically conducted at the Lackawanna facility. Human Health Risk Assessment ID No. 1 (BSC 1998) established the chemicals of potential concern (COPCs) for each SWMU at the Lackawanna Facility. The COPCs were determined by sequentially applying the following criteria to each COPI on a medium by medium basis for each SWMU and watercourse: 1) the chemical was detected in at least 5% of the samples, 2) the chemical was detected in at least one sample at levels above background (*i.e.*, the maximum concentration was above background; for chemicals in surficial SWMU material only), and 3) the chemical was positively detected in at least one sample at levels above applicable screening criteria [*i.e.,* the maximum concentration was greater than the screening criteria: USEPA Region III Risk Based Concentrations (RBCs), USEPA Soil Screening Levels (SSLs), or NYSDEC Ambient Water Quality Standards and Guidance values].

In accordance with ID No. 1, background comparisons were not made for constituents in subsurface soil.

The 1995 and 2000 sampling data for SWMU P-73 (as presented in Section 2.0 of this report) were evaluated in order to identify the site-related COPCs for the SWMU. Originally, COPCs were determined in ID No. 1; however, as some screening criteria were revised since ID No. 1 was submitted, and because additional SWMU data was collected, this screening process was updated (Tables 6 and 7). Table 6 presents the screening of surficial SWMU material and Table 7 presents the screening of subsurface SWMU material.

Three inorganic COPCs (arsenic, chromium, and thallium) were identified in surficial SWMU material; no volatile or volatile semivolatile organic COPCs were identified. One inorganic (arsenic) and five semivolatile organic COPCs (all PAHs) were identified subsurface SWMU material; no volatile organic COPCs were identified. Representative concentrations were then determined for each COPC. For COPCs with data set sample sizes of ten or greater, the 95% upper confidence limit of the mean (95% UCL) was calculated and used as the representative concentration for that COPC. For COPCs with sample sizes of less than ten, the maximum concentration was used. Between one and six surface and between four and six subsurface soil samples were collected from SWMU P-73, therefore, the maximum concentrations were used as representative concentrations (Table 8). SWMU P-73 is not assigned to a specific groundwater zone. Therefore, there are no groundwater COPCs in this HHRA (BSC 1998, 1999b).

## 3.2 Exposure Assessment

The exposure assessment conducted for SWMU P-73 included a review of current and future human receptor scenarios and potential exposure pathways, as related to COPCs. In general, exposure pathways by which a human receptor could come into contact with SWMU material are defined by four components (USEPA 1989):

- A source and mechanism of constituent release to the environment,
- An environmental transport mechanism,
- A point of potential human contact with the affected medium, and
- A route of entry into humans.

If any one of these components is missing, the pathway is considered incomplete and therefore does not contribute to receptor exposure.

Human Health Risk Assessment ID No. 2 (BSC 1999b) presented the current and future human receptor scenarios and potentially complete exposure pathways for each of the SWMUs identified at the Lackawanna Facility. ID No. 1 (BSC 1998) identifies the COPCs; these COPCs were also integral in determining complete exposure pathways, based on their type and presence in each media (*e.g.*, there are no volatile COPCs in SWMU P-73 surface or subsurface material, which precludes inhalation of volatile chemicals from SWMU material as a complete exposure pathway for any receptor population). Potential exposure pathways for SWMU P-73 are summarized in Table 9.

For SWMU P-73, the potential receptor scenarios include a current non-BSC commercial/industrial worker, a future commercial/industrial worker, a future construction worker, a future utility/maintenance worker, a trespasser, a future marina worker, a future greenway user, a future fenceline resident, and a present fenceline resident. These scenarios were developed based on current use patterns, unrestricted future commercial/industrial development, and potential future recreational uses.

For the future commercial/industrial worker scenario, the future utility/maintenance worker scenario, the future construction worker scenario and the trespasser scenario, the following pathways were determined to be complete: direct contact (*i.e.*, ingestion or dermal contact) with surface SWMU material and inhalation of airborne particulates from surface SWMU material. The future construction worker and future utility/maintenance worker scenarios could additionally be exposed via direct contact with subsurface SWMU material (ingestion, dermal contact, and particulate inhalation) during potential future digging activities. The only potentially complete exposure pathway for the current non-BSC commercial/industrial worker, future marina worker, future greenway user, and present and future resident scenarios is inhalation of particulates in surficial SWMU material. A detailed description of the potentially exposed receptor scenarios and pathways for SWMU P-73 can be found in ID No. 2 (BSC 1999b).

## 3.3 Toxicity Assessment

A toxicity assessment characterizes the relationship between the exposure to a COPC and the frequency of adverse health effects that may result from such an exposure (dose-response). The end result of the dose-response assessment is the determination of human uptake levels that provide an adequate measure of protection to exposed persons for carcinogenic and noncarcinogenic endpoints. The derivation of acceptable levels of exposure (*e.g.*, risk-based screening levels) and the manner in which these levels are used in this HHRA are discussed below.

Tier 1 risk-based screening levels (RBSLs) were calculated and compared to the representative SWMU P-73 COPC concentrations. RBSLs are defined as concentrations of COPCs in media that are not expected to produce any adverse health effects under chronic exposure conditions. Tier 1 RBSLs were developed using information previously defined and described in detail in the Work Plan and ID No. 2;. The equations used to calculate the RBSLs follow basic USEPA risk assessment principles (USEPA 1989; 1996). Conservative exposure parameters, as defined by the ASTM Standard (ASTM 1995) and USEPA guidance (USEPA 1989, 1991a, and 1991b), and USEPA toxicity criteria (USEPA 2000b), were inputs into these equations to develop the RBSLs. As some of the toxicity criteria revised by the USEPA since originally presented in ID No. 1, they are presented in Table 10 of this report. The above information was used to calculate Tier 1 RBSLs for COPCs in SWMU material, for each of the nine exposure scenarios (Table 11).

Certain items should be noted regarding the RBSL calculations. First, the future commercial/industrial worker scenario RBSL for direct contact with arsenic (0.94 mg/kg) is below the arsenic background level established for the site (12 mg/kg). As the background level was deemed an appropriate screening value in a previous step of the HHRA, it was used as the default RBSL in lieu of the future commercial/industrial worker scenario RBSL. It should also be noted that chromium in surface SWMU material was conservatively assumed to be hexavalent chromium in the absence of data indicating the valence state. This is considered to be a conservative measure as hexavalent chromium is more toxic than other forms of chromium, and it is unlikely that all of the chromium found in SWMU Group P-73 surface material is

hexavalent. Some of the RBSLs for COPCs in SWMU material were determined to be health protective at levels that are greater than 1,000,000 parts per million (mg/kg); such cases are noted by the following indicator ">1,000,000" in Table 11.

A comparison of the representative COPC concentrations to RBSLs for each of the exposure scenarios is presented in Table 11. This comparison provides a preliminary screening of potential risks to the specific receptor populations and exposure pathways identified for SWMU P-73. For the future commercial/industrial worker scenario, the representative concentrations of arsenic and chromium in surficial SWMU material exceed the direct contact RBSL. The RBSL for arsenic however was lower than the background concentrations of arsenic. For the future construction worker scenario, the representative concentrations of arsenic in surficial SWMU material and arsenic and benzo(a)pyrene in subsurface SWMU material exceed the respective direct contact RBSLs. For all other scenarios, chemicals and pathways, the representative concentrations are below the respective RBSLs.

In accordance with the Work Plan (see Figure 2, the Risk-Based Decision Tree; BSC, 1996) those COPCs that do not exceed the Tier 1 RBSLs are not evaluated further. For those COPCs that exceed Tier 1 RBSLs, the risk to human health is evaluated further in a Tier 1 HHRA.

### 3.4 Risk Characterization

Risk characterization involves the estimation of the magnitude of potential adverse health effects of the COPCs, and summarizing the nature of the health impact to the defined receptor populations. It combines the results of the toxicity and exposure assessments to provide numerical estimates of health risk.

In accordance with Part IV of this RFI, those COPCs that exceeded an RBSL were further evaluated in a Tier I HHRA. A Tier I HHRA provides an estimate of risk and hazard based on a comparison of the RBSL (*i.e.*, health-protective levels) to the COPC concentrations (*i.e.*, site-specific levels). For those COPCs, that exceeded an RBSL, a screening-level hazard index (SLHI) was calculated to evaluate noncarcinogenic health effects, and a total screening-

level cancer risk ($SLCR_{total}$) was calculated to evaluate carcinogenic effects. The SLHI and $SLCR_{total}$ methodologies are presented in the Work Plan (BSC 1997).

### 3.4.1 Noncarcinogenic Hazards

The noncancer hazards were assessed in this HHRA using a hazard quotient approach (USEPA 1989). For each COPC, the noncarcinogenic RBSL was compared to the COPC representative concentrations to determine the screening level hazard quotient (SLHQ) for that chemical. The equation is as follows:

$$SLHQ = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}}$$

The SLHQs for each chemical are summed to create a total Screening Level Hazard Index ($SLHI_{total}$) for each pathway. The smaller the SLHQ/SLHI, the greater the degree of protection for that pathway. Based on USEPA methodology (USEPA 1989) and as discussed in the Work Plan, if the SLHI is less than 1, the risks are considered negligible. Those $SLHI_{total}$s that exceed 1 were further evaluated by developing target organ-specific SLHIs. This process is appropriate as only certain chemicals affect similar biological target endpoints; it is only relevant to quantify the additive effects of these chemicals. This process is illustrated in Table 12.

The $SLHI_{total}$ for the future commercial/industrial worker scenario is 2.5, as a result of direct contact with arsenic (SLHQ = 1.4) and chromium (SLHQ = 1.1) in surficial SWMU material. In accordance with the Work Plan, as the $SLHI_{total}$ is greater than 1, it is subject to further evaluation by target organ. For the commercial/industrial worker scenario exposed to surficial SWMU material, the skin SLHI is 1.4 (solely arsenic) and the lung SLHI is 1.1 (solely chromium).

### 3.4.2 Carcinogenic Risk

In a human health risk assessment, carcinogenic health risks are defined in terms of the probability of an individual developing cancer over a lifetime as the result of exposure to a given

chemical at a given concentration (USEPA 1989). The incremental probability of developing cancer over a lifetime (*i.e.*, the theoretical excess lifetime cancer risk) is the additional risk above and beyond the cancer risk an individual would face in the absence of the exposures characterized in this risk assessment. In this Tier I HHRA, cancer risk was evaluated according to the following equation:

$$SLCR = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}} x \text{ Target Risk Level}$$

Cancer risks are summed regardless of the differences in target organ, weight-of-evidence for human carcinogenicity, or potential chemical interactions (*e.g.*, antagonistic or synergistic effects). This approach is consistent with USEPA's current approach to carcinogenic effects, which is to assume effects are additive unless adequate information to the contrary is available (USEPA 1989). Based on this methodology and as discussed in the Work Plan, if the total screening level cancer risk ($SLCR_{total}$) for each receptor/pathway is less than $1 \times 10^{-4}$, the risks are considered negligible.

All SLCR totals are lower than $1 \times 10^{-4}$. For the future commercial/industrial worker scenario, the $SLCR_{total}$ is $5 \times 10^{-5}$ from arsenic in surficial SWMU material. For the future construction worker scenario, the $SLCR_{total}$ is $6 \times 10^{-6}$. These $SLCR_{total}$s were further evaluated by media type. The SLCR for direct contact with surficial SWMU material is $3 \times 10^{-6}$ (arsenic comprises the entire risk). The SLCR for direct contact with subsurface SWMU material is $3 \times 10^{-6}$, both arsenic and benzo(a)pyrene contribute to this risk.

## 3.5 Conclusions

The results of the Tier 1 HHRA are that, for the future commercial/industrial worker scenario, arsenic and chromium in surface SWMU material produce noncarcinogenic hazard levels that are greater than the Tier 1 noncarcinogenic benchmark of 1.0. Based on these results and in accordance with the Work Plan, further evaluation will be completed during the Corrective Measures Study (CMS) and may include a Tier 2 assessment or an evaluation of

corrective measures. The uncertainties inherent in these conclusions are presented in the following Uncertainty Analysis.

### 3.5.1 Uncertainty Analysis

There are multiple sources of uncertainty that can be identified for any risk assessment. These include, among others, uncertainty associated with the toxicity criteria used to derive dose-response factors, uncertainties associated with exposure parameters used in the exposure assessment, and uncertainties associated with combining exposure parameters and toxicity criteria to characterize risk.

In the development of any health assessment, some level of uncertainty is introduced each time an assumption is relied upon to describe a dynamic parameter. Some assumptions have a significant scientific basis while others do not, which may result in the selection and use of conservative, default exposure parameters in the exposure assessment. The selection of multiple conservative assumptions in the exposure assessment generally results in an overestimation of potential health risks associated with exposure to specific chemical constituents. The primary areas of uncertainty for this risk assessment are qualitatively discussed below.

### 3.5.2 Site Sampling and Representative Concentrations

SWMU samples were selected in an attempt to identify the highest concentrations of chemicals at the site. Sample biasing was accomplished based on visual observations and photoionization detector readings. Thus, the sampling activities are thought to have characterized the most highly impacted areas of the SWMU, and not an average. This is conservative, as a potential receptor is not expected to remain on, or inhale particulates from, one portion of the SWMU for his or her entire exposure duration. Therefore, it is believed that the maximum concentrations used in this HHRA are likely to represent the true maximum site concentrations.

It should also be noted that, for all of the COPCs in this SWMU material, the maximum

concentration was used as the representative concentration in this HHRA. This was because an insufficient number of observations were available to calculate a 95% UCL. The representative concentrations were used to compare to the RBSLs calculated for this HHRA, and ultimately determine the COPCs in this HHRA. Use of the maximum concentrations, and for SWMU material, maximum concentrations of the biased sampling are very conservative methodologies utilized in this HHRA.

### 3.5.3 COPC Selection Process

The COPCs evaluated for SWMU P-73 were identified in the HHRA ID No. 1 (BSC 1998). These chemicals were selected in part because of their representative concentrations exceeded Region III RBCs (USEPA 2000a) for residential scenarios. Since no residential exposures are realistic for any of the on-site scenarios, some chemicals have been retained as COPCs that are not likely to pose a potential threat to most of the human receptors evaluated here.

### 3.5.4 Exposure Parameters

Several conservative default exposure parameters (*e.g.*, inhalation rates, exposure frequency, exposure duration) were incorporated into the exposure assessment to define general population behavior. For example, for the industrial/commercial worker scenarios, default exposure parameters are intended to be conservative and representative of an individual who is consistently present at the site 24 hours a day, 250 days a year, in the area of highest concentration. It is more likely that the exposure of the industrial worker scenario to a particular SWMU on the Lackawanna site is limited to only a few hours a day, 2 weeks year. Most parameters incorporated into the exposure assessment are conservative values and used to define worst-case population behavior. The net effect of using multiple conservative exposure assumptions is the overestimation of potential health risks.

Additionally, for a receptor population such as an industrial worker or a resident (*i.e.*, where exposure duration is greater than 250 days/year), exposure frequency typically is corrected in site-specific health risk assessments for the fraction of the year when outdoor exposure to soil

is limited due to severe weather conditions such as snow, ice, rain, and freezing temperatures (USEPA 1989). This factor is called a meteorological factor. Because of the geographical location of the Lackawanna site, a correction factor for weather conditions would be reasonable. In this Tier I human health risk assessment, exposure did not exclude days when the temperature is less than 32°F, when there is snow cover, or the ground was wet from other forms of precipitation. Thus, exposure frequency may be over-estimated in this human health risk assessment.

### 3.5.5 Toxicity Assessment

*Noncarcinogenic Criteria*- Toxicity information for many of the COPCs is limited for humans. Consequently, depending on the quality and extent of toxicity information, varying degrees of uncertainty will be associated with the calculated toxicity values. The toxicity criteria such as the oral Reference Dose (RfD) are based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. In the case of arsenic, there is not a clear consensus among USEPA scientists on the oral RfD. Although in the critical studies (Tseng 1977, Tseng et al. 1968) an extremely large number of people were included in the assessment (> 40,000), the doses of arsenic were not well characterized and other contaminants were present. In fact, though the supporting human toxicity database is extensive, problems exist with all of the epidemiological studies. Applying the Agency's RfD methodology, strong scientific arguments can be made for various values within a factor of 2 or 3 of the currently recommended RfD value, i.e., 0.1 to 0.8 ug/kg/day. It should be noted, however, that the RfD methodology, by definition, yields a number with inherent uncertainty spanning perhaps an order of magnitude. New data that possibly impact on the recommended RfD for arsenic will be evaluated by USEPA as it becomes available. Thus, the USEPA advises that risk managers should recognize the considerable flexibility afforded them in formulating regulatory decisions when uncertainty and lack of clear consensus are taken into account.

*Carcinogenic Criteria*- USEPA cancer SFs are developed using variations of the Linear

Multistage Model (LMS) for carcinogenicity. The LMS is highly conservative as it assumes linearity between dose and effect to zero dose assuming no threshold for carcinogenicity. However, the human body has mechanisms to detoxify most chemicals particularly at low doses, and therefore many scientists believe that most, if not all carcinogens only cause cancer above a "threshold dose."

The carcinogenic COPCs evaluated for this SWMU include arsenic. The inhalation slope factor for arsenic is based on human data from occupational exposure studies, and thus an extrapolation from animal data is not necessary, thereby reducing the some uncertainty in the slope factor. However, there is significant uncertainty associated with the low-dose extrapolation (environmental exposures are relevant in the low-dose range) used to generate the slope factor. The USEPA has used its default linear model to estimate risks in the low-dose range citing lack of carcinogenic mode of action information. Thus, should this information become available, the low-dose carcinogenic risks for arsenic may be evaluated differently.

*Absence of Inhalation Toxicity Criteria* - Although toxicity information is generally available for the most significant chemicals and exposure routes in this HHRA, there were some volatile COPCs in this HHRA for which no inhalation toxicity criteria (RfDs or cancer slope factors) exist. In the absence of data, either the oral RfD or SF was used to evaluate inhalation exposures. The letter "R" on Table 9 notes these instances. It is more conservative to evaluate these chemicals for inhalation exposures than to not evaluate them at all. Nonetheless, route-to-route extrapolations assume the chemical is equitoxic by both routes. Thus, this method potentially overestimates inhalation risks for COPCs evaluated as such.

### 3.5.6 Risk Characterization

Uncertainties in the risk characterization portion of the risk assessment for the facility are a combination of the uncertainties associated with both the dose-response assessment and the exposure assessment. As discussed above, the assumptions and parameters used for both the dose response and exposure assessments are extremely conservative. In addition, since the toxicity criteria and exposure parameters are combined in the risk characterization, the conservatism is compounded.

### 3.5.7 Uncertainty Analysis Summary

This Tier I HHRA includes uncertainties and conservative assumptions that, in general, effectively combine to overestimate the potential current and future exposures. The major sources of uncertainty and conservatisms in this HHRA are summarized below:

- Biased SWMU sample collection
- Use of maximum concentrations as representative concentrations
- Compounding effect of multiple conservative exposure parameters
- No meteorological factor assumption
- Confidence in toxicity criteria
- Extrapolation of oral toxicity criteria to inhalation toxicity criteria

The net effect of the uncertainties of this HHRA is the generation of risk and hazard estimates that probably far exceed any true exposure conditions that currently exist or which could possibly exist in the future.

## 4.0 CONTAINMENT

There are no containment structures for the Flander's Field portion of SWMU P-73. This area consists of numerous uncovered piles of varying sizes laying on a ground surface. The surrounding area is generally flat and any surface runoff would either infiltrate the surrounding surface or evaporate.

The majority of the Former Drum Storage Areas of SWMU P-73 is paved with either asphalt or concrete. Any runoff from the remaining uncovered areas would either infiltrate the surface or evaporate.

## 5.0 CONCLUSIONS

Based on review of the data collected at the 1989, 1995 and 2000 SWMU investigations of both the Former Drum Storage and Flander's Field areas of SWMU P-73 the following conclusion can be made:

- In preparation of the Linde Plant hydrogen station construction and the asphalt paving of the surrounding areas, surface materials from the Former Drum Storage Area were excavated and subsequently placed in Flander's Field area.

- The TCLP extract concentrations indicate that the materials stored in Flander's Field are not above TCLP criteria.

- The 1995 Total Constituent analytical results, when compared to subsequent SPLP results indicate that hazardous constituents within both the subsurface materials in the Former Drum Storage Area and the stockpiles on Flander's Field, have a low potential to leach.

- The year 2000 surface samples from Flander's Field indicate concentrations of several SVOCs and metals in the samples in the Total Constituent analysis. No VOCs were detected. SPLP extraction of the samples detected concentrations of metals and VOCs.

- No SVOCs were detected. The results of the SPLP analysis indicate that the SWMU is not likely to affect the groundwater conditions beneath the SWMU.

- The results of the Tier 1 HHRA are that, for the future commercial/industrial worker scenario, arsenic and chromium in surface SWMU material produce noncarcinogenic hazard levels that are greater than the Tier 1 noncarcinogenic benchmark of 1.0.

Based on these results and in accordance with the work plan, further evaluation will be completed during the Corrective Measures Study (CMS) and may include a Tier 2 assessment or an evaluation of corrective measures.

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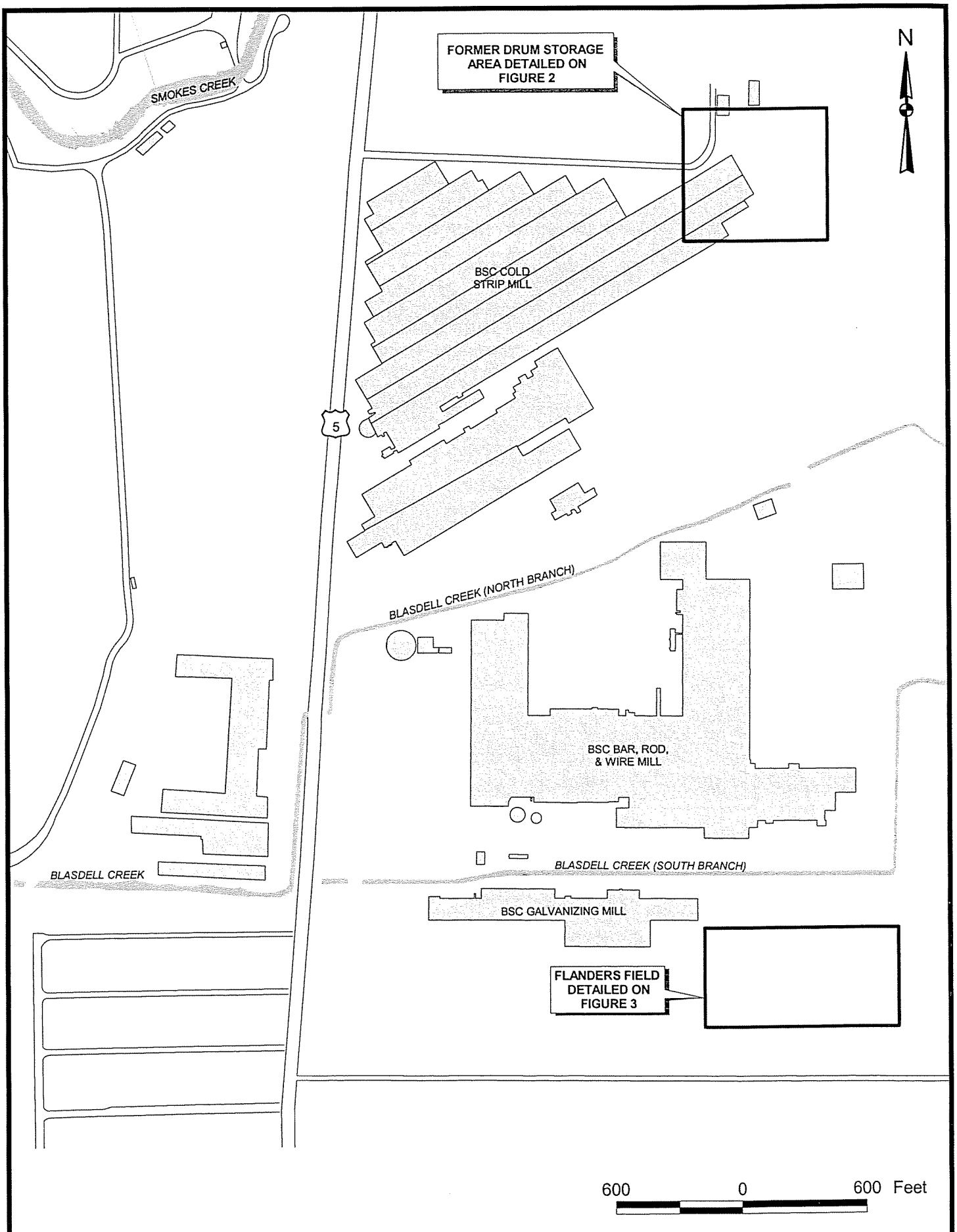
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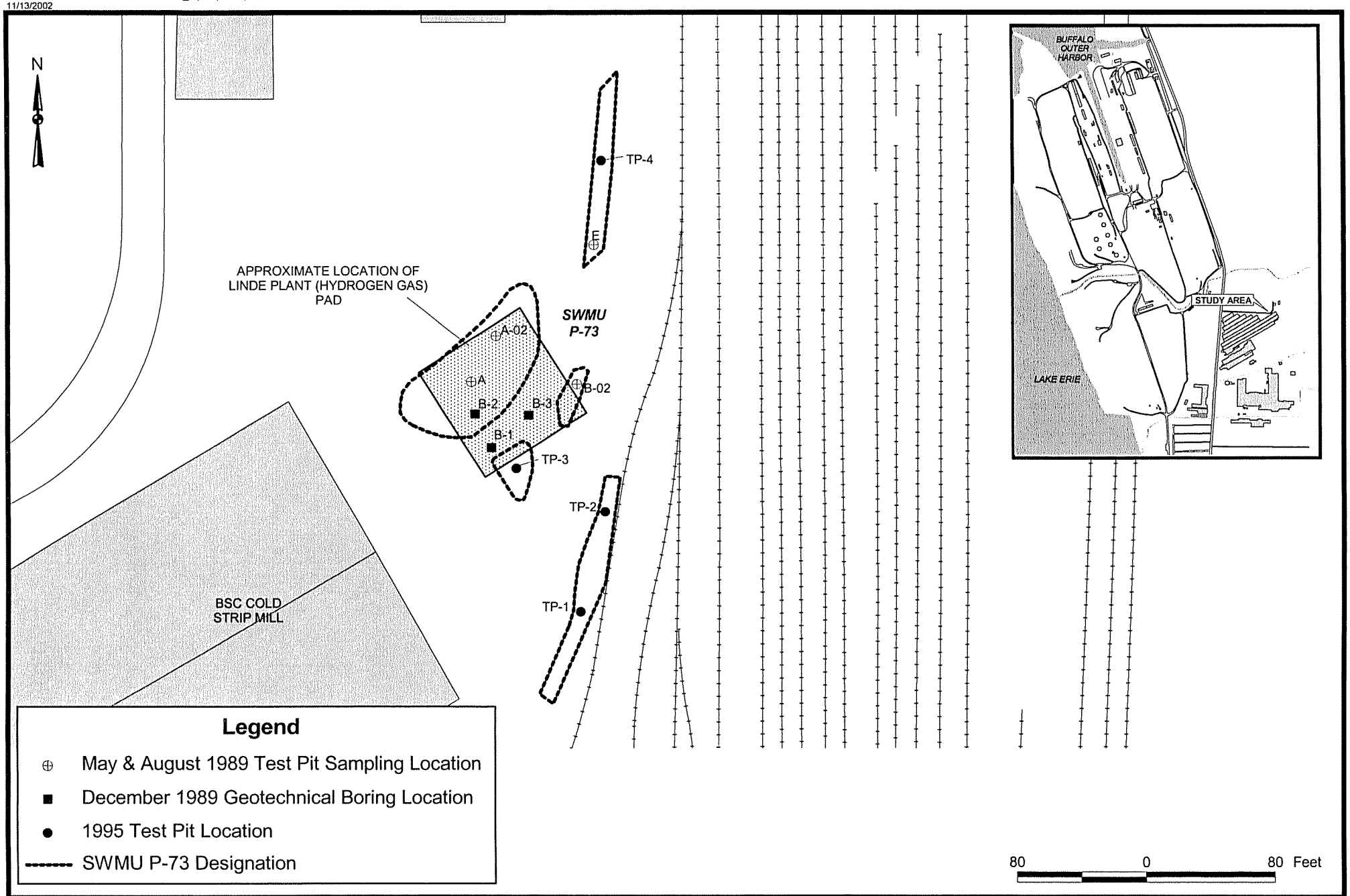
U.S. Environmental Protection Agency (USEPA). 2000b. *Integrated Risk Information System* (IRIS). Cincinnati, OH.




| URS | BETHLEHEM STEEL CORPORATION<br>SITE LOCATION OF THE FORMER DRUM STORAGE AREA AND FLANDERS FIELD (SWMU P-73) | FIGURE 1 |
|---|---|---|

N:\11172630.00000\GIS\PRESENT\swmu_report\p-73.apr P-73 SITE LOCATION
11/13/2002

N:\11172630.00000\GIS\PRESENT\swmu_report\p-73.apr SWMU P-73 DRUM STORAGE AREA
11/13/2002

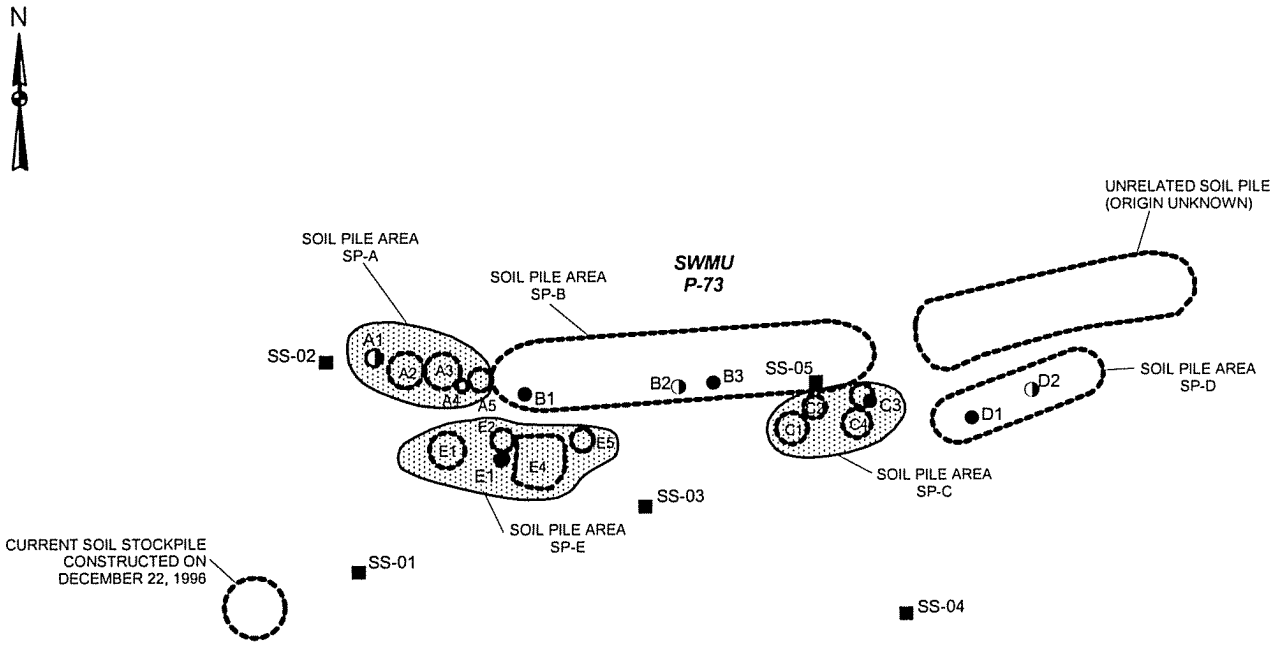


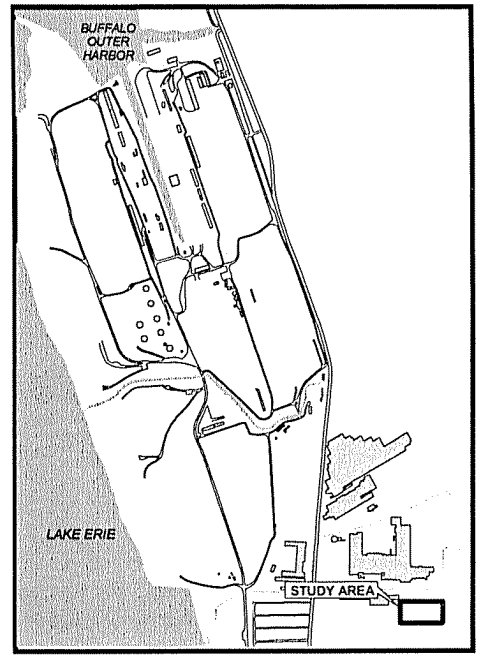

URS

BETHLEHEM STEEL CORPORATION
FORMER DRUM STORAGE AREA (SWMU P-73) SHOWING
1989 SAMPLE AND 1995 TEST PIT LOCATIONS

FIGURE 2

J:\4200008bsc.15\gis\PRESENT\swmu_report\p-73.apr FLANDERS FIELD SAMPLE LOCATIONS
11/15/2001




## Legend

- ■ 2000 Surface Soil Sample Location
- ● 1995 - Composite Sample Aliquot Location
- ◑ 1995 - VOC Grab Sample/Composite Aliquot Location
- ------ SWMU P-73 Designation

70 0 70 Feet

URS

BETHLEHEM STEEL CORPORATION
FLANDERS FIELD (SWMU P-73) SOIL/FILL STOCKPILES SHOWING 1995 AND 2000 SAMPLE LOCATIONS

FIGURE 3

# TABLE 1
## SITE-SPECIFIC HAZARDOUS CONSTITUENTS AND INDICATOR PARAMETERS

| PARAMETER | | |
|---|---|---|
| **Volatile Organic Compounds** | **Semivolatile Organic Compounds** | **Metals** |
| Acrylonitrile | Acenaphthylene | Antimony |
| Benzene* | Anthracene | Arsenic |
| Bromochloromethane | Benzo(a)Anthracene | Barium |
| Bromodichloromethane | Benzo(a)Pyrene | Cadmium |
| Bromoform | Butyl benzyl phthalate | Calcium |
| Bromomethane | 4-Chloro-3-Methylphenol | Chromium* |
| Carbon tetrachloride | bis(2-Chloroethyl)ether | Lead* |
| Chlorobenzene | 2-Chloronaphthalene | Magnesium |
| Chloroethane | Chrysene | Mercury |
| 2-Chloroethyl vinyl ether | 1,2-Dichlorobenzene | Nickel |
| Chloroform | 1,3-Dichlorobenzene | Potassium |
| Chloromethane | 1,4-Dichlorobenzene | Selenium |
| Dibromochloromethane | Di-n-butyl phthalate | Silver |
| Dichlorodifluoromethane | Di-n-octyl phthalate | Sodium |
| 1,1-Dichloroethane | 2,4-Dichlorophenol | Thallium |
| 1,2-Dichloroethane | Diethyl phthalate | |
| 1,1-Dichloroethene | Dimethyl phthalate | |
| trans-1,2-Dichloroethene | 2,4-Dimethylphenol | **Indicator Parameters** |
| 1,2-Dichloropropane | 4,6-Dinitro-2-Methylphenol | Alkalinity (CaCO3 to pH 4.5) |
| cis-1,3-Dichloropropene | 2,4-Dinitrotoluene | Alkalinity Total |
| trans-1,3-Dichloropropene | 2,6-Dinitrotoluene | Chloride |
| Ethylbenzene | bis(2-Ethylhexyl)Phthalate | Cyanide |
| Methylene chloride | Fluoranthene | Sulfate |
| 1,1,1,2-Tetrachloroethane | Fluorene | Total Organic Carbon |
| 1,1,2,2-Tetrachloroethane | Hexachlorobenzene | Total Dissolved Solids |
| Tetrachloroethene | Hexachlorobutadiene | Total Organic Halogens |
| Toluene | Hexachlorocyclopentadiene | Total Recoverable Phenolics |
| 1,1,1-Trichloroethane | Hexachloroethane | |
| 1,1,2-Trichloroethane | Isophorone | |
| Trichloroethene | 3-Methylphenol & 4-Methylphenol | |
| Trichlorofluoromethane | 2-Methylphenol | |
| Vinyl chloride | Naphthalene* | |
| Xylenes, Total | Pentachlorophenol | |
| | Phenanthrene | |
| | Phenol | |
| | Pyrene | |
| | Pyridine | |
| | 2,3,4,6-Tetrachlorophenol | |
| | 1,2,4-Trichlorobenzene | |
| | 2,4,5-Trichlorophenol | |
| | 2,4,6-Trichlorophenol | |

Notes:

* Benzene, chromium, lead, naphthalene, and phenolic compounds represent hazardous metals and organic compounds that are generally prevalent in iron and steel industry wastes and which have been found at varying levels during previous groundwater monitoring studies at the Lackawanna site. These pollutants were also selected by EPA for regulation under 40 CFR 420 (EPA's effluent limitations specific for the iron and steel manufacturing point source category) and cover each major family of hazardous constituents—chromium and lead for metals; benzenes for volatile organics; naphthalene for base/neutral semi-volatile organics; and phenolics for acid extractable semi-volatile organics.

# DATA VALIDATION QUALIFYING FLAGS

U – Compound was analyzed for but not detected above the sample quantitation limit

J – Analyte was positively identified; associated numerical value is an approximation of the analyte concentration

N – Analysis indicates the presence of an analyte for which there is presumed evidence to make a tentative identification

NJ – Analysis indicates the presence of an analyte that has been " tentatively identified" and the numerical value represents the approximate concentration

UJ – Analyte was not detected above the reported samples quantitation limit

B – Metals only: The analyte was detected above instrument detection limits (IDL); the reported concentration is below the contract required detection limit (CRDL)

R – Sample results are rejected due to serious deficiencies in ability to analyze the sample and meet quality control criteria

D – The sample results are reported from a secondary dilution analysis.

Data validation qualifying flags are used in conjunction with reason codes summarized below[1].

| Organics | Metals |
|---|---|
| c – Calibration failure; poor or unstable response | a – Analytical sequence deficiency or omission |
| d – Matrix spike/matrix spike duplicate imprecision | c – Calibration verification failure |
| e – Laboratory duplicate control sample imprecision | d – Matrix duplicate imprecision |
| f – Field replicate or duplicate imprecision | e – Laboratory duplicate control sample imprecision |
| g – Poor chromatography | f – Field replicate or duplicate imprecision |
| h – Holding time violation | h – Holding time violation |
| i – Internal standard failure | k – Serial dilution imprecision |
| j – Poor mass spectrographic performance | l – Laboratory control sample recovery failure |
| l – Laboratory control sample recovery failure | m – Matrix spike recovery failure |
| m – Matrix spike/matrix spike duplicate recovery failure | n- Interference check sample recovery failure |
| r – Linearity failure in initial calibration | o – Calibration blank contamination |
| s – Surrogate spike recovery failure | p – Preparation blank contamination |
| t – Instrument tuning failure | r – Linearity failure in calibration or MSA analysis |
| w – Relative retention time failure | v – Post digestion spike failure |
| x – Field blank contamination | x – Field blank contamination |
| y – Trip blank contamination | z – Laboratory storage blank contamination |
| z – Method blank contamination | Q – Other – total/dissolved imprecision |
| Q - Other | -- |

Note: NA – Not analyzed for that compound

# TABLE 2
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 TEST PIT SOIL SAMPLES - FORMER DRUM STORAGE AREA
# SWMU P-73

| Location ID | | TP-1 | TP-2 | TP-3 | TP-4 |
|---|---|---|---|---|---|
| Sample ID | | TP-1 | TP-2 | TP-3 | TP-4 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 3.8-4.0 | 4.0-4.5 | 3.0-3.5 | 2.5-3.5 |
| Date Sampled | | 02/16/95 | 02/16/95 | 02/16/95 | 02/16/95 |
| Parameter | Units | | | | |
| **Volatile Organic Compounds** | | | | | |
| Bromoform | UG/KG | 1.8 J | 6.6 U | 6.7 U | 6.5 U |
| 1,2-Dichloroethane | UG/KG | 7.2 U | 1.5 J | 6.7 U | 6.5 U |
| 1,1,2,2-Tetrachloroethane | UG/KG | 3.3 J | 6.6 U | 6.7 U | 6.5 U |
| Toluene | UG/KG | 7.2 U | 6.6 U | 6.7 U | 2.1 J |
| Xylenes, Total | UG/KG | 5 U | 5 U | 5 U | 2.6 |
| **Volatile Organic Compounds - SPLP** | | | | | |
| Methylene chloride -SPLP | MG/L | 0.006 J,c | 0.010 UJ,h | 0.010 UJ,h | 0.010 UJ,h |
| **Semivolatile Organic Compounds** | | | | | |
| Di-n-butyl phthalate | UG/KG | 470 U | 430 U | 440 U | 120 J |
| **Semivolatile Organic Compounds - SPLP** | | | | | |
| Naphthalene -SPLP | MG/L | 0.010 U | 0.010 U | 0.002 J | 0.010 U |
| **Metals** | | | | | |
| Antimony | MG/KG | 10.3 J,m | 9.6 J,m | 8.8 J,m | 7.8 UJ,m |
| Arsenic | MG/KG | 10.7 J,m | 3.4 J,m | 5.8 J,m | 3.3 J,m |
| Barium | MG/KG | 130 J,m | 117 J,m | 108 J,m | 119 J,m |
| Chromium | MG/KG | 21.7 J,a | 20 J,a | 21.2 J,a | 19.6 J,a |
| Lead | MG/KG | 12.7 J,m | 12.9 J,m | 12.9 J,m | 10.9 J,m |
| Nickel | MG/KG | 33.6 J,m | 31.2 J,m | 33.6 J,m | 35.4 J,m |
| **Metals-SPLP** | | | | | |
| Lead -SPLP | MG/L | 0.004 | 0.0030 U | 0.0031 | 0.0030 U |
| **General Chemistry Parameters** | | | | | |
| O&G | MG/KG | 1,260 | 2,500 | 910 | 1,750 |
| PHSOL | S.U. | 7.4 J,h | 7 J,h | 6.5 J,h | 6.4 J,h |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 SOIL PILE SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SP-ACE | SP-ACEV | SP-B | SP-BV | SP-D |
|---|---|---|---|---|---|---|
| Sample ID | | SP-ACE | SP-ACEV | SP-B | SP-BV | SP-D |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | - | - | 8.0-9.0 | 8.0-9.0 | 5.5-6.5 |
| Date Sampled | | 02/02/95 | 02/02/95 | 02/01/95 | 02/01/95 | 02/01/95 |
| **Parameter** | **Units** | | | | | |
| **Volatile Organic Compounds** | | | | | | |
| Benzene | UG/KG | NA | 5.8 | NA | 7.5 | NA |
| Carbon disulfide | UG/KG | NA | 5.5 U | NA | 4.8 J | NA |
| Ethylbenzene | UG/KG | NA | 2.8 J,i | NA | 3.3 J | NA |
| Methylene chloride | UG/KG | NA | 5.4 J | NA | 15 | NA |
| 1,1,2,2-Tetrachloroethane | UG/KG | NA | 3 J,i | NA | 5.6 U | NA |
| Tetrachloroethene | UG/KG | NA | 3.3 J,i | NA | 5.6 U | NA |
| Toluene | UG/KG | NA | 7.8 J,i | NA | 27 | NA |
| Trichlorofluoromethane | UG/KG | NA | 7.1 J,r | NA | 5.6 UJ,r | NA |
| Xylenes, Total | UG/KG | NA | 7.2 | NA | 4 | NA |
| **Volatile Organic Compounds - SPLP** | | | | | | |
| Methyl ethyl ketone -SPLP | MG/L | NA | 0.050 U | NA | 0.0023 J | NA |
| **Semivolatile Organic Compounds** | | | | | | |
| Acenaphthene | UG/KG | 330 J,g | NA | 1,000 J | NA | 220 J |
| Acenaphthylene | UG/KG | 730 UJ,g | NA | 1,800 U | NA | 190 J |
| Anthracene | UG/KG | 650 J,g | NA | 2,300 | NA | 500 |
| Benzo(a)anthracene | UG/KG | 1,400 J,g | NA | 5,000 | NA | 1,900 |
| Benzo(a)pyrene | UG/KG | 850 | NA | 4,700 | NA | 240 J |
| Benzo(b)fluoranthene | UG/KG | 730 U | NA | 8,900 | NA | 3,000 |
| Benzo(ghi)perylene | UG/KG | 730 U | NA | 2,400 | NA | 440 U |
| Benzo(k)fluoranthene | UG/KG | 730 U | NA | 4,500 | NA | 830 |
| Chrysene | UG/KG | 1,500 J,g | NA | 5,500 | NA | 1,700 |
| Di-n-butyl phthalate | UG/KG | 180 J,g | NA | 410 J | NA | 400 J |
| Dibenz(a,h)anthracene | UG/KG | 730 U | NA | 840 J | NA | 440 U |
| Fluoranthene | UG/KG | 2,900 J,g | NA | 9,200 | NA | 3,800 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 SOIL PILE SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SP-ACE | SP-ACEV | SP-B | SP-BV | SP-D |
|---|---|---|---|---|---|---|
| Sample ID | | SP-ACE | SP-ACEV | SP-B | SP-BV | SP-D |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | - | - | 8.0-9.0 | 8.0-9.0 | 5.5-6.5 |
| Date Sampled | | 02/02/95 | 02/02/95 | 02/01/95 | 02/01/95 | 02/01/95 |
| Parameter | Units | | | | | |
| **Semivolatile Organic Compounds** | | | | | | |
| Fluorene | UG/KG | 350 J,g | NA | 840 J | NA | 200 J |
| Indeno(1,2,3-cd)pyrene | UG/KG | 730 U | NA | 4,400 | NA | 440 U |
| 3-Methylphenol & 4-Methylphenol | UG/KG | 730 U | NA | 1,800 U | NA | 160 J |
| Naphthalene | UG/KG | 240 J | NA | 370 J | NA | 440 U |
| Phenanthrene | UG/KG | 2,100 J,g | NA | 9,300 | NA | 2,200 |
| Phenol | UG/KG | 260 J | NA | 640 J | NA | 320 J |
| Pyrene | UG/KG | 2,200 J,g | NA | 12,000 | NA | 3,200 |
| **Semivolatile Organic Compounds - SPLP** | | | | | | |
| bis(2-Ethylhexyl)phthalate -SPLP | MG/L | 0.005 J | NA | 0.010 U | NA | 0.010 U |
| Phenol -SPLP | MG/L | 0.020 U | NA | 0.003 J | NA | 0.010 U |
| **Polychlorinated Biphenyls** | | | | | | |
| Aroclor 1260 | UG/KG | 40 J,g | NA | 38 U | NA | 45 U |
| **Metals** | | | | | | |
| Antimony | MG/KG | 14.4 J,m | NA | 6.7 UR,m | NA | 7.9 UR,m |
| Arsenic | MG/KG | 36.3 J,m | NA | 25 J,m | NA | 26.4 J,m |
| Barium | MG/KG | 123 J,m | NA | 152 | NA | 112 |
| Cadmium | MG/KG | 0.68 J,m | NA | 0.84 | NA | 0.66 U |
| Chromium | MG/KG | 94.2 J,k | NA | 37.8 J,m | NA | 22.1 J,m |
| Lead | MG/KG | 65.5 J,m | NA | 68.2 J,m | NA | 35.9 J,m |
| Nickel | MG/KG | 14.4 J,m | NA | 12.2 J,m | NA | 17.7 J,m |
| Selenium | MG/KG | 0.55 UJ,m | NA | 1.1 J,c | NA | 1.2 J,c |
| **Metals-SPLP** | | | | | | |
| Arsenic -SPLP | MG/L | 0.30 U | NA | 0.037 | NA | 0.010 U |
| Selenium -SPLP | MG/L | 0.30 U | NA | 0.0050 U | NA | 0.007 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

N:\11BAB2~1.000\DB\program\Program.mde
Printed: 11/13/02 5:00:36 PM
[SITEID] = 'SWMU P-73' AND ( [LOCID] LIKE 'SP-A*' OR [LOCID] LIKE 'SP-B*' OR [LOCID] LIKE 'SP-D*' ) AND [PRCCODE] NOT LIKE '*-lc'

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 SOIL PILE SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SP-ACE | SP-ACEV | SP-B | SP-BV | SP-D |
|---|---|---|---|---|---|---|
| Sample ID | | SP-ACE | SP-ACEV | SP-B | SP-BV | SP-D |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | - | - | 8.0-9.0 | 8.0-9.0 | 5.5-6.5 |
| Date Sampled | | 02/02/95 | 02/02/95 | 02/01/95 | 02/01/95 | 02/01/95 |
| Parameter | Units | | | | | |
| General Chemistry Parameters | | | | | | |
| O&G | MG/KG | 8,330 | NA | 10,300 | NA | 6,770 |
| PHSOL | S.U. | 7.8 J,h | NA | 8.4 J,h | NA | 7.2 J,h |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

N:\11BAB2~1.000\DB\program\Program.mde
Printed: 11/13/02 5:00:36 PM
[SITEID] = 'SWMU P-73' AND ( [LOCID] LIKE 'SP-A*' OR [LOCID] LIKE 'SP-B*' OR [LOCID] LIKE 'SP-D*' ) AND [PRCCODE] NOT LIKE '*-tc'

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 SOIL PILE SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SP-DV |
|---|---|---|
| Sample ID | | SP-DV |
| Matrix | | Soil |
| Depth Interval (ft) | | 5.5-6.5 |
| Date Sampled | | 02/01/95 |
| Parameter | Units | |
| **Volatile Organic Compounds** | | |
| Benzene | UG/KG | 8.2 |
| Carbon disulfide | UG/KG | 3.8 J |
| Ethylbenzene | UG/KG | 3.3 J |
| Methylene chloride | UG/KG | 13 |
| 1,1,2,2-Tetrachloroethane | UG/KG | 6.6 U |
| Tetrachloroethene | UG/KG | 4.8 J |
| Toluene | UG/KG | 17 |
| Trichlorofluoromethane | UG/KG | 6.6 UJ,r |
| Xylenes, Total | UG/KG | 4.5 |
| **Volatile Organic Compounds - SPLP** | | |
| Methyl ethyl ketone -SPLP | MG/L | 0.050 U |
| **Semivolatile Organic Compounds** | | |
| Acenaphthene | UG/KG | NA |
| Acenaphthylene | UG/KG | NA |
| Anthracene | UG/KG | NA |
| Benzo(a)anthracene | UG/KG | NA |
| Benzo(a)pyrene | UG/KG | NA |
| Benzo(b)fluoranthene | UG/KG | NA |
| Benzo(ghi)perylene | UG/KG | NA |
| Benzo(k)fluoranthene | UG/KG | NA |
| Chrysene | UG/KG | NA |
| Di-n-butyl phthalate | UG/KG | NA |
| Dibenz(a,h)anthracene | UG/KG | NA |
| Fluoranthene | UG/KG | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 SOIL PILE SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SP-DV |
|---|---|---|
| Sample ID | | SP-DV |
| Matrix | | Soil |
| Depth Interval (ft) | | 5.5-6.5 |
| Date Sampled | | 02/01/95 |
| **Parameter** | **Units** | |
| **Semivolatile Organic Compounds** | | |
| Fluorene | UG/KG | NA |
| Indeno(1,2,3-cd)pyrene | UG/KG | NA |
| 3-Methylphenol & 4-Methylphenol | UG/KG | NA |
| Naphthalene | UG/KG | NA |
| Phenanthrene | UG/KG | NA |
| Phenol | UG/KG | NA |
| Pyrene | UG/KG | NA |
| **Semivolatile Organic Compounds - SPLP** | | |
| bis(2-Ethylhexyl)phthalate -SPLP | MG/L | NA |
| Phenol -SPLP | MG/L | NA |
| **Polychlorinated Biphenyls** | | |
| Aroclor 1260 | UG/KG | NA |
| **Metals** | | |
| Antimony | MG/KG | NA |
| Arsenic | MG/KG | NA |
| Barium | MG/KG | NA |
| Cadmium | MG/KG | NA |
| Chromium | MG/KG | NA |
| Lead | MG/KG | NA |
| Nickel | MG/KG | NA |
| Selenium | MG/KG | NA |
| **Metals-SPLP** | | |
| Arsenic -SPLP | MG/L | NA |
| Selenium -SPLP | MG/L | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 1995 SOIL PILE SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SP-DV |
|---|---|---|
| Sample ID | | SP-DV |
| Matrix | | Soil |
| Depth Interval (ft) | | 5.5-6.5 |
| Date Sampled | | 02/01/95 |
| Parameter | Units | |
| General Chemistry Parameters | | |
| O&G | MG/KG | NA |
| PHSOL | S.U. | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 2000 SURFACE SOIL SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SS-01 | SS-01 | SS-02 | SS-03 | SS-04 |
|---|---|---|---|---|---|---|
| Sample ID | | P-73 DUP 1 | P-73 SS-1 | P-73 SS-2 | P-73 SS-3 0-6 in | P-73 SS-4 0-6 in |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 12/01/00 | 12/01/00 | 12/01/00 | 12/04/00 | 12/04/00 |
| Parameter | Units | FIELD DUPLICATE (1-1) | | | | |
| **Volatile Organic Compounds - SPLP** | | | | | | |
| Ethylbenzene -SPLP | MG/L | 0.0015 J | 0.005 U | 0.0013 J | 0.005 U | 0.0021 J |
| Methylene chloride -SPLP | MG/L | 0.013 | 0.011 | 0.0023 J | 0.011 | 0.012 |
| Toluene -SPLP | MG/L | 0.0056 | 0.0017 J | 0.005 U | 0.0026 J | 0.0052 |
| m-Xylene & p-Xylene -SPLP | MG/L | 0.0046 J | 0.0029 J | 0.0063 | 0.0059 | 0.0071 |
| o-Xylene -SPLP | MG/L | 0.0038 J | 0.0025 J | 0.0053 | 0.004 J | 0.0051 |
| **Semivolatile Organic Compounds** | | | | | | |
| Acenaphthylene | UG/KG | 140 J | 120 J | 140 J | 56 J | 370 U |
| Anthracene | UG/KG | 180 J | 140 J | 100 J | 720 U | 370 U |
| Benzo(a)anthracene | UG/KG | 520 J | 40 J | 290 J | 190 J | 43 J |
| Benzo(a)pyrene | UG/KG | 1,100 | 720 J | 390 | 250 J | 42 J |
| Chrysene | UG/KG | 750 J | 560 J | 390 | 260 J | 75 J |
| bis(2-Ethylhexyl)phthalate | UG/KG | 800 U | 790 U | 380 U | 720 U | 31 J |
| Fluoranthene | UG/KG | 1,000 | 440 J | 490 | 260 J | 86 J |
| Naphthalene | UG/KG | 51 J | 790 U | 56 J | 720 U | 370 U |
| Phenanthrene | UG/KG | 260 J | 130 J | 230 J | 110 J | 39 J |
| Phenol | UG/KG | 800 U | 790 U | 380 U | 720 U | 38 J |
| Pyrene | UG/KG | 470 J | 220 J | 360 J | 240 J | 99 J |
| **Metals** | | | | | | |
| Antimony | MG/KG | 2.3 BJ | 3.2 BJ | 3.3 BJ | 3.6 B | 4.1 B |
| Arsenic | MG/KG | 15.1 | 14.8 | 50.5 | 17.2 | 12.7 |
| Barium | MG/KG | 134 J | 134 J | 76.7 J | 46.1 | 57.7 |
| Cadmium | MG/KG | 0.16 B | 0.29 U | 0.28 U | 0.55 B | 2.8 U |
| Calcium | MG/KG | 85,200 | 82,900 | 57,400 | 38,200 | 50,600 |
| Chromium | MG/KG | 86.6 J | 110 J | 409 J | 372 | 371 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 2000 SURFACE SOIL SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SS-01 | SS-01 | SS-02 | SS-03 | SS-04 |
|---|---|---|---|---|---|---|
| Sample ID | | P-73 DUP 1 | P-73 SS-1 | P-73 SS-2 | P-73 SS-3 0-6 in | P-73 SS-4 0-6 in |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 12/01/00 | 12/01/00 | 12/01/00 | 12/04/00 | 12/04/00 |
| Parameter | Units | FIELD DUPLICATE (1-1) | | | | |
| **Metals** | | | | | | |
| Lead | MG/KG | 61.8 | 86.0 | 134 | 101 | 69.9 |
| Magnesium | MG/KG | 7,430 J | 6,840 J | 10,100 J | 6,300 | 6,260 |
| Mercury | MG/KG | 0.023 B | 0.018 B | 0.039 B | 0.038 B | 0.031 B |
| Nickel | MG/KG | 54.7 J | 35.3 J | 21.8 J | 201 J | 146 J |
| Potassium | MG/KG | 612 | 782 | 401 B | 199 B | 341 B |
| Selenium | MG/KG | 2.0 B | 3.0 | 2.8 B | 4.8 B | 6.5 |
| Silver | MG/KG | 0.15 B | 0.20 B | 0.72 | 0.44 B | 0.56 B |
| Sodium | MG/KG | 306 B | 291 B | 180 B | 95.8 B | 160 B |
| Thallium | MG/KG | 2.9 B | 4.8 B | 8.1 B | 11.0 U | 11.3 U |
| **Metals-SPLP** | | | | | | |
| Arsenic -SPLP | MG/L | 0.030 U | 0.030 U | 0.073 B | 0.030 U | 0.030 U |
| Barium -SPLP | MG/L | 0.017 B | 0.019 B | 0.0034 B | 0.0018 B | 0.0043 B |
| Calcium -SPLP | MG/L | 34.2 | 62.8 | 18.9 | 22.4 | 17.9 |
| Lead -SPLP | MG/L | 0.025 U | 0.025 U | 0.025 U | 0.025 U | 0.060 B |
| Magnesium -SPLP | MG/L | 0.83 B | 0.066 B | 1.2 B | 0.93 B | 0.97 B |
| Mercury -SPLP | MG/L | 1.10E-04 B | 1.10E-04 B | 8.50E-05 B | 1.00E-04 B | 9.10E-05 B |
| Potassium -SPLP | MG/L | 0.50 U | 0.50 U | 0.50 U | 0.89 B | 0.50 U |
| Sodium -SPLP | MG/L | 1.1 B | 0.83 B | 4.5 B | 0.98 B | 5.1 |
| **General Chemistry Parameters** | | | | | | |
| Chloride - Leachable | MG/L | 1.2 | 1.2 | 1.3 | 1.0 U | 1.0 U |
| Sulfate - Leachable | MG/L | 5.0 U | 5.0 U | 11.7 | 5.0 U | 30.9 |
| Total Organic Carbon | MG/KG | 20,450 J | 21,850 J | 5,030 U | 33,500 J | 12,400 J |
| Total Solids | PERCENT | 82.5 | 83.9 | 86.8 | 91.2 | 88.4 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 2000 SURFACE SOIL SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SS-05 |
|---|---|---|
| Sample ID | | P-73 SS-5 0-6 in |
| Matrix | | Soil |
| Depth Interval (ft) | | 0.0-0.5 |
| Date Sampled | | 12/04/00 |
| **Parameter** | **Units** | |
| **Volatile Organic Compounds - SPLP** | | |
| Ethylbenzene -SPLP | MG/L | 0.005 U |
| Methylene chloride -SPLP | MG/L | 0.021 |
| Toluene -SPLP | MG/L | 0.005 U |
| m-Xylene & p-Xylene -SPLP | MG/L | 0.005 U |
| o-Xylene -SPLP | MG/L | 0.005 U |
| **Semivolatile Organic Compounds** | | |
| Acenaphthylene | UG/KG | 250 J |
| Anthracene | UG/KG | 390 J |
| Benzo(a)anthracene | UG/KG | 1,000 J |
| Benzo(a)pyrene | UG/KG | 1,100 J |
| Chrysene | UG/KG | 1,200 J |
| bis(2-Ethylhexyl)phthalate | UG/KG | 770 UJ |
| Fluoranthene | UG/KG | 2,700 J |
| Naphthalene | UG/KG | 770 UJ |
| Phenanthrene | UG/KG | 1,200 J |
| Phenol | UG/KG | 72 J |
| Pyrene | UG/KG | 1,500 J |
| **Metals** | | |
| Antimony | MG/KG | 0.87 B |
| Arsenic | MG/KG | 25.8 |
| Barium | MG/KG | 180 |
| Cadmium | MG/KG | 1.3 |
| Calcium | MG/KG | 117,000 |
| Chromium | MG/KG | 120 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# 2000 SURFACE SOIL SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | SS-05 |
|---|---|---|
| Sample ID | | P-73 SS-5 0-6 in |
| Matrix | | Soil |
| Depth Interval (ft) | | 0.0-0.5 |
| Date Sampled | | 12/04/00 |
| **Parameter** | **Units** | |
| **Metals** | | |
| Lead | MG/KG | 118 |
| Magnesium | MG/KG | 13,300 |
| Mercury | MG/KG | 0.078 B |
| Nickel | MG/KG | 27.9 J |
| Potassium | MG/KG | 1,370 |
| Selenium | MG/KG | 2.3 B |
| Silver | MG/KG | 0.39 B |
| Sodium | MG/KG | 601 |
| Thallium | MG/KG | 5.8 U |
| **Metals-SPLP** | | |
| Arsenic -SPLP | MG/L | 0.030 U |
| Barium -SPLP | MG/L | 0.0099 B |
| Calcium -SPLP | MG/L | 22.5 |
| Lead -SPLP | MG/L | 0.025 U |
| Magnesium -SPLP | MG/L | 1.9 B |
| Mercury -SPLP | MG/L | 7.50E-05 B |
| Potassium -SPLP | MG/L | 0.50 U |
| Sodium -SPLP | MG/L | 3.8 B |
| **General Chemistry Parameters** | | |
| Chloride - Leachable | MG/L | 2.8 |
| Sulfate - Leachable | MG/L | 11.3 |
| Total Organic Carbon | MG/KG | 30,100 J |
| Total Solids | PERCENT | 85.7 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 5
# SUMMARY OF DETECTED TCLP RESULTS
# 2000 SURFACE SOIL SAMPLES - FLANDERS FIELD AREA
# SWMU P-73

| Location ID | | | SS-01 | SS-01 | SS-02 | SS-03 | SS-04 |
|---|---|---|---|---|---|---|---|
| Sample ID | | | P-73 DUP 1 | P-73 SS-1 | P-73 SS-2 | P-73 SS-3 0-6 in | P-73 SS-4 0-6 in |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | | 12/01/00 | 12/01/00 | 12/01/00 | 12/04/00 | 12/04/00 |
| **Parameter** | **Units** | **Criteria*** | FIELD DUPLICATE (1-1) | | | | |
| **Volatile Organic Compounds - TCLP** | | | | | | | |
| Methylene chloride -TCLP | MG/L | - | 0.022 J | 0.050 U | 0.050 U | 0.017 J | 0.016 J |
| Toluene -TCLP | MG/L | - | 0.018 J | 0.050 U | 0.050 U | 0.013 J | 0.050 U |
| m-Xylene & p-Xylene -TCLP | MG/L | - | 0.016 J | 0.050 U | 0.018 J | 0.030 J | 0.014 J |
| o-Xylene -TCLP | MG/L | - | 0.012 J | 0.050 U | 0.015 J | 0.023 J | 0.050 U |
| **Metals-TCLP** | | | | | | | |
| Antimony -TCLP | MG/L | - | 0.042 U | 0.042 U | 0.099 | 0.042 U | 0.042 U |
| Arsenic -TCLP | MG/L | 5 | 0.15 B | 0.25 B | 0.23 B | 0.22 B | 0.23 B |
| Barium -TCLP | MG/L | 100 | 0.41 B | 0.46 B | 0.094 B | 0.26 B | 0.14 B |
| Cadmium -TCLP | MG/L | 1 | 0.0028 U | 0.0028 U | 0.0028 U | 0.012 B | 0.0028 U |
| Calcium -TCLP | MG/L | - | 1,010 | 950 | 915 | 783 | 891 |
| Chromium -TCLP | MG/L | 5 | 0.0038 U | 0.0038 U | 0.0038 U | 0.0038 U | 0.023 B |
| Magnesium -TCLP | MG/L | - | 15.7 | 13.9 | 21.4 | 20.0 | 16.0 |
| Mercury -TCLP | MG/L | 0.2 | 1.30E-04 B | 1.20E-04 B | 1.20E-04 B | 1.50E-04 B | 9.80E-05 B |
| Nickel -TCLP | MG/L | - | 0.025 B | 0.012 B | 0.026 B | 0.21 | 0.15 |
| Potassium -TCLP | MG/L | - | 2.6 B | 2.3 B | 2.2 B | 3.7 B | 1.4 B |
| Thallium -TCLP | MG/L | - | 0.095 U | 0.095 U | 0.15 B | 0.095 U | 0.10 B |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

N:\118AB2~1.000\DB\program\Program.mde
Printed: 11/13/02 5:10:47 PM
( [SITEID] = "SWMU P-73" ) AND ( [LOCID] LIKE "SS-*") AND [PRCCODE] LIKE "*-TC"

# TABLE 5
## SUMMARY OF DETECTED TCLP RESULTS
## 2000 SURFACE SOIL SAMPLES - FLANDERS FIELD AREA
## SWMU P-73

| Location ID | | | SS-05 |
|---|---|---|---|
| Sample ID | | | P-73 SS-5 0-6 in |
| Matrix | | | Soil |
| Depth Interval (ft) | | | 0.0-0.5 |
| Date Sampled | | | 12/04/00 |
| **Parameter** | **Units** | **Criteria*** | |
| **Volatile Organic Compounds - TCLP** | | | |
| Methylene chloride -TCLP | MG/L | - | 0.026 J |
| Toluene -TCLP | MG/L | - | 0.050 U |
| m-Xylene & p-Xylene -TCLP | MG/L | - | 0.011 J |
| o-Xylene -TCLP | MG/L | - | 0.050 U |
| **Metals-TCLP** | | | |
| Antimony -TCLP | MG/L | - | 0.047 B |
| Arsenic -TCLP | MG/L | 5 | 0.24 B |
| Barium -TCLP | MG/L | 100 | 0.52 B |
| Cadmium -TCLP | MG/L | 1 | 0.0028 U |
| Calcium -TCLP | MG/L | - | 891 |
| Chromium -TCLP | MG/L | 5 | 0.0038 U |
| Magnesium -TCLP | MG/L | - | 27.6 |
| Mercury -TCLP | MG/L | 0.2 | 1.30E-04 B |
| Nickel -TCLP | MG/L | - | 0.025 B |
| Potassium -TCLP | MG/L | - | 4.4 B |
| Thallium -TCLP | MG/L | - | 0.095 U |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

N:\11BAB2~1.000\DB\program\Program.mde
Printed: 11/13/02 5:10:48 PM
( [SITEID] = 'SWMU P-73' ) AND ( [LOCID] LIKE 'SS-*') AND [PRCCODE] LIKE '*-TC'

# TABLE 6
# SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
# SURFACE SWMU MATERIAL
# SWMU P-73

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Background Concentration (mg/kg) | Region III Residential Soil RBC (mg/kg)[a] | Human Health COPC?[b] |
|---|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | | |
| 1,1,2,2-Tetrachloroethane | 6 | 1 | 17% | 0.003 | NA | 3.2 | No |
| Benzene | 6 | 1 | 17% | 0.006 | 0.01 | 12 | No |
| Ethylbenzene | 6 | 1 | 17% | 0.003 | NA | 7,800 | No |
| Methylene chloride | 6 | 1 | 17% | 0.005 | NA | 85 | No |
| Tetrachloroethene | 6 | 1 | 17% | 0.003 | NA | 12 | No |
| Toluene | 6 | 1 | 17% | 0.008 | 0.006 | 16,000 | No |
| Trichlorofluoromethane | 6 | 1 | 17% | 0.007 | NA | 23,000 | No |
| Xylenes, Total | 1 | 1 | 100% | 0.007 | NA | 160,000 | No |
| ***Semivolatiles*** | | | | | | | |
| Acenaphthene | 1 | 1 | 100% | 0.33 | 0.34 | 4,700 | No |
| Acenaphthylene | 6 | 4 | 67% | 0.25 | 1.1 | 2,300[f] | No |
| Anthracene | 6 | 4 | 67% | 0.65 | 1.9 | 23,000 | No |
| Benzo(a)anthracene | 6 | 6 | 100% | 1.4 | 6.7 | 0.87 | No |
| Benzo(a)pyrene | 6 | 6 | 100% | 1.1 | 6 | 0.087 | No |
| Bis(2-ethylhexyl)phthalate | 6 | 1 | 17% | 0.031 | 2.7 | 46 | No |
| Chrysene | 6 | 6 | 100% | 1.5 | 4.9 | 87 | No |
| Di-n-butyl phthalate | 6 | 1 | 17% | 0.18 | 0.49 | 7,800 | No |
| Fluoranthene | 6 | 6 | 100% | 2.9 | 12 | 3,100 | No |
| Fluorene | 6 | 1 | 17% | 0.35 | 0.81 | 3,100 | No |
| Naphthalene | 6 | 3 | 50% | 0.24 | 0.22 | 1,600 | No |
| Phenanthrene | 6 | 6 | 100% | 2.1 | 8.1 | 2,300[f] | No |
| Phenol | 6 | 3 | 50% | 0.26 | NA | 47,000 | No |
| Pyrene | 6 | 6 | 100% | 2.2 | 10 | 2,300 | No |
| ***Metals*** | | | | | | | |
| Antimony | 6 | 6 | 100% | 14 | 1 | 31 | No |
| Arsenic | 6 | 6 | 100% | 51 | 12 | 0.43 | Yes |
| Barium | 6 | 6 | 100% | 180 | 84.3 | 5,500 | No |
| Cadmium | 6 | 4 | 67% | 1.3 | NA | 78 | No |
| Chromium | 6 | 6 | 100% | 409 | 27.1 | 230[c] | Yes |
| Lead | 6 | 6 | 100% | 134 | 30 | 400[d] | No |
| Mercury | 6 | 5 | 83% | 0.078 | 0.32 | 23[e] | No |
| Nickel | 6 | 6 | 100% | 201 | 27.7 | 1,600 | No |
| Selenium | 6 | 5 | 83% | 6.5 | 0.6 | 390 | No |
| Silver | 6 | 5 | 83% | 0.72 | NA | 390 | No |
| Thallium | 6 | 2 | 33% | 8.1 | NA | 5.5 | Yes |

a USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA, 2000a).

b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than background and the screening criteria are retained as COPCs.

c Chromium is compared to the RBC for hexavalent chromium.

d Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994a).

e Mercury is compared to the RBC for mercuric chloride.

f Pyrene used as a surrogate RBC.

NA Not available.

# TABLE 7
# SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
# SUBSURFACE SWMU MATERIAL
# SWMU P-73

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Soil Screening Criteria[a] (mg/kg) | Human Health COPC?[b] |
|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | |
| 1,1,2,2-Tetrachloroethane | 6 | 1 | 17% | 0.003 | 1 | No |
| 1,2-Dichloroethane | 6 | 1 | 17% | 0.002 | 0.4 | No |
| Benzene | 6 | 2 | 33% | 0.008 | 0.8 | No |
| Bromoform | 6 | 1 | 17% | 0.002 | 53 | No |
| Carbon disulfide | 6 | 2 | 33% | 0.005 | 720[c] | No |
| Ethylbenzene | 6 | 2 | 33% | 0.003 | 400[c] | No |
| Methylene chloride | 6 | 5 | 83% | 0.015 | 13 | No |
| Tetrachloroethene | 6 | 1 | 17% | 0.005 | 11 | No |
| Toluene | 6 | 3 | 50% | 0.027 | 650[c] | No |
| Xylenes, Total | 6 | 3 | 50% | 0.005 | 410[c,d] | No |
| ***Volatile Semivolatiles*** | | | | | | |
| Acenaphthene | 6 | 2 | 33% | 1.0 | 120[c] | No |
| Anthracene | 6 | 2 | 33% | 2.3 | 6.8[c] | No |
| Acenaphthylene | 6 | 1 | 17% | 0.19 | 120[e] | No |
| Fluorene | 6 | 2 | 33% | 0.84 | 89[c] | No |
| Naphthalene | 6 | 1 | 17% | 0.37 | 180[c] | No |
| Phenanthrene | 6 | 2 | 33% | 9.3 | 2,300[f] | No |
| ***Semivolatiles*** | | | | | | |
| -Methylphenol & 4-Methylphenol | 6 | 1 | 17% | 0.16 | 390 | No |
| Benzo(a)anthracene | 6 | 2 | 33% | 5.0 | 0.87 | **Yes** |
| Benzo(a)pyrene | 6 | 2 | 33% | 4.7 | 0.087 | **Yes** |
| Benzo(b)fluoranthene | 6 | 2 | 33% | 8.9 | 0.87 | **Yes** |
| Benzo(g,h,i)perylene | 6 | 1 | 17% | 2.4 | 2,300[f] | No |
| Benzo(k)fluoranthene | 6 | 2 | 33% | 4.5 | 8.7 | No |
| Chrysene | 6 | 2 | 33% | 5.5 | 87 | No |
| Dibenz(a,h)anthracene | 6 | 1 | 17% | 0.84 | 0.087 | **Yes** |
| Di-n-butyl phthalate | 6 | 3 | 50% | 0.41 | 7,800 | No |
| Fluoranthene | 6 | 2 | 33% | 9.2 | 3,100 | No |
| Indeno(1,2,3-c,d)pyrene | 6 | 1 | 17% | 4.4 | 0.87 | **Yes** |
| Phenol | 6 | 2 | 33% | 0.64 | 47,000 | No |
| Pyrene | 6 | 2 | 33% | 12 | 2,300 | No |

# TABLE 7
# SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
# SUBSURFACE SWMU MATERIAL
# SWMU P-73

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Soil Screening Criteria[a] (mg/kg) | Human Health COPC?[b] |
|---|---|---|---|---|---|---|
| ***Metals*** | | | | | | |
| Antimony | 4 | 3 | 75% | 10.3 | 31 | No |
| Arsenic | 6 | 6 | 100% | 26.4 | 0.43 | Yes |
| Barium | 6 | 6 | 100% | 152 | 5,500 | No |
| Cadmium | 6 | 1 | 17% | 0.84 | 78 | No |
| Chromium | 6 | 6 | 100% | 38 | 230[g] | No |
| Lead | 6 | 6 | 100% | 68 | 400[h] | No |
| Nickel | 6 | 6 | 100% | 35.4 | 1600 | No |
| Selenium | 6 | 2 | 33% | 1.2 | 390 | No |

a For chemicals, USEPA Soil Screening Levels for vapor inhalation (Generic SSLs) were used (USEPA 1996); for semivolatile chemicals and metals, USEPA Region III Residential Soil Risk Based Concentration (RBC) were used (USEPA 2000a).

b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than the screening criteria are retained as COPCs.

c Soil saturation concentration ($C_{sat}$); the concentration at which soil pore air is saturated with a chemical, and volatile emissions reach their maximum. (USEPA 1996).

d Most conservative value for xylene isomers (*o*-xylene).

e Screening value for acenaphthene used as surrogate criteria for acenaphthylene.
Screening values for pyrene are used as surrogate criteria for phenanthrene and benzo(g,h,i)perylene.

g Chromium is compared to the RBC for hexavalent chromium.

h Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994a).

