SWMU ASSESSMENT REPORT
LIME DUST AND KISH LANDFILL R
(SWMU S-18)

BETHLEHEM STEEL CORPORATION
LACKAWANNA, NEW YORK

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BETHLEHEM STEEL CORPORATION
2600 HAMBURG TURNPIKE
LACKAWANNA, NEW YORK 14218

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1.0 INTRODUCTION

This report documents the results of an environmental assessment of Lime Dust and Kish Landfill R at Bethlehem Steel Corporation's (BSC's) Lackawanna, New York facility. The Lime Dust and Kish Landfill R was identified as Solid Waste Management Unit (SWMU) S-18 in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) for the facility (USEPA 1988). Landfill R was designated as a SWMU because it received two waste products of the basic oxygen furnace process—lime dust (calcium oxide) and kish (consisting principally of carbon fines) (USEPA 1988). The United States Environmental Protection Agency (USEPA) has required that a Resource Conservation and Recovery Act (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. This report evaluates data available to BSC as of November 2001.

An initial SWMU assessment was completed in 1992. The USEPA reviewed and commented on the SWMU S-18 assessment in 1993. This SWMU S-18 assessment includes information to further clarify issues noted in the USEPA comments. A copy of the USEPA comments is provided in Attachment 1.

1.1 Description

SWMU S-18 is an approximately 2-acre, irregularly shaped area located in the northwest portion of Zone 4 of the Slag Fill Area (Figure 1). There are approximately 40 exposed piles of disposed lime dust and kish placed on the slag fill surface with an approximate total volume of 600 cubic yards. The piles, which are located on the northwestern and north ends of the SWMU boundary, are not covered and are exposed to wind and rain. Additionally, in the central portion of the SWMU there is a sloped mound of lime, kish, and slag fill that is approximately 150 feet long and 75 feet wide, with a height ranging from 1 to 9 feet. The extent of the mound material below the surrounding grade is unknown. The volume of this pile, however, is estimated to be 1,900 cubic yards.

The piles are on and surrounded by slag fill at an approximate elevation of 620 feet above mean sea level (msl). Groundwater is at an approximate elevation of 570 feet above msl. Surface water runoff is generally contained within the SWMU S-18 area, although some surface water runoff can occur on the southeastern and northern perimeters of the SWMU.

1.2 History

From 1966 to 1983, two waste products of the basic oxygen furnace (BOF) process, lime dust (calcium oxide) and kish (consisting principally of carbon fines), were disposed of in this landfill. Lime dust, or burnt lime, was produced through the unsuccessful dehydration of lime (i.e., it was either baked too long or not long enough), making it unsuitable for steel making operations. During the hydration process, the lime contacted no other process operations where it could have been intermixed with other waste streams. Kish consists primarily of carbon fines and iron oxides. During handling, the hot iron metals from the Blast Furnace cools down and the carbon that saturates the hot iron separates from solution in the form of a fine particulate. Kish was collected in baghouses at the reladling stations in the BOF where the hot metal was poured in to ladles to be charged into the BOF vessels to make steel. Kish was collected from the baghouses and disposed. Deposition of lime and kish disposal ceased in 1983 when steel making operations shut down. Neither lime dust nor kish are suspected to contain hazardous constituents (USEPA 1988).

On February 20, 1996, BSC filed a declaration in the Erie County Clerk's Office limiting future use of the property around and including SWMU S-18. Under the deed restriction, future use of the property shall be limited to industrial use only. Industrial use includes manufacturing, assembling, warehousing, and related railroad, port, and shipping activities. The deed restriction also prevented the installation and operation of extraction or water wells for the purposes other than environmental remediation use. A copy of the Declaration of Conditions, Covenants, and Restrictions is provided in Attachment 2.

Historical documents obtained from regulatory agencies, including the United States Army Corps of Engineers (US Army Corp) 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 current slag fill area (SFA), including the area immediately under SWMU S-18. The contribution of this particular SWMU to groundwater contamination is not known. 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 condition of SWMU S-18 has been monitored since June 1992, when BSC reportedly conducted a site inspection that consisted of a walk-through visual inspection. Dames & Moore visited the site in September 1996. URS inspected the SWMU on June 4, 2000. During all three visits, conditions at the unit were found to be consistent with the descriptions in Section 1.1 and Section 4.0 of this report. Documentation of the 1996 and 2000 site visits are provided in Appendix A. Written documentation of the 1992 BSC inspection was not available.

2.0 SAMPLING AND ANALYSIS

Waste and groundwater sampling was conducted in and near SWMU S-18 between 1991 and 2000. Samples of the waste were collected in 1992 for waste characterization as part of the RFI Phase 1 investigation. Samples were also collected in 1994 and 2000 as part of subsequent phases of the RFI. All waste sampling was conducted in accordance with USEPA approved Work Plans (BSC 1989, revised 1990, 1993, 1994, 1997, 1999a).

Groundwater near SWMU S-18 was sampled over several phases of the RFI starting in 1991 and concluding in 2000. All groundwater sampling was conducted in accordance with USEPA approved work plans (BSC 1989, revised 1990, 1993, 1994, 1997, 1999a). A complete list of the site-specific compounds targeted for groundwater analysis in the site investigations is provided in Table 1. Laboratory analytical reports are provided in Section II of the RFI.

There are two groundwater units beneath the site: the shallow fill unit and the deeper sand unit. The shallow fill unit wells are labeled as "A" wells, while the deeper sand unit wells are typically labeled as "B" wells. Groundwater contour maps for the fill and sand units are presented in Figures 2 and 3, respectively.

2.1 Waste Characterization

On June 17, 1992, a composite sample was obtained from discrete surface grab samples collected at several randomly selected piles of lime and kish exposed at the surface. The sample was analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) for seven heavy metals (arsenic, cadmium, chromium, lead, nickel, selenium, and thallium).

On June 15, 1994, two discrete surface grab samples were collected. One sample was collected from a pile of exposed lime dust (S18-LIME) and one from a pile of exposed kish (S18-KISH) (Figure 1). Samples were collected from the 0- to 6-inch depth interval and were analyzed for total volatile organic compounds (VOCs), total semivolatile organic compounds (SVOCs), and metals.

On October 25, and 26, 2000, two borings were advanced in the lime and kish pile area. One kish sample (S-18-B1 (2-4) Kish) was collected from Boring S18-B01. One kish sample (S18-B2 (2-4) Kish) and one lime sample (S18-B2 (2-4) Lime) was collected from Boring S18-B02. All three samples were analyzed for total VOCs, SVOCs and metals. Laboratory analysis included TCLP, Synthetic Precipitation Leaching Procedure (SPLP) and total constituent analysis. Total cyanide, chloride, total recoverable phenolics and sulfates were also analyzed.

On October 26, 2000, two kish grab samples (S18-Kish-Grab1 and S18-Kish-Grab2) were collected from two representative kish piles and two lime grab samples (S18-Lime-Grab1 and S18-Lime-Grab2) were collected from two representative lime piles. Samples were analyzed for total VOCs, SVOCs and metals. Laboratory analysis included TCLP, SPLP and total constituent analysis. Total cyanide, chloride, total recoverable phenolics and sulfates were also analyzed.

On October 26, 2000, two composite kish samples (S18-Kish-Comp1 and S18-Kish-Comp2) were collected from 9 kish piles and two composite lime samples (S18-Lime-Comp1 and S18-Lime-Comp2) were collected from 26 lime piles. Samples were analyzed for total VOCs, SVOCs and metals. Laboratory analysis included TCLP, SPLP and total constituent analysis. Total cyanide, chloride, total recoverable phenolics and sulfates were also analyzed.

A summary of the detected analytes for the 1994 and 2000 sampling events is provided in Table 2 and Table 3. Field sampling records are provided in Appendix B. Laboratory results for samples collected in 1992 are provided in Appendix C.

2.1.1 1992 TCLP Results

TCLP results were compared to regulatory concentration levels listed in 40 CFR Part 261. TCLP results show that all of the metals analyzed for (arsenic, barium, cadmium, chromium, lead, selenium and silver) were below detection limits and, therefore, did not meet TCLP criteria.

2.1.2 1994 Total Constituent Results

For the kish sample (S18-KISH), VOCs were not present above detection limits. Only trace levels of four polynuclear aromatic hydrocarbons (PAHs) ranging from fluoranthene [84.0 micrograms per kilogram (µg/kg)] to benzo(g,h,i)perylene (110 µg/kg) were detected at levels below the reporting limits. The PAHs are typical of coal combustion by-products. Eight metals were detected above method detection limits in the kish sample, ranging from thallium [7.1 milligrams per kilogram (mg/kg)] to lead (452 mg/kg).

In the lime dust sample (S18-Lime), no VOCs or SVOCs were present above detection limits. Only four metals were present above detection limits ranging in concentration from 2.8 mg/kg of selenium to 87.5 mg/kg of antimony and lead, respectively.

2.1.3 2000 Total Constituent Results

Lime and kish samples from borings S18-B01 and S18-B02 had 11 detected SVOCs and 14 detected metals. No VOCs were detected in the samples. SVOCs were found in higher concentrations in the Kish samples. SVOC concentrations ranged from 48 µg/kg of pyrene [S18-B02 (3-4 ft) LIME] to 60,000 µg/kg of fluoranthene [S18-B01 (2-4 ft) KISH]. Metals ranged in concentration from 0.1 mg/kg of mercury [S18-B01 (2-4 ft) KISH] to 323,000 mg/kg of calcium [S-18-B02 (2-4 ft) LIME].

Analytical results for the kish grab and composite surface samples showed the presence of several SVOCs and metals. The seven SVOCs detected ranged from 260 µg/kg of phenanthrene in S18-KISH-G01 to 3,800 µg/kg of chrysene in S18-KISH-G02. Fourteen metals were detected in samples. Concentrations ranged from 0.43 mg/kg of mercury to 99,200 mg/kg of calcium, both in S18-KISH-G01. VOCs were not detected in the grab samples. VOCs were not analyzed in the composite samples.

Results for the grab and composite lime surface samples showed no VOCs detected in the grab sample and no SVOCs detected in the grab and composite samples. VOCs were not analyzed in the composite sample. Up to twelve metals were detected in the four samples analyzed. Concentrations ranged from 0.018 mg/kg of mercury in S18-LIME-CO2 to 533,000 mg/kg of calcium

in S18-LIME-C02. The second and third highest metal concentrations were magnesium (57,200 mg/kg) and lead (216 mg/kg), both present in S18-LIME-G01.

2.1.4 2000 SPLP Results

SPLP analysis was conducted to more closely mimic the effect of compounds leaching from the waste piles due to rainwater infiltration. The analysis was performed in accordance with the USEPA's SW846 Method 1312 protocols. The SPLP results help evaluate what compounds can potentially leach from the waste piles into the subsurface. Several VOCs, SVOCs and metals, all at low concentrations, were detected in the kish and lime samples from borings S18-B01 and S18-B02. Although no VOCs were detected in the Total Constituent analysis, 4 VOC compounds were detected, with concentrations ranging from .0021 milligrams per liter (mg/L) of ethylbenzene to 0.011 mg/L of toluene, both detected in S18-B02 (2-4 ft) LIME. Three SVOCs were detected, ranging from .0041 mg/L of naphthalene in S18-B02 (2-4 ft) LIME to 0.013 mg/L of both naphthalene and phenanthrene in samples S18-B02-(2-4 ft) LIME and S18-B01 (2-4 ft) KISH, respectively. SPLP results for the kish and lime grab and composite surface samples showed no VOCs present, and only one SVOC [bis(2-ethylhexyl)phthalate at .004 mg/L] detected in one of the kish grab surface samples (S28-KISH-G02).

Eleven metals were also detected at low concentrations in both boring and surficial samples. The detections ranged from 0.000047 mg/L of mercury in samples S18-B2 (2-4 ft) KISH to 948 mg/L of calcium in S18-LIME-C01. The next two highest metals detected were potassium (710 mg/L) and magnesium (57.5 mg/L), both present in S18-KISH-G01.

2.1.5 2000 TCLP Results

TCLP results for the kish samples from Borings S18-B01 and S18-B02 showed no VOCs, several SVOCs and several metals present. All of the detected parameters were at low concentrations. Laboratory results for the lime sample from Boring S18-B02 revealed three VOCs, one SVOC and several metals at low concentrations.

TCLP results for the surficial kish and lime grab and composite samples showed the presence of several VOCs, SVOCs, and metals in most of the samples. Concentrations were generally low. Lead results, however, ranged from 15.4 mg/L to 37.7 mg/L, which indicates that the concentration of lead in the TCLP extract on the surface kish material in SWMU S-18 does meet TCLP criteria.

2.2 Groundwater

Six monitoring wells, MWN-05A, MWN-05B, MWN-05D, MWN-14A, MWN-14B, and MWN-42A were used to evaluate the groundwater near SWMU S-18. Monitoring wells MWN-05A, MWN-14A, and MWN-42A are screened in the fill unit. Monitoring well MWN-05D is screened in the bedrock. MWN-05B and MWN-14B are screened in the sand unit. Monitoring well locations are shown in Figures 1, 2, and 3. Groundwater elevation contours for the fill and sand units are shown in Figure 2 and Figure 3, respectively.

