SWMU ASSESSMENT REPORT
GENERAL RUBBLE LANDFILL N
(SWMU S-14)

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1.0 INTRODUCTION

This report documents the results of an environmental assessment of General Rubble Landfill N, at the Bethlehem Steel Corporation (BSC) facility in Lackawanna, New York. General Rubble Landfill N was designated Solid Waste Management Unit (SWMU) S-14 in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (USEPA, 1988) as an area used to dispose of discarded material from plant operations. The United States Environmental Protection Agency (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 (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. A preliminary SWMU assessment was completed for SWMU S-14 and submitted to the USEPA on January 5, 1993. Attachment A provides USEPA comments regarding the Preliminary SWMU Assessment. This report evaluates SWMU data available to BSC as of November 2001.

1.1 Description

SWMU S-14 is located in the northwestern portion of Zone 4 of the Slag Fill Area. It is north of Smokes Creek, on the west side of BSC Highway 11 and immediately north of SWMU S-23. (Figure 1). SWMU S-14 is a heavily vegetated mound of brown, fine- to coarse-grained sand and gravel-like material containing a variety of debris including scrap metal, construction materials (concrete, bricks, plastic pipe) wood, slag, and glass. The vegetation consisting of small brush and trees is concentrated on the top of the mound, while the steeply sloped sides (60° to 90°) are approximately 50% covered with vegetation. SWMU S-14 is roughly oval in shape, approximately 450 feet long at the base, 300 feet long at the top, 130 feet wide, and 40 feet high. The estimated volume is 57,000 cubic yards and it covers an approximate surface area of one acre. The base of the unit rests on approximately 50 feet of slag fill. Although there are no wells located within or immediately adjacent to SWMU S-14, groundwater data from proximate wells (upgradient) indicated groundwater was generally encountered at 574 feet above mean sea level (approximately 50 feet below the base of the SWMU).

1.2 History

SWMU S-14 is believed to contain mostly slag material from steel production. As seen in the boring logs in Appendix B, slag fill was consistently encountered throughout the entire subsurface profile that was investigated. The slag was placed in this unit for storage prior to the reclamation of metallics. The greatest production of "general rubble" was from the pit areas of the open-hearth steel making shops. Such rubble consisted of slag and some steel, both of which would have accumulated in the pits in the molten state. In addition, brick rubble from the cleaning of the slag pockets of the open hearth furnaces, scrap billets from the bar mills, and steel and iron buttons from the bottoms of slag pots were normally mixed with other materials in the pits. The material that collected in the pits was periodically removed and transported to SWMU S-14 via rail cars or off-road trucks. Placement and recovery of materials continued up until the shutdown of steel-making operations in 1983. SWMU S-14 presently is inactive and there are no plans for further activity at this unit.

Historical documents obtained from regulatory agencies, including the United States Army Corps of Engineers (US Army Corps) show that the dredge spoils were deposited off the BSC Lackawanna facility shoreline from at least 1937 to 1948. These spoils underlie a significant portion of the slag fill area (SFA), including the area immediately under SWMU S-14. The potential impact to groundwater beneath the site, especially in the sand unit in the groundwater Zone 3, 4, and 5 is further assessed in the RFI. The contribution of this particular SWMU to groundwater contamination is not known.

On February 20, 1996, BSC filed a declaration in the Erie County, N.Y. Clerk's office limiting future use of the property around and including SWMU S-14. 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 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 provided as Attachment B.

An inspection of SWMU S-14 was conducted by Dames & Moore in September 1995 and in September 1996. During these inspections, the unit appeared to contain only debris from steel-making operations. An additional inspection was performed by URS in September 2000. All inspections found the site as described in Sections 1.1 and 4.0. The field notes for the 1996 and 2000 SWMU inspections are provided in Appendix A. The 1995 inspection notes are not available.

2.0 SAMPLING AND ANALYSIS

Soil samples were collected from the material contained in SWMU S-14 on two separate occasions. Near-surface grab samples were obtained in February 1995, and subsurface samples were obtained in September 1995. Sampling was conducted in accordance with the Quality Assurance Plan, Phase IIC Work Plan, and the Sampling Analysis and Testing Module, Phased Site Investigation (Phase III) (BSC 1989, 1994, 1995). A complete list of site-specific compounds targeted for analysis in the site investigations is provided in Table 1. Sample records and boring logs are included in Appendix B. Laboratory analytical reports are provided in Section II of the RFI.

There are no downgradient wells for SWMU S-14. Due to a localized groundwater mound beneath SWMU S-23, one monitoring well MW-1D8 is upgradient to a portion of SWMU-S-14. The remainder of the wells that are near SWMU S-14 (e.g., MW-1D7) are crossgradient or generally not considered applicable to this waste management unit. Therefore, a groundwater analytical data table was not generated for this unit. Groundwater elevation contour maps are provided in Figures 2 and 3.

2.1 Soil Samples

In response to a USEPA request (Attachment A), this SWMU was investigated during Phase IIC of the RFI to evaluate the presence of hazardous materials. In February 1995, four discrete surface samples were collected from SWMU-14. The samples were obtained from the 0- to 6-inch interval at the sample locations (S14-1 through S14-4) shown in Figure 1. The samples were described as brown, fine- to coarse-grained sand and gravel-like material, with some silt, cinders, glass debris, and half-inch diameter steel pellets. The samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and cyanide. Analyses included Total Constituent Analysis, Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) analysis for VOCs, SVOCs, metals, and cyanide.

During a Phase III investigation in September 1995, two borings (S-14-1C and S-14-2C) were drilled at SWMU S-14. Samples were obtained from continuous split–spoon sampling. Composite samples were collected from each boring [S-14-1C (0-15.8 feet); S-14-2C (0-30.0 feet)] for analysis of SVOCs and metals. Additionally, one grab sample for VOC analysis was collected [S-14-1G (6.0-8.0 feet) and S-14-2G (4.0-6.0 feet)] from the sampling interval in each boring having the highest levels of volatile organics as measured by field screening methodologies.

2.1.1 Total Constituent Results

The 1995 analysis of the four surface grab samples, as well as the two grab and associated composite subsurface samples obtained from the borings revealed the presence of several VOCs, SVOCs, metals, and cyanide. Detected analytes are summarized in Table 2. Analysis of the September 1995 samples from the borings indicated trace levels of several VOCs; however, a significant number of results were flagged as estimated values due to internal standard failure. Numerous SVOCs were detected in both composite subsurface samples. The highest concentrations of SVOCs were found in sample S14-1C (0-15.8 feet). Concentrations of SVOCs in S14-1C ranged from a low of 57 micrograms per kilogram (ug/kg) of 2-methylphenol to 1,400,000 ug/kg of naphthalene. A total of 19 SVOCs were detected in sample S14-1C and 16 SVOCs were detected in sample S14-2C (0-30.0 feet). Nine metals were detected in both composite subsurface samples. Although fairly consistent, the highest concentrations were generally present in sample S14-2C. Concentrations in S14-2C ranged from 0.135 milligrams per kilogram (mg/kg) of mercury to 225.5 mg/kg of lead.

2.1.2 TCLP Results

TCLP results were compared to regulatory concentration levels listed in 40 CFR Part 261. The TCLP extract concentration indicates that the material in the General Rubble Landfill N (SWMU S-14) does not meet TCLP criteria.

SWMU S-14 TCLP analytical results are summarized in Table 3.

2.1.3 SPLP Results

SPLP analyses were conducted to more closely mimic the effect of compounds leaching from the soil due to rainwater 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 into the subsurface.

Analyses of the February 1995 surficial grab samples indicate lead and chromium concentrations were above detectable levels. With exception of methylene chloride in surface samples S14-3 and S14-4, no other compounds, including VOCs and SVOCs were detected in the surface grab samples.

Analysis of September 1995 subsurface samples from the borings indicated that several VOCs, SVOCs, and metals were detected above method detection limits. Of the two composite subsurface samples, SVOCs and metals were only detected in S14-1C. The 10 SVOCs detected ranged from 0.006 milligrams per liter (mg/L) of 2-methylphenol to 15.0 mg/L of naphthalene. The three metals detected in S14-1C ranged in concentration from 0.006 mg/L of antimony and selenium to 0.049 mg/L of barium.

Several VOCs were detected in both grab samples S14-1G (6.0-8.0 feet) and S14-2G (4.0-6.0 feet). Although concentrations of VOCs are similar, the highest concentrations were generally present in S14-1G. Of the five VOCs detected in both samples, (benzene, ethylbenzene, toluene, xylenes and methylene chloride), the concentrations ranged from 0.007 mg/L of ethylbenzene to 0.2 mg/L of xylenes.

SPLP results are summarized in Table 2.

2.2 Groundwater

Historical documents obtained from regulatory agencies show that the dredge spoils from the U.S. Army Corps, were deposited off the BSC shoreline in the late 1930's to the late 1940's. These spoils underlie a significant portion of the SFA, including the area immediately under SWMU S-14. The potential impact to groundwater beneath the site, especially in the sand unit in the groundwater Zone 3, 4, and 5 is further assessed in the RFI. The contribution of this particular SWMU to groundwater is not known.

2.3 Summary of Sampling Results

The TCLP extract concentration indicates that the materials in SWMU S-14 material do not meet TCLP criteria.

Total constituent analysis shows concentrations of VOCs, SVOCs and metal are present in the SWMU surface material.

Constituents detected in the SPLP leachate were consistent with those detected in the total constituent analysis.

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 SWMU S-14, General Rubble Landfill N. 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 Interim Deliverable (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: 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, a background comparison was not made for the subsurface SWMU material in this report.

The sampling data for SWMU S-14 (as presented in Section 2.0 of this report) were evaluated in order to identify the site-related COPCs for the SWMU. COPCs were originally determined in ID No. 1, however, as some screening criteria were reviewed since ID No. 1 was submitted, the screening process was updated (Tables 4 through 6). Table 4 presents the screening of the surficial SWMU material, Table 5 presents the screening of the subsurface SWMU material, and Table 6 presents the screening of groundwater. Two inorganic COPCs (antimony and lead) and no organic COPCs were identified in surficial SWMU material. One inorganic (arsenic) and twelve organic COPCs (mostly PAHs) were identified in subsurface SWMU material, and fourteen volatile organic COPCs were identified in groundwater. Representative concentrations were then determined for each COPC; these representative concentrations are presented in Table 7. If the sample size for a dataset was ten or greater, the 95% upper confidence limit of the mean was used as the representative concentration. For those datasets with sample sizes of less than ten, the maximum detected concentration was used. Four surface soil samples and two subsurface soil samples were collected for SWMU S-14; therefore, the maximum concentration was used to represent all COPCs in SWMU material. SWMU S-14 is located in Groundwater Zone 4 (BSC 1998). As more than ten groundwater samples have been collected, the 95% UCL was used as the representative concentration for each of the COPCs. If a chemical's representative concentration exceeds its saturation limit in soil, or its solubility limit in groundwater, this is noted in Table 7. Exceedances of either of these levels may indicate the presence of free product. The COPCs and their representative concentrations are presented in Table 7; these concentrations are used in the SWMU S-14 risk characterization.

3.2 Exposure Assessment

The exposure assessment conducted for SWMU S-14 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 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 Facility. ID No. 1 (BSC 1998) identifies the COPCs; these COPCs were also integral in determining complete exposure pathways, based on their presence in each medium (*i.e.*, surface SWMU material, subsurface SWMU material or groundwater) and their volatility (*e.g.*, inorganics in groundwater do not present a complete inhalation exposure pathway as they are not volatile and groundwater is not used as a drinking water source). Potential exposure pathways for S-14 are presented in Table 8 and below.

For SWMU S-14, 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. Potentially complete exposure pathways were previously established in ID No. 2 for each receptor and are summarized below. Scenarios were developed based on current use patterns, unrestricted future commercial/industrial development, and potential future recreation 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, inhalation of airborne particulates from surface SWMU material, inhalation of vapors from subsurface SWMU material and inhalation of vapors from Groundwater Zone 4. 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 SWMU S-14 under current conditions.

The future construction worker scenario and future utility/maintenance worker scenario may additionally be exposed via direct contact with subsurface SWMU material (ingestion, dermal contact, vapor and particulate inhalation) during potential future digging activities. Potentially complete exposure pathways for the current non-BSC scenario, and present and future residential scenario, include inhalation of particulates in surficial SWMU material and inhalation of vapors in subsurface SWMU material. A detailed description of the potentially exposed receptor scenarios and pathways for SWMU S-14 can be found in ID No. 2 (BSC 1999) and a summary is provided in Table 8.

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 S-14 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), and USEPA toxicity criteria (USEPA 2001) 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, the criteria for all chemicals have been re-presented in Table 9 of this HHRA. The above information was used to calculate Tier 1 RBSLs for COPCs in SWMU material and groundwater for each of the nine receptor scenarios.

For this risk assessment, vapor dispersion modeling was performed to enable estimation of potential exposure to airborne COPCs emanating from subsurface SWMU material. 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 current the non-BSC worker scenario, Tier 1 RBSLs were calculated based on the maximum estimated impacts in the northern, middle, and southern regions of the facility. 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.

It should be noted that, in groundwater, many 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. The solubility limits of these chemicals are indicated in Table 10.