NA Not available.

## TABLE 8
## REPRESENTATIVE CONCENTRATIONS[a] OF CHEMICALS OF POTENTIAL CONCERN (COPCs)
## SWMU P-73

| Surface SWMU Material COPCs | Representative Concentration (mg/kg) | Subsurface SWMU Material COPCs | Representative Concentration (mg/kg) |
|---|---|---|---|
| Arsenic | 51 | Arsenic | 26 |
| Chromium | 409 | Benzo(a)anthracene | 5.0 |
| Thallium | 8.1 | Benzo(a)pyrene | 4.7 |
| | | Benzo(b)fluoranthene | 8.9 |
| | | Dibenz(a,h)anthracene | 0.84 |
| | | Indeno(1,2,3-c,d)pyrene | 4.4 |

a For datasets of 10 or greater, the 95% UCL is used as the representative concentration. For datasets with less than 10 samples, the maximum concentration is used.

# TABLE 9
# POTENTIAL EXPOSURE SCENARIOS[a]
# SWMU P-73

| Potential Receptor Scenario | Exposure Media | Potential Pathway of Exposure |
|---|---|---|
| Future Commercial/Industrial Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Current Non-BSC Commercial/Industrial Worker | Surface SWMU Material | particulate inhalation |
| Future Utility/Maintenance Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Trespasser | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Future Construction Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| Future Marina Worker | Surface SWMU Material | particulate inhalation |
| Future Greenway User | Surface SWMU Material | particulate inhalation |
| Future Fenceline Resident | Surface SWMU Material | particulate inhalation |
| Present Fenceline Resident | Surface SWMU Material | particulate inhalation |

a Potential exposure scenarios for SWMU Group P-73 are based on those determined in ID No. 2 (BSC 1999b) and the chemicals of potential concern determined in ID No. 1 (BSC 1998).

# TABLE 10
# TOXICITY CRITERIA FOR COPCs REFERENCE DOSES (RfDs) AND SLOPE FACTORS (SFs)
# SWMU P-73

| Chemical | CAS | Noncarcinogenic Toxicity Criteria | | | | Carcinogenic Toxicity Criteria | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Oral RfD (mg/kg-d) | Source | Inhalation RfD (mg/kg-d) | Source | Weight of Evidence[a] | Oral SF $(mg/kg\text{-}d)^{-1}$ | Source | Inhalation SF $(mg/kg\text{-}d)^{-1}$ | Source |
| ***Inorganics*** | | | | | | | | | | |
| Arsenic | 7440-38-2 | 3.00E-04 | I | -- | -- | A | 1.50E+00 | I | 1.51E+01 | I |
| Chromium[b] | 18540-29-9 | 3.00E-03 | I | 3.00E-05 | I | A | -- | -- | 4.10E+01 | H |
| Thallium | 7440-28-0 | 8.00E-05 | I | 8.00E-05 | R | -- | -- | -- | -- | -- |
| ***Organics*** | | | | | | | | | | |
| Benzo(a)anthracene | 56-55-3 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Benzo(a)pyrene | 50-32-8 | -- | -- | -- | -- | B2 | 7.30E+00 | I | 3.10E+00 | E |
| Benzo(b)fluoranthene | 205-99-2 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Dibenz(a,h)anthracene | 53-70-3 | -- | -- | -- | -- | B2 | 7.30E+00 | E | 3.10E+00 | E |
| Indeno(1,2,3-c,d)pyrene | 193-39-5 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |

a Weight of Evidence: A - known human carcinogen, B2 - probable human carcinogen (sufficient animal/inadequate human evidence).

b The toxicity criteria for hexavalent chromium is conservatively used for chromium.

-- There is no toxicity criteria for this pathway.

E Obtained from the USEPA National Center for Environmental Assessment (Region III RBC Tables) (USEPA 2000a).

H Health Effects Assessment Summary Tables (HEAST) (USEPA 1997).

I Integrated Risk Information System (IRIS) online database (USEPA 2000b).

# TABLE 11
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# SWMU P-73

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Current Non-BSC Commercial/Industrial Worker** | | | |
| *Inhalation of Particles from Uncovered SWMUs (mg/kg)* | | | |
| Arsenic | 51 | > 1,000,000 | -- |
| Chromium[a] | 409 | 610,000 | > 1,000,000 |
| Thallium | 8.1 | -- | > 1,000,000 |
| **Future Commercial/Industrial Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51 | **12**[b] | **37** |
| Chromium[a] | 409 | 610,000 | **373** |
| Thallium | 8.1 | -- | 9.9 |
| **Future Construction Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51 | **16** | 96 |
| Chromium[a] | 409 | > 1,000,000 | 964 |
| Thallium | 8.1 | -- | 26 |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Arsenic | 26 | **16** | 96 |
| Benzo(a)anthracene | 5.0 | 33 | -- |
| Benzo(a)pyrene | 4.7 | **3.3** | -- |
| Benzo(b)fluoranthene | 8.9 | 33 | -- |
| Dibenz(a,h)anthracene | 0.84 | 3.3 | -- |
| Indeno(1,2,3-c,d)pyrene | 4.4 | 33 | -- |
| **Future Utility/Maintenance Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51 | 69 | 416 |
| Chromium[a] | 409 | > 1,000,000 | 4,160 |
| Thallium | 8.1 | -- | 111 |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Arsenic | 26 | 69 | 416 |
| Benzo(a)anthracene | 5.0 | 140 | -- |
| Benzo(a)pyrene | 4.7 | 14 | -- |
| Benzo(b)fluoranthene | 8.9 | 140 | -- |
| Dibenz(a,h)anthracene | 0.84 | 14 | -- |
| Indeno(1,2,3-c,d)pyrene | 4.4 | 140 | -- |

# TABLE 11
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# SWMU P-73

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Trespasser** | | | |
| *Direct Contact with Surficial SWMU Material (mg/kg)* | | | |
| Arsenic | 51 | 212 | 5,100 |
| Chromium[a] | 409 | > 1,000,000 | 50,800 |
| Thallium | 8.1 | -- | 1,350 |
| **Future Marina Worker** | | | |
| *Inhalation of Particles from Uncovered SWMUs (mg/kg)* | | | |
| Arsenic | 51 | > 1,000,000 | -- |
| Chromium[a] | 409 | 782,000 | > 1,000,000 |
| Thallium | 8.1 | -- | > 1,000,000 |
| **Future Greenway User** | | | |
| *Inhalation of Particles from Uncovered SWMUs (mg/kg)* | | | |
| Arsenic | 51 | > 1,000,000 | -- |
| Chromium[a] | 409 | > 1,000,000 | > 1,000,000 |
| Thallium | 8.1 | -- | > 1,000,000 |
| **Present/Future Fenceline Resident** | | | |
| *Inhalation of Particles from Uncovered SWMUs (mg/kg)* | | | |
| Arsenic | 51 | 190,000 | -- |
| Chromium[a] | 409 | 69,800 | > 1,000,000 |
| Thallium | 8.1 | -- | > 1,000,000 |

| | |
|---|---|
| a | All chromium is conservatively considered to be hexavalent chromium; RBSLs are for hexavalent chromium. |
| b | The RBSL for arsenic is less than the background, therefore, the background was used as the RBSL. |
| -- | Not evaluated as there is no toxicity criteria for this pathway. |
| | Shaded cell indicates value exceeds the RBSL. |
| >1,000,000 | Calculated RBSL is greater than 1,000,000 parts per million (mg/kg or mg/L). |

# TABLE 12
# TIER I RISK ASSESSMENT RESULTS
# SWMU P-73

| | Representative Concentration (mg/kg) | Cancer RBSL (mg/kg) | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL (mg/kg) | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **FUTURE COMMERCIAL/INDUSTRIAL WORKER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material* | | | | | | |
| Arsenic | 51 | 0.94[c] | 5.4E-05 | 37 | 1.4 | skin |
| Chromium[b] | 409 | NA | NA | 373 | 1.1 | lung |
| | | $SLCR_{total}$ = | **5E-05** | Total SLHI= | **2.5** | |
| | | | | Total skin SLHI= | **1.4** | |
| | | | | Total lung SLHI= | **1.1** | |
| **FUTURE CONSTRUCTION WORKER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material* | | | | | | |
| Arsenic | 51 | 16 | 3.2E-06 | NA | NA | NA |
| | | $SLCR_{total}$ = | **3E-06** | SLHI= | **NA** | |
| *Direct Contact (including particulate inhalation) with Subsurface SWMU Material* | | | | | | |
| Arsenic | 26 | 16 | 1.6E-06 | NA | NA | NA |
| Benzo(a)pyrene | 4.7 | 3.3 | 1.4E-06 | NA | NA | NA |
| | | $SLCR_{total}$ = | **3E-06** | SLHI= | **NA** | |
| Total across all pathways: | | $SLCR_{total}$ = | **6E-06** | | | |

a Primary Target Organ information obtained from IRIS (USEPA 2000b).
b Chromium is conservatively considered to be hexavalent chromium.
c In calculating SLCR, risk-based value used, not background value (12 mg/kg).
NA Not applicable as chemical does not exceed the RBSL for this effect.
SLHI Screening Level Hazard Index.
SLCR Screening Level Cancer Risk.

# APPENDIX A

# FIELD INSPECTION NOTES

# URS Greiner

# SWMU INSPECTION REPORT

282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

DATE 6/30/00

| DAY | S | M | T | W | TH | F | S |
|---|---|---|---|---|---|---|---|
| | | | | | | (F) | |

| WEATHER | Bright Sun | Clear | Overcast | Rain | Snow |
|---|---|---|---|---|---|
| | (Bright Sun) | | | | |

| TEMP | To 32 | 32-50 | 50-70 | 70-85 | 85 up |
|---|---|---|---|---|---|
| | | | (50-70) | | |

| WIND | Still | Moder | High | Report No. |
|---|---|---|---|---|
| | | (Moder) | | |

| HUMIDITY | Dry | Moder | Humid |
|---|---|---|---|
| | | (Moder) | |

PROJECT _____
OWNER _____
CONTRACT No. _____
URS GREINER JOB No. 42000BSC.15
URS GREINER PROJECT MANAGER _____

AVERAGE FIELD FORCE

| Name of Contractor | Non-manual | Manual | Remarks |
|---|---|---|---|
| | | | |

VISITORS

| Time | Representating | Representating | Remarks |
|---|---|---|---|
| 11:00 A.M. | Mark Colmerauer - URS | | |

EQUIPMENT AT THE SITE

None

FIELD OBSERVATIONS

SWMU P-73 is located in two areas on the site. One area is immediately southeast of the GAL. plant. In this area, it consists of one heavily vegitated pile located between rail spurs. There is no cover or containment on the pile. Material was reportedly spread around the ground near the pile. It could not be discerned where this occurred. The surrounding soil is a mix of gravel and sand/slag. Surface water flows from the pile to the surrounding grade. It is contained within the rail spurs until it drains into the ground.

The other location of P-73 is the former Drum Storage Area. The drums were removed in the early 1980's. The surface of the SWMU is mostly asphelt and concrete. Fifty to sixty percent of the area is occupied by the Hydrogen Pumping Station. The Area to the northwest along the tracks is a slag surface. Surface water runs off asphelt into slag/gravel along the tracks.

See the attached sheet for diagrams of both locations of SWMU P-73.

SHEET 1 OF 2

BY Kyle Jackson TITLE _____

REVIEWED BY: _____ PROJECT ENGINEER

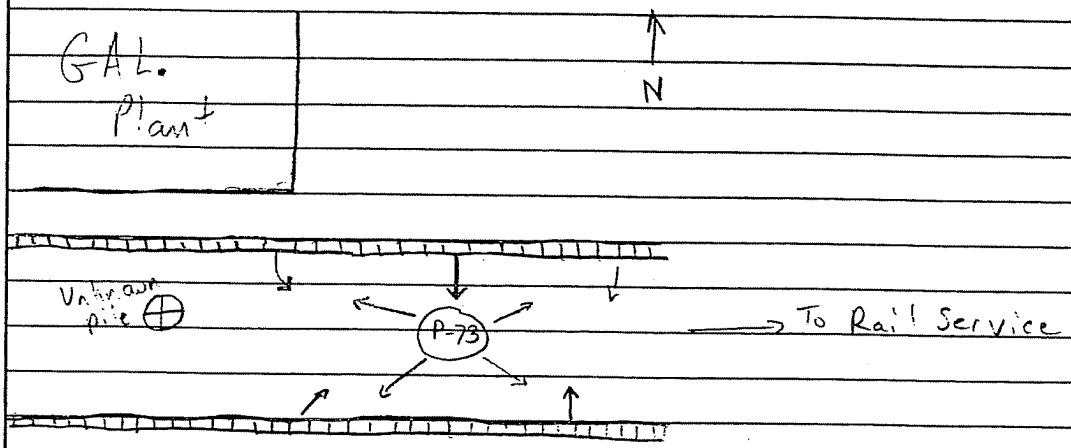
# SWMU INSPECTION REPORT (cont'd)

PROJECT _____ REPORT No. _____

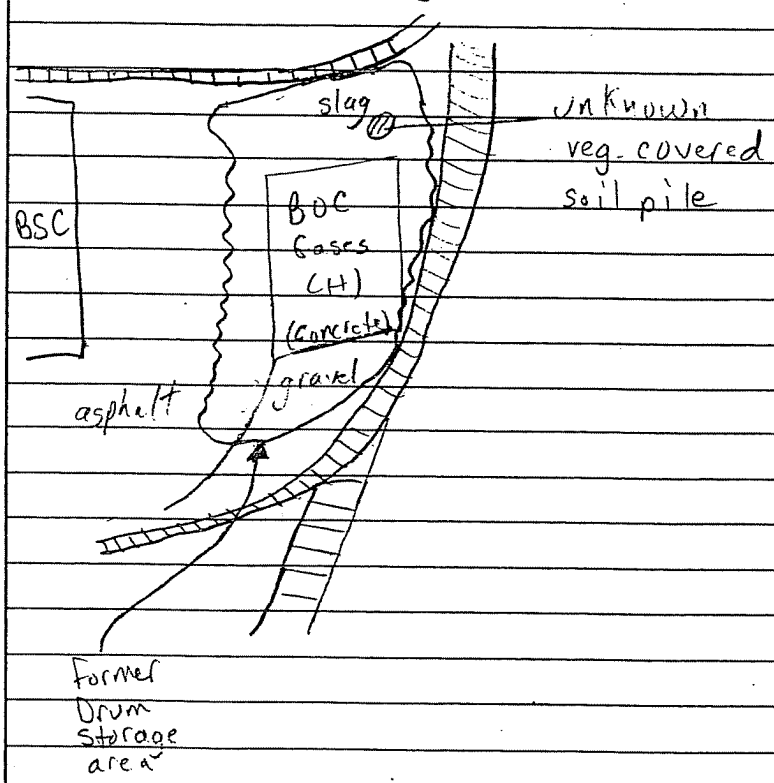
URS GREINER JOB No. 42000BSC.15 DATE 6/30/00

FIELD OBSERVATIONS (cont'd)

P-73 (GAL. Plant)




P-73 (Drum Storage Area)




SHEET 2 OF 2

BY Kyle Jackson TITLE _____

REVIEWED BY: _____ PROJECT ENGINEER

URSF-011/2 OF 3/GDCONREP

Rev 2 rec'd

# FIELD INSPECTION CHECKLIST
# SWMU SURFACE WATER RUNOFF POTENTIAL EVALUATION
# BETHLEHEM STEEL CORPORATION
# LACKAWANNA, NEW YORK

SWMU #: P-73

SWMU Name: Drum Storage Area

Date of Inspection: 9/5/96

Inspector(s): Don Porterfield & Jim Hannan

**TYPE OF SWMU** (check type and configuration and add comments):

**Type:**

_____ Landfill _____ Impoundment

_____ Pit/sump/trench _X_ Pile drum storage

**Configuration:**

_X_ Level
_____ Above Grade - height_____ ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft, depth_____ ft, height of top above grade_____ft
_____ Free board_____ft
_____ Other (describe)_____

Comments:_____

SWMU# P-73

Inspection Date: 9/5/96

**SURFACE OF SWMU** (check all that apply and add comments):

**Material:**

| | |
|---|---|
| X Concrete/Asphalt | ____ Unvegetated Soil |
| ____ Grass | ____ Trees/Shrubs |
| X Slag | ____ Liquid |
| ____ Other (describe): | |

Comments: Linde plant (Concrete Pad) covers portion of SWMU

**SURROUNDING AREA** (Attach topography map and indicate features of interest, check all that apply and add comments):

**Features:**

| | |
|---|---|
| X Buildings, direction West, distance ____ ft | |
| ____ Road, type ~~Dual Lane~~ Paved, direction West, distance ____ ft | |
| X Railroad, direction NE, distance ____ ft | |
| ____ Other (describe): | |

**Ground Surface:**

| | |
|---|---|
| X Concrete/Asphalt | ____ Unvegetated Soil |
| ____ Grass | ____ Trees/Shrubs |
| X Slag | ____ Liquid |
| ____ Other (describe): | |

Some sparse vegetation to NE

SWMU# P-73

Inspection Date: 9/5/96

Comments: _____

**Surrounding topography:**

X Level

_____ Sloped to _____ at _____ ft (vertical) per feet (horizontal)

Comments: _____

**CONTAINMENT SYSTEM** (check all that apply and add comments):

_____ Cover - type _____

_____ Concrete sump/pit

_____ Concrete trench

_____ Wooden trench

_____ Berm or dike

height _____ ft

width _____ ft at crest

width _____ ft at base

Comments: None

**DISTANCE TO NEAREST SURFACE WATER BODY:** 1200 ft, direction S

Name of water body: North Branch, Blasdell Creek

SWMU# P-73

Inspection Date: 9/5/96

**VISUAL EVIDENCE OF RUN ON**

X No

_____ Yes, Description: _____

**VISUAL EVIDENCE OF RUN OFF:**

_____ No

? Yes, Description: swale between RR track to NE

If Yes, which of following are present?

_____ Erosion scars on SWMU

_____ Sediments near SWMU in runoff areas

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

**DOES RUNOFF REACH SURFACE WATER BODY?** _____ None visible

If yes, provide description: _____

# APPENDIX B

# PRELIMINARY SWMU ASSESSMENT - TARGET COMPOUND LIST AND 1989 MEMORANDUM OF SAMPLING ACTVITY

## TABLE 3

## ANALYTE LIST

### Soils at Former Drum Storage Area (SWMU P-73) and Associated Stockpiles of Excavated Soils/Slag Fill Material from SWMU P-73 Bethlehem Steel Corporation (BSCO); Lackawanna, New York; East Plant Area

### A. Generic Hazardous Constituents of Potential Interest (HzCOPIs)*,** for Total Constituent and/or SPLP (EPA Method 1312) Extract Analyses

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| Antimony | Benzene | Naphthalene |
| Arsenic | Ethylbenzene | Acenaphthene |
| Barium | Toluene | Acenaphthylene |
| Cadmium | m-Xylene | Anthracene |
| Chromium | o-Xylene | Benzo(a)anthracene |
| Lead | p-Xylene | Benzo(a)pyrene |
| Mercury | Acrylonitrile | Benzo(b)fluoranthene |
| Nickel | Bromodichloromethane | Benzo(k)fluoranthene<br><br>Benz(g,h,i) perylene |
| Selenium | Bromoform | Benzyl alcohol |
| Silver | Bromomethane | Benzyl butyl phthalate |
| Thallium | 2-Butanone<br>(Methyl Ethyl Ketone) | Bis(2-chloroethyl)ether |
| Cyanide | Carbon disulfide | Bis(2-chloroethoxy)methane |
| | Carbon tetrachloride | Bis(2-chloroisopropyl)ether |
| | Chlorobenzene | Bis(2-ethylhexyl)phthalate |
| | Chloroethane | 4-Bromophenyl phenyl ether |
| | 2-Chloroethylvinyl ether | 4-Chloroaniline |
| | Chloroform | p-Chloro-m-cresol |
| | Chloromethane | 2-Chloronaphthalene |
| | Dibromochloromethane | 2-Chlorophenol |
| | Dichlorodifluoromethane | Chrysene |
| | 1,1-Dichloroethane | m-Cresol |
| | 1,2-Dichloroethane | o-Cresol |
| | 1,1-Dichloroethylene | p-Cresol |
| | trans-1,2-Dichloroethylene | Dibenz(a,h)anthracene |

Note: Footnotes *, ** provided on the last page of this table

## TABLE 3 (Continued)

## ANALYTE LIST

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| | 1,2-Dichloropropane | 1,2-Dichlorobenzene |
| | cis-1,3-Dichloropropene | 1,3-Dichlorobenzene |
| | trans-1,3-Dichloropropene | 1,4-Dichlorobenzene |
| | Methylene chloride | 3,3´-Dichlorobenzidine |
| | Styrene | 2,4-Dichlorophenol |
| | 1,1,1,2-Tetrachloroethane | Diethyl phthalate |
| | 1,1,2,2-Tetrachloroethane | 2,4-Dimethylphenol |
| | Tetrachloroethylene | Dimethyl phthalate |
| | 1,1,1-Trichloroethane | Di-n-butyl phthalate |
| | 1,1,2-Trichloroethane | 4,6-Dinitro-o-cresol |
| | Trichloroethylene | 2,4-Dinitrophenol |
| | Trichlorofluoromethane | 2,4-Dinitrotoluene |
| | Vinyl chloride | 2,6-Dinitrotoluene |
| | | Di-n-octyl phthalate |
| | | Fluoranthene |
| | | Fluorene |
| | | Hexachlorobenzene |
| | | Hexachlorobutadiene |
| | | Hexachlorocyclopentadiene |
| | | Hexachloroethane |
| | | Indeno(1,2,3-cd)pyrene |
| | | Isophorone |
| | | 2-Methylnaphthalene*** |
| | | 4-Nitroaniline |
| | | Nitrobenzene |
| | | 4-Nitrophenol |
| | | N-Nitrosodiphenylamine |
| | | N-Nitrosodi-n-propylamine |

## TABLE 3 (Concluded)

## ANALYTE LIST

| Metals/Cyanide | Volatile Organics | Semi-Volatile Organics |
|---|---|---|
| | | Pentachlorophenol |
| | | Phenanthrene |
| | | Phenol |
| | | Pyrene |
| | | Pyridine |
| | | 2,3,4,6-Tetrachlorophenol |
| | | 1,2,4-Trichlorobenzene |
| | | 2,4,5-Trichlorophenol |
| | | 2,4,6-Trichlorophenol |
| | | Polychlorinated Biphenyl - Arochlor 1016 |
| | | Polychlorinated Biphenyl - Arochlor 1221 |
| | | Polychlorinated Biphenyl - Arochlor 1232 |
| | | Polychlorinated Biphenyl - Arochlor 1242 |
| | | Polychlorinated Biphenyl - Arochlor 1248 |
| | | Polychlorinated Biphenyl - Arochlor 1254 |
| | | Polychlorinated Biphenyl - Arochlor 1260 |

### B. Miscellaneous Parameters for Total Constituent Analyses

| |
|---|
| Oil & Grease |
| Percent Water |
| pH |

## TABLE 3 (Concluded)

## ANALYTE LIST
## Footnotes

* HzCOPIs for SWMU P-73 and the associated stockpiles of excavated soils/fill previously removed from SWMU P-73 are defined as all compounds in Superfund Target Compound List (TCL) minus herbicides, pesticides and TCL compounds not identified as hazardous constituents in 40 CFR 261, Appendix VIII plus all constituents in the site-wide hazardous constituent list for the Lackawanna site (Appendix I, tables 2 and 3 in RCRA Section 3008(h) Administrative Order on Consent (AOC) Final Work Plan for Phased Site Investigation) that are not included in above modified Superfund TCL minus bromochloromethane (a laboratory quality control standard specified in EPA manual SW-846 Method 8240). See also BSCO's 06/30/93 response to EPA-II's 03/04/93 comment #43 on BSCO's 08/15/92 Phased Site Investigation, Phase I Report regarding bromochloromethane.

This generic HzCOPI list is consistent with discussions and agreement in 09/16/93 teleconference with Agency (agreement on analyte list for purpose of cooperatively reaching full agreement on technical scope of work for these supplemental preliminary SWMU assessments). Use of this generic analyte list sets no precent beyond this work plan, and is without prejudice to position that that RCRA corrective action program analyte lists should be focused on those hazardous constituents that are reasonably expected to be present in and released from the SWMUs under investigation. All four sitly clay samples from the stockpiles of previously excavated SWMU P-73 soils/slag fill material (stored in "Flanders Field" southeast of BSCO's Galvanizing Mill) will be tested for the HzCOPIs on this generic analyte list.

** "Hazardous constituents" are defined in the RCRA Section 3008(h) AOC between EPA-II and BSCO as those constituents which are codified as such in 40 CFR 261, Appendix VIII. See "EPA Statement of Purpose," AOC Section III. Further, the legislative history for the RCRA corrective action program shows that Congress explicitly defined "hazardous constituents" to be "those constituents listed in Appendix VIII of the RCRA regulations." H. Rep. No. 98-198, 98th Cong., 1st Sess. 60-61, 05/1783.

*** Not RCRA hazardous constituent in 40 CFR 261, Appendix VIII. Nevertheless, without prejudice or precedent for future action at the site, BSCO agreed, in 09/16/93 teleconference with Agency, to add this compound to the analyte list (as requested by Agency) so as to cooperatively each full agreement on technical scope of work for these supplemental preliminary SWMU assessments.

B E T H L E H E M  S T E E L
Bethlehem, PA

Interoffice Correspondence
Corporate Development and
Human Resources
Environmental Control

October 26, 1989

R606-E5-A574

From: W. D. Egan

To: R. B. Allen

Subject: SAMPLING AND ANALYSIS OF SOIL LOCATED UNDER FORMER DRUM STORAGE AREA AT COLD STRIP MILL (SWMU P-73)

We have completed tests on soil samples taken from the area identified as SWMU P-73 which was previously used for drum storage. The drums had been removed from the area and shipped off-site prior to our sample collection. The samples were analyzed for constituents including oil and grease, metals and organic compounds. Our testing shows that the majority of the hazardous constituents that were determined in seven composite soil samples are present at concentrations less than the quantitation limit of the analytical method (Table 1). However, several constituents are present at concentrations higher than the quantitation limit. These constituents are listed in Table 3 which shows the maximum concentration that was found in the seven samples together with the regulatory level. All of the maximum constituent concentration values are less than the corresponding regulatory levels. Table 1 also shows that the highest concentration of oil and grease (6.6%) was found near the surface (4 to 8 inches deep). Deeper samples contained less oil and grease and the concentration was less than 0.05% at a depth of 54 inches. The following information is provided for incorporation in your SWMU Assessment Report.

A first set of soil samples was taken from five locations for the investigation of the P-73 site which was listed for oil stained soil. At each location, samples were collected from four depths -- 0 to 4 inches, 4 to 8 inches, 8 to 12 inches and 12 to 16 inches -- to establish a vertical profile of constituents. Oil and grease measurements were made on each of the 20 samples (Table 2) and samples from the two locations having the highest average oil and grease content were selected for additional testing. These sample locations are designated A and E on Figure 1. Equal parts of the A and E material from each depth were combined to provide four samples for chemical analysis: 0-4 in., 4-8 in., 8-12 in., and 12-16 in. Additional samples were taken from two other locations (shown as A-2 and B-2 on Figure 1). These samples were collected at three depths -- 26 inches, 40 inches and 54 inches. The material from both locations was combined to provide a single sample from each of the three depths for analysis.

The sampling was done on May 31 and August 16, 1989 by C. E. Jablonski, Technical Analyst, Environmental Control. The initial sampling was done with a pick and shovel. Material was collected to the maximum depth that could be loosened with the sampling equipment used. The individual samples all had a black color. The additional samples were collected by digging holes with a back-hoe and sampling the sides of the holes with a scoop at depths of 26, 40 and 54 inches. Clay-like material was reached at 40 inches. All samples were

sealed in containers and shipped in an insulated chest packed with dry ice to Bethlehem's Homer Research Laboratories in Bethlehem, PA. Chain of Custody records for each of the sample increments selected for chemical analysis are attached. Table 1 lists the constituents that were determined in the samples. The constituents include moisture, oil and grease, metals and organic compounds. The moisture analyses and total constituent analyses for the organic compounds were performed by Lancaster Laboratories, Inc., Lancaster, PA. Oil and grease analyses and Extraction Procedure (EP) toxicity tests for metals were done by Bethlehem's Research Analytical Chemistry Laboratory, Bethlehem, PA.

W. D. Egan

WDE:nar

Attachments

cc: LMHarbold
DGBoltz
THWeidner
DGBays
DMFollweiler
CEJablonski

TABLE 1. RESULTS OF ANALYSES: MOISTURE, OIL AND GREASE, EP EXTRACT METALS AND TOTAL CONSTITUENT ORGANIC CONCENTRATIONS. SOIL SAMPLES FROM PRIOR DRUM STORAGE AREA[a] BETHLEHEM STEEL CORPORATION, LACKAWANNA, NY

| Non-hazardous Parameter | Concentration, wt. %[b] | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 to 4 in. | 4 to 8 in. | 8 to 12 in. | 12 to 16 in. | 26 in. | 40 in. | 54 in. |
| Moisture | 9.0 | 12.7 | 8.4 | 9.9 | 24.6 | 30.4 | 26.2 |
| Oil and Grease | 1.5 | 6.6 | 5.5 | 5.1 | 2.3 | 0.05 | <0.05 |
| **Hazardous Metal Constituent** | **EP Extract Concentration, mg/l[c]** | | | | | | |
| | 0 to 4 in. | 4 to 8 in. | 8 to 12 in. | 12 to 16 in. | 26 in. | 40 in. | 54 in. |
| Arsenic | <0.02 | <0.02 | 0.02 | 0.03 | .13 | <0.02 | <0.02 |
| Barium | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Cadmium | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Chromium | <0.05 | 0.07 | 0.05 | 0.07 | 0.07 | <0.05 | <0.05 |
| Lead | <0.01 | 0.01 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 |
| Mercury | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Selenium | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Silver | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| **Hazardous Organic Constituent** | **Total Constituent Concentration, mg/kg[d]** | | | | | | |
| | 0 to 4 in. | 4 to 8 in. | 8 to 12 in. | 12 to 16 in. | 26 in. | 40 in. | 54 in. |
| Acrylonitrile | <0.11 | <0.11 | <0.11 | <0.11 | <0.13 | <0.14 | <0.14 |
| Benzene | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| Bis (2-chloroethyl) ether | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Carbon disulfide | <0.005 | <0.006 | 0.016 | 0.023 | <0.13 | <0.14 | <0.14 |
| Carbon tetrachloride | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| Chlorobenzene | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| Chloroform | 0.024 | 0.058 | 0.031 | 0.018 | 0.015 | <0.007 | <0.007 |
| o-Cresol | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| m- and p-Cresol | <0.73 | <0.76 | 2.3 | 3.7 | <2.3 | <0.47 | <0.45 |
| 1,2-Dichlorobenzene | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| 1,4-Dichlorobenzene | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| 1,2-Dichloroethane | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| 1,1-Dichloroethylene | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| 2,4-Dinitrotoluene | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Ethylbenzene | <0.005 | 0.007 | 0.012 | 0.010 | <0.007 | <0.007 | <0.007 |
| Hexachlorobenzene | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Hexachlorobutadiene | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Hexachloroethane | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Isobutanol | <0.11 | <0.11 | <0.11 | <0.11 | <0.13 | <0.14 | <0.14 |
| Methylene chloride | <0.005 | 0.010 | 0.011 | 0.048 | 0.007 | <0.007 | 0.011 |
| Methyl ethyl ketone | <0.11 | <0.11 | 0.023 | 0.017 | 0.15 | <0.14 | <0.14 |
| Nitrobenzene | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| PCB-1016 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |
| PCB-1221 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |
| PCB-1232 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |
| PCB-1242 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |
| PCB-1248 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |
| PCB-1254 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |
| PCB-1260 | <1.0 | <1.0 | <1.0 | <1.0 | <30.0 | <7.0 | <1.0 |

TABLE 1 - Continued

| Hazardous Organic Constituent | Total Constituent Concentration, mg/kg[d] 0 to 4 in. | 4 to 8 in. | 8 to 12 in. | 12 to 16 in. | 26 in. | 40 in. | 54 in. |
|---|---|---|---|---|---|---|---|
| Pentachlorophenol | <1.9 | <1.9 | <3.7 | <3.8 | <5.6 | <1.2 | <1.1 |
| Phenol | <0.73 | <0.76 | 2.3 | 3.4 | <2.3 | <0.47 | <0.45 |
| Pyridine | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| 1,1,1,2-Tetrachloroethane | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| 1,1,2,2-Tetrachloroethane | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| Tetrachloroethylene | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| 2,3,4,6-Tetrachlorophenol | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Toluene | <0.005 | <0.006 | 0.020 | 0.019 | <0.007 | <0.007 | <0.007 |
| 1,1,1-Trichloroethane | <0.005 | <0.006 | 0.052 | 0.057 | <0.007 | <0.007 | <0.007 |
| 1,1,2-Trichloroethane | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| Trichloroethylene | <0.005 | <0.006 | <0.005 | <0.006 | <0.007 | <0.007 | <0.007 |
| 2,4,5-Trichlorophenol | <3.7 | <3.9 | <7.2 | <7.3 | <11.0 | <2.4 | <2.3 |
| 2,4,6-Trichlorophenol | <0.73 | <0.76 | <1.4 | <1.4 | <2.3 | <0.47 | <0.45 |
| Vinyl chloride | <0.011 | <0.011 | <0.011 | <0.011 | <0.013 | <0.014 | <0.014 |
| Xylenes | <0.005 | 0.13 | 0.27 | 0.22 | 0.011 | <0.007 | <0.007 |

(a) Drum storage area is identified as SWMU P-73 in report furnished to Bethlehem by EPA's National Enforcement Investigations Center during a July 26, 1989 meeting in New York, NY. Samples coded 0 to 4 in., 4 to 8 in., 8 to 12 in. and 12 to 16 in. are composites from locations A and E (Figure 1) obtained on May 31, 1989 and analyzed from June 2 to July 25, 1989. Samples coded 26 in., 40 in. and 54 in. are composites from locations A-2 and B-2 (Figure 1) obtained on August 16, 1989 and analyzed from August 17 to October 12, 1989.

(b) Moisture analyses were performed by Lancaster Laboratories, Inc., Lancaster, PA using Method 160.3 outlined in "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020. Oil and grease analyses were performed by Bethlehem's Research Department Analytical Chemistry Group, Bethlehem, PA using Method 9071 outlined in "Test Methods for Evaluating Solid Waste", SW-846. The oil and grease analyses were performed on previously dried samples, so the method was followed from step 7.6. Chloroform was used instead of Freon because it extracts the oil and grease more effectively than Freon.

(c) EP Toxicity tests and resultant extract analyses were performed by Bethlehem's Research Analytical Chemistry Group pursuant to procedures outlined in Appendices II and III of 40CFR261.

(d) Total constituent organic analyses were performed by Lancaster Laboratories, Inc., Lancaster, PA in accordance with standard gas chromatography/mass spectrometry methods (volatiles and semi-volatiles) and standard gas chromatography methods (PCB's) outlined in SW-846. Results for semi-volatiles and PCB's are reported on a dry weight basis. Organic compounds analyzed constitute the proposed Toxicity Characteristic organic contaminants excluding pesticides and herbicides (see 6/13/86 proposed EPA rule re: TCLP, 51FR21648), PCB's and common petroleum-based hydrocarbon contaminants (i.e., ethylbenzene and xylene). The quantitation limit for some of the organic compounds differs among the samples because of matrix background differences.

TABLE 2. OIL AND GREASE ANALYSES FOR FIRST SET OF SOIL SAMPLES FROM FIVE LOCATIONS - A, B, C, D AND E

| Sample Depth, inches | Oil and Grease Concentration, wt. % | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 0-4 | 2.5 | 3.9 | 1.6 | 0.7 | 0.6 |
| 4-8 | 4.1 | 5.0 | 4.0 | 2.0 | 9.1 |
| 8-12 | 5.3 | 4.7 | 5.5 | 1.5 | 5.8 |
| 12-16 | 6.7 | 4.3 | 5.1 | 1.4 | 3.5 |
| Average | 4.7 | 4.5 | 4.1 | 1.4 | 4.8 |

TABLE 3. COMPARISON OF MAXIMUM CONCENTRATIONS OF CONSTITUENTS DETECTED ABOVE THE LIMIT OF QUANTITATION IN SOIL SAMPLES FROM PRIOR DRUM STORAGE AREA AND REGULATORY LEVELS BETHLEHEM STEEL CORPORATION, LACKAWANNA, NEW YORK

| Constituent | Measured Maximum Constituent Concentration, ppm[a] | Calculated Maximum Constituent Concentration in EP or TCLP Extract, ppm[b] | Regulatory Level: Proposed TCLP Threshold, mg/l[c] | Regulatory Level: Current EPA Health Based Standard-Drinking Water, mg/l[d] |
|---|---|---|---|---|
| Arsenic | 0.13 | 0.13 | 5.0 | 0.05 (MCL) |
| Chromium | 0.07 | 0.07 | 5.0 | 0.05 (MCL) |
| Carbon disulfide | 0.023 | 0.001 | 14.4 | 4.0 (CTRL) |
| Chloroform | 0.058 | 0.003 | 0.07 | 0.06 (CTRL) |
| m- and p-cresol | 3.7 | 0.185 | 10.0 | 2.0 (CTRL) |
| Ethylbenzene | 0.012 | NA | NA | 0.7 (PMCL) |
| Methylene chloride | 0.048 | 0.002 | 8.6 | 0.05 (CTRL) |
| Methyl ethyl ketone | 0.15 | 0.008 | 7.2 | 2.0 (CTRL) |
| Phenol | 3.4 | 0.170 | 14.4 | 1.0 (CTRL) |
| Toluene | 0.020 | 0.001 | 14.4 | 2.0 (PMCL) |
| 1,1,1-Trichloroethane | 0.057 | 0.003 | 30.0 | 0.2 (MCL) |
| Xylenes | 0.27 | NA | NA | 10.0 (PMCL) |

(a) From Table 1 - EP Toxicity test results for metals are reported in mg/l; total constituent organic analyses are mg/kg.

(b) Calculated maximum organic constituent concentration in extract is equal to the measured maximum constituent concentration divided by 20, so as to compensate for sample dilution by the TCLP extraction fluid. IT IS BASED ON A WORST CASE ASSUMPTION THAT 100% OF A CONSTITUENT WILL LEACH DURING A TCLP TEST. (Arsenic and chromium were determined in EP extracts and were not calculated).

(c) From June 13, 1986 proposed EPA rule regarding TCLP, 51FR21648 et seq.
NA = Not applicable; these common petroleum-based hydrocarbons are not proposed toxicity characteristic contaminants, 51FR21648 et seq.

(d) Bases/sources of health-based standards are as follows:

(MCL) = Maximum contaminant level, see 40CFR141.
(PMCL) = Proposed maximum contaminant level, see 54FR22062 et seq. (5/22/89).
(CTRL) = Chronic toxicity reference level, see 51FR21673-21674 (6/13/86) and 53FR18024 et seq. (5/19/88).

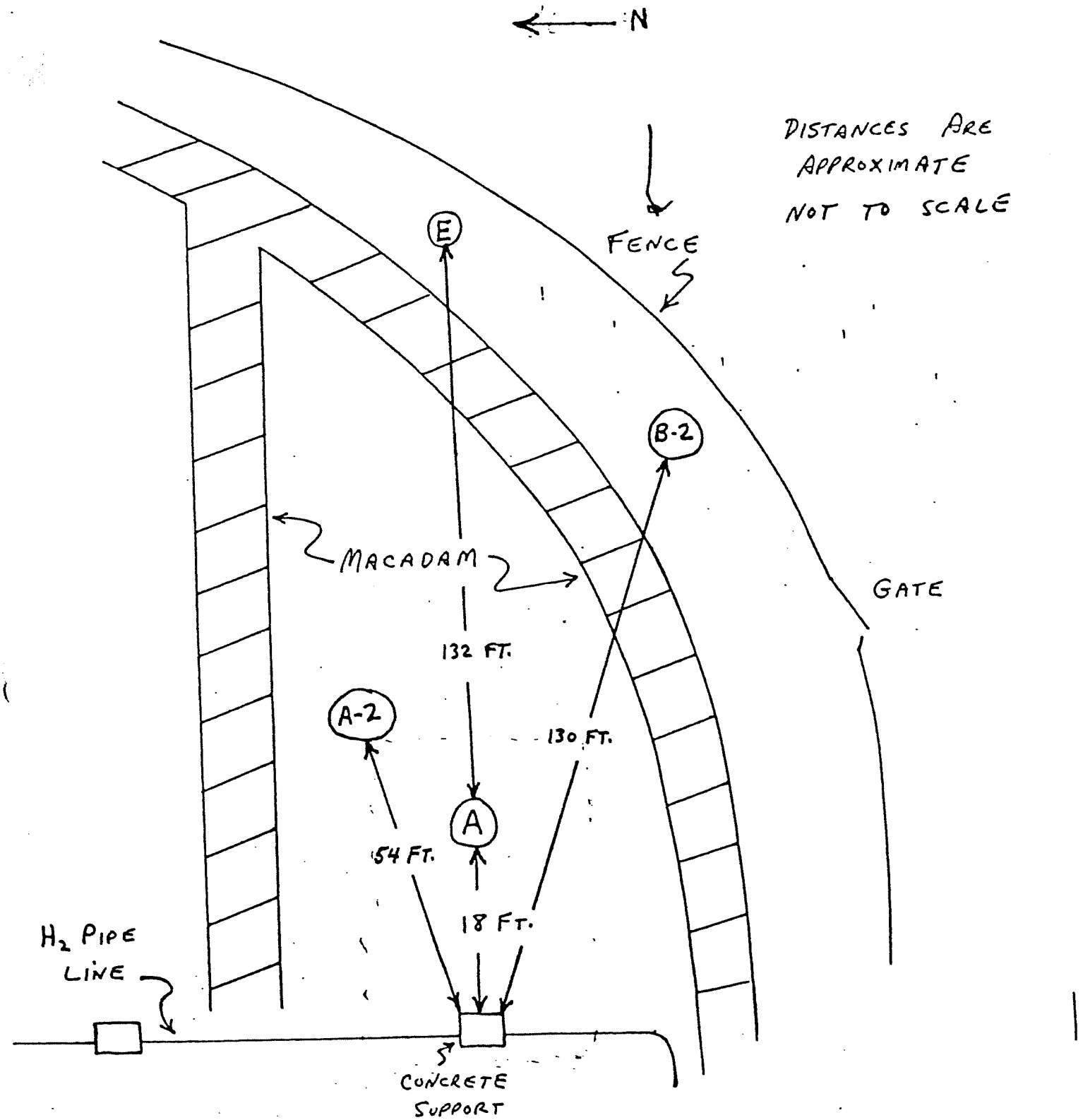



FIGURE 1. LOCATION OF SOIL SAMPLES TAKEN FROM SITE OF FORMER DRUM STORAGE AREA.

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. A, 0-4" Date Sampled 5-31-89 Time Sampled 1⁰⁰ pm

Collector's Name Charles E. Jedlowski (Signature) Dept. ENVIR. CONTROL

Field Information. SAMPLE TAKEN USING PICK & SHOVEL - 18 FT. FROM PIER (SEE MAP).

Sample Disposition · SAMPLE PLACED IN ZIP LOC BAG AND STORED IN CONTAINER WITH DRY ICE FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | | | | |
|---|---|---|---|---|
| 1. | Charles E. Jedlowski (Signature) | TECH. ANALYST (Title) | 5-31-89 | 6-2-89 (inclusive Dates) |
| 2. | (Signature) | ENG'R. (Title) | 6-2-89 | 6-10-89 (inclusive Dates) |
| 3. | Douglas Follweiler (Signature) | Engineer (Title) | 6/20/89 | 6/22/89 (inclusive Dates) |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. A, 4-8" Date Sampled 5-31-89 Time Sampled 1^05 pm

Collector's Name Charles E. Gallagher Dept. ENVIR. CONTROL
(Signature)

Field Information.

SAMPLE TAKEN USING PICK & SHOVEL - 18 FT. FROM PIER (SEE MAP).

Sample Disposition SAMPLE PLACED IN ZIP LOC BAG AND STORED IN CONTAINER WITH DRY ICE FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | (Signature) | (Title) | (inclusive Dates) | |
|---|---|---|---|---|
| 1. | Charles E. Gallagher | TECH. ANALYST | 5-31-89 | 6-2-89 |
| 2. | [signature] | ENG'R. | 6-2-89 | 6-20-89 |
| 3. | Douglas Fellwock | Engineer | 6/20/89 | 6/22/89 |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. A, 8-12" Date Sampled 5-31-89 Time Sampled 1^10 pm

Collector's Name Charles E. Jakubowski (Signature) Dept. ENVIR. CONTROL

Field Information. SAMPLE TAKEN USING PICK & SHOVEL - 18 FT. FROM PIER (SEE MAP).

Sample Disposition SAMPLE PLACED IN ZIP LOC BAG AND STORED IN CONTAINER WITH DRY ICE FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | (Signature) | (Title) | (inclusive Dates) | |
|---|---|---|---|---|
| 1. | Charles E. Jakubowski | TECH. ANALYST | 5-31-89 | 6-2-89 |
| 2. | [signature] | ENG'R. | 6-2-89 | 6-10-89 |
| 3. | Douglas Follweiler | Engineer | 6/20/89 | 6/22/89 |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. A, 12-16" Date Sampled 5-31-89 Time Sampled 1:15 pm

Collector's Name Ralph E. Jahnke (Signature) Dept. ENVIR. CONTROL

Field Information.

SAMPLE TAKEN USING PICK & SHOVEL - 18 FT. FROM PIER (SEE MAP).

Sample Disposition · SAMPLE PLACED IN ZIP LOC BAG AND STORED IN CONTAINER WITH DRY ICE FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | (Signature) | (Title) | (inclusive Dates) | |
|---|---|---|---|---|
| 1. | Ralph E. Jahnke | TECH. ANALYST | 5-31-89 | 6-2-89 |
| 2. | [signature] | ENG'R. | 6-2-89 | 6-20-89 |
| 3. | Douglas Fellwock | Engineer | 6/20/89 | 6/22/89 |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. E, 0+4" Date Sampled 5-31-89 Time Sampled 2:15 pm

Collector's Name [signature] (Signature) Dept. ENVIR. CONTROL

Field Information.

SAMPLE TAKEN USING PICK & SHOVEL - 150 FT. FROM PIER (SEE MAP)

Sample Disposition · SAMPLE PLACED IN ZIP LOC BAG AND STORED IN CONTAINER WITH DRY ICE FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | (Signature) | (Title) | (inclusive Dates) | |
|---|---|---|---|---|
| 1. | [signature] | TECH. ANALYST | 5-31-89 | 6-2-89 |
| 2. | [signature] | ENG'R. | 6-2-89 | 6-20-89 |
| 3. | Douglas Follweiler | Engineer | 6/20/89 | 6/22/89 |

JHP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. E, 4-8" Date Sampled 5-31-89 Time Sampled 2:20 pm

Collector's Name [signature] (Signature) Dept. ENVIR. CONTROL

Field Information.

SAMPLE TAKEN USING PICK & SHOVEL - 150 FT. FROM PIER (SEE MAP).

Sample Disposition SAMPLE PLACED IN ZIP LOC BAG AND STORED IN CONTAINER WITH DRY ICE FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | | | | |
|---|---|---|---|---|
| 1. | [signature] (Signature) | TECH. ANALYST (Title) | 5-31-89 | 6-2-89 (inclusive Dates) |
| 2. | [signature] (Signature) | ENG'R. (Title) | 6-2-89 | 6-20-89 (inclusive Dates) |
| 3. | Douglas Fillwalk (Signature) | Engineer (Title) | 6/20/89 | 6/22/89 (inclusive Dates) |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. E, 8-12" Date Sampled 5-31-89 Time Sampled 2^10 pm

Collector's Name [signature] (Signature) Dept. ENVIR. CONTROL

Field Information.

SAMPLE TAKEN USING PICK & SHOVEL - 150 FT.
FROM PIER (SEE MAP).

Sample Disposition SAMPLE PLACED IN ZIP LOC BAG
AND STORED IN CONTAINER WITH DRY ICE
FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | (Signature) | (Title) | (inclusive Dates) | |
|---|---|---|---|---|
| 1. | [signature] | TECH. ANALYST | 5-31-89 | 6-2-89 |
| 2. | [signature] | ENG'R. | 6-2-89 | 6-2-89 |
| 3. | Douglas Fallwell | Engineer | 6/20/89 | 6/22/89 |

JWF 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

LACKAWANNA Plant/Operation

Sample Name SOIL NEAR COLD MILL

Sample No. E, 12-16 A Date Sampled 5-31-89 Time Sampled 2:35 pm

Collector's Name [signature] (Signature) Dept. ENVIR. CONTROL

Field Information.

SAMPLE TAKEN USING PICK & SHOVEL - 150 FT.
FROM PIER (SEE MAP).

Sample Disposition · SAMPLE PLACED IN ZIP LOC BAG
AND STORED IN CONTAINER WITH DRY ICE
FOR SHIPMENT TO BETHLEHEM.

Chain of Possession:

| | | | | |
|---|---|---|---|---|
| 1. | [signature] (Signature) | TECH. ANALYST (Title) | 5-31-89 | 6-2-89 (inclusive Dates) |
| 2. | [signature] (Signature) | ENG'R. (Title) | 6-2-89 | 6-20-89 (inclusive Dates) |
| 3. | Douglas Folkowski (Signature) | Engineer (Title) | 6/20/89 | 6/22/89 (inclusive Dates) |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

BETHLEHEM STEEL LACKAWANNA Plant/Operation

Sample Name P-73

Sample No. A-2 Date Sampled 8/16/89 Time Sampled 11:20 A.M.

Collector's Name Charles Ekablowski (Signature) Dept. ENVIRONMENTAL CONTROL

Field Information. SAMPLE A2 DISTANCE OF 54 FT FROM PIER (PER MAP) HOLE WAS 36" WIDE 36" LONG AND 40" DEEP. SAMPLED WALL 26" DOWN FROM TOP, SAMPLED WATER IN HOLE, SAMPLED CLAY AT 40" DEEP, SAMPLED 14" INTO CLAY

Sample Disposition DUG HOLE WITH BACK HOE (DISTANCE SHOWN ON MAP) SAMPLED WATER IN HOLE THEN DUG SAMPLE OUT OF SIDE WALL 26" DOWN SYPHONED WATER OUT & GOT SAMPLE OF CLAY AT 40" DEPTH LEVEL, DUG 14" INTO CLAY & GOT SAMPLE. ALL SOLIDS PLACED IN ZIP LOCK BAGS & BOTH LABELED & PLACED IN DRY ICE COOLERS AND BROUGHT BACK TO B.S.Co. LABS

Chain of Possession:

| | | | | |
|---|---|---|---|---|
| 1. | Charles Ekablowski (Signature) | Tech Analyist (Title) | 8/16/89 | 8/17/89 (inclusive Dates) |
| 2. | [signature] (Signature) | Engr. (Title) | 8/17/89 | 8/23/89 (inclusive Dates) |
| 3. | Douglas Follweiler (Signature) | Engineer (Title) | 8/23/89 | 8/29/89 (inclusive Dates) |

JWP 6/80

Bethlehem Steel Corp.
CHAIN OF CUSTODY RECORD
Solid Waste Classification Samples

BETHLEHEM STEEL LACKAWANNA Plant/Operation

Sample Name P-73

Sample No. B-2 Date Sampled 8/16/89 Time Sampled 11:30 A.M.

Collector's Name Roger E. Hubbell (Signature) Dept. ENVIRONMENTAL CONTROL

Field Information. SAMPLED B2 DISTANCE OF 130 FT FROM PIER (PER MAP) HOLE WAS 36" WIDE 36" LONG & 40" DEEP. SAMPLED WALL 26" DOWN FROM TOP, SAMPLED WATER IN HOLE, SAMPLED CLAY AT 40" DEEP SAMPLED 14" IN TO CLAY

Sample Disposition DUG HOLE WITH BACK HOE (DISTANCES SHOWN ON MAP) SAMPLED WATER IN HOLE THEN DUG SAMPLE OUT OF SIDE WALL 26" DOWN SYPHONED WATER OUT & GOT SAMPLE OF CLAY AT 40" DEPTH LEVEL, DUG 14" IN TO CLAY & GOT SAMPLE. ALL SOLIDS SAMPLED PLACED IN ZIP LOCK BAGS & BOTTLES LABELED, PLACED IN DRY ICE COOLERS AND BROUGHT BACK TO B.S.CO LABS

Chain of Possession:

| | (Signature) | (Title) | (inclusive Dates) | |
|---|---|---|---|---|
| 1. | Roger E. Hubbell | TECH ANALYST | 8/16/89 | 8/17/89 |
| 2. | [signature] | ENGR. | 8/17/89 | 8/23/89 |
| 3. | Douglas Follweiler | ENGINEER | 8/23/89 | 8/29/89 |

JWP 6/80

# APPENDIX C

# 1989 BORING LOGS

FINISHED 12-7-89 | B-1 | G.W. DEPTH See note

SHEET 1 OF 1

PROJECT Proposed Linde Tanks
Bethlehem Steel

LOCATION Route 5
Lackawanna, New York

| DEPTH | SAMPLES | SAMPLE NO | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | N | Q(U) (T.S.F.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | 1 | 33 | 56 | | | | Brown-grey f-c SAND and f-c Slag (moist, FILL) | Q(U) obtained using Forney "Geotester" Penetrometer, and is expressed in tons per sqare foot. |
| | | | 21 | 19 | | 77 | | | |
| | | 2 | 19 | 15 | | | | Becomes grey (wet) | |
| | | | 14 | 9 | | 29 | | | |
| 5 | | 3 | 2 | 1 | | | 1.1 | Grey Silty CLAY, tr. sand (moist, soft) | |
| | | | 2 | 4 | | 3 | | | |
| | | 4 | 3 | 4 | | | 1.2 | Grey & brown Clayey SILT, tr.-little-fine Sand, tr. peat (moist, medium) | |
| | | | 5 | 5 | | 9 | | | |
| | | 5 | 1 | 1 | | | | Olive-grey fine Sand and Clayey Silt, tr. peat, (moist-wet, loose) | |
| 10 | | | 1 | 2 | | 2 | | | |
| | | 6 | 8 | 12 | | | 3.1 | Grey Silty CLAY, tr. sand (moist, hard) | |
| | | | 14 | 15 | | 26 | | | |
| 15 | | 7 | 2 | 2 | | | 0.6 | Becomes brown (wet, soft) | |
| | | | 2 | 3 | | 4 | | | |
| 20 | | 8 | WOH/ | 1.0 | | | 0.3 | (very soft) | WOH = Weight of hammer & rods |
| | | | 1 | 2 | | 1 | | | |
| 25 | | | | | | | | | Driller notes change in auger at 32.0'. Driller notes diffucult augering to 39.0'. No samples obtained |
| | | 9 | 1 | 1 | | | 0.4 | Contains occasional Silt seams and partings | |
| 30 | | | 1 | 4 | | 2 | | | |
| 35 | | | | | | | | | |
| 40 | | | | | | | | Boring complete with auger refusal at 39.0' | No Free Standing Water obtained at boring completion |

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

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

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS

12-7-89

ED 12-7-89

1 OF 2

# EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-2

SURF. ELEV.

G. W. DEPTH See note

JECT Proposed Linde Tanks
Bethlehem Steel

LOCATION Route 5
Lackawanna, New York

| SAMPLES | SAMPLE NO | BLOWS ON SAMPLER 0/6 | 6/12 | 12/16 | N | Q(U) (T.S.F.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|
| | 1 | 24 | 32 | | | | Grey-brown f-c Slag and f-c Sand (moist, FILL) | Q(U) obtained using Fourney "Geotester" Penetrometer and is expressed in tons per square foot. |
| | | 16 | 12 | | 48 | | | |
| | 2 | 10 | 15 | | | | Becomes brown, contains tr. concrete | |
| | | 5 | 3 | | 20 | | | |
| | 3 | 2 | 2 | | | 1.8 | Olive & orange mottled Clayey SILT, tr. sand (moist, soft) | |
| 5 | | 3 | 5 | | 5 | | | |
| | 4 | 5 | 6 | | | 1.2 | Becomes orange-brown, contains little fine Sand (moist-wet, medium) | |
| | | 6 | 7 | | 12 | | | |
| | 5 | 1 | 1 | | | | Olive-grey fine SAND and Clayey Silt, tr. peat (moist-wet, loose) | |
| 10 | | 2 | 2 | | 3 | | | |
| | 6 | 5 | 6 | | | 2.1 | Grey Clayey SILT, tr. sand (moist, medium) | |
| 15 | | 7 | 8 | | 13 | | | |
| | 7 | 1 | 1 | | | 0.6 | Grey Silty Clay, tr. sand, tr. peat (wet, very soft) | |
| 20 | | 1 | 1 | | 2 | | | |
| | 8 | WOH/1.0 | | | | 0.3 | Contains occasional Silt seams | |
| 25 | | 1 | 1 | | 1 | | | |
| | 9 | 2 | 8 | | | | Brown-black f-c Sand, some Silt little f-c Gravel, tr. shale, tr. clay (moist, firm) | |
| 0 | | 13 | 10 | | 21 | | | |
| | 10 | 19 | 16 | | | | Becomes brown-grey (compact) | |
| 5 | | 25 | 26 | | 41 | | | |
| | 11 | 22 | 28 | | | | | |
| | | 49 | 30 | | 77 | | (very compact) | |

blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow.

blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

CLASSIFICATION Visual by geologist

ASTM D-1586 USING HOLLOW STEM AUGERS

12-7-89

12-7-89

SHEET 1 OF 1

# ELIPIRE
SOILS INVESTIGATIONS INC

## SUBSURFACE LOG

HOLE NO. B-2

SURF. ELEV.

G. W. DEPTH See note

PROJECT Proposed Linde Tanks
Bethlehem Steel

LOCATION Route 5
Lackawanna, New York

| DEPTHS | SAMPLES | SAMPLE NO | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | N | Q(U) (T.S.F) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | Boring completion at 40.0' | No Free Standing Water reading obtained at boring completion |

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

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

CLASSIFICATION Visual by geologist

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

12-7-89
12-7-89
1 OF 2

# ELIPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-3
SURF. ELEV.
G. W. DEPTH See note

PROJECT Proposed Linde Tanks
Bethlehem Steel

LOCATION Route 5
Lackawanna, New York

| SAMPLES | SAMPLE NO | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | N | Q(U) (T.S.F) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|
| | 1 | 20 | 30 | | | | Brown-grey f-c SLAG and f-c Sand (moist, FILL) | Q(U) obtained using Fourney "Geotester" Penetrometer and is expressed in tons per square foot. |
| | | 22 | 24 | | 52 | | | |
| | 2 | 24 | 20 | | | | (Wet) | |
| | | 16 | 15 | | 36 | | | |
| | 3 | 12 | 6 | | | | | |
| | | 5 | 4 | | 11 | | | |
| | 4 | 5 | 5 | | | 1.0 | Brown mottled Silty Clay, tr. sand, tr. peat (moist, medium) Becomes grey, contains "and" fine Sand (very soft) | |
| | | 5 | 5 | | 10 | | | |
| | 5 | WOH | /1.0' | | | 0.1 | | |
| | | 2 | 2 | | 2 | | | |
| | 6 | 7 | 8 | | | | Grey Clayey SILT, tr. sand (moist, stiff) | |
| | | 10 | 12 | | 18 | | | |
| | 7 | 2 | 2 | | | 1.0 | Grey Silty Clay, tr. sand, occasional Silt seams (moist-wet, soft) | |
| | | 3 | 2 | | 5 | | | |
| | 8 | 1 | 2 | | | 0.4 | | |
| | | 1 | 2 | | 3 | | | |
| | 9 | 1 | 2 | | | 0.4 | | |
| | | 1 | 1 | | 3 | | | |
| | 10 | 1 | 15 | | | | Brown-grey f-c SAND, little-some Silt, little f-c Gravel, tr. shale, tr. clay (moist, compact) | |
| | | 30 | 50 | | 45 | | | |
| | 11 | 30 | 47 | | | | | |
| | | 51 | 100/0.3 | | 98 | | | |

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

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

CLASSIFICATION Visual by geologist

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

12-7-89

12-7-89

1 OF 2

SOILS INVESTIGATIONS INC

# SUBSURFACE LOG

HOLE NO. B-3

SURF. ELEV.

G. W. DEPTH See note

PROJECT Proposed Linde Tanks
Bethlehem Steel

LOCATION Route 5
Lackawanna, New York

| SAMPLES | SAMPLE NO | BLOWS ON SAMPLER 0/6 6/12 12/18 N | Q(U) (T.S.F.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|
| | | | | Boring Terminated at 43.0' due to obstruction in hollow stem augers. | No Free Standing Water obtained at boring completion |

blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. CLASSIFICATION Visual by geologist

blows to drive " casing " with lb. weight falling " per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

# APPENDIX D

# 1995 AND 2000 SAMPLE RECORDS

# DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73 DATE : 2/16/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 13 : 50

SAMPLE ID : TP-1
SAMPLE LOCATION : TEST PIT 1 3.75-4.0' CLAY BASE

VOC SAMPLE ID TP-1V 2 16 95 1250

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

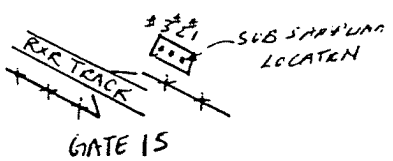
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☒
VOC SAMPLE ONLY ALL NON-VOC ANALYSES

SAMPLE DESCRIPTION : GREENISH-GRAY AND BRILLIANT-YELLOW MOTTLED SILTY CLAY (CL/ML) (MOIST)

## SAMPLE ANALYSIS

SAMPLE ID : TP-1 + TP-1V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 -P-73 Generic Analyte List Compounds
Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :
TEMP. (°C/°F) —
pH —
SPEC. COND.(µMHOs/CM) —
OTHER (UNITS) HEADSPACE 11.7 eV PID 0.5 – 1.0 PPM

TP-1



WEATHER : OVERCAST, 30's, CALM
COMMENTS : VOC SAMPLE COLLECTED FROM SUB SAMPLING LOCATION #3. MAX. HEADSPACE OF 1.0 PPM.

# DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73 DATE : 2/16/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 11:45

SAMPLE ID : TP-2
SAMPLE LOCATION : TP-2 4C'-4.5' CLAY BASE

VOC SAMPLE ID
TP2V
2.16.95
1145

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

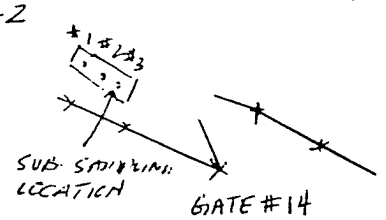
SAMPLE TYPE : POINT ☐ GRAB ☒ (VOC SAMPLE ONLY) COMPOSITE ☒ (ALL NON-VOC ANALYSES)

SAMPLE DESCRIPTION : GREENISH-GRAY MOIST FINE TEXTURED SILTY CLAY (dry) (medium stiff)

## SAMPLE ANALYSIS

SAMPLE ID : TP-2 + TP-2V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 -P-73 Generic Analyte List Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :
TEMP. (°C/°F)
pH
SPEC. COND.(μMHOs/CM)
OTHER (UNITS) 11.7eV HNU 0.6 - 1.2 PPM




WEATHER : OVERCAST, 30's, CALM
COMMENTS : VOC SAMPLE COLLECTED FROM SUB-SAMPLING LOCATION #2 MAX HEADSPACE OF 1.2 PPM.

# DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73 DATE : 2/16/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 09 : 25

SAMPLE ID : TP-3
SAMPLE LOCATION : TP-3 30'-35' CLAY BASE

VOC. SAMPLE ID
TP 3V
2.16.95
0925

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ (VOC. SAMPLE ONLY) COMPOSITE ☒ (ALL NON-VOC ANALYSES)

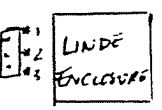
SAMPLE DESCRIPTION : GREENISH-GRAY SILTY CLAY, FEW TAN mottles (dry) (SHELBY)

## SAMPLE ANALYSIS

SAMPLE ID : TP-3 + TP-3V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 - P-73 Generic Analyte List Compounds
Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :

TEMP. (°C/°F) —
pH —
SPEC. COND.(μMHOs/CM) —
OTHER (UNITS) HEADSPACE 11.7eV UNIT all 0.4 PPM

TP-3
SUB-SAMPLING LOCATION



WEATHER : OVERCAST, 30's, CALM
COMMENTS : VOC SAMPLE COLLECTED FROM SUB SAMPLING LOCATION #1 - RANDOM NUMBER SELECTION.

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73 DATE : 2/16/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 14 : 20

SAMPLE ID : TP-4
SAMPLE LOCATION : TP-4 -2.5'-3.5' CLAY BASE

VOC SAMPLE ID.
2/16/95
14:20

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

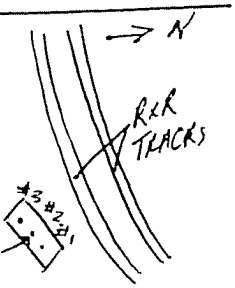
SAMPLE TYPE : POINT ☐ GRAB ☒ VOC-ANALYSIS ONLY COMPOSITE ☒ ALL NON-VOC ANALYSES

SAMPLE DESCRIPTION : DARK GRAY-GREEN SILTY CLAY (dry) (medium stiff)

## SAMPLE ANALYSIS

SAMPLE ID : TP-4 & TP-4V (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 -P-73 Generic Analyte List Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : —

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | — |
| pH | — |
| SPEC. COND.(µMHOs/CM) | — |
| OTHER (UNITS) HEADSPACE 11.7 IN HNU | ALL 0.4 PPM |




WEATHER : OVERCAST 30's CALM
COMMENTS : VOC SAMPLE COLLECTED FROM SUB-SAMPLING LOCATION #2 RANDOM NUMBER SELECTION

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73 DATE : 2/2/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 10:30

SAMPLE ID : SP-ACE
SAMPLE LOCATION : Stockpiles A1, C3 and E1.

TRIPLICATE SET OF SAMPLES OBTAINED.
SAMPLE ID:
SP-ACE MS
SP-ACE MSD

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : BROWN FINE TO COARSE GRAINED SILTY SAND AND GRAVEL, some round reddish-brown slag fragments, trace of roots from top growth of piles (local) (dry)

SOIL DESCRIPTION FROM STOCKPILES A1, C3 AND E1 SAMPLE

## SAMPLE ANALYSIS

SAMPLE ID : SP-ACE, SP-ACE MS, SP-ACE MSD (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 -P-73 Generic Analyte List Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : —

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | — |
| pH | — |
| SPEC. COND.(μMHOs/CM) | — |
| OTHER (UNITS) | — |

WEATHER : CLOUD ~18°, CLEARCAST, CALM
COMMENTS : FROM EACH PILE, SOIL COLLECTED FROM MIDDLE 1-FOOT INTERVAL.

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU P-73, DATE : 2/2/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 11:00

SAMPLE ID : SP-ACEV
SAMPLE LOCATION : Stockpile A1

TRIPLICATE SET OF SAMPLES OBTAINED. SAMPLE ID'S SP-ACE MS SP-ACE MS/MSD

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : BROWN FINE TO COARSE GRAINED SILTY SAND AND GRAVEL, some rounded reddish-brown slag fragments, trace of roots from top growth at site (loose) (dry)

## SAMPLE ANALYSIS

SAMPLE ID : SP-ACEV, SP-ACEVMS, SP-ACEVMSD (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8240 - P-73 Generic Analyte List VOCs
PHYSICAL APPEARANCE & ODOR : —

FIELD TEST : VALUE :

| | |
|---|---|
| TEMP. (°C/°F) | / |
| pH | / |
| SPEC. COND.(μMHOs/CM) | / |
| OTHER (UNITS) HEAD-SPACE | — ppm |

WEATHER : COLD · 18°, OVERCAST, CALM
COMMENTS : SOIL COLLECTED FROM MIDDLE 1-FOOT INTERVAL

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73. DATE : 2-11-95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 15:00

SAMPLE ID : SP-B
SAMPLE LOCATION : Stockpile B
FROM 3 EXCAVATIONS, 9 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

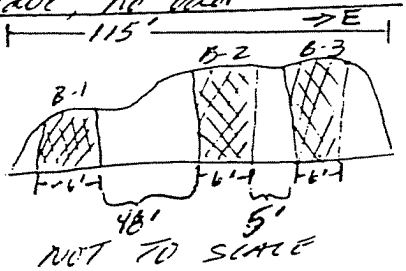
SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : GENERAL DESCRIP. FOR ALL 9 LOCATIONS
DARK GRAY FINE GRAINED SILTY SAND AND BROWN COARSE GRAINED SAND AND GRAVEL (dry) (loose - silty sand) (very dense - sand and gravel) slight oily residue

## SAMPLE ANALYSIS

SAMPLE ID : SP-B (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 8010, 7471 -P-73 Generic Analyte List Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : slight oily residue, no odor

FIELD TEST : VALUE :
TEMP. (°C/°F)
pH
SPEC. COND.(μMHOs/CM)
OTHER (UNITS)



NOT TO SCALE

WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : FROM ALL 3 EXCAVATIONS, COLLECTED SAMPLES FROM TOP 1-FOOT, MIDDLE 1-FOOT AND BOTTOM 1-FOOT INTERVALS.

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU P-73 DATE : 7/1/95

JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 16:20

SAMPLE ID : SP-BV

SAMPLE LOCATION : Stockpile B
EXCAVATION B-2, TOP 1-FOOT INTERVAL

SAMPLERS : E. FUJITA OF : DAMES & MOORE
B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : DARK GRAY FINE TO COARSE GRAINED SILTY SAND (dry) (loose), slight oily residue

## SAMPLE ANALYSIS

SAMPLE ID : SP-BV (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : SW-846 8240 - P-73 Generic Analyte List VOCs

PHYSICAL APPEARANCE & ODOR : slight oily residue, no odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | / |
| pH | / |
| SPEC. COND.(μMHOs/CM) | / |
| OTHER (UNITS) HEAD-SPACE | / ppm |

WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST

COMMENTS : SAMPLE COLLECTED FROM TOP 1-FOOT INTERVAL OF EXCAVATION B-2, APPROX. 9-10 FOOT HEIGHT

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU #73 DATE : 2/1/95
JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 14:00

SAMPLE ID : SP-D
SAMPLE LOCATION : Stockp. 6 D
From 2 excavations, 6 locations

SAMPLERS : E. FUJITA OF : DAMES + MOORE
B. PHILLIPS DAMES + MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

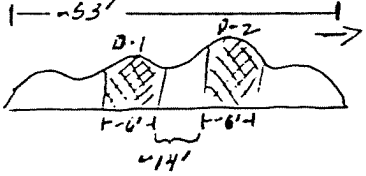
SAMPLE TYPE : POINT ☐ GRAB ☐ COMPOSITE ☒

SAMPLE DESCRIPTION : GENERAL DESCRIPTION FOR ALL 6 LOCATIONS:
DARK BROWN AND DARK GRAY FINE GRAINED SILTY SAND AND GREY AND REDDISH-BROWN SILTY CLAY, with coarse rounded sand and gravel [steel slag fragments] (dry-moist) (loose)
Upper 1-foot interval at both excavations contains vegetation roots.

## SAMPLE ANALYSIS

SAMPLE ID : SP-D (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : SW-846 8270, 6010, 9010, 7471 - P-73 Generic Analyte List Compounds Oil + Grease 9071, Percent Water, pH
PHYSICAL APPEARANCE & ODOR : slight oily residue in upper 1-foot

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) HEAD-SPACE | 0.4 - 0.5 ppm* |




*SUSPECT READING FROM 11.7 V HNu.

WEATHER : Low 30's, OVERCAST, MODERATE WIND FROM WEST
COMMENTS : FROM BOTH EXCAVATION COLLECTED SAMPLES FROM APPROX. TOP 1-FOOT, MIDDLE 1-FOOT AND BOTTOM 1-FOOT INTERVALS.

DAMES & MOORE

**SOIL/SEDIMENT SAMPLE RECORD**

JOB No.: 00120-171-152 JOB NAME : SWMU P-73 DATE : 2/11/95

JOB LOCATION : Bethlehem Steel Corp. Lackawanna, NY TIME : 16:00

SAMPLE ID : SP-D1

SAMPLE LOCATION : Stockpile D

EXCAVATION D-2, TOP 1-FOOT INTERVAL

SAMPLERS : E. FUJITA OF : DAMES & MOORE

B. PHILLIPS DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☒

SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : DARK GRAY AND DARK BROWN FINE GRAINED SILTY SAND, AND GRAY SILTY CLAY, vegetation roots, some coarse rounded reddish-brown sand [STEEL SLAG FRAGMENTS] (moist) (loose) slight oily residue

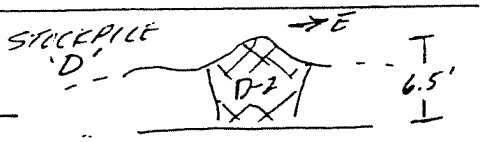
## SAMPLE ANALYSIS

SAMPLE ID : SP-D1 (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : SW-846 8240 - P-73 Generic Analyte List VOCs

PHYSICAL APPEARANCE & ODOR : slight oily residue, no odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | / |
| pH | / |
| SPEC. COND.(µMHOs/CM) | / |
| OTHER (UNITS) HEAD-SPACE | 0.5 ppm * SUSPECT READINGS FROM 11.7eV HNu. |




WEATHER : LOW 30's, OVERCAST, MODERATE WIND FROM WEST

COMMENTS : SAMPLE COLLECTED FROM TOP 1-FOOT INTERVAL OF EXCAVATION D-2, APPROX 5.5 - 6.5 FOOT HEIGHT.