On October 25, 2000, monitoring well MWN-42A was installed approximately 500 feet east and upgradient of SWMU-S18. Additionally, monitoring wells MWN-14A and MWN-14B are situated approximately 1,000 feet upgradient of SWMU S-18 (Figures 2 and 3). Monitoring wells MWN-05A, MWN-05B, and MWN-05D are located downgradient of SWMU S-18.

From 1991 to 1999, several rounds of groundwater samples were collected from upgradient wells MWN-14A and MWN-14B and downgradient wells MWN-05A, MWN-05B, and MWN-05D over several phases of the RFI. In November 1999, all of the onsite wells were sampled within nine days. However, monitoring well MWN-42A has been sampled only once, on December 19, 2000, following its installation. Analytical data from the 1999 and 2000 sampling events are used to evaluate groundwater conditions relative to SWMU S-18. A summary of detected analytes in the downgradient wells and upgradient wells is presented in Table 4A and Table 4B, respectively.

2.2.1 Groundwater Results

For the groundwater samples collected in 1999 and 2000, several VOCs, SVOCs, and metals were detected in the three upgradient wells (MWN-14A, MWN-14B and MWN-42A) and in the three downgradient wells (MWN-05A, MWN-05B and MWN-05D). For the shallow ("A") wells placed in the fill, concentrations of these parameters were generally higher in the upgradient wells.

In the sand unit, monitoring well MWN-05B, contained concentrations of 2 VOCs (chlorobenzene and ethylbenzene), SVOCs (acenaphthylene, anthracene, bis(2-ethylhexyl)phthalate, 3&4-methylphenol, naphthalene, and phenol) and total metals (barium, cadmium, calcium, chromium, iron, lead, magnesium, nickel, potassium, silver, and sodium) that were of slightly higher concentrations than in the upgradient well MWN-14B, which is screened in the same geologic unit. USACE dredge spoils are present within this unit; therefore it is unknown what effect these materials have had on groundwater quality.

In bedrock well MW-05D, one VOC (xylene), no SVOCs and 8 metals (barium, calcium, chromium, iron, magnesium, nickel, potassium and sodium) were detected at concentrations lower than those found in the upgradient and downgradient wells located in the overlying groundwater zones.

2.3 Summary of Analytical Data

Total analysis of the subsurface material indicated that 11 SVOCs and 14 metals were present. The surface kish material contained 7 SVOCs and 14 metals in detectable concentrations. The surface lime material contained no VOCs or SVOCs, but did contain 12 metals.

SPLP analysis indicated that 11 of the 12 metals detected in the total-analysis samples have the potential to leach from the surface materials. SPLP results for the kish and lime grab and composite surface samples showed no VOCs present, and only one SVOC [bis(2-ethylhexyl)phthalate at .004 mg/L] detected in one of the kish grab surface samples (S28-KISH-G02).

The concentration of lead in the TCLP extract of the surficial kish material in SWMU S-18 does meet TCLP criteria. However, for those samples that were above RCRA criteria for lead, the corresponding SPLP analyses for the same samples were non-detect. Lime was determined to be nonhazardous.

Total metal concentrations in the upgradient and downgradient wells indicated that several SVOCs and numerous metals present in the SWMU material were also present in the downgradient wells at concentrations higher than upgradient wells. USACE dredge spoils are present in the sand unit, and it is unknown what effect these materials have had on groundwater quality. Further evaluation of the potential groundwater impacts resulting from the dredge spoils is provided in the RFI.

The presence of a restrictive covenant on the slag fill area, including SWMU S-18, restricts the current and future use of the property to commercial and industrial uses. In addition, groundwater use is also restricted. This reduces the risk of exposure to the SWMU material.

The potential risks associated with the compounds detected in the SWMU material are further evaluated in the Human Health Risk Assessment presented in Section 3.0.

3.0 RISK ASSESSMENT

A human health risk assessment, as described in the *Human Health Risk Assessment* Work Plan (BSC 1997), was conducted for SWMU S-18. 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 site. The Human Health Risk Assessment ID No. 1 (BSC 1998) established the chemicals of potential concern (COPCs) for each SWMU at the Lackawanna Site. The COPCs were determined by sequentially applying the following criteria to each COPI on a medium by medium basis for each SWMU and watercourse: 1) the chemical was detected in at least 5% of the samples, 2) the chemical was detected in at least one sample at levels above background (*i.e.*, the maximum concentration was above background; for chemicals in surficial SWMU material only), and 3) the chemical was positively detected in at least one sample at levels above applicable screening criteria [*i.e.*, the maximum concentration was greater than the screening criteria: USEPA Region III Risk Based Concentrations (RBCs), USEPA Soil Screening Levels (SSLs), or NYSDEC Ambient Water Quality Standards and Guidance values]. In accordance with ID No. 1, a background comparison was not made for the subsurface SWMU material in this report.

The sampling data for SWMU S-18 (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 revised since ID No. 1 was submitted, the screening process was also updated and is presented in Tables 5 and 6. For the groundwater evaluation, data from groundwater Zone 4 was used. Based on the above criteria, and ID No. 1, twenty COPCs were identified for SWMU S-18. Five inorganic (antimony, arsenic, chromium, lead, thallium) and no organic chemicals were identified in surficial SWMU material (Table 5). Four inorganic (arsenic, chromium, lead, thallium) and three organic (anthracene, benzo(a)anthracene, benz(a)anthracene) COPCs were identified in subsurface soil (Table 6). Fourteen organic (benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, methylene chloride, pyridine, toluene, trichloroethene, xylenes, acenaphthylene, anthracene, fluorene, naphthalene, phenanthrene) COPCs were identified in groundwater (Table 7).

Representative concentrations were then determined for each COPC. If the sample size for a dataset was ten or greater, the 95% upper confidence limit of the mean was used. For those datasets with sample sizes of less than ten, the maximum concentration was used. Ten samples were collected of the surficial SWMU material, therefore, 95% UCL could be calculated. Three samples were collected of subsurface SWMU material; therefore, the maximum concentration was used to represent these COPCs. SWMU S-18 is located in Groundwater Zone 4 (BSC 1998), which had more than ten samples; therefore, the 95% UCL was used. The COPCs, as determined in ID No. 1, and their representative concentrations are presented in Table 8.

3.2 Exposure Assessment

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

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

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

Human Health Risk Assessment ID No. 2 (BSC 1999) presented the current and future human receptor scenarios and potentially complete exposure pathways for each of the SWMUs identified at the Lackawanna Site. For SWMU S-18, 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 established for each receptor scenario. For the commercial/industrial worker scenario, the utility/maintenance 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 uncovered surface SWMU material, or from inhalation of vapors from groundwater. These pathways also apply for the construction worker and utility/maintenance worker scenarios; however, these receptors could additionally be exposed to subsurface SWMU material during potential future digging activities. For the marina worker scenario, greenway user scenario, and residential scenarios, inhalation of particulates in surficial SWMU material is the only complete exposure pathway. A detailed description of the potentially exposed receptor scenarios and pathways for SWMU S-18 can be found in ID No. 2 (BSC 1999), and a summary is provided in Table 9.

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-18 COPC concentrations. Risk-based screening levels are defined as concentrations of COPCs in media that are

not expected to produce any adverse health effects under chronic exposure conditions. Tier 1 RBSLs were developed using information previously defined and described in detail in the Work Plan and ID No. 2; 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 updated by the USEPA since originally presented in ID No. 1, they are presented in Table 10 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 exposure scenarios.

It should be noted that, in groundwater, many of the RBSLs calculated were greater than the chemical's 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 11.

Similarly, the RBSL calculated for anthracene in subsurface SWMU material (trespasser scenario) was determined to be health protective at a concentration that is greater than its saturation limit in soil. 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 soil saturation limit. Furthermore, an RBSL that is above the saturation limit is not likely to pose an increased risk or hazard (USEPA 1996a). Therefore, this RBSL for anthracene, which is based only upon the inhalation pathway, is capped at the saturation limit, and "> sat" is indicated on Table 11. 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 11. 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 11 as it is more indicative of the level of health-protectiveness.

In accordance with ID No. 2, lead in SWMU material was evaluated for the industrial/commercial, construction worker, utility/maintenance and trespasser direct contact scenarios; it was not evaluated for any other scenario (i.e., inhalation routes).

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

A comparison of the representative COPC concentrations to RBSLs for each of the exposure scenarios is presented in Table 11. This comparison provides a preliminary screening of potential risk to the specific receptor populations and exposure pathways identified for this SWMU. As presented in Table 11, the following chemicals exceeded the future commercial/industrial worker scenario RBSL for direct contact with surficial SWMU material: antimony, arsenic, lead and thallium. For the future construction worker scenario, antimony, arsenic, lead and thallium also exceed the direct contact with surficial SWMU material RBSLs, and arsenic, lead and benzo(a)pyrene exceeded the direct contact with subsurface SWMU material RBSLs. Lead exceeds the direct contact with surficial SWMU material RBSL for the future utility/maintenance worker scenario, and lead and benzo(a)pyrene exceed the direct contact with subsurface material RBSL for this scenario. For the trespasser, the representative concentration of lead in surface soil exceeds the direct contact RBSL. For all other scenarios and chemicals, the representative concentrations are below the respective RBSLs and therefore, are not evaluated further.

3.4 Risk Characterization

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

In accordance with Part IV of this RFI report, those COPCs that exceed an RBSL were further evaluated in the Tier 1 Risk Characterization, or HHRA. 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. SLHI and $SLCR_{total}$ methodology are presented in Part IV (BSC 1998). The Tier 1 HHRA results are presented in Table 12.

3.4.1 Noncarcinogenic Hazard

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 negligible. Those $SLHI_{total}$s that exceed 1 were further evaluated by developing target organ-specific SLHIs. This process is appropriate as only chemicals affect different biological target endpoints, and it is only relevant to quantify the additive effects of similar chemicals. This process is illustrated in Table 12.

For the future commercial/industrial worker scenario, the $SLHI_{total}$ is 8.0. The liver/blood/hair SLHI is 6.5 (antimony and thallium in surficial SWMU material) and the total skin SLHI is 1.5 (arsenic in surficial SWMU material). For the future construction worker scenario, the total SLHI is 2.5. The liver/blood/hair target organ SLHI is also 2.5 (antimony and thallium in surface 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 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 (BSC 1997), if the total screening level cancer risk ($SLCR_{total}$) for each receptor/pathway is less than 1×10^{-4}, the risks are considered negligible. All SLCRs are below 1×10^{-4}. For the future commercial/industrial worker, the $SLCR_{total}$ is 6×10^{-6}, attributable solely to direct contact with arsenic in surface SWMU material. For the future construction worker scenario, the $SLCR_{total}$ is 1×10^{-6}. This was further broken down by pathway: the SLCR for direct contact with surficial SWMU material is 3×10^{-6} (arsenic) and the SLCR for direct contact with subsurface soil is 8×10^{-6} (arsenic and benzo(a)pyrene). For the future utility/maintenance worker scenario, the SLCR total is 1×10^{-6}, attributable solely to benzo(a)pyrene in subsurface SWMU material.

3.5 Conclusion

The HHRA completed for SWMU S-18 indicates that carcinogenic risks are negligible, but noncancer hazards are not.

The results of the HHRA indicate that antimony, arsenic, and thallium in surficial SWMU exceed noncarcinogenic RBSLs and produce a hazard index greater than the Tier 1 acceptable noncarcinogenic benchmark of 1.0 for certain scenarios. Specifically, for the future commercial/industrial worker scenario, the calculated noncarcinogenic hazard indices for antimony, arsenic and thallium in surface SWMU material are greater than the Tier 1 noncarcinogenic benchmark. For the future construction worker scenario, the calculated noncarcinogenic hazard for antimony and thallium in surface SWMU material is greater than the Tier 1 noncarcinogenic benchmark.

Additionally, lead in surficial SWMU material is found at a level higher than the Tier 1 RBSLs for the future commercial/industrial worker scenario, the future construction worker scenario, the future utility maintenance worker scenario, and the trespasser scenario. In subsurface SWMU material, the representative concentration of lead exceeds the future construction worker scenario and future utility/maintenance worker scenario RBSLs.

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 identified for any risk assessment. These include, among others, uncertainty associated with the toxicity criteria used to derive dose-response factors, uncertainties associated with exposure parameters used in the exposure assessment, and uncertainties associated with combining exposure parameters and toxicity criteria to characterize risk.

In the development of any health assessment, some level of uncertainty is introduced each time an assumption is relied upon to describe a dynamic parameter. Some assumptions have a significant scientific basis while others do not, which may result in the selection and use of conservative, default exposure parameters in the exposure assessment. The selection of multiple conservative assumptions in the exposure assessment generally results in an overestimation of

potential health risks associated with exposure to specific chemical constituents. The primary areas of uncertainty for this risk assessment are qualitatively discussed below.