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 limit in soils. However, it is important to consider that chemical emissions from soil to air reach a plateau at the 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, RBSLs that are above the saturation limit are not likely to pose increased risks or hazards (USEPA 1996). Therefore, RBSLs that are based only upon the inhalation pathway are capped at the saturation limit for that chemical, and "> sat limit" is indicated in such situations (Table 10). Other 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, 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 10. 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 10 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 10. 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 10, the representative concentrations of benzene and naphthalene in subsurface SWMU material exceed the indoor vapor inhalation RBSLs for the future commercial/industrial worker scenario. The representative concentrations of benzo(a)pyrene, dibenz(a,h)anthracene and naphthalene in subsurface SWMU material exceed respective direct contact RBSLs for the future construction worker scenario, and the representative concentrations of benzo(a)pyrene in subsurface SWMU material exceeds the direct contact RBSLs for the future utility/maintenance worker scenario. 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, 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 the Tier 1 Risk Characterization.

3.4 Risk Characterization

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

In accordance with Part IV, those COPCs that exceeded an RBSL were further evaluated in the Tier 1 Risk Characterization, or 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, 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). The Tier 1 HHRA results are presented in Table 11.

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'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. Based on 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. The SLHI was 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 11.

The SLHI totals are greater than 1 for two worker populations (commercial/industrial and construction). The $SLHI_{total}$ for the future commercial/industrial worker scenario is 14.8, as a result of inhalation of indoor benzene (SLHQ = 1.2) and naphthalene (SLHQ = 13.6) vapors from subsurface SWMU material. The $SLHI_{total}$ for the future construction worker scenario is 3.6; it is a result of direct contact (including vapor inhalation) with naphthalene in subsurface SWMU material.

In accordance with the work plan, as the $SLHI_{total}$s are greater than 1, each is subject to further evaluated by target organ. This step was only necessary for the future commercial/industrial worker scenario, as it was the only scenario with RBSL exceedances for more than one noncarcinogenic chemical (for the future construction worker scenario, the total upper respiratory system equals the $SLHI_{total}$ as naphthalene is the only chemical evaluated in the risk characterization). For the commercial/industrial scenario exposed to indoor vapors, the blood/immune system SLHI is 1.2 (benzene in subsurface SWMU material) and the upper respiratory system SLHI is 13.6 (naphthalene in subsurface SWMU material).

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:

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

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 less than 1×10^{-4}, the risks are considered to be negligible.

All SLCRs are less than $1x10^{-4}$ for all receptor populations. For the future commercial/industrial worker scenario, the $SLCR_{total}$ for the indoor worker scenario is 5×10^{-6} from benzene in subsurface SWMU material. The $SLCR_{total}$ for the future construction worker scenario is 9×10^{-6}, attributable to direct contact with benzo(a)pyrene and dibenz(a,h)anthracene in subsurface SWMU material. The $SLCR_{total}$ for the utility/maintenance worker scenario is 2×10^{-6}, attributable to direct contact with benzo(a)pyrene in subsurface SWMU material.

3.5 Conclusion

The results of the Tier I HHRA indicate that benzene and naphthalene in subsurface SWMU material exceed noncarcinogenic RBSLs and result in calculated hazard indices greater than the Tier 1 benchmark of 1.0. Specifically, for the future commercial/industrial worker, the calculated hazard index for benzene and naphthalene in subsurface SWMU material is greater than the Tier 1 noncarcinogenic benchmark. Additionally, for the future construction worker scenario, the calculated hazard index for naphthalene in subsurface SWMU material is greater than the Tier 1 noncarcinogenic benchmark. It should also be noted that of the COPCs in subsurface SWMU material, as indicated in Table 7, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3-c,d)pyrene and naphthalene, exceed their saturation limits in soil.

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.

3.6 Uncertainty Analysis

There are multiple sources of uncertainty associated with 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 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 exposure scenarios evaluated in this risk assessment are not realistic in terms of planned redevelopment for the site. The placement of a building on SWMU S-14 site is not planned and not likely, given the location of this SWMU. A Tier 1 risk is generated for a scenario that does not currently exist, nor is likely to exist in the future.

3.6.2 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 (PID) 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 SWMU material, the maximum concentrations were used as the representative concentrations in this HHRA. As less than ten samples were collected for surface and for subsurface SWMU material, a 95% UCL could not be calculated. The representative concentrations were used to compare to the RBSLs calculated for this HHRA, and ultimately determine the chemicals of interest in this HHRA. Use of the maximum concentrations of the biased sampling is a very conservative methodology utilized in this HHRA.

It should also be pointed out that some of the COPC's maximum concentrations were greater than the chemicals' saturation limits (see Table 7). Thus, as it is conservative to use the maximum concentration, it should still be noted that free product likely exists. Also, the maximum concentration of benzene in subsurface SWMU material is the average of two field duplicate samples, which are both estimated values. Thus, the confidence in risk calculations involving this concentration is somewhat less than for other calculations.

3.6.3 COPC Selection Process

The COPCs evaluated for SWMU S-14 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 2000) 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.

3.6.4 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 and not when there is snow cover or the ground was wet from other forms of precipitation. For SWMU S-14, 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.

3.6.5 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 (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."

The carcinogenic COPCs evaluated for SWMU S-14 include benzene. The inhalation slope factor for benzene 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 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 benzene 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 oral 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. However, this methodology assumes that the chemical is equitoxic by both routes of exposure (oral and inhalation). Thus, this method potentially overestimates inhalation risks for COPCs evaluated as such. This uncertainty is not applicable to the inhalation RfCs or slope factors for the COPCs that showed exceedances of their Tier 1 RBSLs (benzene, naphthalene, and arsenic) at SWMU S-14.

3.6.6 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.

3.6.7 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 future indoor industrial/commercial worker scenario
- Biased SWMU sample collection
- Use of maximum concentrations as representative concentrations
- 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

SWMU S-14 was placed directly on slag fill and although there is no engineering containment structure, such as a liner or cover, in place, the majority of the pile is stabilized by vegetation. However, portions of the pile are exposed to wind and rain. A site inspection conducted in September 1996 by Dames & Moore revealed evidence of surface water runoff from the sides of the landfill. This runoff, however, will be confined to the area immediately surrounding the landfill (URS 2000 Inspection Report), where it will eventually infiltrate into the slag material because of the flat topography and porous nature of surrounding areas.

5.0 CONCLUSIONS

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

- The 1995 TCLP extract concentration indicates that the material in SWMU S-14 does not meet TCLP criteria. While the total constituent analysis shows that the VOCs, SVOC, and metals are present, the SPLP data indicates the presence of SVOCs.

- Groundwater within Zone 4 contains concentrations of VOCs, SVOCs, and metals. The contribution of this particular SWMU to the groundwater within Zone 4 is not known.

- The results of the HHRA indicate that benzene and naphthalene in subsurface SWMU material exceed noncarcinogenic RBSLs and produce calculated hazard indices that are greater than the Tier 1 benchmark of 1.0. Specifically, for the future commercial/industrial worker, the calculated hazard index for benzene and naphthalene in subsurface SWMU material is greater than the Tier 1 noncarcinogenic benchmark. Additionally, for the future construction worker scenario, the calculated hazard index for naphthalene in subsurface SWMU material is greater than the Tier 1 noncarcinogenic benchmark.

- Additionally, COPCs anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3-c,d)pyrene and naphthalene, in subsurface SWMU material exceed their saturation limits in soil.

- The presence of a restrictive covenant on the slag fill area, including S-14, restricts the current and future use of the property to commercial and industrial uses. In addition, the restriction also prevents the installation and operation of extraction or water wells for purposes other than environmental remediation use. This reduces the risk of exposure to the SWMU material.

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 II assessment or an evaluation of corrective measures.

REFERENCES

Ames, B.N., Magaw, R. and Gold, L.S. (1987). Ranking possible carcinogenic hazards. *Science.* 236:271-273.

American Society for Testing and Materials (ASTM). 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites.* ASTM E1739-95. Philadelphia, PA.

Bethlehem Steel Corporation (BSC). 1989. *Data Collection Quality Assurance Plan, Bethlehem Steel Corporation, Lackawanna, New York.* Lackawanna, NY. August

Bethlehem Steel Corporation (BSC). 1994. *Work Plan, Phased Site Investigation, Bethlehem Steel Corporation, Lackawanna, New York – Phase IIC.* Lackawanna, NY. 15 December.

Bethlehem Steel Corporation (BSC). 1997. *Human Health Risk Assessment Work Plan.* Bethlehem Steel Corporation, Lackawanna, NY. April.

Bethlehem Steel Corporation (BSC). 1998. *Human Health Risk Assessment for Bethlehem Steel Corporation's Lackawanna, New York Site. Revised Final Interim Deliverable Number 1: Detailed Process for Selection of Chemicals of Potential Concern and Identification of Toxicological Criteria.* Bethlehem Steel Corporation, Lackawanna, NY. May.

Bethlehem Steel Corporation (BSC). 1999. *Human Health Risk Assessment for Bethlehem Steel Corporation's Lackawanna, New York Site. Interim Deliverable Number 2: Exposure Pathway Conceptual Site Model and Tier I Equations and Parameter Values.* Bethlehem Steel Corporation, Lackawanna, NY.

Federal Register, March 29, 1990, Toxicity Characteristics (TC) Final Rule (55 FR 11798).

New York State Department of Environmental Conservation (NYSDEC). 1998. *Ambient Water Quality Standards and Guidance Values.*

New York State Department of Environmental Conservation (NYSDEC). 1999. "Water Quality Standards Surface and Groundwater," Table 1 cf. Section 703.5. (www.dec.state.ny.us/website/regs/703.htm#Table1). August.

Northeast Research Institute LLC (NERI). 1996 Correspondence from Mark H. Hatheway, Manager of Environmental Operations to John Boyd, Dames & Moore. 16 May.

United States Environmental Protection Agency (USEPA). 1988. *RCRA Facility Assessment, Bethlehem Steel Corporation, Lackawanna Plant*, EPA-330/2-88-054. Washington, DC: USEPA, National Enforcement Investigations Center. September.

REFERENCED (CONT.)

United States Environmental Protection Agency (USEPA). 1989. *Risk Assessment Guidance for Superfund, Volume 1. Human Health Evaluation Manual (Part A)*, interim final. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/1-89/002.

United States Environmental Protection Agency (USEPA). 1990. "Administrative Order on Consent, Docket No. II RCRA-90-3008(h)-0201, Bethlehem Steel Corporation, Lackawanna, New York." Washington, DC. 13 August.

United States Environmental Protection Agency (USEPA). 1991a. *Risk Assessment Guidance for Superfund, Volume 1. Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)*, interim. Office of Emergency and Remedial Response, Washington, D.C. PB92-963333.

United States Environmental Protection Agency (USEPA). 1991b. *Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors."* Directive 9285.6-03. Interim Final. Office of Emergency and Remedial Response, Toxics Integration Branch, Washington, D.C.

United States Environmental Protection Agency (USEPA). 1993. Correspondence between Bethlehem Steel Corporation regarding preliminary SWMU reports.

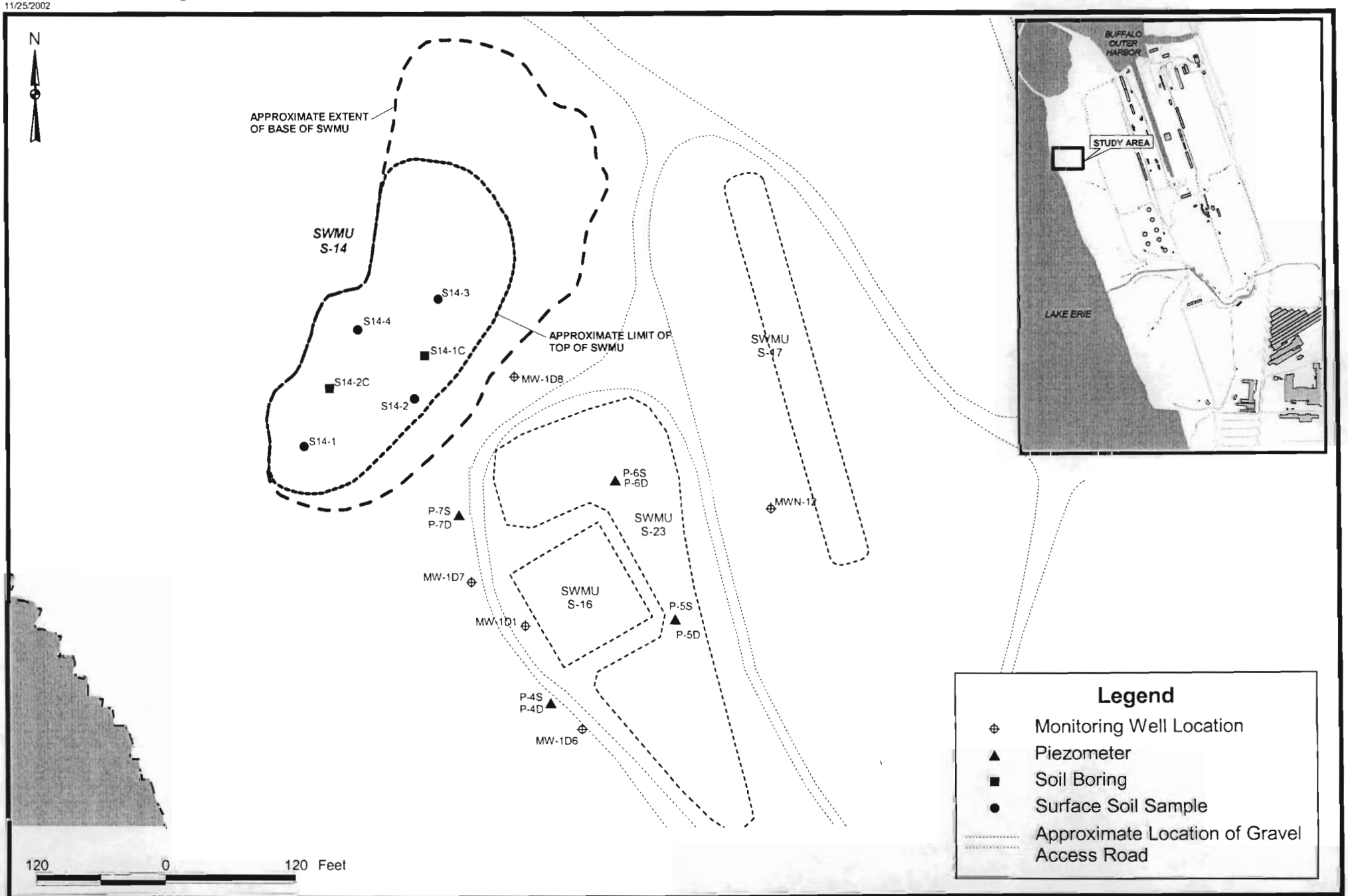
United States Environmental Protection Agency (USEPA). 1994. *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities.* OSWER Directive No. 9355.4-12. Office of Emergency and Remedial Response, Washington, DC EPA/540F-94/043, PB94-983282.