Attachment 2

**Test Pit Logs**

# DAMES & MOORE

# TEST PIT LOG SHEET

ROJECT : SWIHA P-73 PROJECT No. : 0020-154-152
WEATHER CONDITIONS : OVERCAST 30's, CALM DATE : 2-16-95
CLIENT : Bethlehem Steel CONTRACTOR : R. STEINER, SES
INSPECTOR : E. FUJITA, H.M. PAYSE EQUIPMENT : FORD 555

TEST PIT No. : TP-1 ELEVATION :
START TIME : 1230 STOP TIME : 1245 GROUNDWATER DEPTH : ~ 3.5'

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| | | 0-2" SNOW COVERED | |
| | | 2"-5" DK. GRAY AND BROWN COARSE SAND & GRAVEL CONCRETE-LIKE (moist) | |
| 5 | | 5"-3.5' DK. GRAY F-C SILTY SAND (moist) [FILL] WIRE DEBRIS | |
| 10 | | 3.5' DK. GRAY BLACK AND GREENISH OILY GLOBULES ON WATER SURFACE | |
| | | 3.5' GREENISH-GRAY SAND - CHANGES TO TAN Y. BROWN | |
| 15 | | 3.75-4.0' GREENISH-GRAY S. CLAY (dry) (m. stiff) | |
| 20 | | 18" × 8' × 4.0' W L D → N | |
| 25 | |   GATE 15 | |

COMMENTS :

ZONES OF SEEPAGE : Water noted at approx. 3.5' BGS

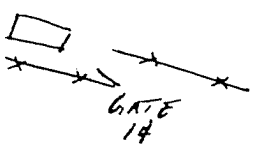
INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) SHEET ____ OF ____

DAMES & MOORE

# TEST PIT LOG SHEET

PROJECT : SUMMIT P-73 PROJECT No. : 00120-189-152
WEATHER CONDITIONS : OVERCAST 30's, CALM DATE : 2-16-95
CLIENT : Bethlehem Steel CONTRACTOR : R. STEINER, SEB
INSPECTOR : E. FURTA, H.M. PAYSEL EQUIPMENT : FOLD 555

TEST PIT No. : TP-2 ELEVATION :
START TIME : 1115 STOP TIME : 1130 GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 5 | | 4-6" SNOW COVERED<br>0-3" BROWN FINE SILTY SAND with coarse gravel (dry) (hard)<br>3"-1' GRADES TO DK. BROWN (REDDISH) FINE TO COARSE SILTY SAND (dry) | |
| 10 | | 1'-4' DARK GRAY ~~FAT~~ FINE TO COARSE SILTY SAND [FILL] (moist) coke odor | |
| 15 | | 4' GREENISH-GRAY AND TAN MOTTLED SILTY CLAY (dry) (m. stiff)<br>Strong coke-petrol. odor | |
| 20 | | 18" x 9' x 4.5'<br>W L D<br>→N | |
| 25 | |  | |

COMMENTS :

ZONES OF SEEPAGE :

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) SHEET ____ OF ____

DAMES & MOORE

# TEST PIT LOG SHEET

PROJECT : SUMMIL P-73 PROJECT No. : 0120-189-152
WEATHER CONDITIONS : OVERCAST 30's, CALM DATE : 2-16-95
CLIENT : Bethlehem Steel CONTRACTOR : R. STEINER, SJB
INSPECTOR : E. FUJITA, H.M. PAYSE EQUIPMENT : FORD 555

TEST PIT No. : TP-3 ELEVATION :
START TIME : 8:30 STOP TIME : 0920 GROUNDWATER DEPTH :

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| 5 | | AT 2' PENETRATION, 6" WATER IN EXCAVATION - BROKE THRU CLAY TILE (OLD DRAIN) | (N-S ORIENTATION) |
| | | 2" UPPER SURFACE ICE | |
| | | TO 1' DEPTH BROWN CEMENT-LIKE MATERIAL (V. DENSE) | |
| 10 | | 1-3' GRADES TO DK. GRAY + GRAVEL AND FINE S. SAND, COARSE COBBLES | COARSE SAND |
| | | 3' GREENISH-GRAY SILTY CLAY FEW TAN MOTTLES | (CLAY) (STIFF) |
| 15 | | WATER AT 2' BGS | |
| | | 3' x 10' x 3.5' | |
| | | W L D | |
| 20 | | → N | |
| | | LINDE ENG. | |
| 25 | | | |

COMMENTS :

ZONES OF SEEPAGE :

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... ) SHEET ____ OF ____

DAMES & MOORE

# TEST PIT LOG SHEET

OJECT : SWIMM P-73 PROJECT No. : 20120-169.152

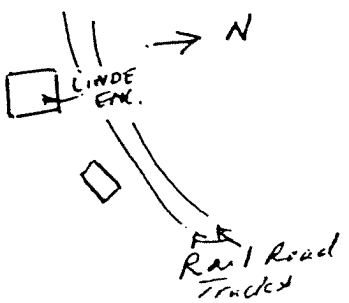
WEATHER CONDITIONS : OVERCAST 30's, CALM DATE : 2-16-95

CLIENT : Bethlehem Steel CONTRACTOR : R. STEINER, SFB

INSPECTOR : E. FUJITA, H.M. PAYSE EQUIPMENT : FORD 555

TEST PIT No. : TP-4 ELEVATION : _____

START TIME : 1350 STOP TIME : 1410 GROUNDWATER DEPTH : _____

| DEPTH (FT.) | SAMPLE No. DEPTH | CLASSIFICATION | NOTES |
|---|---|---|---|
| | | 12" SNOW COVERED | |
| | | 0-3" RED-BROWN FINE SILTY SAND (dry) | |
| | | 3"-5" LT. GRAY SAND LAYER | |
| 5 | | 5"-2.5' DK. GRAY FINE TO COARSE SILTY SAND (moist) (petrol - cake odor) | |
| | | 2.5'-3.5' DK. GRAY-GREEN SILTY CLAY (dry) (m. stiff) | |
| 10 | | initially dry p.t, infilling slowly. | |
| | | 18" x 8' x 3.5' | |
| | | W L D | |
| 15 | | | |
| | |   | |
| 20 | | | |
| 25 | | | |

COMMENTS :

ZONES OF SEEPAGE :

INCLUDE A SKETCH (DIMENSIONS, GRADE, ETC... )

SHEET ____ OF ____

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: Bethlehem Steel Corp Lackawanna, NY
PROJECT NO.: 42000 8 BSC .15
SITE: P-73 Soil Stockpile AREA South of Galvanizing Mill

## SAMPLE INFORMATION

MATRIX: Soil
SAMPLE ID: P-73 SS-1 0-6"
SAMPLING METHOD: Shovel + Trowels
DUP.REP. OF: —
BEGINNING DEPTH: Surface
MATRIX SPIKE/MATRIX SPIKE DUPLICATE
END DEPTH: 6-inches below surface
YES ( ) NO (✓)
GRAB (✓) COMPOSITE ( )
DATE: 12/1/00 TIME: 1210

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| Encore | 2 | None | | | VOCs |
| ~~8oz~~ Glass | 2 | | | | SVOCs, Metals, Cl, SO4, CN, Phenolics |
| 4oz " | 2/2 | | | | TOC/TOX |
| 4oz " JB | ~~2/2~~ 1/1 | | | | TCLP SVOCs, Metals / TCLP VOAs |
| 4oz " | 1 | | | | SPLP SVOCs, Metals, CN |
| 4oz " | 1 | | | | SPLP VOAs |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st None Taken | COLOR: Dark Brown | |
| 2nd | ODOR: None | |
| | OTHER: | |
| | | |

## GENERAL INFORMATION

WEATHER: (SUN/CLEAR) ____ OVERCAST/RAIN ____ WIND DIRECTION SW (Light) AMBIENT TEMP. ≈ 30°F
SHIPMENT VIA: FED-X ✓ HAND DELIVER ____ COURIER ____ OTHER ____
SHIPPED TO: STL Labs, Pittsburgh PA
COMMENTS:
SAMPLER: John Boyd URS Corp OBSERVER: None

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
(SO = SOIL)
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
(G = GRAB)
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: Bethlehem Steel Corp Lackawanna, NY
PROJECT NO.: 42000 8 BSC .15
SITE: P-73 Soil Stockpile AREA South of Galvanizing Mill

## SAMPLE INFORMATION

MATRIX: Soil
SAMPLE ID: P-73 SS-2
SAMPLING METHOD: Shovel + Trowels
DUP.REP. OF: —
BEGINNING DEPTH: Surface
MATRIX SPIKE/MATRIX SPIKE DUPLICATE
END DEPTH: 6-inches below surface
YES ( ) NO (X)
GRAB (✓) COMPOSITE ( )
DATE: 12/1/00 TIME: 1500

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| Encore | 3 | None | | | VOCs |
| 8 oz glass | 2 | | | | SVOCs, Metals, Cl, SO4, CN, Phenolics |
| 4 oz glass | 1/2 | | | | TOC/TOX |
| 4 oz glass | 1/1 | | | | TCLP SVOCs, Metals / TCLP VOAs |
| 4 oz glass | 1 | | | | SPLP SVOCs, Metals, CN |
| 4 oz glass | 1 | | | | SPLP VOAs |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st None Taken | COLOR: Medium Brown | |
| 2nd | ODOR: None | |
| | OTHER: — | |
| | | |

## GENERAL INFORMATION

WEATHER: (SUN/CLEAR) OVERCAST/RAIN WIND DIRECTION SW (Light) AMBIENT TEMP. ≈30°F
SHIPMENT VIA: FED-X ✓ HAND DELIVER COURIER OTHER
SHIPPED TO: STL Labs, Pittsburgh PA
COMMENTS:
SAMPLER: John Boyd URS Corp OBSERVER: None

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
(SO = SOIL)
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
(G = GRAB)
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: Bethlehem Steel Corp Lackawanna, NY
PROJECT NO.: 42000 8 BSC .15
SITE: P-73 Soil Stockpile AREA (South of Galvanizing Mill)

## SAMPLE INFORMATION

MATRIX: Soil
SAMPLE ID: P-73 SS-3 0-6"
SAMPLING METHOD: Shovel + Trowels
DUP.REP. OF: —
BEGINNING DEPTH: Surface
MATRIX SPIKE/MATRIX SPIKE DUPLICATE
END DEPTH: 6-inches below surface
YES ( ) NO (X)
GRAB (✓) COMPOSITE ( )
DATE: 12/4/06 TIME: 1315

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| Encore | 3 | None | | | VOCs |
| 8oz glass | 2 | | | | SVOCs, METALS, Cl, SO4, CN, Phenolics |
| 8oz | 1/1 | | | | TOC/TOX |
| 8oz | 1/1 | | | | TCLP SVOCs, METALS / TCLP VOAs |
| 8oz | 1 | | | | SPLP SVOCs, METALS, CN |
| 8oz | 1 | | | | SPLP VOAs |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st None Taken | COLOR: Dark Gray - Brown | |
| 2nd | ODOR: none | |
| | OTHER: — | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR ___ (OVERCAST)/RAIN ___ WIND DIRECTION SW (Light) AMBIENT TEMP. ≈30°F
SHIPMENT VIA: FED-X ✓ HAND DELIVER ___ COURIER ___ OTHER ___
SHIPPED TO: STL Labs, Pittsburgh PA
COMMENTS:
SAMPLER: John Boyd URS Corp OBSERVER: None

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
(SO = SOIL)
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
(G = GRAB)
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: Bethlehem Steel Corp LACKAWANNA, NY  PROJECT NO.: 42000.8 BSC.15

SITE: P-73 Soil Stockpile AREA (South of GALVANIZING MILL)

## SAMPLE INFORMATION

MATRIX: Soil  SAMPLE ID: P-73 SS-4 06"

SAMPLING METHOD: Shovel + Trowels  DUP.REP. OF: —

BEGINNING DEPTH: SURFACE  MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 6-inches below surface  YES (✓)  NO ( )

GRAB (✓)  COMPOSITE ( )  DATE: 12/4/00  TIME: 1415

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| Encore | 5 | None | | | VOCs |
| 8oz glass | 4 | | | | SVOCs, Metals, Cl, SO4, CN, Phenolics |
| 8oz | 2/2 | | | | TOC/TOX |
| 8oz | 2/2 | | | | TCLP SVOCs, Metals / TCLP VOAs |
| 8 oz | 2 | | | | SPLP SVOCs, Metals, CN |
| 8oz | 2 | | | | SPLP VOAs |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st NONE TAKEN | COLOR: | |
| 2nd | ODOR: | |
| | OTHER: | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR ___ OVERCAST/RAIN ___ WIND DIRECTION SW (Light) AMBIENT TEMP. ≈ 30°F

SHIPMENT VIA: FED-X ✓ HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL Labs. Pittsburgh PA

COMMENTS: ___

SAMPLER: John Boyd URS Corp  OBSERVER: None

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
(SO = SOIL)
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
(G = GRAB)
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: Bethlehem Steel Corp Lackawanna, NY
PROJECT NO.: 42000 8 BSC .15
SITE: P-73 Soil Stockpile AREA (South of Galvanizing Mill)

SAMPLE INFORMATION

MATRIX: Soil
SAMPLE ID: P-73 SS-5 0-6"
SAMPLING METHOD: Shovel + Trowels
DUP.REP. OF: —
BEGINNING DEPTH: Surface
MATRIX SPIKE/MATRIX SPIKE DUPLICATE
END DEPTH: 6-inches below surface
YES ( ) NO (X)
GRAB (✓) COMPOSITE ( )
DATE: 12/4/00 TIME: 1450

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| Encore | | None | | | VOCs |
| 8oz glass | 2 | | | | SVOCs, Metals, Cl, SO4, CN, Phenolics |
| 8oz | 1/1 | | | | TOC/TOX |
| 8oz | 1/1 | | | | TCLP SVOCs, Metals / TCLP VOAs |
| 8oz | 1 | | | | SPLP SVOCs, Metals, CN |
| 8oz | 1 | | | | SPLP VOAs |

NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st None Taken | COLOR: Dark Brown | |
| 2nd | ODOR: None | |
| | OTHER: — | |
| | | |

GENERAL INFORMATION

WEATHER: SUN/CLEAR ___ OVERCAST/RAIN ___ WIND DIRECTION SW (Light) AMBIENT TEMP. ≈ 30°F
SHIPMENT VIA: FED-X ✓ HAND DELIVER ___ COURIER ___ OTHER ___
SHIPPED TO: STL Labs, Pittsburgh PA
COMMENTS: ___
SAMPLER: John Boyd URS Corp OBSERVER: None

MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
(SO = SOIL)
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
(G = GRAB)
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: Bethlehem Steel Corp Lackawanna, NY
PROJECT NO.: 42000 8 BSC .15
SITE: P-73 Soil Stockpile AREA South of Galvanizing Mill

## SAMPLE INFORMATION

MATRIX: Soil
SAMPLE ID: P-73 Dup 1
SAMPLING METHOD: Shovel + Trowels
DUP.REP. OF: P-73 SS-1 0-6"
BEGINNING DEPTH: Surface
MATRIX SPIKE/MATRIX SPIKE DUPLICATE
END DEPTH: 6-inches below surface
YES ( ) NO (✓)
GRAB (✓) COMPOSITE ( )
DATE: 12/1/06 TIME: 1240

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| Encore | 2 | None | | | VOCs |
| 8oz glass | 2 | | | | SVOCs, Metals, Cl, SO4, CN, Phenolics |
| 4oz glass | 2/2 | | | | TOC/TOX |
| 4oz glass | 1/1 | | | | TCLP SVOCs, Metals / TCLP VOAs |
| 8oz glass | 1 | | | | SPLP SVOCs, Metals, CN |
| 8oz glass | 1 | | | | SPLP VOAs |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st None Taken | COLOR: Dark Brown | |
| 2nd | ODOR: none | |
| | OTHER: — | |
| | | |

## GENERAL INFORMATION

WEATHER: (SUN/CLEAR) OVERCAST/RAIN ___ WIND DIRECTION SW (Light) AMBIENT TEMP. ≈30°F
SHIPMENT VIA: FED-X ✓ HAND DELIVER ___ COURIER ___ OTHER ___
SHIPPED TO: STL Labs, Pittsburgh PA
COMMENTS:
SAMPLER: John Boyd URS Corp OBSERVER: None

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
(SO = SOIL)
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
(G = GRAB)
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# ATTACHMENT A

# USEPA COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

JUL 01 1992

Mr. Robert B. Allen
Environmental Manager
Lackawanna Area
Bethlehem Steel Corporation
Box 310
Lackawanna, New York 14218

Re: Bethlehem Steel Corporation - EPA ID #NYD002134880
Administrative Order on Consent
Docket No. II RCRA-90-3008(h)-0201
Preliminary SWMU Assessment Report

Dear Mr. Allen:

The U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) have reviewed the Preliminary Solid Waste Management Unit (SWMU) Assessment Report dated August 8, 1991, submitted by Bethlehem Steel Corporation (BSC). This assessment report covers the following nine (9) SWMUs located at the East Plant Area:

1. Mill Scale Storage Area No. 2 (P-63)
2. Drum Storage Area (P-73)
3. Runout Table Spray Water Pit (P-54)
4. Main Settling Basin (P-56)
5. Twenty-four Sand Filters (P-57)
6. Bar Mill East Acid Pump (Coil Pickling Area) (P-58)
7. Bar Mill Acid Sump (Billet Prep Area) (P-59)
8. Hot Strip Mill Acid Pit (P-61)
9. Pump Station Wet Well for Old Acid Sewer Line from Galvanizing Mill (P-71)

INTED ON RECYCLED PAPER

The Agencies provide the following comments:

SWMU No.1 - Mill Scale Storage Area No.2 (P-63):

According to the assessment report, the Mill Storage Area No. 2 is an area being used for the interim storage of mill scale for purposes of beneficial recycling. The area is an open field (100 yards x 150 yards in dimension) storing a pile of mill scale approximately 100 yards long, 40 yards wide and 12 feet in height. The pile is at grade level and there are no artificial containment barriers. The mill scale is composed of iron with some oil. Analyses of the scale using the EP Toxicity Testing procedure has demonstrated that the material does not exhibit the RCRA hazardous waste characteristic for toxicity.

During site inspections conducted by BSC in October 1989 and by EPA and NYSDEC personnel on April 28, 1992, it was noted that ponded rainwater was in direct contact with the scale pile, and surface sheens of oil were observed on the ponded water. Also during the April 1992 inspection, a reddish color was observed at the bottom of the pile and in contact with the ponded rainwater. This is an indication of iron and possibly other metals leaching into the environment. Inspections of test pits excavated in 1989 by BSC in this area revealed "oil and grease" staining in the upper six to twelve inches of soil. No sampling of the soils or the groundwater in this area has been conducted.

BSC indicated in the assessment report that following the planned removal of the mill scale, the EPA will be provided a final inspection report describing the final actions taken to close this unit.

The Agencies disagree with BSC's conclusions in the report that there have not been releases of hazardous constituents to the soils and groundwater from the Mill Scale Storage Area No. 2, and that no further investigatory action is necessary.

Although the mill scale and the oil/grease contained in the mill scale are not RCRA hazardous wastes, oil/grease may contain hazardous constituents (organics and metals) that may be of concern. Also, the assessment report does not provide sufficient evidence to conclude that the groundwater in the vicinity of the stained soils has not been impacted.

The closure plan for this unit should include sampling and analysis of soil and groundwater to define the hazardous constituents present, if any, the extent of the contamination, and any impact to the groundwater. The closure plan should be provided to the Agencies for approval prior to its implementation. Please provide a sampling plan for EPA and NYSDEC review and approval within 45 days of receipt of this letter.

SWMU No.2 - Drum Storage Area (P-73):

This unit is an open field (approximately 230 yards long and 50 yards wide) operated from 1940 through 1983 as an area for drum storage. Typical materials stored were lubricants, oils, grease and chemical additives.

In 1989, soil samples were collected and analyzed for total organics, oil and grease, and the EP Toxicity test was performed for metals. The results of the analysis indicated the presence of trace levels of solvents and some metals. The highest concentration of arsenic detected in the EP Toxicity test leachate was 130 ppb.

Although the 130 ppb concentration in the soil leachate is below the toxicity characteristic level, it is above the 6 NYCRR Part 703.5 Water Quality Standard of 25 ppb. The arsenic concentration in the soil has a potential to leach into the groundwater and impact the groundwater quality in the area. However, the Agencies understand that some factors, such as dilution and attenuation may affect the impact of this arsenic concentration in the groundwater. Since no groundwater quality data has been provided for this area, the Agencies cannot make a determination of "no further action" at this time. However, since the concentrations of organics and metals detected in the soils are relatively low levels, the Agencies do not require further investigation or remediation at this time. The significance and any potential impact of the hazardous constituents in the soils should be evaluated in the Corrective Measures Study (CMS) for the facility.

SWMUs No. 3-9 Listed Above:

As a result of the Agencies review of the information provided in the assessment report regarding the design of SWMUs No. 3-9, wastes managed, analysis of wastes, inspection history, and a site inspection conducted by EPA and NYSDEC personnel on April 28, 1992, we have determined that no additional investigation is required for SWMUs No. 3-9 listed above. However, if any additional information is revealed, as a result of the on-going RCRA Facility Investigation (RFI) at the BSC facility or from any other source, which indicates that an actual or potential threat to human and/or the environment exists as a result of past or present operations at any one of the SWMUs No. 3-9 listed above, both EPA and NYSDEC reserve the right to require BSC to perform work determined to be necessary by the Agencies for the protection of human health and the environment.

Should you have any questions, please contact Ms. Maria Jon of the EPA at (212) 264-9397 or Mr. Jean Dubois, P.E., of the NYSDEC at (518) 457-9253.

Sincerely yours,

Andrew Bellina

Andrew Bellina, P.E., Chief
Hazardous Waste Facilities Branch

A. Bellina for PRC

Paul R. Counterman, P.E., Director
Bureau of Hazardous Waste Facility Management
Division of Hazardous Substances Regulation

cc: Stanley Radon, NYSDEC, Region 9
Jean Dubois, NYSDEC
Steve Sisk, EPA - NEIC

# ATTACHMENT B

# DEED RESTRICTION
# FORMER DRUM STORAGE AREA

# DECLARATION
# OF
# CONDITIONS, COVENANTS AND RESTRICTIONS

Made By: Bethlehem Steel Corporation
1170 Eighth Avenue
Bethlehem, Pennsylvania 18016-7699

Dated: February 20, 1996

RRC 980

779-14

# DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS

THIS DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS, made this 20th day of February, 1996, by Bethlehem Steel Corporation, a corporation duly formed and existing under the laws of the State of Delaware, authorized to do business in the State of New York, and having its principal place of business in the City of Bethlehem, Lehigh County, Pennsylvania, with a mailing address of 1170 Eighth Avenue, Bethlehem, Pennsylvania 18016-7699 (hereinafter "BSC"),

## W I T N E S S E T H:

WHEREAS, BSC is the owner of certain noncontiguous lands adjacent to the eastern shore of Lake Erie situate partly in the City of Lackawanna, partly in the Town of Hamburg and partly in the Village of Blasdell, all in the County of Erie, State of New York, containing in the aggregate approximately 1,215 acres, and encompassing approximately 2.5 miles in an approximate north-south direction and approximately 1.4 miles in an approximate east-west direction, which were formerly part of the site of an integrated steel plant, and a portion of which lands is described and delineated more particularly in SCHEDULE B herein (said portion shall be hereinafter referred to as the "Premises"); and

WHEREAS, the history of the Premises is described more fully in SCHEDULE A herein; and

WHEREAS, certain governmental agencies and BSC have conducted environmental investigations at and near the Premises, the scope, result and impact of each of which are described more fully in SCHEDULE A herein; and

WHEREAS, BSC seeks to impose conditions, covenants and restrictions on the Premises for the purpose of promoting, benefitting, preserving and protecting the health and safety of the public and the environment all as related to the foregoing.

NOW, THEREFORE, (i) BSC, on behalf of itself, its successors and assigns, hereby declares and (ii) each and every person or entity who shall be an owner of the Premises or any part thereof, hereby covenants and agrees on behalf of itself, its successors and assigns, that the Premises or any part thereof shall be held, transferred, sold, conveyed, occupied and developed subject to the following conditions, covenants and restrictions:

1. The Premises or any part thereof shall be limited to industrial use only, which shall include manufacturing, assembling, warehousing, and related railroad, port and shipping activities, together with office space and other facilities including laboratories incidental to such uses, but incidental uses such as day care centers, nursery schools or other facilities that are designed or intended to be primarily for use or occupancy by multiple numbers of persons under the age of eighteen (18) years shall not be permitted.

2. No wells for the extraction or use of water from beneath the surface of the Premises or any part thereof shall be installed, built, permitted or utilized on the Premises or any part thereof for any purpose whatsoever; provided, however, that BSC may install, use, operate and maintain monitoring wells and treatment wells, including the extraction and treatment of water therefrom, solely for the purpose of monitoring, treating or remediating such water; and provided, further, that any other owner of the Premises or any

part thereof may install, use, operate and maintain monitoring wells and treatment wells, including the extraction and treatment of water therefrom, on the part of the Premises so owned by such owner, solely for the purpose of monitoring, treating or remediating such water.

3. Any activity or use not specifically permitted hereby or any activity prohibited pursuant hereto shall be forbidden.

A. Purpose.

It is the intent of BSC by means of said conditions, covenants and restrictions to promote, benefit, preserve and protect the health and safety of the public and the environment by preventing any activity or use not specifically permitted above or any activity prohibited pursuant to paragraphs 1 and 2 above.

B. Conditions, Covenants and Restrictions to Run with the Premises.

Said conditions, covenants and restrictions shall run with the Premises and every part thereof and shall bind all owners and occupiers of the Premises or any part thereof, and their respective successors and assigns; all parties claiming by, through, or under them or any of them shall be taken to hold, agree and covenant with all owners of the Premises or any part thereof, and their respective successors and assigns and each of them, to conform to and observe said conditions, covenants and restrictions.

C. Enforceability.

Said conditions, covenants and restrictions shall inure to the benefit of and be enforceable by BSC and by each and every person or entity, including BSC,

who shall be an owner of the Premises or any part thereof, and their respective successors and assigns, and shall also benefit BSC, its successors and assigns, for so long as BSC shall (i) own any property either adjacent or proximal to the Premises or any part thereof or (ii) be responsible under any law, ordinance, rule or regulation for the presence of hazardous wastes or hazardous constituents or both upon or within the Premises or any part thereof or in said property adjacent or proximal to the Premises or any part thereof but said conditions, covenants and restrictions shall not give rise, by implication or otherwise, to a reciprocal condition, covenant or restriction burdening or binding upon the other lands or any part thereof of BSC benefitted hereby, by actions at law or by suits in equity. As it may be impossible to measure monetarily the damages which may accrue to the beneficiaries hereunder by reason of a violation of this Declaration, any beneficiary hereunder shall be entitled to relief by way of injunction or specific performance, as well as any other relief available at law or in equity, to enforce the provisions hereof.

The failure of any beneficiary hereunder to enforce any provision of this Declaration shall in no event be construed as a waiver of the right of that beneficiary or any other beneficiary hereunder to do so thereafter, as to the same or a similar violation occurring prior or subsequent thereto. No liability shall attach to BSC or any subsidiary or other affiliate of BSC (or any officer, director, employee, member, agent, committee or committee member of any of them) or to any other beneficiary hereunder

(excepting, however, the subject owner in breach) for failure to enforce the provisions of this Declaration.

If BSC or any other beneficiary hereunder successfully brings an action to extinguish a breach or otherwise enforce the provisions of this Declaration, the costs of such action, including legal fees, shall become a binding, personal obligation of the owner in breach.

D. Amendments and Termination.

Any amendment or termination of this Declaration affecting any part of the Premises shall require the written consent of all owners of the Premises or any part thereof, which consent shall not be unreasonably withheld, and of BSC, or its successors or assigns, whose consent may be withheld in its sole discretion.

Any amendment or termination of this Declaration shall not become effective until the instrument evidencing such change has been duly recorded in the Erie County Clerk's Office.

Neither this Declaration nor any amendment to this Declaration shall be interpreted as permitting any action or thing prohibited by the applicable laws, ordinances, rules or regulations of any governmental authority having jurisdiction over the part of the Premises affected or by specific restrictions imposed by any other instrument relating to the Premises or to such part of the Premises.

No change of conditions or circumstances shall operate to amend this Declaration, and this Declaration may be amended only in the manner provided herein.

The determination by any court of competent jurisdiction that any provision of this Declaration is unenforceable invalid or void shall not affect the enforceability or validity of any other provision hereof.

IN WITNESS WHEREOF, BSC has executed this Declaration as of the day and year first above written.

ATTEST:

Assistant Secretary

BETHLEHEM STEEL CORPORATION,
by

A. E. Moffitt Jr.

Vice President

COMMONWEALTH OF PENNSYLVANIA )
) SS.:
COUNTY OF LEHIGH )

On the 20th day of February, 1996, before me personally came A. E. Moffitt, Jr., to me known, who, being by me duly sworn, did depose and say that he resides at 3850 Brandeis Avenue, Bethlehem, Pennsylvania 18017; that he is a Vice President of Bethlehem Steel Corporation, the corporation described in and which executed the above instrument; and that he signed his name thereto by authority of the By-laws of said corporation.

Dorothy A. Midash
Notary Public

NOTARIAL SEAL
Dorothy A. Midash, Notary Public
City of Bethlehem, Lehigh County, Pa.
My Commission Expires Dec. 7, 1996

## SCHEDULE A
## HISTORY OF THE PREMISES

The Premises were formerly part of the site of an integrated steel plant for iron and steel production, which plant consisted of blast furnaces, coke batteries, basic oxygen and open hearth steelmaking furnaces, a sinter plant, rolling mills, and finishing mills (includes a galvanizing line). Iron and steel production ceased in October 1983. Thus, as of the date hereof, the only operations remaining in service are coke batteries that are located on lands of BSC other than the Premises and a galvanizing line a portion of which line is located on the Premises.

A Resource Conservation and Recovery Act ("RCRA") Facility Assessment ("RFA") conducted in 1988 by the U.S. Environmental Protection Agency (the "EPA") and National Enforcement Investigation Center ("NEIC") identified certain solid waste management units ("SWMUs") some of which are located within the Premises. Said SWMUs may have received various wastes or substances, and several water courses, portions or all of which may be on the Premises or on lands adjacent to the Premises, may have been impacted by releases from SWMUs. Pursuant to Section 3008(h) of RCRA, BSC and the EPA entered into an Administrative Order on Consent dated August 13, 1990 ("AOC"), which directed BSC to perform a phased site-wide RCRA Facility Investigation to determine the nature and extent of any releases of hazardous wastes or hazardous constituents or both from SWMUs into soils, groundwater, sediment, and surface water at or near the Premises.

Documentary information with respect to the types and locations of SWMUs, and any areas of the Premises (or adjacent to the Premises) that may have been impacted by releases of hazardous wastes or hazardous constituents or both from SWMUs, can currently be obtained from documents submitted to (1) the EPA Region II New York office (currently at Hazardous Waste Facilities Branch, Air and Waste Management Division, U.S. Environmental Protection Agency, Region II, 22nd Floor, 240 Broadway, New York, New York 10007-1866), and (2) the New York State Department of Environmental Conservation (the "DEC") at its Albany, New York office (currently at 50 Wolf Road, Albany, New York 12233), and its Region 9 office at Buffalo, New York (currently at 270 Michigan Avenue, Buffalo, New York 14208-2999). Such documentary information (the "Documentary Information") includes but is not limited to the following:

A. Letter from BSC to EPA Region II, dated September 25, 1986, together with attachments, concerning Response to Information Request Pursuant to RCRA Section 3007, Bethlehem Steel Corporation: Lackawanna, New York;

B. United States Environmental Protection Agency Region II, Administrative Order on Consent, Docket No. II RCRA-90-3008(h)-0201, In the Matter of Bethlehem Steel Corporation, Lackawanna, New York 14218-0310, EPA I.D. No. NYD002134880, dated August 13, 1990, together with attachments;

C. Draft Final Report Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York, Phase I, dated August 14, 1992; and

D. Draft Final Report Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York, Phase II-A, dated June 29, 1993, together with appendices.

Further information with respect to past activities at the Premises, current activities, previous environmental investigations, current environmental investigations, groundwater quality, settings and classifications of identified SWMUs, areas of possible environmental concern, topography, and geology, hydrogeology, human health and environmental impacts (with respect to the Premises and regionally), can be obtained from the Documentary Information and other documents submitted to the EPA and the DEC at the above-identified locations.

## SCHEDULE B
## LEGAL DESCRIPTION OF THE PREMISES

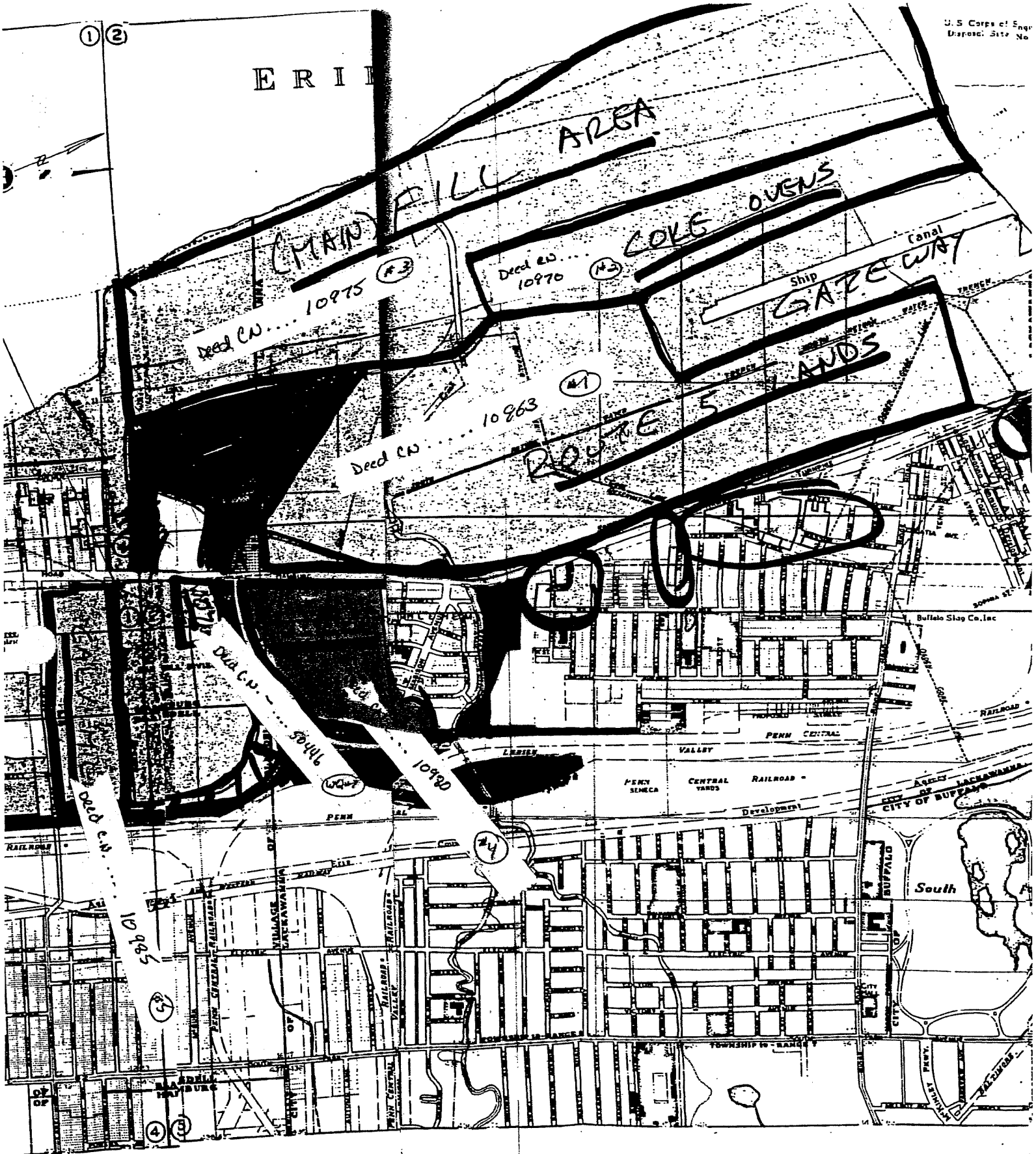
All that certain tract of land, situate partly in the City of Lackawanna and partly in the Town of Hamburg, Erie County, New York, being parts of Lot No. 14 and Lot No. 15, of the Ogden Gore Tract, and parts of Lot No. 15, Lot No. 18 and Lot No. 19, of the Buffalo Creek Reservation, Township 10, Range 8, and more particularly bounded and described as follows:

BEGINNING at the intersection of the easterly line of the right of way of Hamburg Turnpike (New York State Route 5), a road of varying widths, and the southerly line of the right of way of Lincoln Avenue, a street thirty-five and fourteen one-hundredths (35.14) feet in width; thence, along said last-mentioned line, South eighty-seven degrees forty-seven minutes forty-five seconds East (S. 87° 47′ 45″ E.) one thousand five hundred thirty-six and ninety-four one-hundredths (1536.94) feet to the southeasterly line of Birch Street, a street of varying widths at this location; thence, along said last-mentioned line, northeastwardly by a curve to the left the radius of which is one hundred sixty and no one-hundredths (160.00) feet and the chord of which bears North thirty-four degrees forty-six minutes twenty-three seconds East (N. 34° 46′ 23″ E.) one hundred seventy-two and eighteen one-hundredths (172.18) feet, an arc distance of one hundred eighty-one and eighty one-hundredths (181.80) feet; thence, continuing along the easterly line of the right of way of said Birch Street, a street fifty and no one-hundredths (50.00) feet in width at this location, North two degrees thirteen minutes sixteen seconds East (N. 02° 13′ 16″ E.) three hundred one and sixty-six one-hundredths (301.66) feet to a corner of other lands of said Bethlehem Steel Corporation; thence, along said last-mentioned lands, the following two (2) courses and distances: (1) South eighty-seven degrees forty-six minutes forty-four seconds East (S. 87° 46′ 44″ E.) two hundred thirty hundred and no one-hundredths (230.00) feet and (2) North one degree forty minutes fifty-one seconds East (N. 01° 40′ 51″ E.) two hundred sixty-one and sixty-three one-hundredths (261.63) feet to the southerly line of lands now or formerly of Mary A. Daley; thence, along said last-mentioned lands, South eighty-seven degrees forty-six minutes fifty-four seconds East (S. 87° 46′ 54″ E.) twenty-two and forty-four one-hundredths (22.44) feet to the westerly line of lands now or formerly of South Buffalo Railway; thence, along said last-mentioned lands, the following twelve (12) courses and distances: (1) South two degrees thirteen minutes six seconds West (S. 02° 13′ 06″ W.) seventy-five and no one-hundredths (75.00) feet, (2) South eighty-seven degrees forty-six minutes fifty-four seconds East

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(S. 87° 46′ 54″ E.) thirty-three and fifty one-hundredths (33.50) feet, (3) South two degrees one minute forty-two seconds West (S. 02° 01′ 42″ W.) six hundred ninety-six and sixty-seven one-hundredths (696.67) feet, (4) South eighty-seven degrees fifty-eight minutes eighteen seconds East (S. 87° 58′ 18″ E.) twenty and twenty-five one-hundredths (20.25) feet, (5) South two degrees one minute forty-two seconds West (S. 02° 01′ 42″ W.) one hundred eighty and thirty-three one-hundredths (180.33) feet, (6) North eighty-seven degrees fifty-eight minutes eighteen seconds West (N. 87° 58′ 18″ W.) twenty and twenty-five one-hundredths (20.25) feet, (7) South two degrees one minute forty-two seconds West (S. 02° 01′ 42″ W.) five hundred thirty-six and forty-five one-hundredths (536.45) feet, (8) South twenty-six degrees eleven minutes four seconds West (S. 26° 11′ 04″ W.) two hundred forty and sixty-three one-hundredths (240.63) feet, (9) South sixty-three degrees forty-eight minutes fifty-six seconds East (S. 63° 48′ 56″ E.) six and sixteen one-hundredths (6.16) feet, (10) South twenty-six degrees eleven minutes four seconds West (S. 26° 11′ 04″ W.) forty-seven and sixteen one-hundredths (47.16) feet, (11) North sixty-three degrees forty-eight minutes fifty-six seconds West (N. 63° 48′ 56″ W.) six and fifty-four one-hundredths (6.54) feet, and (12) southwestwardly by a curve to the right the radius of which is one thousand one and sixty-seven one-hundredths (1001.67) feet and the chord of which bears South thirty-one degrees twenty-three minutes seventeen seconds West (S. 31° 23′ 17″ W.) one hundred fifty-six and thirty-three one-hundredths (156.33) feet, an arc distance of one hundred fifty-six and forty-one one-hundredths (156.41) feet to a northerly corner of a tract of land now or formerly of Niagara Mohawk Power Corporation; thence along said last-mentioned tract of land, the following seven (7) courses and distances: (1) North eighty-nine degrees twenty-four minutes twenty-one seconds West (N. 89° 24′ 21″ W.) ninety-six and ten one-hundredths (96.10) feet, (2) South fifty-seven degrees fifteen minutes eighteen seconds West (S. 57° 15′ 18″ W.) two hundred thirty-two and sixty one-hundredths (232.60) feet, (3) South zero degrees fifteen minutes eighteen seconds West (S. 00° 15′ 18″ W.) forty-eight and ninety-seven one-hundredths (48.97) feet, (4) South forty-four degrees fifty-one minutes eighteen seconds West (S. 44° 51′ 18″ W.) two hundred thirty-five and sixty one-hundredths (235.60) feet, (5) South sixty degrees twenty-three minutes eighteen seconds West (S. 60° 23′ 18″ W.) three hundred ninety-seven and no one-hundredths (397.00) feet, (6) South seventy-four degrees forty minutes eighteen seconds West (S. 74° 40′ 18″ W.) five hundred twenty-seven and ninety-five one-hundredths (527.95) feet, and (7) South eighty-nine degrees thirty-nine minutes twenty-two seconds West (S. 89° 39′ 22″ W.) five hundred thirty-one and seventy-seven one-hundredths (531.77) feet to the easterly line of the right of way of Lake Shore Road, being

the portion of the above-mentioned New York State Route 5 located in the Town of Hamburg; thence, along said last-mentioned line, the following four (4) courses and distances: (1) North four degrees thirty-five minutes thirty-five seconds East (N. 04° 35′ 35″ E.) seventeen and sixty-three one-hundredths (17.63) feet, (2) North nine degrees seventeen minutes nine seconds East (N. 09° 17′ 09″ E.) one hundred sixty-six and fifty-six one-hundredths (166.56) feet, (3) North four degrees fifty-five minutes forty-five seconds East (N. 04° 55′ 45″ E.) eighty-one and eighty-two one-hundredths (81.82) feet, and (4) North four degrees fifty-six minutes five seconds East (N. 04° 56′ 05″ E.) three and eighty one-hundredths (3.80) feet to the intersection with the northerly municipal line of the Town of Hamburg and being the southerly municipal line of the City of Lackawanna; thence, continuing along said easterly line of said last-mentioned road being known as the above-mentioned Hamburg Turnpike located in the City of Lackawanna, the following ten (10) courses and distances: (1) North four degrees fifty-six minutes five seconds East (N. 04° 56′ 05″ E.) two hundred seventeen and thirty-eight one-hundredths (217.38) feet, (2) North eighty-five degrees twenty-four minutes twenty-five seconds West (N. 85° 24′ 25″ W.) six and no one-hundredths (6.00) feet, (3) North four degrees fifty-six minutes five seconds East (N. 04° 56′ 05″ E.) one hundred thirty-five and no one-hundredths (135.00) feet, (4) North three degrees nine minutes thirty-nine seconds East (N. 03° 09′ 39″ E.) two hundred sixteen and seven one-hundredths (216.07) feet, (5) North eighty-five degrees twenty-four minutes twenty-five seconds West (N. 85° 24′ 25″ W.) four and eighty-three one-hundredths (4.83) feet, (6) North four degrees thirty-five minutes thirty-five seconds East (N. 04° 35′ 35″ E.) sixty-nine and eighty-four one-hundredths (69.84) feet, (7) South eighty-five degrees twenty-four minutes twenty-five seconds East (S. 85° 24′ 25″ E.) four and forty-four one-hundredths (4.44) feet, (8) North four degrees fifty minutes thirty-eight seconds East (N. 04° 50′ 38″ E.) three hundred fifty-six and sixteen one-hundredths (356.16) feet, (9) North five degrees nine minutes eleven seconds East (N. 05° 09′ 11″ E.) four hundred forty and two one-hundredths (440.02) feet, and (10) North five degrees two minutes fifty-four seconds East (N. 05° 02′ 54″ E.) two hundred twenty-eight and six one-hundredths (228.06) feet to the place of beginning; CONTAINING seventy-six and one hundred forty-two one-thousandths (76.142) acres, more or less.


ERIE
MAIN FILL AREA
COKE OVENS
Deed CW..... 10975
Deed CW 10970
Ship Canal
GATEWAY
LANDS
Deed CW..... 10863
ROUTE 5
Buffalo Slag Co.,Inc
Deed C.W. 10446
Deed C.W. 10980
Deed C.W. 10965
PENN CENTRAL VALLEY
PENN SENECA
CENTRAL YARDS
RAILROAD
Development
CITY OF BUFFALO
South
TOWNSHIP 10 - RANGE 7

# ATTACHMENT C

# DEED RESTRICTION
# FLANDER'S FIELD

# DECLARATION
# OF
# CONDITIONS, COVENANTS AND RESTRICTIONS

Made By: Bethlehem Steel Corporation
1170 Eighth Avenue
Bethlehem, Pennsylvania 18016-7699

Dated: February 20, 1996

RAC 985

779-13

# DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS

THIS DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS, made this 20th day of February, 1996, by Bethlehem Steel Corporation, a corporation duly formed and existing under the laws of the State of Delaware, authorized to do business in the State of New York, and having its principal place of business in the City of Bethlehem, Lehigh County, Pennsylvania, with a mailing address of 1170 Eighth Avenue, Bethlehem, Pennsylvania 18016-7699 (hereinafter "BSC"),

## W I T N E S S E T H:

WHEREAS, BSC is the owner of certain noncontiguous lands adjacent to the eastern shore of Lake Erie situate partly in the City of Lackawanna, partly in the Town of Hamburg and partly in the Village of Blasdell, all in the County of Erie, State of New York, containing in the aggregate approximately 1,215 acres, and encompassing approximately 2.5 miles in an approximate north-south direction and approximately 1.4 miles in an approximate east-west direction, which were formerly part of the site of an integrated steel plant, and a portion of which lands is described and delineated more particularly in SCHEDULE B herein (said portion shall be hereinafter referred to as the "Premises"); and

WHEREAS, the history of the Premises is described more fully in SCHEDULE A herein; and

WHEREAS, certain governmental agencies and BSC have conducted environmental investigations at and near the Premises, the scope, result and impact of each of which are described more fully in SCHEDULE A herein; and

WHEREAS, BSC seeks to impose conditions, covenants and restrictions on the Premises for the purpose of promoting, benefitting, preserving and protecting the health and safety of the public and the environment all as related to the foregoing.

NOW, THEREFORE, (i) BSC, on behalf of itself, its successors and assigns, hereby declares and (ii) each and every person or entity who shall be an owner of the Premises or any part thereof, hereby covenants and agrees on behalf of itself, its successors and assigns, that the Premises or any part thereof shall be held, transferred, sold, conveyed, occupied and developed subject to the following conditions, covenants and restrictions:

1. The Premises or any part thereof shall be limited to industrial use only, which shall include manufacturing, assembling, warehousing, and related railroad, port and shipping activities, together with office space and other facilities including laboratories incidental to such uses, but incidental uses such as day care centers, nursery schools or other facilities that are designed or intended to be primarily for use or occupancy by multiple numbers of persons under the age of eighteen (18) years shall not be permitted.

2. No wells for the extraction or use of water from beneath the surface of the Premises or any part thereof shall be installed, built, permitted or utilized on the Premises or any part thereof for any purpose whatsoever; provided, however, that BSC may install, use, operate and maintain monitoring wells and treatment wells, including the extraction and treatment of water therefrom, solely for the purpose of monitoring, treating or remediating such water; and provided, further, that any other owner of the Premises or any

part thereof may install, use, operate and maintain monitoring wells and treatment wells, including the extraction and treatment of water therefrom, on the part of the Premises so owned by such owner, solely for the purpose of monitoring, treating or remediating such water.

3. Any activity or use not specifically permitted hereby or any activity prohibited pursuant hereto shall be forbidden.

A. Purpose.

It is the intent of BSC by means of said conditions, covenants and restrictions to promote, benefit, preserve and protect the health and safety of the public and the environment by preventing any activity or use not specifically permitted above or any activity prohibited pursuant to paragraphs 1 and 2 above.

B. Conditions, Covenants and Restrictions to Run with the Premises.

Said conditions, covenants and restrictions shall run with the Premises and every part thereof and shall bind all owners and occupiers of the Premises or any part thereof, and their respective successors and assigns; all parties claiming by, through, or under them or any of them shall be taken to hold, agree and covenant with all owners of the Premises or any part thereof, and their respective successors and assigns and each of them, to conform to and observe said conditions, covenants and restrictions.

C. Enforceability.

Said conditions, covenants and restrictions shall inure to the benefit of and be enforceable by BSC and by each and every person or entity, including BSC,

who shall be an owner of the Premises or any part thereof, and their respective successors and assigns, and shall also benefit BSC, its successors and assigns, for so long as BSC shall (i) own any property either adjacent or proximal to the Premises or any part thereof or (ii) be responsible under any law, ordinance, rule or regulation for the presence of hazardous wastes or hazardous constituents or both upon or within the Premises or any part thereof or in said property adjacent or proximal to the Premises or any part thereof but said conditions, covenants and restrictions shall not give rise, by implication or otherwise, to a reciprocal condition, covenant or restriction burdening or binding upon the other lands or any part thereof of BSC benefitted hereby, by actions at law or by suits in equity. As it may be impossible to measure monetarily the damages which may accrue to the beneficiaries hereunder by reason of a violation of this Declaration, any beneficiary hereunder shall be entitled to relief by way of injunction or specific performance, as well as any other relief available at law or in equity, to enforce the provisions hereof.

The failure of any beneficiary hereunder to enforce any provision of this Declaration shall in no event be construed as a waiver of the right of that beneficiary or any other beneficiary hereunder to do so thereafter, as to the same or a similar violation occurring prior or subsequent thereto. No liability shall attach to BSC or any subsidiary or other affiliate of BSC (or any officer, director, employee, member, agent, committee or committee member of any of them) or to any other beneficiary hereunder

(excepting, however, the subject owner in breach) for failure to enforce the provisions of this Declaration.

If BSC or any other beneficiary hereunder successfully brings an action to extinguish a breach or otherwise enforce the provisions of this Declaration, the costs of such action, including legal fees, shall become a binding, personal obligation of the owner in breach.

D. Amendments and Termination.

Any amendment or termination of this Declaration affecting any part of the Premises shall require the written consent of all owners of the Premises or any part thereof, which consent shall not be unreasonably withheld, and of BSC, or its successors or assigns, whose consent may be withheld in its sole discretion.

Any amendment or termination of this Declaration shall not become effective until the instrument evidencing such change has been duly recorded in the Erie County Clerk's Office.

Neither this Declaration nor any amendment to this Declaration shall be interpreted as permitting any action or thing prohibited by the applicable laws, ordinances, rules or regulations of any governmental authority having jurisdiction over the part of the Premises affected or by specific restrictions imposed by any other instrument relating to the Premises or to such part of the Premises.

No change of conditions or circumstances shall operate to amend this Declaration, and this Declaration may be amended only in the manner provided herein.

The determination by any court of competent jurisdiction that any provision of this Declaration is unenforceable invalid or void shall not affect the enforceability or validity of any other provision hereof.

IN WITNESS WHEREOF, BSC has executed this Declaration as of the day and year first above written.

ATTEST:

Assistant Secretary

BETHLEHEM STEEL CORPORATION,
by

Vice President

COMMONWEALTH OF PENNSYLVANIA )
) SS.:
COUNTY OF LEHIGH )

On the 20th day of February, 1996, before me personally came A. E. Moffitt, Jr., to me known, who, being by me duly sworn, did depose and say that he resides at 3850 Brandeis Avenue, Bethlehem, Pennsylvania 18017; that he is a Vice President of Bethlehem Steel Corporation, the corporation described in and which executed the above instrument; and that he signed his name thereto by authority of the By-laws of said corporation.

Dorothy A. Midash
Notary Public

NOTARIAL SEAL
Dorothy A. Midash, Notary Public
City of Bethlehem, Lehigh County, Pa.
My Commission Expires Dec. 7, 1996

## SCHEDULE A
## HISTORY OF THE PREMISES

The Premises were formerly part of the site of an integrated steel plant for iron and steel production, which plant consisted of blast furnaces, coke batteries, basic oxygen and open hearth steelmaking furnaces, a sinter plant, rolling mills, and finishing mills (includes a galvanizing line). Iron and steel production ceased in October 1983. Thus, as of the date hereof, the only operations remaining in service are coke batteries that are located on lands of BSC other than the Premises and a galvanizing line a portion of which line is located on the Premises.

A Resource Conservation and Recovery Act ("RCRA") Facility Assessment ("RFA") conducted in 1988 by the U.S. Environmental Protection Agency (the "EPA") and National Enforcement Investigation Center ("NEIC") identified certain solid waste management units ("SWMUs") some of which are located within the Premises. Said SWMUs may have received various wastes or substances, and several water courses, portions or all of which may be on the Premises or on lands adjacent to the Premises, may have been impacted by releases from SWMUs. Pursuant to Section 3008(h) of RCRA, BSC and the EPA entered into an Administrative Order on Consent dated August 13, 1990 ("AOC"), which directed BSC to perform a phased site-wide RCRA Facility Investigation to determine the nature and extent of any releases of hazardous wastes or hazardous constituents or both from SWMUs into soils, groundwater, sediment, and surface water at or near the Premises.

Documentary information with respect to the types and locations of SWMUs, and any areas of the Premises (or adjacent to the Premises) that may have been impacted by releases of hazardous wastes or hazardous constituents or both from SWMUs, can currently be obtained from documents submitted to (1) the EPA Region II New York office (currently at Hazardous Waste Facilities Branch, Air and Waste Management Division, U.S. Environmental Protection Agency, Region II, 22nd Floor, 240 Broadway, New York, New York 10007-1866), and (2) the New York State Department of Environmental Conservation (the "DEC") at its Albany, New York office (currently at 50 Wolf Road, Albany, New York 12233), and its Region 9 office at Buffalo, New York (currently at 270 Michigan Avenue, Buffalo, New York 14208-2999). Such documentary information (the "Documentary Information") includes but is not limited to the following:

A. Letter from BSC to EPA Region II, dated September 25, 1986, together with attachments, concerning Response to Information Request Pursuant to RCRA Section 3007, Bethlehem Steel Corporation: Lackawanna, New York;

B. United States Environmental Protection Agency Region II, Administrative Order on Consent, Docket No. II RCRA-90-3008(h)-0201, In the Matter of Bethlehem Steel Corporation, Lackawanna, New York 14218-0310, EPA I.D. No. NYD002134880, dated August 13, 1990, together with attachments;

C. Draft Final Report Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York, Phase I, dated August 14, 1992; and

D. Draft Final Report Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York, Phase II-A, dated June 29, 1993, together with appendices.

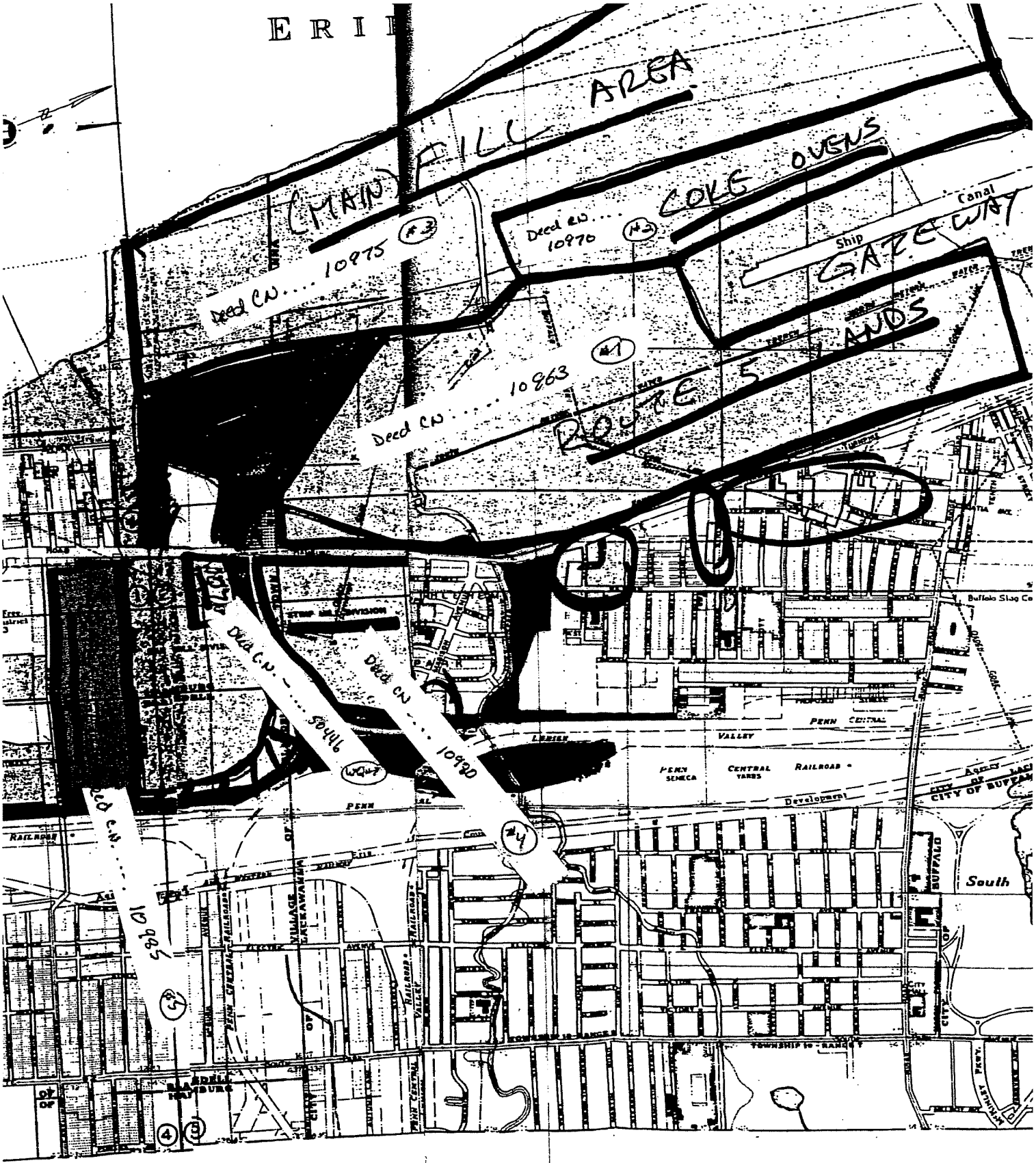
Further information with respect to past activities at the Premises, current activities, previous environmental investigations, current environmental investigations, groundwater quality, settings and classifications of identified SWMUs, areas of possible environmental concern, topography, and geology, hydrogeology, human health and environmental impacts (with respect to the Premises and regionally), can be obtained from the Documentary Information and other documents submitted to the EPA and the DEC at the above-identified locations.

## SCHEDULE B
## LEGAL DESCRIPTION OF THE PREMISES

All that certain tract of land, situate partly in the Town of Hamburg and partly in the Village of Blasdell, Erie County, New York, being parts of Lot No. 11 and Lot No. 12, of the Ogden Gore Tract and parts of Lot No. 11 and Lot No. 14, of the Buffalo Creek Reservation, Township 10, Range 8, and more particularly bounded and described as follows:

BEGINNING on the easterly line of the right of way of Lake Shore Road (New York State Route 5), a road of varying widths, at the southwesterly corner of a tract of land that is designated on the above-mentioned plan as "PARCEL A", which tract of land was conveyed by said Bethlehem Steel Corporation to BRW Steel Corporation by Indenture dated September 21, 1994, and recorded in the Erie County Clerk's Office on September 27, 1994, in Liber 10877 of Deeds at page 4675; said corner being also at the approximate center of the south branch of the Blasdell Creek; thence, along said last-mentioned tract of land and being in and through said Blasdell Creek, the following three (3) courses and distances: (1) South eighty-nine degrees twenty-one minutes sixteen seconds East (S. 89° 21′ 16″ E.) six hundred forty-eight and ninety-nine one-hundredths (648.99) feet, (2) North seventy-nine degrees forty-five minutes fifteen seconds East (N. 79° 45′ 15″ E.) two hundred fifty and no one-hundredths (250.00) feet, and (3) South eighty-nine degrees forty-one minutes forty-five seconds East (S. 89° 41′ 45″ E.) one thousand eight hundred fifty and no one-hundredths (1,850.00) feet to the southeasterly corner of said last-mentioned tract of land and being also a westerly corner of a tract of land of said Bethlehem Steel Corporation that is designated on the above-mentioned plan as "PARCEL B"; thence, along said last-mentioned tract of land and being partly in and across said Blasdell Creek, South twenty-nine degrees thirty-nine minutes forty-five seconds East (S. 29° 39′ 45″ E.) one hundred ten and no one-hundredths (110.00) feet; thence, continuing along said last-mentioned tract of land, South zero degrees fifty-two minutes fifty-four seconds West (S. 00° 52′ 54″ W.) eight hundred fifty-two and sixty-two one-hundredths (852.62) feet to the northerly line of the right of way of Lake Avenue, a street forty-nine and fifty one-hundredths (49.50) feet in width; thence, along said last-mentioned line, North eight-nine degrees thirty-five minutes twelve seconds West (N. 89° 35′ 12″ W.) two thousand seven hundred sixty and twenty-seven one-hundredths (2,760.27) feet to the southeasterly corner of a tract of land now or formerly of S. Fabiatos and L. Virgos; thence, partly along said last-mentioned tract of land and partly along a tract of land now or formerly of Ted

Czosnyka, North four degrees thirty-five minutes thirty-five seconds East (N. 04° 35′ 35″ E.) three hundred twenty-three and seventeen one-hundredths (323.17) feet to the northeasterly corner of said last-mentioned tract of land; thence, continuing along said last-mentioned tract of land, North eighty-nine degrees thirty-five minutes twelve seconds West (N. 89° 35′ 12″ W.) ninety-eight and thirty-six one-hundredths (98.36) feet to the above-mentioned easterly line of the right of way of Lake Shore Road; thence, along said last-mentioned line, North four degrees thirty-five minutes thirty-five seconds East (N. 04° 35′ 35″ E.) five hundred seventy-nine and eighty-seven one-hundredths (579.87) feet to the place of beginning; CONTAINING fifty-nine and seven hundred ninety-five one-thousandths (59.795) acres, more or less.


ERIE
MAIN FILL AREA
COKE OVENS
Canal
Ship
GATEWAY
Deed CN..... 10975
#3
Deed CN..... 10970
#2
#1
Deed CN..... 10863
ROUTE 5
AVDS
Deed CN..... 10946
Deed CN..... 10980
#4
Deed CN..... 10985
#5
PENN CENTRAL
VALLEY
PENN SENECA
CENTRAL YARDS
RAILROAD
Development
CITY OF BUFFALO
BUFFALO
South
RAILROAD
PENN
VILLAGE LACKAWANNA
TOWNSHIP 10 - RANGE 7
CITY
OP

# SWMU ASSESSMENT REPORT
# TANK FARM
# SWMUs P-74, P-75 AND P-8

## BETHLEHEM STEEL CORPORATION
## LACKAWANNA, NEW YORK

SEPTEMBER 2004

BETHLEHEM STEEL CORPORATION
2600 HAMBURG TURNPIKE
LACKAWANNA, NEW YORK 14218

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# 1.0 INTRODUCTION

This report documents the results of an environmental assessment for the Tank Farm Group at Bethlehem Steel Corporation's (BSC's) Lackawanna, New York facility. The Tank Farm Group units consist of designated Solid Waste Management Units (SWMUs) P-74, P-75 and P-8. The Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (USEPA, 1988) identified SWMU P-74 as the Waste Piles in Tank Farm, SWMU P-75 as the Tank Farm and P-8 as the Waste Oil Storage Tanks. The United States Environmental Protection Agency (USEPA) has required that a RCRA Facility Investigation (RFI) of these and other SWMUs at the BSC facility be completed in accordance with the Administrative Order on Consent (AOC) signed by BSC and USEPA in 1990 (USEPA, 1990). The RFI has been conducted in a phased approach and has included field work consisting of the collection of environmental samples from SWMUs and other areas throughout the property.

Preliminary SWMU assessments were completed for SWMUs P-74 and P-75 and submitted to the USEPA on January 29, 1993 (BSC, 1993) and for SWMU P-8 on December 30, 1992 (BSC 1992). Attachment A provides USEPA comments regarding the Preliminary SWMU Assessments. This assessment report provides additional information to further address the USEPA's comments. This report evaluates SWMU data available to BSC as of March 2002.

## 1.1 Description

SWMU P-75 is the largest area of the Tank Farm Group unit. The remaining two SWMUs are located within the P-75 boundaries. The following section describes each SWMU.

### SWMU P-75

SWMU P-75 comprises the entire Tank Farm located in the central part of the BSC plant, north of Smokes Creek and west of BSC Highway 10. SWMU P-75 is approximately 18 acres in area and currently contains three tanks—Tank Nos. 5, 7, and 16. At the time of the RFA, the Tank Farm consisted of seven 3- to 4-million-gallon tanks (major tank Nos. 1 through 7) and nine smaller tanks (small tanks Nos. 1, 2, 3, 11, 15, 16, 31, and two un-numbered tanks). The seven

major tanks are shown in Figure 1. A figure depicting the seven major tanks and nine small tanks, as presented in the RFA, is provided in Appendix A.

According to the RFA, the seven major tanks were used at one time for storing No. 6 fuel oil. Majors tanks Nos. 2, 3, and 4 also were used for storing petroleum tar and may have been used for storing coal tar. Of the smaller nine tanks, tank Nos. 1, 2, and 3 contained tar and the two un-numbered tanks (which are associated with SWMU P-8) are labeled as tar distillation – carbolic plant oil tanks. The contents of tank Nos. 11, 15, 16 and 31 was not described in the RFA.

Only Tank Nos. 5, 7, and 16 are still onsite. The others have been dismantled and removed with four tank pads still present and visible.

Major Tank No. 5 and small tank No. 16 were used as flow equalization tanks for weak ammonia liquor (WAL) prior to treatment by the onsite water treatment system. Some overhead transfer pipes used to transfer the WAL stored in Tank Nos. 5 and 16 to the water treatment system are visible. According to BSC-Lackawanna personnel, Tank No. 5 stopped receiving WAL in December 2001 and Tank No. 16 has not been used since 1999. Tank No. 7 was cut open in 2001 and is used as a shelter as part of ongoing shutdown operations of the Coke Ovens. The overhead pipes run east from these tanks and then trend north-south on the eastern perimeter of the Tank Farm.

A series of berms, 6 to 10 feet high, originally constructed for spill containment around the major tank areas, is still present. The berms have openings at several locations that were created to allow access during previous cleaning and demolition operations (Figure 1).

The surface (floor) of the Tank Farm area consists of hard-packed gravel and crushed slag with some areas of sand. Some scrub vegetation exists on parts of the surface and on the berms. Under the remaining overhead piping, there are six areas, approximately 10 feet by 20 feet (tar-like), of surficial staining. These areas are noted in the 2001 inspection report (Appendix B). There are also areas of asphalt-like material associated with SWMU P-74, which is discussed below.

**SWMU P-74**

SWMU P-74 formerly consisted of four storage piles placed within SWMU P-75 containing tar bottoms material cleaned from the tanks in the Tank Farm (P-75) in 1987 and mixed with coke breeze and coke fines to create a solid fuel (Figure 1). At the time of the RFA, this material was stockpiled onsite adjacent to the tanks. It subsequently has been sold for recycling and removed. Some small remnants of the SWMU P-74 waste piles are present in the form of thin, hardened lenses of asphalt-like material.

**SWMU P-8**

SWMU P-8 is located in the southeastern section of the Tank Farm (P-75). P-8 formerly contained two steel storage tanks (un-numbered), located approximately 125 feet east of Tar Tank No. 5 (Figure 1). The tanks were 38 feet 6 inches in diameter and 29 feet 7 inches high, constructed with ¼ inch thick welded steel plate and placed on 12-inch thick, steel reinforced bar concrete pads. The tanks had 4-foot by 5-foot clean-out doors. The capacity of each of these two tanks was 5,000 barrels or 210,000 gallons. Both tanks were encircled by an earthen containment berm. One of the tanks once contained tar acid oil and the other once contained carbolic oil. Later, they were both used to store No. 6 fuel oil, and eventually, waste oil, before being taken out of service, cleaned, dismantled, and sold for steel scrap during the winter of 1994/1995. The two concrete tank pads are all that remain of the two tanks. As noted in the SWMU inspection reports, provided in Appendix B, the area contained five tank pads. Only the two discussed above are associated with P-8.

The area of SWMU P-8 is highly vegetated and surface water runoff was observed during a 2000 inspection by URS. Additionally, a "tar-like" substance was observed on concrete foundation footers and in the berm wall.

Groundwater is approximately 23 feet beneath the SWMUs.

## 1.2 History

Operation and supervision of the Tank Farm (P-75) traditionally was handled by the Coke Oven Division and included the unloading, storage, and distribution of the fuels utilized by the various operating units (open hearth furnaces, rolling mills, etc.) of the BSC facility.

The seven main tanks consisted of: four tanks each with a 3,380,000-gallon capacity, two tanks each with a 4,500,000-gallon capacity, and one tank with a 4,873,000-gallon capacity. Principal products stored were No. 6 fuel oil used primarily in the boiler houses and reheating furnaces in the various rolling mills; petroleum tar used as open hearth fuel; and possibly coal tar. The tanks were active until 1983, when basic plant operations were discontinued.

In November 1986, composite samples of the residues from each of the seven main tanks were collected and analyzed for RCRA toxic hazardous waste parameters by extraction procedure (EP toxicity), leachable metals, and polychlorinated biphenyls (PCBs). Analytical results are provided in Appendix C and discussed in Section 2.0. In 1987, BSC hired a contractor to remove the residue ("tar-bottoms") from the bottoms of the seven main tanks. The residue (remnants of coal tar and other residues) were stored at locations shown in Figure 1 (SWMU P-74). These tank-bottom residues were then mixed with coke breeze and coal fines to create a solid blended fuel. The blended fuel was then sold and removed from the site.

As stated in Section 1.1, two (major tank No. 5 and small tank No. 16) of the remaining three tanks were used to store WAL prior to treatment at the onsite water treatment facility. The tanks are no longer used for WAL storage. The third tank (major tank No. 7) has been cleaned, and is presently used as a shelter as part of the ongoing Coke Oven shutdown operations.

SWMU P-8 (waste oil storage tanks) was comprised of the two un-numbered tanks. One tank was used for the storage of carbolic oil and originally put into service in 1942. The tank was replaced with a larger tank in 1961 which was subsequently used to store tar acid oil. The second tank was also used for the storage of carbolic oil and was put into service in 1942. These two tanks were used in support of the Coke Oven Division Tar Distillation Plant.

The Tar Distillation Plant was shut down in 1970. The products were removed from the two un-numbered tanks and sold. In about 1974-1975 the tanks were brought back into service

for the storage of No. 6 fuel oil. In 1983, basic steel-making operations at the Lackawanna Plant ceased, after which fuel oil was no longer stored in the tanks.

During the late 1980's, the tanks in P-8 were used temporarily for the storage of waste oil. Use of the tanks for waste oil storage ceased in 1991. A contractor removed the waste oil from the tanks for reuse.

In September 1990, a waste oil sample was collected from one of the tanks (identified as Tank No. 2). A bailer was extended 16 feet from the tank opening and used to obtain a representative sample of the vertical profile of the oil in the tank. The sample was analyzed for TCLP metals, volatile organics, semi-volatile organics, herbicides, and pesticides. In November 1990, a similar sample was collected from the second tank (identified as Tank No. 1) and analyzed for TCLP metals, volatile organics, semi-volatile organics and PCB's. Analytical reports are provided as Appendix C and are discussed in Section 2.0.

On May 20, 1991 an oil spill event occurred during the removal of waste oil from "Tank No. 1". The contractor had installed a steam heating coil to facilitate the removal of the waste oil. The steam coil leaked condensate (water) which resulted in the tank overflowing at the sill of the clean-out door. Approximately 200 gallons were spilled. The New York Department of Environmental Conservation (NYSDEC) was notified and subsequently made two visits to the site to monitor progress during the cleanup. It was reported that all spilled material was recovered. NYSDEC declared the spill clean-up complete on July 22, 1991.

As noted earlier, the two tanks were taken out of service, cleaned, dismantled, and sold for steel scrap during the winter of 1994/1995.

On February 20, 1996, BSC filed a declaration in the Erie County Clerk's office limiting future use of the property around and including the Tank Farm SWMUs. Under the deed restriction, future use of the property shall be limited to industrial use only. Industrial use includes manufacturing, assembling, warehousing, and related railroad, port, and shipping activities. The deed restriction also prevented in installation and operation of extraction or water wells for purposes other than environmental remediation use. A copy of the Declaration of Conditions, Covenants, and Restrictions is attached as Attachment B.

The Tank Farm was inspected in 1996 by Dames & Moore and in 2001 by URS. The site inspection are provided in Appendix B. The inspections reflect the information in Section 1.1.

## 2.0 SAMPLING AND ANALYSIS

Waste and groundwater sampling was conducted in and near the Tank Farm between 1986 and 2000. Composite samples of the waste from each of the seven main tank residues were collected in 1986 prior to the residue's consolidation into the four SWMU P-74 piles in 1987. Additional samples were taken in 1990 from P-8 as part of the determination of waste characterization. These samples were collected outside of the RFI program. Soil samples were also collected in 1995 and 2000 as part of subsequent phases of the RFI. All RFI soil sampling was conducted in accordance with the Phase IIC Work Plan, and the Supplemental SWMU Investigation Work Plan (BSC 1994 and 2000, respectively). A compete list of site-specific compounds targeted for analysis in the site investigations is provided in Table 1, followed by a list of Data qualifiers. Sample records and boring logs are included in Appendix D. Sample locations are shown in Figure 1. Laboratory analytical reports are provided in Section II of the RFI.

Groundwater near the Tank Farm was sampled in six phases starting in 1991 and extending to 2000. The phases were Phase I (1990 to 1992), Phase IIA (1992 to 1993), Phase IIB (1993 to 1994), Phase IIC (1994 to 1995), Comprehensive Well Sampling (1999a), and Supplemental SWMU Investigation (2000). Groundwater sampling was conducted in accordance with work plans approved for each of the six phases by the USEPA (BSC 1989, 1992, 1993, 1994, 1999a and 2000).

There are two groundwater units that effect groundwater around the Tank Farm: the shallow fill unit and the deeper sand unit. The shallow fill unit wells are labeled as "A" wells, while the deeper sand unit wells are, in general, labeled as "B" wells. Groundwater was encountered at approximately 23 feet below ground surface in groundwater monitoring wells in July 2000. Groundwater contour maps for the fill and sand units are presented in Figures 2 and 3, respectively.