3.6.1 Site Sampling and Representative Concentrations

SWMU samples were selected in an attempt to identify the highest concentrations of chemicals at the site. Sample biasing was accomplished based on visual observations and photoionization detector readings. Thus, the sampling activities are thought to have characterized the most highly impacted areas of the SWMU, and do not represent 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 subsurface SWMU material, the maximum concentration was used as the representative concentration in this HHRA. This was because an insufficient number of samples were collected to calculate a 95% UCL. Also, the maximum concentration of antimony in surface SWMU material is an estimated value. Thus, the confidence in risk calculations involving this concentration is somewhat less than for other calculations. Use of the maximum concentrations of the biased sampling is a very conservative methodology utilized in this HHRA.

3.6.2 COPC Selection Process

The COPCs evaluated for SWMU S-18 were identified in the Human Health Risk Assessment Interim Deliverable (ID) No. 1 (BSC 1998). These chemicals were selected in part because of their representative concentrations exceeded Region III RBCs (USEPA 2000b) for residential scenarios. Since no residential exposures are realistic for any of the on-site scenarios, some chemicals have been retained as COPCs, which are not likely to pose a potential threat to most of the human receptors, evaluated here.

3.6.3 Exposure Parameters

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

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

3.6.4 Toxicity Assessment

Noncarcinogenic Criteria- Toxicity information for many of the COPCs is limited for humans. Consequently, depending on the quality and extent of toxicity information, varying degrees of uncertainty are associated with the calculated toxicity values. The USEPA derives reference concentrations (RfC; inhalation exposures) and reference doses (oral exposures) for chemicals using an uncertainty factor (UF) approach. The UF for arsenic, for instance, is 3. This was applied to account for both the lack of data to preclude reproductive toxicity as a critical effect and to account for some uncertainty in whether the NOAEL of the critical study accounts for all sensitive individuals.

The UF for chromium, however, is 300. The uncertainty factor of 300 represents two 10-fold decreases in dose to account for both the expected interhuman and interspecies variability in the toxicity of the chemical in lieu of specific data, and an additional factor of 3 to compensate for the less-than-lifetime exposure duration of the principal study.

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

The carcinogenic COPCs evaluated for this SWMU include arsenic. The inhalation slope factor for arsenic is based on human data from occupational exposure studies. An extrapolation from animal data is not necessary, thereby reducing the some uncertainty in the slope factor. However, there is significant uncertainty associated with the low dose extrapolation (environmental exposures are relevant in the low dose range) used to generate the slope factor. The 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 arsenic may be evaluated differently.

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

The development of an RBSL for lead, based on pharmacokinetic modeling (the USEPA Adult Lead Model) is inherently uncertain. These uncertainties relate to whether the model is capable of fully accounting for all significant variables that affect blood lead levels and whether selected input values that cannot be measured, are accurate, especially for future, hypothetical populations. In addition, the use of this model for the trespasser is highly uncertain since it is not known whether an adolescent (who is not pregnant) is more sensitive to the effects of lead than the developing fetus of a pregnant adolescent.

3.6.5 Risk Characterization

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

3.6.6 Uncertainty Analysis Summary

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

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

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-18 was placed directly on slag fill and there is no engineering containment structure, such as a liner or cover, in place. However, SWMU S-18 is surrounded by slag piles on the west, and, partially, the north and east sides which generally contain surface water runoff within the SWMU area. The southern portion of the fill area slopes toward the south into a small basin contained by the surrounding slag piles. Surface water can leave the area to the southeast. Additionally, the extreme northern area of the SWMU S-18 area slopes toward the former slag reclamation area (Figure 1). There is no cover material on the lime dust or kish piles and, therefore, the waste material is exposed to rain and wind.

The topography at SWMU S-18 is such that surface runoff can leave the site on the southeastern and northeastern sides. There are no drainage channels or ditches that collect surface water runoff and direct the flow to Lake Erie; rather, the surface water runs off the area via sheet flow across the slag surface. The runoff drains to both the former slag reclamation area to the north and to the access road to SWMU S-18 to the southeast, and eventually infiltrates into the slag material because of the porous nature of surrounding areas.

5.0 CONCLUSION

Based upon the data collected and evaluated during the investigations, the following conclusions can be made:

- The type of material landfilled is a dry dirt-like material placed on top of steel slag. There are no engineering containment structures in place.

- The 1992 TCLP extract concentration indicates that metals in the lime and kish material stockpiled at the SWMU does not exceed TCLP criteria.

- In the 2000 analysis, the concentration of lead in the TCLP extract in the surficial material in kish in SWMU-S-18 does exceed TCLP criteria. However, lead was not detected in the same samples in the SPLP extraction analysis. Lime was determined to be non-hazardous.

- The 1994 total VOC, SVOC, and metals analyses of the kish material indicated the presence of four SVOCs; [benzo(a)fluoranthene, benzo(ghi)perylene, fluoranthene, and indeno(1,2,3-cd)pyrene] at low concentrations. All eight metals analyzed (antimony, arsenic, cadmium, chromium, lead, nickel, selenium, and thallium) also were detected in the sample.

- 2000 SPLP analysis indicated that 11 of the 12 metals detected in the total-analysis samples have the potential to leach from the surface materials.

- Groundwater results indicate that SWMU S-18 has not impacted the shallow fill unit groundwater beneath the SWMU. Additionally, the SWMU is located within areas determined to be historical US Army Corp of Engineers dredge spoils disposal grounds. The analytical results from the deeper "B" wells (downgradient MWN-5B and upgradient MWN-14B) indicate that the sand unit may have been impacted by an on-site source. Because of the presence of U.S. Army Corps of Engineer drudge spoils in this unit; the contribution of SWMU S-18 to groundwater contamination is not known.

- The results of the Tier I human health risk assessment indicate that direct contact with antimony, arsenic, thallium, and/or lead in surficial materials poses a potential non-carcinogen risk to future commercial/industrial and/or construction workers.

- Additionally lead in surface SWMU material is found at levels higher than Tier 1 RBSLs for the future utility maintenance worker and trespasser scenarios. In subsurface SWMU material, the representative concentration of lead exceeds the future construction worker and future utility/maintenance worker scenario RBSLs.

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

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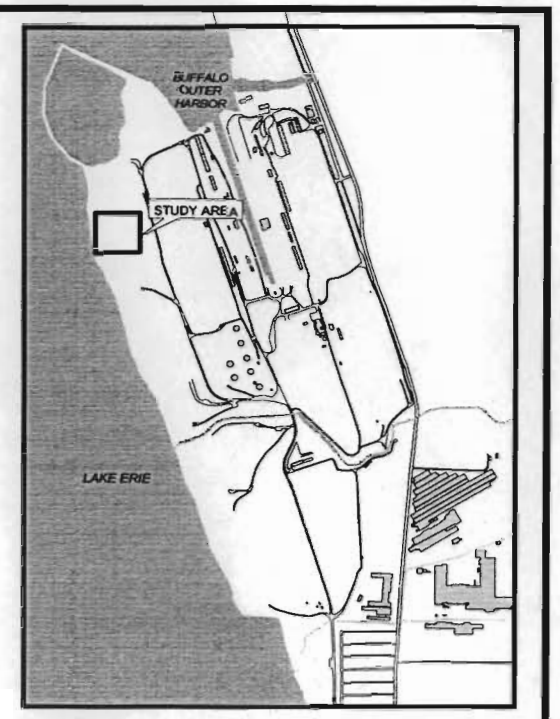


S18-KISH-G02
S18-KISH-C02
SLAG/LIME/
KISH MOUND
S18-LIME-C01
MWN-05A
S18-LIME-G01
MWN-05B
MWN-05D
S18-KISH-C01
S18-KISH-G01
S18-LIME-G02
S18-LIME-C02
S18-LIME-C
S18-B01
S18-B02
S18-KISH
SWMU
S-18
MWN-42A
SWMU
S-17
SWMU
S-14

Legend

- Monitoring Well Location
- 1994 Surface Sample Location
- Soil Boring
- 2000 Grab Sample Location
- 2000 Composite Sample Location (represents one of multiple locations)
- Direction of Surface Runoff
- Approximate Location of Gravel Access Road
- Approximate Location of Kish/Lime Pile

100 0 100 Feet

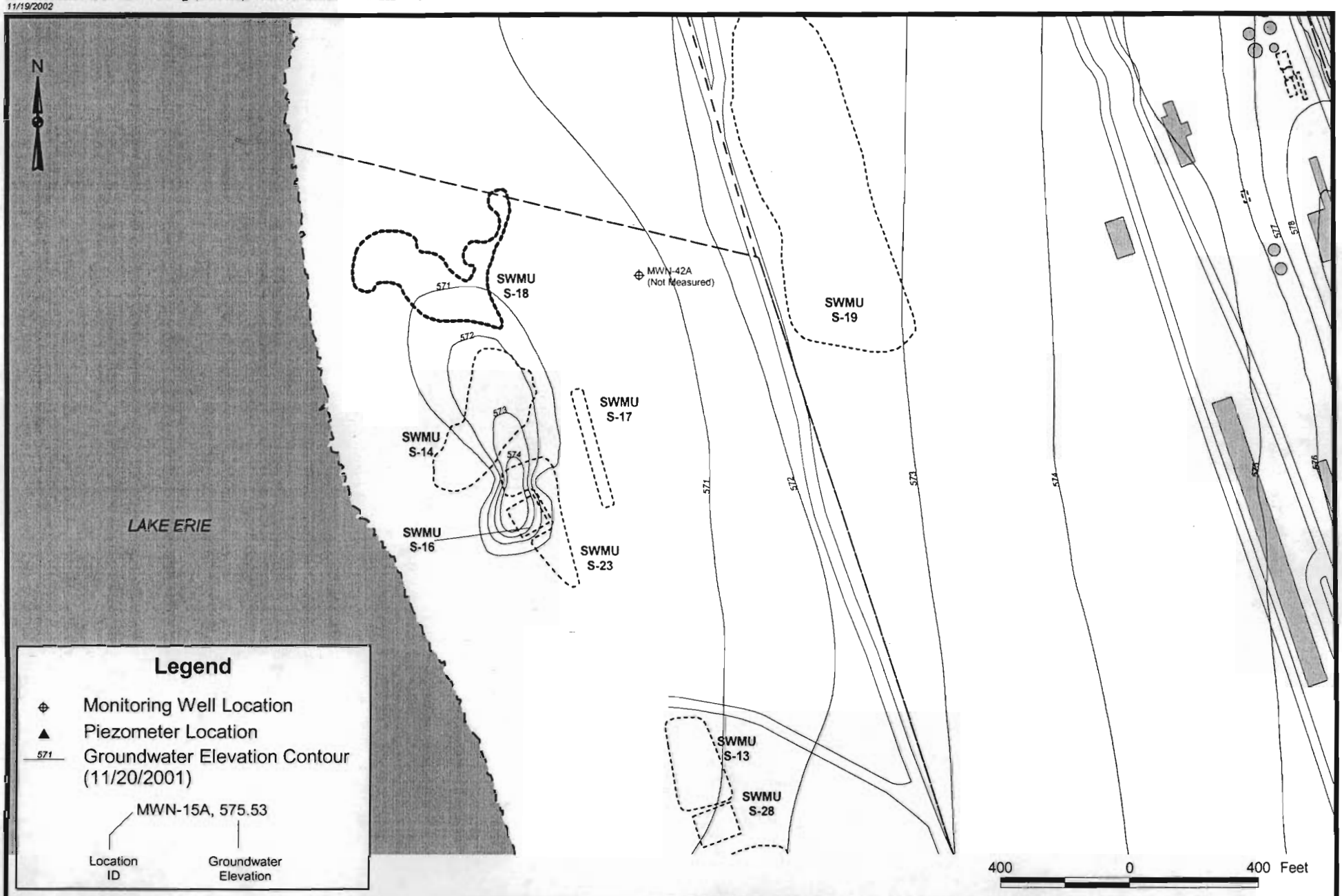
BETHLEHEM STEEL CORPORATION
SITE LOCATION MAP SHOWING SAMPLE LOCATIONS FOR:
DUST AND KISH LANDFILL R (SWMU S-18)

URS

FIGURE 1

N:\11172630.00000\GIS\PRESENT\swmu_reports-18.apr SWMU S-18 SAMPLING LOCATIONS
11/25/2002

N:\11172630.00000\GIS\PRESENT\swmu_report\s-18.apr 11/01 FILL GROUNDWATER ELEVATIONS
11/19/2002