United States Environmental Protection Agency (USEPA). 1996. *Soil Screening Guidance: Technical Background Document*, EPA/540/R-95/128. Washington, DC: Office of Solid Waste and Emergency Response, Hazardous Site Control Division. July.

United States Environmental Protection Agency (USEPA). 2000a. *Integrated Risk Information System* (IRIS). Cincinnati, OH.

United States Environmental Protection Agency (USEPA). 2000b. Risk-Based Concentration Table, Region III. October 2000.

N:\11172630.00000\GIS\PRESENT\swmu_report\s-14.apr SWMU S-14 SAMPLING LOCATIONS
11/25/2002

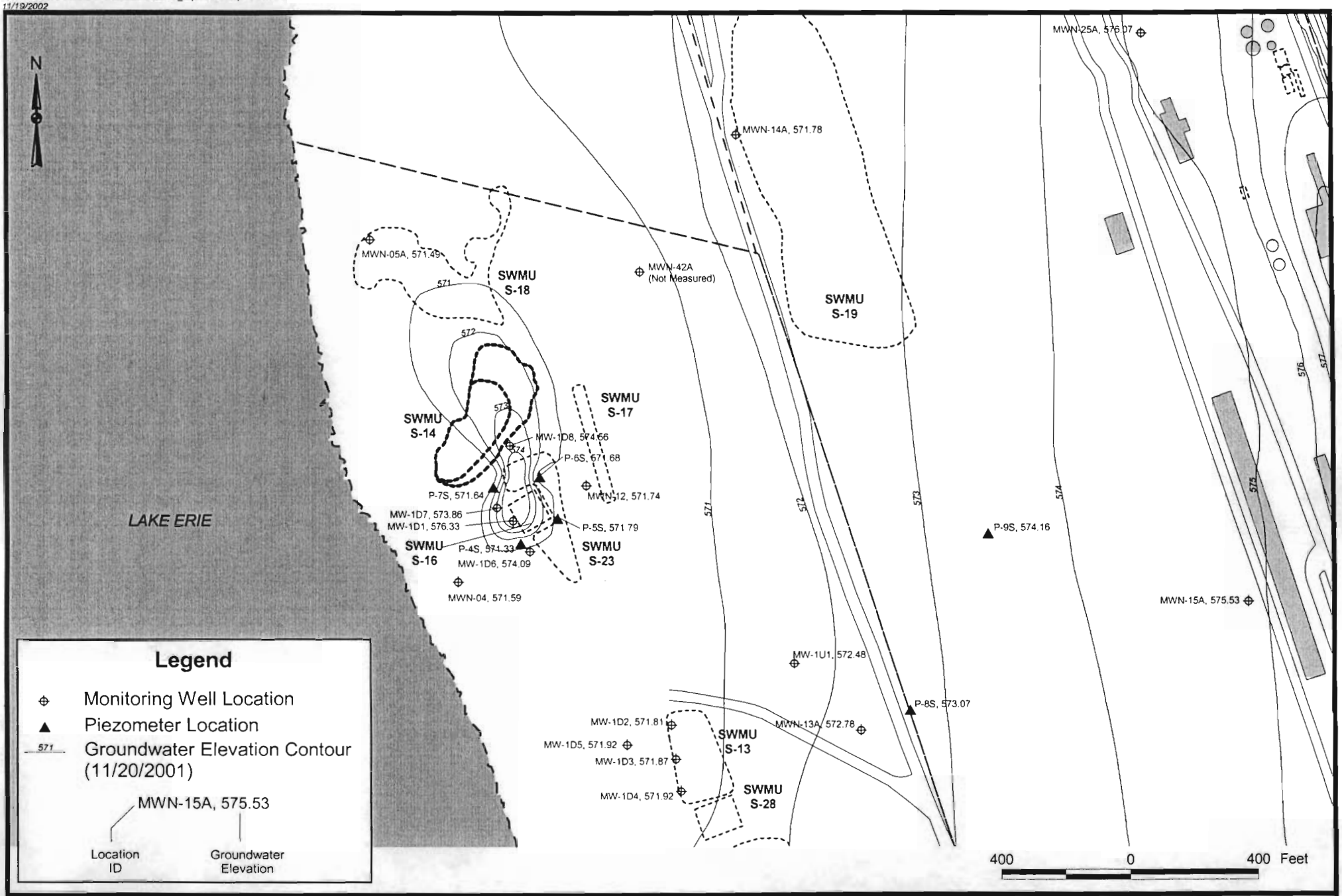


URS

BETHLEHEM STEEL CORPORATION
SITE LOCATION MAP SHOWING SAMPLE LOCATIONS FOR:
GENERAL RUBBLE LANDFILL N (SWMU S-14)

FIGURE 1

N:\11172630.00000\GIS\PRESENT\swmu_report\s-14.apr 11/01 FILL GROUNDWATER ELEVATIONS
11/19/2002

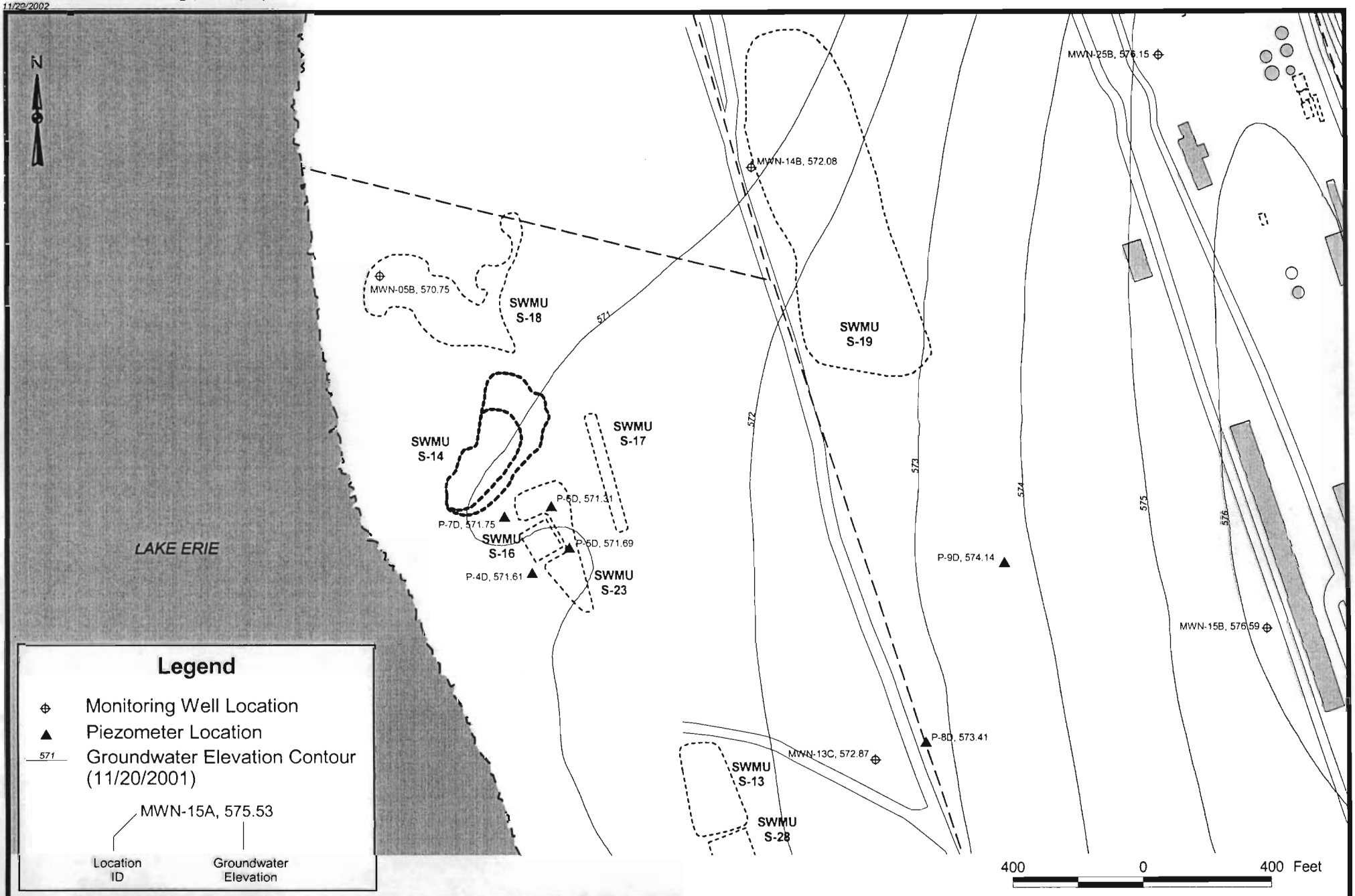


URS

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

FIGURE 2

N:\11172630.00000\GIS\PRESENT\swmu_report\s-14.apr Layout1
11/20/2002



URS

BETHLEHEM STEEL CORPORATION
MONITORING WELL/PIEZOMETER 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 ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Sample ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.5	0.0-15.8	6.0-8.0	0.0-0.5	0.0-30.0
Date Sampled		02/08/95	09/05/95	09/05/95	02/08/95	09/07/95
Parameter	Units					
Volatile Organic Compounds						
Benzene	UG/KG	5.9 U	NA	87	6.3 U	NA
Carbon disulfide	UG/KG	5.9 U	NA	19 U	6.3 U	NA
Ethylbenzene	UG/KG	5.9 U	NA	130	6.3 U	NA
Methyl ethyl ketone	UG/KG	59 U	NA	45	63 U	NA
Methylene chloride	UG/KG	8 J,s	NA	19 U	13 UJ,z	NA
Toluene	UG/KG	5.9 U	NA	520	6.3 U	NA
Trichloroethene	UG/KG	5.9 U	NA	19 U	6.3 U	NA
Xylenes, Total	UG/KG	5.9 U	NA	3,500	6.3 U	NA
Volatile Organic Compounds - SPLP						
Benzene -SPLP	MG/L	0.0050 U	NA	0.007 J,h	0.0050 U	NA
Ethylbenzene -SPLP	MG/L	0.0050 U	NA	0.007 J,h	0.0050 U	NA
Methylene chloride -SPLP	MG/L	0.010 U	NA	0.012 J,h	0.010 U	NA
Toluene -SPLP	MG/L	0.0050 U	NA	0.032 J,h	0.0050 U	NA
Xylenes, Total -SPLP	MG/L	0.0050 U	NA	0.2 J,h	0.0050 U	NA
Semivolatile Organic Compounds						
Acenaphthene	UG/KG	390 U	5,600 J	NA	750	1,800 U
Acenaphthylene	UG/KG	390 U	32,000	NA	420 U	290
Anthracene	UG/KG	390 U	26,000	NA	1,200	520
Benzo(a)anthracene	UG/KG	330 J	30,000	NA	2,900	3,000
Benzo(a)pyrene	UG/KG	290 J	27,000	NA	1,900	4,800
Benzo(b)fluoranthene	UG/KG	520	27,000	NA	3,500	5,900
Benzo(ghi)perylene	UG/KG	160 J	15,000	NA	1,300	3,800
Benzo(k)fluoranthene	UG/KG	250 J	20,000	NA	730	2,800
Chrysene	UG/KG	380 J	28,000	NA	2,500	3,600