### 2.1 Non-RFI Waste Sampling

To determine if the residual material (ie. "tar bottoms") in the seven main storage tanks at the Tank Farm (ultimately consolidated into P-74) meet the definition of a RCRA characteristic hazardous waste, composite waste samples were collected (P-74). The samples were collected on

November 25, 1986 and were submitted for RCRA EP toxicity leachable metals and PCB analysis. Current and former tank locations are provided in Figure 1.

To determine if the waste oil in "Tank No. 2" (SWMU P-8) was hazardous, a waste oil sample was collected in September 1990. A bailer was extended 16 feet from the tank opening and used to obtain a representative sample of the vertical profile of the oil in the tank. The sample was analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals, volatile organic compounds (VOCs), semi-volatile organics compounds (SVOCs), herbicides, and pesticides. In November 1990, a similar sample was collected from "Tank No. 1" (SWMU P-8) and analyzed for TCLP metals, VOCs, SVOCs, and PCB's.

### 2.1.1 Waste Sample Results

Based on the 1986 analytical results for P-74 samples, the material from the seven main storage tanks does not meet TCLP criteria.

Based on the 1990 analytical results from the waste in P-8, the material does not meet TCLP criteria.

Analytical results are provided in Appendix C.

## 2.2 1995 Phase IIC Investigation

As part of Phase IIC of the RFI conducted in February 1995, soil samples were collected from the Tank Farm area. Two grab samples [P8-1 (0-6 inches) and P8-2 (0-6 inches)] were collected from the soil adjacent to the concrete pads of former "Tanks No. 1 and 2". The soil grab samples at SWMU P-8 consisted of dry, dense, brown to gray, fine-coarse sand and coarse gravel.

One grab soil sample was collected from each of the four former solid fuel mix pile locations at SWMU P-74. The four samples [P74-1 through P74-4] were collected at depths of 0 to 6 inches below the surface.

Soil samples [P75-1 through P75-4] were collected from 0 to 6 inches below the surface from areas surrounding the tanks within the SWMU P-75 unit. The soil samples consisted primarily of dry, brown to black, dense, silty fine-coarse and coarse gravel (slag fill).

Samples were analyzed for VOCs, SVOCs, metals, and indicator parameters. The samples were also extracted and the resulting extracts analyzed using the TCLP and Synthetic Precipitation Leaching Procedure (SPLP).

### 2.2.1 1995 Phase IIC Total Constituent Results

**SWMU P-8**

The analysis of the samples collected from SWMU P-8 indicated that eight VOCs, sixteen SVOCs, nine metals, and cyanide were detected. VOC concentrations ranged from 2.9 micrograms per kilogram (ug/kg) of ethylbenzene to 65 ug/kg of methylene chloride, both detected in P08-2. SVOC concentrations ranged from 2,300 ug/kg of acenaphthene in P08-1 to 210,000 ug/kg of fluoranthene in P08-2. Metals concentrations ranged from 1.3 milligrams per kilogram (mg/kg) of cadmium to 26,500 mg/kg of calcium, both detected in P08-2. Cyanide was only detected in P08-2 at a concentration of 123 mg/kg. A summary of the detected analytes is presented in Table 2.

**SWMU P-74**

Six VOCs, sixteen SVOCs, ten metals, and cyanide were detected in the SWMU P-74 soil samples. VOCs concentrations ranged from 3.5 ug/kg of trichlorofluoromethane in P74-2 to 180 ug/kg of toluene in P74-1. SVOC concentrations ranged from 500 ug/kg of acenaphthylene in P74-2 to 520,000 ug/kg of pyrene in P74-1. Metals ranged from 0.64 mg/kg of cadmium to 47,400 mg/kg of calcium, both detected in P74-3. Cyanide was detected in two samples, P74-2 and P74-3 at 6.8 mg/kg, and 4.6 mg/kg, respectively. A summary of the detected analytes is provided in Table 3.

**SWMU P-75**

Seven VOCs, eighteen SVOCs, nine metals, and cyanide were detected in the samples collected from SWMU P-75. VOC concentrations ranged from 3.4 ug/kg of benzene to 79 ug/kg of methylene chloride, both detected in P75-2 DUP. SVOC concentrations ranged from 93 ug/kg of dibenz(a,h)anthracene in P75-4 to 640,000 ug/kg of benzo(b)fluoranthene in P75-3. Metals concentrations ranged from 1.6 mg/kg of mercury in P75-2 DUP to 31,200 mg/kg of calcium in P75-4. Cyanide was detected in three samples, ranging from 2.6 mg/kg in P75-2 DUP to 4.2 mg/kg in P75-1. A summary of the detected analytes is provided in Table 4.

### 2.2.2 1995 Phase IIC SPLP Results

SPLP analyses were conducted to more closely mimic the effect of compounds leaching from the soil due to rain water infiltration. The analyses were performed in accordance with the USEPA's SW846 Method 1312 protocols. The SPLP results help evaluate what compounds can potentially leach from the soils.

**SWMU P-8**

One SVOC and three metals were detected in the SPLP extract of the samples collected from SWMU P-8. The SVOC, anthracene, was only detected at 0.003 milligrams per liter (mg/L) in P08-2. Metals ranged from 0.02 mg/L of chromium to 28.9 mg/L of calcium, both detected in P08-2. No VOCs were detected. Detected SPLP results for SWMU P-8 are shown in Table 2.

**SWMU P-74**

Six SVOCs and four metals were detected in the SPLP extracts for samples collected in SWMU P-74. SVOC concentrations ranged from 0.003 mg/L of phenol in P74-4 to 0.011 mg/L of pyrene in P74-1. Metals ranged from 0.005 mg/L of lead in P74-1 to 12.2 mg/L of calcium in P74-3. No VOCs were detected. Detected SPLP results for SWMU P-74 are shown in Table 3.

**SWMU P-75**

Three metals were detected in the SPLP extracts for the samples collected from SWMU P-75. The metals ranged from 0.004 mg/L of lead in P75-3 to 29 mg/L of calcium in P75-1. No VOCs or SVOCs were detected. Detected SPLP results for SWMU P-75 are shown in Table 4.

### 2.2.3 1995 Phase IIC TCLP Results

TCLP results were compared to regulatory concentration levels as listed in the 40 CFR Part 261. Based on the 1995 results, analytes detected do not meet TCLP criteria. Detected analytical results are compared to RCRA criteria on Tables 5, 6, and 7.

## 2.3 2000 Supplemental SWMU Investigation

In June 2000, several additional samples were collected from SWMUs P-8 and P-75. Two borings [P08-B01 and P08-B02] were advanced in SWMU P-8. Samples consisted of dark brown fine to coarse sand and gravel. The material was in a tar-like matrix in sample P08-B02.

Four borings were advanced in SWMU P-75 [P75-B01 through P75-B04]. Samples were collected at the surface [0-12 inches] and from the subsurface (either highest photoionization detection reading or visibly stained soil). Due to poor recovery in boring B04, a composite sample of the entire boring (1.0 to 10.0 feet bgs) was submitted for SVOC and metals analysis and with the interval 6.0 to 8.0 feet bgs collected for VOC analysis. Surface samples consisted of brown gray fine to coarse sand and gravel (slag). Subsurface samples consisted of dark brown fine to coarse sand and gravel with some of the material in a tar-like matrix.

No samples were collected from the P-74 areas.

Samples were analyzed for VOCs, SVOCs, metals, and indicator parameters. The samples were also extracted and the resulting extracts analyzed using the TCLP and SPLP.

### 2.3.1 2000 Total Constituent Results

**SWMU P-8**

Four VOCs, eleven SVOCs, and fifteen metals were detected in the samples collected from SWMU P-8. VOCs ranged from 440 ug/kg of toluene in P08-B02 to 140,000 ug/kg of m-xylene & p-xylene in P08-B02. SVOCs ranged from 2,300 ug/kg of phenol to 2,100,000 ug/kg of naphthalene, both detected in P08-B02. Metals ranged from 0.021 mg/kg of mercury in P08-B01 to 39,600 mg/kg of calcium in P08-B02. A summary of the detected analytes is presented in Table 8.

**SWMU P-75**

Four VOCs, thirteen SVOCs, and fifteen metals were detected in the samples collected from SWMU P-75. All four VOCs were detected in only one sample, P75-B03. VOCs ranged from 5,700 ug/kg of o-xylene to 17,000 ug/kg of benzene. SVOCs ranged from 63 ug/kg of fluorene in P75-B04 (1.0-10.0 feet) to 6,500,000 ug/kg of naphthalene in P75-B01 (2-6 feet). Metals ranged from 0.01 mg/kg of mercury to 287,000 mg/kg of calcium, both detected in P75-B02 (4.0-8.0 feet). A summary of the detected analytes is provided in Table 9.

### 2.3.2 2000 SPLP Results

**SWMU P-8**

Analysis of the SPLP extract for samples collected from SWMU P-8 indicate the presence of five VOCs, three SVOCs, seven metals, and cyanide. VOCs ranged from 0.012 mg/L of toluene in P08-B01 to 0.86 mg/L of m-xylene and p-xylene in P08-B02. Four SVOCs were detected ranging from 0.41 mg/L of phenanthrene in P08-B01 to 13 mg/L of naphthalene in P08-B02. Metals ranged from 0.000061 mg/L of mercury to 49.6 mg/L of calcium, both detected in P08-B01. Cyanide was detected at 0.0196 mg/L in P08-B01 to 0.655 mg/L in P08-B02. Detected SPLP results are shown in Table 8.

**SWMU P-75**

Analysis of the SPLP extract for samples collected from SWMU P-75 indicate the presence of five VOCs, nine SVOCs, ten metals, and cyanide. VOCs concentrations ranged from 0.0023 mg/L of ethylbenzene in P075-B03 (0-1 feet) to 0.62 mg/L of benzene in P75-B01 (4-6 feet). SVOC concentrations ranged from 0.0041 mg/L of naphthalene in P075-B04 (1-10 feet) to 15 mg/L of naphthalene P75-B01 (2-6 feet). Metals concentrations ranged from 0.000046 mg/L of mercury in P75-B03 (8-10 feet) to 117 mg/L of calcium in P75-B02 (4-8 feet). Cyanide was detected in two samples ranging from 0.02 mg/L in P75-B01 (0-1 feet) to 0.08 mg/L in P75-B03 (8-10 feet). Detected SPLP results are shown in Table 9.

### 2.3.3 2000 TCLP Results

Based on the 2000 results, benzene was detected in one sample above TCLP criteria. In sample P75-B01 (4.0-6.0 feet), benzene was detected at a concentration of 0.69 mg/L.

Analytical results for SWMUs P-8 and P-75 are presented in Tables 10 and 11.

## 2.4 Groundwater

Seven groundwater monitoring wells (MWN-10, MWN-17A, MWN-17B, MWN-37A, MWN-38A, MWN-39A, and MWN-40A) were used to evaluate groundwater in the vicinity of the Tank Farm SWMUs. Monitoring wells MWN-10 and MWN-40A are upgradient of the Tank Farm. MWN-37A, MWN-38A, and MWN-39A are downgradient, and wells MWN-17A and MWN-17B are crossgradient wells to the Tank Farm SWMUs. Well MWN-17B is screened in a sand unit that underlies the slag fill. The remaining wells are screened in the fill unit that underlies the site. Figures 2 and 3 illustrate the monitoring well/piezometer locations with groundwater elevation contours in the fill and sand units, respectively.

In 2000, monitoring wells MWN-37A, MWN-38A, and MWN-39A were installed downgradient and MWN-40A was installed upgradient of the Tank Farm SWMUs. Analytical results from MWN-40A were used to assess upgradient groundwater conditions.

From 1991 to 1999, several rounds of groundwater samples were collected from wells around the Tank Farm SWMUs over several phases of the RFI. In November 1999, all of the onsite wells sampled at the same time. Monitoring wells MWN-37A, MWN-38A, MWN-39A, and MWN-40A were sampled in December 2000, following their installation. Analytical data from the 1999 and 2000 sampling events are used to evaluate groundwater conditions relative to the Tank Farm SWMUs. A summary of detected analytes in the downgradient wells, crossgradient wells, and upgradient wells is presented in Tables 12, 13, and 14, respectively.

### 2.4.1 Groundwater Results

Analytical results for upgradient and downgradient wells from the November 1999 site wide sampling event and the 2000 sampling event are discussed below.

One SVOC, eleven metals and cyanide were detected in the two upgradient wells, MWN-10 and MWN-40A. No VOCs were detected. The SVOC detected, naphthalene, was detected at a concentration of 2.3 micrograms per liter (ug/L) in only one well, MWN-10. Metals ranged from 0.069 ug/L of mercury to 81,100 ug/L, both detected in MWN-40A. Cyanide was detected in both wells ranging from 0.012 mg/L in MWN-10 to 0.22 mg/L in MWN-40A.

Two VOCs, seven SVOCs, ten metals and cyanide were detected in the downgradient wells, MWN-37A, MWN-38A and MWN-39A. The VOCs detected were benzene and total xylenes. Benzene ranged from 9 ug/L in MWN-37A to 200 ug/L in MWN-39A. Total xylenes was detected in only one well, MWN-38A at a concentration of 1.7 ug/L. SVOCs ranged from 3.4 ug/L of fluorene in MWN-39A to 190 ug/L of phenol in MWN-37A and MWN-38A. Three SVOCs were only detected in MWN-39A: acenaphthylene, bis(2-ethylhexyl)phalate and fluorene. Metals ranged from 0.048 ug/L of mercury in MWN-38A to 158,000 ug/L of calcium in MWN-39A. Cyanide was detected in all three wells ranging from 0.024 mg/L in MWN-37A to 0.19 mg/L in MWN-38A.

Analytical results from crossgradient wells MWN-17A and MWN-17B show several analytes detected that were not detected in either the upgradient or downgradient wells, or are detected at higher concentrations. Two VOCs, toluene, and chloroform were detected in the crossgradient wells and were not detected in the upgradient or downgradient wells. Nine SVOCs, five of which were also detected in the downgradient wells including phenol at a concentration of

2,400 u/L in MWN-17B. These two wells are adjacent to a former SWMU P-74 pile, as well as SWMU P-75 in general. These higher concentration may be the results of the proximity of these wells to the SWMUs (Figures 2 and 3) and the localized groundwater flow in the area.

Detected groundwater analytical data is provided in Tables 12, 13 and 14.

## 2.5 Summary of Sampling Results

Although most waste characterization results indicate the SWMU materials do not meet TCLP criteria, one sample, obtained from P-75, contained detectable levels of benzene above TCLP criteria.

Total constituent analysis of samples obtained from borings performed within limits of SWMU P-74, P-75, and P8 detected several VOCs, SVOCs, and metals.

SPLP results detected VOCs, SVOCs, metals and cyanide, although the number of detected analytes was smaller than the number detected in the Total Constituent analysis.

Groundwater analytical data indicates the materials within the Tank Farm area are likely to be contributing to constituent concentrations in the groundwater. The compounds detected in the groundwater were detected in the SWMU soil samples SPLP extracts. In addition, VOCs and SVOCs detected in the downgradient wells were not detected in the upgradient wells.

Further evaluation of the compounds detected in the SWMU material will be presented in Section 3.0 (Risk Assessment).

## 3.0 RISK ASSESSMENT

A human health risk assessment, as described in the *Human Health Risk Assessment Work Plan* (BSC 1997), was conducted for the Tank Farm SWMU Group. The results of the Tier 1 Human Health Risk Assessment (HHRA) are presented here and are organized into the following sections: Data Evaluation, Exposure Assessment, Toxicity Assessment, Risk Characterization and Uncertainty Analysis. The major components of this HHRA have previously been presented in Human Health Risk Assessment Report, Part IV of this RFI Report. Therefore, the following sections provide summary overviews of this previously presented information. This section, therefore, serves as a summary report, bringing together all associated and related work from previous risk assessment deliverables, and providing the conclusions of the SWMU-specific risk assessment.

### 3.1 Data Evaluation

SWMUs P-8, P-74, and P-75 make up the Tank Farm SWMU Group. Placing SWMUs into groups at the BSC facility was done in accordance with ID No. 1, with the main purpose being to increase the size of analytical datasets for SWMUs with similar operations, types of constituents, and proximity of the SWMUs to neighboring units. Therefore, this risk assessment uses SWMU material data collected from each of the three SWMUs listed above. The associated uncertainties of grouping these three SWMUs are presented in the Uncertainty Analysis section of this report.

A list of 96 constituents of potential interest (COPIs) was developed for the BSC Lackawanna, New York facility based on USEPA and industry studies (BSC 1998). The list contains hazardous constituents that could be present in the waste streams as a result of integrated iron and steel plant operations, such as those historically conducted at the Lackawanna facility. Human Health Risk Assessment ID No. 1 (BSC 1998) established the chemicals of potential concern (COPCs) for each SWMU at the Lackawanna facility. The COPCs were determined by sequentially applying the following criteria, as applicable, to each COPI on a medium-by-medium basis for each SWMU and watercourse: 1) the chemical was detected in at least 5% of the samples, 2) the chemical was detected in at least one sample at levels above background (*i.e.*, the maximum concentration was above the background concentration; for chemicals in surficial SWMU material only), and 3) the chemical was positively detected in at least one sample at a

level above the applicable screening criterion [*i.e.*, USEPA Region III Risk Based Concentrations (RBCs), USEPA Soil Screening Levels (SSLs), or NYSDEC Ambient Water Quality Standards and Guidance values]. In accordance with ID No. 1, a background comparison was not made for subsurface SWMU material.

The sampling data for the Tank Farm SWMU Group (as presented in Section 2.0 of this report) were evaluated in order to identify the site-related COPCs for the SWMU. The COPCs were originally determined in ID No. 1, however, as some screening criteria have been revised and because additional USEPA Region 2 comments have been received (USEPA 2003) since ID No. 1 was submitted, this screening process has been updated (Tables 15 through 17). Screening criteria are current as of 2000. Table 15 presents the screening of the surficial SWMU material, Table 16 presents the screening of the subsurface SWMU material, and Table 17 presents the screening of groundwater. Eight semivolatile organic COPCs (all PAHs) and five metal COPCs were identified in surficial SWMU material. One volatile organic COPC (benzene), five volatile semivolatile organic COPCs, three semivolatile organic COPCs, and two metal COPCs (arsenic and thallium) were identified in subsurface SWMU material. Four volatile organic COPCs, one volatile semivolatile COPC, five semivolatile organic COPCs, two metal COPCs, and one "miscellaneous" COPC (cyanide) were identified in groundwater.

Representative concentrations were determined for each COPC. If the sample size for a dataset was ten or greater, the 95% upper confidence limit (UCL) of the mean was used. For those datasets with sample sizes of less than ten, the maximum concentration was used. Between eight and fifteen samples of the surficial material in the Tank Farm SWMU Group were collected. Both the 95% UCL and maximum concentrations were used. Between five and eight samples were collected for COPCs in subsurface SWMU material, therefore, the maximum concentration was used as the representative concentration. The Tank Farm SWMU Group is located in the Tank Farm Zone groundwater area (BSC 1998). As all of the COPC datasets in the Tank Farm Zone groundwater have at least 10 samples, the 95% UCL was used as the representative concentration for each of the groundwater COPCs. The COPCs and their representative concentrations are presented in Table 18. These representative concentrations are used in the Tank Farm SWMU Group risk characterization.

## 3.2 Exposure Assessment

The exposure assessment conducted for the Tank Farm SWMU Group included a review of current and future human receptor scenarios and potential exposure pathways, as related to the COPCs. In general, exposure pathways by which a human receptor could come into contact with SWMU material are defined by four components (USEPA 1989):

- A source and mechanism of constituent release to the environment;
- An environmental transport mechanism;
- A point of potential human contact with the affected medium, and
- A route of entry into humans.

If any one of these components is missing, the pathway is considered incomplete and does not contribute to receptor exposure.

Human Health Risk Assessment ID No. 2 (BSC 1999b) presented the current and future human receptor scenarios and potentially complete exposure pathways to be considered for each of the SWMUs identified at the Lackawanna facility. Subsequent USEPA Region 2 comments included the identification of additional potentially complete exposure pathways. Human Health Risk Assessment ID No. 1 (BSC 1998) identifies the COPCs; these COPCs were also integral in determining potentially complete exposure pathways, based on their presence in each media (*i.e.*, surface SWMU material, subsurface SWMU material, or groundwater) and their volatility (*e.g.*, inorganics in groundwater do not present a complete exposure pathway as they are not volatile and groundwater is not used as a drinking water source). Potential exposure pathways for the Tank Farm SWMU Group are presented in Table 19.

For the Tank Farm SWMU Group, the potential receptor scenarios include a current non-BSC commercial/industrial worker, a future commercial/industrial worker, a future construction worker, a future utility/maintenance worker, a trespasser, a future marina worker, a future greenway user, a future fenceline resident, and a present fenceline resident. As previously established in ID No. 2 and based on additional collection of subsurface SWMU material samples, the potentially complete exposure pathways are as follows. For the future commercial/industrial worker scenario, the future utility/maintenance worker scenario, the future construction worker scenario, and the trespasser scenario, the following pathways were

determined to be complete: direct contact (*i.e.*, ingestion and dermal contact) with surface SWMU material, inhalation of airborne particulates from surface SWMU material, inhalation of vapors from subsurface SWMU material, and inhalation of vapors from Tank Farm Zone groundwater. The future commercial/industrial worker scenario may also be potentially exposed to indoor vapors from groundwater or subsurface SWMU material, should a building be placed on the site. It should be noted, however, that the indoor exposure pathway for the future commercial/industrial worker scenario is not a realistic pathway. This is discussed further in the Uncertainty Analysis.

The future construction worker scenario and future utility/maintenance worker scenario may additionally be exposed via direct contact with and inhalation of particulates in subsurface SWMU material during potential future digging activities and via dermal contact with groundwater. For the current non-BSC commercial/industrial worker scenario, future marina worker scenario, future greenway user scenario, and present and future residential scenarios, inhalation of particulates in surficial SWMU material and inhalation of vapors in subsurface SWMU material are the only potentially complete exposure pathways evaluated in this SWMU-specific risk assessment. It is relevant to note that the current and future residential scenarios and future marina worker scenario represent potential exposure scenarios that are located off site.

### 3.3 Toxicity Assessment

A toxicity assessment characterizes the relationship between the exposure to a COPC and the frequency of adverse health effects that may result from such an exposure (dose-response). The end result of the dose-response assessment is the determination of human uptake levels that provide an adequate measure of protection to exposed persons for carcinogenic and noncarcinogenic endpoints. The derivation of acceptable levels of exposure (*e.g.*, risk-based screening levels; RBSLs) and the manner in which these levels are used in this HHRA are discussed below.

Tier 1 RBSLs were calculated and compared to the representative Tank Farm SWMU Group COPC concentrations. RBSLs are defined as concentrations of COPCs in media that are not expected to produce any adverse health effects under assumed exposure conditions. Tier 1 RBSLs were developed using information previously defined and described in detail in the Work Plan and ID No. 2. The equations used to calculate the RBSLs follow basic USEPA risk

assessment principles (USEPA 1989, 1996). Conservative exposure parameters, as defined by the ASTM Standard (ASTM 1995), USEPA guidance (USEPA 1989, 1991a, 1991b), and USEPA toxicity criteria (USEPA 2000b) were inputs into these equations to develop the RBSLs. As some of the toxicity criteria have been revised by the USEPA since originally presented in ID No. 1, they are presented in Table 20. Toxicity criteria are current as of 2000 (USEPA 2000b). The above information was used to calculate Tier 1 RBSLs for COPCs in SWMU material and groundwater for each of the nine receptor exposure scenarios.

For this risk assessment, vapor dispersion modeling was performed to enable estimation of potential exposure to airborne COPCs emanating from subsurface SWMU material; the equations and parameters used were previously discussed and presented in ID. No 2. Modeling was performed with the USEPA Industrial Source Complex Short-Term Model (ISCST3, version 99155) and with meteorological data collected at a monitoring station at the Lackawanna facility in 1991. For the current non-BSC worker scenario, Tier 1 RBSLs were calculated based on the maximum estimated impacts in the northern, middle, and southern regions of the site. For this Tier 1 assessment, the most conservative RBSL (*i.e.*, lowest) of the regions was used to represent the current non-BSC worker scenario. Particle dispersion modeling was not performed for Tier 1 RBSLs; instead, it was conservatively assumed that the receptor is actually present on the SWMU.

Certain items should be discussed in reference to the RBSL calculations. First, the future commercial/industrial worker scenario RBSL for direct contact with arsenic (0.94 mg/kg) is below the arsenic background level established at the site (12 mg/kg). As the background level was deemed an appropriate screening value in a previous step of the HHRA, it was used as the default RBSL for the future commercial/industrial worker scenario RBSL.

It should also be noted that, in groundwater, many of the RBSLs calculated were greater than the chemicals' solubilities in water. This indicates that, based on the predicted amount of chemical volatilization, pure product in the groundwater would not pose an inhalation health threat from these chemicals. The solubility limits of these chemicals are indicated in Table 21.

Similarly, some of the RBSLs calculated for the COPCs in subsurface SWMU material may have been determined to be health protective at concentrations that are greater than the chemicals' saturation limits in soils. However, it is important to consider that chemical emissions

from soil to air reach a plateau at a chemical's saturation limit, and volatile emissions will not increase above this level, regardless of how much more chemical is added to the soil. In other words, the exposure concentration for an inhalation-only scenario cannot exceed a chemical's saturation limit. Furthermore, as the saturation limit corresponds to the maximum volatile emissions, RBSLs that are above the saturation limit are not likely to pose increased risks or hazards via inhalation (USEPA 1996). Therefore, RBSLs that are based only upon the inhalation pathway are capped at the saturation limit for that chemical, and "> saturation limit" is indicated in such situations (Table 21). The RBSLs that are not based solely on inhalation were not capped at the saturation limit, as the potential exposure concentrations are greater than the saturation limit for direct contact scenarios (*e.g.*, dermal contact and ingestion).

Lastly, some of the RBSLs for COPCs in SWMU material were determined to be health protective at levels that are greater than 1,000,000 parts per million (mg/kg); such cases are noted by the following indicator ">1,000,000" in Table 21. For those RBSLs that were based on inhalation, if a calculated RBSL is greater than both the saturation limit in soil and 1,000,000 mg/kg, ">1,000,000" is shown in Table 21 as it is more indicative of the level of health-protectiveness.

A comparison of the representative COPC concentrations to RBSLs for each of the exposure scenarios is presented in Table 21. This comparison provides a preliminary screening of potential risk to the specific receptor populations and exposure pathways identified for this SWMU.

For the current non-BSC commercial/industrial worker scenario, benzene in subsurface SWMU material exceeds the ambient vapor inhalation cancer RBSL. For the future commercial/industrial worker scenario, antimony, arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene concentrations in surface SWMU material exceed their respective direct contact RBSLs. The representative concentrations of benzene and naphthalene exceed their respective RBSLs for subsurface SWMU material for the ambient and indoor inhalation scenarios.

For the future construction worker scenario, arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene concentrations in surface SWMU material exceed their respective direct contact RBSLs. The representative

concentrations of arsenic, benzo(a)anthracene, benzo(a)pyrene, and naphthalene exceed their respective RBSLs for direct contact with subsurface SWMU material.

For the future utility maintenance worker scenario, arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene concentrations in surface SWMU material exceed their respective direct contact RBSLs. The representative concentrations of benzo(a)anthracene, benzo(a)pyrene, and naphthalene exceed their RBSLs for direct contact with subsurface SWMU material.

The trespasser scenario RBSLs are exceeded for direct contact with benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene in surficial SWMU material. For all other scenarios, chemicals, and pathways, the representative concentrations are below their respective RBSLs.

In accordance with Part IV of this RFI Report, those COPCs that do not exceed the Tier 1 RBSLs are not evaluated further. For those COPCs that exceed Tier 1 RBSLs, the risk to human health is evaluated further in a Tier 1 HHRA.

### 3.4 Risk Characterization

Risk characterization involves estimating the magnitude of potential adverse health effects of the COPCs and summarizing the nature of the health impact to the defined receptor populations. It combines the results of the toxicity and exposure assessments to provide numerical estimates of health risk.

A Tier 1 HHRA provides an estimate of risk and hazard based on a comparison of the RBSL (*i.e.*, health-protective levels) to the COPC concentrations (*i.e.*, site-specific levels). Specifically, for those COPCs that exceed an RBSL, a screening-level hazard index (SLHI) was calculated to evaluate noncarcinogenic health effects, and a total screening-level cancer risk ($SLCR_{total}$) was calculated to evaluate carcinogenic effects. The SLHI and $SLCR_{total}$ methodologies are based on USEPA guidance (USEPA 1989) and follow that utilized in Part IV of the RFI. The Tier 1 HHRA results are presented in Table 22.

### 3.4.1 Noncarcinogenic Hazards

Noncancer hazards were assessed in this HHRA using a hazard quotient approach (USEPA 1989). For each COPC, the noncarcinogenic RBSL was compared to the COPC's representative concentration to determine the screening-level hazard quotient (SLHQ) for that chemical. The equation is as follows:

$$SLHQ = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}}$$

The SLHQs for each chemical are summed to create a total Screening-Level Hazard Index ($SLHI_{total}$) for each pathway. The smaller the SLHQ/SLHI, the greater the degree of protection for that pathway. In accordance with USEPA methodology (USEPA 1989), if the SLHI is less than 1, the risks are considered to be negligible. Those $SLHI_{total}$s that exceed 1 were further evaluated by developing target organ-specific SLHIs. This process is appropriate as only certain chemicals affect similar biological target endpoints, and thus, it is only relevant to quantify the additive effects of these chemicals.

The SLHQs and SLHIs are presented in Table 22. The future commercial/industrial worker scenario was evaluated for exposure to both indoor and ambient air. As a worker will not be exposed to both ambient and indoor air simultaneously, the ambient and indoor air SLCRs were evaluated separately. The $SLHI_{total}$ for the future commercial/industrial worker scenario exposed to ambient air is 30, and the $SLHI_{total}$ for the indoor future commercial/industrial worker scenario is 91. The SLHIs were also evaluated for exposure pathway-specific scenarios. The SLHI for inhalation of ambient vapors from subsurface SWMU material is 27 (benzene and naphthalene); for inhalation of indoor vapors, the SLHI is 88 (benzene and naphthalene). The SLHI for direct contact with surficial SWMU material is 3.5 (arsenic and antimony).

The $SLHI_{total}$s were further evaluated by target organ. For the outdoor future commercial/industrial worker scenario, the blood/immune system SLHI is 2.8 (benzene in subsurface SWMU material and antimony in surficial SWMU material), the upper respiratory SLHI is 26 (naphthalene in subsurface SWMU material), and the skin SLHI is 1.9 (arsenic in surficial SWMU material). For the indoor worker scenario, the blood/immune system SLHI is 26 (benzene in subsurface SWMU material and antimony in surficial SWMU material), the upper

respiratory system SLHI is 63 (naphthalene in subsurface SWMU material), and the skin SLHI is 1.9 (arsenic in surficial SWMU material).

The future construction worker scenario $SLHI_{total}$ is 97 attributable to direct contact with naphthalene in subsurface SWMU material. The upper respiratory SLHI is also 97, as naphthalene is the only hazard contributor for this scenario.

The future utility/maintenance worker scenario $SLHI_{total}$ is 19 attributable to direct contact with naphthalene in subsurface SWMU material. The upper respiratory SLHI is also 19, as naphthalene is the only hazard contributor for this scenario.

### 3.4.2 Carcinogenic Risk

In a human health risk assessment, carcinogenic health risks are defined in terms of the probability of an individual developing cancer over a lifetime as the result of exposure to a given chemical at a given concentration (USEPA 1989). The incremental probability of developing cancer over a lifetime (*i.e.*, the theoretical excess lifetime cancer risk) is the additional risk above and beyond the cancer risk an individual would face in the absence of the exposures characterized in this risk assessment. In this Tier 1 HHRA, cancer risk was evaluated according to the following equation:

$$SLCR = \frac{\text{Representative concentration}_{COPC/medium}}{RBSL_{COPC/medium/receptor/pathway}} x \text{ Target Risk Level}$$

Cancer risks are summed regardless of the differences in target organ, weight-of-evidence for human carcinogenicity, or potential chemical interactions (*e.g.*, antagonistic or synergistic effects). This approach is consistent with USEPA's current approach to carcinogenic effects, which is to assume effects are additive unless adequate information to the contrary is available (USEPA 1989). Based on USEPA methodology (USEPA 1989) and as discussed in the Work Plan, if the total screening level cancer risk ($SLCR_{total}$) for each receptor/pathway is equal to or less than $1 \times 10^{-4}$, the risks are considered to be negligible.

The $SLCR_{total}$ values calculated for this SWMU group are greater than the carcinogenic benchmark of $1 \times 10^{-4}$ for two receptor populations: the commercial/industrial worker and the future construction worker.

As mentioned earlier, because the future commercial/industrial worker will not be exposed to both ambient and indoor air simultaneously, a $SLCR_{total}$ for each scenario was developed. For the future commercial/industrial worker scenario, both the ambient and indoor $SLCR_{totals}$ are $3 \times 10^{-3}$. Each $SLCR_{total}$ was further evaluated by media type. The SLCR for direct contact with surficial SWMU material is $3 \times 10^{-3}$ (arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene all contribute to the risk). The SLCR for inhalation of ambient vapors from subsurface SWMU material is $5 \times 10^{-6}$, and for inhalation of indoor vapors from subsurface SWMU material, the SLCR is $1 \times 10^{-4}$. For both the ambient and indoor workers, benzene comprises the entire risk.

For the future construction worker scenario, the ambient $SLCR_{total}$ is $5 \times 10^{-4}$. The SLCR for direct contact with surficial SWMU material is $2 \times 10^{-4}$ (arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene contribute to the risk). The SLCR for direct contact with subsurface SWMU material is $3 \times 10^{-4}$ (arsenic, benzo(a)anthracene, and benzo(a)pyrene contribute to the risk).

For the future utility/maintenance worker scenario, the ambient $SLCR_{total}$ is $1 \times 10^{-4}$. The SLCR for direct contact with surficial SWMU material is $5 \times 10^{-5}$ (arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene contribute to the risk). The SLCR for direct contact with subsurface SWMU material is $7 \times 10^{-5}$ (benzo(a)anthracene and benzo(a)pyrene contribute to the risk).

For the trespasser, the $SLCR_{total}$ is $1 \times 10^{-5}$. This potential risk is attributable to direct contact with benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene in surficial SWMU material. For the current non-BSC worker scenario, the $SLCR_{total}$ is $3 \times 10^{-6}$ attributable solely to inhalation of ambient benzene vapors from subsurface SWMU material.

## 3.5 Conclusions

The results of the Tier 1 HHRA are that levels of arsenic and antimony in surface soil, and benzene and naphthalene in subsurface SWMU material exceed noncarcinogenic RBSL, and produce a hazard index greater than the Tier 1 noncarcinogenic benchmark of 1.0 for certain receptor scenarios. Additionally, the levels of arsenic, benzene, benzo(a)anthracene, and benzo(a)pyrene in subsurface SWMU material and arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene in surficial SWMU material exceed carcinogenic RBSLs and produce carcinogenic risk levels greater than the Tier 1 carcinogenic risk benchmark of $1 \times 10^{-4}$ for some receptor scenarios.

For the future commercial/industrial worker scenario, the calculated noncarcinogenic hazard indices for antimony and arsenic in surface SWMU material and benzene and naphthalene in subsurface SWMU material (ambient and indoor vapor inhalation) are greater than the Tier 1 noncarcinogenic benchmark. Also for this scenario, the calculated risk levels for benzene in subsurface SWMU material and arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene in surface SWMU material are greater than the Tier 1 carcinogenic risk benchmark.

For the future construction worker and utility/maintenance worker scenarios, the calculated hazard level for naphthalene in subsurface SMWU material is greater than the Tier 1 noncarcinogenic benchmark. Also for the future construction worker scenario, the calculated risk levels for direct contact with surficial SWMU material (generated by arsenic, benzo(a)pyrene, benzo(a)anthracene, dibenz(a,h)anthracene, benzo(b)fluoranthene and indeno(1,2,3-c, d)pyrene) and subsurface SWMU material (generated by arsenic, benzo(a)pyrene, and benzo(a)anthracene) are greater than the Tier 1 carcinogenic benchmark.

It is also important to note that, as indicated in Table 18, many of the chemicals in SWMU material were detected at levels greater than their saturation limits in soil including almost all of the organic COPCs in the subsurface SWMU material. In surface SWMU material, representative concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene exceed their saturation limits in soil. In subsurface SWMU material, representative concentrations of

acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluorene, naphthalene, and phenanthrene exceed their saturation limits in soil.

Based on these results, further evaluation may be completed during the Corrective Measures Study (CMS) and could include a Tier 2 assessment or an evaluation of corrective measures. The uncertainties inherent in these conclusions are presented in the Uncertainty Analysis that follows. It should be noted that the grouping of SWMUs P-8, P-74, and P-75 into the Tank Farm SWMU Group might present the greatest uncertainty with this HHRA.

## 3.6 Uncertainty Analysis

There are multiple sources of uncertainty that can be identified for any risk assessment. These include, among others, uncertainty associated with the toxicity criteria used to derive dose-response factors, uncertainties associated with exposure parameters used in the exposure assessment, and uncertainties associated with combining exposure parameters and toxicity criteria to characterize risk.

In the development of any health assessment, some level of uncertainty is introduced each time an assumption is relied upon to describe a dynamic parameter. Some assumptions have a significant scientific basis while others do not, which can result in the selection and use of conservative, default exposure parameters in the exposure assessment. The selection of multiple conservative assumptions in the exposure assessment generally results in an overestimation of potential health risks associated with exposure to specific chemical constituents. The primary areas of uncertainty for this risk assessment are qualitatively discussed below.

### 3.6.1 Exposure Scenarios

The evaluation of exposure scenarios that are not necessarily representative of realistic exposures based on current and future land use creates uncertainty in the overall risk potential of the SWMU and the site. Many of the exposure scenarios evaluated in this risk assessment are not realistic in terms of planned redevelopment for the site. Specifically, evaluation of an indoor future industrial/commercial worker scenario is required for most every SWMU on the Lackawanna site (USEPA 1998). However, given the physical characteristics and current status of the Tank Farm, it is not feasible to construct a building that would result in exposures to

industrial/commercial workers. Construction could not occur without removal of the tanks, potentially changing the media of interest, and possibly chemicals of interest. Thus, for the indoor commercial/industrial worker scenario, the potential elevated risks and hazards identified in this Tier I risk characterization are not truly representative of future exposure to COPCs for the Tank Farm SWMU Group.

### 3.6.2 Site Sampling and Representative Concentrations

The SWMU sampling locations were selected in an attempt to identify the highest concentrations of chemicals at the site. Subsurface VOC sample biasing was accomplished based on visual observations and photoionization detector readings. Thus, the sampling activities are thought to have characterized the most highly VOC-impacted subsurface areas of the SWMU but not an average. This is conservative, as a potential receptor is not expected to remain on, or inhale particulates from, one portion of the SWMU for his or her entire exposure duration. Therefore, it is believed that the maximum concentrations used in this HHRA are likely to represent the true maximum site concentrations, but overstate the average concentrations that are generally considered representative of risk.

It should also be noted that, for many of the COPCs in surface and subsurface SWMU material, the maximum concentration was used as the representative concentration in this HHRA. This was either because there were not enough observations to calculate a 95% UCL, or because the calculated 95% UCL exceeded the maximum concentration. The representative concentrations were used to compare to the RBSLs calculated for this HHRA and ultimately determined the chemicals of potential concern in this HHRA. Use of the maximum concentrations of the biased sampling is a very conservative methodology utilized in this HHRA.

The maximum concentrations of most semivolatile COPCs were greater than the chemicals' saturation limits (Table 18). Thus, as it is conservative to use the maximum concentration, it should still be noted that there is likely free phase solids in surface and subsurface SWMU material. Additionally, the maximum concentrations were used as the representative concentrations for three inorganic COPCs, antimony in surface SWMU material and arsenic and thallium in subsurface SWMU material. These maximum concentrations were estimated results.

### 3.6.3 COPC Selection Process

The COPCs evaluated for the Tank Farm SWMU Group were identified in the Human Health Risk Assessment Interim Deliverable (ID) No. 1 (BSC 1998). These chemicals were selected in part because their representative concentrations exceed Region III RBCs (USEPA 2000a) for residential scenarios. Since no residential exposures are realistic for any of the on-site scenarios, some chemicals that are not likely to pose a potential threat to most of the human receptors have been retained as COPCs and are evaluated here.

### 3.6.4 Grouping of SWMUs P-8, P-74 and P-75

In accordance with ID No. 1, SWMUs P-8, P-74, and P-75 are included in the Tank Farm SWMU Group. As mentioned previously, this is due to their proximity to one another, their similarities in process waste, and amount of samples taken for each SWMU. The Tank Farm SWMU Group originally consisted of seven large (3 to 4 million gallons) tanks and nine smaller tanks. With the exception of three tanks, the majority of the tanks have been dismantled and removed. The tanks were used to store No. 6 fuel oil, various waste oils, and weak ammonia liquor. Although SWMUs P-8, P-74, and P-75 were grouped together for risk assessment purposes according to ID No. 1, there may be variations in the subsurface and surface materials among individual SWMUs, as each tank held different liquids at different times (*e.g.*, Tanks No. 1 and 2 in SWMU P-8 were used to store No. 6 fuel oil and then varying waste oils before being dismantled) and certain surface areas stored wastes (SWMU P-74).

### 3.6.5 Exposure Parameters

Several conservative default exposure parameters (*e.g.*, inhalation rates, exposure frequency, exposure duration) were incorporated into the exposure assessment to define general population behavior. For example, for the industrial/commercial worker scenarios, default exposure parameters are intended to be conservative and representative of an individual who is consistently present at the site 24 hours a day, 250 days a year, in the area of highest concentration. It is more likely that the exposure of an industrial worker to a *particular SWMU* on the Lackawanna site is limited to only a few hours a day, two weeks a year. Most parameters incorporated into the exposure assessment are conservative values and used to define a worst-case

population behavior. The net effect of using multiple conservative exposure assumptions is the overestimation of potential health risks.

Additionally, for a receptor population such as an industrial worker or a resident (*i.e.,* where exposure duration is greater than 250 days/year), exposure frequency typically is corrected in site-specific health risk assessments for the fraction of the year when outdoor exposure to soil will be limited due to severe weather conditions such as snow, ice, rain, and freezing temperatures (USEPA 1989). This factor is called a meteorological factor. Because of the geographical location of the Lackawanna site, a correction factor for weather conditions would be reasonable. In this Tier I human health risk assessment, exposure did not exclude days when the temperature is less than 32°F, when there is snow cover, or the ground was wet from other forms of precipitation. Applying a more realistic exposure frequency and a meteorological factor would result in higher RBSLs.

### 3.6.6 Toxicity Assessment

*Noncarcinogenic Criteria-* Toxicity information for many of the COPCs is limited for humans. Consequently, depending on the quality and extent of toxicity information, varying degrees of uncertainty are associated with the calculated toxicity values. The USEPA derives reference concentrations (RfC; inhalation exposures) and reference doses (RfDo; oral exposures) for chemicals using an uncertainty factor (UF) approach. The uncertainty factor for naphthalene, for instance, is 3000. This was derived by applying a UF of 10 to account for extrapolation of a mouse study to humans, another UF of 10 to account for sensitive humans, another UF of 10 to account for extrapolation from a LOAEL to a NOAEL, and a final UF of 3 to account for lack of an appropriate reproductive study. In general, the procedures used to extrapolate from animals to humans in toxicity studies include a conservative use of uncertainty factors so that potential effects on humans are likely overestimated rather than underestimated. It is widely accepted in the scientific community that low doses of toxicants may be detoxified by any one of several processes present in human organ systems (Ames *et al.* 1987). As a result, humans may not react to the same degree as the population of genetically homogeneous laboratory animal populations used in standard bioassays.

*Carcinogenic Criteria-* USEPA cancer SFs are developed using variations of the Linear Multistage Model (LMS) for carcinogenicity. The LMS is highly conservative as it assumes

linearity between dose and effect to zero dose assuming no threshold for carcinogenicity. However, the human body has mechanisms to detoxify most chemicals particularly at low doses, and therefore, many scientists believe that most, if not all, carcinogens only cause cancer above a "threshold dose."

The carcinogenic COPCs evaluated for the Tank Farm SWMU Group include benzene and arsenic. The inhalation slope factors for benzene and arsenic are based on human data from occupational exposure studies, and thus an extrapolation from animal data is not necessary, thereby reducing the some uncertainty in the slope factors. However, there is significant uncertainty associated with the low-dose extrapolation (environmental exposures are relevant in the low-dose range) used to generate the slope factors. The USEPA has used its default linear model to estimate risks in the low-dose range citing lack of carcinogenic mode of action information. Thus, should this information become available, the low-dose carcinogenic risks for benzene and arsenic may be evaluated differently.

Additionally, the derivation of the slope factor for benzo(a)pyrene has some uncertainty. The oral slope factor for benzo(a)pyrene (7.3 $(mg/kg\text{-}day)^{-1}$) is the geometric mean of four slope factors derived from two rodent feeding studies: Neal and Rigdon (1967), a mouse study and Brune et al. (1981), a rat study. Three of the four values employ the data from the Neal and Ridgon (1967) study. The fourth cancer slope factor estimate was made using the linearized multistage model to calculate the upper 95% confidence interval on the slope in the low does region using the data of Brune et al. (1981). The Neal and Rigdon (1967) study suffers from several study design flaws including dosing regimens and length of observation periods. Thus, in three of its four cancer slope factor estimates, USEPA mathematically manipulated data from a poor animal bioassay that did not conform to the standards of modern toxicology to derive the values. The mouse cancer slope factor was translated into a human cancer slope factor but there are no studies showing that ingestion of PAHs can cause cancer in humans. This slope factor is also used with adjustments for six other carcinogenic PAHs.

*Absence of Inhalation Toxicity Criteria* - Although toxicity information is generally available for the most significant chemicals and exposure routes in this HHRA, there were some volatile COPCs in this HHRA for which no inhalation toxicity criteria (RfDs or cancer slope factors) exist. In the absence of data, either the oral RfD or oral SF was used to evaluate inhalation exposures. The letter "R" in Table 20 notes these instances. It is more conservative to

evaluate these chemicals for inhalation exposures than to not evaluate them at all. Thus, this method potentially overestimates inhalation risks for COPCs evaluated as such. This uncertainty is not applicable for those inhalation toxicity criteria for the COPCs that showed exceedances of their Tier 1 RBSLs [benzene, naphthalene, arsenic, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene] at the Tank Farm SWMU Group.

### 3.6.7 Risk Characterization

The development of an RBSL for lead, based on pharmacokinetic modeling (the USEPA Adult Lead Model) is inherently uncertain. These uncertainties relate to whether the model is capable of fully accounting for all significant variables that affect blood lead levels and whether selected input values, that cannot be measured, are accurate, especially for future, hypothetical populations. In addition, the use of this model for the trespasser is highly uncertain since it is not known whether an adolescent (who is not pregnant) is more sensitive to the effects of lead than the developing fetus of a pregnant adolescent.

Uncertainties in the risk characterization portion of the risk assessment for the site are a combination of the uncertainties associated with both the dose-response assessment and the exposure assessment. As discussed above, the assumptions and parameters used for both the dose-response and exposure assessments are extremely conservative. In addition, since the toxicity criteria and exposure parameters are combined in the risk characterization, the conservatism is compounded.

### 3.6.8 Uncertainty Analysis Summary

This Tier I HHRA includes uncertainties and conservative assumptions that, in general, effectively combine to overestimate the potential current and future exposures. The major sources of uncertainty contributing to the conservatisms in this HHRA are summarized below:

- Evaluation of an indoor industrial/commercial worker scenario
- Biased SWMU sample collection
- Use of maximum concentrations as representative concentrations
- Grouping of SWMUs into Tank Farm SWMU Group

- Compounding effect of multiple conservative exposure parameters
- No meteorological factor adjustment
- Confidence in toxicity criteria

The net effect of the uncertainties of this HHRA is the generation of risk and hazard estimates that probably far exceed any true exposure conditions that currently exist or which could possibly exist in the future.

## 4.0 CONTAINMENT

There is no engineered liners or covers for any of the SWMUs in the Tank Farm Group. However, surface run-off within the Tank Farm area is generally prevented from leaving the area by the berms and elevated roadways that surround the unit. The surface water run-off contained within the Tank Farm would eventually evaporate or infiltrate the surface. One exception to surface water containment was noted, however, during a site inspection in September 1996 by Dames and Moore. The inspection found evidence that precipitation falling within the bermed areas remains there except at the southeastern corner of the Tank Farm. At this location, there was evidence of surface water runoff leaving the Tank Farm area via a break in the berm. Observations of this area, however, revealed that the runoff was contained to areas immediately surrounding the Tank Farm where it would either evaporate or eventually infiltrate the surface.

## 5.0 CONCLUSION

Based on review of the data the following conclusions can be made:

- Although most waste characterization analysis indicated the Tank Farm materials did not meet TCLP criteria, TCLP results from one sample obtained from P-75 contained detectable levels of benzene above TCLP criteria.

- Total constituent analysis of samples obtained from borings performed within limits of SWMU P-74, P-75, and P8 detected several VOCs, SVOCs, and metals.

- SPLP results detected VOCs, SVOCs, metals and cyanide, although the number of detected analytes was smaller than the number detected in the Total Constituent analysis.

- Groundwater analytical data indicates the materials within the Tank Farm area are likely to be contributing to constituent concentrations in groundwater. The compounds detected in the groundwater were detected in the SWMU soil samples SPLP extracts. In addition, VOCs and SVOCs detected in the downgradient wells were not detected in the upgradient wells.

- For the future commercial/industrial worker scenario, the calculated noncarcinogenic hazard index for antimony and arsenic in surface SWMU material, and benzene and naphthalene in subsurface SWMU material (ambient and indoor vapor inhalation) are greater than the Tier 1 noncarcinogenic benchmark . Also for this scenario, the calculated risk levels for benzene in subsurface soil and arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-c,d)pyrene in surface SWMU material is greater than the Tier 1 carcinogenic risk benchmark.

- For the future construction worker and utility/maintenance worker scenarios, the calculated hazard level for naphthalene in subsurface SMWU material is greater than the Tier 1 noncarcinogenic benchmark. Also for the future construction worker scenario, the calculated risk levels for direct contact with surficial SWMU material (generated by arsenic, benzo(a)pyrene, benzo(a)anthracene, dibenz(a,h)anthracene,

benzo(b)fluoranthene and indeno (1,2,3-c, d) pyrene) and subsurface SWMU material (generated by arsenic, benzo(a)pyrene, benzo(a)anthracene and naphthalene) are greater than the Tier 1 carcinogenic benchmarks.

- Many of the chemicals in SWMU material are found at levels greater than the chemical's saturation limits in soil including all of the COPCs in the subsurface SWMU material. In surface SWMU material, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene exceed their saturation limits in soil. In subsurface SWMU material, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, fluorene, naphthalene and phenanthrene exceed their saturation limits in soil.

Based on these results, further evaluation may be completed during the CMS and could include a Tier 2 assessment or an evaluation of corrective measures.

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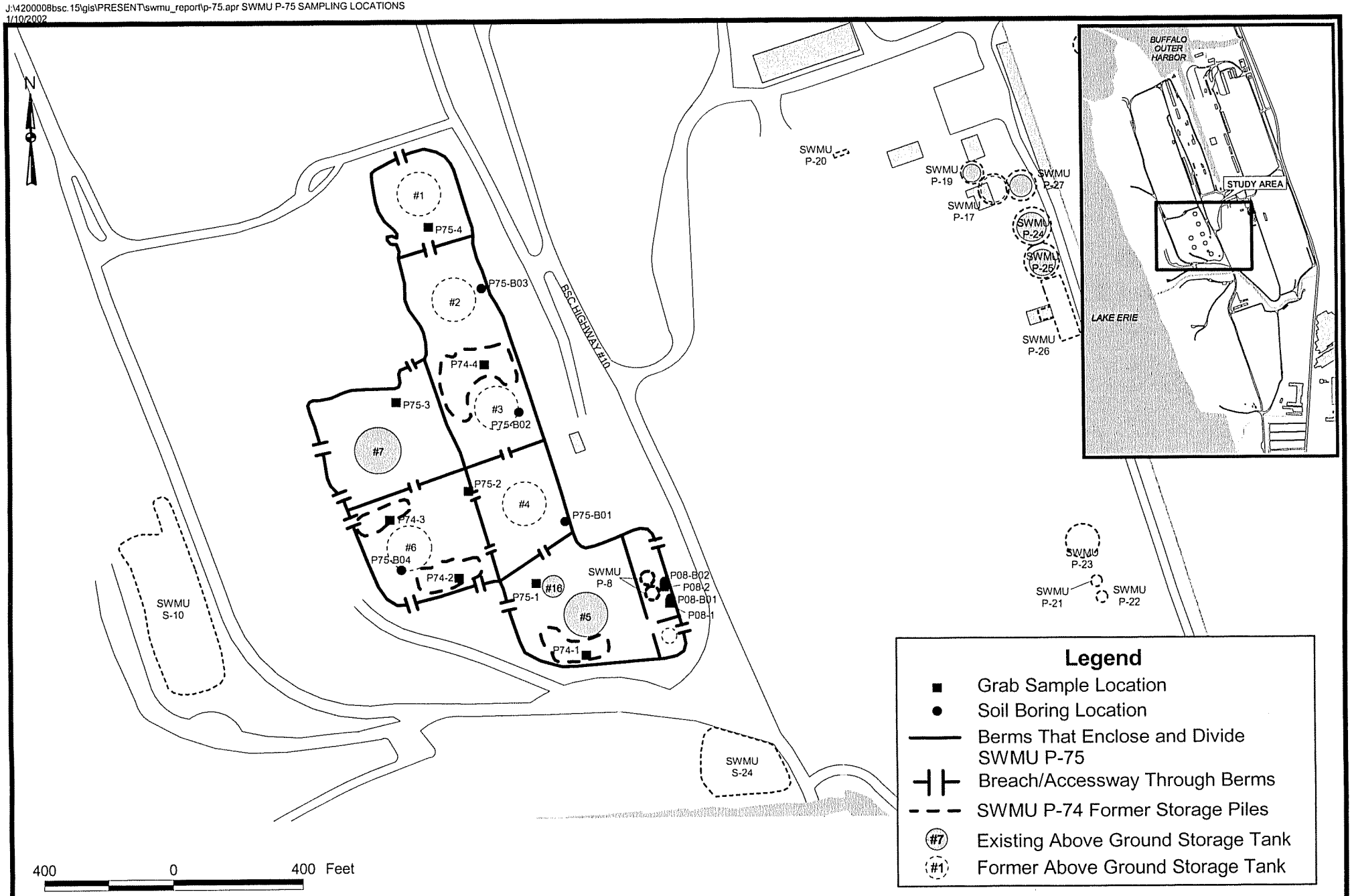
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J:\420008bsc.15\gis\PRESENT\swmu_report\p-75.apr SWMU P-75 SAMPLING LOCATIONS
1/10/2002

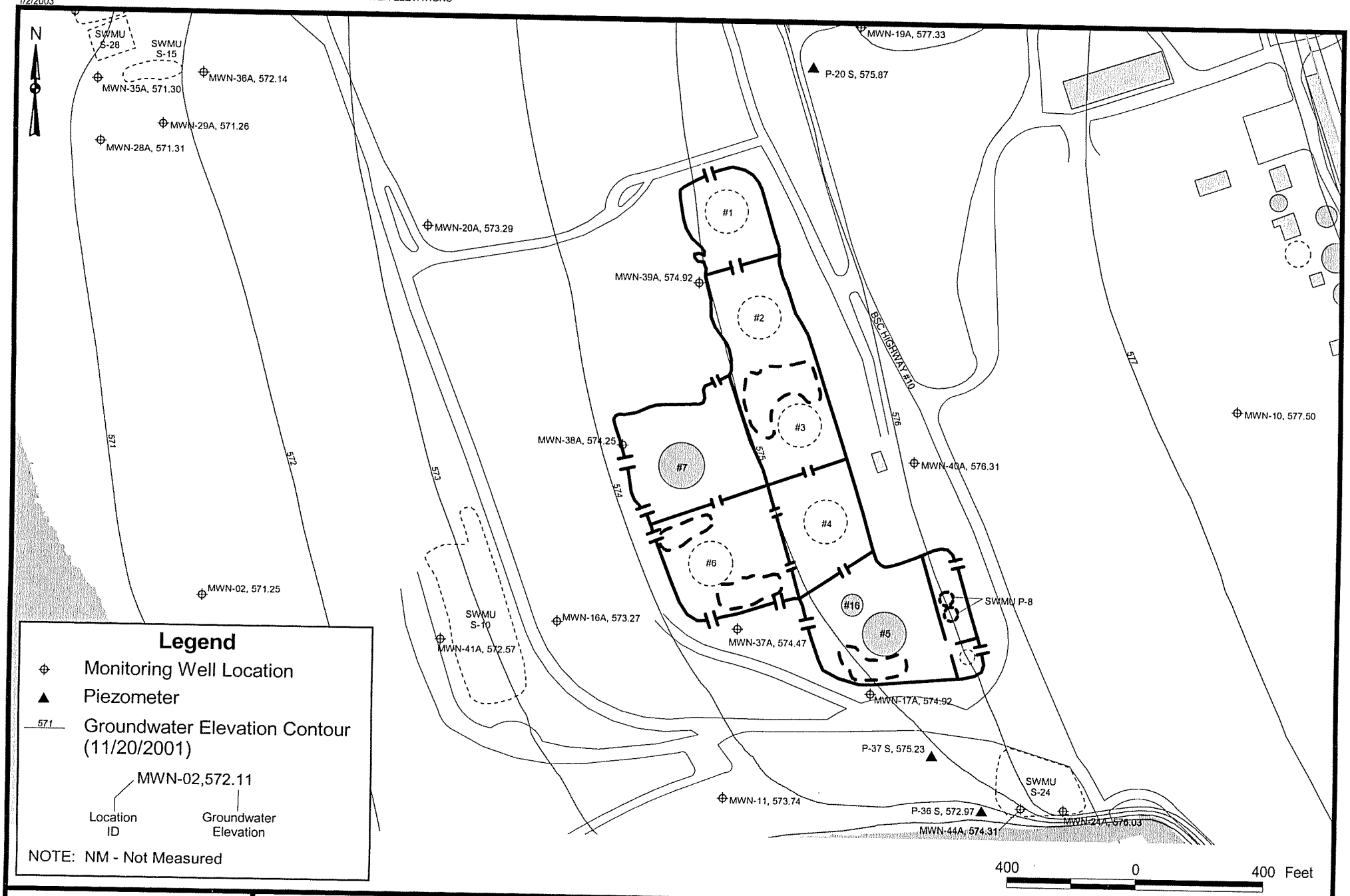



URS

BETHLEHEM STEEL CORPORATION
TANK FARM GROUP SAMPLE LOCATIONS

FIGURE 1

N:\11172630.00000\GIS\PRESENT\swmu_report\p-75.apr 11/01 FILL GROUNDWATER ELEVATIONS
1/2/2003

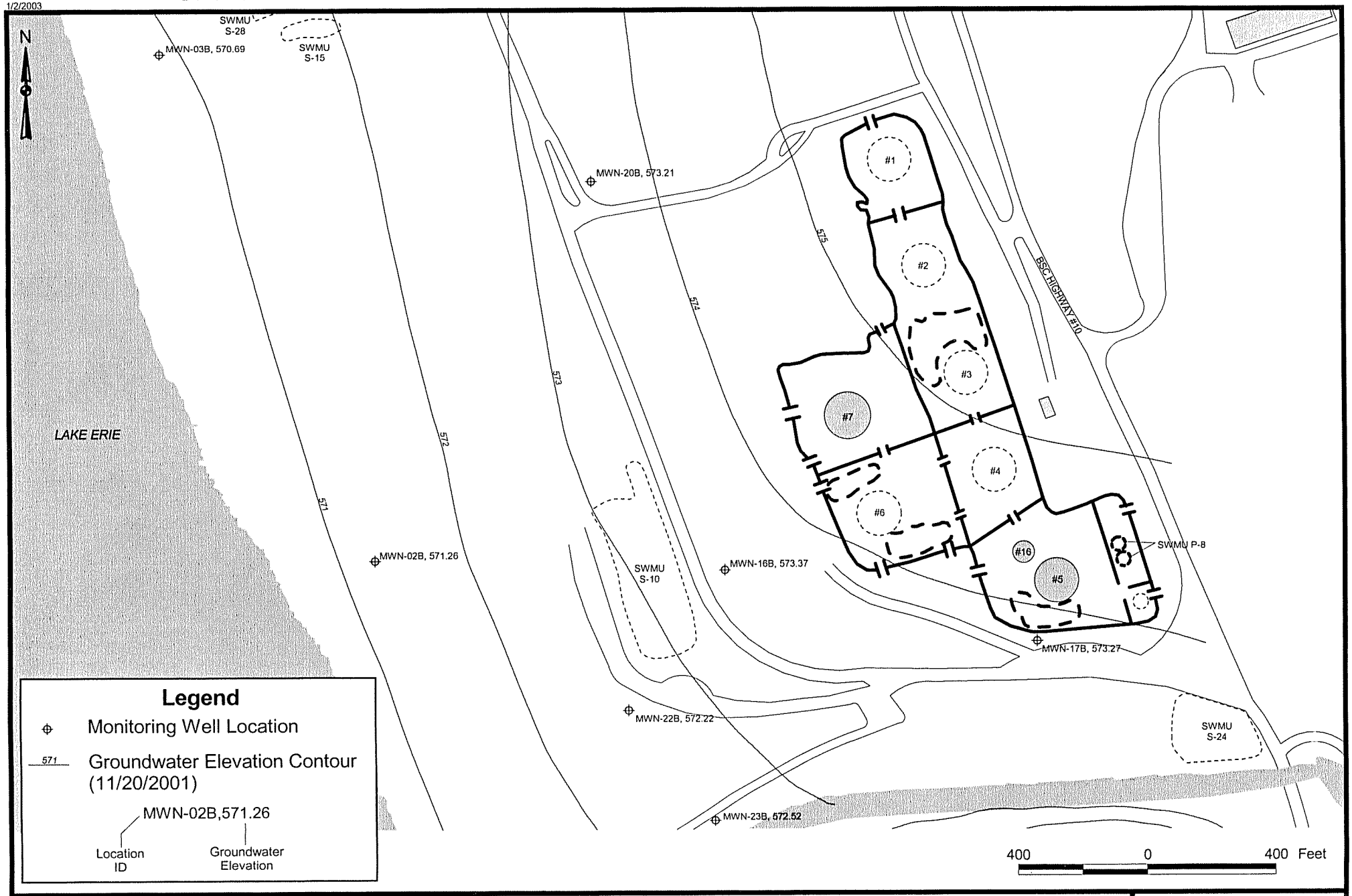



URS

BETHLEHEM STEEL CORPORATION
MONITORING WELL/PIEZOMETER LOCATION MAP WITH GROUNDWATER ELEVATION CONTOURS (FILL UNIT)

FIGURE 2

N:\11172630.00000\GIS\PRESENT\swmu_report\p-75.apr 11/01 SAND GROUNDWATER ELEVATIONS
1/2/2003




URS

BETHLEHEM STEEL CORPORATION
MONITORING WELL LOCATION MAP WITH GROUNDWATER ELEVATION CONTOURS (SAND UNIT)

FIGURE 3

# TABLE 1
## SITE-SPECIFIC HAZARDOUS CONSTITUENTS AND INDICATOR PARAMETERS

| PARAMETER | | |
|---|---|---|
| **Volatile Organic Compounds** | **Semivolatile Organic Compounds** | **Metals** |
| Acrylonitrile | Acenaphthylene | Antimony |
| Benzene* | Anthracene | Arsenic |
| Bromochloromethane | Benzo(a)Anthracene | Barium |
| Bromodichloromethane | Benzo(a)Pyrene | Cadmium |
| Bromoform | Butyl benzyl phthalate | Calcium |
| Bromomethane | 4-Chloro-3-Methylphenol | Chromium* |
| Carbon tetrachloride | bis(2-Chloroethyl)ether | Lead* |
| Chlorobenzene | 2-Chloronaphthalene | Magnesium |
| Chloroethane | Chrysene | Mercury |
| 2-Chloroethyl vinyl ether | 1,2-Dichlorobenzene | Nickel |
| Chloroform | 1,3-Dichlorobenzene | Potassium |
| Chloromethane | 1,4-Dichlorobenzene | Selenium |
| Dibromochloromethane | Di-n-butyl phthalate | Silver |
| Dichlorodifluoromethane | Di-n-octyl phthalate | Sodium |
| 1,1-Dichloroethane | 2,4-Dichlorophenol | Thallium |
| 1,2-Dichloroethane | Diethyl phthalate | |
| 1,1-Dichloroethene | Dimethyl phthalate | |
| trans-1,2-Dichloroethene | 2,4-Dimethylphenol | **Indicator Parameters** |
| 1,2-Dichloropropane | 4,6-Dinitro-2-Methylphenol | Alkalinity (CaCO3 to pH 4.5) |
| cis-1,3-Dichloropropene | 2,4-Dinitrotoluene | Alkalinity Total |
| trans-1,3-Dichloropropene | 2,6-Dinitrotoluene | Chloride |
| Ethylbenzene | bis(2-Ethylhexyl)Phthalate | Cyanide |
| Methylene chloride | Fluoranthene | Sulfate |
| 1,1,1,2-Tetrachloroethane | Fluorene | Total Organic Carbon |
| 1,1,2,2-Tetrachloroethane | Hexachlorobenzene | Total Dissolved Solids |
| Tetrachloroethene | Hexachlorobutadiene | Total Organic Halogens |
| Toluene | Hexachlorocyclopentadiene | Total Recoverable Phenolics |
| 1,1,1-Trichloroethane | Hexachloroethane | |
| 1,1,2-Trichloroethane | Isophorone | |
| Trichloroethene | 3-Methylphenol & 4-Methylphenol | |
| Trichlorofluoromethane | 2-Methylphenol | |
| Vinyl chloride | Naphthalene* | |
| Xylenes, Total | Pentachlorophenol | |
| | Phenanthrene | |
| | Phenol | |
| | Pyrene | |
| | Pyridine | |
| | 2,3,4,6-Tetrachlorophenol | |
| | 1,2,4-Trichlorobenzene | |
| | 2,4,5-Trichlorophenol | |
| | 2,4,6-Trichlorophenol | |

Notes:

* Benzene, chromium, lead, naphthalene, and phenolic compounds represent hazardous metals and organic compounds that are generally prevalent in iron and steel industry wastes and which have been found at varying levels during previous groundwater monitoring studies at the Lackawanna site. These pollutants were also selected by EPA for regulation under 40 CFR 420 (EPA's effluent limitations specific for the iron and steel manufacturing point source category) and cover each major family of hazardous constituents—chromium and lead for metals; benzenes for volatile organics; naphthalene for base/neutral semi-volatile organics; and phenolics for acid extractable semi-volatile organics.

# DATA VALIDATION QUALIFYING FLAGS

U – Compound was analyzed for but not detected above the sample quantitation limit

J – Analyte was positively identified; associated numerical value is an approximation of the analyte concentration

N – Analysis indicates the presence of an analyte for which there is presumed evidence to make a tentative identification

NJ – Analysis indicates the presence of an analyte that has been " tentatively identified" and the numerical value represents the approximate concentration

UJ – Analyte was not detected above the reported samples quantitation limit; associated numerical value is an approximation of the quantitation limit

B – Metals only: The analyte was detected above instrument detection limits (IDL); the reported concentration is below the contract required detection limit (CRDL)

R – Sample results are rejected due to serious deficiencies in ability to analyze the sample and meet quality control criteria

D – The sample results are reported from a secondary dilution analysis.