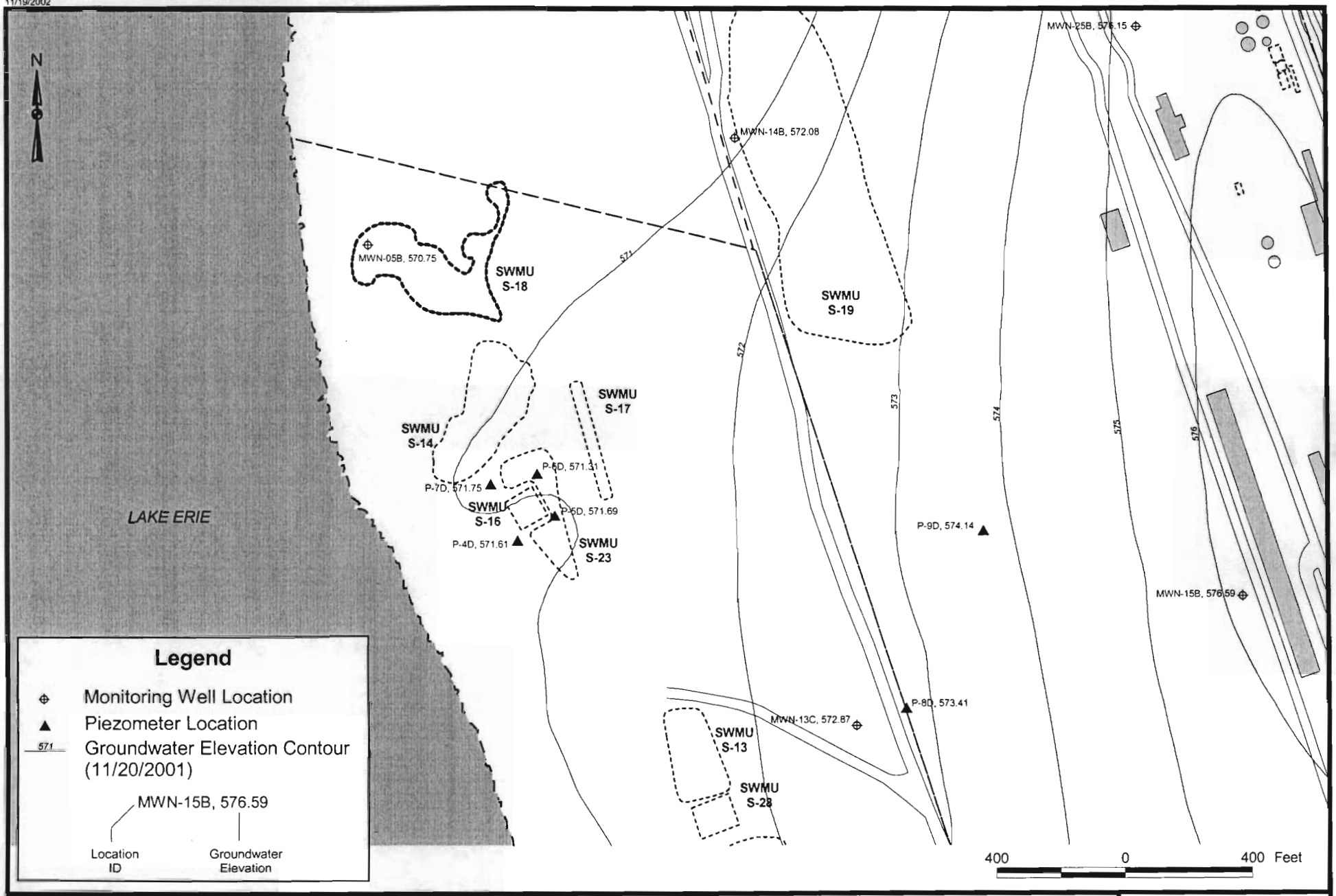


URS

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

FIGURE 2

N:\11172630.00000\GIS\PRESENT\swmu_report\s-18.apr 11/01 SAND GROUNDWATER ELEVATIONS
11/19/2002



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 TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-B01	S18-B02	S18-B02	S18-KISH	S18-KISH-C01
Sample ID		S18-B1(2-4)KISH	S18-B2(2-4)KISH	S18-B2(2-4)LIME	S18-KISH	S18-KISH-COMP1
Matrix		Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		2.0-4.0	2.0-3.0	3.0-4.0	0.0-0.5	0.0-1.0
Date Sampled		10/25/00	10/26/00	10/26/00	06/15/94	10/26/00
Parameter	**Units**					
Volatile Organic Compounds - SPLP						
Ethylbenzene -SPLP	MG/L	0.005 UJ	0.005 UJ	0.0021 J	NA	NA
Toluene -SPLP	MG/L	0.0033 J	0.0047 J	0.011 J	NA	NA
m-Xylene & p-Xylene -SPLP	MG/L	0.0057 J	0.0039 J	0.010 J	NA	NA
o-Xylene -SPLP	MG/L	0.0036 J	0.0028 J	0.0079 J	NA	NA
Semivolatile Organic Compounds						
Acenaphthylene	UG/KG	4,000 U	2,000 J	520 U	340 U	3,700 U
Anthracene	UG/KG	7,300	880 J	520 U	340 U	3,700 U
Benzo(a)anthracene	UG/KG	18,000	3,900 J	520 U	340 U	400 J
Benzo(a)pyrene	UG/KG	17,000	4,800 J	520 U	340 U	3,700 U
Benzo(b)fluoranthene	UG/KG	NA	NA	NA	100 J	NA
Benzo(ghi)perylene	UG/KG	NA	NA	NA	110 J	NA
Chrysene	UG/KG	21,000	4,500	520 U	340 U	850 J
bis(2-Ethylhexyl)phthalate	UG/KG	4,000 U	230 J	50 J	340 U	3,700 U
Fluoranthene	UG/KG	60,000	8,100	100 J	84 J,I	620 J
Fluorene	UG/KG	3,500 J	4,200 U	520 U	340 U	3,700 U
Indeno(1,2,3-cd)pyrene	UG/KG	NA	NA	NA	100 J	NA
Naphthalene	UG/KG	2,600 J	3,400 J	79 J	340 U	3,700 U
Phenanthrene	UG/KG	48,000 D	4,400	300 J	340 U	380 J
Pyrene	UG/KG	42,000 D	4,300	48 J	340 U	340 J
Semivolatile Organic Compounds - SPLP						
bis(2-Ethylhexyl)phthalate -SPLP	MG/L	0.0082 J	0.01 U	0.01 U	NA	0.01 U
Naphthalene -SPLP	MG/L	0.0062 J	0.013	0.0041 J	NA	0.01 U
Phenanthrene -SPLP	MG/L	0.013	0.0088 J	0.0095 J	NA	0.01 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-B01	S18-B02	S18-B02	S18-KISH	S18-KISH-C01
Sample ID		S18-B1(2-4)KISH	S18-B2(2-4)KISH	S18-B2(2-4)LIME	S18-KISH	S18-KISH-COMP1
Matrix		Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		2.0-4.0	2.0-3.0	3.0-4.0	0.0-0.5	0.0-1.0
Date Sampled		10/25/00	10/26/00	10/26/00	06/15/94	10/26/00
Parameter	**Units**					
Metals						
Antimony	MG/KG	3.6 B	6.7	0.25 B	33.7 J,m	4.9 B
Arsenic	MG/KG	49.3	16.3	2.1	16.7	74.9
Barium	MG/KG	51.3	35.1	4.5 B	20.3 U	43.3
Cadmium	MG/KG	2.6 BJ	4.8 J	0.19 BJ	16.7	19.8 J
Calcium	MG/KG	94,100	66,100	323,000	NA	95,100
Chromium	MG/KG	316	206	9.3	253 J,m	110
Lead	MG/KG	1,650	1,070	94.5	452	13,800
Magnesium	MG/KG	10,400 J	9,330 J	55,000 J	NA	14,000 J
Mercury	MG/KG	0.10	0.64	0.46	0.10 U	0.64
Nickel	MG/KG	64.6 R	71.2 R	3.2 R	144	45.4 R
Potassium	MG/KG	819	1,110	106 B	NA	6,980
Selenium	MG/KG	9.9	16.7	2.8	9.7	245
Silver	MG/KG	1.9	2.1	0.19 B	5.1 UJ,m	11.9
Sodium	MG/KG	207 B	158 B	54.5 B	NA	469 B
Thallium	MG/KG	9.4 B	7.9	0.61 U	7.1 J,m	30.9
Metals-SPLP						
Barium -SPLP	MG/L	0.083 B	0.095 B	0.16 B	NA	0.048 B
Calcium -SPLP	MG/L	745	830	902	NA	167
Chromium -SPLP	MG/L	0.0096 B	0.0047 B	0.0097 B	NA	0.0038 U
Lead -SPLP	MG/L	1.4	1.2	0.16	NA	0.025 U
Magnesium -SPLP	MG/L	0.34 B	0.020 U	0.034 B	NA	22.7
Mercury -SPLP	MG/L	5.80E-05 B	4.70E-05 B	4.50E-05 U	NA	4.50E-05 U
Nickel -SPLP	MG/L	0.0061 U	0.0061 U	0.0061 U	NA	0.0061 U
Potassium -SPLP	MG/L	0.50 U	1.6 B	0.68 B	NA	207