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Sample ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.5	0.0-15.8	6.0-8.0	0.0-0.5	0.0-30.0
Date Sampled		02/08/95	09/05/95	09/05/95	02/08/95	09/07/95
Parameter	**Units**					
Semivolatile Organic Compounds						
Dibenz(a,h)anthracene	UG/KG	390 U	3,500	NA	270 J	800 J
2,4-Dimethylphenol	UG/KG	390 U	9,100 U	NA	420 U	1,800 U
bis(2-Ethylhexyl)phthalate	UG/KG	330 J	9,100 U	NA	420 U	1,800 U
Fluoranthene	UG/KG	480	79,000	NA	4,100	3,400
Fluorene	UG/KG	390 U	41,000	NA	550	500 J
Indeno(1,2,3-cd)pyrene	UG/KG	160 J	17,000	NA	1,400	3,800
2-Methylphenol	UG/KG	390 U	9,100 U	NA	420 U	1,800 U
4-Methylphenol	UG/KG	NA	9,100 U	NA	NA	1,800 U
Naphthalene	UG/KG	130 J	1,400,000	NA	750	5,000
Phenanthrene	UG/KG	230 J	130,000	NA	3,700	2,500
Pyrene	UG/KG	390	56,000	NA	3,400	3,800
Semivolatile Organic Compounds - SPLP						
Acenaphthene -SPLP	MG/L	0.010 U	0.019	NA	0.010 U	0.011 U
Acenaphthylene -SPLP	MG/L	0.010 U	0.12	NA	0.010 U	0.011 U
Anthracene -SPLP	MG/L	0.010 U	0.023	NA	0.010 U	0.011 U
Fluoranthene -SPLP	MG/L	0.010 U	0.018 J,c	NA	0.010 U	0.011 UJ,c
Fluorene -SPLP	MG/L	0.010 U	0.087 J,c	NA	0.010 U	0.011 UJ,c
2-Methylphenol -SPLP	MG/L	0.010 U	0.006 J	NA	0.010 U	0.011 U
4-Methylphenol -SPLP	MG/L	NA	0.013	NA	NA	0.011 U
Naphthalene -SPLP	MG/L	0.010 U	15	NA	0.010 U	0.024
Phenanthrene -SPLP	MG/L	0.010 U	0.11	NA	0.010 U	0.005 J
Pyrene -SPLP	MG/L	0.010 U	0.01	NA	0.010 U	0.011 U
Metals						
Antimony	MG/KG	12.5 J,m	1.5 J,m	NA	44.7 J,m	4 J,m

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Sample ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.5	0.0-15.8	6.0-8.0	0.0-0.5	0.0-30.0
Date Sampled		02/08/95	09/05/95	09/05/95	02/08/95	09/07/95
Parameter	**Units**					
Metals						
Arsenic	MG/KG	7.5 J,m	12.8	NA	6.1 J,m	11.5
Barium	MG/KG	42.4	64.8	NA	57.2	84
Cadmium	MG/KG	10.1 J,m	7.4 J,k	NA	2.1 J,m	9 J,k
Calcium	MG/KG	19,800 R,m	NA	NA	41,400 R,m	NA
Chromium	MG/KG	85.6 R,m	149	NA	156 R,m	180
Lead	MG/KG	911 J,k	109 J,k	NA	157 J,k	253 J,k
Mercury	MG/KG	0.31	0.36	NA	0.28	0.14
Nickel	MG/KG	58.6 J,k	135	NA	26.6	143
Potassium	MG/KG	594 U	NA	NA	727	NA
Selenium	MG/KG	3.0 UJ,c	0.22 UJ	NA	0.63 UJ	0.22 UJ
Silver	MG/KG	3.3	4.7 J,l	NA	1.3 U	4.9 J,l
Sodium	MG/KG	594 U	NA	NA	632	NA
Metals-SPLP						
Antimony -SPLP	MG/L	0.060 U	0.006 J,v	NA	0.060 U	0.0022 U
Barium -SPLP	MG/L	0.20 U	0.049 J,l	NA	0.20 U	0.056 J,l
Calcium -SPLP	MG/L	21	NA	NA	24.7	NA
Chromium -SPLP	MG/L	0.010 U	0.0057 U	NA	0.010 U	0.0057 U
Lead -SPLP	MG/L	0.24	0.0027 U	NA	0.018	0.0027 U
Nickel -SPLP	MG/L	0.040 U	0.01 U	NA	0.040 U	0.01 U
Selenium -SPLP	MG/L	0.0050 UJ,c	0.006	NA	0.0050 UJ,c	0.003 J,v
General Chemistry Parameters						
Chloride	MG/KG	57.5 J,c	NA	NA	28.6 J,c	NA
Cyanide	MG/KG	3.0 U	0.55 UJ,m	NA	3.1 U	0.55 UJ,m
Organic Matter	PERCENT	NA	8.7	NA	NA	11

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Sample ID		S14-1	S14-1C	S14-1G	S14-2	S14-2C
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.5	0.0-15.8	6.0-8.0	0.0-0.5	0.0-30.0
Date Sampled		02/08/95	09/05/95	09/05/95	02/08/95	09/07/95
Parameter	Units					
General Chemistry Parameters						
PHSOL	S.U.	7.7 J,h	NA	NA	8 J,h	NA
Total Organic Carbon	MG/KG	20,600	NA	NA	14,200	NA
Total Organic Halogens	MG/KG	125	NA	NA	259	NA
Total Recoverable Phenolics	MG/KG	0.030 U	NA	NA	0.091	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-2C	S14-2G	S14-2G	S14-3	S14-4
Sample ID		S14-2C DUP	S14-2G	S14-2G DUP	S14-3	S14-4
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-30.0	4.0-6.0	4.0-6.0	0.0-0.5	0.0-0.5
Date Sampled		09/07/95	09/07/95	09/07/95	02/08/95	02/08/95
Parameter	Units	FIELD DUPLICATE (1-1)		FIELD DUPLICATE (1-1)		
Volatile Organic Compounds						
Benzene	UG/KG	NA	1,300 J,i	350 J,s	5.7 UJ,s	6.6 U
Carbon disulfide	UG/KG	NA	6 J,i	27 J,s	5.7 UJ,s	6.6 U
Ethylbenzene	UG/KG	NA	37 J,i	49 J,s	5.7 UJ,s	6.6 UJ,i
Methyl ethyl ketone	UG/KG	NA	29 J,i	49 J,s	57 UJ,s	66 UJ,c
Methylene chloride	UG/KG	NA	53 UJ,i	27 U	43 J,s	9 J,s
Toluene	UG/KG	NA	2,700 J,l	620 J,s	5.7 UJ,s	6.6 UJ,i
Trichloroethene	UG/KG	NA	3 J,i	27 U	5.7 UJ,s	6.6 U
Xylenes, Total	UG/KG	NA	610 J,i	790 J,s	5.7 UJ,s	6.6 UJ,i
Volatile Organic Compounds - SPLP						
Benzene -SPLP	MG/L	NA	0.009	0.013	0.0050 U	0.0050 U
Ethylbenzene -SPLP	MG/L	NA	0.005 U	0.002 J	0.0050 U	0.0050 U
Methylene chloride -SPLP	MG/L	NA	0.002 J	0.005 U	0.0083 J	0.0033 J
Toluene -SPLP	MG/L	NA	0.004 J	0.007	0.0050 U	0.0050 U
Xylenes, Total -SPLP	MG/L	NA	0.01	0.02	0.0050 U	0.0050 U
Semivolatile Organic Compounds						
Acenaphthene	UG/KG	180	NA	NA	370 U	440 U
Acenaphthylene	UG/KG	340	NA	NA	370 U	440 U
Anthracene	UG/KG	800	NA	NA	160 J,g	100 J
Benzo(a)anthracene	UG/KG	3,400	NA	NA	400	430 J
Benzo(a)pyrene	UG/KG	4,600	NA	NA	290 J	410 J
Benzo(b)fluoranthene	UG/KG	5,800	NA	NA	680	680
Benzo(ghi)perylene	UG/KG	3,000	NA	NA	420	340 J
Benzo(k)fluoranthene	UG/KG	2,400	NA	NA	150 J	260 J
Chrysene	UG/KG	3,500	NA	NA	450	480

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-2C	S14-2G	S14-2G	S14-3	S14-4
Sample ID		S14-2C DUP	S14-2G	S14-2G DUP	S14-3	S14-4
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-30.0	4.0-6.0	4.0-6.0	0.0-0.5	0.0-0.5
Date Sampled		09/07/95	09/07/95	09/07/95	02/08/95	02/08/95
Parameter	Units	FIELD DUPLICATE (1-1)		FIELD DUPLICATE (1-1)		
Semivolatile Organic Compounds						
Dibenz(a,h)anthracene	UG/KG	730	NA	NA	91 J	440 U
2,4-Dimethylphenol	UG/KG	86 J	NA	NA	370 U	440 U
bis(2-Ethylhexyl)phthalate	UG/KG	360 U	NA	NA	370 UJ,g	440 U
Fluoranthene	UG/KG	4,300	NA	NA	400 J,g	650
Fluorene	UG/KG	700	NA	NA	370 U	440 U
Indeno(1,2,3-cd)pyrene	UG/KG	3,900	NA	NA	320 J	330 J
2-Methylphenol	UG/KG	57 J	NA	NA	370 U	440 U
4-Methylphenol	UG/KG	200 J	NA	NA	NA	NA
Naphthalene	UG/KG	5,400	NA	NA	200 J	180 J
Phenanthrene	UG/KG	3,300	NA	NA	750 J,g	420 J
Pyrene	UG/KG	4,600	NA	NA	420 J,g	540
Semivolatile Organic Compounds - SPLP						
Acenaphthene -SPLP	MG/L	0.01 U	NA	NA	0.010 U	0.010 U
Acenaphthylene -SPLP	MG/L	0.01 U	NA	NA	0.010 U	0.010 U
Anthracene -SPLP	MG/L	0.01 U	NA	NA	0.010 U	0.010 U
Fluoranthene -SPLP	MG/L	0.01 UJ,c	NA	NA	0.010 U	0.010 U
Fluorene -SPLP	MG/L	0.01 UJ,c	NA	NA	0.010 U	0.010 U
2-Methylphenol -SPLP	MG/L	0.01 U	NA	NA	0.010 U	0.010 U
4-Methylphenol -SPLP	MG/L	0.01 U	NA	NA	NA	NA
Naphthalene -SPLP	MG/L	0.006 J	NA	NA	0.010 U	0.010 U
Phenanthrene -SPLP	MG/L	0.01 U	NA	NA	0.010 U	0.010 U
Pyrene -SPLP	MG/L	0.01 U	NA	NA	0.010 U	0.010 U
Metals						
Antimony	MG/KG	2.4 J,m	NA	NA	19.3 J,m	34.4 J,m

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-2C	S14-2G	S14-2G	S14-3	S14-4
Sample ID		S14-2C DUP	S14-2G	S14-2G DUP	S14-3	S14-4
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-30.0	4.0-6.0	4.0-6.0	0.0-0.5	0.0-0.5
Date Sampled		09/07/95	09/07/95	09/07/95	02/08/95	02/08/95
Parameter	Units	FIELD DUPLICATE (1-1)		FIELD DUPLICATE (1-1)		
Metals						
Arsenic	MG/KG	8.2	NA	NA	4.2 J,m	11.3 J,m
Barium	MG/KG	74	NA	NA	29	208
Cadmium	MG/KG	6.6 J,k	NA	NA	0.57 U	1.2 J,m
Calcium	MG/KG	NA	NA	NA	35,400 R,m	53,400 R,m
Chromium	MG/KG	220	NA	NA	130 R,m	175 R,m
Lead	MG/KG	198 J,k	NA	NA	20.7 J,k	109 J,k
Mercury	MG/KG	0.13	NA	NA	0.16	0.29
Nickel	MG/KG	110	NA	NA	12.2	130 J,k
Potassium	MG/KG	NA	NA	NA	566 U	699
Selenium	MG/KG	5.9 R,r	NA	NA	0.57 UJ	0.66 UJ
Silver	MG/KG	5 J,l	NA	NA	1.1 U	1.3 U
Sodium	MG/KG	NA	NA	NA	566 U	663 U
Metals-SPLP						
Antimony -SPLP	MG/L	0.0046 J,v	NA	NA	0.060 U	0.060 U
Barium -SPLP	MG/L	0.062 J,l	NA	NA	0.20 U	0.20 U
Calcium -SPLP	MG/L	NA	NA	NA	19.5	25.9
Chromium -SPLP	MG/L	0.0057 U	NA	NA	0.010 U	0.011
Lead -SPLP	MG/L	0.0027	NA	NA	0.0030 U	0.048
Nickel -SPLP	MG/L	0.01 U	NA	NA	0.040 U	0.051
Selenium -SPLP	MG/L	0.0022 J,v	NA	NA	0.0050 UJ,c	0.0050 UJ,c
General Chemistry Parameters						
Chloride	MG/KG	NA	NA	NA	31.9 J,c	16.9 J,c
Cyanide	MG/KG	0.55 UJ,m	NA	NA	2.8 U	8.8
Organic Matter	PERCENT	NA	NA	NA	NA	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

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[LOCID] LIKE 'S14-*' AND [PRCODE] NOT LIKE '*-TC'