Data validation qualifying flags are used in conjunction with reason codes summarized below.

| Organics | Metals |
|---|---|
| c – Calibration failure; poor or unstable response | a – Analytical sequence deficiency or omission |
| d – Matrix spike/matrix spike duplicate imprecision | c – Calibration verification failure |
| e – Laboratory duplicate control sample imprecision | d – Matrix duplicate imprecision |
| f – Field replicate or duplicate imprecision | e – Laboratory duplicate control sample imprecision |
| g – Poor chromatography | f – Field replicate or duplicate imprecision |
| h – Holding time violation | h – Holding time violation |
| i – Internal standard failure | k – Serial dilution imprecision |
| j – Poor mass spectrographic performance | l – Laboratory control sample recovery failure |
| l – Laboratory control sample recovery failure | m – Matrix spike recovery failure |
| m – Matrix spike/matrix spike duplicate recovery failure | n- Interference check sample recovery failure |
| r – Linearity failure in initial calibration | o – Calibration blank contamination |
| s – Surrogate spike recovery failure | p – Preparation blank contamination |
| t – Instrument tuning failure | r – Linearity failure in calibration or MSA analysis |
| w – Relative retention time failure | v – Post digestion spike failure |
| x – Field blank contamination | x – Field blank contamination |
| y – Trip blank contamination | z – Laboratory storage blank contamination |
| z – Method blank contamination | Q – Other – total/dissolved imprecision |
| Q - Other | -- |

Note: NA – Not analyzed for that compound

# TABLE 2
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-8 PHASE IIC SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P08-1 | P08-2 |
|---|---|---|---|
| Sample ID | | P08-1 | P08-2 |
| Matrix | | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/14/95 | 02/14/95 |
| Parameter | Units | | |
| **Volatile Organic Compounds** | | | |
| Benzene | UG/KG | 8.9 J,i | 9.7 J,i |
| Carbon disulfide | UG/KG | 7.6 UR,i | 5.9 J |
| Dichlorodifluoromethane | UG/KG | 15 UR,i | 52 |
| Ethylbenzene | UG/KG | 7.6 UR,i | 2.9 J,i |
| Methylene chloride | UG/KG | 48 J,i | 65 |
| Toluene | UG/KG | 35 J,i | 24 J,i |
| Trichlorofluoromethane | UG/KG | 7.6 UR,i | 25 |
| Xylenes, Total | UG/KG | 51 J,i | 15 J,i |
| **Semivolatile Organic Compounds** | | | |
| Acenaphthene | UG/KG | 2,300 J | 97,000 |
| Acenaphthylene | UG/KG | 7,300 J | 12,000 J |
| Anthracene | UG/KG | 31,000 | 87,000 |
| Benzo(a)anthracene | UG/KG | 47,000 | 86,000 |
| Benzo(a)pyrene | UG/KG | 31,000 | 44,000 J |
| Benzo(b)fluoranthene | UG/KG | 29,000 | 55,000 |
| Benzo(ghi)perylene | UG/KG | 13,000 | 44,000 J |
| Benzo(k)fluoranthene | UG/KG | 26,000 | 36,000 J |
| Chrysene | UG/KG | 39,000 | 95,000 |
| Dibenz(a,h)anthracene | UG/KG | 3,000 J | 11,000 J |
| Fluoranthene | UG/KG | 100,000 | 210,000 |
| Fluorene | UG/KG | 12,000 | 64,000 |
| Indeno(1,2,3-cd)pyrene | UG/KG | 16,000 | 28,000 J |
| Naphthalene | UG/KG | 11,000 | 67,000 |
| Phenanthrene | UG/KG | 79,000 | 170,000 J |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 2
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-8 PHASE IIC SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P08-1 | P08-2 |
|---|---|---|---|
| Sample ID | | P08-1 | P08-2 |
| Matrix | | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/14/95 | 02/14/95 |
| Parameter | Units | | |
| **Semivolatile Organic Compounds** | | | |
| Pyrene | UG/KG | 78,000 | 200,000 |
| **Semivolatile Organic Compounds - SPLP** | | | |
| Anthracene -SPLP | MG/L | 0.020 U | 0.003 J |
| **Metals** | | | |
| Antimony | MG/KG | 9.1 UJ,c | 30.3 J,c |
| Arsenic | MG/KG | 4.2 J,k | 43.8 J,k |
| Barium | MG/KG | 30.3 U | 54.4 |
| Cadmium | MG/KG | 0.76 UJ,c | 1.3 J,c |
| Calcium | MG/KG | 2,480 J,m | 26,500 J,m |
| Chromium | MG/KG | 11 J,m | 113 J,m |
| Lead | MG/KG | 24.1 J,k | 960 J,k |
| Mercury | MG/KG | 0.15 U | 22.9 J,c |
| Nickel | MG/KG | 6.1 UJ,m | 26.9 J,m |
| **Metals-SPLP** | | | |
| Calcium -SPLP | MG/L | 23.7 | 28.9 |
| Chromium -SPLP | MG/L | 0.010 U | 0.02 |
| Lead -SPLP | MG/L | 0.008 J,c | 0.0032 J,c |
| **General Chemistry Parameters** | | | |
| Chloride | MG/KG | 19 | 22 |
| Cyanide | MG/KG | 3.8 U | 123 |
| PHSOL | S.U. | 8.1 J,h | 11.9 J,h |
| Total Organic Carbon | MG/KG | 25,500 | 147,000 |
| Total Organic Halogens | MG/KG | 272 | 43.9 |
| Total Recoverable Phenolics | MG/KG | 2.6 | 18.2 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-74 PHASE IIC SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P74-1 | P74-2 | P74-3 | P74-4 |
|---|---|---|---|---|---|
| Sample ID | | P74-1 | P74-2 | P74-3 | P74-4 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/10/95 | 02/10/95 | 02/10/95 | 02/10/95 |
| Parameter | Units | | | | |
| **Volatile Organic Compounds** | | | | | |
| Benzene | UG/KG | 20 J | 6.0 U | 5.5 U | 6.0 U |
| Ethylbenzene | UG/KG | 27 J | 6.0 U | 5.5 UJ,i | 6.0 U |
| Methylene chloride | UG/KG | 56 UJ,z | 11 J,s | 15 J,i | 6.1 J |
| Toluene | UG/KG | 180 | 5.3 J,s | 9.9 J,i | 14 |
| Trichlorofluoromethane | UG/KG | 28 U | 3.5 J,s | 5.5 UJ,i | 6.0 U |
| Xylenes, Total | UG/KG | 470 | 6.0 U | 5.5 UJ,i | 10 |
| **Semivolatile Organic Compounds** | | | | | |
| Acenaphthene | UG/KG | 10,000 J | 1,600 U | 36,000 U | 10,000 J |
| Acenaphthylene | UG/KG | 20,000 J | 500 J | 36,000 U | 8,400 J |
| Anthracene | UG/KG | 56,000 | 2,000 | 8,800 J | 32,000 J |
| Benzo(a)anthracene | UG/KG | 230,000 | 6,400 | 49,000 | 100,000 |
| Benzo(a)pyrene | UG/KG | 160,000 | 4,400 | 120,000 | 240,000 |
| Benzo(b)fluoranthene | UG/KG | 210,000 | 4,700 | 150,000 | 220,000 |
| Benzo(ghi)perylene | UG/KG | 110,000 | 3,500 | 86,000 | 210,000 |
| Benzo(k)fluoranthene | UG/KG | 320,000 | 5,600 | 92,000 | 230,000 |
| Chrysene | UG/KG | 160,000 | 5,700 | 52,000 J,c | 99,000 |
| Dibenz(a,h)anthracene | UG/KG | 27,000 J | 910 J | 18,000 J | 49,000 |
| Fluoranthene | UG/KG | 360,000 | 12,000 | 69,000 | 190,000 |
| Fluorene | UG/KG | 55,000 | 1,100 J | 8,800 J | 20,000 J |
| Indeno(1,2,3-cd)pyrene | UG/KG | 170,000 | 4,100 | 85,000 | 260,000 |
| Naphthalene | UG/KG | 84,000 | 1,600 | 44,000 | 31,000 J |
| Phenanthrene | UG/KG | 180,000 | 7,700 | 34,000 J | 90,000 |
| Pyrene | UG/KG | 520,000 | 9,700 | 130,000 | 320,000 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-74 PHASE IIC SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P74-1 | P74-2 | P74-3 | P74-4 |
|---|---|---|---|---|---|
| Sample ID | | P74-1 | P74-2 | P74-3 | P74-4 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/10/95 | 02/10/95 | 02/10/95 | 02/10/95 |
| Parameter | Units | | | | |
| **Semivolatile Organic Compounds - SPLP** | | | | | |
| Benzo(b)fluoranthene -SPLP | MG/L | 0.007 J | 0.010 U | 0.003 J | 0.005 J |
| Chrysene -SPLP | MG/L | 0.010 U | 0.010 U | 0.010 U | 0.004 J |
| Fluoranthene -SPLP | MG/L | 0.005 J | 0.010 U | 0.010 U | 0.008 J |
| Naphthalene -SPLP | MG/L | 0.010 U | 0.010 U | 0.010 U | 0.003 J |
| Phenol -SPLP | MG/L | 0.010 U | 0.010 U | 0.010 U | 0.003 J |
| Pyrene -SPLP | MG/L | 0.011 | 0.010 U | 0.004 J | 0.01 |
| **Metals** | | | | | |
| Antimony | MG/KG | 8.9 J,m | 42.4 J,m | 10.1 J,m | 24 J,m |
| Arsenic | MG/KG | 9.5 J,m | 90.3 J,m | 11.5 J,m | 35 J,m |
| Barium | MG/KG | 87.1 | 84.5 | 62.3 | 119 |
| Cadmium | MG/KG | 0.56 UJ,m | 4.7 J,m | 0.64 J,m | 2 J,m |
| Calcium | MG/KG | 7,560 J,k | 34,600 J,k | 47,400 J,k | 43,700 J,k |
| Chromium | MG/KG | 27.7 J,m | 66 J,m | 797 J,m | 71.7 J,m |
| Lead | MG/KG | 138 J,k | 200 J,k | 90.5 J,k | 59.8 J,k |
| Mercury | MG/KG | 10.5 | 0.92 | 6.2 | 1.6 |
| Nickel | MG/KG | 16.4 | 12.7 | 13.4 | 10.7 |
| Potassium | MG/KG | 564 U | 631 | 549 U | 617 |
| **Metals-SPLP** | | | | | |
| Arsenic -SPLP | MG/L | 0.010 U | 0.044 | 0.010 U | 0.010 U |
| Calcium -SPLP | MG/L | 11.2 | 11.5 | 12.2 | 11.8 |
| Lead -SPLP | MG/L | 0.005 | 0.02 | 0.0030 U | 0.0030 U |
| Selenium -SPLP | MG/L | 0.0050 U | 0.0053 | 0.0050 U | 0.0050 U |
| **General Chemistry Parameters** | | | | | |
| Chloride | MG/KG | 42.3 | 16.6 | 17.4 | 7.6 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 3
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-74 PHASE IIC SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P74-1 | P74-2 | P74-3 | P74-4 |
|---|---|---|---|---|---|
| Sample ID | | P74-1 | P74-2 | P74-3 | P74-4 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/10/95 | 02/10/95 | 02/10/95 | 02/10/95 |
| Parameter | Units | | | | |
| General Chemistry Parameters | | | | | |
| Cyanide | MG/KG | 2.8 U | 6.8 | 4.6 | 3.0 U |
| PHSOL | S.U. | 8 J,h | 8.6 J,h | 7.8 J,h | 8 J,h |
| Sulfate | MG/KG | 56.4 U | 120 U | 79.8 | 59.7 U |
| Total Organic Carbon | MG/KG | 122,000 | 43,600 | 101,000 | 112,000 |
| Total Organic Halogens | MG/KG | 611 | 254 | 473 | 306 |
| Total Recoverable Phenolics | MG/KG | 7.7 | 0.030 U | 5.3 | 12.2 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 PHASE IIC SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-1 | P75-2 | P75-2 | P75-3 | P75-4 |
|---|---|---|---|---|---|---|
| Sample ID | | P75-1 | P75-2 | P75-2 (DUP) | P75-3 | P75-4 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/14/95 | 02/14/95 | 02/14/95 | 02/14/95 | 02/14/95 |
| Parameter | Units | | | FIELD DUPLICATE (1-1) | | |
| **Volatile Organic Compounds** | | | | | | |
| Benzene | UG/KG | 10 J,s | 6.1 U | 3.4 J,s | 20 J,s | 6.4 U |
| Dichlorodifluoromethane | UG/KG | 73 J,s | 21 J,s | 51 J,s | 27 R,I | 13 U |
| Ethylbenzene | UG/KG | 6.1 UR,i | 6.1 UJ,i | 5.9 UJ,i | 3.9 J,s | 6.4 UJ,i |
| Methylene chloride | UG/KG | 58 J,s | 45 J,s | 79 J,s | 43 J,s | 38 |
| Toluene | UG/KG | 33 J,s | 19 J,s | 28 J,s | 53 J,s | 5.1 J,i |
| Trichlorofluoromethane | UG/KG | 50 J,s | 29 J,s | 36 J,s | 33 J,s | 6.4 U |
| Xylenes, Total | UG/KG | 8.3 J,s | 6.1 UJ,i | 5.9 UJ,i | 19 J,s | 6.4 UJ,i |
| **Semivolatile Organic Compounds** | | | | | | |
| Acenaphthene | UG/KG | 16,000 U | 40,000 U | 39,000 U | 18,000 J | 420 U |
| Acenaphthylene | UG/KG | 16,000 U | 40,000 U | 39,000 U | 42,000 J | 420 U |
| Anthracene | UG/KG | 7,000 J | 8,600 J | 11,000 J | 89,000 | 420 U |
| Benzo(a)anthracene | UG/KG | 33,000 | 51,000 | 47,000 | 310,000 | 240 J |
| Benzo(a)pyrene | UG/KG | 35,000 | 82,000 | 79,000 | 400,000 | 310 J |
| Benzo(b)fluoranthene | UG/KG | 56,000 | 130,000 | 120,000 J | 640,000 | 470 |
| Benzo(ghi)perylene | UG/KG | 33,000 | 62,000 | 62,000 | 380,000 | 380 J |
| Benzo(k)fluoranthene | UG/KG | 35,000 | 44,000 | 45,000 | 220,000 | 160 J |
| Chrysene | UG/KG | 39,000 | 58,000 | 57,000 | 330,000 | 270 J |
| Di-n-butyl phthalate | UG/KG | 16,000 U | 40,000 U | 39,000 U | 57,000 U | 220 J |
| Dibenz(a,h)anthracene | UG/KG | 9,300 J | 13,000 J | 13,000 J | 89,000 | 93 J |
| bis(2-Ethylhexyl)phthalate | UG/KG | 16,000 U | 40,000 U | 39,000 U | 57,000 U | 150 J |
| Fluoranthene | UG/KG | 50,000 | 65,000 | 67,000 | 540,000 | 240 J |
| Fluorene | UG/KG | 16,000 U | 40,000 U | 39,000 U | 43,000 J | 420 U |
| Indeno(1,2,3-cd)pyrene | UG/KG | 43,000 | 78,000 | 80,000 | 400,000 | 380 J |
| Naphthalene | UG/KG | 14,000 J | 29,000 J | 36,000 J | 62,000 | 98 J |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 4
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 PHASE IIC SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-1 | P75-2 | P75-2 | P75-3 | P75-4 |
|---|---|---|---|---|---|---|
| Sample ID | | P75-1 | P75-2 | P75-2 (DUP) | P75-3 | P75-4 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | 02/14/95 | 02/14/95 | 02/14/95 | 02/14/95 | 02/14/95 |
| Parameter | Units | | | FIELD DUPLICATE (1-1) | | |
| **Semivolatile Organic Compounds** | | | | | | |
| Phenanthrene | UG/KG | 17,000 | 32,000 J | 31,000 J | 350,000 | 230 J |
| Pyrene | UG/KG | 64,000 | 130,000 | 120,000 | 750,000 | 250 J |
| **Metals** | | | | | | |
| Antimony | MG/KG | 7.3 UJ,c | 9.5 J,c | 11.3 J,c | 11.1 J,c | 80.8 J,c |
| Arsenic | MG/KG | 18.7 J,k | 13.2 J,k | 15 J,c | 23.2 J,k | 71.2 J,k |
| Barium | MG/KG | 61.2 | 115 | 109 | 70.2 | 76.8 |
| Calcium | MG/KG | 21,000 J,m | 9,680 J,m | 10,800 J,m | 12,600 J,m | 31,200 J,m |
| Chromium | MG/KG | 32.2 J,m | 28.5 J,m | 54.4 J,m | 49.1 J,m | 13.5 J,m |
| Lead | MG/KG | 134 J,k | 95.2 J,k | 85.4 J,k | 90.5 J,k | 56.8 J,k |
| Mercury | MG/KG | 9.1 J,c | 5.1 J,c | 1.6 J,c | 2.7 J,c | 0.13 U |
| Nickel | MG/KG | 13.7 J,m | 11.1 J,m | 11.3 J,m | 15 J,m | 5.1 UJ,m |
| Potassium | MG/KG | 611 U | 612 U | 589 U | 571 U | 854 |
| **Metals-SPLP** | | | | | | |
| Arsenic -SPLP | MG/L | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.014 |
| Calcium -SPLP | MG/L | 29 | 21.7 | 23.4 | 28.2 | 20.8 |
| Lead -SPLP | MG/L | 0.0030 UJ,c | 0.0030 UJ,c | 0.0030 UJ,c | 0.004 J,c | 0.0030 UJ,c |
| **General Chemistry Parameters** | | | | | | |
| Chloride | MG/KG | 9.8 | 9 | 8.1 | 16.2 | 27.9 |
| Cyanide | MG/KG | 4.2 | 3.1 U | 3.6 | 3.9 | 3.2 U |
| PHSOL | S.U. | 9.1 J,h | 8.9 J,h | 8.2 J,h | 8.6 J,h | 8.4 J,h |
| Sulfate | MG/KG | 69.7 | 69.8 | 78.1 | 85.1 | 127 U |
| Total Organic Carbon | MG/KG | 132,000 | 101,000 | 101,000 | 67,900 | 14,800 |
| Total Organic Halogens | MG/KG | 389 | 411 | 325 | 337 | 190 |
| Total Recoverable Phenolics | MG/KG | 2 | 5.3 | 7 | 12 | 0.032 U |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 5
## SUMMARY OF DETECTED TCLP RESULTS
## SWMU P-8 PHASE IIC SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | | P08-1 | P08-2 |
|---|---|---|---|---|
| Sample ID | | | P08-1 | P08-2 |
| Matrix | | | Soil | Soil |
| Depth Interval (ft) | | | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | | 02/14/95 | 02/14/95 |
| **Parameter** | **Units** | **Criteria*** | | |
| **Volatile Organic Compounds - TCLP** | | | | |
| Methylene chloride -TCLP | MG/L | - | 0.010 UJ,c | 0.009 J,c |
| **Semivolatile Organic Compounds - TCLP** | | | | |
| Acenaphthylene -TCLP | MG/L | - | 0.004 J | 0.020 U |
| Fluorene -TCLP | MG/L | - | 0.003 J | 0.020 U |
| 3-Methylphenol & 4-Methylphenol - TCLP | MG/L | 200 | 0.002 J | 0.020 U |
| Naphthalene -TCLP | MG/L | - | 0.02 | 0.014 J |
| Phenanthrene -TCLP | MG/L | - | 0.004 J | 0.020 U |
| Phenol -TCLP | MG/L | - | 0.002 J | 0.006 J |
| **Metals-TCLP** | | | | |
| Cadmium -TCLP | MG/L | 1 | 0.0050 U | 0.02 |
| Calcium -TCLP | MG/L | - | 54.1 | 462 |
| Chromium -TCLP | MG/L | 5 | 0.010 U | 0.016 |
| Lead -TCLP | MG/L | 5 | 0.013 | 0.0030 U |
| Potassium -TCLP | MG/L | - | 5.0 U | 6.3 |
| Selenium -TCLP | MG/L | 1 | 0.01 | 0.011 |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 6
# SUMMARY OF DETECTED TCLP RESULTS
# SWMU P-74 PHASE IIC SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | | P74-1 | P74-2 | P74-3 | P74-4 |
|---|---|---|---|---|---|---|
| Sample ID | | | P74-1 | P74-2 | P74-3 | P74-4 |
| Matrix | | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | | 02/10/95 | 02/10/95 | 02/10/95 | 02/10/95 |
| Parameter | Units | Criteria* | | | | |
| **Semivolatile Organic Compounds - TCLP** | | | | | | |
| Acenaphthene -TCLP | MG/L | - | 0.006 J | 0.020 U | 0.020 U | 0.020 U |
| Benzo(a)pyrene -TCLP | MG/L | - | 0.005 J | 0.020 U | 0.020 U | 0.020 U |
| Benzo(b)fluoranthene -TCLP | MG/L | - | 0.013 J | 0.020 U | 0.020 U | 0.020 U |
| Chrysene -TCLP | MG/L | - | 0.008 J | 0.020 U | 0.020 U | 0.020 U |
| Fluoranthene -TCLP | MG/L | - | 0.018 J | 0.020 U | 0.020 U | 0.005 J |
| Fluorene -TCLP | MG/L | - | 0.005 J | 0.020 U | 0.020 U | 0.020 U |
| 3-Methylphenol & 4-Methylphenol - TCLP | MG/L | 200 | 0.009 J | 0.020 U | 0.020 U | 0.020 U |
| 2-Methylphenol -TCLP | MG/L | 200 | 0.009 J | 0.020 U | 0.020 U | 0.020 U |
| Naphthalene -TCLP | MG/L | - | 0.016 J | 0.020 U | 0.020 U | 0.005 J |
| Phenanthrene -TCLP | MG/L | - | 0.007 J | 0.020 U | 0.020 U | 0.020 U |
| Phenol -TCLP | MG/L | - | 0.013 J | 0.020 U | 0.020 U | 0.01 J |
| Pyrene -TCLP | MG/L | - | 0.028 | 0.020 U | 0.020 U | 0.007 J |
| **Metals-TCLP** | | | | | | |
| Arsenic -TCLP | MG/L | 5 | 0.010 UJ,c | 0.011 J,c | 0.010 UJ,c | 0.010 UJ,c |
| Barium -TCLP | MG/L | 100 | 0.25 | 0.33 | 0.26 | 0.20 U |
| Calcium -TCLP | MG/L | - | 201 | 621 | 211 | 290 |
| Chromium -TCLP | MG/L | 5 | 0.020 U | 0.020 U | 0.025 | 0.021 |
| Lead -TCLP | MG/L | 5 | 0.007 J,c | 0.0030 UJ,c | 0.014 J,c | 0.0030 UJ,c |
| Potassium -TCLP | MG/L | - | 5.0 U | 5.0 U | 5.0 U | 14.3 |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 7
# SUMMARY OF DETECTED TCLP RESULTS
# SWMU P-75 PHASE IIC SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | | P75-1 | P75-2 | P75-2 | P75-3 | P75-4 |
|---|---|---|---|---|---|---|---|
| Sample ID | | | P75-1 | P75-2 | P75-2 (DUP) | P75-3 | P75-4 |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 | 0.0-0.5 |
| Date Sampled | | | 02/14/95 | 02/14/95 | 02/14/95 | 02/14/95 | 02/14/95 |
| Parameter | Units | Criteria* | | | FIELD DUPLICATE (1-1) | | |
| Metals-TCLP | | | | | | | |
| Barium -TCLP | MG/L | 100 | 0.27 | 0.26 | 0.25 | 0.22 | 0.20 U |
| Calcium -TCLP | MG/L | - | 162 | 110 | 152 | 226 | 513 |
| Lead -TCLP | MG/L | 5 | 0.025 | 0.006 | 0.005 | 0.01 | 0.0030 U |
| Selenium -TCLP | MG/L | 1 | 0.0050 U | 0.007 | 0.009 | 0.006 | 0.006 |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\42000088.15\db\program\PROGRAM.MDE
Printed: 1/16/2002 9:17:19 AM
[SITEID] = 'SWMU P-75' AND [LOGDATE] < #5/23/1995# AND [PRCODE] LIKE "*-TC"

# TABLE 8
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-8 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P08-B01 | P08-B01 | P08-B02 | P08-B02 |
|---|---|---|---|---|---|
| Sample ID | | P-8 B-1 12-18 | P-8 B-1 16-18 | P-8 B-2 2-12 | P-8 B-2 4-6 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 12.0-18.0 | 16.0-18.0 | 2.0-12.0 | 4.0-6.0 |
| Date Sampled | | 11/06/00 | 11/06/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | | | | |
| **Volatile Organic Compounds** | | | | | |
| Ethylbenzene | UG/KG | NA | 620 | NA | 18,000 J |
| Toluene | UG/KG | NA | 440 | NA | 18,000 J |
| m-Xylene & p-Xylene | UG/KG | NA | 1,200 | NA | 140,000 |
| o-Xylene | UG/KG | NA | 580 | NA | 56,000 |
| **Volatile Organic Compounds - SPLP** | | | | | |
| Benzene -SPLP | MG/L | NA | 0.01 U | NA | 0.054 |
| Ethylbenzene -SPLP | MG/L | NA | 0.0087 J | NA | 0.14 |
| Toluene -SPLP | MG/L | NA | 0.012 J | NA | 0.47 |
| m-Xylene & p-Xylene -SPLP | MG/L | NA | 0.023 J | NA | 0.86 |
| o-Xylene -SPLP | MG/L | NA | 0.012 J | NA | 0.43 |
| **Semivolatile Organic Compounds** | | | | | |
| Acenaphthylene | UG/KG | 38,000 U | NA | 43,000 | NA |
| Anthracene | UG/KG | 8,000 J | NA | 45,000 | NA |
| Benzo(a)anthracene | UG/KG | 38,000 U | NA | 11,000 | NA |
| Benzo(a)pyrene | UG/KG | 38,000 U | NA | 7,800 J | NA |
| Chrysene | UG/KG | 38,000 U | NA | 9,500 | NA |
| Fluoranthene | UG/KG | 7,100 J | NA | 63,000 | NA |
| Fluorene | UG/KG | 59,000 | NA | 550,000 D | NA |
| Naphthalene | UG/KG | 45,000 | NA | 2,100,000 D | NA |
| Phenanthrene | UG/KG | 69,000 | NA | 330,000 D | NA |
| Phenol | UG/KG | 38,000 U | NA | 2,300 J | NA |
| Pyrene | UG/KG | 4,400 J | NA | 26,000 | NA |
| **Semivolatile Organic Compounds - SPLP** | | | | | |
| Fluorene -SPLP | MG/L | 0.79 | NA | 0.46 J | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 8
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-8 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P08-B01 | P08-B01 | P08-B02 | P08-B02 |
|---|---|---|---|---|---|
| Sample ID | | P-8 B-1 12-18 | P-8 B-1 16-18 | P-8 B-2 2-12 | P-8 B-2 4-6 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 12.0-18.0 | 16.0-18.0 | 2.0-12.0 | 4.0-6.0 |
| Date Sampled | | 11/06/00 | 11/06/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | | | | |
| **Semivolatile Organic Compounds - SPLP** | | | | | |
| Naphthalene -SPLP | MG/L | 2.7 | NA | 13 D | NA |
| Phenanthrene -SPLP | MG/L | 0.41 J | NA | 0.6 U | NA |
| **Metals** | | | | | |
| Antimony | MG/KG | 3.1 J | NA | 2.1 BJ | NA |
| Arsenic | MG/KG | 6.3 J | NA | 27.8 J | NA |
| Barium | MG/KG | 15.5 B | NA | 80.6 | NA |
| Cadmium | MG/KG | 0.11 UJ | NA | 0.15 B | NA |
| Calcium | MG/KG | 5,210 | NA | 39,600 | NA |
| Chromium | MG/KG | 87.7 J | NA | 27.1 J | NA |
| Lead | MG/KG | 5.3 J | NA | 18.6 | NA |
| Magnesium | MG/KG | 588 | NA | 1,430 | NA |
| Mercury | MG/KG | 0.021 B | NA | 1.4 | NA |
| Nickel | MG/KG | 7.6 J | NA | 9.9 J | NA |
| Potassium | MG/KG | 231 B | NA | 788 J | NA |
| Selenium | MG/KG | 6.1 U | NA | 5.2 B | NA |
| Silver | MG/KG | 2.6 | NA | 0.71 | NA |
| Sodium | MG/KG | 39.9 B | NA | 203 B | NA |
| Thallium | MG/KG | 15.5 B | NA | 9.2 B | NA |
| **Metals-SPLP** | | | | | |
| Arsenic -SPLP | MG/L | 0.048 B | NA | 0.050 B | NA |
| Barium -SPLP | MG/L | 0.012 B | NA | 0.012 B | NA |
| Calcium -SPLP | MG/L | 49.6 | NA | 43.2 | NA |
| Magnesium -SPLP | MG/L | 1.4 B | NA | 2.0 B | NA |
| Mercury -SPLP | MG/L | 6.10E-05 B | NA | 4.80E-05 B | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 8
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-8 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P08-B01 | P08-B01 | P08-B02 | P08-B02 |
|---|---|---|---|---|---|
| Sample ID | | P-8 B-1 12-18 | P-8 B-1 16-18 | P-8 B-2 2-12 | P-8 B-2 4-6 |
| Matrix | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 12.0-18.0 | 16.0-18.0 | 2.0-12.0 | 4.0-6.0 |
| Date Sampled | | 11/06/00 | 11/06/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | | | | |
| **Metals-SPLP** | | | | | |
| Potassium -SPLP | MG/L | 0.86 B | NA | 0.65 B | NA |
| Sodium -SPLP | MG/L | 3.7 B | NA | 3.4 B | NA |
| **General Chemistry Parameters** | | | | | |
| Chloride - Leachable | MG/L | 5.5 | NA | 8.4 | NA |
| Cyanide - Leachable | MG/L | 0.086 | NA | 1.5 | NA |
| Sulfate - Leachable | MG/L | 5 U | NA | 13.4 | NA |
| Total Organic Carbon | MG/KG | 4,220 J | NA | 107,700 J | NA |
| Total Recoverable Phenolics | MG/KG | 0.39 | NA | 3.4 | NA |
| Total Solids | PERCENT | 86.4 | NA | 81.5 | NA |
| **Miscellaneous - SPLP** | | | | | |
| Cyanide -SPLP | MG/L | 0.0196 | NA | 0.655 | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-B01 | P75-B01 | P75-B01 | P75-B02 | P75-B02 |
|---|---|---|---|---|---|---|
| Sample ID | | P-75 B-1 0-12 in | P-75 B-1 2-6 | P-75 B-1 4-6 | P-75 B-2 0-12 in | P-75 B-2 4-6 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-1.0 | 2.0-6.0 | 4.0-6.0 | 0.0-1.0 | 4.0-6.0 |
| Date Sampled | | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 |
| Parameter | Units | | | | | |
| **Volatile Organic Compounds** | | | | | | |
| Benzene | UG/KG | 1,900 U | NA | 42,000 U | 5.2 U | 8.6 U |
| Toluene | UG/KG | 1,900 U | NA | 42,000 U | 5.2 U | 8.6 U |
| m-Xylene & p-Xylene | UG/KG | 1,900 U | NA | 42,000 U | 5.2 U | 8.6 U |
| o-Xylene | UG/KG | 960 U | NA | 21,000 U | 2.6 U | 4.3 U |
| **Volatile Organic Compounds - SPLP** | | | | | | |
| Benzene -SPLP | MG/L | 0.01 U | NA | 0.62 D | 0.005 U | 0.005 U |
| Ethylbenzene -SPLP | MG/L | 0.01 U | NA | 0.01 U | 0.005 U | 0.005 U |
| Toluene -SPLP | MG/L | 0.0046 J | NA | 0.54 DJ | 0.005 U | 0.0023 J |
| m-Xylene & p-Xylene -SPLP | MG/L | 0.0065 J | NA | 0.25 J | 0.005 U | 0.0030 J |
| o-Xylene -SPLP | MG/L | 0.0048 J | NA | 0.10 J | 0.005 U | 0.0016 J |
| **Semivolatile Organic Compounds** | | | | | | |
| Acenaphthylene | UG/KG | 130,000 D | 1,600,000 | NA | 1,500 J | NA |
| Anthracene | UG/KG | 110,000 DJ | 1,400,000 | NA | 17,000 U | NA |
| Benzo(a)anthracene | UG/KG | 240,000 D | 1,000,000 | NA | 17,000 U | NA |
| Benzo(a)pyrene | UG/KG | 220,000 D | 850,000 J | NA | 900 J | NA |
| Chrysene | UG/KG | 230,000 D | 1,000,000 | NA | 1,000 J | NA |
| bis(2-Ethylhexyl)phthalate | UG/KG | 19,000 U | 210,000 U | NA | 17,000 U | NA |
| Fluoranthene | UG/KG | 600,000 D | 2,500,000 D | NA | 1,400 J | NA |
| Fluorene | UG/KG | 120,000 DJ | 1,300,000 | NA | 17,000 U | NA |
| 2-Methylphenol | UG/KG | 19,000 U | 21,000 J | NA | 17,000 U | NA |
| Naphthalene | UG/KG | 180,000 DJ | 6,500,000 D | NA | 17,000 U | NA |
| Phenanthrene | UG/KG | 540,000 D | 4,100,000 D | NA | 2,300 J | NA |
| Phenol | UG/KG | 19,000 U | 130,000 J | NA | 17,000 U | NA |
| Pyrene | UG/KG | 460,000 D | 1,700,000 D | NA | 1,300 J | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-B01 | P75-B01 | P75-B01 | P75-B02 | P75-B02 |
|---|---|---|---|---|---|---|
| Sample ID | | P-75 B-1 0-12 in | P-75 B-1 2-6 | P-75 B-1 4-6 | P-75 B-2 0-12 in | P-75 B-2 4-6 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-1.0 | 2.0-6.0 | 4.0-6.0 | 0.0-1.0 | 4.0-6.0 |
| Date Sampled | | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 |
| Parameter | Units | | | | | |
| **Semivolatile Organic Compounds - SPLP** | | | | | | |
| Acenaphthylene -SPLP | MG/L | 0.083 J | 2.5 U | NA | 0.01 U | NA |
| Anthracene -SPLP | MG/L | 0.2 U | 2.5 U | NA | 0.01 U | NA |
| Fluoranthene -SPLP | MG/L | 0.2 U | 2.5 U | NA | 0.01 U | NA |
| Fluorene -SPLP | MG/L | 0.091 J | 2.5 U | NA | 0.01 U | NA |
| 3-Methylphenol & 4-Methylphenol -SPLP | MG/L | 0.2 U | 6.4 | NA | 0.01 U | NA |
| 2-Methylphenol -SPLP | MG/L | 0.2 U | 1.7 J | NA | 0.01 U | NA |
| Naphthalene -SPLP | MG/L | 1.2 | 15 | NA | 0.0089 J | NA |
| Phenanthrene -SPLP | MG/L | 0.14 J | 2.5 U | NA | 0.0052 J | NA |
| Phenol -SPLP | MG/L | 0.2 U | 11 | NA | 0.01 U | NA |
| **Metals** | | | | | | |
| Antimony | MG/KG | 6.2 J | 0.93 BJ | NA | 1.1 J | NA |
| Arsenic | MG/KG | 64.3 J | 14.3 J | NA | 15.4 J | NA |
| Barium | MG/KG | 90.5 | 238 | NA | 55.8 | NA |
| Cadmium | MG/KG | 1.5 BJ | 0.55 BJ | NA | 0.36 BJ | NA |
| Calcium | MG/KG | 63,900 | 233,000 | NA | 31,900 | NA |
| Chromium | MG/KG | 19.1 J | 5.1 J | NA | 10.4 J | NA |
| Lead | MG/KG | 93.1 J | 20.7 J | NA | 58.8 J | NA |
| Magnesium | MG/KG | 3,040 | 7,630 | NA | 2,360 | NA |
| Mercury | MG/KG | 0.051 | 0.10 | NA | 0.041 | NA |
| Nickel | MG/KG | 6.6 B | 1.5 B | NA | 5.2 | NA |
| Potassium | MG/KG | 1,560 | 3,140 | NA | 733 | NA |
| Selenium | MG/KG | 2.9 | 5.5 | NA | 0.70 | NA |
| Silver | MG/KG | 0.38 B | 0.20 B | NA | 0.099 U | NA |
| Sodium | MG/KG | 589 | 1,370 | NA | 183 B | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-B01 | P75-B01 | P75-B01 | P75-B02 | P75-B02 |
|---|---|---|---|---|---|---|
| Sample ID | | P-75 B-1 0-12 in | P-75 B-1 2-6 | P-75 B-1 4-6 | P-75 B-2 0-12 in | P-75 B-2 4-6 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 0.0-1.0 | 2.0-6.0 | 4.0-6.0 | 0.0-1.0 | 4.0-6.0 |
| Date Sampled | | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 |
| Parameter | Units | | | | | |
| **Metals** | | | | | | |
| Thallium | MG/KG | 6.9 | 2.5 U | NA | 0.44 B | NA |
| **Metals-SPLP** | | | | | | |
| Arsenic -SPLP | MG/L | 0.042 B | 0.031 B | NA | 0.060 B | NA |
| Barium -SPLP | MG/L | 0.0060 B | 0.041 B | NA | 0.037 B | NA |
| Calcium -SPLP | MG/L | 18.6 | 70.7 | NA | 108 | NA |
| Chromium -SPLP | MG/L | 0.0084 B | 0.0038 U | NA | 0.0038 U | NA |
| Lead -SPLP | MG/L | 0.025 U | 0.025 U | NA | 0.025 U | NA |
| Magnesium -SPLP | MG/L | 0.72 B | 0.13 B | NA | 1.9 B | NA |
| Mercury -SPLP | MG/L | 4.50E-05 U | 1.00E-04 B | NA | 4.80E-05 B | NA |
| Nickel -SPLP | MG/L | 0.0061 U | 0.0061 U | NA | 0.0086 B | NA |
| Potassium -SPLP | MG/L | 1.3 B | 1.6 B | NA | 1.4 B | NA |
| Sodium -SPLP | MG/L | 5.4 | 3.6 B | NA | 4.6 B | NA |
| **General Chemistry Parameters** | | | | | | |
| Chloride - Leachable | MG/L | 1.4 | 9.3 | NA | 1.0 | NA |
| Cyanide - Leachable | MG/L | 0.031 | 0.010 U | NA | 0.010 U | NA |
| Sulfate - Leachable | MG/L | 100 U | 36.2 | NA | 10 U | NA |
| Total Organic Carbon | MG/KG | 40,900 J | 124,000 J | NA | 12,800 J | NA |
| Total Recoverable Phenolics | MG/KG | 0.16 | 391 | NA | 0.11 | NA |
| Total Solids | PERCENT | 88.4 | 77.4 | NA | 94.7 | NA |
| **Miscellaneous - SPLP** | | | | | | |
| Cyanide -SPLP | MG/L | 0.020 | 0.010 U | NA | 0.010 U | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-B02 | P75-B03 | P75-B03 | P75-B04 | P75-B04 |
|---|---|---|---|---|---|---|
| Sample ID | | P-75 B-2 4-8 | P-75 B-3 0-12 in | P-75 B-3 8-10 | P-75 B-4 0-12 in | P-75 B-4 COMP 1-10 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 4.0-8.0 | 0.0-1.0 | 8.0-10.0 | 0.0-1.0 | 1.0-10.0 |
| Date Sampled | | 11/03/00 | 11/03/00 | 11/03/00 | 11/06/00 | 11/06/00 |
| **Parameter** | **Units** | | | | | |
| **Volatile Organic Compounds** | | | | | | |
| Benzene | UG/KG | NA | 5.2 U | 17,000 | 6.1 U | NA |
| Toluene | UG/KG | NA | 5.2 U | 16,000 | 6.1 U | NA |
| m-Xylene & p-Xylene | UG/KG | NA | 5.2 U | 16,000 | 6.1 U | NA |
| o-Xylene | UG/KG | NA | 2.6 U | 5,700 | 3 U | NA |
| **Volatile Organic Compounds - SPLP** | | | | | | |
| Benzene -SPLP | MG/L | NA | 0.005 U | 0.26 | 0.005 U | NA |
| Ethylbenzene -SPLP | MG/L | NA | 0.0023 J | 0.025 U | 0.0072 J | NA |
| Toluene -SPLP | MG/L | NA | 0.0089 J | 0.34 J | 0.028 J | NA |
| m-Xylene & p-Xylene -SPLP | MG/L | NA | 0.0088 J | 0.20 J | 0.046 J | NA |
| o-Xylene -SPLP | MG/L | NA | 0.0068 J | 0.085 J | 0.052 J | NA |
| **Semivolatile Organic Compounds** | | | | | | |
| Acenaphthylene | UG/KG | 290 J | 100,000 DJ | 1,300,000 | 810 J | 77 J |
| Anthracene | UG/KG | 360 J | 110,000 | 760,000 | 430 J | 83 J |
| Benzo(a)anthracene | UG/KG | 300 J | 120,000 | 640,000 | 1,100 J | 96 J |
| Benzo(a)pyrene | UG/KG | 260 J | 92,000 J | 520,000 | 1,400 J | 81 J |
| Chrysene | UG/KG | 300 J | 100,000 | 550,000 | 1,200 J | 100 J |
| bis(2-Ethylhexyl)phthalate | UG/KG | 120 J | 17,000 U | 210,000 U | 1,900 U | 75 J |
| Fluoranthene | UG/KG | 960 | 240,000 D | 1,600,000 D | 1,900 | 300 J |
| Fluorene | UG/KG | 260 J | 130,000 | 870,000 | 110 J | 63 J |
| 2-Methylphenol | UG/KG | 860 U | 17,000 U | 210,000 U | 1,900 U | 360 UR |
| Naphthalene | UG/KG | 270 J | 77,000 | 4,600,000 D | 2,200 | 90 J |
| Phenanthrene | UG/KG | 1,100 | 370,000 D | 2,600,000 D | 1,200 J | 310 J |
| Phenol | UG/KG | 860 U | 17,000 U | 210,000 U | 1,900 U | 360 UR |
| Pyrene | UG/KG | 530 J | 170,000 D | 1,100,000 | 1,500 J | 160 J |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-B02 | P75-B03 | P75-B03 | P75-B04 | P75-B04 |
|---|---|---|---|---|---|---|
| Sample ID | | P-75 B-2 4-8 | P-75 B-3 0-12 in | P-75 B-3 8-10 | P-75 B-4 0-12 in | P-75 B-4 COMP 1-10 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 4.0-8.0 | 0.0-1.0 | 8.0-10.0 | 0.0-1.0 | 1.0-10.0 |
| Date Sampled | | 11/03/00 | 11/03/00 | 11/03/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | | | | | |
| **Semivolatile Organic Compounds - SPLP** | | | | | | |
| Acenaphthylene -SPLP | MG/L | 0.01 U | 0.42 | 2.5 U | 0.01 U | 0.01 U |
| Anthracene -SPLP | MG/L | 0.01 U | 0.034 J | 2.5 U | 0.01 U | 0.01 U |
| Fluoranthene -SPLP | MG/L | 0.01 U | 0.036 J | 2.5 U | 0.01 U | 0.01 U |
| Fluorene -SPLP | MG/L | 0.01 U | 0.21 | 2.5 U | 0.01 U | 0.01 U |
| 3-Methylphenol & 4-Methylphenol -SPLP | MG/L | 0.01 U | 0.1 U | 2.5 U | 0.01 U | 0.01 U |
| 2-Methylphenol -SPLP | MG/L | 0.01 U | 0.1 U | 2.5 U | 0.01 U | 0.01 U |
| Naphthalene -SPLP | MG/L | 0.0076 J | 0.96 D | 15 | 0.01 U | 0.0041 J |
| Phenanthrene -SPLP | MG/L | 0.0071 J | 0.25 | 2.5 U | 0.01 U | 0.0049 J |
| Phenol -SPLP | MG/L | 0.01 U | 0.1 U | 1 J | 0.01 U | 0.01 U |
| **Metals** | | | | | | |
| Antimony | MG/KG | 1.1 BJ | 0.19 BJ | 0.52 BJ | 0.59 BJ | 0.72 BJ |
| Arsenic | MG/KG | 25.6 J | 5.7 J | 6.9 J | 78.6 J | 12.5 J |
| Barium | MG/KG | 351 | 8.0 B | 216 | 402 | 739 |
| Cadmium | MG/KG | 0.25 BJ | 0.19 BJ | 0.23 BJ | 0.66 J | 0.11 UJ |
| Calcium | MG/KG | 287,000 | 4,290 | 255,000 | 225,000 | 259,000 |
| Chromium | MG/KG | 8.6 J | 4.2 J | 4.6 J | 26.7 J | 13.7 J |
| Lead | MG/KG | 9.1 J | 39.9 J | 6.5 J | 82.5 J | 17.3 J |
| Magnesium | MG/KG | 14,500 | 1,260 | 10,000 | 13,600 | 19,900 |
| Mercury | MG/KG | 0.010 B | 0.081 | 0.075 | 0.18 | 0.014 B |
| Nickel | MG/KG | 0.90 B | 6.1 | 0.81 B | 3.3 B | 2.0 B |
| Potassium | MG/KG | 3,190 | 215 B | 2,360 | 1,580 | 5,560 |
| Selenium | MG/KG | 6.8 | 0.45 B | 4.7 | 1.6 B | 3.2 B |
| Silver | MG/KG | 0.40 B | 0.098 U | 0.27 B | 0.47 B | 0.83 B |
| Sodium | MG/KG | 1,390 | 30.0 B | 1,340 | 785 | 1,180 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-75 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P75-B02 | P75-B03 | P75-B03 | P75-B04 | P75-B04 |
|---|---|---|---|---|---|---|
| Sample ID | | P-75 B-2 4-8 | P-75 B-3 0-12 in | P-75 B-3 8-10 | P-75 B-4 0-12 in | P-75 B-4 COMP 1-10 |
| Matrix | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | 4.0-8.0 | 0.0-1.0 | 8.0-10.0 | 0.0-1.0 | 1.0-10.0 |
| Date Sampled | | 11/03/00 | 11/03/00 | 11/03/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | | | | | |
| **Metals** | | | | | | |
| Thallium | MG/KG | 5.1 U | 0.47 B | 2.5 U | 5.1 B | 9.9 B |
| **Metals-SPLP** | | | | | | |
| Arsenic -SPLP | MG/L | 0.052 B | 0.037 B | 0.032 B | 0.030 U | 0.030 U |
| Barium -SPLP | MG/L | 0.057 B | 0.021 B | 0.069 B | 0.13 B | 0.27 |
| Calcium -SPLP | MG/L | 117 | 44.8 | 88.0 | 74.9 | 99.9 |
| Chromium -SPLP | MG/L | 0.0038 U | 0.0038 U | 0.0038 U | 0.0038 U | 0.0038 U |
| Lead -SPLP | MG/L | 0.025 U | 0.048 B | 0.025 U | 0.025 U | 0.025 U |
| Magnesium -SPLP | MG/L | 0.29 B | 5.6 | 0.18 B | 0.15 B | 0.22 B |
| Mercury -SPLP | MG/L | 5.20E-05 B | 6.50E-05 B | 4.60E-05 B | 1.50E-04 B | 4.50E-05 U |
| Nickel -SPLP | MG/L | 0.0061 U | 0.010 B | 0.0061 U | 0.0061 U | 0.0061 U |
| Potassium -SPLP | MG/L | 1.3 B | 0.63 B | 3.4 B | 0.75 B | 2.3 B |
| Sodium -SPLP | MG/L | 4.2 B | 12.7 | 3.9 B | 1.1 B | 2.6 B |
| **General Chemistry Parameters** | | | | | | |
| Chloride - Leachable | MG/L | 15.3 | 1.0 | 7.0 | 7.3 | 34.8 |
| Cyanide - Leachable | MG/L | 0.010 U | 0.010 U | 0.025 | 0.01 U | 0.01 U |
| Sulfate - Leachable | MG/L | 60.4 | 5.0 U | 25.5 | 18.4 | 38.5 |
| Total Organic Carbon | MG/KG | 3,220 J | 6,500 | 114,000 J | 84,000 J | 5,030 U |
| Total Recoverable Phenolics | MG/KG | 0.19 | 0.15 | 29.5 | 0.11 | 0.99 |
| Total Solids | PERCENT | 76.6 | 95.5 | 78.5 | 87.9 | 90.7 |
| **Miscellaneous - SPLP** | | | | | | |
| Cyanide -SPLP | MG/L | 0.010 U | 0.010 U | 0.080 | 0.01 U | 0.01 U |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-75 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P75-B04 |
|---|---|---|
| Sample ID | | P-75 B-4 COMP 1-10 |
| Matrix | | Soil |
| Depth Interval (ft) | | 6.0-8.0 |
| Date Sampled | | 11/06/00 |
| Parameter | Units | |
| **Volatile Organic Compounds** | | |
| Benzene | UG/KG | 6.5 U |
| Toluene | UG/KG | 6.5 U |
| m-Xylene & p-Xylene | UG/KG | 6.5 U |
| o-Xylene | UG/KG | 3.3 U |
| **Volatile Organic Compounds - SPLP** | | |
| Benzene -SPLP | MG/L | 0.005 U |
| Ethylbenzene -SPLP | MG/L | 0.0047 J |
| Toluene -SPLP | MG/L | 0.0092 J |
| m-Xylene & p-Xylene -SPLP | MG/L | 0.019 J |
| o-Xylene -SPLP | MG/L | 0.016 J |
| **Semivolatile Organic Compounds** | | |
| Acenaphthylene | UG/KG | NA |
| Anthracene | UG/KG | NA |
| Benzo(a)anthracene | UG/KG | NA |
| Benzo(a)pyrene | UG/KG | NA |
| Chrysene | UG/KG | NA |
| bis(2-Ethylhexyl)phthalate | UG/KG | NA |
| Fluoranthene | UG/KG | NA |
| Fluorene | UG/KG | NA |
| 2-Methylphenol | UG/KG | NA |
| Naphthalene | UG/KG | NA |
| Phenanthrene | UG/KG | NA |
| Phenol | UG/KG | NA |
| Pyrene | UG/KG | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 9
# SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | P75-B04 |
|---|---|---|
| Sample ID | | P-75 B-4 COMP 1-10 |
| Matrix | | Soil |
| Depth Interval (ft) | | 6.0-8.0 |
| Date Sampled | | 11/06/00 |
| **Parameter** | **Units** | |
| **Semivolatile Organic Compounds - SPLP** | | |
| Acenaphthylene -SPLP | MG/L | NA |
| Anthracene -SPLP | MG/L | NA |
| Fluoranthene -SPLP | MG/L | NA |
| Fluorene -SPLP | MG/L | NA |
| 3-Methylphenol & 4-Methylphenol -SPLP | MG/L | NA |
| 2-Methylphenol -SPLP | MG/L | NA |
| Naphthalene -SPLP | MG/L | NA |
| Phenanthrene -SPLP | MG/L | NA |
| Phenol -SPLP | MG/L | NA |
| **Metals** | | |
| Antimony | MG/KG | NA |
| Arsenic | MG/KG | NA |
| Barium | MG/KG | NA |
| Cadmium | MG/KG | NA |
| Calcium | MG/KG | NA |
| Chromium | MG/KG | NA |
| Lead | MG/KG | NA |
| Magnesium | MG/KG | NA |
| Mercury | MG/KG | NA |
| Nickel | MG/KG | NA |
| Potassium | MG/KG | NA |
| Selenium | MG/KG | NA |
| Silver | MG/KG | NA |
| Sodium | MG/KG | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\42000088.15\db\program\PROGRAM.MDE
Printed: 1/16/2002 9:24:13 AM
[SITEID] = 'SWMU P-75' AND ([SACODE] <> 'MS' AND [SACODE] <> 'SD') AND [LOGDATE] >#5/23/1995# AND [PRCCODE] NOT LIKE '*-TC'

# TABLE 9
## SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
## SWMU P-75 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | P75-B04 |
|---|---|---|
| Sample ID | | P-75 B-4 COMP 1-10 |
| Matrix | | Soil |
| Depth Interval (ft) | | 6.0-8.0 |
| Date Sampled | | 11/06/00 |
| Parameter | Units | |
| **Metals** | | |
| Thallium | MG/KG | NA |
| **Metals-SPLP** | | |
| Arsenic -SPLP | MG/L | NA |
| Barium -SPLP | MG/L | NA |
| Calcium -SPLP | MG/L | NA |
| Chromium -SPLP | MG/L | NA |
| Lead -SPLP | MG/L | NA |
| Magnesium -SPLP | MG/L | NA |
| Mercury -SPLP | MG/L | NA |
| Nickel -SPLP | MG/L | NA |
| Potassium -SPLP | MG/L | NA |
| Sodium -SPLP | MG/L | NA |
| **General Chemistry Parameters** | | |
| Chloride - Leachable | MG/L | NA |
| Cyanide - Leachable | MG/L | NA |
| Sulfate - Leachable | MG/L | NA |
| Total Organic Carbon | MG/KG | NA |
| Total Recoverable Phenolics | MG/KG | NA |
| Total Solids | PERCENT | NA |
| **Miscellaneous - SPLP** | | |
| Cyanide -SPLP | MG/L | NA |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 10
# SUMMARY OF DETECTED TCLP RESULTS
# SWMU P-8 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | | P08-B01 | P08-B01 | P08-B02 | P08-B02 |
|---|---|---|---|---|---|---|
| Sample ID | | | P-8 B-1 12-18 | P-8 B-1 16-18 | P-8 B-2 2-12 | P-8 B-2 4-6 |
| Matrix | | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 12.0-18.0 | 16.0-18.0 | 2.0-12.0 | 4.0-6.0 |
| Date Sampled | | | 11/06/00 | 11/06/00 | 11/06/00 | 11/06/00 |
| **Parameter** | **Units** | **Criteria*** | | | | |
| **Volatile Organic Compounds - TCLP** | | | | | | |
| Benzene -TCLP | MG/L | 0.5 | NA | 0.05 U | NA | 0.048 J |
| Ethylbenzene -TCLP | MG/L | - | NA | 0.17 J | NA | 0.16 |
| Toluene -TCLP | MG/L | - | NA | 0.4 J | NA | 0.4 |
| m-Xylene & p-Xylene -TCLP | MG/L | - | NA | 0.44 J | NA | 0.94 |
| o-Xylene -TCLP | MG/L | - | NA | 0.34 J | NA | 0.52 |
| **Semivolatile Organic Compounds - TCLP** | | | | | | |
| Acenaphthylene -TCLP | MG/L | - | 0.021 J | NA | 0.13 J | NA |
| Anthracene -TCLP | MG/L | - | 0.015 J | NA | 0.5 U | NA |
| 2,4-Dimethylphenol -TCLP | MG/L | - | 0.05 U | NA | 0.23 J | NA |
| bis(2-Ethylhexyl)phthalate -TCLP | MG/L | - | 0.0046 J | NA | 0.5 U | NA |
| Fluoranthene -TCLP | MG/L | - | 0.0083 J | NA | 0.5 U | NA |
| Fluorene -TCLP | MG/L | - | 0.56 D | NA | 0.37 J | NA |
| 3-Methylphenol & 4-Methylphenol - TCLP | MG/L | 200 | 0.05 U | NA | 0.21 J | NA |
| 2-Methylphenol -TCLP | MG/L | 200 | 0.05 U | NA | 0.11 J | NA |
| Naphthalene -TCLP | MG/L | - | 2.8 D | NA | 14 D | NA |
| Phenanthrene -TCLP | MG/L | - | 0.31 | NA | 0.082 J | NA |
| Phenol -TCLP | MG/L | - | 0.05 U | NA | 0.12 J | NA |
| Pyrene -TCLP | MG/L | - | 0.004 J | NA | 0.5 U | NA |
| **Metals-TCLP** | | | | | | |
| Antimony -TCLP | MG/L | - | 0.051 B | NA | 0.042 U | NA |
| Arsenic -TCLP | MG/L | 5 | 0.30 B | NA | 0.21 B | NA |
| Barium -TCLP | MG/L | 100 | 0.18 BJ | NA | 0.22 BJ | NA |
| Calcium -TCLP | MG/L | - | 209 | NA | 537 | NA |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 10
## SUMMARY OF DETECTED TCLP RESULTS
## SWMU P-8 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | | P08-B01 | P08-B01 | P08-B02 | P08-B02 |
|---|---|---|---|---|---|---|
| Sample ID | | | P-8 B-1 12-18 | P-8 B-1 16-18 | P-8 B-2 2-12 | P-8 B-2 4-6 |
| Matrix | | | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 12.0-18.0 | 16.0-18.0 | 2.0-12.0 | 4.0-6.0 |
| Date Sampled | | | 11/06/00 | 11/06/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | Criteria* | | | | |
| Metals-TCLP | | | | | | |
| Magnesium -TCLP | MG/L | - | 5.2 | NA | 8.6 | NA |
| Mercury -TCLP | MG/L | 0.2 | 6.10E-05 B | NA | 3.40E-04 | NA |
| Nickel -TCLP | MG/L | - | 0.028 B | NA | 0.019 B | NA |
| Potassium -TCLP | MG/L | - | 1.9 B | NA | 2.8 B | NA |
| Thallium -TCLP | MG/L | - | 0.40 B | NA | 0.12 B | NA |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 11
# SUMMARY OF DETECTED TCLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | | P75-B01 | P75-B01 | P75-B01 | P75-B02 | P75-B02 |
|---|---|---|---|---|---|---|---|
| Sample ID | | | P-75 B-1 0-12 in | P-75 B-1 2-6 | P-75 B-1 4-6 | P-75 B-2 0-12 in | P-75 B-2 4-6 |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 0.0-1.0 | 2.0-6.0 | 4.0-6.0 | 0.0-1.0 | 4.0-6.0 |
| Date Sampled | | | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 |
| **Parameter** | **Units** | **Criteria*** | | | | | |
| **Volatile Organic Compounds - TCLP** | | | | | | | |
| Benzene -TCLP | MG/L | 0.5 | 0.05 U | NA | 0.69 | 0.05 U | 0.05 U |
| Ethylbenzene -TCLP | MG/L | - | 0.038 J | NA | 0.05 U | 0.05 U | 0.05 U |
| Toluene -TCLP | MG/L | - | 0.15 J | NA | 0.54 J | 0.05 U | 0.05 U |
| m-Xylene & p-Xylene -TCLP | MG/L | - | 0.11 J | NA | 0.23 J | 0.05 U | 0.05 U |
| o-Xylene -TCLP | MG/L | - | 0.089 J | NA | 0.086 J | 0.05 U | 0.05 U |
| **Semivolatile Organic Compounds - TCLP** | | | | | | | |
| Acenaphthylene -TCLP | MG/L | - | 0.11 | 0.64 J | NA | 0.05 U | NA |
| Anthracene -TCLP | MG/L | - | 0.021 J | 2.5 U | NA | 0.05 U | NA |
| Di-n-butyl phthalate -TCLP | MG/L | - | 0.05 U | 2.5 U | NA | 0.0041 J | NA |
| 2,4-Dimethylphenol -TCLP | MG/L | - | 0.05 U | 0.61 J | NA | 0.05 U | NA |
| bis(2-Ethylhexyl)phthalate -TCLP | MG/L | - | 0.0082 J | 2.5 U | NA | 0.011 J | NA |
| Fluoranthene -TCLP | MG/L | - | 0.029 J | 2.5 U | NA | 0.05 U | NA |
| Fluorene -TCLP | MG/L | - | 0.10 | 0.19 J | NA | 0.05 U | NA |
| 3-Methylphenol & 4-Methylphenol - TCLP | MG/L | 200 | 0.05 U | 5.0 | NA | 0.05 U | NA |
| 2-Methylphenol -TCLP | MG/L | 200 | 0.05 U | 1.2 J | NA | 0.05 U | NA |
| Naphthalene -TCLP | MG/L | - | 1.4 D | 14 | NA | 0.05 U | NA |
| Phenanthrene -TCLP | MG/L | - | 0.15 | 0.26 J | NA | 0.0044 J | NA |
| Phenol -TCLP | MG/L | - | 0.0033 J | 9.6 | NA | 0.0057 J | NA |
| Pyrene -TCLP | MG/L | - | 0.017 J | 2.5 U | NA | 0.05 U | NA |
| **Metals-TCLP** | | | | | | | |
| Antimony -TCLP | MG/L | - | 0.053 B | 0.042 U | NA | 0.042 U | NA |
| Arsenic -TCLP | MG/L | 5 | 0.18 B | 0.19 B | NA | 0.21 B | NA |
| Barium -TCLP | MG/L | 100 | 0.12 BJ | 0.26 BJ | NA | 0.46 BJ | NA |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\42000088.15\db\program\PROGRAM.MDE
Printed: 1/15/2002 9:25:09 AM
[SITEID] = 'SWMU P-75' AND ([SACODE] <> 'MS' AND [SACODE] <> 'SD') AND [LOGDATE] > #5/23/1995# AND [PRCCODE] LIKE '*-TC'

# TABLE 11
# SUMMARY OF DETECTED TCLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | | P75-B01 | P75-B01 | P75-B01 | P75-B02 | P75-B02 |
|---|---|---|---|---|---|---|---|
| Sample ID | | | P-75 B-1 0-12 in | P-75 B-1 2-6 | P-75 B-1 4-6 | P-75 B-2 0-12 in | P-75 B-2 4-6 |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 0.0-1.0 | 2.0-6.0 | 4.0-6.0 | 0.0-1.0 | 4.0-6.0 |
| Date Sampled | | | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 | 11/03/00 |
| Parameter | Units | Criteria* | | | | | |
| Metals-TCLP | | | | | | | |
| Calcium -TCLP | MG/L | - | 757 | 759 | NA | 633 | NA |
| Lead -TCLP | MG/L | 5 | 0.025 UJ | 0.025 UJ | NA | 0.025 UJ | NA |
| Magnesium -TCLP | MG/L | - | 6.1 | 4.2 B | NA | 5.0 | NA |
| Mercury -TCLP | MG/L | 0.2 | 7.40E-05 B | 8.50E-05 B | NA | 8.10E-05 B | NA |
| Nickel -TCLP | MG/L | - | 0.010 B | 0.0088 B | NA | 0.012 B | NA |
| Potassium -TCLP | MG/L | - | 7.1 J | 4.4 B | NA | 3.7 B | NA |
| Thallium -TCLP | MG/L | - | 0.095 U | 0.095 U | NA | 0.095 U | NA |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

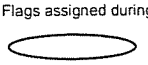
J:\4200008B.15\db\program\PROGRAM.MDE
Printed: 1/16/2002 9:25:09 AM
[SITEID] = 'SWMU P-75' AND ( [SACODE] <> 'MS' AND [SACODE] <> 'SD' ) AND [LOGDATE] >#5/23/1995# AND [PRCODE] LIKE '*-TC'

# TABLE 11
## SUMMARY OF DETECTED TCLP RESULTS
## SWMU P-75 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | | P75-B02 | P75-B03 | P75-B03 | P75-B04 | P75-B04 |
|---|---|---|---|---|---|---|---|
| Sample ID | | | P-75 B-2 4-8 | P-75 B-3 0-12 in | P-75 B-3 8-10 | P-75 B-4 0-12 in | P-75 B-4 COMP 1-10 |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 4.0-8.0 | 0.0-1.0 | 8.0-10.0 | 0.0-1.0 | 1.0-10.0 |
| Date Sampled | | | 11/03/00 | 11/03/00 | 11/03/00 | 11/06/00 | 11/06/00 |
| **Parameter** | **Units** | **Criteria*** | | | | | |
| **Volatile Organic Compounds - TCLP** | | | | | | | |
| Benzene -TCLP | MG/L | 0.5 | NA | 0.05 U | 0.35 | 0.05 U | NA |
| Ethylbenzene -TCLP | MG/L | - | NA | 0.05 U | 0.05 U | 0.063 J | NA |
| Toluene -TCLP | MG/L | - | NA | 0.018 J | 0.36 J | 0.18 J | NA |
| m-Xylene & p-Xylene -TCLP | MG/L | - | NA | 0.015 J | 0.20 J | 0.21 J | NA |
| o-Xylene -TCLP | MG/L | - | NA | 0.010 J | 0.082 J | 0.20 J | NA |
| **Semivolatile Organic Compounds - TCLP** | | | | | | | |
| Acenaphthylene -TCLP | MG/L | - | 0.05 U | 0.35 D | 0.73 | 0.05 U | 0.05 U |
| Anthracene -TCLP | MG/L | - | 0.05 U | 0.031 J | 0.030 J | 0.05 U | 0.05 U |
| Di-n-butyl phthalate -TCLP | MG/L | - | 0.0044 J | 0.0070 J | 0.25 U | 0.05 U | 0.05 U |
| 2,4-Dimethylphenol -TCLP | MG/L | - | 0.05 U | 0.011 J | 0.42 | 0.05 U | 0.05 U |
| bis(2-Ethylhexyl)phthalate -TCLP | MG/L | - | 0.012 J | 0.011 J | 0.25 U | 0.013 J | 0.021 J |
| Fluoranthene -TCLP | MG/L | - | 0.05 U | 0.027 J | 0.019 J | 0.05 U | 0.05 U |
| Fluorene -TCLP | MG/L | - | 0.05 U | 0.17 | 0.15 J | 0.05 U | 0.05 U |
| 3-Methylphenol & 4-Methylphenol - TCLP | MG/L | 200 | 0.05 U | 0.018 J | 0.67 | 0.05 U | 0.05 U |
| 2-Methylphenol -TCLP | MG/L | 200 | 0.05 U | 0.0085 J | 0.29 | 0.05 U | 0.05 U |
| Naphthalene -TCLP | MG/L | - | 0.05 U | 0.65 D | 14 D | 0.05 U | 0.05 U |
| Phenanthrene -TCLP | MG/L | - | 0.0068 J | 0.21 | 0.18 J | 0.05 U | 0.0053 J |
| Phenol -TCLP | MG/L | - | 0.0033 J | 0.0061 J | 0.58 | 0.05 U | 0.05 U |
| Pyrene -TCLP | MG/L | - | 0.05 U | 0.016 J | 0.25 U | 0.05 U | 0.05 U |
| **Metals-TCLP** | | | | | | | |
| Antimony -TCLP | MG/L | - | 0.047 B | 0.042 U | 0.042 U | 0.042 U | 0.042 U |
| Arsenic -TCLP | MG/L | 5 | 0.25 B | 0.15 B | 0.26 B | 0.44 B | 0.23 B |
| Barium -TCLP | MG/L | 100 | 0.22 BJ | 0.13 BJ | 0.30 BJ | 0.70 B | 1.1 BJ |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.


Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\42000088.15\db\program\PROGRAM.MDE
Printed: 1/15/2002 9:25:09 AM
[SITEID] = 'SWMU P-75' AND ( [SACODE] <> 'MS' AND [SACODE] <> 'SD' ) AND [LOGDATE] >#5/23/1995# AND [PRCCODE] LIKE '*-TC'

# TABLE 11
## SUMMARY OF DETECTED TCLP RESULTS
## SWMU P-75 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | | P75-B02 | P75-B03 | P75-B03 | P75-B04 | P75-B04 |
|---|---|---|---|---|---|---|---|
| Sample ID | | | P-75 B-2 4-8 | P-75 B-3 0-12 in | P-75 B-3 8-10 | P-75 B-4 0-12 in | P-75 B-4 COMP 1-10 |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Depth Interval (ft) | | | 4.0-8.0 | 0.0-1.0 | 8.0-10.0 | 0.0-1.0 | 1.0-10.0 |
| Date Sampled | | | 11/03/00 | 11/03/00 | 11/03/00 | 11/06/00 | 11/06/00 |
| Parameter | Units | Criteria* | | | | | |
| Metals-TCLP | | | | | | | |
| Calcium -TCLP | MG/L | - | 862 | 125 | 781 | 805 | 802 |
| Lead -TCLP | MG/L | 5 | 0.025 UJ | 1.3 J | 0.033 BJ | 0.025 UJ | 0.025 UJ |
| Magnesium -TCLP | MG/L | - | 1.9 B | 13.0 | 4.3 B | 6.2 | 10.5 |
| Mercury -TCLP | MG/L | 0.2 | 7.40E-05 B | 9.00E-05 B | 8.20E-05 B | 7.10E-05 B | 1.10E-04 B |
| Nickel -TCLP | MG/L | - | 0.0061 U | 0.010 B | 0.0061 U | 0.010 B | 0.0064 B |
| Potassium -TCLP | MG/L | - | 3.4 B | 1.5 B | 5.0 B | 2.8 B | 4.6 B |
| Thallium -TCLP | MG/L | - | 0.095 U | 0.095 U | 0.10 B | 0.095 U | 0.095 U |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\4200005B.15\db\program\PROGRAM.MDE
Printed: 1/16/2002 9:25:10 AM
[SITEID] = 'SWMU P-75' AND ([SACODE] <> 'MS' AND [SACODE] <> 'SD') AND [LOGDATE] >#5/23/1995# AND [PRCCODE] LIKE '*-TC'

# TABLE 11
## SUMMARY OF DETECTED TCLP RESULTS
## SWMU P-75 2000 SOIL SAMPLES
## TANK FARM GROUP

| Location ID | | | P75-B04 |
|---|---|---|---|
| Sample ID | | | P-75 B-4 COMP 1-10 |
| Matrix | | | Soil |
| Depth Interval (ft) | | | 6.0-8.0 |
| Date Sampled | | | 11/06/00 |
| **Parameter** | **Units** | **Criteria*** | |
| **Volatile Organic Compounds - TCLP** | | | |
| Benzene -TCLP | MG/L | 0.5 | 0.05 U |
| Ethylbenzene -TCLP | MG/L | - | 0.21 J |
| Toluene -TCLP | MG/L | - | 0.41 J |
| m-Xylene & p-Xylene -TCLP | MG/L | - | 0.54 J |
| o-Xylene -TCLP | MG/L | - | 0.46 J |
| **Semivolatile Organic Compounds - TCLP** | | | |
| Acenaphthylene -TCLP | MG/L | - | NA |
| Anthracene -TCLP | MG/L | - | NA |
| Di-n-butyl phthalate -TCLP | MG/L | - | NA |
| 2,4-Dimethylphenol -TCLP | MG/L | - | NA |
| bis(2-Ethylhexyl)phthalate -TCLP | MG/L | - | NA |
| Fluoranthene -TCLP | MG/L | - | NA |
| Fluorene -TCLP | MG/L | - | NA |
| 3-Methylphenol & 4-Methylphenol - TCLP | MG/L | 200 | NA |
| 2-Methylphenol -TCLP | MG/L | 200 | NA |
| Naphthalene -TCLP | MG/L | - | NA |
| Phenanthrene -TCLP | MG/L | - | NA |
| Phenol -TCLP | MG/L | - | NA |
| Pyrene -TCLP | MG/L | - | NA |
| **Metals-TCLP** | | | |
| Antimony -TCLP | MG/L | - | NA |
| Arsenic -TCLP | MG/L | 5 | NA |
| Barium -TCLP | MG/L | 100 | NA |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 11
# SUMMARY OF DETECTED TCLP RESULTS
# SWMU P-75 2000 SOIL SAMPLES
# TANK FARM GROUP

| Location ID | | | P75-B04 |
|---|---|---|---|
| Sample ID | | | P-75 B-4 COMP 1-10 |
| Matrix | | | Soil |
| Depth Interval (ft) | | | 6.0-8.0 |
| Date Sampled | | | 11/06/00 |
| Parameter | Units | Criteria* | |
| Metals-TCLP | | | |
| Calcium -TCLP | MG/L | - | NA |
| Lead -TCLP | MG/L | 5 | NA |
| Magnesium -TCLP | MG/L | - | NA |
| Mercury -TCLP | MG/L | 0.2 | NA |
| Nickel -TCLP | MG/L | - | NA |
| Potassium -TCLP | MG/L | - | NA |
| Thallium -TCLP | MG/L | - | NA |

*Criteria- TCLP Action Levels: Federal Register, Vol. 55, No. 61 ,No. 126.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\42000088.15\db\program\PROGRAM.MDE
Printed: 1/16/2002 9:25:10 AM
[SITEID] = 'SWMU P-75' AND ([SACODE] <> 'MS' AND [SACODE] <> 'SD') AND [LOGDATE] > #5/23/1995# AND [PRCCODE] LIKE '*-TC'

# TABLE 12
## SUMMARY OF DETECTED GROUNDWATER RESULTS
## DOWNGRADIENT WELLS MWN-37A, MWN-38A, AND MWN-39A
## TANK FARM GROUP

| Location ID | | MWN-37A | MWN-38A | MWN-39A |
|---|---|---|---|---|
| Sample ID | | MWN-37A | MWN-38A | MWN-39A |
| Matrix | | Groundwater | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - | - |
| Date Sampled | | 12/20/00 | 12/20/00 | 12/20/00 |
| **Parameter** | **Units** | | | |
| **Volatile Organic Compounds** | | | | |
| Benzene | UG/L | 9.0 | 47 | 200 D |
| Xylenes, Total | UG/L | 5.0 U | 1.7 J | 5.0 U |
| **Semivolatile Organic Compounds** | | | | |
| Acenaphthylene | UG/L | 10 U | 10 U | 4.9 J |
| bis(2-Ethylhexyl)phthalate | UG/L | 10 U | 10 U | 4.5 J |
| Fluorene | UG/L | 10 U | 10 U | 3.4 J |
| 3-Methylphenol & 4-Methylphenol | UG/L | 48 | 57 | 9.7 J |
| 2-Methylphenol | UG/L | 12 | 14 | 10 U |
| Naphthalene | UG/L | 8.7 J | 7.6 J | 55 |
| Phenol | UG/L | 190 D | 190 D | 23 |
| **Metals** | | | | |
| Arsenic | UG/L | 2.8 B | 2.8 B | 3.8 B |
| Barium | UG/L | 386 | 114 B | 196 B |
| Calcium | UG/L | 175000 | 142000 | 158000 |
| Chromium | UG/L | 7.3 | 9.0 | 9.7 |
| Iron | UG/L | 169 | 190 | 1120 |
| Magnesium | UG/L | 190 B | 49.4 B | 1120 B |
| Mercury | UG/L | 0.056 B | 0.048 B | 0.045 U |
| Potassium | UG/L | 40300 | 21300 | 13700 |
| Selenium | UG/L | 14.3 | 9.6 | 2.9 B |
| Sodium | UG/L | 74900 | 40200 | 64900 |
| **General Chemistry Parameters** | | | | |
| Alkalinity (as CaCO3) | MG/L | 204 | 46.6 | 43.0 |
| Alkalinity Total | MG/L | 392 | 193 | 170 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 12
## SUMMARY OF DETECTED GROUNDWATER RESULTS
## DOWNGRADIENT WELLS MWN-37A, MWN-38A, AND MWN-39A
## TANK FARM GROUP

| Location ID | | MWN-37A | MWN-38A | MWN-39A |
|---|---|---|---|---|
| Sample ID | | MWN-37A | MWN-38A | MWN-39A |
| Matrix | | Groundwater | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - | - |
| Date Sampled | | 12/20/00 | 12/20/00 | 12/20/00 |
| Parameter | Units | | | |
| General Chemistry Parameters | | | | |
| Chloride | MG/L | 185 J | 91.0 J | 170 J |
| Cyanide | MG/L | 0.024 J | 0.19 J | 0.034 J |
| Sulfate | MG/L | 110 | 168 | 141 |
| Total Organic Carbon | MG/L | 8.5 | 4.4 | 4.1 |
| Total Dissolved Solids | MG/L | 744 | 546 | 627 |
| Total Recoverable Phenolics | MG/L | 0.36 | 0.32 | 0.037 U |
| Dissolved Gases | | | | |
| Methane | MG/L | 1.2 | 0.41 | 0.79 |
| Nitrogen | MG/L | 19 | 22 | 18 |
| Oxygen | MG/L | 0.78 | 1.0 | 0.79 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 13
# SUMMARY OF DETECTED GROUNDWATER RESULTS
# CROSSGRADIENT WELLS MWN-17A AND MWN-17B
# TANK FARM GROUP

| Location ID | | MWN-17A | MWN-17B |
|---|---|---|---|
| Sample ID | | MWN-17A | MWN-17B |
| Matrix | | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - |
| Date Sampled | | 11/02/99 | 11/02/99 |
| Parameter | Units | | |
| **Volatile Organic Compounds** | | | |
| Benzene | UG/L | 5.0 U | 10 |
| Chloroform | UG/L | 12 | 4.2 J |
| Toluene | UG/L | 5.0 U | 1.7 J |
| **Semivolatile Organic Compounds** | | | |
| bis(2-Chloroethyl)ether | UG/L | 10 U | 81 J |
| 2,4-Dimethylphenol | UG/L | 2.3 J | 92 DJ |
| Fluoranthene | UG/L | 10 U | 1.1 J |
| 3-Methylphenol & 4-Methylphenol | UG/L | 43 | 1200 D |
| 2-Methylphenol | UG/L | 10 | 270 DJ |
| Naphthalene | UG/L | 6.4 J | 22 |
| Phenanthrene | UG/L | 1.1 J | 2.2 J |
| Phenol | UG/L | 140 D | 2400 D |
| Pyrene | UG/L | 2.5 J | 1.4 J |
| **Metals** | | | |
| Arsenic | UG/L | 6.3 B | 11.4 |
| Barium | UG/L | 92.7 BJ | 102 BJ |
| Calcium | UG/L | 71500 | 81100 |
| Chromium | UG/L | 2.7 B | 30.5 |
| Iron | UG/L | 601 | 463 |
| Magnesium | UG/L | 521 B | 210 B |
| Nickel | UG/L | 40 U | 20.8 B |
| Potassium | UG/L | 8370 | 17900 |
| Selenium | UG/L | 12.2 | 14.8 |
| Sodium | UG/L | 23000 | 105000 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 13
# SUMMARY OF DETECTED GROUNDWATER RESULTS
# CROSSGRADIENT WELLS MWN-17A AND MWN-17B
# TANK FARM GROUP

| Location ID | | MWN-17A | MWN-17B |
|---|---|---|---|
| Sample ID | | MWN-17A | MWN-17B |
| Matrix | | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - |
| Date Sampled | | 11/02/99 | 11/02/99 |
| **Parameter** | **Units** | | |
| **Dissolved Metals** | | | |
| Arsenic -DISS | UG/L | 2.0 B | 9.9 B |
| Barium -DISS | UG/L | 60.8 B | 99.7 B |
| Cadmium -DISS | UG/L | 0.27 B | 2.0 U |
| Calcium -DISS | UG/L | 57300 | 80800 |
| Chromium -DISS | UG/L | 0.56 B | 0.96 B |
| Iron -DISS | UG/L | 47.1 B | 84.0 B |
| Magnesium -DISS | UG/L | 5000 U | 20.5 B |
| Potassium -DISS | UG/L | 7230 | 18300 |
| Selenium -DISS | UG/L | 7.9 | 12.5 |
| Sodium -DISS | UG/L | 21800 | 111000 |
| Thallium -DISS | UG/L | 6.3 B | 10 U |
| **General Chemistry Parameters** | | | |
| Alkalinity (as CaCO3) | MG/L | 46.6 | 99.2 |
| Alkalinity Total | MG/L | 98.6 | 206 |
| Chloride | MG/L | 24.8 | 177 |
| Cyanide | MG/L | 0.010 UR | 0.050 J |
| Sulfate | MG/L | 63.3 | 55.1 |
| Total Organic Carbon | MG/L | 4.7 J | 21.2 J |
| Total Dissolved Solids | MG/L | 256 | 541 |
| Total Organic Halogens | MG/L | 0.030 J | 0.030 J |
| Total Recoverable Phenolics | MG/L | 0.13 | 4.2 |
| **Dissolved Gases** | | | |
| Methane | MG/L | 0.07 U | 9.2 |
| Nitrogen | MG/L | 16.0 | 13.2 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 13
# SUMMARY OF DETECTED GROUNDWATER RESULTS
# CROSSGRADIENT WELLS MWN-17A AND MWN-17B
# TANK FARM GROUP

| Location ID | | MWN-17A | MWN-17B |
|---|---|---|---|
| Sample ID | | MWN-17A | MWN-17B |
| Matrix | | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - |
| Date Sampled | | 11/02/99 | 11/02/99 |
| Parameter | Units | | |
| Dissolved Gases | | | |
| Oxygen | MG/L | 0.73 | 0.47 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

J:\4290008B.15\db\program\PROGRAM.MDB
Printed: 11/5/2001 3:24:44 PM
( [LOCID] = 'MWN-17A' OR [LOCID] = 'MWN-17B' ) AND [LOGDATE] > #12/17/1998#

# TABLE 14
## SUMMARY OF DETECTED GROUNDWATER RESULTS
## UPGRADIENT WELLS MWN-10 AND MWN-40A
## TANK FARM GROUP

| Location ID | | MWN-10 | MWN-40A |
|---|---|---|---|
| Sample ID | | MWN-10 | MWN-40A |
| Matrix | | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - |
| Date Sampled | | 11/03/99 | 12/20/00 |
| Parameter | Units | | |
| **Semivolatile Organic Compounds** | | | |
| Naphthalene | UG/L | 2.3 J | 10 U |
| **Metals** | | | |
| Antimony | UG/L | 60 UJ | 2.6 B |
| Barium | UG/L | 13.1 BJ | 15.4 B |
| Calcium | UG/L | 35400 | 81100 |
| Chromium | UG/L | 0.59 B | 4.1 B |
| Iron | UG/L | 44.9 B | 432 |
| Lead | UG/L | 3.0 U | 2.0 B |
| Magnesium | UG/L | 258 B | 16200 |
| Mercury | UG/L | 0.20 U | 0.069 B |
| Potassium | UG/L | 16200 | 6680 |
| Selenium | UG/L | 1.6 B | 2.1 U |
| Sodium | UG/L | 73400 | 58900 |
| **General Chemistry Parameters** | | | |
| Alkalinity (as CaCO3) | MG/L | 53.5 | 5.0 U |
| Alkalinity Total | MG/L | 87.4 | 252 |
| Chloride | MG/L | 71.6 | 81.0 J |
| Cyanide | MG/L | 0.012 J | 0.22 J |
| Sulfate | MG/L | 78.9 | 27.0 |
| Total Organic Carbon | MG/L | 3.2 J | 4.6 |
| Total Dissolved Solids | MG/L | 365 | 428 |
| Total Organic Halogens | MG/L | 0.025 BJ | 0.030 UJ |
| **Dissolved Gases** | | | |
| Carbon Dioxide | MG/L | 0.60 U | 4.2 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 14
## SUMMARY OF DETECTED GROUNDWATER RESULTS
## UPGRADIENT WELLS MWN-10 AND MWN-40A
## TANK FARM GROUP

| Location ID | | MWN-10 | MWN-40A |
|---|---|---|---|
| Sample ID | | MWN-10 | MWN-40A |
| Matrix | | Groundwater | Groundwater |
| Depth Interval (ft.) | | - | - |
| Date Sampled | | 11/03/99 | 12/20/00 |
| Parameter | Units | | |
| Dissolved Gases | | | |
| Methane | MG/L | 8.7 | 0.54 |
| Nitrogen | MG/L | 12.6 | 16 |
| Oxygen | MG/L | 0.43 | 0.86 |

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

**Detection Limits shown are PQL**

# TABLE 15
## SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
## SURFACE SWMU MATERIAL
## TANK FARM GROUP

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Maximum Background Concentration (mg/kg) | Region III Residential Soil RBC (mg/kg)[a] | Human Health COPC?[b] |
|---|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | | |
| Benzene | 15 | 6 | 40% | 0.02 | 0.01 | 12 | No |
| Carbon disulfide | 8 | 1 | 13% | 0.006 | NA | 7,800 | No |
| Dichlorodifluoromethane | 13 | 4 | 31% | 0.073 | NA | 16,000 | No |
| Ethylbenzene | 13 | 3 | 23% | 0.027 | NA | 7,800 | No |
| Methylene chlroide | 15 | 10 | 67% | 0.079 | NA | 85 | No |
| Toluene | 15 | 11 | 73% | 0.18 | 0.006 | 16,000 | No |
| Trichlorofluoromethane | 14 | 6 | 43% | 0.05 | NA | 23,000 | No |
| Xylenes, Total | 11 | 6 | 55% | 0.47 | NA | 160,000 | No |
| ***Semivolatiles*** | | | | | | | |
| Di-n-butyl phthalate | 15 | 1 | 7% | 0.22 | 0.49 | 7,800 | No |
| Acenaphthene | 11 | 5 | 45% | 97 | 0.34 | 4,700 | No |
| Acenaphthylene | 15 | 10 | 67% | 130 | 1.1 | NA | **Yes** |
| Anthracene | 15 | 13 | 87% | 110 | 1.9 | 23,000 | No |
| Benzo(a)anthracene | 15 | 14 | 93% | 310 | 6.7 | 0.87 | **Yes** |
| Benzo(a)pyrene | 15 | 15 | 100% | 400 | 6 | 0.087 | **Yes** |
| Benzo(b)fluoranthene | 11 | 11 | 100% | 640 | 12 | 0.87 | **Yes** |
| Benzo(k)fluoranthene | 11 | 11 | 100% | 320 | 3.3 | 8.7 | **Yes** |
| Benzo(g,h,i)perylene | 11 | 11 | 100% | 380 | 5.9 | 2,300[g] | No |
| bis(2-Ethylhexyl)phthalate | 15 | 1 | 7% | 0.15 | 2.7 | 46 | No |
| Chrysene | 15 | 15 | 100% | 330 | 4.9 | 87 | **Yes** |
| Dibenz(a,h)anthracene | 11 | 11 | 100% | 89 | 1.8 | 0.087 | **Yes** |
| Fluoranthene | 15 | 15 | 100% | 600 | 12 | 3,100 | No |
| Fluorene | 15 | 10 | 67% | 130 | 0.81 | 3,100 | No |
| Indeno(1,2,3-c,d)pyrene | 11 | 11 | 100% | 400 | 6 | 0.87 | **Yes** |
| Naphthalene | 15 | 14 | 93% | 180 | 0.22 | 1,600 | No |
| Phenanthrene | 15 | 15 | 100% | 540 | 8.1 | 2,300[g] | No |
| Pyrene | 10 | 10 | 100% | 750 | 10 | 2,300 | No |
| ***Metals*** | | | | | | | |
| Antimony | 15 | 13 | 87% | 80.8 | 1 | 31 | **Yes** |
| Arsenic | 15 | 15 | 100% | 90.3 | 12 | 0.43 | **Yes** |
| Barium | 15 | 14 | 93% | 402 | 84.3 | 5,500 | No |
| Cadmium | 15 | 8 | 53% | 4.7 | NA | 78 | No |
| Chromium | 15 | 15 | 100% | 797 | 27.1 | 230[c] | **Yes** |
| Lead | 15 | 15 | 100% | 960 | 30 | 400[d] | **Yes** |
| Mercury | 15 | 13 | 87% | 22.90 | 0.32 | 23[e] | No |
| Nickel | 15 | 13 | 87% | 26.9 | 27.7 | 1,600 | No |
| Selenium | 11 | 4 | 36% | 2.9 | 0.6 | 390 | No |
| Silver | 15 | 2 | 13% | 0.5 | NA | 390 | No |
| Thallium | 15 | 4 | 27% | 6.9 | NA | 5.5 | **Yes** |
| ***Miscellaneous*** | | | | | | | |
| Cyanide | 11 | 6 | 55% | 123 | NA | 1600[f] | No |

a USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA 2000a).
b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than background and the screening criteria are retained as COPCs.
c Chromium is compared to the RBC for hexavalent chromium.
d Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).
e Mercury is compared to the RBC for mercuric chloride.
f Cyanide is compared to the RBC for free cyanide.
g Pyrene RBC used as a surrogate.
NA Not available.