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-B01	S18-B02	S18-B02	S18-KISH	S18-KISH-C01
Sample ID		S18-B1(2-4)KISH	S18-B2(2-4)KISH	S18-B2(2-4)LIME	S18-KISH	S18-KISH-COMP1
Matrix		Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		2.0-4.0	2.0-3.0	3.0-4.0	0.0-0.5	0.0-1.0
Date Sampled		10/25/00	10/26/00	10/26/00	06/15/94	10/26/00
Parameter	Units					
Metals-SPLP						
Selenium -SPLP	MG/L	0.067 U	0.067 U	0.067 U	NA	0.20 B
Sodium -SPLP	MG/L	6.2	3.4 B	2.3 B	NA	16.0
Thallium -SPLP	MG/L	0.095 U	0.095 U	0.095 U	NA	0.095 U
General Chemistry Parameters						
Chloride - Leachable	MG/L	6.6 J	14.9 J	8.4 J	NA	201 J
Sulfate - Leachable	MG/L	13.8 J	5.0 U	7.6 J	NA	577 J
Total Organic Carbon	MG/KG	35,300 J	51,300 J	7,100 U	NA	22,700
Total Recoverable Phenolics	MG/KG	0.11	0.032 U	0.039 U	NA	0.028 U
Total Solids	PERCENT	82.2	79.2	63.3	NA	88.8
Miscellaneous - SPLP						
Cyanide -SPLP	MG/L	0.01 U	0.01 U	0.022	NA	0.01 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-KISH-C02	S18-KISH-G01	S18-KISH-G02	S18-LIME	S18-LIME-C01
Sample ID		S18-KISH-COMP2	S18-KISH-GRAB1	S18-KISH-GRAB2	S18-LIME	S18-LIME-COMP1
Matrix		Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		0.0-1.0	0.0-1.0	0.0-1.0	0.0-0.5	0.0-1.0
Date Sampled		10/26/00	10/26/00	10/26/00	06/15/94	10/26/00
Parameter	Units					
Volatile Organic Compounds - SPLP						
Ethylbenzene -SPLP	MG/L	NA	0.005 U	0.005 U	NA	NA
Toluene -SPLP	MG/L	NA	0.005 U	0.005 U	NA	NA
m-Xylene & p-Xylene -SPLP	MG/L	NA	0.005 U	0.005 U	NA	NA
o-Xylene -SPLP	MG/L	NA	0.005 U	0.005 U	NA	NA
Semivolatile Organic Compounds						
Acenaphthylene	UG/KG	3,700 U	3,800 U	3,800 U	660 U	670 UJ
Anthracene	UG/KG	3,700 U	3,800 U	3,800 U	660 U	670 UJ
Benzo(a)anthracene	UG/KG	430 J	390 J	1,900 J	660 U	670 UJ
Benzo(a)pyrene	UG/KG	3,700 U	3,800 U	2,500 J	660 U	670 UJ
Benzo(b)fluoranthene	UG/KG	NA	NA	NA	660 U	NA
Benzo(ghi)perylene	UG/KG	NA	NA	NA	660 U	NA
Chrysene	UG/KG	900 J	740 J	3,800	660 U	670 UJ
bis(2-Ethylhexyl)phthalate	UG/KG	3,700 U	3,800 U	3,800 U	660 U	670 UJ
Fluoranthene	UG/KG	680 J	400 J	1,600 J	660 U	670 UJ
Fluorene	UG/KG	3,700 U	3,800 U	3,800 U	660 U	670 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	NA	NA	NA	660 U	NA
Naphthalene	UG/KG	3,700 U	3,800 U	290 J	660 U	670 UJ
Phenanthrene	UG/KG	410 J	260 J	750 J	660 U	670 UJ
Pyrene	UG/KG	350 J	3,800 U	1,200 J	660 U	670 UJ
Semivolatile Organic Compounds - SPLP						
bis(2-Ethylhexyl)phthalate -SPLP	MG/L	0.01 U	0.01 U	0.0043 J	NA	0.01 U
Naphthalene -SPLP	MG/L	0.01 U	0.01 U	0.01 U	NA	0.01 U
Phenanthrene -SPLP	MG/L	0.01 U	0.01 U	0.01 U	NA	0.01 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-KISH-C02	S18-KISH-G01	S18-KISH-G02	S18-LIME	S18-LIME-C01
Sample ID		S18-KISH-COMP2	S18-KISH-GRAB1	S18-KISH-GRAB2	S18-LIME	S18-LIME-COMP1
Matrix		Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		0.0-1.0	0.0-1.0	0.0-1.0	0.0-0.5	0.0-1.0
Date Sampled		10/26/00	10/26/00	10/26/00	06/15/94	10/26/00
Parameter	Units					
Metals						
Antimony	MG/KG	5.0 B	6.3	8.6	87.5 J,m	150 J
Arsenic	MG/KG	70.2	84.9	80.0	3.8	4.2 J
Barium	MG/KG	42.0	44.8	68.4	39.8 U	2.1 BJ
Cadmium	MG/KG	19.6 J	21.4 J	43.2 J	5.0 U	0.25 BJ
Calcium	MG/KG	95,400	99,200	93,000	NA	517,000 J
Chromium	MG/KG	101	114	109	9.9 U	6.9 J
Lead	MG/KG	13,200	13,800	18,800	87.5	87.8 J
Magnesium	MG/KG	13,400 J	12,100 J	13,400 J	NA	44,100 J
Mercury	MG/KG	0.65	0.43	3.1	0.20 U	0.015 UJ
Nickel	MG/KG	43.6 R	44.2 R	48.5 R	39.8 U	5.0 R
Potassium	MG/KG	5,720	18,400	2,730	NA	100 UJ
Selenium	MG/KG	203	315	93.0	2.8	2.5 J
Silver	MG/KG	12.3	10.2	24.4	9.9 UJ,m	0.48 BJ
Sodium	MG/KG	399 B	1,100	254 B	NA	37.2 BJ
Thallium	MG/KG	26.6	34.4	27.3	2.0 UJ,m	0.79 UJ
Metals-SPLP						
Barium -SPLP	MG/L	0.046 B	0.083 B	0.053 B	NA	0.012 B
Calcium -SPLP	MG/L	162	279	252	NA	948
Chromium -SPLP	MG/L	0.0038 U	0.0038 U	0.0038 U	NA	0.0038 U
Lead -SPLP	MG/L	0.025 U	0.025 U	0.025 U	NA	0.18
Magnesium -SPLP	MG/L	21.0	57.5	13.1	NA	0.020 U
Mercury -SPLP	MG/L	4.50E-05 U	4.90E-05 B	5.40E-05 B	NA	4.50E-05 U
Nickel -SPLP	MG/L	0.0063 B	0.0061 U	0.0061 U	NA	0.0061 U
Potassium -SPLP	MG/L	170	710	50.0	NA	0.50 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-KISH-C02	S18-KISH-G01	S18-KISH-G02	S18-LIME	S18-LIME-C01
Sample ID		S18-KISH-COMP2	S18-KISH-GRAB1	S18-KISH-GRAB2	S18-LIME	S18-LIME-COMP1
Matrix		Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		0.0-1.0	0.0-1.0	0.0-1.0	0.0-0.5	0.0-1.0
Date Sampled		10/26/00	10/26/00	10/26/00	06/15/94	10/26/00
Parameter	Units					
Metals-SPLP						
Selenium -SPLP	MG/L	0.17 B	0.61	0.067 U	NA	0.067 U
Sodium -SPLP	MG/L	12.0	39.9	7.3	NA	3.0 B
Thallium -SPLP	MG/L	0.095 U	0.11 B	0.095 U	NA	0.095 U
General Chemistry Parameters						
Chloride - Leachable	MG/L	186 J	655 J	18.6 J	NA	2.1 J
Sulfate - Leachable	MG/L	462 J	931 J	577 J	NA	5 UJ
Total Organic Carbon	MG/KG	23,000	23,100	31,900	NA	8,030 UJ
Total Recoverable Phenolics	MG/KG	0.028 U	0.029 U	0.029 U	NA	0.053 J
Total Solids	PERCENT	88.4	87.1	86.9	NA	49.4
Miscellaneous - SPLP						
Cyanide -SPLP	MG/L	0.01 U	0.01 U	0.01 U	NA	0.01 UJ

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-LIME-C02	S18-LIME-G01	S18-LIME-G02
Sample ID		S18-LIME-COMP2	S18-LIME-GRAB1	S18-LIME-GRAB2
Matrix		Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		0.0-1.0	0.0-1.0	0.0-1.0
Date Sampled		10/26/00	10/26/00	10/26/00
Parameter	Units			
Volatile Organic Compounds - SPLP				
Ethylbenzene -SPLP	MG/L	NA	0.005 U	0.005 U
Toluene -SPLP	MG/L	NA	0.0027 J	0.0034 J
m-Xylene & p-Xylene -SPLP	MG/L	NA	0.0052 J	0.0059 J
o-Xylene -SPLP	MG/L	NA	0.0036 J	0.0032 J
Semivolatile Organic Compounds				
Acenaphthylene	UG/KG	730 UJ	620 U	590 U
Anthracene	UG/KG	730 UJ	620 U	590 U
Benzo(a)anthracene	UG/KG	730 UJ	620 U	590 U
Benzo(a)pyrene	UG/KG	730 UJ	620 U	590 U
Benzo(b)fluoranthene	UG/KG	NA	NA	NA
Benzo(ghi)perylene	UG/KG	NA	NA	NA
Chrysene	UG/KG	730 UJ	620 U	590 U
bis(2-Ethylhexyl)phthalate	UG/KG	730 UJ	620 U	590 U
Fluoranthene	UG/KG	730 UJ	620 U	590 U
Fluorene	UG/KG	730 UJ	620 U	590 U
Indeno(1,2,3-cd)pyrene	UG/KG	NA	NA	NA
Naphthalene	UG/KG	730 UJ	620 U	590 U
Phenanthrene	UG/KG	730 UJ	620 U	590 U
Pyrene	UG/KG	730 UJ	620 U	590 U
Semivolatile Organic Compounds - SPLP				
bis(2-Ethylhexyl)phthalate -SPLP	MG/L	0.01 U	0.01 U	0.01 U
Naphthalene -SPLP	MG/L	0.01 U	0.01 U	0.01 U
Phenanthrene -SPLP	MG/L	0.01 U	0.01 U	0.01 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-LIME-C02	S18-LIME-G01	S18-LIME-G02
Sample ID		S18-LIME-COMP2	S18-LIME-GRAB1	S18-LIME-GRAB2
Matrix		Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		0.0-1.0	0.0-1.0	0.0-1.0
Date Sampled		10/26/00	10/26/00	10/26/00
Parameter	Units			
Metals				
Antimony	MG/KG	10.5 J	0.27 U	0.26 U
Arsenic	MG/KG	5.5 J	0.96 B	0.95 B
Barium	MG/KG	2.4 BJ	1.1 B	2.5 B
Cadmium	MG/KG	0.14 BJ	0.11 BJ	0.089 U
Calcium	MG/KG	533,000 J	397,000	501,000
Chromium	MG/KG	9.3 J	3.3	2.5
Lead	MG/KG	108 J	216	0.90 R
Magnesium	MG/KG	47,400 J	57,200 J	56,900 J
Mercury	MG/KG	0.018 BJ	0.014 U	0.014 U
Nickel	MG/KG	5.4 R	1.6 R	1.1 U
Potassium	MG/KG	110 UJ	93.6 U	89.0 U
Selenium	MG/KG	4.0 J	6.5	0.38 U
Silver	MG/KG	0.41 BJ	0.18 U	0.17 U
Sodium	MG/KG	37.1 BJ	19.2 B	53.6 B
Thallium	MG/KG	1.7 UJ	0.73 U	0.70 U
Metals-SPLP				
Barium -SPLP	MG/L	0.0095 B	0.016 B	0.031 B
Calcium -SPLP	MG/L	918	911	929
Chromium -SPLP	MG/L	0.0050 B	0.0038 U	0.0038 U
Lead -SPLP	MG/L	0.22	0.55	0.025 U
Magnesium -SPLP	MG/L	0.029 B	0.036 B	0.020 U
Mercury -SPLP	MG/L	4.50E-05 U	4.50E-05 U	7.70E-05 B
Nickel -SPLP	MG/L	0.0061 U	0.0061 U	0.0061 U
Potassium -SPLP	MG/L	0.50 U	0.50 U	0.50 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 2
SUMMARY OF DETECTED TOTAL CONSTITUENT AND SPLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID		S18-LIME-C02	S18-LIME-G01	S18-LIME-G02
Sample ID		S18-LIME-COMP2	S18-LIME-GRAB1	S18-LIME-GRAB2
Matrix		Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)		0.0-1.0	0.0-1.0	0.0-1.0
Date Sampled		10/26/00	10/26/00	10/26/00
Parameter	Units			
Metals-SPLP				
Selenium -SPLP	MG/L	0.067 U	0.067 U	0.067 U
Sodium -SPLP	MG/L	3.4 B	7.8	3.3 B
Thallium -SPLP	MG/L	0.095 U	0.095 U	0.095 U
General Chemistry Parameters				
Chloride - Leachable	MG/L	2.1 J	1.7 J	2.0 J
Sulfate - Leachable	MG/L	5 UJ	5 U	5 U
Total Organic Carbon	MG/KG	10,400 UJ	7,690 U	6,630 U
Total Recoverable Phenolics	MG/KG	0.055 UJ	0.047 U	0.045 U
Total Solids	PERCENT	45.3	53.0	55.7
Miscellaneous - SPLP				
Cyanide -SPLP	MG/L	0.01 UJ	0.01 U	0.01 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 3
SUMMARY OF DETECTED TCLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID			S18-B01	S18-B02	S18-B02	S18-KISH-C01	S18-KISH-C02
Sample ID			S18-B1(2-4)KISH	S18-B2(2-4)KISH	S18-B2(2-4)LIME	S18-KISH-COMP1	S18-KISH-COMP2
Matrix			Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)			2.0-4.0	2.0-3.0	3.0-4.0	0.0-1.0	0.0-1.0
Date Sampled			10/25/00	10/26/00	10/26/00	10/26/00	10/26/00
Parameter	Units	Criteria*					
Volatile Organic Compounds - TCLP							
Toluene -TCLP	MG/L	-	0.05 U	0.05 U	0.019 J	NA	NA
m-Xylene & p-Xylene -TCLP	MG/L	-	0.05 U	0.05 U	0.028 J	NA	NA
o-Xylene -TCLP	MG/L	-	0.05 U	0.05 U	0.021 J	NA	NA
Semivolatile Organic Compounds - TCLP							
bis(2-Ethylhexyl)phthalate -TCLP	MG/L	-	0.0052 J	0.0084 J	0.034 J	0.0052 J	0.0082 J
Naphthalene -TCLP	MG/L	-	0.05 U	0.0041 J	0.05 U	0.05 U	0.05 U
Phenanthrene -TCLP	MG/L	-	0.0047 J	0.05 U	0.05 U	0.05 U	0.05 U
Pyridine -TCLP	MG/L	5	0.0036 J	0.1 U	0.1 U	0.1 U	0.1 U
Metals-TCLP							
Arsenic -TCLP	MG/L	5	0.14 B	0.16 B	0.14 B	0.19 B	0.15 B
Barium -TCLP	MG/L	100	0.18 B	0.13 B	0.030 BJ	0.15 B	0.16 B
Cadmium -TCLP	MG/L	1	0.015 B	0.017 B	0.0028 U	0.077 B	0.096 B
Calcium -TCLP	MG/L	-	660	728	2,270	664	704
Lead -TCLP	MG/L	5	0.067 B	0.095 B	0.095 B	15.4	17.6
Magnesium -TCLP	MG/L	-	39.6	62.6	0.053 B	59.8	59.9
Mercury -TCLP	MG/L	0.2	5.90E-05 B	7.80E-05 B	8.90E-05 B	6.70E-05 B	8.50E-05 B
Nickel -TCLP	MG/L	-	0.076	0.029 B	0.0061 U	0.020 B	0.022 B
Potassium -TCLP	MG/L	-	2.7 B	8.9	0.50 U	75.2	66.8
Selenium -TCLP	MG/L	1	0.067 U	0.067 U	0.067 U	0.17 B	0.21 B
Thallium -TCLP	MG/L	-	0.095 U	0.095 U	0.095 U	0.095 U	0.13 B