TABLE 2
SUMMARY OF DETECTED ANALYTES
TOTAL CONSTITUENT AND SPLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID		S14-2C	S14-2G	S14-2G	S14-3	S14-4
Sample ID		S14-2C DUP	S14-2G	S14-2G DUP	S14-3	S14-4
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-30.0	4.0-6.0	4.0-6.0	0.0-0.5	0.0-0.5
Date Sampled		09/07/95	09/07/95	09/07/95	02/08/95	02/08/95
Parameter	Units	FIELD DUPLICATE (1-1)		FIELD DUPLICATE (1-1)		
General Chemistry Parameters						
PHSOL	S.U.	NA	NA	NA	8.5 J,h	8.3 J,h
Total Organic Carbon	MG/KG	NA	NA	NA	35,400	31,700
Total Organic Halogens	MG/KG	NA	NA	NA	210	146
Total Recoverable Phenolics	MG/KG	NA	NA	NA	0.028 U	0.033 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 3
SUMMARY OF DETECTED TCLP EXTRACTION OF SOIL SAMPLES
SWMU S-14

Location ID			S14-1	S14-2	S14-3	S14-4
Sample ID			S14-1	S14-2	S14-3	S14-4
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			02/08/95	02/08/95	02/08/95	02/08/95
Parameter	**Units**	**Criteria***				
Volatile Organic Compounds - TCLP						
Methylene chloride -TCLP	MG/L	-	0.010 U	0.010 U	0.010 U	0.0024 J
1,1,1-Trichloroethane -TCLP	MG/L	-	0.0035 J	0.0050 U	0.0050 U	0.0050 U
Metals-TCLP						
Barium -TCLP	MG/L	100	0.6	0.20 U	0.20 U	0.26
Cadmium -TCLP	MG/L	1	0.16 J,a	0.0050 U	0.0050 U	0.0050 U
Calcium -TCLP	MG/L	-	625 J,a	678 J,a	798 J,a	686 J,a
Lead -TCLP	MG/L	5	0.46 J,a	0.0030 U	0.0030 U	0.0030 U
Nickel -TCLP	MG/L	-	0.17	0.051	0.040 U	0.88 J,a
Potassium -TCLP	MG/L	-	5.3	11.4	5.0 U	5.6
Thallium -TCLP	MG/L	-	0.012	0.010 U	0.013	0.012

*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

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[LOCID] LIKE 'S14-*' AND [PRCCODE] LIKE '*-TC'

TABLE 4
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPCs) SELECTION PROCESS
SURFACE SWMU MATERIAL
SWMU S-14

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							
Methylene chloride	4	4	100%	0.043	NA	85	No
Semivolatiles							
Acenaphthene	4	1	25%	0.75	0.34	4,700	No
Anthracene	4	3	75%	1.2	1.9	23,000	No
Benzo(a)anthracene	4	4	100%	2.9	6.7	0.87	No
Benzo(a)pyrene	4	4	100%	1.9	NA	0.087	No
Benzo(b)fluoranthene	4	4	100%	3.5	12	0.87	No
Benzo(k)fluoranthene	4	4	100%	0.73	3.3	8.7	No
Benzo(g,h,i)perylene	4	4	100%	1.3	5.9	2300[f]	No
Bis(2-ethylhexyl)phthalate	4	1	25%	0.33	2.7	46	No
Chrysene	4	4	100%	2.5	4.9	87	No
Dibenz(a,h)anthracene	4	2	50%	0.27	1.8	0.087	No
Fluoranthene	4	4	100%	4.1	12	3,100	No
Fluorene	4	1	25%	0.55	0.81	3,100	No
Indeno(1,2,3-c,d)pyrene	4	4	100%	1.4	6	0.87	No
Naphthalene	4	4	100%	0.75	0.22	1,600	No
Phenanthrene	4	4	100%	3.7	8.1	2300[f]	No
Pyrene	4	4	100%	3.4	10	2,300	No
Metals							
Antimony	4	4	100%	44.7	1	31	**Yes**
Arsenic	4	4	100%	11.3	12	0.43	No
Barium	4	4	100%	208	84.3	5,500	No
Cadmium	4	3	75%	10.1	NA	78[g]	No
Lead	4	4	100%	911	30	400[c]	**Yes**
Mercury	4	4	100%	0.31	0.32	23[d]	No
Nickel	4	4	100%	130	27.7	1,600	No
Silver	4	1	25%	3.3	NA	390	No
Miscellaneous							
Cyanide	4	1	25%	8.8	NA	1,564[e]	No

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 Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).
d Mercury is compared to the RBC for mercuric chloride.
e Cyanide is compared to the RBC for free cyanide.
f Pyrene as surrogate.
g RBC based on dietary RfD for cadmium.
NA Not available.

TABLE 5
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPCs) SELECTION PROCESS
SUBSURFACE SWMU MATERIAL
SWMU S-14

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	2	2	100%	0.825	0.8	**Yes**
Carbon disulfide	2	1	50%	0.017	720[c]	No
Ethylbenzene	2	2	100%	0.13	400[c]	No
Methyl ethyl ketone	2	2	100%	0.045	21,000[e]	No
Toluene	2	2	100%	1.66	650[c]	No
Trichloroethene	2	1	50%	0.008	5	No
Xylenes, Total	2	2	100%	3.5	410[c,d]	No
Volatile Semivolatiles						
Acenaphthene	2	2	100%	5.6	120[c]	No
Acenaphthylene	2	2	100%	32	NA	**Yes**
Anthracene	2	2	100%	26	6.8[c]	**Yes**
Fluorene	2	2	100%	41	89[c]	No
Naphthalene	2	2	100%	1,400	180[c]	**Yes**
Phenanthrene	2	2	100%	130	NA	**Yes**
Semivolatiles						
Benzo(a)anthracene	2	2	100%	30	0.87	**Yes**
Benzo(b)fluoranthene	2	2	100%	27	0.87	**Yes**
Benzo(k)fluoranthene	2	2	100%	20	8.7	**Yes**
Benzo(g,h,i)perylene	2	2	100%	15	NA	**Yes**
Benzo(a)pyrene	2	2	100%	27	0.087	**Yes**
Chrysene	2	2	100%	28	87	No
Dibenz(a,h)anthracene	2	2	100%	3.5	0.087	**Yes**
2,4-Dimethylphenol	2	1	50%	0.49	1,600	No
Fluoranthene	2	2	100%	79	3,100	No
Indeno(1,2,3-c,d)pyrene	2	2	100%	17	0.87	**Yes**
2-Methylphenol	2	1	50%	0.48	3,900	No
4-Methylphenol	2	1	50%	0.55	390	No
Pyrene	2	2	100%	56	2,300	No
Metals						
Antimony	2	2	100%	3.2	31	No
Arsenic	2	2	100%	12.8	0.43	**Yes**
Barium	2	2	100%	79	5,500	No
Cadmium	2	2	100%	7.8	78[f]	No
Chromium	2	2	100%	200	230[g]	No
Lead	2	2	100%	225.5	400[h]	No
Mercury	2	2	100%	0.36	23[i]	No
Nickel	2	2	100%	135	1,600	No
Silver	2	2	100%	4.95	391	No

a For volatile chemicals, USEPA Soil Screening Levels for vapor inhalation were used (USEPA 1996); for semi-volatile chemicals and metals, USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA 2000) 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 This screening criterion is capped at the 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 (*o*-xylene).

e SSL calculated per EPA SSL guidance (USEPA 1996).

f Cadmium RBC based on dietary reference dose (USEPA 1998).

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
SUMAMRY OF CHEMICALS OF POTENTIAL CONCERN (COPCs) SELECTION PROCESS
SLAG FILL AREA ZONE 4 - 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							
Acrylonitrile	245	2	1%	7.9	0.037	5	No
Benzene	311	254	82%	2200	0.32	1	**Yes**
Carbon disulfide	13	5	38%	19	1,000	NA	No
Chlorobenzene	255	15	6%	54	110	5	**Yes**
1,2-Dichlorobenzene	259	2	1%	28	550	3	No
1,1-Dichloroethane	255	40	16%	160	800	5	**Yes**
Ethylbenzene	255	66	26%	35	1300	5	**Yes**
Methylene chloride	250	26	10%	200	4.1	5	**Yes**
Pyridine	248	38	16%	50	37	50	**Yes**
Toluene	250	179	72%	170	750	5	**Yes**
1,1,1-Trichloroethane	250	7	3%	14	3200	5	No
1,1,2-Trichloroethane	250	1	0.4%	2.3	0.19	1	No
Trichloroethene	250	48	19%	46	1.6	5	**Yes**
Xylenes, Total	249	199	80%	140	12,000	5	**Yes**
Volatile Semivolatiles							
Acenaphthene	22	5	23%	2.4	370	20	No
Acenaphthylene	257	167	65%	130	NA	NA	**Yes**
Anthracene	259	44	18%	59	1,800	50	**Yes**
2-Chloronaphthalene	259	1	0.4%	1	490	10	No
Fluorene	259	186	72%	72	240	50	**Yes**
Naphthalene	314	264	84%	1900	7	10	**Yes**
Phenanthrene	259	171	66%	120	NA	50	**Yes**

a USEPA Region III Tapwater Risk Based Concentration (RBC) (USEPA 2000b).
b NYSDEC Ambient Water Quality Standard and Guidance value (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.
NA Not available.

TABLE 7
REPRESENTATIVE CONCENTRATIONS OF CHEMICALS OF POTENTIAL CONCERN (COPCs)
SWMU S-14

Surface SWMU Material COPCs	Representative Concentration[a] (mg/kg)	Subsurface SWMU Material COPCs	Representative Concentration[a] (mg/kg)	Zone 4 Groundwater COPCs	Representative Concentration[a] (mg/L)
Antimony	45	Acenaphthylene	32	1,1-Dichloroethane	0.0061
Lead	910	Anthracene	26[b]	Acenaphthylene	0.016
		Arsenic	13	Anthracene	0.012
		Benzene	0.83	Benzene	0.067
		Benzo(a)anthracene	30	Chlorobenzene	0.0036
		Benzo(a)pyrene	27[b]	Ethylbenzene	0.0037
		Benzo(b)fluoranthene	27[b]	Fluorene	0.014
		Benzo(k)fluoranthene	20[b]	Methylene Chloride	0.0061
		Benzo(g,h,i)perylene	15[b]	Naphthalene	0.20
		Dibenz(a,h)anthracene	3.5	Phenanthrene	0.017
		Indeno(1,2,3-c,d)pyrene	17[b]	Pyridine	0.015
		Naphthalene	1,400[b]	Toluene	0.014
		Phenanthrene	130	Trichloroethene	0.0040
				Xylenes, Total	0.040

a For datasets with 10 or more samples, 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 in soil.

TABLE 8
POTENTIAL EXPOSURE SCENARIOS[a]
SWMU S-14

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
	Zone 4 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	vapor and particulate inhalation
		ingestion
		dermal contact
	Zone 4 Groundwater	ambient vapor inhalation
Trespasser	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	ambient vapor inhalation
	Zone 4 Groundwater	ambient vapor inhalation
Future Construction Worker	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	vapor and particulate inhalation
		ingestion
		dermal contact
	Zone 4 Groundwater	ambient vapor inhalation
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 SWMU S-14 are based on those determined in ID No. 2 (BSC 1999) and the chemicals of potential interest determined in ID No. 1 (BSC 1998).

TABLE 9
TOXICITY CRITERIA FOR COPCs
REFERENCE DOSES (RfDs) AND SLOPE FACTORS (SFs)
SWMU S-14

		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
Lead[b]	71-43-2	--	--	--	--	--	--	--	--	--
Organics										
Acenaphthylene	83-32-9	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	207-08-9	--	--	--	--	B2	7.30E-02	E	3.10E-02	E
Benzo(g,h,i)perylene	191-24-2	3.00E-02	I, pyrene surrogate	3.00E-02	R	--	--	--	--	--
Chlorobenzene	75-09-2	2.00E-02	I	1.70E-02	E	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	--	--	--	--	B2	7.30E+00	E	3.10E+00	E
1,1-Dichloroethane	79-01-6	1.00E-01	H	1.40E-01	H	--	--	--	--	--
Ethylbenzene	100-41-4	1.00E-01	I	2.90E-01	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
Methylene chloride	75-09-2	6.00E-02	I	8.60E-01	H	B2	7.50E-03	I	1.65E-03	I
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	--	--	--	--	--
Pyridine	110-86-1	1.00E-03	I	1.00E-03	R	--	--	--	--	--
Toluene	108-88-3	2.00E-01	I	1.14E-01	I	--	--	--	--	--
Trichloroethene	79-01-6	6.00E-03	E	--	--	NC	1.10E-02	E	6.00E-03	E
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), NC - no classification at this time (USEPA 2000a).

b Lead lacks standard toxicity criteria and was evaluated alternatively.

-- There is no toxicity criteria 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 2000a).