# TABLE 16
# SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
# SUBSURFACE SWMU MATERIAL
# TANK FARM GROUP

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (mg/kg) | Soil Screening Criteria[a] (mg/kg) | Human Health COPC?[b] |
|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | |
| Benzene | 6 | 1 | 17% | 17 | 0.8 | **Yes** |
| Ethylbenzene | 6 | 2 | 33% | 18 | 400[c] | No |
| Toluene | 6 | 3 | 50% | 18 | 650[c] | No |
| m-Xylene & p-Xylene | 6 | 3 | 50% | 140 | 420[c,d] | No |
| o-Xylene | 6 | 3 | 50% | 56 | 410[c] | No |
| ***Volatile Semivolatiles*** | | | | | | |
| Acenaphthylene | 6 | 5 | 83% | 1,600 | 120[c,e] | **Yes** |
| Anthracene | 6 | 6 | 100% | 1,400 | 6.8[c] | **Yes** |
| Fluorene | 6 | 6 | 100% | 1,300 | 89 | **Yes** |
| Naphthalene | 6 | 6 | 100% | 6,500 | 180 | **Yes** |
| Phenanthrene | 6 | 6 | 100% | 4,100 | 160[c,f] | **Yes** |
| ***Semivolatiles*** | | | | | | |
| 2-Methylphenol | 5 | 1 | 20% | 21 | 3,900 | No |
| Benz(a)anthracene | 6 | 5 | 83% | 1,000 | 0.86 | **Yes** |
| Benzo(a)pyrene | 6 | 5 | 83% | 850 | 0.087 | **Yes** |
| Bis(2-ethylhexyl)phthalate | 6 | 2 | 33% | 0.12 | 46 | No |
| Chrysene | 6 | 5 | 83% | 1,000 | 87 | **Yes** |
| Fluoranthene | 6 | 6 | 100% | 2,500 | 3,100 | No |
| Phenol | 5 | 2 | 40% | 130 | 47,000 | No |
| Pyrene | 6 | 6 | 100% | 1,700 | 2,300 | No |
| ***Metals*** | | | | | | |
| Antimony | 6 | 6 | 100% | 3.1 | 31 | No |
| Arsenic | 6 | 6 | 100% | 27.8 | 0.43 | **Yes** |
| Barium | 6 | 6 | 100% | 739 | 5,500 | No |
| Cadmium | 6 | 4 | 67% | 0.55 | 78 | No |
| Chromium | 6 | 6 | 100% | 87.7 | 230[g] | No |
| Lead | 6 | 6 | 100% | 20.7 | 400[h] | No |
| Mercury | 8 | 8 | 100% | 2.70 | 23[i] | No |
| Nickel | 6 | 6 | 100% | 9.9 | 1,600 | No |
| Selenium | 6 | 5 | 83% | 6.8 | 390 | No |
| Silver | 6 | 6 | 100% | 2.6 | 390 | No |
| Thallium | 6 | 3 | 50% | 15.5 | 5.5 | **Yes** |

a For volatile chemicals, USEPA Soil Screening Levels (Generic SSLs) for vapor inhalation were used (USEPA 1996a); for semivolatile chemicals and metals, USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA 2000a) are used.

b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than the screening criteria are retained as COPCs.

c The calculated RBSL exceeds the soil saturation concentration ($C_{sat}$), the concentration at which soil pore air is saturated with a chemical emissions reach their maximum. $C_{sat}$ is used as the RBSL. (USEPA 1996a).

d Most conservative value for the two isomers (m-xylene).

e Acenaphthylene is compared to the screening criteria for acenaphthene.

f Calculated according to USEPA (1996a).

g Chromium is compared to the RBC for hexavalent chromium.

h Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).

i Mercury is compared to the RBC for mercuric chloride.

NA Not available.

# TABLE 17
## SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
## TANK FARM GROUP - GROUNDWATER

| Chemical | Number of Samples | Number of Detects | Detection Frequency | Maximum Detected Concentration (µg/L) | Region III Tap Water RBC[a] (µg/L) | NYSDEC Standard[b] (µg/L) | Human Health COPC?[c] |
|---|---|---|---|---|---|---|---|
| ***Volatiles*** | | | | | | | |
| Benzene | 25 | 12 | 48% | 200 | 0.32 | 1 | **Yes** |
| Chloroform | 22 | 2 | 9% | 12 | 0.15 | 7 | **Yes** |
| Toluene | 22 | 5 | 23% | 8.7 | 750 | 5 | **Yes** |
| Xylenes, Total | 18 | 3 | 17% | 7.8 | 12,000 | 5 | **Yes** |
| ***Volatile Semivolatiles*** | | | | | | | |
| Acenaphthylene | 22 | 1 | 4.5% | 4.9 | 370[d] | 20[d] | No |
| bis(2-Chloroethyl)ether | 22 | 1 | 4.5% | 81 | 0.0096 | 0.030 | No |
| Fluorene | 22 | 2 | 9% | 3.4 | 240 | 50 | No |
| Naphthalene | 25 | 14 | 56% | 130 | 6.5 | 10 | **Yes** |
| Phenanthrene | 22 | 5 | 23% | 5.2 | 180[i] | 50 | No |
| ***Semivolatiles*** | | | | | | | |
| bis(2-Ethylhexyl)phthalate | 22 | 3 | 14% | 10 | 4.8 | 5 | **Yes** |
| 2,4-Dimethylphenol | 22 | 11 | 50% | 420 | 730 | 50 | **Yes** |
| Fluoranthene | 22 | 2 | 9% | 2.6 | 1,500 | 50 | No |
| 2-Methylphenol | 22 | 15 | 68% | 2,600 | 1,800 | 1 | **Yes** |
| 3-Methylphenol and 4-Methylphenol | 20 | 16 | 80% | 11,000 | 180[e] | 1[e] | **Yes** |
| Phenol | 22 | 17 | 77% | 28,000 | 21,900 | 1 | **Yes** |
| Pyrene | 22 | 3 | 14% | 2.6 | 180 | 50 | No |
| Pyridine | 22 | 1 | 4.5% | 7.6 | 37 | 50 | No |
| ***Metals*** | | | | | | | |
| Antimony | 13 | 1 | 8% | 2.6 | 15 | 3 | No |
| Arsenic | 13 | 8 | 62% | 36 | 0.045 | 25 | **Yes** |
| Barium | 13 | 9 | 69% | 386 | 2,600 | 1,000 | No |
| Chromium | 13 | 9 | 69% | 31 | 110[f] | 50[f] | No |
| Lead | 13 | 3 | 23% | 9.2 | 15[g] | 25 | No |
| Manganese | 5 | 4 | 80% | 250 | 730 | 300 | No |
| Mercury | 13 | 3 | 23% | 0.069 | 11 | 0.7 | No |
| Nickel | 13 | 2 | 15% | 21 | 730 | 100 | No |
| Selenium | 13 | 11 | 85% | 15 | 180 | 10 | **Yes** |
| ***Miscellaneous*** | | | | | | | |
| Cyanide | 19 | 16 | 84% | 28,000 | 730[h] | 200 | **Yes** |

a USEPA Region III Tapwater Risk Based Concentration (RBC) (USEPA 2000a).
b NYSDEC Ambient Water Quality Standard and Guidance value (NYSDEC 1998).
c Chemical is a COPC if detection frequency exceeds 5.0%, and the maximum detected concentration exceeds the lower of the RBC or NYSDEC Standard.
d Screening values for acenaphthene are used as surrogate criteria for acenaphthylene.
e The 3-methylphenol and 4-methylphenol mixture is compared to RBC and NYSDEC Standard for 4-methylphenol.
f Chromium is compared to RBC and NYSDEC Standard for hexavalent chromium.
g Lead lacks standard toxicity criteria. A value of 15 µg/L is used for screening purposes (USEPA 1991c).
h Cyanide is compared to RBC for free cyanide.
i Phenanthrene compared to RBC for pyrene.

## TABLE 18
## REPRESENTATIVE CONCENTRATIONS[a] OF CHEMICALS OF POTENTIAL CONCERN (COPCs)
## TANK FARM GROUP

| Surface SWMU Material COPCs | Representative Concentration (mg/kg) | Subsurface SWMU Material COPCs | Representative Concentration (mg/kg) | Tank Farm Zone Groundwater COPCs | Representative Concentration (mg/L) |
|---|---|---|---|---|---|
| Antimony | 81 | Arsenic | 28 | Arsenic | 0.015 |
| Arsenic | 71 | Thallium | 16 | Selenium | 0.010 |
| Chromium | 202 | Acenaphthylene | 1,600[b] | Cyanide | 7.5 |
| Lead | 226 | Anthracene | 1,400[b] | Benzene | 0.055 |
| Thallium | 2.0 | Benzene | 17 | Chloroform | 0.0042 |
| Acenaphthylene | 130 | Benzo(a)anthracene | 1,000[b] | 2,4-Dimethylphenol | 0.11 |
| Benzo(a)anthracene | 310[b] | Benzo(a)pyrene | 850[b] | 2-Methylphenol | 0.63 |
| Benzo(a)pyrene | 400[b] | Chrysene | 1,000[b] | 3-Methylphenol and | |
| Benzo(b)fluoranthene | 640[b] | Fluorene | 1,300[b] | 4-Methylphenol | 3.0 |
| Benzo(k)fluoranthene | 320[b] | Naphthalene | 6,500[b] | Naphthalene | 0.16 |
| Chrysene | 330[b] | Phenanthrene | 4,100[b] | Phenol | 6.8 |
| Dibenz(a,h)anthracene | 89[b] | | | Toluene | 0.0044 |
| Indeno(1,2,3-c,d)pyrene | 400[b] | | | Xylenes, Total | 0.0043 |
| | | | | bis(2-Ethylhexyl)phthalate | 0.010 |

a For datasets of 10 or greater, the 95% UCL is used as the representative concentration. For datasets with less than 10 samples, the maximum concentration is used.

b The representative concentration for this chemical exceeds the chemical's saturation limit.

# TABLE 19
# POTENTIAL EXPOSURE SCENARIOS[a]
# TANK FARM GROUP

| Potential Receptor Scenario | Exposure Media | Potential Pathway of Exposure |
|---|---|---|
| Future Commercial/Industrial Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | ambient and indoor vapor inhalation |
| | Tank Farm Zone groundwater | ambient and indoor vapor inhalation |
| Current Non-BSC Commercial/Industrial Worker | Surface SWMU Material | particulate inhalation |
| | Subsurface SWMU Material | ambient vapor inhalation |
| Future Utility/Maintenance Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | particulate/ambient vapor inhalation |
| | | ingestion |
| | | dermal contact |
| | Tank Farm Zone groundwater | ambient vapor inhalation |
| | | dermal contact |
| Trespasser | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | ambient vapor inhalation |
| | Tank Farm Zone groundwater | ambient vapor inhalation |
| Future Construction Worker | Surface SWMU Material | particulate inhalation |
| | | ingestion |
| | | dermal contact |
| | Subsurface SWMU Material | particulate/ambient vapor inhalation |
| | | ingestion |
| | | dermal contact |
| | Tank Farm Zone groundwater | ambient vapor inhalation |
| | | dermal contact |
| Future Marina Worker | Surface SWMU Material | particulate inhalation |
| | Subsurface SWMU Material | ambient vapor inhalation |
| Future Greenway User | Surface SWMU Material | particulate inhalation |
| | Subsurface SWMU Material | ambient vapor inhalation |
| Future Fenceline Resident | Surface SWMU Material | particulate inhalation |
| | Subsurface SWMU Material | ambient vapor inhalation |
| Present Fenceline Resident | Surface SWMU Material | particulate inhalation |
| | Subsurface SWMU Material | ambient vapor inhalation |

a Potential exposure scenarios for the Tank Farm SWMUs are based on those determined in ID No. 2 (BSC 1999b), the chemicals of potential concern determined in ID No. 1 (BSC 1998) and this SWMU report, and 4/2/03 comments from USEPA Region 2 (USEPA 2003).

# TABLE 20
## TOXICITY CRITERIA FOR COPCs
## REFERENCE DOSES (RfDs) AND SLOPE FACTORS (SFs)
## TANK FARM GROUP

| Chemical | CAS | Noncarcinogenic Toxicity Criteria | | | | Carcinogenic Toxicity Criteria | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Oral RfD (mg/kg-d) | Source | Inhalation RfD (mg/kg-d) | Source | Weight of Evidence[a] | Oral SF $(mg/kg-d)^{-1}$ | Source | Inhalation SF $(mg/kg-d)^{-1}$ | Source |
| ***Inorganics*** | | | | | | | | | | |
| Antimony | 7440-36-0 | 4.00E-04 | H | 4.00E-04 | R | -- | -- | -- | -- | -- |
| Arsenic | 7440-38-2 | 3.00E-04 | I | -- | -- | A | 1.50E+00 | I | 1.51E+01 | I |
| Chromium[b] | 18540-29-9 | 3.00E-03 | I | 3.00E-05 | I | A | -- | -- | 4.10E+01 | H |
| Lead[c] | 71-43-2 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Selenium | 7782-49-2 | 5.00E-03 | I | 5.00E-03 | R | -- | -- | -- | -- | -- |
| Thallium | 7440-28-0 | 8.00E-05 | I | 8.00E-05 | R | -- | -- | -- | -- | -- |
| Cyanide | 57-12-5 | 2.00E-02 | I | -- | -- | -- | -- | -- | -- | -- |
| ***Organics*** | | | | | | | | | | |
| Acenaphthylene | 208-96-8 | 6.00E-02 | I, acenaphthene surrogate | 6.00E-02 | R | -- | -- | -- | -- | -- |
| Anthracene | 120-12-7 | 3.00E-01 | I | 3.00E-01 | R | -- | -- | -- | -- | -- |
| Benzene | 71-43-2 | 3.00E-03 | E | 1.70E-03 | E | A | 5.50E-02 | I | 2.90E-02 | I |
| Benzo(a)anthracene | 56-55-3 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Benzo(a)pyrene | 50-32-8 | -- | -- | -- | -- | B2 | 7.30E+00 | I | 3.10E+00 | E |
| Benzo(b)fluoranthene | 205-99-2 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| Benzo(k)fluoranthene | 218-09-9 | -- | -- | -- | -- | B2 | 7.30E-02 | E | 3.10E-02 | E |
| bis(2-Ethylhexyl)phthalate | 117-81-7 | 2.00E-02 | I | -- | -- | B2 | 1.40E-02 | I | 1.40E-02 | I |
| Chloroform | 67-66-3 | 1.00E-02 | I | 8.60E-05 | E | B2 | 6.10E-03 | I | 8.10E-02 | I |
| Chrysene | 218-09-9 | -- | -- | -- | -- | B2 | 7.30E-03 | E | 3.10E-03 | E |
| Dibenz(a,h)anthracene | 53-70-3 | -- | -- | -- | -- | B2 | 7.30E+00 | E | 3.10E+00 | E |
| 2,4-Dimethylphenol | 105-67-9 | 2.00E-02 | I | 2.00E-02 | R | -- | -- | -- | -- | -- |
| Fluorene | 86-73-7 | 4.00E-02 | I | 4.00E-02 | R | -- | -- | -- | -- | -- |
| Indeno(1,2,3-c,d)pyrene | 193-39-5 | -- | -- | -- | -- | B2 | 7.30E-01 | E | 3.10E-01 | E |
| 2-Methylphenol | 95-48-7 | 5.00E-02 | I | 5.00E-02 | R | -- | -- | -- | -- | -- |
| 3-Methylphenol and 4-Methylphenol[d] | 108-39-4/ 106-44-5 | 5.00E-03 | I | 5.00E-03 | R | -- | -- | -- | -- | -- |
| Naphthalene | 91-20-3 | 2.00E-02 | I | 9.00E-04 | I | -- | -- | -- | -- | -- |
| Phenanthrene | 85-01-8 | 3.00E-02 | I, pyrene surrogate | 3.00E-02 | R | -- | -- | -- | -- | -- |
| Phenol | 108-95-2 | 6.00E-01 | I | -- | -- | -- | -- | -- | -- | -- |
| Toluene | 108-88-3 | 2.00E-01 | I | 1.14E-01 | I | -- | -- | -- | -- | -- |
| Xylenes, Total | 1130-20-7 | 2.00E+00 | I | 2.00E+00 | R | -- | -- | -- | -- | -- |

-- There is no toxicity criteria for this pathway.
a Weight of Evidence: A - known human carcinogen, B2 - probable human carcinogen (sufficient animal/inadequate human evidence) (USEPA 2000b).
b The toxicity criteria for hexavalent chromium is conservatively used for chromium.
c Lead lacks standard toxicity criteria and was evaluated alternatively.
d The toxicity criteria for 4-methylphenol is conservatively used for 3-methylphenol and 4-methylphenol.
E Obtained from the USEPA National Center for Environmental Assessment (Region III RBC Tables) (USEPA 2000a).
H Health Effects Assessment Summary Tables (HEAST) (USEPA 1997).
I Integrated Risk Information System (IRIS) online database (USEPA 2000b).
R Route to route extrapolation; in absence of inhalation RfD, oral RfD was used for volatile COPCs which do not have carcinogenic inhalation toxicity criteria.

# TABLE 21
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# TANK FARM GROUP

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| **Current Non-BSC Commercial/Industrial Worker** | | | |
| *Inhalation of Particles from Surficial SWMU material (mg/kg)* | | | |
| Antimony | 81 | -- | >1,000,000 |
| Arsenic | 71 | 233,000 | -- |
| Chromium[a] | 202 | 85,700 | >1,000,000 |
| Lead | 226 | -- | NE |
| Thallium | 2.0 | -- | >1,000,000 |
| Acenaphthylene | 130 | -- | >1,000,000 |
| Benzo(a)anthracene | 310 | >1,000,000 | -- |
| Benzo(a)pyrene | 400 | >1,000,000 | -- |
| Benzo(b)fluoranthene | 640 | >1,000,000 | -- |
| Benzo(k)fluoranthene | 320 | >1,000,000 | -- |
| Chrysene | 330 | >1,000,000 | -- |
| Dibenz(a,h)anthracene | 89 | >1,000,000 | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | >1,000,000 | -- |
| *Inhalation of Ambient Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | **6.3** | 27 |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | > sat (371) |
| Phenanthrene | 4,100 | -- | > sat (163) |
| **Future Commercial/Industrial Worker** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Antimony | 81 | -- | **50** |
| Arsenic | 71 | **12[b]** | **37** |
| Chromium[a] | 202 | 85,700 | 373 |
| Lead[c] | 226 | -- | 1,545 |
| Thallium | 2.0 | -- | 9.9 |
| Acenaphthylene | 130 | -- | 5,800 |
| Benzo(a)anthracene | 310 | **1.9** | -- |
| Benzo(a)pyrene | 400 | **0.19** | -- |
| Benzo(b)fluoranthene | 640 | **1.9** | -- |
| Benzo(k)fluoranthene | 320 | **19** | -- |
| Chrysene | 330 | **194** | -- |
| Dibenz(a,h)anthracene | 89 | **0.19** | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | **1.9** | -- |
| *Inhalation of Ambient Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | **3.4** | **15** |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | **252** |
| Phenanthrene | 4,100 | -- | > sat (163) |

# TABLE 21
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# TANK FARM GROUP

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| *Inhalation of Indoor Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | **0.16** | **0.69** |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | **103** |
| Phenanthrene | 4,100 | -- | > sat (163) |
| *Inhalation of Ambient Vapors from Groundwater (mg/L)* | | | |
| Benzene | 0.055 | 11 | 50 |
| Chloroform | 0.0042 | 5 | 3 |
| Naphthalene | 0.16 | -- | > sol (31) |
| Toluene | 0.0044 | -- | > sol (526) |
| Xylenes, Total | 0.0043 | -- | > sol (175) |
| *Inhalation of Indoor Vapors from Groundwater (mg/L)* | | | |
| Benzene | 0.055 | 0.50 | 2.2 |
| Chloroform | 0.0042 | 0.22 | 0.13 |
| Naphthalene | 0.16 | -- | 12 |
| Toluene | 0.0044 | -- | 130 |
| Xylenes, Total | 0.0043 | -- | > sol (175) |
| **Future Construction Worker** *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Antimony | 81 | -- | 129 |
| Arsenic | 71 | **16** | 96 |
| Chromium[a] | 202 | >1,000,000 | 963 |
| Lead[c] | 226 | -- | 1,545 |
| Thallium | 2.0 | -- | 26 |
| Acenaphthylene | 130 | -- | 11,000 |
| Benzo(a)anthracene | 310 | **33** | -- |
| Benzo(a)pyrene | 400 | **3.3** | -- |
| Benzo(b)fluoranthene | 640 | **33** | -- |
| Benzo(k)fluoranthene | 320 | 330 | -- |
| Chrysene | 330 | 3,300 | -- |
| Dibenz(a,h)anthracene | 89 | **3.3** | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | **33** | -- |
| *Direct Contact (including particulate and ambient vapor inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Arsenic | 28 | **16** | 96 |
| Thallium | 16 | -- | 26 |
| Acenaphthylene | 1,600 | -- | 11,000 |
| Anthracene | 1,400 | -- | 76,300 |
| Benzene | 17 | 25 | 17 |
| Benz(a)anthracene | 1,000 | **33** | -- |
| Benzo(a)pyrene | 850 | **3.3** | -- |
| Chrysene | 1,000 | 3,300 | -- |
| Fluorene | 1,300 | -- | 8,680 |
| Naphthalene | 6,500 | -- | **67** |
| Phenanthrene | 4,100 | -- | 6,470 |

# TABLE 21
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# TANK FARM GROUP

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| *Inhalation of Ambient Vapors from and Dermal Contact with Groundwater (mg/L)* | | | |
| Arsenic | 0.015 | 0.19 | 1.1 |
| Selenium | 0.010 | -- | 40 |
| Cyanide | 7.5 | -- | 167 |
| Benzene | 0.055 | 43 | 1.0 |
| bis(2-Ethylhexyl)phthalate | 0.010 | 0.020 | 0.073 |
| Chloroform | 0.0042 | 74 | 3.9 |
| 2,4-Dimethylphenol | 0.11 | -- | 9.8 |
| 2-Methylphenol | 0.63 | -- | 36 |
| 3-Methylphenol and 4-Methylphenol | 3.0 | -- | 3.6 |
| Naphthalene | 0.16 | -- | 2.1 |
| Phenol | 6.8 | -- | 782 |
| Toluene | 0.0044 | -- | 32 |
| Xylenes, Total | 0.0043 | -- | 152 |
| **Future Utility/Maintenance Worker** *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Antimony | 81 | -- | 554 |
| Arsenic | 71 | **69** | 416 |
| Chromium[a] | 202 | >1,000,000 | 4,160 |
| Lead[c] | 226 | -- | 1,545 |
| Thallium | 2.0 | -- | 111 |
| Acenaphthylene | 130 | -- | 50,500 |
| Benzo(a)anthracene | 310 | **142** | -- |
| Benzo(a)pyrene | 400 | **14** | -- |
| Benzo(b)fluoranthene | 640 | **142** | -- |
| Benzo(k)fluoranthene | 320 | 1,420 | -- |
| Chrysene | 330 | 14,240 | -- |
| Dibenz(a,h)anthracene | 89 | **14** | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | **142** | -- |
| *Direct Contact (including particulate and ambient vapor inhalation) with Subsurface SWMU Material (mg/kg)* | | | |
| Arsenic | 28 | 69 | 416 |
| Thallium | 16 | -- | 111 |
| Acenaphthylene | 1,600 | -- | 50,500 |
| Anthracene | 1,400 | -- | 339,000 |
| Benzene | 17 | 122 | 84 |
| Benzo(a)anthracene | 1,000 | **142** | -- |
| Benzo(a)pyrene | 850 | **14** | -- |
| Chrysene | 1,000 | 14,240 | -- |
| Fluorene | 1,300 | -- | 39,200 |
| Naphthalene | 6,500 | -- | **334** |
| Phenanthrene | 4,100 | -- | 29,300 |

# TABLE 21
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# TANK FARM GROUP

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| *Inhalation of Ambient Vapors from and Dermal Contact with Groundwater (mg/L)* | | | |
| Arsenic | 0.015 | 2.1 | 12 |
| Selenium | 0.010 | -- | 440 |
| Cyanide | 7.5 | -- | 1,835 |
| Benzene | 0.055 | 93 | 11 |
| bis(2-Ethylhexyl)phthalate | 0.010 | 0.22 | > sol (0.27) |
| Chloroform | 0.0042 | 338 | 26 |
| 2,4-Dimethylphenol | 0.11 | -- | 108 |
| 2-Methylphenol | 0.63 | -- | 393 |
| 3-Methylphenol and 4-Methylphenol | 3.0 | -- | 40 |
| Naphthalene | 0.16 | -- | 23 |
| Phenol | 6.8 | -- | 8,621 |
| Toluene | 0.0044 | -- | 350 |
| Xylenes, Total | 0.0043 | -- | > sol (175) |
| **Trespasser** | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)* | | | |
| Antimony | 81 | -- | 6,770 |
| Arsenic | 71 | 212 | 5,080 |
| Chromium[a] | 202 | >1,000,000 | 50,800 |
| Lead[c] | 226 | -- | 1,545 |
| Thallium | 2.0 | -- | 1,350 |
| Acenaphthylene | 130 | -- | 847,360 |
| Benzo(a)anthracene | 310 | 435 | -- |
| Benzo(a)pyrene | 400 | 44 | -- |
| Benzo(b)fluoranthene | 640 | 435 | -- |
| Benzo(k)fluoranthene | 320 | 4,350 | -- |
| Chrysene | 330 | 43,476 | -- |
| Dibenz(a,h)anthracene | 89 | 44 | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | 435 | -- |
| *Inhalation of Ambient Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | 862 | > sat (1,264) |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | > sat (371) |
| Phenanthrene | 4,100 | -- | > sat (163) |
| *Inhalation of Ambient Vapors from Groundwater (mg/L)* | | | |
| Benzene | 0.055 | > sol (1,750) | > sol (1,750) |
| Chloroform | 0.0042 | 1,990 | 740 |
| Naphthalene | 0.16 | -- | > sol (31) |
| Toluene | 0.0044 | -- | > sol (526) |
| Xylenes, Total | 0.0043 | -- | > sol (175) |
| **Future Marina Worker** | | | |
| *Inhalation of Particles from Surficial SWMU material (mg/kg)* | | | |
| Antimony | 81 | -- | >1,000,000 |
| Arsenic | 71 | 298,000 | -- |

# TABLE 21
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# TANK FARM GROUP

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| Chromium[a] | 202 | 110,000 | >1,000,000 |
| Lead | 226 | -- | NE |
| Thallium | 2.0 | -- | >1,000,000 |
| Acenaphthylene | 130 | -- | >1,000,000 |
| Benzo(a)anthracene | 310 | >1,000,000 | -- |
| Benzo(a)pyrene | 400 | >1,000,000 | -- |
| Benzo(b)fluoranthene | 640 | >1,000,000 | -- |
| Benzo(k)fluoranthene | 320 | >1,000,000 | -- |
| Chrysene | 330 | >1,000,000 | -- |
| Dibenz(a,h)anthracene | 89 | >1,000,000 | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | >1,000,000 | -- |
| *Inhalation of Ambient Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | > sat (1,260) | > sat (1,260) |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | > sat (371) |
| Phenanthrene | 4,100 | -- | > sat (163) |
| **Future Greenway User** | | | |
| *Inhalation of Particles from Surficial SWMU material (mg/kg)* | | | |
| Antimony | 81 | -- | >1,000,000 |
| Arsenic | 71 | 702,000 | -- |
| Chromium[a] | 202 | 259,000 | >1,000,000 |
| Lead | 226 | -- | NE |
| Thallium | 2.0 | -- | >1,000,000 |
| Acenaphthylene | 130 | -- | >1,000,000 |
| Benz(a)anthracene | 310 | >1,000,000 | -- |
| Benzo(a)pyrene | 400 | >1,000,000 | -- |
| Benzo(b)fluoranthene | 640 | >1,000,000 | -- |
| Benzo(k)fluoranthene | 320 | >1,000,000 | -- |
| Chrysene | 330 | >1,000,000 | -- |
| Dibenz(a,h)anthracene | 89 | >1,000,000 | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | >1,000,000 | -- |
| *Inhalation of Ambient Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | > sat (1,260) | > sat (1,260) |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | > sat (371) |
| Phenanthrene | 4,100 | -- | > sat (163) |
| **Present/Future Fenceline Resident** | | | |
| *Inhalation of Particles from Surficial SWMU material (mg/kg)* | | | |
| Antimony | 81 | -- | >1,000,000 |
| Arsenic | 71 | 26,600 | -- |
| Chromium[a] | 202 | 9,810 | >1,000,000 |
| Lead | 226 | -- | NE |
| Thallium | 2.0 | -- | >1,000,000 |

# TABLE 21
# COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
# TANK FARM GROUP

| Scenarios and COPCs | Representative Concentration | Cancer RBSL | Non-Cancer RBSL |
|---|---|---|---|
| Acenaphthylene | 130 | -- | >1,000,000 |
| Benzo(a)anthracene | 310 | >1,000,000 | -- |
| Benzo(a)pyrene | 400 | >1,000,000 | -- |
| Benzo(b)fluoranthene | 640 | >1,000,000 | -- |
| Benzo(k)fluoranthene | 320 | >1,000,000 | -- |
| Chrysene | 330 | >1,000,000 | -- |
| Dibenz(a,h)anthracene | 89 | >1,000,000 | -- |
| Indeno(1,2,3-c,d)pyrene | 400 | >1,000,000 | -- |
| *Inhalation of Ambient Vapors from Subsurface SWMU material (mg/kg)* | | | |
| Acenaphthylene | 1,600 | -- | > sat (1,115) |
| Anthracene | 1,400 | -- | > sat (10.2) |
| Benzene | 17 | 30 | 592 |
| Fluorene | 1,300 | -- | > sat (153) |
| Naphthalene | 6,500 | -- | > sat (371) |
| Phenanthrene | 4,100 | -- | > sat (163) |

| | |
|---|---|
| a | All chromium is conservatively considered to be hexavalent chromium; RBSLs are for hexavalent chromium. |
| b | The RBSL for arsenic (0.94 mg/kg) is less than the background (12 mg/kg) , therefore, the background was used as the RBSL. |
| c | RBSL for lead calculated using Adult Lead Model (USEPA 1996b). Inputs from BSC (1999b). |
| -- | Not evaluated as there is no toxicity criteria for this pathway. |
| > sol | The RBSL exceeds the solubility limit indicated in parentheses. |
| > sat | The RBSL exceeds the saturation limit indicated in parentheses. |
| | Shaded cell indicates representative concentration exceeds the RBSL. |
| >1,000,000 | Calculated RBSL is greater than 1,000,000 parts per million (mg/kg). |
| NE | Not evaluated for this scenario. |

# TABLE 22
# TIER I RISK ASSESSMENT RESULTS
# TANK FARM GROUP

| | Representative Concentration (mg/kg) | Cancer RBSL (mg/kg) | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL (mg/kg) | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **CURRENT NON-BSC COMMERCIAL/INDUSTRIAL WORKER** | | | | | | |
| *Inhalation of Ambient Vapors from Subsurface SWMU material** | | | | | | |
| Benzene | 17 | 6.3 | 3E-06 | NA | NA | NA |
| | | $SLCR_{total}$= | **3E-06** | | **NA** | |
| **FUTURE COMMERCIAL/INDUSTRIAL WORKER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material** | | | | | | |
| Antimony | 81 | NA | NA | 50 | 1.6 | blood |
| Arsenic[b] | 71 | 0.94 | 7.6E-05 | 37 | 1.9 | skin |
| Benzo(a)anthracene[c] | 310 | 1.9 | 1.6E-04 | NA | NA | NA |
| Benzo(a)pyrene[c] | 400 | 0.19 | 2.1E-03 | NA | NA | NA |
| Benzo(b)fluoranthene[c] | 640 | 1.9 | 3.4E-04 | NA | NA | NA |
| Benzo(k)fluoranthene[c] | 320 | 19 | 1.7E-05 | NA | NA | NA |
| Chrysene[c] | 330 | 194 | 1.7E-06 | NA | NA | NA |
| Dibenz(a,h)anthracene[c] | 89 | 0.19 | 4.7E-04 | NA | NA | NA |
| Indeno(1,2,3-c,d)pyrene[c] | 400 | 1.9 | 2.1E-04 | NA | NA | NA |
| | | SLCR= | **3E-03** | SLHI= | **3.5** | |
| *Inhalation of Ambient Vapors from Subsurface SWMU material** | | | | | | |
| Benzene | 17 | 3.4 | 5.0E-06 | 15 | 1.1 | blood/immune system |
| Naphthalene[c] | 6,500 | NA | NA | 252 | 26 | upper respiratory system |
| | | SLCR= | **5E-06** | SLHI= | **27** | |
| *Inhalation of Indoor Vapors from Subsurface SWMU material** | | | | | | |
| Benzene | 17 | 0.16 | 1.1E-04 | 0.69 | 25 | blood/immune system |
| Naphthalene[c] | 6,500 | NA | NA | 103 | 63 | upper respiratory system |
| | | SLCR= | **1E-04** | SLHI= | **88** | |

| | | | | Ambient | Indoor |
|---|---|---|---|---|---|
| Total across all pathways: | Ambient $SLCR_{total}$ = | **3E-03** | Total SLHI= | **30** | **91** |
| | Indoor $SLCR_{total}$ = | **3E-03** | Total blood/immune system SLHI= | **2.8** | **26** |
| | | | Total upper respiratory system SLHI= | **26** | **63** |
| | | | Total skin SLHI = | **1.9** | **1.9** |

# TABLE 22
# TIER I RISK ASSESSMENT RESULTS
# TANK FARM GROUP

| | Representative Concentration (mg/kg) | Cancer RBSL (mg/kg) | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL (mg/kg) | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **FUTURE CONSTRUCTION WORKER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material** | | | | | | |
| Arsenic | 71 | 16 | 4E-06 | NA | NA | NA |
| Benzo(a)anthracene[c] | 310 | 33 | 9E-06 | NA | NA | NA |
| Benzo(a)pyrene[c] | 400 | 3.3 | 1E-04 | NA | NA | NA |
| Benzo(b)fluoranthene[c] | 640 | 33 | 2E-05 | NA | NA | NA |
| Dibenz(a,h)anthracene[c] | 89 | 3.3 | 3E-05 | NA | NA | NA |
| Indeno(1,2,3-c,d)pyrene[c] | 400 | 33 | 1E-05 | NA | NA | NA |
| | | SLCR= | **2E-04** | | **NA** | |
| *Direct Contact (including particulate and ambient vapor inhalation) with Subsurface SWMU Material** | | | | | | |
| Arsenic | 28 | 16 | 1.8E-06 | NA | NA | NA |
| Benzo(a)anthracene[c] | 1,000 | 33 | 3.0E-05 | NA | NA | NA |
| Benzo(a)pyrene[c] | 850 | 3.3 | 2.6E-04 | NA | NA | NA |
| Naphthalene[c] | 6,500 | NA | NA | 67 | 97 | upper respiratory system |
| | | SLCR= | **3E-04** | SLHI= | **97** | |
| Total across all pathways: | | $SLCR_{total}$ = | **5E-04** | Total SLHI= | **97** | |
| | | | | Total upper respiratory system SLHI= | **97** | |

## TABLE 22
## TIER I RISK ASSESSMENT RESULTS
## TANK FARM GROUP

| | Representative Concentration (mg/kg) | Cancer RBSL (mg/kg) | Screening Level Cancer Risk (SLCR) | Non-Cancer RBSL (mg/kg) | Screening Level Hazard Quotient (SLHQ) | Primary Target Organ[a] |
|---|---|---|---|---|---|---|
| **TRESPASSER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material* | | | | | | |
| Benzo(a)pyrene[c] | 400 | 44 | 9E-06 | NA | NA | NA |
| Benzo(b)fluoranthene[c] | 640 | 435 | 1E-06 | NA | NA | NA |
| Dibenz(a,h)anthracene[c] | 89 | 44 | 2E-06 | NA | NA | NA |
| | | $SLCR_{total}$= | **1E-05** | | **NA** | |
| **FUTURE UTILITY/MAINTENANCE WORKER** | | | | | | |
| *Direct Contact (including particulate inhalation) with Surficial SWMU Material* | | | | | | |
| Arsenic | 71 | 69 | 1E-06 | NA | NA | NA |
| Benzo(a)anthracene[c] | 310 | 142 | 2E-06 | NA | NA | NA |
| Benzo(a)pyrene[c] | 400 | 14 | 3E-05 | NA | NA | NA |
| Benzo(b)fluoranthene[c] | 640 | 142 | 5E-06 | NA | NA | NA |
| Dibenz(a,h)anthracene[c] | 89 | 14 | 6E-06 | NA | NA | NA |
| Indeno(1,2,3-c,d)pyrene[c] | 400 | 142 | 3E-06 | NA | NA | NA |
| | | SLCR= | **5E-05** | | **NA** | |
| *Direct Contact (including particulate and ambient vapor inhalation) with Subsurface SWMU Material* | | | | | | |
| Benzo(a)anthracene[c] | 1,000 | 142 | 7.0E-06 | NA | NA | NA |
| Benzo(a)pyrene[c] | 850 | 14 | 6.1E-05 | NA | NA | NA |
| Naphthalene[c] | 6,500 | NA | NA | 334 | 19 | upper respiratory system |
| | | SLCR= | **7E-05** | SLHI= | **19** | |
| Total across all pathways: | | $SLCR_{total}$ = | **1E-04** | Total SLHI= | **19** | |
| | | | | Total upper respiratory system SLHI= | **19** | |

a Primary Target Organ information obtained from IRIS (USEPA, 2000).
b Screening level for arsenic based on risk. Background value is 12 mg/kg.
c The representative concentration for this chemical exceeds the chemical's saturation limit.
* Concentrations in ppm (mg/kg or mg/L).
NA Not applicable as chemical does not exceed an RBSL for this effect, or no toxicity criteria exists for this pathway.
SLHI Screening Level Hazard Index.
SLCR Screening Level Cancer Risk.

# APPENDIX A

# RFA FIGURE

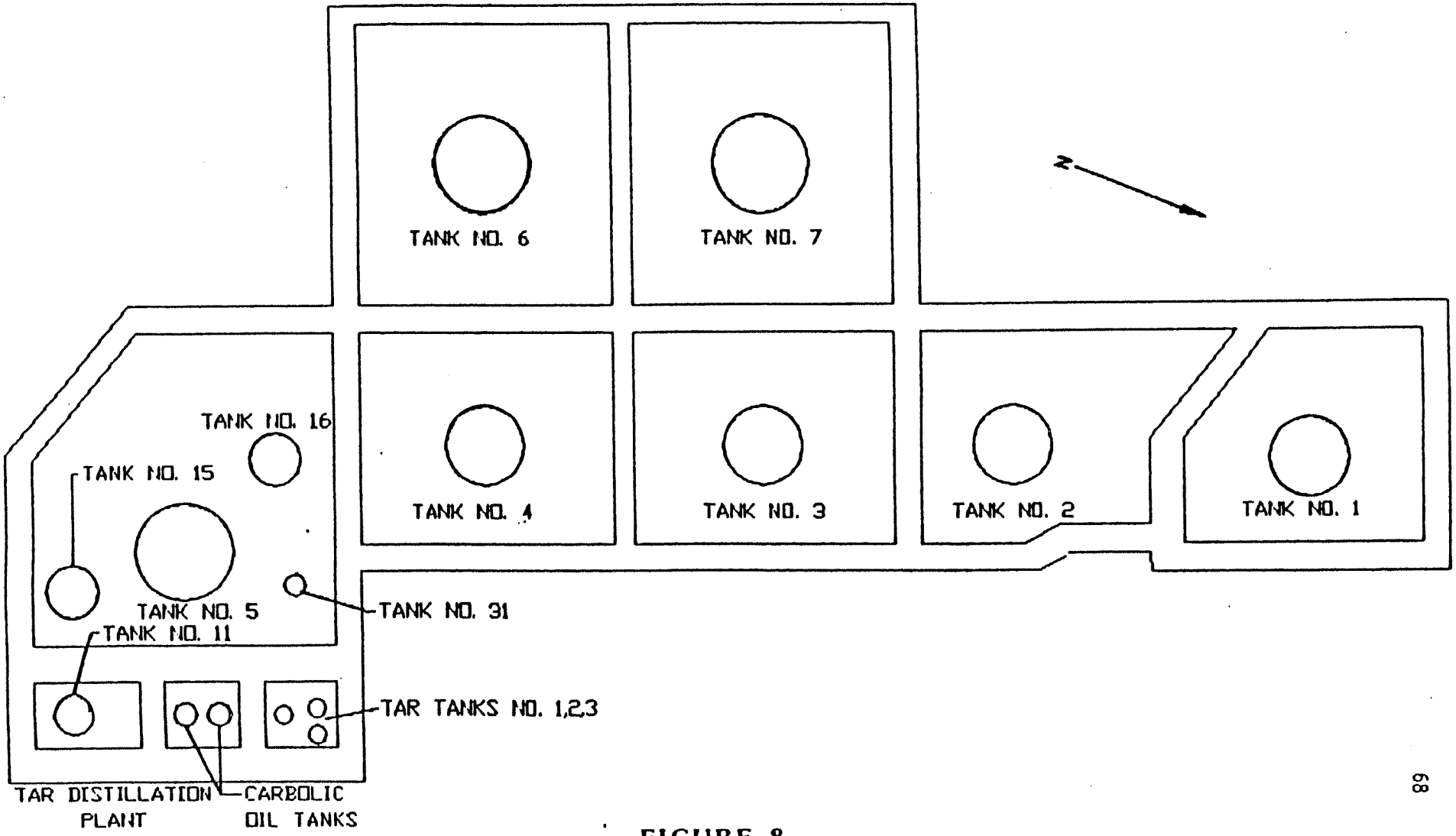



**FIGURE 8**

**COAL TAR AND FUEL OIL STORAGE TANKS**

# APPENDIX B

# SWMU INSPECTION REPORTS

URS
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

# SWMU INSPECTION REPORT

P-8

DATE 6/13/01

| DAY | S | M | T | W | TH. | F | S |
|---|---|---|---|---|---|---|---|

| WEATHER | Bright Sun | Clear | Overcast | Rain | Snow |
|---|---|---|---|---|---|
| TEMP | To 32 | 32-50 | 50-70 | 70-85 | 85 up |
| WIND | Still | Moder | High | Report No. | |
| HUMIDITY | Dry | Moder | Humid | | |

PROJECT BSC LACKAWANNA, NY
OWNER BSC
CONTRACT No.
URS CORP JOB No. 42000088SC.15
URS CORP PROJECT MANAGER JERRY JACOBI

| Name of Contractor | Non-manual | Manual | Remarks |
|---|---|---|---|
| | | | |

VISITORS

| Time | Representating | Representating | Remarks |
|---|---|---|---|
| 9:00 | MARK COLMERAUER URS | J. CHRISTY URS | |

EQUIPMENT AT THE SITE 5 TANK PADS - TANKS REMOVED. BERM SEPARATES 4 NORTHERN TANKS FROM 1 SOUTHERN TANK. ONLY TWO PADS ARE ASSOCIATED W/ P-8

INSPECTION NOTES HIGHLY VEGETATED AREA (SHRUBS / GRASS) NO SURFACE WATER / RUNOFF OBSERVED.
- AREA IS BERMED (SLAG FILL) - BREAKS IN BERM ON NE / NW SIDES.
- "TAR-LIKE" SUBSTANCE ADHERED TO BLOCKS OF CONCRETE - ALSO ON BERM (2' bgs excavated) PART OF P-75

Area is generally flat. Southern most tank pad area slopes from SW TO NE TOWARD EXCAVATED BERM (LOW SPOT WHERE RUN OFF MAY ACCUMULATE)

SHEET ____ OF ____

BY ____ TITLE ____

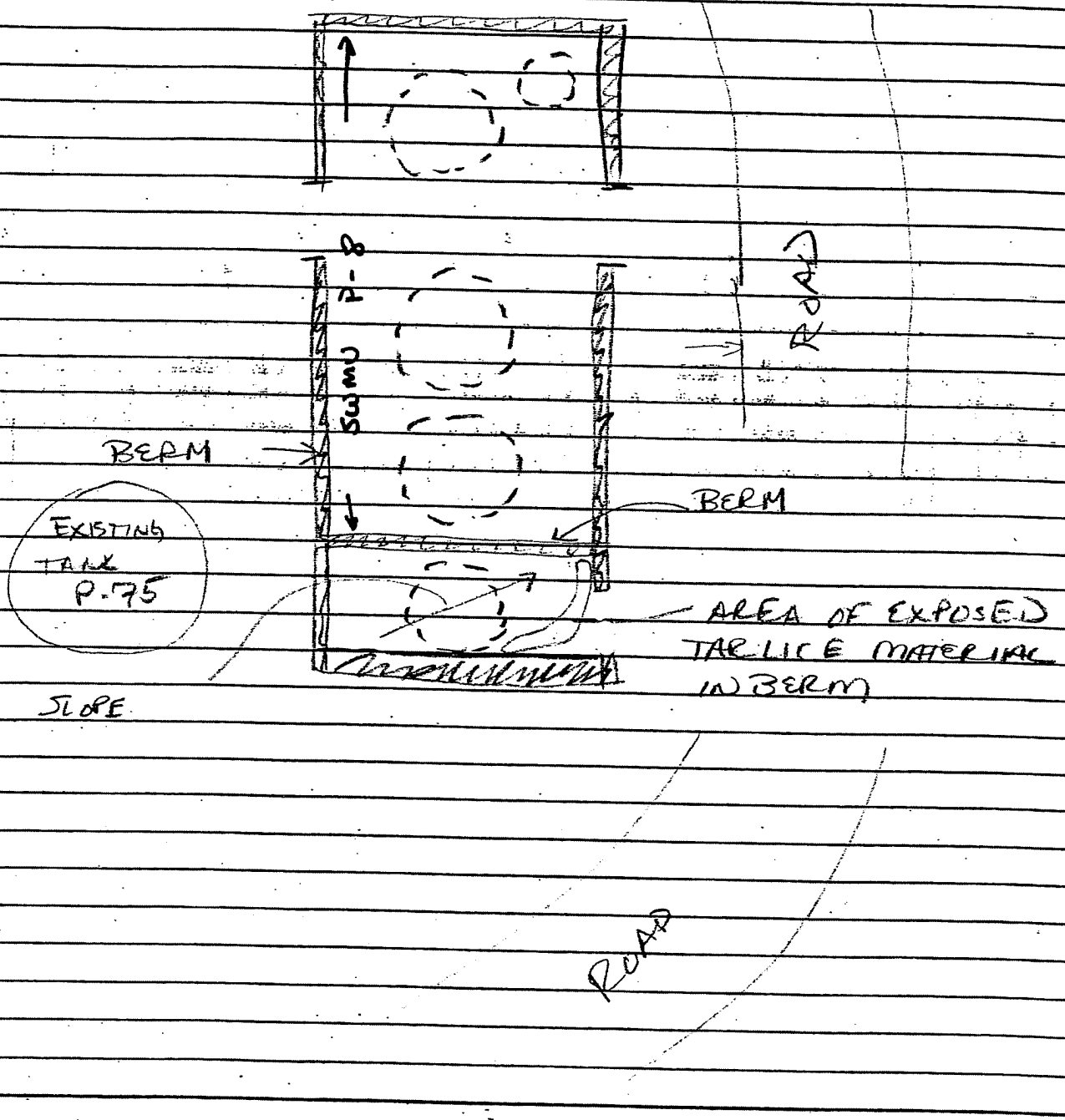
REVIEWED BY: ____ PROJECT ENGINEER

# SWMU INSPECTION REPORT (cont'd)

PROJECT BSC P-8 REPORT No.

URS CORP JOB No. AL00008BSC.15 DATE 10/01

INSPECTION NOTES NOT TO SCALE




SHEET OF

BY TITLE

URSF-011/2 OF 3/GDCONREP REVIEWED BY: PROJECT ENGINEER

# SWMU INSPECTION REPORT

URS
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

DATE 6/13/01

DAY: S | M | T | W | TH | F | S

PROJECT Bethlehem Steel Corporation
OWNER BSC
CONTRACT No.
URS CORP JOB No. 42000085BSC.15
URS CORP PROJECT MANAGER Terry Jacobi

| | | | | | |
|---|---|---|---|---|---|
| WEATHER | Bright Sun | Clear | Overcast | Rain | Snow |
| TEMP | To 32 | 32-50 | 50-70 | 70-85 | 85 up |
| WIND | Still | Moder | High | Report No. | |
| HUMIDITY | Dry | Moder | Humid | | |

| Name of Contractor | Non-manual | Manual | Remarks |
|---|---|---|---|
| | | | |

VISITORS

| Time | Representating | Representating | Remarks |
|---|---|---|---|
| 11:00 | Mark Colmanes URS | Jen Chrisky URS | |

EQUIPMENT AT THE SITE

INSPECTION NOTES P-75 consists of the entire Tank Farm (central BSC plant). Three tanks are currently onsite (four additional tank pads present.). The area is generally flat and berned. Berms are approx 10' high w/ several at grade breaks connecting areas of the Tank Farm to each other. The area is slag based w/ some vegetation (grasses & shrubs) No surface water was observed P-74 spots are located in the Tank Farm.

Piping, which extends north-south on the east side of the Tank Farm was used to fill the tanks. At each tank area (fill lines) there are 10x20 surfical stains (tar-like material). Sampling in 2000 noted material penetrated upto at least 10 feet in depth. The material observed during inspection was had-asphalt-like material

SHEET ____ OF ____

BY ____ TITLE ____

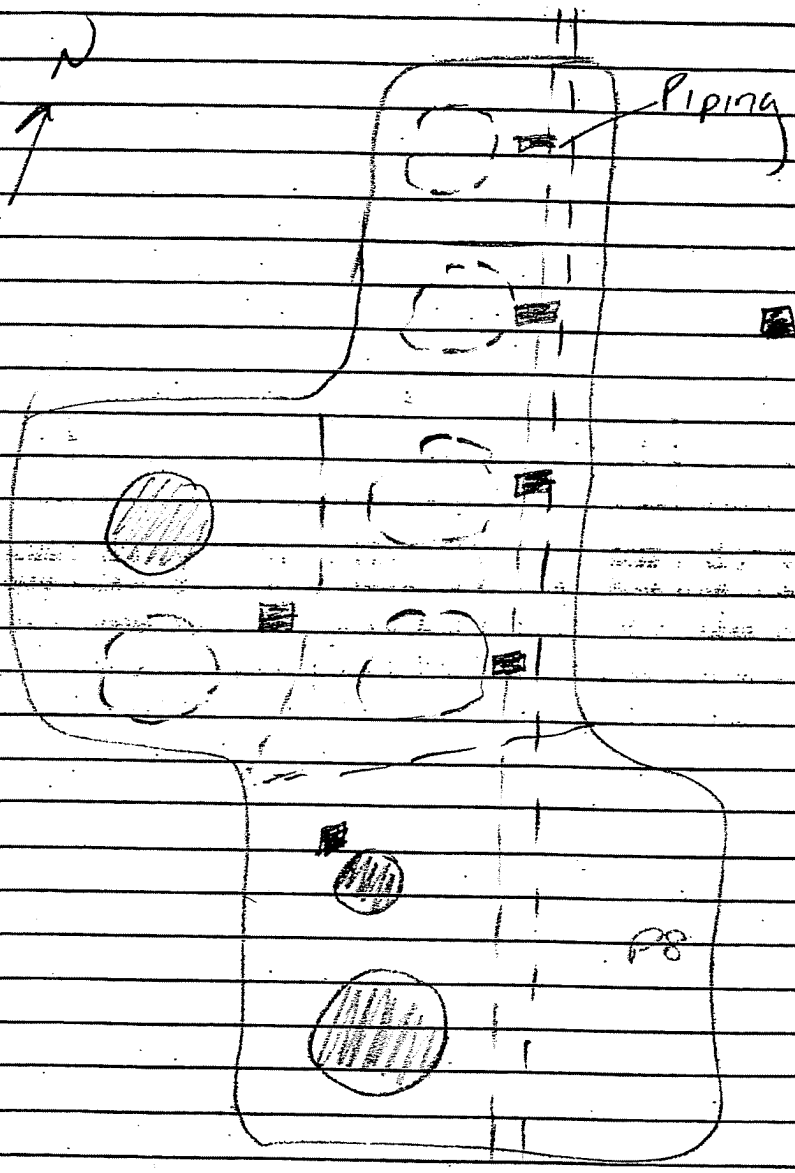
REVIEWED BY: ____ PROJECT ENGINEER

# SWMU INSPECTION REPORT (cont'd)

PROJECT BSC P-75 REPORT No.

URS CORP JOB No. 42000813BSC.15 DATE 6/01

INSPECTION NOTES




Not to Scale

SHEET OF

BY TITLE



REVIEWED BY: PROJECT ENGINEEI

URS
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

# SWMU INSPECTION REPORT

DATE 6/13/01

| DAY | S | M | T | W | TH | F | S |
|---|---|---|---|---|---|---|---|
| | | | | (W) | | | |

| WEATHER | Bright Sun | Clear | Overcast | Rain | Snow |
|---|---|---|---|---|---|
| | | | (Overcast) | | |

| TEMP | To 32 | 32-50 | 50-70 | 70-85 | 85 up |
|---|---|---|---|---|---|
| | | | (50-70) | | |

| WIND | Still | Moder | High | Report No. |
|---|---|---|---|---|
| | | (Moder) | | |

| HUMIDITY | Dry | Moder | Humid |
|---|---|---|---|
| | | | (Humid) |

PROJECT Bethlehem Steel Corporation
OWNER BSC
CONTRACT No.
URS CORP JOB No. 42000SBSC.15
URS CORP PROJECT MANAGER Jerry Jacobi

| Name of Contractor | Non-manual | Manual | Remarks |
|---|---|---|---|
| | | | |

VISITORS

| Time | Representating | Representating | Remarks |
|---|---|---|---|
| 10:00 | Mark Colmerauer URS | Jen Christy URS | |

EQUIPMENT AT THE SITE None - Within P-75 (TANK FARM)

INSPECTION NOTES There are four main areas considered P-74. Material was spread on ground (material - sludge from tanks that have been removed). Material is asphalt-like, black, & relatively hard.

Area (in general) is flat, bermed w/ majority of ground surface covered in slag (fill). Sparsly vegetated w/ trees, shrubs and grasses. Several tank pads (P-75) are present along with patchy tar-like material (also P75) P74-1 (Area1) is located south of Tank 102 - approximately 200 feet long by 70 feet wide. No vegetation on SWMU. P-74-2 (Area2) and P-74-3 (Area3) are located south and north, respectively of a former tank on the south end of the Tank Farm. Additional P-74 material was observed west of same former tank. No vegetation on SWMU.

SHEET ____ OF ____

BY ____ TITLE ____

REVIEWED BY: ____ PROJECT ENGINEER

# SWMU INSPECTION REPORT (cont'd)

PROJECT BSC P-74

URS CORP JOB No. 42000085SC.15

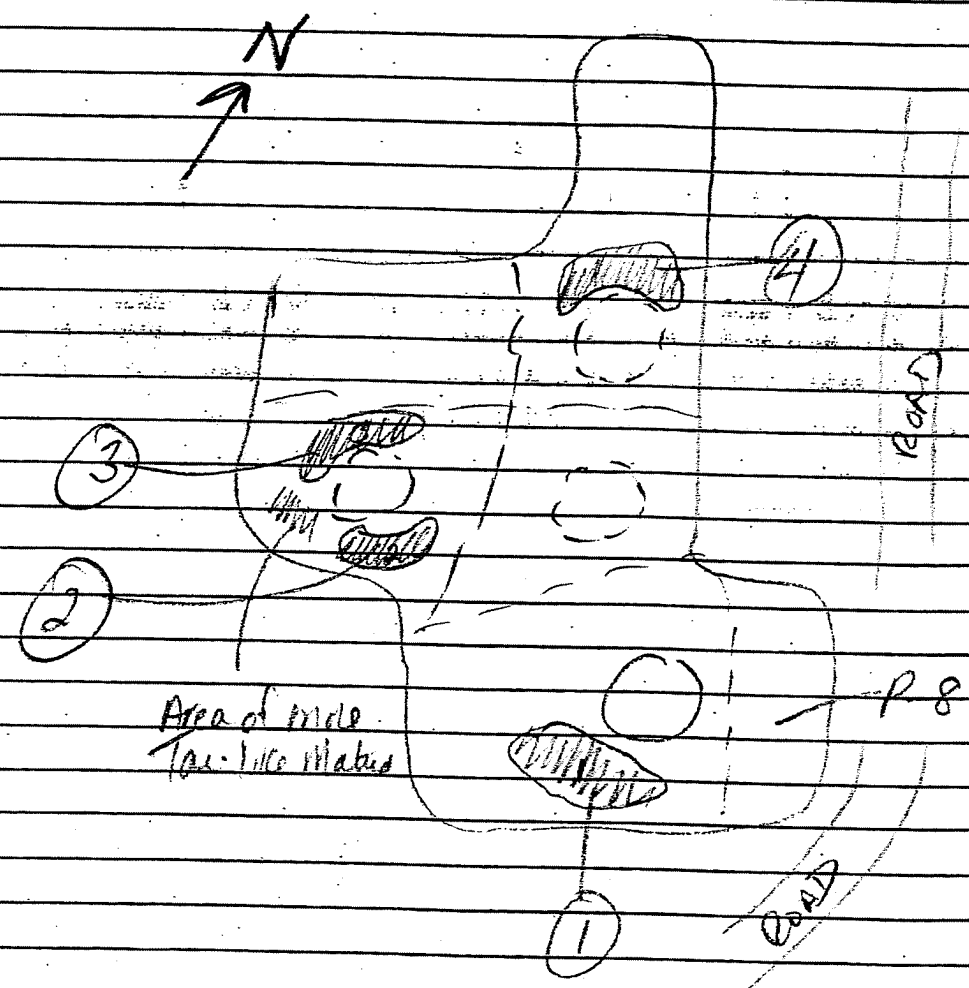
REPORT No.

DATE

**INSPECTION NOTES**

These two areas (2 and 3) are approximately 50 x 70 feet.

P-74-4 (Area 4) is located north of former tank. Irregularly shaped, these areas appear to be surficial (up to 6" thick).




SHEET OF

BY TITLE

URSF-011/2 OF 3/GDCONREP

REVIEWED BY: PROJECT ENGINEER

**FIELD INSPECTION CHECKLIST**
**SWMU SURFACE WATER RUNOFF POTENTIAL EVALUATION**
**BETHLEHEM STEEL CORPORATION**
**LACKAWANNA, NEW YORK**

SWMU #: P-8

SWMU Name: Waste Oil Storage Tanks

Date of Inspection: 9/6/96

Inspector(s): J. Hannan

**TYPE OF SWMU** (check type and configuration and add comments):

**Type:**

_____ Landfill _____ Impoundment ✓ TANK

_____ Pit/sump/trench _____ Pile

**Configuration:**

__X__ Level
_____ Above Grade - height_____ ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft, depth_____ ft, height of top above grade_____ft
_____ Free board_____ft
_____ Other (describe)_____

Comments: P-8 is A level area within P-75 Tank Farm. Tanks have been removed. concrete foundations are present

SWMU# 8

Inspection Date: 9/6/96

**SURFACE OF SWMU** (check all that apply and add comments):

**Material:**

_____ Concrete/Asphalt
_____ Grass
_____ Slag
_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid
X Other (describe): Concrete BASES (2) on slag fill
slag containment except on SE corner which was
open and on NE corner which is open

Comments: _____

**SURROUNDING AREA** (Attach topography map and indicate features of interest, check all that apply and add comments):

**Features:**

_____ Buildings, direction _____, distance _____ ft
X Road, type ACCESS, direction E, distance 75' ft
_____ Railroad, direction _____, distance _____ ft
X Other (describe): Tank ~100' @ NW

**Ground Surface:**

_____ Concrete/Asphalt
_____ Grass
X Slag
_____ Other (describe): Some vegetation
_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

SWMU# P-3

Inspection Date: 9/6/96

Comments: _____

**Surrounding topography:**

__X__ Level
_____ Sloped to _____ at _____ ft (vertical) per feet (horizontal)

Comments: Area generally level

**CONTAINMENT SYSTEM** (check all that apply and add comments):

_____ Cover - type None
_____ Concrete sump/pit
_____ Concrete trench
_____ Wooden trench
__X__ Berm or dike
height 6' ft
width 0 ft at crest
width 24 ft at base

Comments: Slag Berm open ~50' on SE corner and ~50' on NE corner

**DISTANCE TO NEAREST SURFACE WATER BODY:** 660 ft, direction S

Name of water body: Smoker Creek

SWMU# P-3

Inspection Date:_____

**VISUAL EVIDENCE OF RUN ON**

X No

_____ Yes, Description:_____

**VISUAL EVIDENCE OF RUN OFF:**

_____ No

X Yes, Description: Runoff out of opening in SE corner of containment

If Yes, which of following are present?

_____ Erosion scars on SWMU

X Sediments near SWMU in runoff areas

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

**DOES RUNOFF REACH SURFACE WATER BODY?** NO

If yes, provide description:_____

SWMU# P-8

Inspection Date: 9/6/96

Roll 4 - 1-2
Roll 5 - 1-4

**PHOTO LOG**

| Direction | Description | |
|---|---|---|
| N E (S) W | N → South view | 1 1 |
| N (E) S W | View of Opening in Fen. | 2 |
| N E (S) W | View of sediment inside E containment | 3 |
| (N) E S W | containment Eastern side fig-ans | 4 |
| (N) E S W | containment Western side of Fence | 5 |
| (N) E S W | View of containment from South | 6 |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |

**FIELD INSPECTION CHECKLIST**
**SWMU SURFACE WATER RUNOFF POTENTIAL EVALUATION**
**BETHLEHEM STEEL CORPORATION**
**LACKAWANNA, NEW YORK**

SWMU #: P-74

SWMU Name: Waste Piles in Tank Farm

Date of Inspection: 9/6/96

Inspector(s): J. Harman

**TYPE OF SWMU** (check type and configuration and add comments):

**Type:**

_____ Landfill _____ Impoundment

_____ Pit/sump/trench __X__ Pile

**Configuration:**

__X__ Level with containment around site
_____ Above Grade - height_____ ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft,
depth_____ ft, height of top above grade_____ft
_____ Free board_____ft
_____ Other (describe)_____

Comments: This is the location of 4 former piles in the storage tank area.

SWMU# P-74

Inspection Date: 9/6/96

**SURFACE OF SWMU** (check all that apply and add comments):

**Material:**

_____ Concrete/Asphalt
_____ Grass
X Slag
_____ Other (describe):

_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

Comments: P-74 is 4 piles located adjacent to Tanks within the tank farm The sites are placed on slag w/sparse vegetation and within the staging berms of the tank farm

**SURROUNDING AREA** (Attach topography map and indicate features of interest, check all that apply and add comments):

**Features:**

_____ Buildings, direction _____, distance _____ ft
X Road, type Paved, direction E, distance 300 ft
_____ Railroad, direction _____, distance _____ ft
X Other (describe): Tanks

**Ground Surface:**

_____ Concrete/Asphalt
_____ Grass
X Slag
_____ Other (describe): Sparse Vegitation

_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

SWMU#_____

Inspection Date:_____

Comments:_____

**Surrounding topography:**

X Level

_____ Sloped to _____ at _____ ft (vertical) per feet (horizontal)

Comments: Site base slightly higher ~5' than the Access road to the east

**CONTAINMENT SYSTEM** (check all that apply and add comments):

_____ Cover - type _____

_____ Concrete sump/pit

_____ Concrete trench

_____ Wooden trench

X Berm or dike Varies w/ 5'-10'

height_____ ft

width_____ ft at crest

width_____ ft at base

Comments: Various breaks in dike system are on SE corner allow evidence of runoff from site

**DISTANCE TO NEAREST SURFACE WATER BODY:** 470 ft, direction S

Name of water body: Smoker Creek

SWMU#_____

Inspection Date:_____

**VISUAL EVIDENCE OF RUN ON**

_____ No

_____ Yes, Description: Silt fence within containment area which are gravel/weed covered dikes with any run on

**VISUAL EVIDENCE OF RUN OFF:**

_____ No

__Y__ Yes, Description: Erosion gulley within containment on east side

If Yes, which of following are present?

__X__ Erosion scars on SWMU within containment

__X__ Sediments near SWMU in runoff areas at SE entrance of containment

_____ Staining in SWMU runoff areas

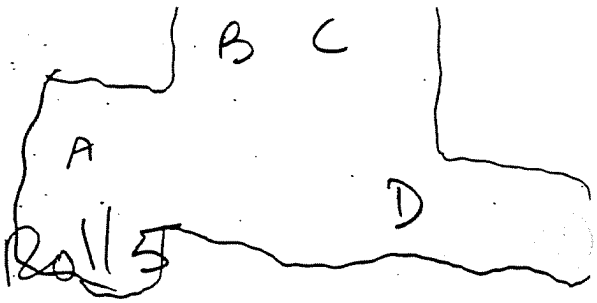
_____ Distressed vegetation in SWMU runoff areas

**DOES RUNOFF REACH SURFACE WATER BODY?** __ND__

If yes, provide description:_____

SWMU# P-74

Inspection Date:_____




## PHOTO LOG

| Direction | Description | |
|---|---|---|
| N E S (W) | A View of pile area | 1 1 |
| N E S (W) | B " " " | 2 |
| N E S (W) | C " " | 3 |
| N E S (W) | D " " " | 4 |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
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pen entries made by J. H. from forms filled in pencil in the field

# FIELD INSPECTION CHECKLIST
## SWMU SURFACE WATER RUNOFF POTENTIAL EVALUATION
## BETHLEHEM STEEL CORPORATION
## LACKAWANNA, NEW YORK

SWMU #: P-75

SWMU Name: TANK FARM

Date of Inspection: 9/6/96

Inspector(s): J. HANNAN

**TYPE OF SWMU** (check type and configuration and add comments):

**Type:**

_____ Landfill _____ Impoundment X Tank Farm

_____ Pit/sump/trench _____ Pile

**Configuration:**

X Level
_____ Above Grade - height_____ ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft,
depth_____ ft, height of top above grade_____ft
_____ Free board 0 ft
_____ Other (describe)_____

There are numerous excavations made into the Berm so the unit really Doesn't have containment

Comments: The tank farm is a large area with A slag/debris dike 6-10 FT ~~high~~ high, for containment
Three Tanks still exist #5, #16, & #1
Tank 16 is a newer welded steel Tank
Tank visible in SE Corner

SWMU# P-75

Inspection Date: 9/6/96

**SURFACE OF SWMU** (check all that apply and add comments):

**Material:**

| | |
|---|---|
| ___ Concrete/Asphalt | X Unvegetated Soil |
| ___ Grass | X Trees/Shrubs |
| X Slag | ___ Liquid |
| X Other (describe): fill debris | |

Comments: Gravel/slag area with slag/rubble containment

**SURROUNDING AREA** (Attach topography map and indicate features of interest, check all that apply and add comments):

**Features:**

X Buildings, direction E, distance 30-50 ft Pumphouse & Coke plant LABORATORY

X Road, type Access, direction E, distance 30 ft

___ Railroad, direction ___, distance ___ ft

___ Other (describe):

**Ground Surface:**

| | |
|---|---|
| ___ Concrete/Asphalt | X Unvegetated Soil |
| ___ Grass | X Trees/Shrubs |
| X Slag | ___ Liquid |
| ___ Other (describe): | |

Sparse vegitation on level areas; some of the dikes have denser vegitation

SWMU# P-75

Inspection Date: 9/6/96

Comments: _____

**Surrounding topography:**

X Level

_____ Sloped to _____ at _____ ft (vertical) per feet (horizontal)

Comments: On a flat plain where most of the former mill was located. Surface elevation ~ 595 Slight uphill grade to the west

**CONTAINMENT SYSTEM** (check all that apply and add comments):

_____ Cover - type _____

_____ Concrete sump/pit

_____ Concrete trench

_____ Wooden trench

X Berm or dike

height 6-10 ft

width 0 ft at crest

width _____ ft at base

Comments: Numerous breaks in containment dikes

**DISTANCE TO NEAREST SURFACE WATER BODY:** 450 ft, direction S

Name of water body: Smokes Creek

SWMU# P-75

Inspection Date: 9/6/96

**VISUAL EVIDENCE OF RUN ON**

X No

_____ Yes, Description: _____

**VISUAL EVIDENCE OF RUN OFF:**

_____ No

X Yes, Description: At SE exit sediments at ditch line outside of containment

If Yes, which of following are present?