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

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 3
SUMMARY OF DETECTED TCLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID			S18-KISH-G01	S18-KISH-G02	S18-LIME-C01	S18-LIME-C02	S18-LIME-G01
Sample ID			S18-KISH-GRAB1	S18-KISH-GRAB2	S18-LIME-COMP1	S18-LIME-COMP2	S18-LIME-GRAB1
Matrix			Solid Waste	Solid Waste	Solid Waste	Solid Waste	Solid Waste
Depth Interval (ft)			0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Date Sampled			10/26/00	10/26/00	10/26/00	10/26/00	10/26/00
Parameter	Units	Criteria*					
Volatile Organic Compounds - TCLP							
Toluene -TCLP	MG/L	-	0.018 J	0.05 U	NA	NA	0.019 J
m-Xylene & p-Xylene -TCLP	MG/L	-	0.014 J	0.05 U	NA	NA	0.030 J
o-Xylene -TCLP	MG/L	-	0.05 U	0.05 U	NA	NA	0.020 J
Semivolatile Organic Compounds - TCLP							
bis(2-Ethylhexyl)phthalate -TCLP	MG/L	-	0.0067 J	0.0053 J	0.0091 J	0.012 J	0.01 J
Naphthalene -TCLP	MG/L	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene -TCLP	MG/L	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Pyridine -TCLP	MG/L	5	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ
Metals-TCLP							
Arsenic -TCLP	MG/L	5	0.16 B	0.14 B	0.13 B	0.10 B	0.13 B
Barium -TCLP	MG/L	100	0.11 B	0.13 B	0.010 BJ	0.010 BJ	0.0074 BJ
Cadmium -TCLP	MG/L	1	0.15	0.24	0.0028 U	0.0028 U	0.0028 U
Calcium -TCLP	MG/L	-	690	646	2,300	2,200	2,230
Lead -TCLP	MG/L	5	32.3	37.7	0.15 B	0.15 B	0.39 B
Magnesium -TCLP	MG/L	-	54.6	51.7	0.042 B	0.042 B	0.038 B
Mercury -TCLP	MG/L	0.2	6.30E-05 B	1.00E-04 B	4.50E-05 B	8.10E-05 B	8.20E-05 B
Nickel -TCLP	MG/L	-	0.016 B	0.017 B	0.0061 U	0.0061 U	0.0061 U
Potassium -TCLP	MG/L	-	228	24.9	0.50 U	0.50 U	0.50 U
Selenium -TCLP	MG/L	1	0.32	0.067 U	0.067 U	0.067 U	0.067 U
Thallium -TCLP	MG/L	-	0.16 B	0.12 B	0.095 U	0.095 U	0.095 U

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

Flags assigned during chemistry validation are shown.

(oval) Concentration Exceeds Criteria.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 3
SUMMARY OF DETECTED TCLP RESULTS
KISH AND LIME DUST SAMPLES
SWMU S-18

Location ID			S18-LIME-G02
Sample ID			S18-LIME-GRAB2
Matrix			Solid Waste
Depth Interval (ft)			0.0-1.0
Date Sampled			10/26/00
Parameter	**Units**	**Criteria***	
Volatile Organic Compounds - TCLP			
Toluene -TCLP	MG/L	-	0.032 J
m-Xylene & p-Xylene -TCLP	MG/L	-	0.045 J
o-Xylene -TCLP	MG/L	-	0.026 J
Semivolatile Organic Compounds - TCLP			
bis(2-Ethylhexyl)phthalate -TCLP	MG/L	-	0.027 J
Naphthalene -TCLP	MG/L	-	0.05 U
Phenanthrene -TCLP	MG/L	-	0.05 U
Pyridine -TCLP	MG/L	5	0.1 UJ
Metals-TCLP			
Arsenic -TCLP	MG/L	5	0.12 B
Barium -TCLP	MG/L	100	0.013 BJ
Cadmium -TCLP	MG/L	1	0.0028 U
Calcium -TCLP	MG/L	-	2,220
Lead -TCLP	MG/L	5	0.025 U
Magnesium -TCLP	MG/L	-	0.032 B
Mercury -TCLP	MG/L	0.2	9.60E-05 B
Nickel -TCLP	MG/L	-	0.0061 U
Potassium -TCLP	MG/L	-	0.50 U
Selenium -TCLP	MG/L	1	0.067 U
Thallium -TCLP	MG/L	-	0.095 U

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

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/22/91	04/22/91	07/12/91	10/14/91	01/17/92
Parameter	Units					
Volatile Organic Compounds						
Benzene	UG/L	3 J	4.5	4.5	5.3	5.4
Chlorobenzene	UG/L	5 U	NA	NA	NA	5 U
Ethylbenzene	UG/L	5 U	NA	NA	NA	5 U
Toluene	UG/L	4 J	NA	NA	NA	3.2 J
Xylenes, Total	UG/L	5.5	NA	NA	NA	3.6 J
Semivolatile Organic Compounds						
Acenaphthylene	UG/L	10 U	NA	NA	NA	11
Anthracene	UG/L	10 U	NA	NA	NA	10 U
1,2-Dichlorobenzene	UG/L	10 U	NA	NA	NA	10 U
2,4-Dimethylphenol	UG/L	10 U	NA	NA	NA	7.2 J
bis(2-Ethylhexyl)phthalate	UG/L	10 U	NA	NA	NA	10 U
Fluoranthene	UG/L	10 U	NA	NA	NA	5.5 J
Fluorene	UG/L	10 U	NA	NA	NA	19
3-Methylphenol & 4-Methylphenol	UG/L	NA	NA	NA	NA	23
2-Methylphenol	UG/L	17	NA	NA	NA	9.7 J
Naphthalene	UG/L	63	118	55	89	130
Phenanthrene	UG/L	30	NA	NA	NA	27
Phenol	UG/L	20	NA	NA	NA	51
Pyrene	UG/L	10 U	NA	NA	NA	5.2 J,c
Pyridine	UG/L	50 U	NA	NA	NA	10 U
Metals						
Arsenic	UG/L	NA	NA	NA	NA	NA
Barium	UG/L	NA	NA	NA	NA	NA
Cadmium	UG/L	NA	NA	NA	NA	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/22/91	04/22/91	07/12/91	10/14/91	01/17/92
Parameter	**Units**					
Metals						
Calcium	UG/L	NA	NA	NA	NA	NA
Chromium	UG/L	NA	NA	NA	NA	NA
Ferrous Iron	UG/L	NA	NA	NA	NA	NA
Iron	UG/L	NA	NA	NA	NA	NA
Lead	UG/L	NA	NA	NA	NA	NA
Magnesium	UG/L	NA	NA	NA	NA	NA
Manganese	UG/L	NA	NA	NA	NA	NA
Nickel	UG/L	NA	NA	NA	NA	NA
Potassium	UG/L	NA	NA	NA	NA	NA
Selenium	UG/L	NA	NA	NA	NA	NA
Silver	UG/L	NA	NA	NA	NA	NA
Sodium	UG/L	NA	NA	NA	NA	NA
Thallium	UG/L	NA	NA	NA	NA	NA
Dissolved Metals						
Antimony -DISS	UG/L	60 U	NA	NA	NA	60 U
Barium -DISS	UG/L	260	NA	NA	NA	200 U
Cadmium -DISS	UG/L	5 U	NA	NA	NA	5 U
Calcium -DISS	UG/L	730,000 J	460,000	460,000	440,000	656,000 J,m
Chromium -DISS	UG/L	10 U	10 U	10 U	10 U	10 U
Iron -DISS	UG/L	NA	NA	NA	NA	NA
Lead -DISS	UG/L	4.8	3 U	30.0 U	3.0 UJ	3 U
Magnesium -DISS	UG/L	NA	NA	NA	NA	NA
Manganese -DISS	UG/L	NA	NA	NA	NA	NA
Mercury -DISS	UG/L	0.2 U	NA	NA	NA	0.2 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/22/91	04/22/91	07/12/91	10/14/91	01/17/92
Parameter	Units					
Dissolved Metals						
Potassium -DISS	UG/L	NA	110,000	130,000	130,000	128,000
Selenium -DISS	UG/L	25 UJ	NA	NA	NA	5 U
Silver -DISS	UG/L	10 U	NA	NA	NA	10 U
Sodium -DISS	UG/L	120,000 J	74,000	88,000	88,000	103,000
General Chemistry Parameters						
Alkalinity (as CaCO3)	MG/L	1,500	970	870	1,100	710
Alkalinity (Total)	MG/L	NA	NA	NA	NA	NA
Carbonate Alkalinity (as CaCO3)	MG/L	NA	NA	80	460	NA
Chloride	MG/L	1,400	450	300	300 J	590
Cyanide	MG/L	0.1	NA	NA	NA	0.010 U
Dissolved Oxygen	MG/L	NA	NA	NA	NA	NA
Field pH	S.U.	13.15	12.7	12.5	12.55	13
Nitrate Nitrogen	MG/L	NA	NA	NA	NA	NA
pH Liquid	S.U.	12	NA	NA	NA	NA
Sulfate	MG/L	210	250	300	270	290
Total Organic Carbon	MG/L	11	7.3	5.4 J	6.4	6.9
Total Dissolved Solids	MG/L	2,300	2,000	1,900 J	1,800	2,300
Total Organic Halogens	MG/L	0.050 U	0.050 U	0.050 U	0.05	0.050 U
Total Recoverable Phenolics	MG/L	0.055	0.06	0.055 J	0.049	0.11
Total Suspended Solids	MG/L	NA	NA	NA	NA	NA
Total Solids	MG/L	NA	NA	NA	NA	NA
Turbidity	NTU	NA	NA	NA	NA	NA
Redox Potential	Millivolts	NA	NA	NA	NA	NA
Temperature	DEG C	7.7	10.6	17.1	14.0	12.3

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		01/22/91	04/22/91	07/12/91	10/14/91	01/17/92
Parameter	Units					
General Chemistry Parameters						
Specific Conductance	UMHOS/CM	NA	NA	NA	NA	NA
Dissolved Gases						
Carbon Dioxide	MG/L	NA	NA	NA	NA	NA
Methane	MG/L	NA	NA	NA	NA	NA
Nitrogen	MG/L	NA	NA	NA	NA	NA
Oxygen	MG/L	NA	NA	NA	NA	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/10/92	05/07/97	05/08/97	05/19/97	05/20/97
Parameter	Units					
Volatile Organic Compounds						
Benzene	UG/L	5 U	5.0 U	NA	NA	NA
Chlorobenzene	UG/L	5 U	5.0 U	NA	NA	NA
Ethylbenzene	UG/L	5 U	5.0 UJ,d	NA	NA	NA
Toluene	UG/L	5 U	5.0 U	NA	NA	NA
Xylenes, Total	UG/L	5 U	5 U	NA	NA	NA
Semivolatile Organic Compounds						
Acenaphthylene	UG/L	6.0 J	10 U	NA	NA	NA
Anthracene	UG/L	10 U	10 U	NA	NA	NA
1,2-Dichlorobenzene	UG/L	10 U	10 U	NA	NA	NA
2,4-Dimethylphenol	UG/L	4.0 J	10 U	NA	NA	NA
bis(2-Ethylhexyl)phthalate	UG/L	2.0 J	3.3 J	NA	NA	NA
Fluoranthene	UG/L	6.0 J	8.6 J	NA	NA	NA
Fluorene	UG/L	10	10 U	NA	NA	NA
3-Methylphenol & 4-Methylphenol	UG/L	NA	1.1 J,cl	NA	NA	NA
2-Methylphenol	UG/L	4.0 J	10 U	NA	NA	NA
Naphthalene	UG/L	42	10 U	NA	NA	NA
Phenanthrene	UG/L	19	5.5 J	NA	NA	NA
Phenol	UG/L	12	1.1 J	NA	NA	NA
Pyrene	UG/L	3.0 J	4.1 J	NA	NA	NA
Pyridine	UG/L	10 U	20 U	NA	NA	NA
Metals						
Arsenic	UG/L	NA	NA	NA	NA	NA
Barium	UG/L	NA	NA	NA	NA	NA
Cadmium	UG/L	NA	NA	NA	NA	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/10/92	05/07/97	05/08/97	05/19/97	05/20/97
Parameter	**Units**					
Metals						
Calcium	UG/L	NA	NA	NA	NA	NA
Chromium	UG/L	NA	NA	NA	NA	NA
Ferrous Iron	UG/L	NA	100 U	NA	100 U	100 U
Iron	UG/L	NA	422	NA	NA	NA
Lead	UG/L	NA	NA	NA	NA	NA
Magnesium	UG/L	NA	NA	NA	NA	NA
Manganese	UG/L	NA	88.0	NA	NA	NA
Nickel	UG/L	NA	NA	NA	NA	NA
Potassium	UG/L	NA	NA	NA	NA	NA
Selenium	UG/L	NA	NA	NA	NA	NA
Silver	UG/L	NA	NA	NA	NA	NA
Sodium	UG/L	NA	NA	NA	NA	NA
Thallium	UG/L	NA	NA	NA	NA	NA
Dissolved Metals						
Antimony -DISS	UG/L	60 UR,m	NA	NA	NA	NA
Barium -DISS	UG/L	200 U	NA	NA	NA	NA
Cadmium -DISS	UG/L	5 U	NA	NA	NA	NA
Calcium -DISS	UG/L	490,000 J,m	NA	NA	NA	NA
Chromium -DISS	UG/L	15	NA	NA	NA	NA
Iron -DISS	UG/L	NA	5.9	NA	NA	NA
Lead -DISS	UG/L	3 U	NA	NA	NA	NA
Magnesium -DISS	UG/L	NA	NA	NA	NA	NA
Manganese -DISS	UG/L	NA	1.3	NA	NA	NA
Mercury -DISS	UG/L	0.22 J,m	NA	NA	NA	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/10/92	05/07/97	05/08/97	05/19/97	05/20/97
Parameter	Units					
Dissolved Metals						
Potassium -DISS	UG/L	110,000	NA	NA	NA	NA
Selenium -DISS	UG/L	5 UR,m	NA	NA	NA	NA
Silver -DISS	UG/L	10 UR,m	NA	NA	NA	NA
Sodium -DISS	UG/L	99,000	NA	NA	NA	NA
General Chemistry Parameters						
Alkalinity (as CaCO3)	MG/L	1,100	NA	NA	NA	NA
Alkalinity (Total)	MG/L	NA	NA	NA	NA	NA
Carbonate Alkalinity (as CaCO3)	MG/L	NA	42	NA	NA	NA
Chloride	MG/L	310	130	NA	NA	NA
Cyanide	MG/L	0.46	NA	NA	NA	NA
Dissolved Oxygen	MG/L	NA	NA	5.50	6.88	2.64
Field pH	S.U.	12.82	NA	12.03	12.54	12.41
Nitrate Nitrogen	MG/L	NA	NA	NA	NA	NA
pH Liquid	S.U.	NA	NA	NA	NA	NA
Sulfate	MG/L	280	130	NA	NA	NA
Total Organic Carbon	MG/L	7.6	NA	NA	NA	NA
Total Dissolved Solids	MG/L	1,900	NA	NA	NA	NA
Total Organic Halogens	MG/L	0.050 U	NA	NA	NA	NA
Total Recoverable Phenolics	MG/L	NA	NA	NA	NA	NA
Total Suspended Solids	MG/L	NA	NA	NA	NA	NA
Total Solids	MG/L	NA	NA	NA	NA	NA
Turbidity	NTU	NA	NA	1.40	0.96	NA
Redox Potential	Millivolts	NA	NA	116.0	60.1	-0.2
Temperature	DEG C	9.56	NA	13.72	13.33	13.23