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 10
COMAPRISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-14

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Current Non-BSC Commercial/Industrial Worker			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	45	--	>1,000,000
Lead	910	--	NE
Inhalation of Vapors from Subsurface SWMU material (mg/kg)			
Acenaphthylene	32	--	>1,000,000
Anthracene	26	--	>1,000,000
Benzene	0.83	> sat (1,260)	> sat (1,260)
Naphthalene	1,400	--	>1,000,000
Phenanthrene	130	--	>1,000,000
Future Commercial/Industrial Worker			
Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)			
Antimony	45	--	49.7
Lead	910	--	1,545
Inhalation of Ambient Vapors From Subsurface SWMU Material (mg/kg)			
Acenaphthylene	32	--	>1,000,000
Anthracene	26	--	>1,000,000
Benzene	0.83	3.0	12
Naphthalene	1,400	--	> sat (371)
Phenanthrene	130	--	>1,000,000
Inhalation of Indoor Vapors From Subsurface SWMU Material (mg/kg)			
Acenaphthylene	32	--	> sat (1,110)
Anthracene	26	--	>1,000,000
Benzene	0.83	0.16	0.69
Naphthalene	1,400	--	103
Phenanthrene	130	--	> sat (163)
Inhalation of Ambient Vapors from Groundwater (mg/L)			
1,1-Dichloroethane	0.0061	--	> sol (5,060)
Acenaphthylene	0.016	--	> sol (16.1)
Anthracene	0.012	--	> sol (0.043)
Benzene	0.067	133	577
Chlorobenzene	0.004	--	> sol (472)
Ethylbenzene	0.004	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	4,265	> sol (13,000)
Naphthalene	0.198	--	> sol (31)
Phenanthrene	0.017	--	> sol (1.15)
Pyridine	0.015	--	280
Toluene	0.014	--	> sol (526)
Trichloroethene	0.0040	425	--
Xylenes, Total	0.040	--	> sol (175)

TABLE 10
COMAPRISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-14

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Inhalation of Indoor Vapors from Groundwater (mg/L)			
1,1-Dichloroethane	0.0061	--	311
Acenaphthylene	0.016	--	> sol (16.1)
Anthracene	0.012	--	> sol (0.043)
Benzene	0.067	0.76	3.3
Chlorobenzene	0.004	--	56
Ethylbenzene	0.004	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	26	3,233
Naphthalene	0.198	--	22.3
Phenanthrene	0.017	--	> sol (1.15)
Pyridine	0.015	--	1.6
Toluene	0.014	--	195
Trichloroethene	0.0040	2.4	--
Xylenes, Total	0.040	--	> sol (175)
Future Construction Worker			
Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)			
Antimony	45	--	128
Lead	910	--	1,545
Direct Contact (including particulate and ambient vapor inhalation) with Subsurface SWMU Material (mg/kg)			
Acenaphthylene	32	--	17,161
Anthracene	26	--	92,383
Arsenic	13	16	96
Benzene	0.83	117	94
Benzo(a)anthracene	30	33	--
Benzo(a)pyrene	27	3.3	--
Benzo(b)fluoranthene	27	33	--
Benzo(k)fluoranthene	20	330	--
Benzo(g,h,i)perylene	15	--	9,637
Dibenz(a,h)anthracene	3.5	3.3	--
Indeno(1,2,3-c,d)pyrene	17	33	--
Naphthalene	1,400	--	387
Phenanthrene	130	--	8,922

TABLE 10
COMAPRISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-14

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Inhalation of Ambient Vapors from Groundwater (mg/L)			
1,1-Dichloroethane	0.0061	--	> sol (5,060)
Acenaphthylene	0.016	--	> sol (16.1)
Anthracene	0.012	--	> sol (0.043)
Benzene	0.067	> sol (1750)	1,469
Chlorobenzene	0.004	--	> sol (472)
Ethylbenzene	0.004	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	> sol (13,000)	> sol (13,000)
Naphthalene	0.198	--	> sol (31)
Phenanthrene	0.017	--	> sol (1.15)
Pyridine	0.015	--	> sol (300)
Toluene	0.014	--	> sol (526)
Trichloroethene	0.0040	> sol (1,100)	--
Xylenes, Total	0.040	--	> sol (175)
Future Utility/Maintenance Worker			
Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)			
Antimony	45	--	1,108
Lead	910	--	1,545
Direct Contact (including particulate and ambient vapor inhalation) with Subsurface SWMU Material (mg/kg)			
Acenaphthylene	32	--	75,200
Anthracene	26	--	401,000
Arsenic	13	69	416
Benzene	0.83	559	464
Benzo(a)anthracene	30	142	--
Benzo(a)pyrene	27	14.2	--
Benzo(b)fluoranthene	27	142	--
Benzo(k)fluoranthene	20	1,420	--
Benzo(g,h,i)perylene	15	--	41,581
Dibenz(a,h)anthracene	3.5	14.2	--
Indeno(1,2,3-c,d)pyrene	17	142	--
Naphthalene	1,400	--	1,920
Phenanthrene	130	--	38,900

TABLE 10
COMAPRISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-14

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Inhalation of Ambient Vapors from Groundwater (mg/L)			
1,1-Dichloroethane	0.0061	--	> sol (5,060)
Acenaphthylene	0.016	--	> sol (16.1)
Anthracene	0.012	--	> sol (0.043)
Benzene	0.067	> sol (1,750)	> sol(1,750)
Chlorobenzene	0.004	--	> sol (472)
Ethylbenzene	0.004	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	> sol (13,000)	> sol (13,000)
Naphthalene	0.198	--	> sol (31)
Phenanthrene	0.017	--	> sol (1.15)
Pyridine	0.015	--	> sol (300)
Toluene	0.014	--	> sol (526)
Trichloroethene	0.0040	> sol (1,100)	--
Xylenes, Total	0.040	--	> sol (175)
Trespasser			
Direct Contact (including particulate inhalation) with Surficial SWMU Material (mg/kg)			
Antimony	45	--	6,771
Lead	910	--	1,545
Inhalation of Vapors from Subsurface SWMU material (mg/kg)			
Acenaphthylene	32	--	>1,000,000
Anthracene	26	--	>1,000,000
Benzene	0.83	984	> sat (1,260)
Naphthalene	1,400	--	> sat (371)
Phenanthrene	130	--	>1,000,000
Inhalation of Ambient Vapors from Groundwater (mg/L)			
1,1-Dichloroethane	0.0061	--	> sol (5,060)
Acenaphthylene	0.016	--	> sol (16.1)
Anthracene	0.012	--	> sol (0.043)
Benzene	0.067	> sol (1,750)	> sol(1,750)
Chlorobenzene	0.004	--	> sol (472)
Ethylbenzene	0.004	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	> sol (13,000)	> sol (13,000)
Naphthalene	0.198	--	> sol (31)
Phenanthrene	0.017	--	> sol (1.15)
Pyridine	0.015	--	> sol (300)
Toluene	0.014	--	> sol (526)
Trichloroethene	0.0040	> sol (1,100)	--
Xylenes, Total	0.040	--	> sol (175)

TABLE 10
COMAPRISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-14

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Future Marina Worker			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	45	--	>1,000,000
Lead	910	--	NE
Inhalation of Vapors from Subsurface SWMU material (mg/kg)			
Acenaphthylene	32	--	>1,000,000
Anthracene	26	--	>1,000,000
Benzene	0.83	> sat (1,260)	> sat (1,260)
Naphthalene	1,400	--	>1,000,000
Phenanthrene	130	--	>1,000,000
Future Greenway User			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	45	--	>1,000,000
Lead	910	--	NE
Inhalation of Vapors from Subsurface SWMU material (mg/kg)			
Acenaphthylene	32	--	>1,000,000
Anthracene	26	--	>1,000,000
Benzene	0.83	> sat (1,260)	>1,000,000
Naphthalene	1,400	--	>1,000,000
Phenanthrene	130	--	>1,000,000
Present/Future Fenceline Resident			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	45	--	>1,000,000
Lead	910	--	NE
Inhalation of Vapors from Subsurface SWMU material (mg/kg)			
Acenaphthylene	32	--	>1,000,000
Anthracene	26	--	>1,000,000
Benzene	0.83	670	> sat (1,260)
Naphthalene	1,400	--	>1,000,000
Phenanthrene	130	--	>1,000,000

--	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 RBSL exceedance.
>1,000,000	Calculated RBSL is greater than 1,000,000 parts per million (mg/kg).
NE	Not evaluated for this scenario.

TABLE 11
TIER I RISK ASSESSMENT RESULTS
SWMU S-14

	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						
Inhalation of Indoor Vapors from Subsurface SWMU Material						
Benzene	0.825	0.16	5.2E-06	0.69	1.2	blood/immune system
Naphthalene	1,400	NA	NA	103	13.6	upper respiratory system
Total			**5E-06**	Total SLHI=	**14.8**	
				Total blood/immune system SLHI=	**1.2**	
				Total upper respiratory system SLHI=	**13.6**	
FUTURE CONSTRUCTION WORKER						
Direct Contact with Subsurface SWMU Material (including vapor inhalation)						
Benzo(a)pyrene	27	3.3	8.2E-06	NA	NA	NA
Dibenz(a,h)anthracene	3.5	3.3	1.1E-06	NA	NA	NA
Naphthalene	1,400	NA	NA	387	3.6	upper respiratory system
Total			**9E-06**	Total SLHI=	**3.6**	
				Total upper respiratory system SLHI=	**3.6**	
FUTURE UTILITY/MAINTENANCE WORKER						
Direct Contact with Subsurface SWMU Material (including vapor inhalation)						
Benzo(a)pyrene	27	14.2	1.9E-06	NA	NA	NA
Total			**2E-06**	Total SLHI=	**NA**	

NA Not applicable as chemical does not exceed the RBSL for this effect.
SLHI Screening Level Hazard Index
a Primary Target Organ information obtained from IRIS (USEPA 2000a).

APPENDIX A

SITE INSPECTION REPORTS

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

SWMU #: S-14

SWMU Name: General Rubble Landfill N

Date of Inspection: 9/6/96

Inspector(s): Dan Porterfield

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

Type:

X Landfill _____ Impoundment

_____ Pit/sump/trench _____ Pile

Configuration:

_____ Level
X Above Grade - height ~40 ft from topo map
_____ 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# S-14

Inspection Date: 9/6/96

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

Material:

____ Concrete/Asphalt	____ Unvegetated Soil
X Grass	X Trees/Shrubs
X Slag	____ Liquid
X Other (describe): hoses, wood, metal debris	

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 gravel, direction east, distance 20 ft
____ Railroad, direction ____, distance ____ ft
____ Other (describe): _____

Ground Surface:

____ Concrete/Asphalt	____ Unvegetated Soil
X Grass	X Trees/Shrubs
X Slag	____ Liquid
____ Other (describe): _____	

SWMU# S-14

Inspection Date: 9/6/96

Comments: _____

Surrounding topography:

X Level ~~east side~~ OH

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

Comments: level in east & west sides

Unit contiguous with pile on North (same height)

~~Unit~~ South of Unit is contiguous with pile (half height)

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: 250 ft, direction W

Name of water body: Lake Erie

SWMU# S-14

Inspection Date: 9/6/96

VISUAL EVIDENCE OF RUN ON

X No

_____ Yes, Description: _____

VISUAL EVIDENCE OF RUN OFF:

_____ No

X Yes, Description: Run. ff from unit will flow into surrounding areas

If Yes, which of following are present?

X Erosion scars on SWMU

X Sediments near SWMU in runoff areas) appear to be related to slope ravelling

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

DOES RUNOFF REACH SURFACE WATER BODY? N/D

If yes, provide description: _____

SWMU# S-14

Inspection Date: 9/6/96

PHOTO LOG

Direction	Description	
N E S W	S-14 ID	1
(N) E S W	South side of unit	2
(N) E S W	close up of South side of unit	3
(N) E S W	Erosion scar + slutting near crest of unit	4
(N) E S W	Coorse sediments @ base of Unit	5
N E (S) W	North side of Unit	6
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		
N E S W		
N E S W		

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

SWMU INSPECTION REPORT

SWMU S-14

DATE 8/28/00

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 Corp.
CONTRACT No. 420000 BSC. 15
URS CORP JOB No. 420000 BSC, 15
URS CORP PROJECT MANAGER Jerry Jacobi

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
			Site Inspection of SWMU - S-14

VISITORS

Time	Representating	Representating	Remarks
2:30	Mark Colmerauer	URS Corp.	

EQUIPMENT AT THE SITE None

~~CONSTRUCTION ACTIVITIES~~ Site Observations:

SWMU S-14 is located in the SFA north of Smokes Creek and is also known as General Rubble Landfill N.

- S-14 is an approx. 20 to 25' high (or greater) debris pile north of HWMU - 1B and south of SWMU S-18. The SWMU is heavily vegitated on the top with steep slopes (60°-90°) on the S, E, + N sides that limit vegitative growth.
- Surface water will either be retained by vegitation or flow down slope on all four sides where it eventually drains into the surrounding slag surface.
- Sides are 40% to 50% vegitated w/ debris such as scrap steel and cable protruding from the sides.