X Erosion scars on SWMU

X Sediments near SWMU in runoff areas

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

**DOES RUNOFF REACH SURFACE WATER BODY?** NO

If yes, provide description: Erosion on east side of containment within the containment

SWMU# P-75

Inspection Date: 9/6/96

## PHOTO LOG

| Direction | Description | |
|---|---|---|
| N E S (W) | Tar seep in containment | 1 |
| N (E) S W | Tank 16, 5 through Break in dike | 2 |
| (N) E S W | Tank 6 through Break in dike | 3 |
| N (E) S W | Tank 7 Through Break in Berm | 4 |
| N (E) (S) W | Tank 1 area from Break in dike | 5 |
| N (E) (S) W | Tank 1 area | 6 |
| (N) E S W | View from Tank 16 to N | 7 |
| N (E) S W | moderately thick vegitation at containment | 8 |
| N (E) S W | Erosion scars between Tank 4 & Tank 1 | 9 |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
| N E S W | | |
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| N E S W | | |

# APPENDIX C

# PRE-RFI ANALYTICAL RESULTS

LIFE SUPPORT PRODUCTS DIVISION
THE ARO CORPORATION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 683-0440
AREA CODE 716
TELEX 315078



# ANALYTICAL RESULTS

Attn: Jim Scherer

USTOMER: Bethlehem Steel Corp., Reclamation Dept., 2600 Hamburg Turnpike, Lackawanna, NY 14218-031

ATE COLLECTED: 11/25/86 RECEIVED: 11/26/86 COMPLETED: 12/18/86

.O. NO. 500-1201-3000-G ARO W.O. 20,137L-15302-08

RESULTS OF EP TOXICITY TESTS

| TEST | Arsenic (ppm) | Barium (ppm) | Cadmium (ppm) | Chromium (ppm) | Lead (ppm) |
|---|---|---|---|---|---|
| #1 | <0.025 | <1.0 | <0.100 | <0.100 | 0.019 |
| #2 | <0.025 | <1.0 | <0.100 | <0.100 | 0.030 |
| #3 | <0.025 | <1.0 | <0.100 | <0.100 | 0.642 |
| #4 | <0.025 | <1.0 | <0.100 | <0.100 | 0.034 |
| #5 | <0.025 | <1.0 | <0.100 | <0.100 | 0.033 |
| #6 | <0.025 | <1.0 | <0.100 | <0.100 | 0.033 |
| #7 | <0.025 | <1.0 | <0.100 | <0.100 | 0.025 |
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Bernard J. Gucza

Bernard J. Gucza, Ph.D.
Director, Environmental Laboratory

LIFE SUPPORT PRODUCTS DIVISION
THE ARO CORPORATION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 683-0440
AREA CODE 716
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P.O. NO. 500-1201-3000-G ARO W.O. 20,137L-15302-08

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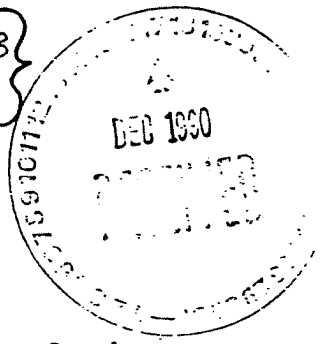
| TEST | Mercury (ppm) | Selenium (ppm) | Silver (ppm) | PCB's mg/kg (ppm) | |
|---|---|---|---|---|---|
| #1 | <0.0005 | 0.005 | <0.100 | <1. | |
| #2 | <0.0005 | <0.005 | <0.100 | <1. | |
| #3 | <0.0005 | 0.010 | <0.100 | <1. | |
| #4 | <0.0005 | <0.005 | <0.100 | <1. | |
| #5 | <0.0005 | <0.005 | <0.100 | <1. | |
| #6 | 0.0007 | 0.010 | <0.100 | <1. | |
| #7 | 0.0020 | <0.0005 | <0.100 | <1. | |
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Bernard J. Grucza, Ph.D.
Director, Environmental Laboratory

EMPIRE
SOILS INVESTIGATIONS INC.

November 16, 1990

SWMU P-8
TANK 2




Bethlehem Steel Corporation
Reclamation Department
2600 Hamburg Turnpike
P.O. Box 310
Lackawanna, New York 14218-0310

Attention: Mr. Jim Scherer

Reference: Tank No. 2 Oil Sampling and Analysis
P.O. X500-102-9594-M Suborder 03
BTA-90-186
HAS Ref 90-1253

Dear Mr. Scherer:

This letter report presents the results of Empire Soils Investigations, Inc. (ESI) sampling and analysis of an above ground storage tank at the Bethlehem Steel Corporations Lackawanna facility.

Sample Site Location

The general site location is shown on Drawing No. 2 (attached). The tank sampled is east of Tar Tank No. 5 and is known as Tank No. 2. The sample was taken from the area shown on Drawing No. 2.

Sample Collection Procedure

The sample was collected by extending a 16-foot extension pole with attached bailer into the tank opening on September 13, 1990. A precleaned polyethylene bailer with a PVC check valve was used to obtain a representative sample of vertical profile of the oil in the tank. Multiple areas within reach of the opening were sampled to obtain a representative sample of the material. ESI believes that a representative sample both vertically, laterally was obtained.

The samples were placed directly into precleaned (I Chem 200 series) amber glass jars and shipped to the laboratory.

Analytical Testing

Huntingdon Analytical Services, HAS, a division of Empire Soils Investigation was contracted to perform the analyses requested by Bethlehem Steel Corporation. The results of the analysis are attached to this report. The material in the tank would not be considered a hazardous waste

S-5167 SOUTH PARK AVENUE, P.O. BOX 0913, HAMBURG, NY 14075, 716-649-8110, TELEFAX 716-649-8051

EMPIRE
SOILS INVESTIGATIONS INC.



based on the TCLP criteria.

If you have any questions, please do not hesitate to call.

Sincerely,
EMPIRE SOILS INVESTIGATIONS, INC.

David M. Harty, P.E.
Senior Environmental Engineer

cam

S-5167 SOUTH PARK AVENUE, P.O. BOX 0913, HAMBURG, NY 14075, 716-649-8110, TELEFAX 716-649-8051

November 16, 1990

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Reclamation Department
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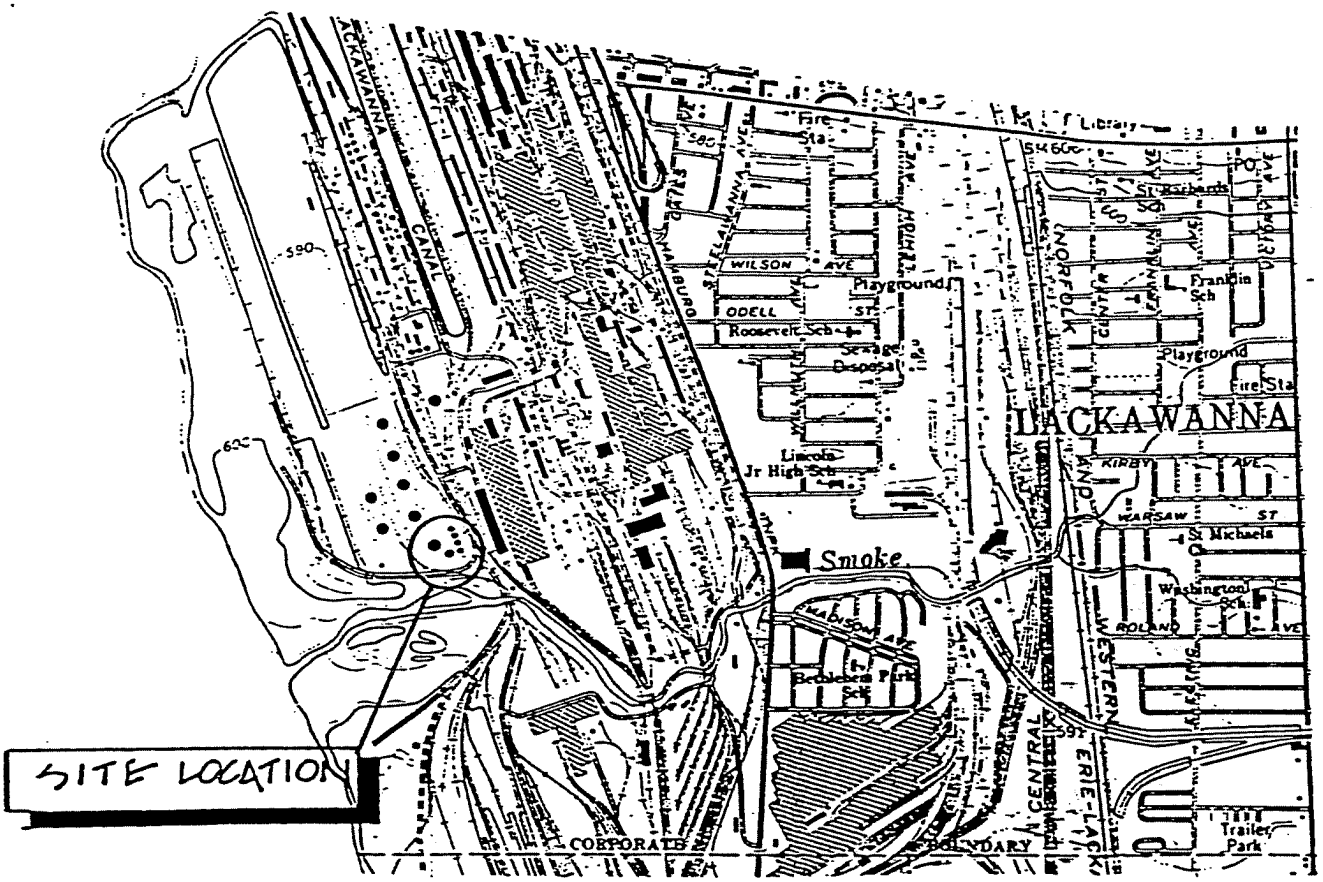
based on the TCLP criteria.

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Sincerely,
EMPIRE SOILS INVESTIGATIONS, INC.

David M. Harty, P.E.
Senior Environmental Engineer

cam




# Notes:

- THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY.
- THIS PLAN WAS ADAPTED FROM A USGS BUFFALO, S.W. MAP. DATED 1965.

N

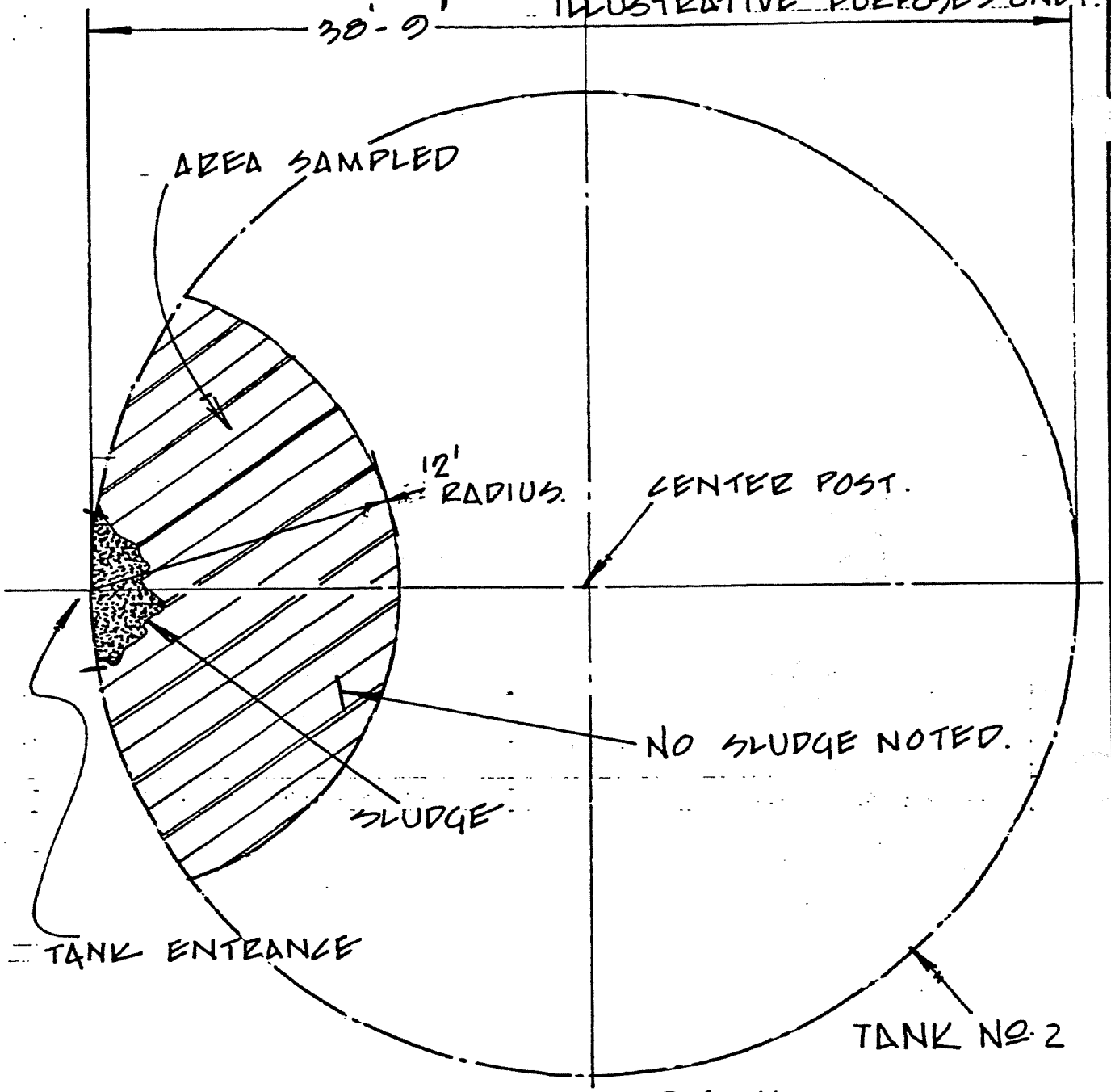
**EMPIRE** SOILS INVESTIGATIONS INC

# Site Location Map

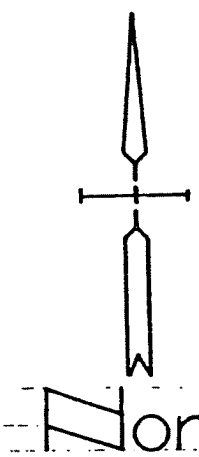
BETHLEHEM STL. CORP.
LACKAWANNA, NEW YORK.

| | | | |
|---|---|---|---|
| DR.BY: DWL. | SCALE: 1"=2000' | PROJ. NO. BTA90186 | |
| CK'D.BY: KJS | DATE: OCT. 1990 | DRWG.NO. 1 | |

* THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY.




PLAN - VIEW




EMPIRE SOILS INVESTIGATIONS INC

SAMPLE LOCATION PLAN.

BETHLEHEM STEEL CORPORATION
LACKAWANNA, NEW YORK
TANK NO 2

| | | |
|---|---|---|
| DR.BY: D.W. LABELLE | SCALE: AS SHOWN | PROJ. NO. BTA-90-186 |
| CK'D.BY: DMH. | DATE: SEPT 90' | DRWG.NO. 2 |

R/T FORM R-1

HUNTINGDON ANALYTICAL SERVICES
Division of EMPIRE SOILS INVESTIGATIONS INC.
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - HAMBURG

HAS Ref. #90-1253

October 16, 1990

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #90-1253

October 16, 1990

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods," Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A. Syracuse

Katherine A. Syracuse
Lab Director, Environmental

---

REPORT CODE LEGEND:

<DL - Less than detection limit
ND - Not detected
NA - Not applicable
INP - Information not provided
MB - Method Blank

---

HUNTINGDON ANALYTICAL SERVICES, INC.
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Sample Identification: BSC Tank 2

HAS Sample #90-1253-001 composite

Date Sampled: 9/13/90

| Analyte | EPA Method | Date Prepared | Date Analyzed | Method Detection Limit | Result | Units | QC in % |
|---|---|---|---|---|---|---|---|
| Specific Gravity | SM16 213E | ---- | 9/21/90 | --- | 0.9920 | ---- | --- |
| Heat Content | ASTM D240 | ---- | 9/21/90 | 500 | 8130 * | BTU/lb. | --- |
| Percent Sulfur | ASTM D129 | 9/25/90 | 9/26/90 | 0.1 | 0.4 * | % Sulfur | 100** 2*** |
| Visual exam for estimation of % dirt/sludge in oil substances | ----- | ---- | 9/21/90 | --- | approx. 10 | % dirt/ sludge and oil | --- |
| Percent Solids | 160.3 | 9/17/90 | 9/18/90 | 0.1 | 7.5 | % Dry Solid | --- |
| Viscosity | Brookfield | --- | 9/09/90 | --- | 1.2 ++ | cps at 74°F | --- |

* Result of analysis on non-aqueous portion of sample

** A known standard of the analyte of interest was analyzed along with this sample with the percent recovery indicated above.

*** This sample was analyzed in duplicate with the RPD indicated above.

++ Subcontracted Analysis.

Due to sample matrix, percent dirt/ sludge in the oil portion could not be numerically represented.

HUNTINGDON ANALYTICAL SERVICES, INC.

METALS ANALYSIS-TCLP DATA SHEET

Sample ID: BSC TANK 2
HAS Sample #90-1253-001
Date Sampled: 09/13/90

| ANALYTE | EPA METHOD | EPA LIMITS | DATE ANALYZED | DETECTION LIMIT | RESULT mg/l | QC |
|---|---|---|---|---|---|---|
| ARSENIC | 6010 | 5.0 mg/l | 09/25/90 | 0.035 | <DL | *95 |
| BARIUM | 6010 | 100 mg/l | 09/25/90 | 0.01 | 0.05 | *95 |
| CADMIUM | 6010 | 1.0 mg/l | 09/25/90 | 0.005 | <DL | *95 |
| CHROMIUM | 6010 | 5.0 mg/l | 09/25/90 | 0.01 | <DL | *95 |
| LEAD | 6010 | 5.0 mg/l | 09/25/90 | 0.045 | <DL | *95 |
| MERCURY | 7470 | 0.2 mg/l | 10/01/90 | 0.0004 | <DL | *95 |
| SELENIUM | 6010 | 1.0 mg/l | 09/25/90 | 0.06 | <DL | *95 |
| SILVER | 6010 | 5.0 mg/l | 09/25/90 | 0.01 | <DL | *95 |

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 625
TCLP SEMI-VOLATILE ORGANICS

| SAMPLE IDENTIFICATION : | BSC TANK 2 | TCLP METHOD BLANK | |
|---|---|---|---|
| HAS SAMPLE #90-1253 | 001 | ---- | |
| COMPOUND | RESULT ug/l | RESULT ug/l | MDL ug/l |
| CRESOL (TOTAL) ---------- | <50 | <50 | <50 |
| 1,4-DICHLOROBENZENE ---------- | <50 | <50 | <50 |
| 2,4-DINITROTOLUENE ---------- | <50 | <50 | <50 |
| HEXACHLOROBENZENE ---------- | <50 | <50 | <50 |
| HEXACHLOROBUTADIENE ---------- | <50 | <50 | <50 |
| HEXACHLOROETHANE ---------- | <50 | <50 | <50 |
| TROBENZENE ---------- | <50 | <50 | <50 |
| ENTACHLOROPHENOL ---------- | <250 | <250 | <250 |
| 2,4,5-TRICHLOROPHENOL ---------- | <250 | <250 | <250 |
| 2,4,6-TRICHLOROPHENOL ---------- | <50 | <50 | <50 |
| DATE SAMPLED: | 9-13-90 | ---- | |
| DATE RECEIVED: | 9-14-90 | ---- | |
| TCLP DATE: | 9-17-90 | 9-17-90 | |
| DATE EXTRACTED: | 9-21-90 | 9-21-90 | |
| DATE ANALYZED: | 9-21-90 | 9-21-90 | |

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 608
TCLP PESTICIDES

| SAMPLE IDENTIFICATION : | BSC TANK 2 — | METHOD BLANK |
|---|---|---|
| HAS SAMPLE #90-1253 | 001 | ---- |
| DATE ANALYZED: | 10-2-90 | 10-2-90 |
| COMPOUND | RESULT ug/l | RESULT ug/l |
| G-BHC | <0.10 | <0.10 |
| CHLORDANE | <1.0 | <1.0 |
| ENDRIN | <0.20 | <0.20 |
| HEPTACHLOR | <0.10 | <0.10 |
| HEPTACHLOR EPOXIDE | <0.10 | <0.10 |
| TOXAPHENE | <2.0 | <2.0 |
| METHOXYCHLOR | <5.0 | <5.0 |

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 509B
TCLP HERBICIDES

| SAMPLE IDENTIFICATION : | BSC TANK 2 | METHOD BLANK |
|---|---|---|
| HAS SAMPLE #90-1253 | 001 | ---- |
| DATE ANALYZED: | 10-2-90 | 10-2-90 |
| COMPOUND | RESULT mg/l | RESULT mg/l |
| 2,4-D | <0.00050 | <0.00005 |
| SILVEX (2,4,5-TP) | <0.00025 | <0.00005 |

F TINGDON ANALYTICAL SERVICES
E. IRONMENTAL

METHOD 624
TCLP VOLATILE ORGANICS

| SAMPLE IDENTIFICATION : | BSC TANK 2 | BLANK | |
|---|---|---|---|
| HAS SAMPLE #90-1253 | 001 | ----- | |
| COMPOUND | RESULT ug/l | RESULT ug/l | MDL ug/l |
| CHLOROFORM | <25 | <25 | <25 |
| 1,2-DICHLOROETHANE | <25 | <25 | <25 |
| CARBON TETRACHLORIDE | <25 | <25 | <25 |
| TRICHLOROETHENE | <25 | <25 | <25 |
| BENZENE | <25 | <25 | <25 |
| TETRACHLOROETHENE | <25 | <25 | <25 |
| CHLOROBENZENE | <25 | <25 | <25 |
| 1,4-DICHLOROBENZENE | <50 | <50 | <50 |
| PYRIDINE | <1,500 | <1,500 | <1,500 |
| 2-BUTANONE (MEK) | <50 | <50 | <50 |
| YL CHLORIDE | <25 | <25 | <25 |
| 1,1-DICHLOROETHENE | <25 | <25 | <25 |
| DATE SAMPLED: | 9-13-90 | ----- | ----- |
| DATE RECEIVED: | 9-14-90 | ----- | ----- |
| TCLP DATE: | 9-18-90 | 9-18-90 | ----- |
| DATE ANALYZED: | 9-29-90 | 9-29-90 | ----- |

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD DOH 313-4
POLYCHLORINATED BIPHENYLS IN OIL

| SAMPLE IDENTIFICATION : | BSC TANK 2 | METHOD BLANK |
|---|---|---|
| HAS SAMPLE #90-1253 | 001 | ---- |
| DATE ANALYZED : | 10-2-90 | 10-2-90 |
| COMPOUND | RESULT ug/g | RESULT ug/g |
| PCB-1016 | <5.0 | <5.0 |
| PCB-1221 | <5.0 | <5.0 |
| PCB-1232 | <5.0 | <5.0 |
| PCB-1242 | <5.0 | <5.0 |
| PCB-1248 | <5.0 | <5.0 |
| PCB-1254 | <5.0 | <5.0 |
| PCB-1260 | <5.0 | <5.0 |

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD MODIFIED DOH 310-13
PETROLEUM PRODUCTS IN OIL

| SAMPLE IDENTIFICATION : | BSC-TANK 2 | METHOD BLANK |
|---|---|---|
| HAS SAMPLE #90-1253- | 001 | ---- |
| DATE ANALYZED: | 9-26-90 | 9-26-90 |
| COMPOUND | RESULT ug/g | RESULT ug/g |
| GASOLINE | ND | ND |
| KEROSENE | <10 | <10 |
| FUEL OILS | 270,000 | <10 |
| LUBE OIL | ND | ND |

ND = NONE DETECTED

NUTMEGON ANALYTICAL SERVICES • CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM

Page 1 of 1

Client Name: Empire Soils Investigations
P.O. Box 0913
Address: Hamburg NY 14075

Client Contact: David Hartz
Phone: (716) 649-8110

NAS Quote #:
P.O. #:

Project No.:

Project/Site Name: Tank Plant 2

Sampler (Signature): David M. Hartz

NAS Ref. #90-1253

| Sample I.D. | Date | Time | Comp. | Grab | Location | Sample Seq. # | NAS I.D. # | MATRIX | # of Containers | Container Size & Type: 950 amber Glass | 40 ml amber Glass | | | | | Analysis Requested/ Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35C Tank 2 | 9/13/90 | 11:00 | | X | Tank 2 | 001 | 01 | | 3 | 2 | 1 | | | | | PCB's, TCLP (Complete) |
| | | | | | | PUP | | | | | | | | | | Percent Water, Total Petroleum Hydrocarbons (NYSDEC 310-13) |
| | | | | | | | | | | | | | | | | |
| * | Note: Laboratory Composite the 3 bottles to obtain a representative sample. | | | | | | | | | | | | | | | |

| Relinquished by: | Date/Time | Received by: | Relinquished by: | Date/Time | Received by: |
|---|---|---|---|---|---|
| David M. Hartz | 9/14/90 9:00 | | | 9/14/90 1:00 | Pam Carlson |
| Relinquished by: | Date/Time | Received by: | Relinquished by: | Date/Time | Received by: |
| Relinquished by: | Date/Time | Received for Lab by: Pam Carlson | Date/Time: 9/14/90 1:00 (CST) | Remarks: cc: DW, DA, TR, PM, SM, TB, JW, MP | |

# ecology and environment, inc.

ANALYTICAL SERVICES CENTER, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-631-0360
International Specialists in the Environment





December 27, 1990

Mr. James Scherer
Bethlehem Steel Corporation
P.O. Box 1000
Bethlehem, PA 18016

RE: 9002.744

{ SWMU P-8
TANK 1 }

Dear Mr. Scherer:

Attached is the laboratory report of the analysis conducted on one sample received at the Analytical Services Center on November 12, 1990. Analysis was performed according to the procedures set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Third Edition, U.S. EPA, 1986; (ASTM) American Society for Testing and Materials; and "The Analysis of Polychlorinated Biphenyls in Transformer Fluid and Waste Oil," U.S. EPA, February 1981.

The accuracy of all analyses depends upon the representative nature of the sample and the reliability of collection procedures as well as the accuracy of the laboratory analysis of the sample as submitted. Ecology and Environment, Inc.'s activity and representations with respect to this sample are limited solely to the laboratory analysis of the sample presented to us.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of $1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

Very truly yours,

Gary Hahn

Gary Hahn, Manager
Analytical Services Center

GH/kr
Enclosure

JOB NUMBER : 9002.744

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

| LAB SAMPLE ID | CLIENT SAMPLE ID | TEST CODE | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED |
|---|---|---|---|---|---|
| 91408.01 | OIL TANK NO.1 | LBSW 1 | 11/09/90 | | 11/28/90 |
| | | LBTU 1 | 11/09/90 | | 11/15/90 |
| | | LIGNIT1 | 11/09/90 | | 11/13/90 |
| | | LPCB 1 | 11/09/90 | 11/28/90 | 11/28/90 |
| | | LSGRAV1 | 11/09/90 | | 11/19/90 |
| | | STCAP 1 | 11/09/90 | 11/20/90 | 11/28/90 |
| | | STCBN 1 | 11/09/90 | 11/20/90 | 11/28/90 |
| | | STCHG 1 | 11/09/90 | 11/16/90 | 12/06/90 |
| | | STCICP1 | 11/09/90 | 11/16/90 | 11/19/90 |
| | | STCPRG1 | 11/09/90 | 11/15/90 | 11/19/90 |

JOB NUMBER :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
SAMPLE ID LAB :EE-90-91408 MATRIX: LIQUID
SAMPLE ID CLIENT: OIL TANK NO.1

| PARAMETER | RESULTS | Q | DET. LIMIT | UNITS |
|---|---|---|---|---|
| Bottom Sediment and Water | 0.000 | | NA | % |
| BTU | 10 | | NA | BTU/LB. |
| Specific Gravity | 1.1 | | NA | G/CC |

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT
NA = NOT APPLICABLE

# QUALITY CONTROL FOR PRECISION
# RESULTS OF ANALYSIS OF REPLICATE
# ANALYSES OF LIQUID SAMPLES

9002.744

(%)

| Parameter | E & E Laboratory No. 90- | Original Analysis | Replicate Analysis | Relative Percent Difference (RPD) |
|---|---|---|---|---|
| Bottom Sediment and Water | | | | |
| | Batch QC | 6.5 | 7.0 | 7.4 |

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF REPLICATE
ANALYSES OF LIQUID SAMPLES

9002.744

(G/CC)

| Parameter | E & E Laboratory No. 90- | Original Analysis | Replicate Analysis | Relative Percent Difference (RPD) |
|---|---|---|---|---|
| Specific Gravity | | | | |
| | 91408 | 1.1 | 1.1 | 0 |

TEST CODE :LIGNIT1 JOB NUMBER :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
TEST NAME : IGNITABILITY UNITS : DEG F
PARAMETER : Flash Point

| SAMPLE ID | RESULTS | Q |
|---|---|---|
| EE-90-91408 OIL TANK NO.1 | No Flash at 140 | - |

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT
NA = NOT APPLICABLE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF REPLICATE
ANALYSES OF LIQUID SAMPLES

9002.744

($^{o}F$)

| Parameter | E & E Laboratory No. 90- | Original Analysis | Replicate Analysis | Relative Percent Difference (RPD) |
|---|---|---|---|---|
| Ignitability | Batch QC | ND | ND | - - |

Results of Analysis of TCLP Extracts  Job Number :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
SAMPLE ID LAB :EE-90-91408  MATRIX: SOLID
SAMPLE ID CLIENT: OIL TANK NO.1  UNITS : MG/L

| PARAMETER | RESULTS | Q | DETECTION LIMIT | REGULATORY LEVEL |
|---|---|---|---|---|
| Mercury | ND | | 0.00020 | 0.20 |
| Arsenic | ND | | 0.50 | 5.0 |
| Barium | ND | | 5.0 | 100 |
| Cadmium | ND | | 0.10 | 1.0 |
| Chromium | ND | | 0.50 | 5.0 |
| Lead | ND | | 0.50 | 5.0 |
| Selenium | ND | | 0.50 | 1.0 |
| Silver | ND | | 0.50 | 5.0 |

QUALIFIERS: C = COMMENT  ND = NOT DETECTED
J = ESTIMATED VALUE  B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

Results of Analysis of TCLP Extracts  Job Number :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
SAMPLE ID LAB : METHOD BLANK  MATRIX: SOLID
UNITS : MG/L

| PARAMETER | RESULTS | Q | DETECTION LIMIT | REGULATORY LEVEL |
|---|---|---|---|---|
| Mercury | ND | | 0.00020 | 0.20 |
| Arsenic | ND | | 0.50 | 5.0 |
| Barium | ND | | 5.0 | 100 |
| Cadmium | ND | | 0.10 | 1.0 |
| Chromium | ND | | 0.50 | 5.0 |
| Lead | ND | | 0.50 | 5.0 |
| Selenium | ND | | 0.50 | 1.0 |
| Silver | ND | | 0.50 | 5.0 |

QUALIFIERS: C = COMMENT  ND = NOT DETECTED
J = ESTIMATED VALUE  B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

TEST CODE :LPCB 1 JOB NUMBER :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT :BETHLEHEM STEEL CORPORATION
TEST NAME:PCB IN LIQUID -LIQUID UNITS : MG/KG

---

LAB SAMPLE ID: EE-90-91408
CLIENT SAMPLE ID: OIL TANK NO.1

| PARAMETER | RESULTS | Q | DET.LIMIT |
|---|---|---|---|
| PCB-1242 | ND | | 5.0 |
| PCB-1254 | ND | | 5.0 |
| PCB-1221 | ND | | 5.0 |
| PCB-1232 | ND | | 5.0 |
| PCB-1248 | ND | | 5.0 |
| PCB-1260 | ND | | 5.0 |
| PCB-1016 | ND | | 5.0 |

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QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

Results of Analysis of TCLP Extracts  Job Number :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
SAMPLE ID LAB :EE-90-91408  MATRIX: SOLID
SAMPLE ID CLIENT: OIL TANK NO.1  UNITS : MG/L

| PARAMETER | RESULTS | Q | DETECTION LIMIT | REGULATORY LEVEL |
|---|---|---|---|---|
| Pentachlorophenol | ND | | 0.50 | 100 |
| 2,4,5-Trichlorophenol | ND | | 0.50 | 400 |
| 2,4,6-Trichlorophenol | ND | | 0.10 | 2.0 |
| 2-Methyl phenol | ND | | 0.10 | 200 |
| 3-Methyl phenol | ND | | 0.10 | 200 |
| 4-Methyl phenol | 1.0 | X | 0.10 | 200 |
| Hexachlorobenzene | ND | | 0.10 | 0.13 |
| Hexachlorobutadiene | ND | | 0.10 | 0.50 |
| Hexachloroethane | ND | | 0.10 | 3.0 |
| Nitrobenzene | ND | | 0.10 | 2.0 |
| Benzene | ND | | 0.050 | 0.50 |
| Carbon tetrachloride | ND | | 0.050 | 0.50 |
| Chlorobenzene | ND | | 0.050 | 100 |
| Chloroform | ND | | 0.050 | 6.0 |
| 1,4-Dichlorobenzene | ND | | 0.10 | 7.5 |
| 1,2-Dichloroethane | ND | | 0.050 | 0.50 |
| 1,1-Dichloroethylene | ND | | 0.050 | 0.70 |
| Methyl ethyl ketone | ND | | 0.10 | 200 |
| Pyridine | ND | | 1.0 | 5.0 |
| Tetrachloroethylene | ND | | 0.050 | 0.70 |
| 2,4-Dinitrotoluene | ND | | 0.10 | 0.13 |
| Trichloroethylene | ND | | 0.050 | 0.50 |
| Vinyl Chloride | ND | | 0.10 | 0.20 |

QUALIFIERS: C = COMMENT  ND = NOT DETECTED
J = ESTIMATED VALUE  B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT
X = EXCEEDS CALIBRATION LIMIT, BUT WITHIN THE LINEAR RANGE

## QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY OF SURROGATE SPIKES

9002.744

| Compound | E & E Laboratory No. 90- | Amount Added | Amount Determined | Percent Recovery |
|---|---|---|---|---|
| | | (mg/L) | | |
| 1,2-dichloroethane-d4 | 91408 | 0.050 | 0.048 | 96 |
| | BLANK | 0.050 | 0.049 | 98 |
| toluene-d8 | 91408 | 0.050 | 0.046 | 92 |
| | BLANK | 0.050 | 0.050 | 100 |
| bromofluorobenzene | 91408 | 0.050 | 0.045 | 90 |
| | BLANK | 0.050 | 0.043 | 86 |

These recoveries are acceptable to E & E, Inc. guidelines.

## QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY OF SURROGATE SPIKES

9002.744

| Compound | E & E Laboratory No. 90- | Amount Added | Amount Determined | Percent Recovery |
|---|---|---|---|---|
| | | (mg/L) | | |
| nitrobenzene-d5 | 91408 | 0.10 | 0.067 | 67 |
| | BLANK | 0.10 | 0.068 | 68 |
| 2-fluorobiphenyl | 91408 | 0.10 | 0.091 | 91 |
| | BLANK | 0.10 | 0.086 | 86 |
| terphenyl-d14 | 91408 | 0.10 | 0.110 | 110 |
| | BLANK | 0.10 | 0.111 | 111 |

These recoveries are acceptable to E & E, Inc. guidelines.

Results of Analysis of TCLP Extracts  Job Number :9002.744

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
SAMPLE ID LAB : METHOD BLANK  MATRIX: SOLID
UNITS : MG/L

| PARAMETER | RESULTS | Q | DETECTION LIMIT | REGULATORY LEVEL |
|---|---|---|---|---|
| Pentachlorophenol | ND | | 0.50 | 100 |
| 2,4,5-Trichlorophenol | ND | | 0.50 | 400 |
| 2,4,6-Trichlorophenol | ND | | 0.10 | 2.0 |
| 2-Methyl phenol | ND | | 0.10 | 200 |
| 3-Methyl phenol | ND | | 0.10 | 200 |
| 4-Methyl phenol | ND | | 0.10 | 200 |
| Hexachlorobenzene | ND | | 0.10 | 0.13 |
| Hexachlorobutadiene | ND | | 0.10 | 0.50 |
| Hexachloroethane | ND | | 0.10 | 3.0 |
| Nitrobenzene | ND | | 0.10 | 2.0 |
| Benzene | ND | | 0.050 | 0.50 |
| Carbon tetrachloride | ND | | 0.050 | 0.50 |
| Chlorobenzene | ND | | 0.050 | 100 |
| Chloroform | ND | | 0.050 | 6.0 |
| 1,4-Dichlorobenzene | ND | | 0.10 | 7.5 |
| 1,2-Dichloroethane | ND | | 0.050 | 0.50 |
| 1,1-Dichloroethylene | ND | | 0.050 | 0.70 |
| Methyl ethyl ketone | ND | | 0.10 | 200 |
| Pyridine | ND | | 1.0 | 5.0 |
| Tetrachloroethylene | ND | | 0.050 | 0.70 |
| 2,4-Dinitrotoluene | ND | | 0.10 | 0.13 |
| Trichloroethylene | ND | | 0.050 | 0.50 |
| Vinyl Chloride | ND | | 0.10 | 0.20 |

QUALIFIERS: C = COMMENT  ND = NOT DETECTED
J = ESTIMATED VALUE  B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

# APPENDIX D

# SAMPLE RECORDS AND MONITORING WELL CONSTRUCTION LOGS

DAMES & MOORE

# SAMPLE RECORD

JOB No.: 00120-~~173~~-186-152 JOB NAME : BSC PHASE I-C DATE : 2/14/95
JOB LOCATION : LACKAWANNA, NY TIME : 11 : 30

SAMPLE ID : P8-1-(0-6)
SAMPLE LOCATION : SWMU P-8-1 SOUTH

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

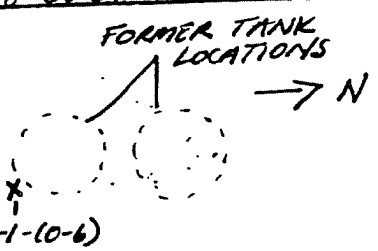
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Brown-grey f-c SAND & GRAVEL (hard) (dry) Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P8-1-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : brown/black, No odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | NA |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : snow, ~20°F, moderate winds
COMMENTS : Hard, had to use pick to Break up (Frozen)

DAMES & MOORE

# SAMPLE RECORD

JOB No.: 00120-~~173~~ 186-152 JOB NAME : BSC PHASE I-C DATE : 2/14/95
JOB LOCATION : LACKAWANNA, NY TIME : 11 :45

SAMPLE ID : P8-2-(0-6)
SAMPLE LOCATION : SWMU P-8-2 NORTH

SAMPLERS : Mike Parish OF : DAMES + MOORE
Brad Phillips

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

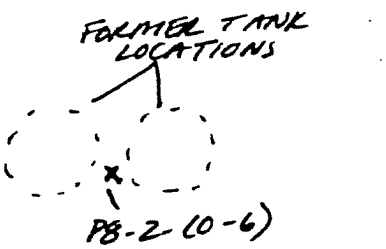
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Brown f-c SAND & GRAVEL (hard) (dry) Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P8-2-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS ALL TOTAL CONSTITUENT, TCLP + SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Brown/Black, No Odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | NA |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : Snow, ~20°F, moderate winds
COMMENTS : Hard, Had to use pick to break-up (Frozen)

DAMES & MOORE

SOIL/SEDIMENT
SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC PHASE I-C DATE : 2/10/95
JOB LOCATION : LACKAWANNA, NY TIME : 14:00

SAMPLE ID : P74-1-(0-6)
SAMPLE LOCATION : SWMU P-74-1
SOUTH MOST WASTE STORAGE PILE

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

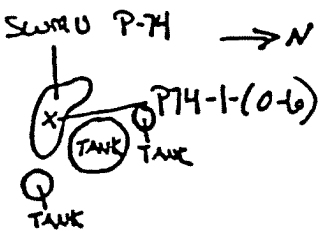
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black SILT to f-c SAND size (hard) (dry)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P74-1-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : black, coke odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | NA |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : ~20°F, windy, overcast
COMMENTS :

DAMES & MOORE

SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC PHASE I-C DATE : 2/10/95
JOB LOCATION : LACKAWANNA, NY TIME : 14:10

SAMPLE ID : P74-2-(0-6)
SAMPLE LOCATION : SWMU P-74-2
SOUTHWEST WASTE STORAGE PILE

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWEL ☑

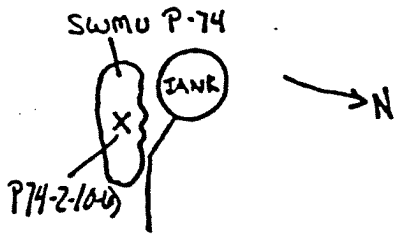
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black & grey f-c SAND, GRAVEL SLAG (dry) (hard)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P74-2-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : slag, slight odor - coke

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | NA |
| pH | |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : ~20°F, windy, overcast
COMMENTS :

DAMES & MOORE

SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC MARKET-C DATE : 2/10/95
JOB LOCATION : LACKAWANNA, NY TIME : 14:20

SAMPLE ID : P74-3-(0-6)
SAMPLE LOCATION : SWMU P-74-3
WEST WASTE STORAGE PILE

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

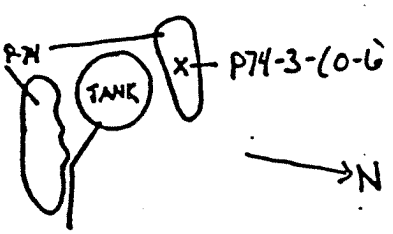
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black SILT & fr SAND size (hard) (dry)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P74-3-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SRLP ANALYSES
PHYSICAL APPEARANCE & ODOR : black, coke odor

FIELD TEST : VALUE :
TEMP. (°C/°F) N/A
pH
SPEC. COND.(µMHOs/CM)
OTHER (UNITS)




WEATHER : ~20°F, windy, overcast
COMMENTS :

DAMES & MOORE

SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC PHASE I-C DATE : 2/10/95
JOB LOCATION : LACKAWANNA, NY TIME : 14:30

SAMPLE ID : P74-4-(0-6)
SAMPLE LOCATION : SWMU P-74-4
NORTH WASTE STORAGE PILE

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

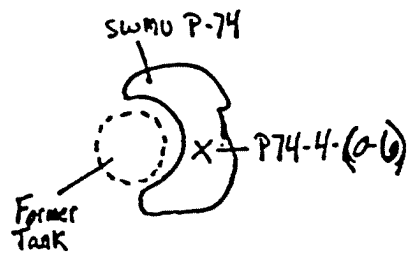
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black SILT (hard) (dry)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P74-4-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : black, coke odor

| FIELD TEST : | VALUE : |
|---|---|
| TEMP. (°C/°F) | |
| pH | NA |
| SPEC. COND.(µMHOs/CM) | |
| OTHER (UNITS) | |




WEATHER : ~20°F, windy, overcast
COMMENTS :

SAMPLE RECORD

JOB No.: 00120-173(186)-152 JOB NAME : BSC PHASE I-C DATE : 2/14/95
JOB LOCATION : LACKAWANNA, NY TIME : 10:15

SAMPLE ID : P75-1-(0-6)
SAMPLE LOCATION : SWMU P-75-1

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

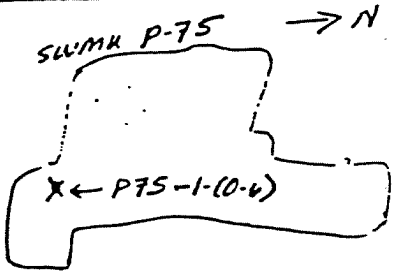
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black fr SAND & GRAVEL (hard)(dry)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P75-1-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Black, light coke odor

FIELD TEST : VALUE :
TEMP. (°C/°F)
pH
SPEC. COND.(µMHOs/CM) NA
OTHER (UNITS)




WEATHER : sunny ~30°F, light winds
COMMENTS : hard, hard to use pick (Frozen)

DAMES & MOORE — SAMPLE RECORD

JOB No.: 00120-RG-175-152 JOB NAME : BSC MAR II-C DATE : 2/14/95
JOB LOCATION : LACKAWANNA, NY TIME : 10:30

SAMPLE ID : P75-2-(0-6)
SAMPLE LOCATION : SWMU P-75-2

SAMPLERS : Mike Parish, Brad Phillips OF : DAMES & MOORE

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

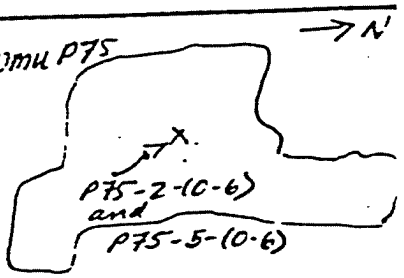
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black fr SAND & GRAVEL (hard)(dry)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P75-2-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Black, no odor

FIELD TEST : VALUE :
TEMP. (°C/°F) NA
pH
SPEC. COND.(µMHOs/CM)
OTHER (UNITS)




WEATHER : ~20°F, snow, light winds
COMMENTS : hard - had to use pick to break up-DUP taken as P75-5-(0-6) (frozen)

JOB No.: 0020-186-152 JOB NAME : BSC MAGET-C DATE : 2/14/95
JOB LOCATION : LACKAWANNA, NY TIME : 10:45

SAMPLE ID : P75-3-(0-6)
SAMPLE LOCATION : SWMU P-75-3

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

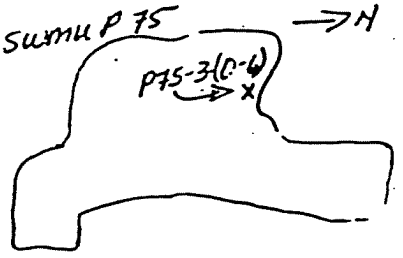
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Black f-c SAND & GRAVEL (hard)(dry)
Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P75-3-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Black, no odor

FIELD TEST : VALUE :
TEMP. (°C/°F) N/A
pH
SPEC. COND.(µMHOs/CM)
OTHER (UNITS)




WEATHER : snow ~20°F, light winds
COMMENTS : hard, had to use pick to break up (Frozen)

JOB No.: 00120-186-152 JOB NAME : BSC PHASE I-C DATE : 2/14/95
JOB LOCATION : LACKAWANNA, NY TIME : 11:00

SAMPLE ID : P75-4-(0-6)
SAMPLE LOCATION : SWMU P-75-4

SAMPLERS : Mike Parish OF : DAMES & MOORE
Brad Phillips " "

SAMPLE CLASSIFICATION : SOIL ☒ SEDIMENT ☐ SOLID WASTE ☐

SAMPLING METHOD : BOTTOM SAMPLER/DREDGE ☐ CORE SAMPLER ☐
STANDARD SPLIT SPOON ☐ HAND AUGER ☐ SPOON/TROWER ☑

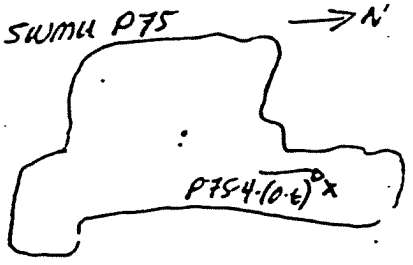
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Reddish brown + grey M-C SAND & GRAVEL SLAG ( Frozen

## SAMPLE ANALYSIS

SAMPLE ID : P75-4-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : No Odor, Reddish Brown/Black/Grey

FIELD TEST : VALUE :
TEMP. (°C/°F) N/A
pH
SPEC. COND.(µMHOs/CM)
OTHER (UNITS)




WEATHER : Snow ~20°F light wind
COMMENTS : Very Hard. Had to use pick to break-up (Frozen)

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P8 B1 PROJECT NO.: 42000088C.15

SITE: Bethlehem Steel Lackawanna NY

SAMPLE INFORMATION P8B1 (16-18') VOA

MATRIX: SOIL SAMPLE ID: P8B1 COMP (12-18')

SAMPLING METHOD: SS DUP.REP. OF: ———

BEGINNING DEPTH: 12 (16' VOA) MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 18 YES ( ) NO (X)

GRAB (X) VOA COMPOSITE (X) OTHER DATE: 11/6/00 TIME: 1530

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| 16oz | 1 | ICE | | | SVOA, Metal, CN, Cl, SO4, Phenolics |
| 8oz | 2 | | | | (1) SPLP SVOA METALS, CN<br>(1) TCLP SVOA METALS |
| 4oz | 7 | | | | (1) TCLP VOA<br>(1) SPLP VOA |
| | | | | | (2) TOX<br>(2) TOC |
| | | | | | (1) PCB |
| ENCORE | 3 | | | | 8260B |

NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 69.0 | COLOR: DK BRN | |
| 2nd 79.1 | ODOR: YES | |
| | OTHER: SHEEN | |
| | | |

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION ____ AMBIENT TEMP. 30°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL

COMMENTS: ____

SAMPLER: J. Chrisby OBSERVER: ____

MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: PS B2 PROJECT NO.: 42000.08BSC.15

SITE: Bethlehem Steel Lackawanna, NY

SAMPLE INFORMATION PSB2 (4-6) VOA

MATRIX: SO SAMPLE ID: PSB2 COMP (2-12) OTHER

SAMPLING METHOD: SS DUP.REP. OF: —

BEGINNING DEPTH: 2 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 12 YES ( ) NO (X)

GRAB (X) VOA COMPOSITE (X) OTHER DATE: 11-7-00 TIME: 9:30

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 160z | 1 | | | | SVOC, METALS, CN, CL, SO4, Phenolics |
| 80z | 2 | | | | SPLP SVOA METALS CN<br>TCLP SVOA METALS |
| 40z | 3 | | | | (1) TCLP VOA<br>(1) SPLP VOA |
| | | | | | (2) TOC<br>(2) TOX |
| | | | | | (1) PCB |

NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 540 | COLOR: BLACK BRN | |
| 2nd 2064 | ODOR: YES | |
| | OTHER: SHEEN | |
| | | |

GENERAL INFORMATION

WEATHER: SUN/CLEAR ____ OVERCAST/RAIN X WIND DIRECTION ____ AMBIENT TEMP. 40°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL

COMMENTS: MARKED "11-6-00" ON COC

SAMPLER: J. Christy OBSERVER: ____

MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75-B1 PROJECT NO.: 42000088SC.15

SITE: BETHLEHEM STEEL, LACKAWANNA NY

## SAMPLE INFORMATION

MATRIX: SOIL SAMPLE ID: P75-B1 (0-12")

SAMPLING METHOD: G (SHOVEL) DUP.REP. OF: —

BEGINNING DEPTH: 0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 12" YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 11-3-00 TIME: 10:30

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 16OZ | 1 | | | | SVOA, METALS, Cl, CN, SO4 phenolics |
| 8OZ | 2 | | | | (1) SVOA, METALS, CN (SPLP) (2) SVOA METALS (TCLP) |
| 4OZ | 7 | | | | (2) TOX (2) TOC |
| — | — | | | | (1) TCLP VOA (1) SPLP VOA |
| — | - | | | | (1) PCB |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 12.0 | COLOR: DK BRN | |
| 2nd — | ODOR: NO APPARENT | |
| | OTHER: — | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION — AMBIENT TEMP. 60°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL LAB

COMMENTS: ____

SAMPLER: J. CHRISTY OBSERVER: ____

### MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

### SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75-B1 PROJECT NO.: 4200008BSC.15

SITE: BETHLEHEM STEEL, LACKAWANNA NY

SAMPLE INFORMATION P75-B1 (2-6)

MATRIX: SOIL SAMPLE ID: P75-B1 COMP1 (2-6)

SAMPLING METHOD: SS (CS) DUP.REP. OF: —

BEGINNING DEPTH: 2' (4-6 VOA) MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 6' YES ( ) NO (X)

GRAB (X) VOA COMPOSITE (X) OTHER DATE: 11-3-00 TIME: 12:00

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | — | | | 8260B |
| 16oz | 1 | - | | | SVOA, METALS, Cl, CN, SO4+ phenolics |
| 8oz | 2 | - | | | (1) SVOA METALS CN (SPLP)<br>(1) SVOA METALS (TCLP) |
| 4oz | 7 | - | | | (2) TOX<br>(2) TOC |
| — | - | | | | (1) TCLP VOA<br>(1) SPLP VOA |
| — | - | | | | (1) PCB |

NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 88.4 | COLOR: GREY BK BRN | |
| 2nd 400.0 | ODOR: YES | |
| | OTHER: SHEEN, TAR | |
| | | |

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION — AMBIENT TEMP. 60°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL LAB

COMMENTS: ____

SAMPLER: J. CHRISTY OBSERVER: ____

MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75-B2 PROJECT NO.: 42000088C.15

SITE: BETHLEHEM STEEL, LACKAWANNA, NY

## SAMPLE INFORMATION

MATRIX: SOIL SAMPLE ID: P75-B2 (0-12")

SAMPLING METHOD: GRAB/SHOVEL DUP.REP. OF:

BEGINNING DEPTH: 0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 12" YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 11-3-00 TIME: 13:30

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 11oz | 1 | \| | | | SVOA, METAL, Cl, CN, SO4, phenolics |
| 8oz | 2 | \| | | | (1) SVOA METALS CN (SPLP)<br>(1) SVOA METALS (TCLP) |
| 4oz | 7 | \| | | | (2) TOC<br>(2) TOX |
| — | — | | | | (1) TCLP VOA<br>(1) SPLP VOA |
| — | — | | | | (1) PCB |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 2.7 | COLOR: BRN | |
| 2nd — | ODOR: No apparent | |
| | OTHER: — | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION ____ AMBIENT TEMP. ____

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL LAB

COMMENTS:

SAMPLER: J. Christy OBSERVER: ____

### MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

### SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75-B2 PROJECT NO.: 42000088SC.15

SITE: BETHLEHEM STEEL, LACKAWANNA NY

SAMPLE INFORMATION P75 B2 (4-6)

MATRIX: SOIL SAMPLE ID: P75B2 COMP1 (4-8)

SAMPLING METHOD: SS (C3) DUP.REP. OF: —

BEGINNING DEPTH: 4 (4-6) VOA MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 8 YES ( ) NO (X)

GRAB (X) VOA COMPOSITE (X) OTHER DATE: 11-3-00 TIME: 14:20

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 16OZ | 1 | \| | | | SVOA, METALS, Cl, CN, SO4, phenolics |
| 8OZ | 2 | \| | | | (1) SVOA METALS CN (SPLP)<br>(1) SVOA METALS TCLP |
| 4OZ | 7 | \| | | | (2) TOX<br>(2) TOC |
| — | - | \| | | | (1) TCLP VOA<br>(1) SPLP VOA |
| — | - | | | | (1) PCB |

NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 2.9 | COLOR: DK BRN/GREY | |
| 2nd 2.0 | ODOR: NO APPARENT | |
| | OTHER: | |
| | | |

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION ____ AMBIENT TEMP. 60°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL LAB

COMMENTS: ____

SAMPLER: J. Christy OBSERVER: ____

MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75-B3 PROJECT NO.: 42000088SC.15

SITE: BETHLEHEM STEEL, LACKAWANNA, NY

## SAMPLE INFORMATION

MATRIX: SOIL SAMPLE ID: P75-B3(0-12")

SAMPLING METHOD: GRAB/SHOVEL DUP.REP. OF: —

BEGINNING DEPTH: 0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 12" YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 11-3-00 TIME: 1500

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 11oz | 1 | / | | | SVOA METALS, Cl, CN, SO4, Phenolics |
| 8oz | 2 | | | | (1) SVOA METALS CN (SPLP) (1) SVOA METALS (TCLP) |
| 4oz | 7 | | | | (2) TOC (2) TOX (1) TCLP VOA (1) SPLP VOA |
| — | — | | | | |
| — | — | | | | (1) PCB |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 12.3 | COLOR: DK BRN | |
| 2nd | ODOR: YES | |
| | OTHER: | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 60°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL LAB

COMMENTS: ___

SAMPLER: J. Chrisly OBSERVER: ___

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
WG = GROUND WATER
LH = HAZARDOUS LIQUID WASTE
SH = HAZARDOUS SOLID WASTE
SE = SEDIMENT
SL = SLUDGE
SO = SOIL
GS = SOIL GAS
WS = SURFACE WATER
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
BR = BRASS RING
CS = COMPOSITE SAMPLE
C = CONTINUOUS FLIGHT AUGER
DT = DRIVEN TUBE
W = SWAB/WIPE
G = GRAB
HA = HAND AUGER
H = HOLLOW STEM AUGER
HP = HYDRO PUNCH
SS = SPLIT SPOON
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75-B3 PROJECT NO.: 42000088SC.15

SITE: BETHLEHEM STEEL, LACKAWANNA, NY

## SAMPLE INFORMATION

MATRIX: SOIL SAMPLE ID: P75B3(8-10)

SAMPLING METHOD: SS (CS) DUP.REP. OF: —

BEGINNING DEPTH: 8 (8-10) VOA ALSO MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 10 YES ( ) NO (X)

GRAB (X) ~~VOA~~ COMPOSITE (~~X~~) QC DATE: 11-3-00 ~~11-6-00~~ ~~11-8-00~~ QC TIME: 1530

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 16oz | 1 | \| | | | SVOA METALS, Cl, CN, SO4, Phenolics |
| 8oz | 2 | \| | | | (1) SVOA METALS CN (SPLP)<br>(1) SVOA METALS (TCLP) |
| 4oz | 7 | \| | | | (2) TOX<br>(2) TOC |
| — | — | | | | (1) TCLP VOA<br>(1) SPLP VOA |
| — | — | | | | (1) PCB |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 150 | COLOR: DK BRN | |
| 2nd | ODOR: YES | |
| | OTHER: TAR, SHEEN, WET | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION ____ AMBIENT TEMP. 60°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL LAB

COMMENTS:

SAMPLER: J. Christy OBSERVER: ____

### MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

### SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P-75 B-4 PROJECT NO.: 42000881SC.05

SITE: Bethlehem Steel Lackawanna, NY

## SAMPLE INFORMATION

MATRIX: SO SAMPLE ID: P-75-B-4 (0-12")

SAMPLING METHOD: SHOVEL/GRAB DUP.REP. OF: —

BEGINNING DEPTH: 0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 12" YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 11-6-00 TIME: 11:00

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 16oz | 1 | \| | | | SVOA, METALS, Cl, CN, SO4, Phenolics |
| 8oz | 2 | \| | | | (1) SPLP SVOA, Metals, CN<br>(1) RLP SVOA METALS |
| 4oz | 7 | \| | | | (1) SPLP VOA<br>(1) TCLP VOA<br>(2) TOX<br>(2) TOC<br>(1) PCB |
| | | | | | |
| | | | | | |

## NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 1.8 | COLOR: GRAYBRN | |
| 2nd | ODOR: — | |
| | OTHER: | |
| | | |

## GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 30°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL

COMMENTS: ___

SAMPLER: J Christy OBSERVER: ___

### MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
SO = SOIL
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

### SAMPLING METHOD CODES

B = BAILER
G = GRAB
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

# FIELD SAMPLING REPORT

**URS Greiner**
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: P75 B-4 PROJECT NO.: 42000085BSC.15

SITE: Bethlehem Steel Corporation, Lackawanna NY

SAMPLE INFORMATION P-75 B4 (6-8') VOA

MATRIX: SOIL SAMPLE ID: P75-B4 Comp (2-10')

SAMPLING METHOD: SS DUP.REP. OF: —

BEGINNING DEPTH: 2' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 10' YES ( ) NO (X)

GRAB (X) VOA COMPOSITE (X) OTHER DATE: 1/6/00 TIME: 1140

| CONTAINER SIZE/TYPE | # | PRESERVATIVE/ PREPARATION | EXTRACTION METHOD | ANALYTICAL | ANALYSIS |
|---|---|---|---|---|---|
| ENCORE | 3 | ICE | | | 8260B |
| 16oz | 1 | \| | | | SVOA, Metals, Cl, CN, SO4, Phenols |
| 8oz | 2 | \| | | | (1) SPLP SVOA, METALS, CN<br>(1) TCLP SVOA METALS |
| 4oz | 7 | \| | | | (1) SPLP VOA<br>(1) TCLP VOA |
| — | — | | | | (2) TOX<br>(2) TOC |
| — | — | | | | (1) PCB |

NOTABLE OBSERVATIONS

| PID READINGS | SAMPLE CHARACTERISTICS | MISCELLANEOUS |
|---|---|---|
| 1st 1.5 | COLOR: Blk Brn | |
| 2nd | ODOR: — | |
| | OTHER: — | |
| | | |

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION ____ AMBIENT TEMP. 30°F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL

COMMENTS: ____

SAMPLER: S. Christy OBSERVER: ____

MATRIX TYPE CODES

| | |
|---|---|
| DC = DRILL CUTTINGS | SL = SLUDGE |
| WG = GROUND WATER | SO = SOIL |
| LH = HAZARDOUS LIQUID WASTE | GS = SOIL GAS |
| SH = HAZARDOUS SOLID WASTE | WS = SURFACE WATER |
| SE = SEDIMENT | SW = SWAP/WIPE |

SAMPLING METHOD CODES

| | |
|---|---|
| B = BAILER | G = GRAB |
| BR = BRASS RING | HA = HAND AUGER |
| CS = COMPOSITE SAMPLE | H = HOLLOW STEM AUGER |
| C = CONTINUOUS FLIGHT AUGER | HP = HYDRO PUNCH |
| DT = DRIVEN TUBE | SS = SPLIT SPOON |
| W = SWAB/WIPE | SP = SUBMERSIBLE PUMP |

# URS Corporation

# TEST BORING LOG

| | |
|---|---|
| BORING NO: | P8-B1 |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | SWMU P-75 |
| GROUND ELEVATION: | 589.30 |
| DATE STARTED: | 11/06/00 |
| DATE FINISHED: | 11/06/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation

CLIENT: Bethlehem Steel Corp.

BORING CONTRACTOR: SJB Services Inc

GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| | | | Static |
| | | | |
| | | | |
| | | | |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | | REC% RQD% | COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 2 | 20 | 75% | Brown Gray | Loose | 0.0-20.0: FILL; Slag, Fine to coarse sand and fine to coarse gravel, consisting of reworked, angular to rounded slag fragments. | SW | 6.0 | Dry |
| | | | | 40 | 15 | | | | | | | |
| | | 2 | SS | 10 | 15 | 75% | | Medium Dense | | | 6.9 | Moist |
| | | | | 15 | 8 | | | | | | | |
| 5 | | 3 | SS | 8 | 18 | 100% | Black Brown | | | | 7.4 | |
| | | | | 26 | 42 | | | | | | | |
| | | 4 | SS | 50/3 | | 10% | | Very Dense | | | 13 | |
| | | | | | | | | | | | | |
| | | 5 | SS | 8 | 26 | 20% | | Medium Dense | | | 75 | Wet |
| 10 | | | | 46 | 50 | | | | | | | |
| | | 6 | SS | 50/4 | | 10% | Dark Brown | Very Dense | As above with cobbles, odor and slight sheen | | 69 | |
| | | 7 | SS | 12 | 50/2 | 10% | | | | | 585 | |
| 15 | | 8 | SS | 50/1 | | 10% | | | | | 785 | |
| | | | | | | | | | | | | |
| | | 9 | SS | 44 | 5 | 50% | | Loose | | | 791 | |
| | | | | 6 | 5 | | | | | | | |
| | | 10 | SS | 2 | 4 | 25% | Medium Brown | Soft | 18-20.0: Clay (clean, no sheen or odor). | CH | 10 | |
| 20 | | | | 6 | 9 | | | | | | | |
| | | | | | | | | | Terminated boring at 20' BGS | | | |
| | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

PROJECT NO. 4200008BSC.15

BORING NO. P8-B1

# URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | P8-B2 |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | SWMU P-75 |
| GROUND ELEVATION: | 588.73 |
| DATE STARTED: | 11/07/00 |
| DATE FINISHED: | 11/07/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation

CLIENT: Bethlehem Steel Corp.

BORING CONTRACTOR: SJB Services Inc

GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| | | | Static |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | STRATA | SAMPLE NO. | SAMPLE TYPE | BLOWS PER 6" | | REC% RQD% | COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 4 | 8 | 50% | Brown Gray | Loose | 0.0-18.0: FILL; Slag, Fine to coarse sand and fine to coarse angular gravel. Slight odor. (2-8) Material in tar matrix with sheen and strong odor. | SW | 280 | Dry |
| | | | | 6 | 10 | | | | | | | |
| | | 2 | SS | 8 | 10 | 100% | | Medium Dense | | | 540 | Moist |
| | | | | 17 | 13 | | | | | | | |
| 5 | | 3 | SS | 10 | 45 | 75% | Black Brown | | | | 2064 | |
| | | | | 50/0 | | | | | | | | |
| | | 4 | SS | 50/2 | | 10% | | Dense | | | 785 | |
| | | | | | | | | | | | | |
| | | 5 | SS | 5 | 25 | 10% | | | (8-18) Less tar matrix, strong naphthalene odor) | | 585 | Wet |
| 10 | | | | 49 | 8 | | | Medium Dense | | | | |
| | | 6 | SS | 10 | 12 | 10% | | | | | 310 | |
| | | | | 26 | 11 | | | | | | | |
| | | 7 | SS | 2 | 2 | 10% | | Loose | | | 290 | |
| | | | | 2 | 19 | | | | | | | |
| 15 | | 8 | SS | 2 | 12 | 10% | | | | | 250 | |
| | | | | 12 | 19 | | | | | | | |
| | | 9 | SS | 6 | 14 | 10% | | | | | 170 | |
| | | | | 9 | 50/4 | | | | | | | |
| | | 10 | SS | 1 | 3 | 10% | Medium Brown | Soft | 18-20.0: Clay: No apparent odor, no sheen | CH | 10 | |
| 20 | | | | 4 | 3 | | | | | | | |
| | | | | | | | | | Terminated boring at 20' BGs | | | |
| 25 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

| | |
|---|---|
| PROJECT NO. | 4200008BSC.15 |
| BORING NO. | P8-B2 |

## URS Corporation

# TEST BORING LOG

| | |
|---|---|
| PROJECT: | Supplemental SWMU Investigation |
| CLIENT: | Bethlehem Steel Corp. |
| BORING CONTRACTOR: | SJB Services Inc |
| GROUNDWATER: | |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |
| * POCKET PENETROMETER READING | | | | |

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| | | | Static |

| | |
|---|---|
| BORING NO: | P75-B1 |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | SWMU S-75 |
| GROUND ELEVATION: | 589.84 |
| DATE STARTED: | 11/03/00 |
| DATE FINISHED: | 11/03/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | | REC% RQD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 5 | 40 | 100% | Dark Brown w/gray and Black | Medium Dense | 0.0-12: FILL; Slag, Fine to medium sand, some fine to medium gravel, (angular slag fragments, some brick. (2-4): Fill held by tar matrix, with strong odor and sheen. | SW | 12 | Moist |
| | | | | 30 | 22 | | | | | | | |
| | | 2 | SS | 50/1 | | 50% | | Very Dense | | | 88.4 | |
| 5 | | 3 | SS | 4 | 41 | 100% | | Medium Dense | | | 400 | |
| | | | | 18 | 11 | | | | | | | |
| | | 4 | SS | 50 | 50/2 | 25% | | Very Dense | (7.8-8.0): Fill with no tar | | 35 | |
| | | 5 | SS | 50/4 | | 25% | | | (8.0-10.0): Fill with no odor or sheen. | | 20 | |
| 10 | | | | | | | | | | | | |
| | | | | | | | | | Terminated boring at 10' BGS | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

| | |
|---|---|
| PROJECT NO. | 4200008BSC.15 |
| BORING NO. | P75-B1 |

# URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | P75-B2 |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | SWMU S-75 |
| GROUND ELEVATION: | 590.83 |
| DATE STARTED: | 11/03/00 |
| DATE FINISHED: | 11/03/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

| | | | | | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|---|---|---|---|
| DATE | TIME | LEVEL | TYPE | TYPE | | Split spoon | | |
| | | | Static | DIA. | | 2" | | |
| | | | | WT. | | 140# | | |
| | | | | FALL | | 30" | | |
| | | | | * POCKET PENETROMETER READING | | | | |

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | REC% RQD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 5 8 / 2 6 | 50% | Dark Brown with Gray | Loose | 0.0-12: FILL; Slag, Fine to medium sand and fine to coarse gravel, consisting of reworked, rounded slag fragments. No odor or sheen. | SW | 3 | Dry |
| | | 2 | SS | 50/2 | -- | | Very Dense | | | -- | |
| 5 | | 3 | SS | 45 50/2 | 50% | | | (2.0-4.0) No recovery | | 3 | Moist |
| | | 4 | SS | 18 12 / 16 50/2 | 100% | | Medium Dense | | | 2.0 | |
| 10 | | 5 | SS | 50/3 | 25% | | Very Dense | | | 1.5 | |
| | | | | | | | | Terminated boring at 10' BGS | | | |
| 15 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

| | |
|---|---|
| PROJECT NO. | 4200008BSC.15 |
| BORING NO. | P75-B2 |

# URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | P75-B3 |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | SWMU S-75 |
| GROUND ELEVATION: | 589.95 |
| DATE STARTED: | 11/03/00 |
| DATE FINISHED: | 11/06/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation

CLIENT: Bethlehem Steel Corp.

BORING CONTRACTOR: SJB Services Inc

GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| | | | Static |
| | | | |
| | | | |
| | | | |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | STRATA | SAMPLE NO. | SAMPLE TYPE | BLOWS PER 6" | REC% RQD% | COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 9 20 / 19 37 | 50% | Dark Brown | Medium Dense | 0.0-12: FILL; Slag, Fine to coarse sand and fine to coarse gravel, (rounded slag fragments), Odor and sheen. | SW | 12 | Dry |
| | | 2 | SS | 34 28 / 11 50/0 | 50% | | | | | 2.3 | |
| 5 | | 3 | SS | 50/4 | 25% | | Very Dense | | | 17 | Moist |
| | | 4 | SS | 46 50/2 | 25% | | | (6.0-16.0): Tar matrix, odor and sheen | | 55 | |
| | | 5 | SS | 10 15 / 50/2 | 75% | | Medium to very Dense | | | 150 | |
| 10 | | 6 | SS | 50/1 | 10% | | | | | 79 | |
| | | 7 | SS | 50/2 | 10% | | | | | 65.5 | Wet |
| 15 | | 8 | SS | 50/2 | 25% | | | | | 74 | |
| | | 9 | SS | 20 50/4 | 50% | | | As above: No tar, sheen or apparent odor | | 10 | |
| | | | | | | | | Terminated boring at 18' BGS | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

| | |
|---|---|
| PROJECT NO. | 4200008BSC.15 |
| BORING NO. | P75-B3 |

# URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | P75-B4 |
| PROJECT: | Supplemental SWMU Investigation |
| SHEET: | 1 of 1 |
| CLIENT: | Bethlehem Steel Corp. |
| JOB NO.: | 4200008BSC.15 |
| BORING CONTRACTOR: | SJB Services Inc |
| BORING LOCATION: | SWMU S-75 |
| GROUNDWATER: | |
| GROUND ELEVATION: | 593.00 |
| DATE STARTED: | 11/06/00 |
| DATE FINISHED: | 11/06/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

| DATE | TIME | LEVEL | TYPE | TYPE | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|---|---|---|---|
| | | | Static | DIA. | | 2" | | |
| | | | | WT. | | 140# | | |
| | | | | FALL | | 30" | | |
| | | | | * POCKET PENETROMETER READING | | | | |

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | REC% RQD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 50 45 / 50/1 | 50% | Gray with Red Brown | Very Dense | 0.0-10: FILL; Slag, Fine to coarse sand and fine to coarse gravel, (angular to rounded slag fragments) No sheen or odor. | SW | 1.8 | Dry |
| | | 2 | SS | 50/2 | 40% | | | | | 0.8 | |
| 5 | | 3 | SS | 15 50/3 | 25% | | | | | 0.7 | |
| | | 4 | SS | 50/2 | 10% | | | | | 1.5 | |
| 10 | | 5 | SS | 50/1 | 10% | | | | | 0.8 | |
| | | | | | | | | Terminated boring at 10' BGS | | | |
| 15 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

| | |
|---|---|
| PROJECT NO. | 4200008BSC.15 |
| BORING NO. | P75-B4 |

## URS Corporation

# TEST BORING LOG

| | |
|---|---|
| BORING NO: | MWN-37A |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | Tank Farm Area |
| GROUND ELEVATION: | |
| DATE STARTED: | 10/19/00 |
| DATE FINISHED: | 10/20/00 |
| DRILLER: | K. Fuller |
| GEOLOGIST: | J. Doerr |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation

CLIENT: Bethlehem Steel Corp.

BORING CONTRACTOR: SJB Services Inc

GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| 10/20/00 | 7:26 | 23.14 TOC | Static |
| 10/23/00 | 7:24 | 23.28' TOC | Static |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | | REC% ROD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 32 | 35 | 50% | Dark Gray | Dense | 0-2: FILL; Silty, fine to coarse sand | | 0.0 | Dry |
| | | | | 12 | 14 | | | | and fine to coarse gravel, (slag) | | 4.5 | |
| | | 2 | SS | 9 | 8 | 40% | | Medium | 2-8: FILL; as above, with angular | | 0.0 | |
| | | | | 10 | 11 | | | Dense | fractured gravel (slag) | | 3.3 | |
| 5 | | 3 | SS | 8 | 17 | 35% | Light Gray | Very Dense | | | 0.0 | |
| | | | | 50/4 | | | | | | | 6.7 | |
| | | 4 | SS | 43 | 6 | 65% | w/Black | Dense | | | 0.0 | |
| | | | | 28 | 41 | | Green | | | | 1.6 | |
| | | 5 | SS | 50/4 | | 10% | Gray | Very | 8-16: FILL; Coarse sand and fine to | | 0.0 | |
| 10 | | | | | | | | Dense | coarse angular gravel (slag) | | 0.6 | |
| | | 6 | SS | 50/1 | | 0% | | | 10-12; No Recovery | | | |
| | | 7 | SS | 6 | 7 | 10% | | Medium | | | 0.0 | Moist |
| | | | | 4 | 2 | | | Dense | | | 4.1 | |
| 15 | | 8 | SS | 2 | 5 | 50% | Brown/ | | 14-16: FILL; as above, with some | | 0.0 | Dry |
| | | | | 19 | 27 | | Gray | | cinder, trace ash | | 5.6 | |
| | | 9 | SS | 50/4 | | 10% | Gray | Very | 16-18: FILL; fine to coarse sand and | | 0.0 | |
| | | | | | | | | Dense | fine to coarse angular gravel (slag) | | 4.8 | |
| | | 10 | SS | 50/2 | | 5% | | | 18-20: Fill; angular gravel fragments | | 0.0 | |
| 20 | | | | | | | | | and chips (slag) | | 1.7 | |
| | | 11 | SS | 2 | 5 | 45% | Gray/ | Dense | 20-22: FILL; fine to coarse sand and | | 0.1 | Moist |
| | | | | 29 | 50/1 | | Yellow | | fine to coarse gravel (slag) some silt | | 2.2 | |
| | | 12 | SS | 26 | 50/4 | 40% | Gray | Very | 22-24 : FILL; coarse sand grading to | | 0.0 | |
| | | | | | | | | Dense | silty fine sand (slag) | | 2.1 | |
| 25 | | 13 | SS | 50/2 | | 40% | | | 24-26 Fill; coarse sand (slag) and | | 0.0 | Wet |
| | | | | | | | | | subangular to subrounded fine gravel | | 2.4 | at 24' |
| | | 14 | SS | 25 | 33 | 80% | | | 26-30: FILL; fine to coarse sand and | | 0.1 | |
| | | | | 27 | 28 | | | | fine to coarse gravel (slag) | | 1.6 | |
| | | 15 | SS | 2 | 20 | 50% | Dark | | | | 0.2 | |
| 30 | | | | 50/5 | | | Gray | | | | 1.1 | |
| | | | | | | | | | End of Boring at 30' BGS | | | |
| 35 | | | | | | | | | | | | |

Comments: Boring advanced with a truck mounted CME 85 utilizing 4-1/4 inch HSA.