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

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[LOCID] = 'MWN-05A' OR [LOCID] = 'MWN-05B' OR [LOCID] = 'MWN-05D' AND [MATRIX] = 'WG'

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Sample ID		MWN-05A	MWN-05A	MWN-05A	MWN-05A	MWN-05A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/10/92	05/07/97	05/08/97	05/19/97	05/20/97
Parameter	Units					
General Chemistry Parameters						
Specific Conductance	UMHOS/CM	NA	NA	46.10	68.76	5,665
Dissolved Gases						
Carbon Dioxide	MG/L	NA	NA	NA	NA	0.3 U
Methane	MG/L	NA	NA	NA	NA	0.10
Nitrogen	MG/L	NA	NA	NA	NA	19.7
Oxygen	MG/L	NA	NA	NA	NA	9.74

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B	MWN-05B
Sample ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B DUP	MWN-05B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/08/99	12/15/92	01/24/95	01/24/95	05/07/97
Parameter	Units				FIELD DUPLICATE (1-1)	
Volatile Organic Compounds						
Benzene	UG/L	5.2	79	45 J,s	NA	7.4
Chlorobenzene	UG/L	2.2 J	54	48 J,s	NA	5.3
Ethylbenzene	UG/L	5.0 U	10 U	6.8 J,s	NA	5.0 U
Toluene	UG/L	2.9 J	42	32 J,s	NA	3.7 J
Xylenes, Total	UG/L	5.8	33	38 J,s	NA	3.7
Semivolatile Organic Compounds						
Acenaphthylene	UG/L	6.7 J	22 J	130	NA	150 U
Anthracene	UG/L	1.4 J	50 U	18 J	NA	150 U
1,2-Dichlorobenzene	UG/L	10 U	28 J	40 U	NA	23 J
2,4-Dimethylphenol	UG/L	3.7 J	50 U	40 U	NA	150 U
bis(2-Ethylhexyl)phthalate	UG/L	3.4 J	50 U	40 U	NA	150 U
Fluoranthene	UG/L	4.6 J	50 UJ,Q	21 J	NA	150 U
Fluorene	UG/L	7.1 J	50 U	72	NA	28 J,c
3-Methylphenol & 4-Methylphenol	UG/L	5.7 J	330	45	NA	150 UJ,l
2-Methylphenol	UG/L	10 U	16 J	10 J	NA	43 J,c
Naphthalene	UG/L	24	1,600	700	NA	1,400 J,c
Phenanthrene	UG/L	11	14 J	120	NA	40 J
Phenol	UG/L	6.9 J	110	40 UJ,l	NA	260
Pyrene	UG/L	2.7 J	50 U	15 J	NA	150 U
Pyridine	UG/L	20 U	50 U	8.4 J	NA	300 U
Metals						
Arsenic	UG/L	2.5 B	NA	2,000 U	2,000 U	NA
Barium	UG/L	102 B	NA	25,400	24,900	NA
Cadmium	UG/L	2.0 U	NA	125 U	125 U	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

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[LOCID] = 'MWN-05A' OR [LOCID] = 'MWN-05B' OR [LOCID] = 'MWN-05D' AND [MATRIX] = 'WG'

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B	MWN-05B
Sample ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B DUP	MWN-05B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/08/99	12/15/92	01/24/95	01/24/95	05/07/97
Parameter	Units				FIELD DUPLICATE (1-1)	
Metals						
Calcium	UG/L	418,000	NA	16,400,000	15,800,000 J,k	NA
Chromium	UG/L	2.8 B	NA	250 U	250 U	NA
Ferrous Iron	UG/L	NA	NA	NA	NA	10,000
Iron	UG/L	50.3 B	NA	NA	1,960,000	1,780,000
Lead	UG/L	3.0 U	NA	600 U	600 U	NA
Magnesium	UG/L	23.3 B	NA	NA	NA	NA
Manganese	UG/L	NA	NA	NA	99,600	95,000
Nickel	UG/L	40 U	NA	1,000 U	1,000 U	NA
Potassium	UG/L	81,300	NA	274,000	278,000	NA
Selenium	UG/L	5.5	NA	1,000 UJ,Q	1,000 UJ,c	NA
Silver	UG/L	5.0 U	NA	250 UJ,l	250 UJ,c	NA
Sodium	UG/L	85,100	NA	227,000	233,000	NA
Thallium	UG/L	5 B	NA	50.0 UJ	50 UR,m	NA
Dissolved Metals						
Antimony -DISS	UG/L	NA	600 U	1,500 UJ,c	1,200 UJ,m	NA
Barium -DISS	UG/L	NA	24,000	26,500	21,400	NA
Cadmium -DISS	UG/L	NA	50 U	125 U	100 U	NA
Calcium -DISS	UG/L	NA	110,000	17,100,000	18,400,000 J,Q	NA
Chromium -DISS	UG/L	NA	100 U	250 U	200 U	NA
Iron -DISS	UG/L	NA	NA	NA	2,110,000	1,750,000
Lead -DISS	UG/L	NA	6 U	60.0 U	60 U	NA
Magnesium -DISS	UG/L	NA	NA	NA	NA	NA
Manganese -DISS	UG/L	NA	NA	NA	111,000	97,300
Mercury -DISS	UG/L	NA	0.2 U	0.20 U	0.2 U	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B	MWN-05B
Sample ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B DUP	MWN-05B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/08/99	12/15/92	01/24/95	01/24/95	05/07/97
Parameter	Units				FIELD DUPLICATE (1-1)	
Dissolved Metals						
Potassium -DISS	UG/L	NA	210,000	290,000	260,000	NA
Selenium -DISS	UG/L	NA	25 U	105 J,Q1	100 U	NA
Silver -DISS	UG/L	NA	100 U	250 U	200 UJ,m	NA
Sodium -DISS	UG/L	NA	180,000	240,000	208,000	NA
General Chemistry Parameters						
Alkalinity (as CaCO3)	MG/L	669	1 U	NA	NA	NA
Alkalinity (Total)	MG/L	800 J	NA	38	NA	NA
Carbonate Alkalinity (as CaCO3)	MG/L	NA	NA	5 U	NA	5 U
Chloride	MG/L	207	25,000	38,300	NA	37,000
Cyanide	MG/L	0.010 U	0.02	0.034	NA	NA
Dissolved Oxygen	MG/L	0.7	NA	NA	NA	NA
Field pH	S.U.	12.4	5.74	6.19	NA	NA
Nitrate Nitrogen	MG/L	0.20	NA	NA	NA	NA
pH Liquid	S.U.	NA	NA	4.4	NA	NA
Sulfate	MG/L	261	6.0	16.7	NA	9
Total Organic Carbon	MG/L	4.1	74	82.6 J,c	NA	NA
Total Dissolved Solids	MG/L	1,480	48,000	5,360	NA	NA
Total Organic Halogens	MG/L	0.023 BJ	1.3 J,h	0.57	NA	NA
Total Recoverable Phenolics	MG/L	0.057	0.25	0.49	NA	NA
Total Suspended Solids	MG/L	NA	NA	404	NA	NA
Total Solids	MG/L	NA	NA	5,750 J,c	NA	NA
Turbidity	NTU	1	NA	91.5	91.5	NA
Redox Potential	Millivolts	-193	NA	NA	NA	NA
Temperature	DEG C	14.0	12.17	9	NA	NA

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B	MWN-05B
Sample ID		MWN-05A	MWN-05B	MWN-05B	MWN-05B DUP	MWN-05B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/08/99	12/15/92	01/24/95	01/24/95	05/07/97
Parameter	Units				FIELD DUPLICATE (1-1)	
General Chemistry Parameters						
Specific Conductance	UMHOS/CM	4,800	NA	74,000	NA	NA
Dissolved Gases						
Carbon Dioxide	MG/L	0.60 U	NA	NA	NA	0.3 U
Methane	MG/L	2.0	NA	NA	NA	5.74
Nitrogen	MG/L	15.7	NA	NA	NA	17.4
Oxygen	MG/L	0.87	NA	NA	NA	1.30

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Sample ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		05/19/97	11/08/99	08/29/95	09/13/95	11/09/99
Parameter	Units					
Volatile Organic Compounds						
Benzene	UG/L	NA	64	NA	5 U	5.2 U
Chlorobenzene	UG/L	NA	46	NA	5 U	5.0 U
Ethylbenzene	UG/L	NA	7.6	NA	5 U	5.0 U
Toluene	UG/L	NA	32	NA	2 J	5.0 U
Xylenes, Total	UG/L	NA	40	NA	2 J	8.6
Semivolatile Organic Compounds						
Acenaphthylene	UG/L	NA	200 U	10 U	NA	10 U
Anthracene	UG/L	NA	200 U	10 U	NA	10 U
1,2-Dichlorobenzene	UG/L	NA	200 U	10 U	NA	10 U
2,4-Dimethylphenol	UG/L	NA	200 U	10 U	NA	10 U
bis(2-Ethylhexyl)phthalate	UG/L	NA	200 U	3 J	NA	10 U
Fluoranthene	UG/L	NA	200 U	10 U	NA	10 U
Fluorene	UG/L	NA	200 U	10 U	NA	10 U
3-Methylphenol & 4-Methylphenol	UG/L	NA	400	NA	NA	20 U
2-Methylphenol	UG/L	NA	200 U	10 U	NA	10 U
Naphthalene	UG/L	NA	1,500	10 U	NA	10 U
Phenanthrene	UG/L	NA	200 U	10 U	NA	10 U
Phenol	UG/L	NA	190 J	10 U	NA	10 U
Pyrene	UG/L	NA	200 U	10 U	NA	10 U
Pyridine	UG/L	NA	400 U	10 U	NA	20 UJ
Metals						
Arsenic	UG/L	NA	50.0 U	2 U	NA	10.0 U
Barium	UG/L	NA	33,400	72.3	NA	81.1 B
Cadmium	UG/L	NA	48.2 J	2.8 U	NA	2.0 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Sample ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		05/19/97	11/08/99	08/29/95	09/13/95	11/09/99
Parameter	Units					
Metals						
Calcium	UG/L	NA	17,000,000	73,700	NA	82,400
Chromium	UG/L	NA	207	5.7 U	NA	13.9
Ferrous Iron	UG/L	NA	NA	NA	NA	NA
Iron	UG/L	NA	2,200,000	NA	NA	3,090
Lead	UG/L	NA	25.2	10.8	NA	3.0 U
Magnesium	UG/L	NA	725,000	NA	NA	46,200
Manganese	UG/L	NA	NA	NA	NA	NA
Nickel	UG/L	NA	146 B	14.5	NA	12 B
Potassium	UG/L	NA	275,000	9,910	NA	8,020
Selenium	UG/L	NA	250 U	3 U	NA	5.0 U
Silver	UG/L	NA	8.2 B	8.3 U	NA	5.0 U
Sodium	UG/L	NA	254,000	129,000	NA	140,000
Thallium	UG/L	NA	250 U	10 UJ,m	NA	10 U
Dissolved Metals						
Antimony -DISS	UG/L	NA	11.9 BJ	2.2 U	NA	10 UJ
Barium -DISS	UG/L	NA	31,800	72.1	NA	78.1 B
Cadmium -DISS	UG/L	NA	67.4 J	2.8 U	NA	2.0 U
Calcium -DISS	UG/L	NA	16,900,000	73,100	NA	80,300
Chromium -DISS	UG/L	NA	10.6 B	5.7 U	NA	2.5 B
Iron -DISS	UG/L	NA	2,100,000	NA	NA	1,420
Lead -DISS	UG/L	NA	8.3 B	1 UJ,m	NA	3.0 U
Magnesium -DISS	UG/L	NA	702,000	NA	NA	46,100
Manganese -DISS	UG/L	NA	NA	NA	NA	NA
Mercury -DISS	UG/L	NA	0.20 U	0.2 U	NA	0.20 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