SHEET 1 OF 2

BY Mark Colmerauer TITLE Geologist

REVIEWED BY: _____ PROJECT ENGINEER

SWMU INSPECTION REPORT (cont'd)

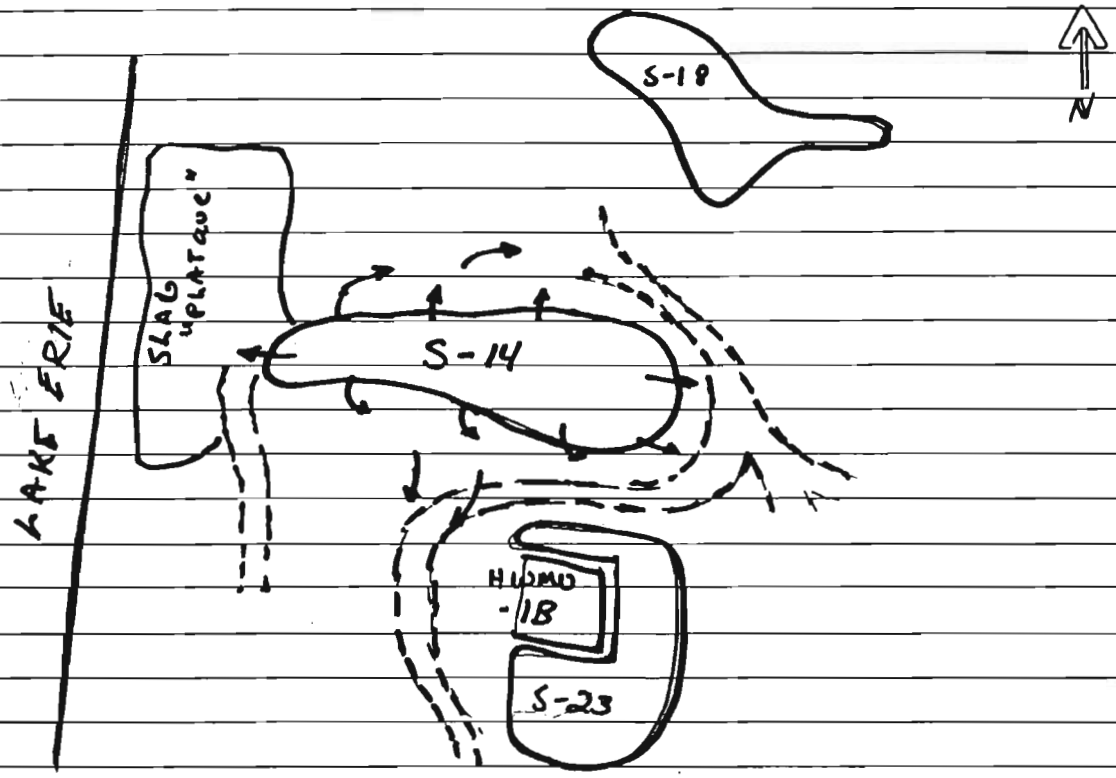
PROJECT BSC-Lackawanna
URS CORP JOB No. 42000088SC.15
REPORT No.
DATE 8/28/00

~~CONSTRUCTION ACTIVITIES~~ (cont'd)

SWMU S-14

- West of S-14 is a "platave" of slag fill which supplies the former access road to S-14.

Sketch:



Not To Scale

→ surface water flow direction

= = = gravel access road

SHEET 2 OF 2

BY Mark Colmerauer TITLE Geologist

REVIEWED BY: _____ PROJECT ENGINEER

APPENDIX B

SAMPLE RECORDS

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-~~123~~186-152 JOB NAME : BSC PHASE II-C DATE : 2/8/95
JOB LOCATION : LACKAWANNA, NY TIME : 14:00

SAMPLE ID : S14-4-(0-6)
SAMPLE LOCATION : SWMU S-14-4 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 ☑

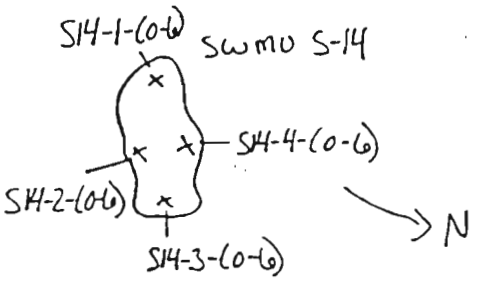
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Brown - lt. brown f-c SAND and GRAVEL, SLAG, STEEL PELLETS ~ ½" DIAMETER, Frozen

SAMPLE ANALYSIS

SAMPLE ID : S14-4-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP & SRLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Brown, no odor

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



WEATHER : ~20°F, very windy, cold, overcast
COMMENTS :

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-~~173~~186-152 JOB NAME : BSC PHASE II-C DATE : 2/8/95
JOB LOCATION : LACKAWANNA, NY TIME : 13:45

SAMPLE ID : S14-3-(0-6)
SAMPLE LOCATION : SWMU S-14-3 EAST

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 ☑

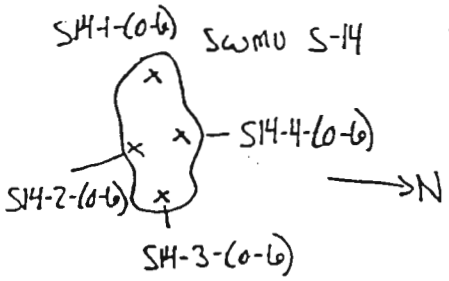
SAMPLE TYPE : POINT ☐ GRAB ☒ COMPOSITE ☐

SAMPLE DESCRIPTION : Dark grey - black SAND and GRAVEL with CINDERS, SLAG, some GLASS, Frozen

SAMPLE ANALYSIS

SAMPLE ID : S14-3-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS ALL TOTAL CONSTITUENT, TCLP & SPLP ANALYSES
PHYSICAL APPEARANCE & ODOR : Brown, no odor

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



WEATHER : ~20°F, very windy, cold, overcast
COMMENTS :

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-~~123~~-186-152 JOB NAME : BSC PHASE II-C DATE : 2/8/95

JOB LOCATION : LACKAWANNA, NY TIME : 13:15

SAMPLE ID : S14-2-(0-6)

SAMPLE LOCATION : SWMU S-14-2 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 f-c SAND and GRAVEL and SLAG, little SILT
Frozen

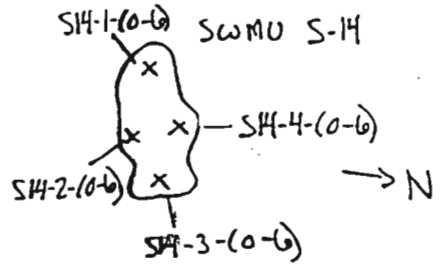
SAMPLE ANALYSIS

SAMPLE ID : S14-2-(0-6) (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : VOC, BNA, METALS, INDICATOR PARAMETERS
ALL TOTAL CONSTITUENT, TCLP + SRLP ANALYSES

PHYSICAL APPEARANCE & ODOR : Brown, no odor

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



WEATHER : ~20°F, very windy, cold, overcast

COMMENTS :

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-~~173~~186-152 JOB NAME : BSC PHASE II-C DATE : 2/8/95

JOB LOCATION : LACKAWANNA, NY TIME : 13:00

SAMPLE ID : S14-1-(0-6)

SAMPLE LOCATION : SWMU S-14-1 WEST

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 and GRAVEL and SLAG, little SILT., Frozen

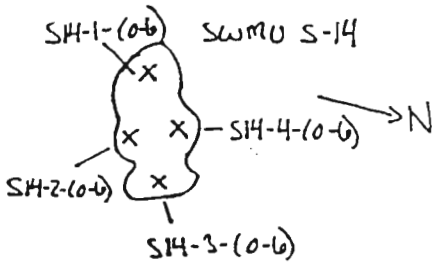
SAMPLE ANALYSIS

SAMPLE ID : S14-1-(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, no odor

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



WEATHER : ~20°F, very windy, cold, overcast

COMMENTS :

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC Phase III DATE : 9/7/95
JOB LOCATION : Lackawanna, NY TIME : 15:00

SAMPLE ID : ScumU-14-2C
SAMPLE LOCATION : ScumU S-14 Boring 2 - Composite

SAMPLERS : J. Gabreski 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 : See Log of Boring S-14-2

SAMPLE ANALYSIS

SAMPLE ID : ScumU-14-2C (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : TOTAL & SRLP SVOC, METALS, TOC, CN
PHYSICAL APPEARANCE & ODOR : See Boring Log

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

WEATHER : Cloudy, Windy, ~70°F Composite of 30' Boring
COMMENTS : Duplicate Sample Collected ScumU-14-2C DUP

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC Phase III DATE : 9/7/95

JOB LOCATION : Lackawanna, NY TIME : 11:00

SAMPLE ID : SWMU-14-2(4-6') G

SAMPLE LOCATION : SWMU 5-14
Boring 2 (4'-6')

SAMPLERS : B J. Gabreski 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 FINE TO COARSE SAND WITH GREY COARSE GRAVEL trace coal fragments, wood, and fire brick (dry) (dense) slight naphthalene odor

SAMPLE ANALYSIS

SAMPLE ID : SWMU-14-2(4-6') G (AS SHOWN ON CHAIN OF CUSTODY)

TEST FOR : TOTAL & SRLP VOCs

PHYSICAL APPEARANCE & ODOR : dry - slight naphthalene odor

FIELD TEST :	VALUE :
TEMP. (°C/°F)	-
pH	-
SPEC. COND.(µMHOs/CM)	-
OTHER (UNITS)	PID 11.7eV : 142 ppm

WEATHER : Cloudy, windy, ~70°F

COMMENTS : Duplicate Sample collected SWMU-14-2G DUP

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC Phase III DATE : 9/5/95
JOB LOCATION : Lackawanna, NY TIME : 14:30

SAMPLE ID : SWMU-14-1C
SAMPLE LOCATION : SWMU S-14 Boring 1 Composite

SAMPLERS : J. Gabreski 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 : Composite Sample of entire boring - See Log of Boring S-14-1.

SAMPLE ANALYSIS

SAMPLE ID : SWMU-14-1C (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : TOTAL & SRLP SVOCs, METALS, TCL, CN
PHYSICAL APPEARANCE & ODOR : See boring Log

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

WEATHER : HOT, HUMID
COMMENTS : Composite of 15.8' Boring

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-186-152 JOB NAME : BSC Phase III DATE : 9/15/95
JOB LOCATION : Lackawanna, NY TIME : 13:25

SAMPLE ID : SWMU-14-1(6'-8') G
SAMPLE LOCATION : SWMU S-14
Boring 1 (6'-8')

SAMPLERS : J. Gabreski 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 : BROWN-BLACK SILTY MEDIUM SAND WITH GREY COARSE GRAVEL (dry) (medium dense) (naphthalene odor) [SLAG FILL]

SAMPLE ANALYSIS

SAMPLE ID : SWMU-14-1(6'-8') G (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : TOTAL & SRLP VOCs
PHYSICAL APPEARANCE & ODOR : dry - naphthalene odor

FIELD TEST :	VALUE :
TEMP. (°C/°F)	-
pH	-
SPEC. COND.(μMHOs/CM)	-
OTHER (UNITS)	PID 11.7eV: 135ppm

WEATHER : HOT, HUMID
COMMENTS :

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFT	00120-186-152	1 of 1	S-14-2

SITE	COORDINATES	LOGGED BY	CHECKED BY
Lackawanna, NY		J. Gabreski	J. Boyd

BEGUN	COMPLETED	DRILLER	DRILLING EQUIPMENT	BORING DIA.	TOTAL DEPTH
9/06/85	9/07/85	SJB Svs Inc./A. Jakubczak	CME 75, 4-1/4" HS Augers	8"	30

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	CASING STICKUP	GROUND ELEV.	DEPTH/ELEV. GROUND WATER	DEPTH/ELEV. TOP OF ROCK
/		15		Plant		

SAMPLE TYPE	CASING DIA/LENGTH	NOTES
2" x 2' Standard Split Spoon	6"SQ/4.5	Units =Feet HNu bkg=2.0ppmv

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
1	24/22	10	bkg					BROWN-BLACK MEDIUM SAND some gravel (dry) (loose) [SLAG FILL]	
2	24/20	10	3.0					BROWN-BLACK MEDIUM SAND some gravel (dry) (loose) [SLAG FILL]	
3	24/20	43	142		5			BLACK FINE TO COARSE SAND WITH GREY COARSE GRAVEL trace coal fragments, wood, and fire brick (dry) (dense) slight naphthalene odor	Auger refusal @ 7.5'. Abandon borehole, move 10 west.
4	2/2	50/.1	38					BLACK SILTY MEDIUM SAND WITH GREY COARSE GRAVEL trace coal fragments and fire brick (dry) (very dense)	Naphthalene odor from borehole
5	24/17	32	3					BLACK SILTY MEDIUM SAND WITH GREY COARSE GRAVEL trace coal, red-orange fire brick (dry) (medium dense) [SLAG FILL]	PID 10 ppm from borehole
6	24/19	28	bkg		10			BROWN-BLACK FINE TO COARSE SAND WITH GREYCOARSE GRAVEL trace yellow fire brick and coal (dry) (medium dense) [SLAG FILL]	
7	24/22	28	5					REDDISH BROWN TO BLACK SAND WITH GREY GRAVEL (moist) (loose) [SLAG FILL] trace metal fragments with coal, slight naphthalene odor	
8	24/10	16	8		15			BROWN SILTY MEDIUM SAND WITH GREY GRAVEL (moist) (loose) [SLAG FILL] trace metal alloy, yellow fire brick, slight naphthalene odor	
9	24/12	32	11					BROWN SILTY MEDIUM SAND WITH GREY GRAVEL (moist) (loose) [SLAG FILL] trace metal alloy, yellow fire brick, slight naphthalene odor	
10	24/8	15	bkg		20			BROWN-GREY CLAYEY SILT AND MEDIUM SAND WITH GRAVEL (moist, plastic) [SLAG FILL] trace yellow-orange fire brick	Augers advance hard
11	24/8	18	3					BROWN SILTY FINE TO COARSE SAND trace clay and grey gravel (moist) (loose) [illegible] FILL]	
12	24/20	22	5					BROWN SILTY FINE TO COARSE SAND trace clay and grey gravel trace clay and fire brick (moist) (loose) [SLAG FILL]	
13	24/18	10	bkg		25			REDDISH BROWN SILTY MEDIUM SAND WITH COARSE GRAVEL trace yellow/orange fire brick (moist) (loose) [FILL]	
14	24/15	14	bkg					REDDISH BROWN SILTY MEDIUM SAND WITH COARSE GRAVEL trace yellow/orange fire brick (moist) (loose) [FILL]	
15	24/10	10	bkg		30			BROWN SILTY MEDIUM SAND WITH COARSE GREY GRAVEL [SLAG FILL] zones of weathered metal and fragments of brown-red fire brick (moist) (loose)	
				30.0				Boring completed at 30' on 9/7/85 @ 1440.	
					35				