Sampling accomplished using 2-inch diameter split spoon samplers.

PROJECT NO. 4200008BSC.15

BORING NO. MWN-37A

## DRILLING SUMMARY

**Geologist:**
J. Doerr

**Drilling Company:**
SJB Services, Inc.

**Driller:**
K. Fuller

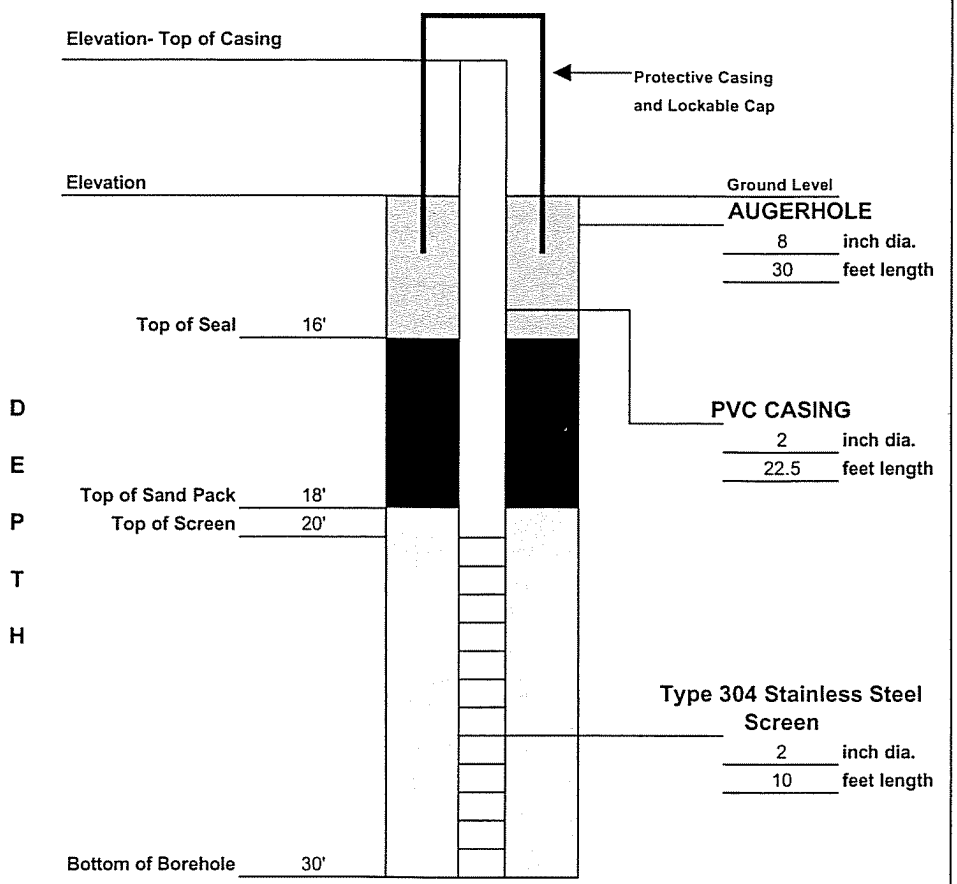
**Rig Make/Model:**
CME 85

**Date:**
10/19/00

## GEOLOGIC LOG

| Depth(ft.) | Description |
|---|---|
| 0-30.0' | FILL: Fine to coarse sand and fine to coarse gravel (Slag) |

## WELL DESIGN




| *CASING MATERIAL* | *SCREEN MATERIAL* | *FILTER MATERIAL* |
|---|---|---|
| **Surface:** 4" Steel Protective Casing | **Type:** 2" Type 304 Stainless Steel (SS) | **Type:** #2 Sand **Setting:** 18-30 |
| **Monitor:** 2" Schedule 40 PVC | **Slot Size:** .010" | ***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 16-18 |

***COMMENTS:***

***LEGEND***

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

| | | |
|---|---|---|
| **Client: Bethlehem Steel Corp.** | **Location: Lackawanna, NY** | **Project No.: 4200008BSC.15** |
| ***URS Corporation*** | **Monitoring Well CONSTRUCTION DETAILS** | **Well Number: MWN-37A** |

## URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | MWN-38A |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | Tank Farm Area |
| GROUND ELEVATION: | |
| DATE STARTED: | 10/20/00 |
| DATE FINISHED: | 10/21/00 |
| DRILLER: | K. Fuller |
| GEOLOGIST: | J. Doerr |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation
CLIENT: Bethlehem Steel Corp.
BORING CONTRACTOR: SJB Services Inc

GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| 10/23/00 | 9:16 | 25.82' TOC | Static |
| 10/27/2000 | 11:42 | 25.89' TOC | Static |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | | REC% ROD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 9 | 12 | 75% | Black | Dense | 0-4: FILL; Silt to coarse gravel, (slag) | | 0.0 | Dry |
| | | | | 20 | 25 | | Dark | | cinder, coke ash, brick, concrete | | 4.7 | |
| | | 2 | SS | 50/1 | | 0% | Brown | Very | 2-4: No Recovery | | | |
| | | | | | | | | Dense | | | | |
| 5 | | 3 | SS | 19 | 18 | 50% | Black | | 4-6: FILL; fine sand, some coarse | | 0.0 | |
| | | | | 50/3 | | | | | gravel (slag), trace brick, concrete | | 0.2 | |
| | | 4 | SS | 50/3 | | 10% | Gray | | 6-8: FILL; angular coarse gravel | | 0.0 | |
| | | | | | | | | | (slag fragments) | | 7.0 | |
| | | 5 | SS | 28 | 50/2 | 40% | | | 8-18: FILL; fine to coarse sand and | | 0.0 | |
| 10 | | | | | | | | | fine to coarse gravel (slag) | | 6.8 | |
| | | 6 | SS | 8 | 5 | 40% | Black/ | Loose | | | 0.0 | |
| | | | | 4 | 3 | | Gray/ | | | | 0.0 | |
| | | 7 | SS | 8 | 14 | 45% | Red/ | Very | | | 0.0 | |
| | | | | 50/3 | | | | Dense | | | 0.0 | |
| 15 | | 8 | SS | 50/1 | | 0% | | | 14-18: No recovery | | | |
| | | 9 | SS | 50/0 | | 0% | | | | | | |
| | | 10 | SS | 50/3 | | 10% | Green/ | | 18-20: FILL; coarse gravel (angular | | 0.0 | |
| 20 | | | | | | | Gray/ | | slag fragments), trace sand | | 1.9 | |
| | | 11 | SS | 27 | 26 | 55% | Light | Very | 20-24: FILL; fine to coarse sand and | | 0.0 | Moist |
| | | | | 50/5 | | | Brown | Dense | fine to coarse gravel (slag) some silt | | 2.7 | |
| | | 12 | SS | 50/2 | | 1% | Gray | | | | 0.0 | |
| | | | | | | | | | 24-28: FILL; fine to coarse sand and | | 2.2 | Wet |
| 25 | | 13 | SS | 16 | 21 | 35% | | | fine to coarse gravel (slag) trace silt | | 0.0 | at 22' |
| | | | | 50/3 | | | | | | | 1.3 | |
| | | 14 | SS | 19 | 30 | 45% | | | | | 0.0 | |
| | | | | 50/2 | | | | | | | 3.2 | |
| | | | | | | | | | End of Boring at 28' BGS | | | |
| 30 | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |

Comments: Boring advanced with a truck mounted CME 85 utilizing 4-1/4 inch HSA.
Sampling accomplished using 2-inch diameter split spoon samplers.

PROJECT NO. 4200008BSC.15
BORING NO. MWN-38A

## DRILLING SUMMARY

**Geologist:**
J. Doerr

**Drilling Company:**
SJB Services, Inc.

**Driller:**
K. Fuller

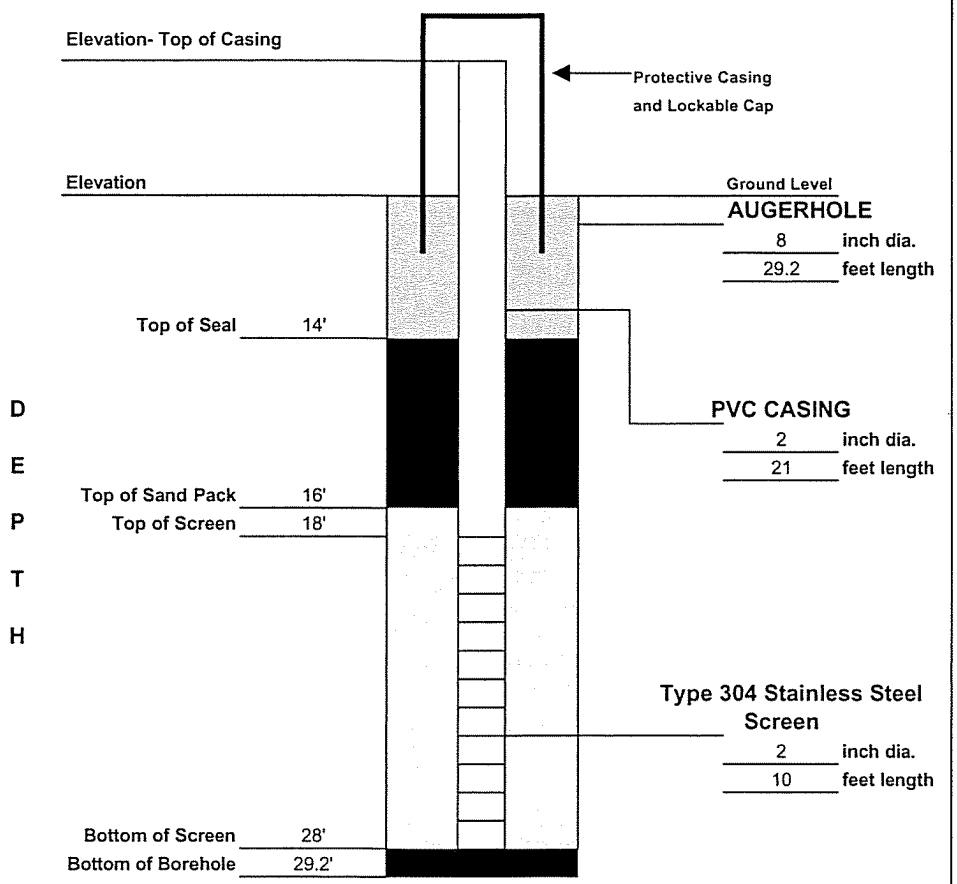
**Rig Make/Model:**
CME 85

**Date:**
10/20/00

## GEOLOGIC LOG

| Depth(ft.) | Description |
|---|---|
| 0-29.2' | FILL: Fine to coarse sand and fine to coarse gravel (Slag) |

## WELL DESIGN




| *CASING MATERIAL* | *SCREEN MATERIAL* | *FILTER MATERIAL* |
|---|---|---|
| **Surface:** 4" Steel Protective Casing | **Type:** 2" Type 304 Stainless Steel (SS) | **Type:** #2 Sand **Setting:** 16-29.2 |
| **Monitor:** 2" Schedule 40 PVC | **Slot Size:** .010" | ***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 14-16 |

***COMMENTS:***

***LEGEND***

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

| | | |
|---|---|---|
| **Client: Bethlehem Steel Corp.** | **Location: Lackawanna, NY** | **Project No.: 4200008BSC.15** |
| ***URS Corporation*** | **Monitoring Well CONSTRUCTION DETAILS** | **Well Number: MWN-38A** |

# URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | MWN-39A |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | Tank Farm Area |
| GROUND ELEVATION: | |
| DATE STARTED: | 10/31/00 |
| DATE FINISHED: | 10/31/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation
CLIENT: Bethlehem Steel Corp.
BORING CONTRACTOR: SJB Services Inc
GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| | | | Static |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | | REC% ROD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 18 | 21 | 100% | Varied Mix of Light Brown Gray and Black | Medium Dense | 0-1.0': Coal dust followed by FILL fine to coarse sand and medium subangular gravel (slag fragments) 2-4.0': No Recovery 4-22.0': Fill; fine to coarse sand and fine to coarse angular gravel, some coal fragments, cobbles. No odor or sheen. | SW | 3.0 | Dry |
| | | | | 23 | 22 | | | | | | | |
| | | 2 | SS | 12 | 50/4 | 0% | | Dense | | | NA | |
| 5 | | 3 | SS | 12 | 29 | 50% | | Medium Dense | | | 0.8 | Moist |
| | | | | 1 | WoH | | | | | | | |
| | | 4 | SS | 1 | 1 | 50% | | Loose | | | 0.4 | |
| | | | | 11 | 23 | | | | | | | |
| | | 5 | SS | 16 | 9 | 50% | | | | | 0.0 | |
| 10 | | | | 1 | 3 | | | | | | | |
| | | 6 | SS | 12 | 30 | 50% | | | | | 0.2 | |
| | | | | 50/1 | | | | Very Dense | | | | |
| | | 7 | SS | 50/2 | | 10% | | | | | 1.4 | |
| 15 | | 8 | SS | 5 | 12 | 100% | | Medium Dense | | | 0.6 | Wet |
| | | | | 45 | 33 | | | | | | | |
| | | 9 | SS | 50/4 | | 10% | | | | | NA | |
| | | 10 | SS | 30 | 36 | 100% | | | | | 2.0 | |
| 20 | | | | 40 | 30 | | | | | | | |
| | | 11 | SS | 23 | 50/4 | 25% | | Very Dense | | | 1.5 | |
| | | | | | | | | | Terminated boring at 22' BGS | | | |
| 25 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

PROJECT NO. 4200008BSC.15
BORING NO. MWN-39A

## DRILLING SUMMARY

**Geologist:** Jennifer Christy

**Drilling Company:** SJB

**Driller:** Art Koske

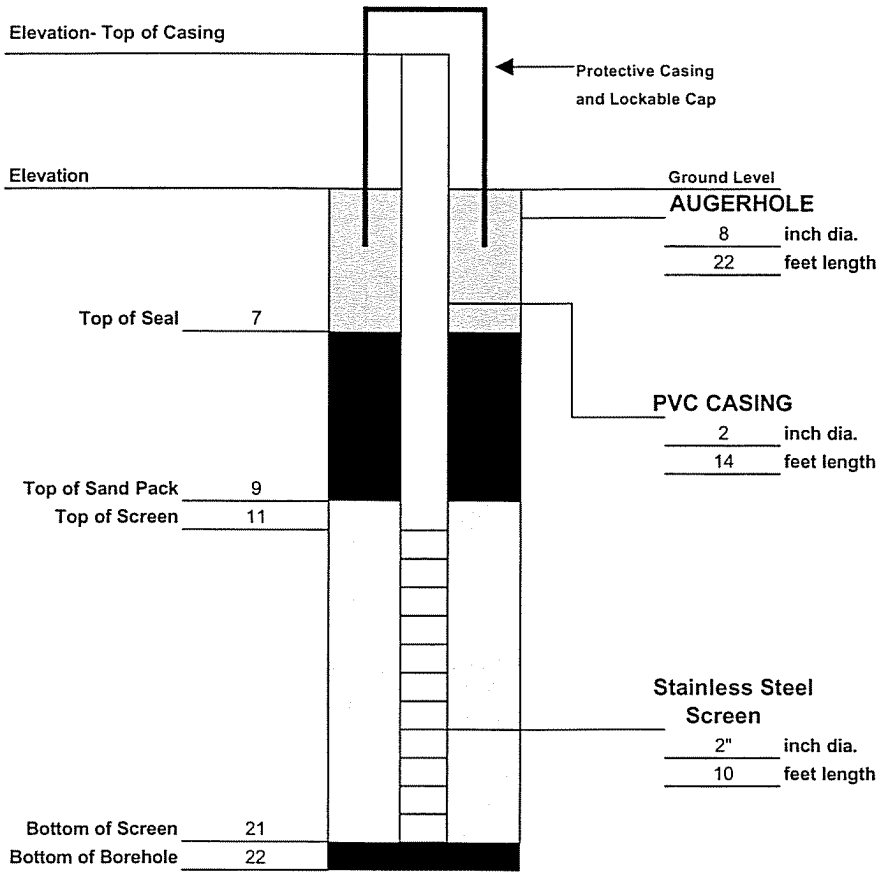
**Rig Make/Model:** CME 75

**Date:** 10/31/00

## GEOLOGIC LOG

| Depth(ft.) | Description |
|---|---|
| 0-22.0 | FILL; Slag, fine to coarse sand and fine to coarse gravel, consisting of reworked, angular to rounded slag fragments, some silt. |

DEPTH




## WELL DESIGN

| CASING MATERIAL | SCREEN MATERIAL | FILTER MATERIAL |
|---|---|---|
| **Surface:** 4" Steel Protective Casing | **Type:** 2" Stainless Steel (SS) | **Type:** #2 Sand **Setting:** 9.0-21.0 |
| **Monitor:** 2" Schedule 40 PVC | **Slot Size:** .010" | **SEAL MATERIAL** **Type:** Bentonite **Setting:** 7.0-9.0 |

***COMMENTS:***

Groundwater encountered at approximately 14' bgs.

***LEGEND***

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

| | | |
|---|---|---|
| **Client: Bethlehem Steel Corp.** | **Location: Lackawanna, NY** | **Project No.: 4200008BSC.15** |
| ***URS Corporation*** | **Monitoring Well CONSTRUCTION DETAILS** | **Well Number: MWN-39A** |

## URS Corporation

## TEST BORING LOG

| | |
|---|---|
| BORING NO: | MWN-40A |
| SHEET: | 1 of 1 |
| JOB NO.: | 4200008BSC.15 |
| BORING LOCATION: | Tank Farm Area |
| GROUND ELEVATION: | |
| DATE STARTED: | 11/01/00 |
| DATE FINISHED: | 11/01/00 |
| DRILLER: | A. Koske |
| GEOLOGIST: | J. Christy |
| REVIEWED BY: | J. Boyd |

PROJECT: Supplemental SWMU Investigation

CLIENT: Bethlehem Steel Corp.

BORING CONTRACTOR: SJB Services Inc

GROUNDWATER:

| DATE | TIME | LEVEL | TYPE |
|---|---|---|---|
| | | | Static |
| | | | |
| | | | |
| | | | |

| | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|
| TYPE | | Split spoon | | |
| DIA. | | 2" | | |
| WT. | | 140# | | |
| FALL | | 30" | | |

* POCKET PENETROMETER READING

| DEPTH FEET | SAMPLE STRATA | NO. | TYPE | BLOWS PER 6" | REC% ROD% | DESCRIPTION COLOR | CONSIST HARD | MATERIAL DESCRIPTION | USCS | REMARKS PID | REMARKS Moist |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | SS | 32 22<br>14 50 | 100% | Medium Brown | Medium Dense | 0.0-20: FILL; Slag, Fine to coarse sand and fine to coarse gravel, (angular to rounded slag fragments) No sheen or odor. | SW | 0.5 | Dry |
| | | 2 | SS | 31 50/4 | 50% | Gray | Dense | | | 1.0 | |
| 5 | | 3 | SS | 6 5<br>3 3 | 50% | Dark Brown | Loose | (4.0-6.0): Some silt | | 0.8 | |
| | | 4 | SS | 3 50/4 | 10% | Gray | Very Dense | | | 0.0 | |
| | | 5 | SS | 1/12<br>2 8 | 25% | Dark Brown | Loose | | | 2.4 | Moist |
| 10 | | 6 | SS | 6 18<br>24 28 | 50% | Medium Brown | Medium Dense | | | 2.3 | |
| | | 7 | SS | 23 33<br>36 10 | 50% | Dark Brown | | | | 1.3 | Wet @ 12' |
| 15 | | 8 | SS | 5 15<br>10 50/3 | 50% | Black | Very Dense | | | 1.9 | |
| | | 9 | SS | 50/3 | 25% | | | | | 2.7 | |
| 20 | | 10 | SS | 9 4<br>2 2 | 50% | | Loose | | | 0.0 | |
| | | | | | | | | Terminated boring at 20' BGS | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |

Comments: Boring advanced with a fully tracked Nodwell ATV mounted CME 75 using 4-1/4 inch HSA. Sampling accomplished using 2-inch or 3-inch split barrel sampler.

| | |
|---|---|
| PROJECT NO. | 4200008BSC.15 |
| BORING NO. | MWN-40A |

## DRILLING SUMMARY

**Geologist:** Jennifer Christy

**Drilling Company:** SJB

**Driller:** Art Koske

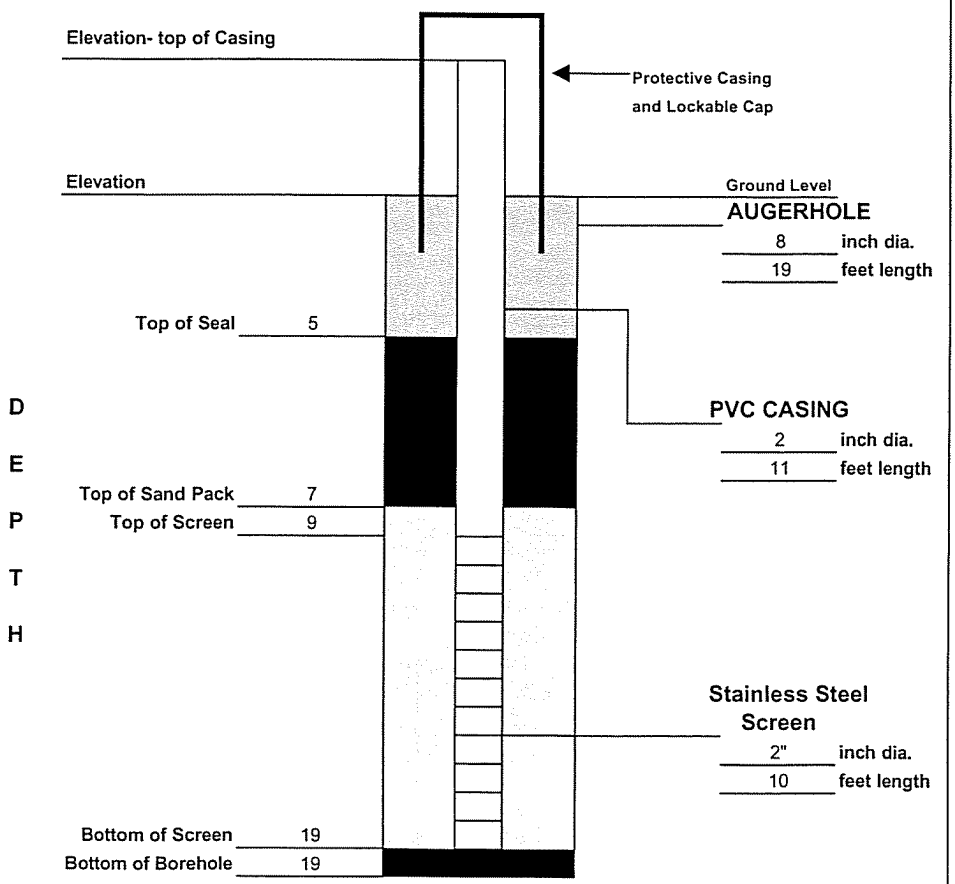
**Rig Make/Model:** CME 75

**Date:** 11/01/00

## GEOLOGIC LOG

| Depth(ft.) | Description |
|---|---|
| 0-19.0 | FILL; Slag, fine to coarse sand and fine to coarse gravel, consisting of reworked, angular to rounded slag fragments, some silt. |

## WELL DESIGN




| CASING MATERIAL | SCREEN MATERIAL | FILTER MATERIAL |
|---|---|---|
| **Surface:** 4" Steel Protective Casing | **Type:** 2" Stainless Steel (SS) | **Type:** #2 Sand **Setting:** 7.0-19.0 |
| **Monitor:** 2" Schedule 40 PVC | **Slot Size:** .010" | **SEAL MATERIAL** **Type:** Bentonite **Setting:** 5.0-7.0 |

***COMMENTS:***

Groundwater encountered at approximately 12' bgs.

***LEGEND***

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

| | | |
|---|---|---|
| **Client: Bethlehem Steel Corp.** | **Location: Lackawanna, NY** | **Project No.: 4200008BSC.15** |
| ***URS Corporation*** | **Monitoring Well CONSTRUCTION DETAILS** | **Well Number: MWN-40A** |

# ATTACHMENT A

# USEPA COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278-0012




DEC 3 0 1994

Mr. Robert B. Allen
Environmental Manager
Lackawanna Area
Bethlehem Steel Corporation
Box 310
Lackawanna, New York 14218

Re: Review of Preliminary SWMU Assessment Reports for SWMUs S-28, S-29 (Drum Landfills) and P-8 (Waste Oil Storage Tanks)

Dear Mr. Allen:

The U.S. Environmental Protection Agency (EPA) Region II and the New York State Department of Environmental Conservation (NYSDEC) have reviewed Bethlehem Steel Corporation's (BSC) Preliminary Solid Waste Management Unit Assessment Reports for the above referenced SWMUs. Our comments are enclosed.

EPA and NYSDEC request that BSC address the enclosed comments by submitting a workplan for additional investigatory work to confirm the absence of buried drums at SWMUs S-28 and S-29, and for sampling of media at SWMU P-8, as described above. The workplan should be submitted to EPA and NYSDEC by January 31, 1995.

Should you have any questions or wish to discuss this matter further, please contact Phil Masters, of my staff, at (212) 264-6118.

Sincerely yours,

for AB.

Andrew Bellina, P.E.
Chief, Hazardous Waste Facilities Branch
Air and Waste Management Division

Enclosure

cc: P. Counterman, NYSDEC w/encl.
L. Thomas, NYSDEC w/encl.
S. Radon, NYSDEC Reg. 9 w/encl.

INTED ON RECYCLED PAPER

Bethlehem Steel Corporation
Review of Preliminary SWMU Assessment Reports for
SWMUs S-28, S-29 (Drum Landfills) and
P-8 (Waste Oil Storage Tanks)

## I. General Comments

BSC states that there have been no releases of hazardous wastes or constituents to the environment as a result of materials stored in SWMUs S-28, S-29 and P-8, and therefore, recommends "no further action" at all three SWMUs. However, BSC provides no analytical data to support this recommendation for any of the three SWMUs.

We recommend that BSC conduct a ground penetrating radar or similar geophysical survey in the former trench areas at SWMUs S-28 and S-29 to confirm the absence of buried drums. Such a survey is required since the entire trench areas were not completely excavated, and both may have been excavated in the wrong location.

## II. SWMU S-28 - Drum Landfill

Page-Specific Comments

| | |
|---|---|
| Page 1, ¶1 and ¶3 | The figures presented in the RCRA Facility Assessment report and Appendix A of the SWMU assessment report show SWMU S-28 located south of SWMU S-15 (General Rubble Landfill O), not SWMU S-13 as BSC states here and illustrates in Figure 1. BSC should reconcile this discrepancy, and verify that the appropriate area was excavated. |
| Page 2, ¶4 | It appears that BSC did not field screen any soil/slag samples for volatile organic compounds (VOCs) during excavation activities. VOC field screening should have been performed to assist in identifying any materials potentially contaminated with VOCs. During future excavation work in this area, BSC must perform VOC field screening of representative slag/soil samples. |
| Page 3, ¶2 | This paragraph states that the location of the former trench was identified from aerial photographs. Based on the information provided in the report, it is not possible to evaluate whether the test pit was excavated at the same location as the trench identified by the National Enforcement Investigations |

During future excavation work in this area, BSC should perform VOC field screening of representative slag/soil samples.

Page 4, ¶3

BSC should describe in greater detail how the trench was actually located in the field. We recommend that an EPA or NYSDEC representative confirm the location with BSC during a site visit.

The test pit log presented in Appendix A does not show the orientation or approximate dimensions of the test pit as BSC states. Additionally, the log does not describe all portions of the test pit.

Page 4, ¶4

BSC states that the length of the former trench was approximately 60 feet; however, BSC only excavated approximately 48 feet of this length. BSC must discuss why the entire length of the trench was not excavated, and if technically feasible, excavate the remaining 12 feet of the former trench. During this future excavation work, BSC must perform VOC field screening of soil/slag samples. At least one sample should be collected for total constituent laboratory analysis. The field screening results should be used to select material for laboratory analysis.

A ground penetrating radar survey should also be performed in this area since buried drums are of concern.

## IV. SWMU P-8 - WASTE OIL STORAGE TANKS

Page-Specific Comments

Page 4, ¶1

This paragraph states that no hazardous constituent was found above detection limits in the TCLP extract of waste oil sample collected from Tank No. 2. Although all results are below the regulatory limits that define if a material exhibits hazardous waste characteristics, analytical results presented in Appendix B show barium detected at a concentration of 0.05 milligrams per liter (mg/L). The text should be revised to indicate barium was found above the detection limit.

Page 4, ¶2 — The text does not discuss the analytical results of the sample collected from the May 20, 1991 oil spill. The results in Appendix C indicate that 0.036 mg/L of benzene was detected in the TCLP extract of this material. The text should be revised to reflect this data.

Page 4, ¶1-3 — BSC needs to collect representative grab samples of the media beneath and surrounding the tanks/containment areas to confirm the absence of hazardous constituents. The sample locations should be biased towards the areas of highest contamination, based on field screening, visual observation, and waste history of this SWMU. These samples should be analyzed for the complete hazardous constituent list and be analyzed using EPA-approved standard methods (SW-846). Additionally, the analytical data should be validated according to EPA Region II guidelines.

Page 4, ¶6 — BSC should discuss whether these storage tanks were ever leak tested.

BSC should also discuss whether any drains or openings are located in the concrete pad and/or berm for management of storm water runoff that could have allowed any release(s) to escape from the storage tank containment area.

Page 4, ¶7 — The text states that the tanks are contained by a berm. BSC should present the construction details and dimensions of the berm.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278-0012

RECEIVED
Dames & Moore
JUN 4 1994

JUN 01 1994

Mr. Robert B. Allen
Environmental Manager
Lackawanna Area
Bethlehem Steel Corporation
Box 310
Lackawanna, New York 14218

Re: Bethlehem Steel Corporation - EPA ID No.: NYD002134880
Administrative Order on Consent
Docket No. II RCRA-90-3008(h)-0201

Dear Mr. Allen:

The U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) have reviewed the Response to Agencies Comments on the RFI Phase I Draft Final Report and nine (9) Preliminary Solid Waste Management Unit (SWMU) Assessment Reports:

1. Rubble Landfills N & O (SWMUs S-14 & S-15);
2. Sludge Storage Area (SWMU S-21);
3. Landfill/Impoundment Under North End of Coal Pile (SWMU S-25);
4. Fill Area Near Coke Battery No. 8 (SWMU S-26);
5. Quench Water Pit, B Station (SWMU P-5);
6. Spill Clean Up Storage Area (SWMU P-12);
7. Cooling Tower Hot and Cold Well Complex (SWMU P-18);
8. Waste Storage Piles (SWMU P-74); and
9. Zone 5 of the Slag Fill Area.

Overall, BSC has concurred and adequately responded to most of the comments on the RFI Phase I Draft Final Report. However, there are several outstanding issues. These issues are discussed in the Agencies' reviews of the Phase II-A Draft Final Report and Phase II Work Plan transmitted to BSC on October 13, 1993 and October 1, 1993, respectively. Additional comments are provided in this review only where appropriate.

The Agencies do not request that a revised RFI Phase I Report be submitted to the Agencies, however, BSC should address these comments in subsequent RFI reports and in the final RFI report, where appropriate. BSC should use its best efforts to ensure that future RFI reports be submitted in an approvable form and do not require extensive EPA and NYSDEC comments.

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In each of the Preliminary SWMU Assessment Reports, BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials stored in the SWMUs and recommends "no further action" for each SWMU.

The Agencies conclude that all the subject SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, P-18, P-74) as well as Zone 5 require further investigation based on the following:

- Data exist which indicate that hazardous wastes and or constituents were disposed in SWMUs S-21, P-5, P-12, P-18, and P-74. The RCRA Facility Assessment and technical references on steel industry wastes document that the material disposed in these SWMUs contain hazardous constituents.

  Additionally, the analytical results presented in the Preliminary SWMU Assessment Reports, which consisted primarily of EP Toxicity and Toxicity Characteristic Leaching Procedure (TCLP) data, verify the presence of hazardous constituents in SWMUs S-21, P-5, P-12, P-18, and P-74. Additionally, the lead levels in the TCLP extract of samples collected from SWMU P-18 exceeded the TCLP regulatory level of 5.0 mg/L.

- BSC has not adequately characterized the material in any of the SWMUs or in Zone 5 and has not provided sufficient data/documentation to demonstrate that these units do not contain or have never contained hazardous wastes or constituents. Thus, conclusions regarding the hazardous nature of the SWMUs are premature. For SWMUs S-21, P-12, P-18, P-74, and Zone 5, BSC has only conducted EP Toxicity or TCLP analysis on a limited number of samples.

  No analytical data were provided for SWMUs S-14, S-15, S-25, and S-26.

  Additionally, the ground water monitoring data indicate that the materials in Zone 5 and SWMU P-74 may be impacting ground water quality.

  Whether or not the remaining SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, and P-18) may be impacting ground water quality cannot be evaluated, due to the absence of ground water monitoring wells downgradient from these SWMUs.

Specific comments on each report are provided in the attachment. BSC should develop SWMU characterization/sampling plans, separately, or as part of the Phase II-C Work Plan, which address the comments provided in the attachment. The sampling plans need to provide adequate justification and rationale for the number, location, and depths of samples to be collected at each SWMU. The sample locations need to be biased towards the areas of highest contamination, based on field screening, visual observation, and waste history of each SWMU.

Some SWMUs undergoing characterization, based on the results of preliminary sampling, may require to be fully investigated in the RFI process. Therefore, BSC must ensure that all the SWMU characterizations and the investigations of those SWMUs that require an RFI be completed by the February 1995 RFI completion date.

If you have any questions, please contact Maria Jon of the EPA at (212) 264-9397 or Mr. Larry Thomas of the NYSDEC at (518) 457-9255.

Sincerely yours,

Andrew Bellina, P.E.
Chief, Hazardous Waste Facilities Branch
Air and Waste Management Division
U.S. Environmental Protection Agency, Region II

Paul R. Counterman, P.E.
Chief, Bureau of Western Hazardous Waste Programs
Division of Hazardous Substances Regulation
New York State Department of Environmental Conservation

Attachments

cc: L. Thomas, NYSDEC, w/attachments
S. Radon, NYSDEC - Region 9, w/attachments
Mike Hanchak, Dames and Moore, w/attachments

April 28, 1994

U.S. ENVIRONMENTAL PROTECTION AGENCY
AND
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

# TECHNICAL REVIEW
# PRELIMINARY SWMU ASSESSMENT REPORTS
# (SWMUs S-14, S-15, S-21, S-25, S-26, P-5, P-12, P-18, P-74, and Zone 5)
# BETHLEHEM STEEL CORPORATION
# LACKAWANNA, NEW YORK

## 1.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Agencies have reviewed the following Preliminary Solid Waste Management Unit (SWMU) Assessment Reports:

1. Rubble Landfills N & O (SWMUs S-14 & S-15); report dated 1/5/93.
2. Sludge Storage Area (SWMU S-21); report dated 12/30/92.
3. Landfill/Impoundment Under North End of Coal Pile (SWMU S-25); report dated 7/31/92.
4. Fill Area Near Coke Battery No. 8 (SWMU S-26); report dated 7/31/92.
5. Quench Water Pit, B Station (SWMU P-5); report dated 10/29/92.
6. Spill Clean Up Storage Area (SWMU P-12); report dated 7/31/92.
7. Cooling Tower Hot and Cold Well Complex (SWMU P-18); report dated 7/31/92.
8. Waste Storage Piles (SWMU P-74); report dated 1/29/93.
9. Zone 5 of the Slag Fill Area; report dated 10/92.

In each of the Preliminary SWMU Assessment Reports, BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials stored in the SWMUs and recommends "no further action" for each SWMU.

The Agencies conclude that the subject SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, P-18, P-74) as well as Zone 5 require further investigation based on the following:

- Data exist which indicate that hazardous wastes and or constituents were disposed in SWMUs S-21, P-5, P-12, P-18, and P-74. The RCRA Facility Assessment and technical references on steel industry wastes document that the material disposed in these SWMUs contain hazardous constituents.

  Additionally, the analytical results presented in the Preliminary SWMU Assessment Reports, which consisted primarily of EP Toxicity and Toxicity Characteristic Leaching Procedure (TCLP) data, verify the presence of hazardous constituents in SWMUs S-21, P-5, P-12, P-18, and P-74. Additionally, the lead levels in the TCLP extract of samples collected from SWMU P-18 exceeded the TCLP regulatory level of 5.0 mg/L.

  The RCRA Facility Assessment states that SWMUs S-14, S-15, S-25, S-26, and Zone 5 are suspected to contain hazardous wastes or constituents. BSC has not provided sufficient data/documentation to demonstrate that these units do not contain or have never contained hazardous wastes or constituents.

- BSC has not adequately characterized the material in any of the SWMUs or in Zone 5. Thus, conclusions regarding the hazardous nature of the SWMUs are

premature. For SWMUs S-21, P-12, P-18, P-74, and Zone 5, BSC has only conducted EP Toxicity or TCLP analysis on a limited number of samples.

No analytical data were provided for SWMUs S-14, S-15, S-25, and S-26.

- There is evidence to indicate that several SWMUs have released hazardous constituents to the environment. It is documented that waste materials from SWMUs P-5 and P-18 were discharged to the Ship Canal during the period the units were in operation. TCLP data of sediment samples collected from the Ship Canal show elevated levels of cyanide and lead, which have also been detected in the samples collected from SWMUs P-5 and P-18.

  Additionally, the ground water monitoring data indicate that the materials in Zone 5 and SWMU P-74 may be impacting ground water quality.

  Whether or not the remaining SWMUs (S-14, S-15, S-21, S-25, S-26, P-5, P-12, and P-18) may be impacting ground water quality cannot be evaluated, due to the absence of ground water monitoring wells downgradient from these SWMUs.

Specific comments on each report are provided in the following sections. Since all of the SWMUs and Zone 5 require further investigation, most of the assessment reports will need to be substantially revised or rewritten. Therefore, the comments on each assessment report point out *only* the most significant issues associated with each SWMU.

BSC should develop SWMU characterization/sampling plans, separately, or as part of the Phase II-C Work Plan, which address the comments provided herein. The sampling plans need to provide adequate justification and rationale for the number, location, and depths of samples to be collected at each SWMU. The sample locations need to be biased towards the areas of highest contamination, based on field screening, visual observation, and waste history of each SWMU.

## 2.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - LANDFILLS N & O (SWMUs S-14 & S-15)

### 2.1 General Comments

BSC concludes that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials stored in SWMUs S-14 and S-15, and therefore recommends "no further action." The Agencies conclude that these SWMUs require further investigation for the following reasons:

- The RCRA Facility Assessment indicates that SWMUs S-14 and S-15 received discarded materials from plant operations that could have included waste oils, solvents, chemicals containing hazardous constituents, and listed hazardous

discharged to the canal. It is not possible to conclude that releases of water from the hot well/cold well to the Lackawanna Ship Canal are not occurring or have not occurred based only on water level elevation data.

## 9.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - WASTE STORAGE PILES (SWMU P-74)

### 9.1 General Comments

BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of the waste fuel piles (SWMU P-74) stored in the area known as the Tank Farm, and is recommending "no further action" for this SWMU. The Agencies conclude that SWMU P-74 requires further investigation due to the following:

- SWMU P-74 was identified in the RCRA Facility Assessment because mixtures of tar and fuel tank residues, coke breeze, and coal fines were stored directly on the ground in the Tank Farm area. The RCRA Facility Assessment states that these materials potentially contain organic hazardous constituents (including benzene, cresol, naphthalene, phenolic compounds, and toluene), which may have leached into the subsurface and ground water. No sampling of the underlying soils has been conducted.

- With the exception of an earthen berm, no containment devices were used to prevent the leaching of contaminants into the subsurface. Furthermore, it does not appear that any cover materials (e.g., plastic sheeting) were placed on the piles to prevent the infiltration of precipitation.

- The December 1992 ground water monitoring data show elevated levels of several hazardous constituents in ground water samples obtained from monitoring wells located downgradient from SWMU P-74 (i.e., MWN-16A, MWN-16B, MWN-17A, and MWN-17B). The hazardous constituents that were detected include, but are not limited to, benzene, toluene, cresol, phenol, and mercury, all of which are believed to be (or to have been) present in the materials stored in SWMU P-74.

### 9.2 Page-Specific Comments

Page 2, ¶3 This paragraph indicates that each fuel tank was surrounded by an earthen berm to contain any spills. However, no indication is provided as to whether any type of impermeable liner, concrete pad, etc. was present to prevent any spills from contaminating the underlying soils/slag. The lack of discussion regarding spill controls beyond the earthen berm suggests that no other controls were in place. Thus, there

is a high potential that the underlying soils have been contaminated by the waste fuel mixtures that were placed in this area.

Page 4, ¶1 This paragraph states that no hazardous constituents were found in the seven composite samples collected from the tank farm tanks, and that the analytical results indicated concentrations at or below detection limits. However, the data provided in Appendix A indicate that lead, mercury, and selenium were detected in EP Toxicity extracts at or above method detection limits. Additionally, the analyses did not include volatile organic compounds, or semi-volatile organic compounds, which were the constituents identified in the RCRA Facility Assessment as potentially being present in the waste fuel piles.

The material from SWMU P-74 has not been adequately characterized, since only EP Toxicity analysis for metals and PCBs was performed on seven composite samples. Total hazardous constituent analyses should have been performed on representative samples.

Regardless, the media of concern is the soil beneath each of the seven waste storage piles. However, these soils have not been tested for the presence of hazardous constituents. To adequately characterize the potentially contaminated soils at SWMU P-74, representative samples need to be collected from the seven areas which comprise the SWMU for total hazardous constituent analyses.

Page 4, ¶2 Containment is a concern because any contaminants that may have been present in the waste fuel storage piles could have leached into the subsurface while these piles were stored in this area. Considering the lack of any spill controls (with the exception of the earthen berm) or cover materials to prevent precipitation from infiltrating the piles, the possibility of contaminants leaching into the subsurface exists.

## 10.0 REVIEW OF PRELIMINARY ASSESSMENT REPORT - ZONE 5 OF THE SLAG FILL AREA

### 10.1 General Comments

BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment as a result of materials deposited in Zone 5 of the Slag Fill Area, and therefore recommends "no further action." The Agencies conclude that Zone 5 warrants further investigation based on the following:

- Although specific SWMUs have not been identified in Zone 5, the RCRA Facility Assessment states that wastes containing hazardous constituents are

## REFERENCES


Bethlehem Steel Corporation. May 1993. Quarterly Report for the Reporting Period January 1, 1993 - April 30, 1993. Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York.

Dames & Moore. May 1990. *Final Work Plan for Phased Site Investigation, Bethlehem Steel Corporation and Preliminary Solid Waste Management Unit (SWMU) Assessment Plan.*

National Enforcement Investigations Center (NEIC). September 1988. *RCRA Facility Assessment, Bethlehem Steel Corporation, Lackawanna Plant, Lackawanna, New York.* EPA/330/2-88-054.

U.S. EPA Office of Water. December 1992. *Drinking Water Regulations and Health Advisories.*

U.S. EPA and New York State Department of Environmental Conservation (NYSDEC). March 1993. EPA and NYSDEC Technical Review of the Draft Final Report, Phased Site Investigation, Phase I, Bethlehem Steel Corporation, Lackawanna, New York.

U.S. EPA. Region II Monitoring Measurements Branch. January 1992. *Evaluation of Metals Data for the Contract Laboratory Program.* SOP No. HW-2, Revision 11.

U.S. EPA. Region II Monitoring Measurements Branch. January 1992. *Contract Laboratory Program Organics Data Review and Preliminary Review.* SOP No. HW-6, Revision 8.

U.S. EPA. August 1990. *Administrative Order on Consent.* Docket No. II RCRA-90-300(h)-0201.

U.S. EPA. May 1989. *Interim Final RCRA Facility Investigation (RFI) Guidance, Volumes I through 4.* EPA/530/SW-89-031.

U.S. EPA. October 1986. *RCRA Facility Assessment Guidance.* EPA/530-86-053.

U.S. EPA. May 1982. *Development Document for Effluent Limitations Guidelines and Standards for the Iron and Steel Manufacturing Point Source Category, Volumes I through IV.* EPA 440/1-82/024.

U.S. EPA. April 1979. *Environmental and Resource Conservation Considerations of Steel Industry Solid Waste.* EPA-600/2-79-074.

# ATTACHMENT B

# DEED RESTICTION

# DECLARATION
# OF
# CONDITIONS, COVENANTS AND RESTRICTIONS

Made By: Bethlehem Steel Corporation
1170 Eighth Avenue
Bethlehem, Pennsylvania 18016-7699

Dated: February 20, 1996

RRC 975

779-17

# DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS

THIS DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS, made this 20th day of February, 1996, by Bethlehem Steel Corporation, a corporation duly formed and existing under the laws of the State of Delaware, authorized to do business in the State of New York, and having its principal place of business in the City of Bethlehem, Lehigh County, Pennsylvania, with a mailing address of 1170 Eighth Avenue, Bethlehem, Pennsylvania 18016-7699 (hereinafter "BSC"),

## W I T N E S S E T H:

WHEREAS, BSC is the owner of certain noncontiguous lands adjacent to the eastern shore of Lake Erie situate partly in the City of Lackawanna, partly in the Town of Hamburg and partly in the Village of Blasdell, all in the County of Erie, State of New York, containing in the aggregate approximately 1,215 acres, and encompassing approximately 2.5 miles in an approximate north-south direction and approximately 1.4 miles in an approximate east-west direction, which were formerly part of the site of an integrated steel plant, and a portion of which lands is described and delineated more particularly in SCHEDULE B herein (said portion shall be hereinafter referred to as the "Premises"); and

WHEREAS, the history of the Premises is described more fully in SCHEDULE A herein; and

WHEREAS, certain governmental agencies and BSC have conducted environmental investigations at and near the Premises, the scope, result and impact of each of which are described more fully in SCHEDULE A herein; and

WHEREAS, BSC seeks to impose conditions, covenants and restrictions on the Premises for the purpose of promoting, benefitting, preserving and protecting the health and safety of the public and the environment all as related to the foregoing.

NOW, THEREFORE, (i) BSC, on behalf of itself, its successors and assigns, hereby declares and (ii) each and every person or entity who shall be an owner of the Premises or any part thereof, hereby covenants and agrees on behalf of itself, its successors and assigns, that the Premises or any part thereof shall be held, transferred, sold, conveyed, occupied and developed subject to the following conditions, covenants and restrictions:

1. The Premises or any part thereof shall be limited to industrial use only, which shall include manufacturing, assembling, warehousing, and related railroad, port and shipping activities, together with office space and other facilities including laboratories incidental to such uses, but incidental uses such as day care centers, nursery schools or other facilities that are designed or intended to be primarily for use or occupancy by multiple numbers of persons under the age of eighteen (18) years shall not be permitted.

2. No wells for the extraction or use of water from beneath the surface of the Premises or any part thereof shall be installed, built, permitted or utilized on the Premises or any part thereof for any purpose whatsoever; provided, however, that BSC may install, use, operate and maintain monitoring wells and treatment wells, including the extraction and treatment of water therefrom, solely for the purpose of monitoring, treating or remediating such water; and provided, further, that any other owner of the Premises or any

part thereof may install, use, operate and maintain monitoring wells and treatment wells, including the extraction and treatment of water therefrom, on the part of the Premises so owned by such owner, solely for the purpose of monitoring, treating or remediating such water.

3. Any activity or use not specifically permitted hereby or any activity prohibited pursuant hereto shall be forbidden.

A. Purpose.

It is the intent of BSC by means of said conditions, covenants and restrictions to promote, benefit, preserve and protect the health and safety of the public and the environment by preventing any activity or use not specifically permitted above or any activity prohibited pursuant to paragraphs 1 and 2 above.

B. Conditions, Covenants and Restrictions to Run with the Premises.

Said conditions, covenants and restrictions shall run with the Premises and every part thereof and shall bind all owners and occupiers of the Premises or any part thereof, and their respective successors and assigns; all parties claiming by, through, or under them or any of them shall be taken to hold, agree and covenant with all owners of the Premises or any part thereof, and their respective successors and assigns and each of them, to conform to and observe said conditions, covenants and restrictions.

C. Enforceability.

Said conditions, covenants and restrictions shall inure to the benefit of and be enforceable by BSC and by each and every person or entity, including BSC,

who shall be an owner of the Premises or any part thereof, and their respective successors and assigns, and shall also benefit BSC, its successors and assigns, for so long as BSC shall (i) own any property either adjacent or proximal to the Premises or any part thereof or (ii) be responsible under any law, ordinance, rule or regulation for the presence of hazardous wastes or hazardous constituents or both upon or within the Premises or any part thereof or in said property adjacent or proximal to the Premises or any part thereof but said conditions, covenants and restrictions shall not give rise, by implication or otherwise, to a reciprocal condition, covenant or restriction burdening or binding upon the other lands or any part thereof of BSC benefitted hereby, by actions at law or by suits in equity. As it may be impossible to measure monetarily the damages which may accrue to the beneficiaries hereunder by reason of a violation of this Declaration, any beneficiary hereunder shall be entitled to relief by way of injunction or specific performance, as well as any other relief available at law or in equity, to enforce the provisions hereof.

The failure of any beneficiary hereunder to enforce any provision of this Declaration shall in no event be construed as a waiver of the right of that beneficiary or any other beneficiary hereunder to do so thereafter, as to the same or a similar violation occurring prior or subsequent thereto. No liability shall attach to BSC or any subsidiary or other affiliate of BSC (or any officer, director, employee, member, agent, committee or committee member of any of them) or to any other beneficiary hereunder

(excepting, however, the subject owner in breach) for failure to enforce the provisions of this Declaration.

If BSC or any other beneficiary hereunder successfully brings an action to extinguish a breach or otherwise enforce the provisions of this Declaration, the costs of such action, including legal fees, shall become a binding, personal obligation of the owner in breach.

D. Amendments and Termination.

Any amendment or termination of this Declaration affecting any part of the Premises shall require the written consent of all owners of the Premises or any part thereof, which consent shall not be unreasonably withheld, and of BSC, or its successors or assigns, whose consent may be withheld in its sole discretion.

Any amendment or termination of this Declaration shall not become effective until the instrument evidencing such change has been duly recorded in the Erie County Clerk's Office.

Neither this Declaration nor any amendment to this Declaration shall be interpreted as permitting any action or thing prohibited by the applicable laws, ordinances, rules or regulations of any governmental authority having jurisdiction over the part of the Premises affected or by specific restrictions imposed by any other instrument relating to the Premises or to such part of the Premises.

No change of conditions or circumstances shall operate to amend this Declaration, and this Declaration may be amended only in the manner provided herein.

The determination by any court of competent jurisdiction that any provision of this Declaration is unenforceable invalid or void shall not affect the enforceability or validity of any other provision hereof.

IN WITNESS WHEREOF, BSC has executed this Declaration as of the day and year first above written.

ATTEST:

BETHLEHEM STEEL CORPORATION,
by

Assistant Secretary

A.E. Moffitt, Jr.
Vice President

COMMONWEALTH OF PENNSYLVANIA )
) SS.:
COUNTY OF LEHIGH )

On the 20th day of February, 1996, before me personally came A. E. Moffitt, Jr., to me known, who, being by me duly sworn, did depose and say that he resides at 3850 Brandeis Avenue, Bethlehem, Pennsylvania 18017; that he is a Vice President of Bethlehem Steel Corporation, the corporation described in and which executed the above instrument; and that he signed his name thereto by authority of the By-laws of said corporation.

Dorothy A. Midash
Notary Public

NOTARIAL SEAL
Dorothy A. Midash, Notary Public
City of Bethlehem, Lehigh County, Pa.
My Commission Expires Dec. 7, 1996

## SCHEDULE A
## HISTORY OF THE PREMISES

The Premises were formerly part of the site (the "Site") of an integrated steel plant for iron and steel production, which plant consisted of blast furnaces, coke batteries, basic oxygen and open hearth steelmaking furnaces, a sinter plant, rolling mills, and finishing mills (includes a galvanizing line). Iron and steel production ceased in October 1983. Thus, as of the date hereof, the only operations remaining in service are coke batteries and a galvanizing line both of which are located on lands of BSC other than the Premises. The approximate western nine-tenths (9/10) of the Premises (the "Fill Area") are "man-made" land, having been filled by the deposition of various constituents hereinafter described to an average elevation of about 30 feet above Lake Erie mean water level.

A Resource Conservation and Recovery Act ("RCRA") Facility Assessment ("RFA") conducted in 1988 by the U.S. Environmental Protection Agency (the "EPA") and National Enforcement Investigation Center ("NEIC") identified certain solid waste management units ("SWMUs") some of which are located within the Premises. Said SWMUs may have received various wastes or substances, and several water courses, portions or all of which may be on the Premises or on lands adjacent to the Premises, may have been impacted by releases from SWMUs. Pursuant to Section 3008(h) of RCRA, BSC and the EPA entered into an Administrative Order on Consent dated August 13, 1990 ("AOC"), which directed BSC to perform a phased site-wide RCRA

Facility Investigation to determine the nature and extent of any releases of hazardous wastes or hazardous constituents or both from SWMUs into soils, groundwater, sediment, and surface water at or near the Premises.

Documentary information with respect to the types and locations of SWMUs, and any areas of the Premises (or adjacent to the Premises) that may have been impacted by releases of hazardous wastes or hazardous constituents or both from SWMUs, can currently be obtained from documents submitted to (1) the EPA Region II New York office (currently at Hazardous Waste Facilities Branch, Air and Waste Management Division, U.S. Environmental Protection Agency, Region II, 22nd Floor, 240 Broadway, New York, New York 10007-1866), and (2) the New York State Department of Environmental Conservation (the "DEC") at its Albany, New York office (currently at 50 Wolf Road, Albany, New York 12233), and its Region 9 office at Buffalo, New York (currently at 270 Michigan Avenue, Buffalo, New York 14208-2999). Such documentary information (the "Documentary Information") includes but is not limited to the following:

A. Letter from BSC to EPA Region II, dated September 25, 1986, together with attachments, concerning Response to Information Request Pursuant to RCRA Section 3007, Bethlehem Steel Corporation: Lackawanna, New York;

B. United States Environmental Protection Agency Region II, Administrative Order on Consent, Docket No. II RCRA-90-3008(h)-0201, In the Matter of Bethlehem Steel Corporation, Lackawanna, New York 14218-0310, EPA I.D. No. NYD002134880, dated August 13, 1990, together with attachments;

C. Draft Final Report Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York, Phase I, dated August 14, 1992; and

D. Draft Final Report Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York, Phase II-A, dated June 29, 1993, together with appendices.

BSC records and aerial photographs dating from 1938 to the present indicate that the Fill Area (as more specifically identified in the Documentary Information, covering the westward advancement of the Lake Erie shoreline that forms the westerly line of the Premises) was used for the disposal from the Premises and from certain other lands located in Erie County, New York (some of which lands are currently owned by BSC and others of which are formerly of BSC or its predecessors in interest that were sold prior to the date hereof), of (i) excess blast furnace and steelmaking slag, (ii) waste materials, including sludges from wastewater treatment plants, other sludges, dusts and liquids from steel finishing, steel forming, steelmaking, ironmaking and coke-making operations, and (iii) dredge materials from Smokes Creek, which creek bisects the Fill Area. The Fill Area has also been the site of coal storage piles and disposal areas for general debris from the Premises, the Site, said other lands of BSC, and said former lands of BSC. Disposal activities in the Fill Area have ceased, one disposal unit (located on the Premises) has been certified closed by the DEC and two are undergoing review by the hazardous waste delisting group of the EPA for designation as nonhazardous disposal units.

Further information with respect to past activities at the Premises, current activities, previous environmental investigations, current environmental investigations, groundwater quality, settings and classifications of identified SWMUs, areas of possible environmental concern, topography, and geology, hydrogeology, human health and environmental impacts (with respect to the Premises and regionally), can be obtained from the Documentary Information and other documents submitted to the EPA and the DEC at the above-identified locations.

## SCHEDULE B
## LEGAL DESCRIPTION OF THE PREMISES

All that tract of land situate partly in the City of Lackawanna and partly in the Town of Hamburg, Erie County, New York, being parts of Lots 12, 13, 16, 17 and 18 of the Ogden Gore Tract, parts of Lots 23 and 24, Township 10, Range 8, of the Buffalo Creek Reservation, and lands now or formerly under the waters of Lake Erie and more particularly bounded and described as follows:

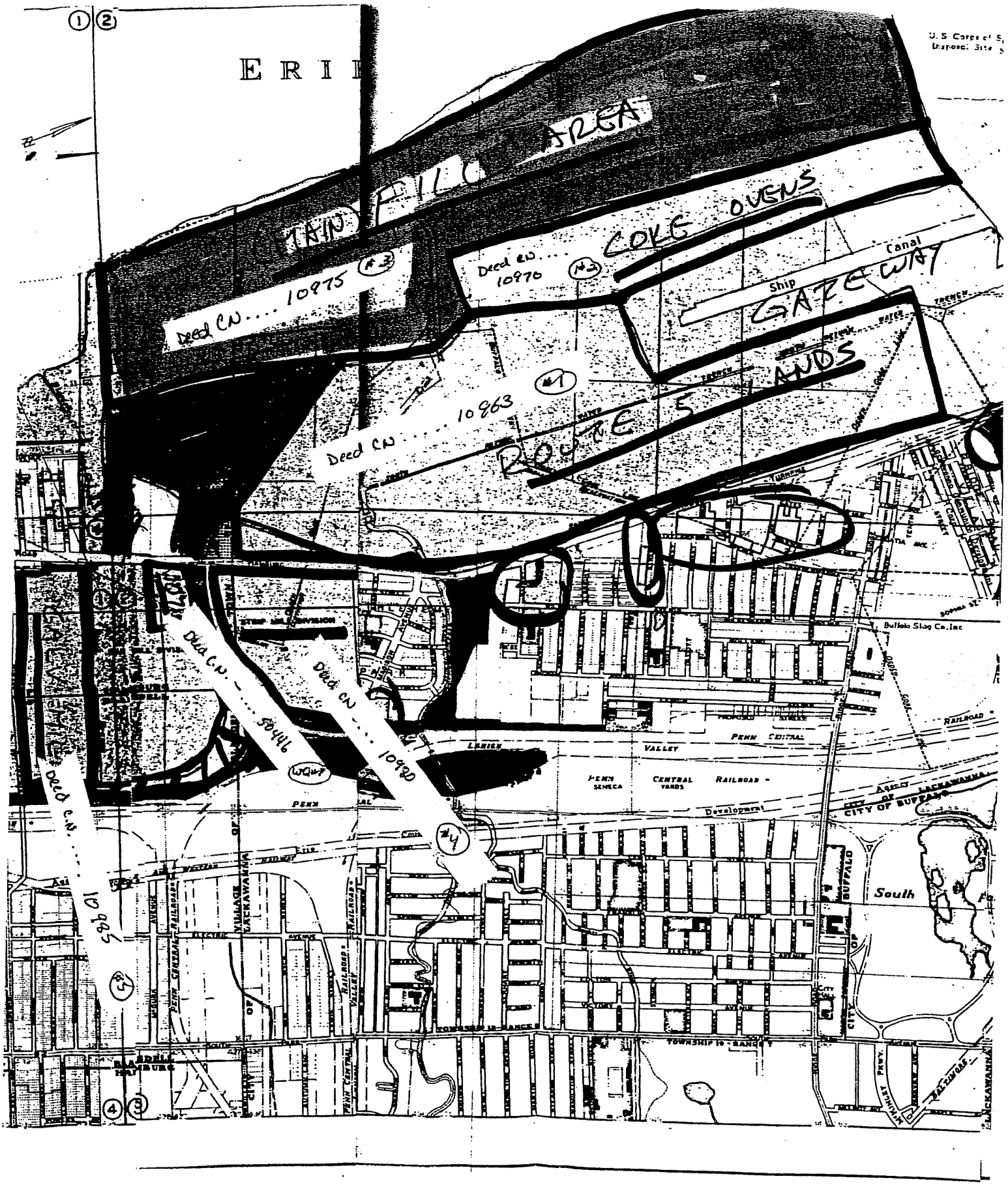
BEGINNING at a TRUE POINT OF BEGINNING, the location of which is ascertained as follows: Beginning on the Buffalo Harbor Line dated August 17, 1903 at the northwesterly corner of the tract of land that was remised, released and quitclaimed by said Bethlehem Steel Corporation to Gateway Trade Center Inc. by Indenture dated December 31, 1985, and recorded on December 31, 1985 in the Erie County Clerk's Office in Liber 9530 of Deeds, at page 385, and which Indenture was, in part, corrected by Corrective Indenture between said Bethlehem Steel Corporation and said Gateway Trade Center Inc. dated May 1, 1995, and recorded on May 16, 1995 in said Office in Liber 10886 of Deeds, at page 1064; thence, along said Buffalo Harbor Line, South fifty degrees one minute forty-five seconds West (S. 50° 01′ 45″ W.) three hundred seventy-nine and fifty-four one-hundredths (379.54) feet to a corner of lands reputedly owned by The United States of America; thence, along said last-mentioned lands, the following two (2) courses and distances: (1) South fifty-four degrees two minutes thirty-five seconds West (S. 54° 02′ 35″ W.) two hundred and no one-hundredths (200.00) feet and (2) North thirty-five degrees fifty-seven minutes twenty-five seconds West (N. 35° 57′ 25″ W.) thirty-five and eighty-three one-hundredths (35.83) feet to lands reputedly owned by The People of the State of New York; thence, along the southerly line of said last-mentioned lands, South seventy-one degrees twenty-three minutes thirty-five seconds West (S. 71° 23′ 35″ W.) seven hundred thirty-eight and no one-hundredths (738.00) feet to said TRUE POINT OF BEGINNING; thence, along other lands of said Bethlehem Steel Corporation, the following six (6) courses and distances: (1) South eighteen degrees thirty-six minutes twenty-five seconds East (S. 18° 36′ 25″ E.) four thousand six hundred fifty and no one-hundredths (4650.00) feet, (2) South seventy-one degrees twenty-three minutes thirty-five seconds West (S. 71° 23′ 35″ W.) thirty and no one-hundredths (30.00) feet, (3) South eighteen degrees thirty-six minutes twenty-five seconds East (S. 18° 36′ 25″ E.) one thousand four hundred and no one-hundredths (1400.00) feet, (4) North seventy-one degrees twenty-three minutes thirty-five seconds East

(N. 71° 23′ 35″ E.) one thousand one hundred and no one-hundredths (1100.00) feet, (5) South twenty-seven degrees fifty-six minutes fifty-four seconds East (S. 27° 56′ 54″ E.) five hundred sixty-six and eighty-five one-hundredths (566.85) feet, and (6) South one degree fifty minutes zero seconds East (S. 01° 50′ 00″ E.) one thousand six hundred thirty-nine and no one-hundredths (1639.00) feet to a northerly corner of the tract of land that was granted and released by said Bethlehem Steel Corporation to South Buffalo Railway Company by Indenture dated September 15, 1989, and recorded on December 20, 1989 in said Office in Liber 10119 of Deeds, at page 131; thence, along said last-mentioned tract of land, the following three (3) courses and distances: (1) South sixty-five degrees thirty-two minutes nine seconds West (S. 65° 32′ 09″ W.) eighty-four and eighty one-hundredths (84.80) feet, (2) South twenty-five degrees thirty-one minutes twenty-six seconds East (S. 25° 31′ 26″ E.) twenty and ninety-eight one-hundredths (20.98) feet, and (3) South eighteen degrees thirty-six minutes forty-nine seconds East (S. 18° 36′ 49″ E.) one thousand one hundred twenty and seventy-three one-hundredths (1120.73) feet to the intersection with the southerly line of the City of Lackawanna and the northerly line of the Town of Hamburg; thence, continuing along said last-mentioned tract of land, the following two (2) courses and distances: (1) South eighteen degrees thirty-six minutes forty-nine seconds East (S. 18° 36′ 49″ E.) one thousand five hundred fifty-six and fifty-eight one-hundredths (1556.58) feet and (2) South thirteen degrees forty-six minutes twenty-five seconds East (S. 13° 46′ 25″ E.) one hundred thirty and nine one-hundredths (130.09) feet to the northerly line of the tract of land that was granted and released by said Bethlehem Steel Corporation to Lake Shore Gateway Associates by Indenture dated May 28, 1985, and recorded on May 29, 1985 in said Office in Liber 9450 of Deeds, at page 55; thence, along said last-mentioned tract of land, North eighty-seven degrees thirteen minutes thirty-nine seconds West (N. 87° 13′ 39″ W.) two thousand ninety and no one-hundredths (2090.00) feet to the easterly shoreline of Lake Erie; thence, along said easterly shoreline of Lake Erie, the following eight (8) courses and distances: (1) North sixteen degrees twenty-nine minutes fifty-three seconds West (N. 16° 29′ 53″ W.) two hundred sixty-seven and eighty-three one-hundredths (267.83) feet, (2) North twenty-four degrees twenty-five minutes zero seconds West (N. 24° 25′ 00″ W.) one hundred ninety-five and one one-hundredths (195.01) feet, (3) North twenty-six degrees forty-five minutes zero seconds West (N. 26° 45′ 00″ W.) two hundred fifty and no one-hundredths (250.00) feet, (4) North thirty-one degrees fifteen minutes zero seconds West (N. 31° 15′ 00″ W.) two hundred five and no one-hundredths (205.00) feet, (5) North twenty-one degrees thirty-five minutes zero seconds West (N. 21° 35′ 00″ W.) one hundred ten and no one-hundredths (110.00) feet, (6) North forty-four degrees zero

minutes fifty-three seconds West (N. 44° 00′ 53″ W.) twenty-six and thirty-eight one-hundredths (26.38) feet, (7) North thirty-three degrees forty-nine minutes eighteen seconds West (N. 33° 49′ 18″ W.) seventy-four and eighty-six one-hundredths (74.86) feet, and (8) North thirty-four degrees twenty-six minutes twenty-six seconds West (N. 34° 26′ 26″ W.) twelve and no one-hundredths (12.00) feet; thence, along riparian land, North eighteen degrees thirty-six minutes twenty-five seconds West (N. 18° 36′ 25″ W.) six hundred thirty-five and twenty-five one-hundredths (635.25) feet to the intersection with the above-mentioned municipal boundary; thence, continuing along said riparian land, North eighteen degrees thirty-six minutes twenty-five seconds West (N. 18° 36′ 25″ W.) one thousand nine hundred sixty-one and twenty-two one-hundredths (1961.22) feet to the southerly edge of Smokes Creek; thence, along said southerly edge of Smokes Creek, South seventy-one degrees twenty-three minutes thirty-five seconds West (S. 71° 23′ 35″ W.) fifty-eight and sixteen one-hundredths (58.16) feet to the above-mentioned easterly shore line of Lake Erie; thence, crossing the mouth of said Smokes Creek, North sixteen degrees one minute eight seconds West (N. 16° 01′ 08″ W.) seventy and four one-hundredths (70.04) feet to the northerly edge of said Smokes Creek at said easterly shoreline of Lake Erie; thence, continuing along said easterly shoreline of Lake Erie, the following twenty (20) courses and distances: (1) North forty-nine degrees seven minutes zero seconds West (N. 49° 07′ 00″ W.) seventy-nine and no one-hundredths (79.00) feet, (2) North nineteen degrees sixteen minutes zero seconds West (N. 19° 16′ 00″ W.) four hundred twenty-five and no one-hundredths (425.00) feet, (3) North sixteen degrees thirty-seven minutes zero seconds West (N. 16° 37′ 00″ W.) two hundred eighty-five and no one-hundredths (285.00) feet, (4) North twenty-five degrees twenty minutes zero seconds West (N. 25° 20′ 00″ W.) three hundred sixty and no one-hundredths (360.00) feet, (5) North thirty-three degrees zero minutes zero seconds West (N. 33° 00′ 00″ W.) two hundred thirty and no one-hundredths (230.00) feet, (6) North thirty-two degrees forty minutes zero seconds West (N. 32° 40′ 00″ W.) three hundred ten and no one-hundredths (310.00) feet, (7) North twenty-seven degrees ten minutes zero seconds West (N. 27° 10′ 00″ W.) one hundred thirty and no one-hundredths (130.00) feet, (8) North twenty-three degrees twenty minutes zero seconds West (N. 23° 20′ 00″ W.) three hundred fifteen and no one-hundredths (315.00) feet, (9) North eighteen degrees twenty minutes four seconds West (N. 18° 20′ 04″ W.) three hundred two and ninety-two one-hundredths (302.92) feet, (10) North twenty degrees fifteen minutes forty-eight seconds West (N. 20° 15′ 48″ W.) three hundred eighty-seven and eighteen one-hundredths (387.18) feet, (11) North fourteen degrees twenty minutes zero seconds West (N. 14° 20′ 00″ W.) five hundred thirty and no one-hundredths (530.00) feet, (12) North sixteen degrees forty minutes zero seconds West

(N. 16° 40′ 00″ W.) two hundred sixty and no one-hundredths (260.00) feet, (13) North twenty-eight degrees thirty-five minutes zero seconds West (N. 28° 35′ 00″ W.) one hundred ninety-five and no one-hundredths (195.00) feet, (14) North eighteen degrees thirty minutes zero seconds West (N. 18° 30′ 00″ W.) one hundred seventy and no one-hundredths (170.00) feet, (15) North eighteen degrees thirty minutes zero seconds West (N. 18° 30′ 00″ W.) one hundred seventy and no one-hundredths (170.00) feet, (16) North twenty-six degrees fifty-seven minutes twenty-six seconds West (N. 26° 57′ 26″ W.) two hundred thirty-nine and forty-one one-hundredths (239.41) feet, (17) North twenty-three degrees fourteen minutes seven seconds West (N. 23° 14′ 07″ W.) sixty-five and eighty-three one-hundredths (65.83) feet, (18) North thirty-one degrees fifty-six minutes five seconds West (N. 31° 56′ 05″ W.) eighty-five and fifty-two one-hundredths (85.52) feet, (19) North thirty-three degrees thirty-seven minutes seven seconds West (N. 33° 37′ 07″ W.) eighty-four and fifty-three one-hundredths (84.53) feet, and (20) North thirty degrees four minutes twenty-six seconds West (N. 30° 04′ 26″ W.) ninety-seven and thirty-one one-hundredths (97.31) feet; thence, along riparian land, North eighteen degrees thirty-six minutes twenty-five seconds West (N. 18° 36′ 25″ W.) one hundred ninety-one and eight one-hundredths (191.08) feet to the above-mentioned easterly shoreline of Lake Erie; thence, continuing along said easterly shoreline of Lake Erie, the following seven (7) courses and distances: (1) North zero degrees nineteen minutes fifty seconds West (N. 00° 19′ 50″ W.) twenty-four and thirty-five one-hundredths (24.35) feet, (2) North six degrees twenty-six minutes thirty-five seconds West (N. 06° 26′ 35″ W.) eighty-one and forty-five one-hundredths (81.45) feet, (3) North eleven degrees forty-four minutes twenty-eight seconds West (N. 11° 44′ 28″ W.) four hundred sixty-three and fifty-eight one-hundredths (463.58) feet, (4) North two degrees fifty-five minutes zero seconds West (N. 02° 55′ 00″ W.) one hundred seventy and no one-hundredths (170.00) feet, (5) North six degrees forty-five minutes zero seconds West (N. 06° 45′ 00″ W.) two hundred forty and no one-hundredths (240.00) feet, (6) North zero degrees ten minutes zero seconds East (N. 00° 10′ 00″ E.) four hundred sixty-five and no one-hundredths (465.00) feet, and (7) North two degrees zero minutes thirty-eight seconds West (N. 02° 00′ 38″ W.) three hundred seventy-eight and fifty-four one-hundredths (378.54) feet to the southerly line of lands reputedly owned by The People of the State of New York; thence, along said last-mentioned lands, North seventy-one degrees twenty-three minutes thirty-five seconds East (N. 71° 23′ 35″ E.) one hundred fifty-four and ninety-three one-hundredths (154.93) feet to the shoreline of water formerly part of Lake Erie; thence, along said last-mentioned shoreline, the following six (6) courses and distances: (1) South eighty degrees fourteen minutes sixteen seconds East (S. 80° 14′ 16″ E.)

one hundred nineteen and thirty one-hundredths (119.30) feet, (2) North forty-six degrees fifteen minutes thirteen seconds East (N. 46° 15′ 13″ E.) forty-seven and eighty-three one-hundredths (47.83) feet, (3) North fifty-nine degrees fifty-three minutes two seconds East (N. 59° 53° 02″ E.) fifty-three and thirty-two one-hundredths (53.32) feet, (4) North thirty-eight degrees twenty minutes forty-three seconds East (N. 38° 20° 43″ E.) twenty-seven and thirty-one one-hundredths (27.31) feet, (5) North sixty-eight degrees twelve minutes forty-six seconds East (N. 68° 12′ 46″ E.) forty-eight and sixty-seven one-hundredths (48.67) feet, and (6) North twenty-six degrees eleven minutes forty-seven seconds East (N. 26° 11′ 47″ E.) eleven and forty-eight one-hundredths (11.48) feet to the first above-mentioned southerly line of lands reputedly owned by The People of the State of New York; thence, along said last-mentioned lands, North seventy-one degrees twenty-three minutes thirty-five seconds East (N. 71° 23′ 35″ E.) one thousand seventeen and nineteen one-hundredths (1017.19) feet to said TRUE POINT OF BEGINNING;
CONTAINING four hundred seventy-four and five hundred forty-one one-thousandths (474.541) acres, more or less.


AREA
COKE OVENS
Deed CN..... 10975
Deed CN..... 10970
Deed CN..... 10863
Deed C.N. ..... 50446
Deed CN ..... 10980
Deed C.N. ..... 10985
Canal
Ship
GATEWAY
LANDS
ROUTE 5
Buffalo Slag Co.,Inc
PENN CENTRAL
VALLEY
PENN SENECA
CENTRAL YARDS
RAILROAD
Development
CITY OF BUFFALO
South
TOWNSHIP 10 - RANGE 7
BLASDELL
HAMBURG
VILLAGE OF LACKAWANNA