Dames & Moore

LOG OF BORING

PROJECT	PROJECT NUMBER	SHEET NO.	HOLE NUMBER
Bethlehem Steel Corp., RFI	00120-186-152.	1 of 1	S-14-1

SITE	COORDINATES	LOGGED BY	CHECKED BY
Lackawanna, NY		J. Gabreski	J. Boyd

BEGUN	COMPLETED	DRILLER	DRILLING EQUIPMENT	BORING DIA.	TOTAL DEPTH
9/05/95	9/05/95	SJB Svs Inc./A. Jakubczak	CME 75, 4-1/4" HS Augers	8"	15.8

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	CASING STICKUP	GROUND ELEV.	DEPTH/ELEV. GROUND WATER	DEPTH/ELEV. TOP OF ROCK
/		8		Plant		

SAMPLE TYPE	CASING DIA/LENGTH	NOTES
2" x 2' Standard Split Spoon	6"SQ/4.5	Units =Feet HNu bkg=2.0ppmv

SAMPLE NUMBER	LENGTH/RECOV. (inches)	BLOWS PER FOOT	HNu (ppm)	LAYER Elev. Depth	DESCRIPTION AND CLASSIFICATION density, grain size/shape, color, structure composition, sorting, texture, moisture facies, odor	DRILLING NOTES water levels, water return, character of drilling, etc.
1	24/12	24	15		BROWN-BLACK MEDIUM SILTY SAND AND FINE TO COARSE GRAVEL trace organic vegetation (dry) (medium dense) [SLAG FILL]	
2	24/6	62	11		BROWN-BLACK MEDIUM SILTY SAND AND FINE TO COARSE GRAVEL (dry) (medium dense) [SLAG FILL]	Auger refusal @ 4.8'. Abandon borehole
3	10/10	50/.3	7		GREY-BROWN MEDIUM SAND WITH COARSE GRAVEL AND ORGANIC WOOD DEBRIS trace coal at bottom of spoon (dry) (loose) [FILL]	
4	24/18	20	135		BROWN-BLACK SILTY MEDIUM SAND WITH GREY COARSE GRAVEL (dry) (medium dense) (naphthalene odor) [SLAG FILL]	
5	24/16	18	62		BROWN-BLACK SILTY MEDIUM TO COARSE SAND WITH GREY COARSE GRAVEL (moist) (medium dense) (naphthalene odor) [SLAG FILL]	
6	24/18	16	85		BLACK MEDIUM TO COARSE SILTY SAND some coarse gravel, stringers of tar like binding sand with odor, trace wood organic debris (moist) (medium dense)	
7	24/17	18	34		BLACK MEDIUM TO COARSE SILTY SAND some coarse gravel, stringers of tar like binding sand with odor, (moist) (medium dense)	
8	9/9	50/.2	90	15.8	BLACK MEDIUM TO COARSE SILTY SAND some gravel (moist) (very dense) [SLAG FILL] naphthalene odor	
					Boring completed @ 15.8' with auger refusal on 9/5/95 @ 1600.	

DEPTH: 5, 10, 15, 20, 25, 30, 35

Dames & Moore

ATTACHMENT A

USEPA COMMENTS

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.

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

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

wastes. The RCRA Facility Assessment also states that several BSC documents indicated that tar sludges were used as "binder" for rubble fill.

- BSC states that SWMUs S-14 and S-15 were used to store primarily material from the slag pits of the open hearth operations, and that hazardous materials were never placed in either of the units. However, no evidence or analytical data are presented to substantiate this claim; no sampling has been conducted at SWMUs S-14 and S-15 to demonstrate the absence of hazardous constituents.

2.2 Page-Specific Comments

Page 3, ¶3 No evidence or data are provided to support the claim that hazardous materials were never placed in SWMUs S-14 and S-15. The RCRA Facility Assessment states that these units may contain hazardous constituents and wastes, including tar sludges, waste oils, solvents, chemicals containing hazardous constituents, and listed hazardous wastes. BSC must acknowledges NEIC's findings as documented in the RCRA Facility Assessment and address the potential existence of hazardous constituents and wastes in these units.

Page 4, ¶2 BSC has not adequately characterized the materials deposited in SWMUs S-14 and S-15. Only EP Toxicity results (for metals only) of steelmaking and ironmaking slag and materials from Zone 5 are provided in the report. No sampling of the actual materials deposited in SWMUs S-14 and S-15 has been conducted.

Although representative samples may be difficult to obtain due to the varied debris in the SWMUs, any no further action decision must be based on quantitative data. Thus, BSC should attempt to collect representative samples from these SWMUs for total hazardous constituent analyses. At a minimum, BSC should evaluate the leachate emanating beneath the SWMUs.

Page 5, ¶2 The text indicates that the material located in Zone 5 is similar to the slag in S-14 and S-15. However, it is unlikely that these materials are representative of the materials deposited in SWMUs S-14 and S-15 due to the varied nature of the materials deposited in the units as described by BSC in previous sections of this Preliminary SWMU Assessment Report. As stated previously, BSC needs to characterize the actual material present in the SWMU.

Page 5, ¶4 The text states that a site inspection confirmed the visual absence of any hazardous materials in SWMUs S-14 and S-15. Although a site inspection can provide useful information regarding the general conditions at the site and nature of materials present at the surface of

the pile (e.g., whether or not stained soils or drums of waste are visible), it would likely provide little information regarding the nature of subsurface materials. Additionally, a site inspection cannot definitively determine that hazardous materials/constituents are not present in the SWMUs.

3.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - SLUDGE STORAGE AREA (SWMU S-21)

3.1 General Comments

BSC states that there have not been any releases of hazardous wastes or hazardous constituents to the environment as a result of materials deposited in SWMU S-21, and recommends "no further action." The Agencies conclude that this unit requires further investigation for the following reasons:

- According to the RCRA Facility Assessment, SWMU S-21 received sludge generated by Water Quality Control Station (WQCS) No. 3. However, BSC contends that the only waste deposited in SWMU S-21 was precipitator dust from the Scrap Melter. The RCRA Facility Assessment indicates that potentially hazardous constituents are present in the precipitator dust from the Scrap Melter. Therefore, the materials deposited in SWMU S-21 still need to be characterized regardless of whether the materials deposited in this unit originated from WQCS No. 3 or only from the Scrap Melter.

- Although the material in SWMU S-21 has not yet been analyzed for total hazardous constituents, the TCLP results presented in Appendix B of the Preliminary SWMU Assessment Report indicate the presence of chromium in a composited sample obtained from SWMU S-21.

3.2 Page-Specific Comments

Page 1, ¶2 The text states that "during the preparation of the SWMU Assessment Report, it was discovered that SWMU S-21 was used to only store precipitator dust from the Scrap Melter," and not sludge from WQCS No. 3. The RCRA Facility Assessment indicates that precipitator dust from the Scrap Melter potentially contains hazardous constituents. Therefore, characterization of the materials deposited in SWMU S-21 is still necessary.

Page 4, ¶1 BSC has not adequately characterized the contents of SWMU S-21. BSC has only provided TCLP results, for metals only, of one composited waste sample collected from SWMU S-21. To adequately characterize the materials deposited in SWMU S-21, representative samples need to be collected and analyzed for total hazardous constituents.

ATTACHMENT B

DEED RESTRICTION

DECLARATION
OF
CONDITIONS, COVENANTS AND RESTRICTIONS

Made By: Bethlehem Steel Corporation
1170 Eighth Avenue
Bethlehem, Pennsylvania 18016-7699

Dated: February 20, 1996

REC 970

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:

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 that are located on the Premises and a galvanizing line that is located on lands of BSC other than the Premises. The approximate western seven-tenths (7/10) of the Premises (the "Fill Area") is "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) 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 some or all 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 is located south of the Premises. The Fill Area has also been the site of oil tanks, 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.

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 in the City of Lackawanna, Erie County, New York, being parts of Lots 18, 19, 22, 23 and 25 of the Ogden Gore Tract, part of Lot 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 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 last-mentioned tract of land, the following fourteen (14) courses and distances: (1) South eighteen degrees forty-four minutes fifty-three seconds East (S. 18° 44′ 53″ E.) six hundred twenty-three and fifty-six one-hundredths (623.56) feet, (2) South thirty-four degrees thirty-three minutes zero seconds East (S. 34″ 33′ 00″ E.) two hundred and no one-hundredths (200.00) feet, (3) South twenty-six degrees eighteen minutes fifty-five seconds East (S. 26° 18′ 55″ E.) five hundred and no one-hundredths (500.00) feet, (4) South nineteen degrees six minutes forty seconds East (S. 19″ 06′ 40″ E.) one thousand seventy-four and twenty-nine one-hundredths (1074.29) feet, (5) South twenty-eight degrees three minutes eighteen seconds East (S. 28° 03′ 18″ E.) two hundred forty-two and forty-four one-hundredths (242.44) feet, (6) South eighteen degrees thirty-eight minutes fifty seconds East (S. 18° 38′ 50″ E.) one thousand ten and ninety-five one-hundredths (1010.95) feet, (7) North seventy-one degrees twenty minutes fifty-one seconds East (N. 71° 20′ 51″ E.) ninety and forty-two one-hundredths (90.42) feet, (8) South eighteen degrees forty-nine minutes twenty seconds East (S. 18° 49′ 20″ E.) one hundred fifty-eight and sixty-one one-hundredths (158.61) feet, (9) South eighty degrees fifty-five minutes ten seconds East (S. 80° 55′ 10″ E.) forty-five and fourteen one-hundredths (45.14) feet, (10) South eighteen degrees four minutes forty-five seconds East (S. 18° 04′ 45″ E.) fifty-two and thirteen one-hundredths (52.13) feet, (11) North seventy-one degrees seven minutes twenty-three seconds East (N. 71° 07′ 23″ E.) one hundred two and fifty-nine one-hundredths (102.59) feet, (12) South eighteen degrees forty-one minutes forty seconds East (S. 18° 41′ 40″ E.) sixty-three and no one-hundredths (63.00) feet, (13) South

seventy-one degrees seven minutes twenty-three seconds West (S. 71° 07′ 23″ W.) two hundred forty and sixty-two one-hundredths (240.62) feet, and (14) South eighteen degrees thirty-eight minutes fifty seconds East (S. 18° 38′ 50″ E.) six hundred sixty-eight and thirteen one-hundredths (668.13) feet; thence, along other lands of said Bethlehem Steel Corporation, the following seven (7) courses and distances: (1) South four degrees forty minutes fifty-one seconds East (S. 04° 40′ 51″ E.) seven hundred eighty-seven and seventy-two one-hundredths (787.72) feet, (2) South seventy-one degrees twenty-three minutes thirty-five seconds West (S. 71° 23′ 35″ W.) two hundred and no one-hundredths (200.00) feet, (3) South eighteen degrees thirty-six minutes twenty-five seconds East (S. 18° 36′ 25″ E.) eight hundred fifty and no one-hundredths (850.00) feet, (4) South seventy-one degrees twenty-three minutes thirty-five seconds West (S. 71° 23′ 35″ W.) one thousand one hundred and no one-hundredths (1100.00) feet, (5) North eighteen degrees thirty-six minutes twenty-five seconds West (N. 18° 36′ 25″ W.) one thousand four hundred and no one-hundredths (1400.00) feet, (6) North seventy-one degrees twenty-three minutes thirty-five seconds East (N. 71° 23′ 35″ E.) thirty and no one-hundredths (30.00) feet, and (7) North eighteen degrees thirty-six minutes twenty-five seconds West (N. 18° 36′ 25″ W.) four thousand six hundred fifty and no one-hundredths (4650.00) 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.) seven hundred thirty-eight and no one-hundredths (738.00) feet to a westerly line 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 thirty-five degrees fifty-seven minutes twenty-five seconds East (S. 35° 57′ 25″ E.) thirty-five and eighty-three one-hundredths (35.83) feet and (2) North fifty-four degrees two minutes thirty-five seconds East (N. 54° 02′ 35″ E.) two hundred and no one-hundredths (200.00) feet to the above-mentioned Buffalo Harbor Line dated August 17, 1903; thence, along said Buffalo Harbor Line, North fifty degrees one minute forty-five seconds East (N. 50° 01′ 45″ E.) three hundred seventy-nine and fifty-four one-hundredths (379.54) feet to the place of beginning; CONTAINING one hundred ninety-one and nine hundred ninety-three one-thousandths (191.993) acres, more or less.