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[LOCID] = 'MWN-05A' OR [LOCID] = 'MWN-05B' OR [LOCID] = 'MWN-05D' AND [MATRIX] = 'WG'

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Sample ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		05/19/97	11/08/99	08/29/95	09/13/95	11/09/99
Parameter	**Units**					
Dissolved Metals						
Potassium -DISS	UG/L	NA	274,000	8,080	NA	7,690
Selenium -DISS	UG/L	NA	125 U	3 UJ,m	NA	5.0 U
Silver -DISS	UG/L	NA	6.8 B	8.3 U	NA	5.0 U
Sodium -DISS	UG/L	NA	236,000	133,000	NA	137,000 J
General Chemistry Parameters						
Alkalinity (as CaCO3)	MG/L	NA	5.0 U	NA	NA	5.0 U
Alkalinity (Total)	MG/L	NA	5.0 UJ	460	NA	442 J
Carbonate Alkalinity (as CaCO3)	MG/L	NA	NA	5 U	NA	NA
Chloride	MG/L	NA	36,900	130	NA	183
Cyanide	MG/L	NA	0.010 U	NA	NA	0.010 UJ
Dissolved Oxygen	MG/L	0.14	0.3	NA	NA	0.4
Field pH	S.U.	5.78	6.8	7.42	6.62	6.7
Nitrate Nitrogen	MG/L	NA	5.0 U	NA	NA	0.10 U
pH Liquid	S.U.	NA	NA	NA	NA	NA
Sulfate	MG/L	NA	5.0 U	3.6	NA	5.0 U
Total Organic Carbon	MG/L	NA	21.1	5.2	NA	1.7
Total Dissolved Solids	MG/L	NA	55,700	700	NA	745
Total Organic Halogens	MG/L	NA	1.3 J	0.031	NA	0.0043 BJ
Total Recoverable Phenolics	MG/L	NA	0.31	0.005 U	NA	0.0050 U
Total Suspended Solids	MG/L	NA	NA	NA	NA	NA
Total Solids	MG/L	NA	NA	NA	NA	NA
Turbidity	NTU	43.6	320	29.1	NA	580
Redox Potential	Millivolts	-54.9	-254	NA	NA	-104
Temperature	DEG C	13.89	14.8	16.4	18.89	15.0

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

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(LOCID) = 'MWN-05A' OR (LOCID) = 'MWN-05B' OR (LOCID) = 'MWN-05D' AND (MATRIX) = 'WG'

TABLE 4A
SUMMARY OF DETECTED ANALYTES IN DOWNGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Sample ID		MWN-05B	MWN-05B	MWN-05D	MWN-05D	MWN-05D
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		05/19/97	11/08/99	08/29/95	09/13/95	11/09/99
Parameter	Units					
General Chemistry Parameters						
Specific Conductance	UMHOS/CM	84,970	82,000	NA	NA	1,500
Dissolved Gases						
Carbon Dioxide	MG/L	NA	2.3 J	NA	NA	152
Methane	MG/L	NA	22.5	NA	NA	32.7
Nitrogen	MG/L	NA	1.0 J	NA	NA	0.62 J
Oxygen	MG/L	NA	0.15 U	NA	NA	0.15 U

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

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[LOCID] = 'MWN-05A' OR [LOCID] = 'MWN-05B' OR [LOCID] = 'MWN-05D' AND [MATRIX] = 'WG'

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-14A	MWN-14A	MWN-14A	MWN-14A	MWN-14A
Sample ID		MWN-14A	MWN-14A	MWN-14A	MWN-14A	MWN-14A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/15/92	05/09/97	05/19/97	05/20/97	11/09/99
Parameter	**Units**					
Volatile Organic Compounds						
Benzene	UG/L	42	44	NA	NA	130
Chlorobenzene	UG/L	10 U	5.0 U	NA	NA	5.0 U
Toluene	UG/L	7.2 J	7.5	NA	NA	21
Trichloroethene	UG/L	10 U	5.0 U	NA	NA	5.0 U
Xylenes, Total	UG/L	9.8 J	14.2	NA	NA	22
Semivolatile Organic Compounds						
Acenaphthylene	UG/L	4.7 J	7.9 J	NA	NA	6.0 J
Anthracene	UG/L	2.5 J	2.2 J	NA	NA	20 U
Benzo(a)anthracene	UG/L	4.5 J	10 U	NA	NA	20 U
Chrysene	UG/L	4.9 J	10 U	NA	NA	20 U
2,4-Dimethylphenol	UG/L	10 U	9.4 J	NA	NA	6.7 J
bis(2-Ethylhexyl)phthalate	UG/L	10 U	3.2 J	NA	NA	20 U
Fluoranthene	UG/L	16 J,Q	5.0 J	NA	NA	4.8 J
Fluorene	UG/L	10	6.8 J,c	NA	NA	8.0 J
3-Methylphenol & 4-Methylphenol	UG/L	41	14 J,cl	NA	NA	14 J
2-Methylphenol	UG/L	12	6.2 J,c	NA	NA	7.0 J
Naphthalene	UG/L	150	38 J,c	NA	NA	49
Phenanthrene	UG/L	26	18	NA	NA	15 J
Phenol	UG/L	70	14	NA	NA	14 J
Pyrene	UG/L	12	3.4 J	NA	NA	3.7 J
Metals						
Antimony	UG/L	NA	NA	NA	NA	10 UJ
Arsenic	UG/L	NA	NA	NA	NA	10.0 U
Barium	UG/L	NA	NA	NA	NA	538

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-14A	MWN-14A	MWN-14A	MWN-14A	MWN-14A
Sample ID		MWN-14A	MWN-14A	MWN-14A	MWN-14A	MWN-14A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/15/92	05/09/97	05/19/97	05/20/97	11/09/99
Parameter	Units					
Metals						
Calcium	UG/L	NA	NA	NA	NA	304,000
Chromium	UG/L	NA	NA	NA	NA	0.98 B
Iron	UG/L	NA	6,500	NA	NA	38.0 B
Lead	UG/L	NA	NA	NA	NA	3.0 U
Magnesium	UG/L	NA	NA	NA	NA	5,000 U
Manganese	UG/L	NA	2,210	NA	NA	NA
Potassium	UG/L	NA	NA	NA	NA	83,100
Selenium	UG/L	NA	NA	NA	NA	5.8
Sodium	UG/L	NA	NA	NA	NA	161,000
Dissolved Metals						
Arsenic -DISS	UG/L	10 U	NA	NA	NA	NA
Barium -DISS	UG/L	1,500	NA	NA	NA	NA
Calcium -DISS	UG/L	400,000	NA	NA	NA	NA
Iron -DISS	UG/L	NA	6.4	NA	NA	NA
Lead -DISS	UG/L	3 U	NA	NA	NA	NA
Magnesium -DISS	UG/L	NA	NA	NA	NA	NA
Manganese -DISS	UG/L	NA	2.3	NA	NA	NA
Mercury -DISS	UG/L	0.2 U	NA	NA	NA	NA
Nickel -DISS	UG/L	40 U	NA	NA	NA	NA
Potassium -DISS	UG/L	110,000	NA	NA	NA	NA
Selenium -DISS	UG/L	5 U	NA	NA	NA	NA
Sodium -DISS	UG/L	140,000	NA	NA	NA	NA
General Chemistry Parameters						
Alkalinity (as CaCO3)	MG/L	1,200	NA	NA	NA	65.0

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-14A	MWN-14A	MWN-14A	MWN-14A	MWN-14A
Sample ID		MWN-14A	MWN-14A	MWN-14A	MWN-14A	MWN-14A
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/15/92	05/09/97	05/19/97	05/20/97	11/09/99
Parameter	Units					
General Chemistry Parameters						
Alkalinity (Total)	MG/L	NA	NA	NA	NA	637 J
Carbonate Alkalinity (as CaCO3)	MG/L	NA	190	NA	NA	NA
Chloride	MG/L	240	260	NA	NA	267
Cyanide	MG/L	0.23	NA	NA	NA	0.011 J
Dissolved Oxygen	MG/L	NA	NA	0.47	0.29	0.5
Field pH	S.U.	12.73	NA	12.39	12.36	12.3
Sulfate	MG/L	73	180	NA	NA	177
Total Organic Carbon	MG/L	14	NA	NA	NA	4.0
Total Dissolved Solids	MG/L	1,600	NA	NA	NA	1,350
Total Organic Halogens	MG/L	0.050 UJ,h	NA	NA	NA	0.0010 BJ
Total Recoverable Phenolics	MG/L	0.21	NA	NA	NA	0.046
Turbidity	NTU	NA	NA	13.6	NA	9
Temperature	DEG C	9.61	NA	11.72	11.83	13.5
Specific Conductance	UMHOS/CM	NA	NA	5,023	4,921	4,700
Dissolved Gases						
Methane	MG/L	NA	NA	NA	0.30	1.5
Nitrogen	MG/L	NA	NA	NA	19.5	16.4
Oxygen	MG/L	NA	NA	NA	1.11	0.56

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-14B	MWN-14B	MWN-14B	MWN-14B	MWN-14B
Sample ID		MWN-14B	MWN-14B	MWN-14B	DUP-4	MWN-14B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/15/92	05/09/97	05/19/97	11/09/99	11/09/99
Parameter	Units				FIELD DUPLICATE (1-1)	
Volatile Organic Compounds						
Benzene	UG/L	590	54	NA	690	690
Chlorobenzene	UG/L	25 U	5.0 U	NA	25 U	7.6 J
Toluene	UG/L	46	3.7 J	NA	52	54
Trichloroethene	UG/L	25 U	5.0 U	NA	77	52
Xylenes, Total	UG/L	51	3.1	NA	50	51
Semivolatile Organic Compounds						
Acenaphthylene	UG/L	50 U	20 J	NA	200 U	100 U
Anthracene	UG/L	50 U	80 U	NA	200 U	100 U
Benzo(a)anthracene	UG/L	50 U	80 U	NA	200 U	100 U
Chrysene	UG/L	50 U	80 U	NA	200 U	100 U
2,4-Dimethylphenol	UG/L	28 J	27 J	NA	200 U	100 U
bis(2-Ethylhexyl)phthalate	UG/L	50 U	80 U	NA	200 U	100 U
Fluoranthene	UG/L	50 UJ,Q	80 U	NA	200 U	100 U
Fluorene	UG/L	14 J	22 J,c	NA	200 U	16 J
3-Methylphenol & 4-Methylphenol	UG/L	84	80 UJ,l	NA	400 U	200 U
2-Methylphenol	UG/L	130	43 J,c	NA	200 U	24 J
Naphthalene	UG/L	940	1,100 J,c	NA	940	1,100 D
Phenanthrene	UG/L	24 J	39 J	NA	28 J	27 J
Phenol	UG/L	330	280	NA	160 J	160
Pyrene	UG/L	50 U	80 U	NA	200 U	100 U
Metals						
Antimony	UG/L	NA	NA	NA	10 UJ	10 UJ
Arsenic	UG/L	NA	NA	NA	51.4	53.7
Barium	UG/L	NA	NA	NA	119 B	120 B

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-14B	MWN-14B	MWN-14B	MWN-14B	MWN-14B
Sample ID		MWN-14B	MWN-14B	MWN-14B	DUP-4	MWN-14B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/15/92	05/09/97	05/19/97	11/09/99	11/09/99
Parameter	Units				FIELD DUPLICATE (1-1)	
Metals						
Calcium	UG/L	NA	NA	NA	69,700	70,800
Chromium	UG/L	NA	NA	NA	8.2	8.5
Iron	UG/L	NA	3,450	NA	1,440	1,520
Lead	UG/L	NA	NA	NA	3.6	2.6 B
Magnesium	UG/L	NA	NA	NA	577 B	580 B
Manganese	UG/L	NA	267	NA	NA	NA
Potassium	UG/L	NA	NA	NA	138,000	138,000
Selenium	UG/L	NA	NA	NA	4.7 B	3.8 B
Sodium	UG/L	NA	NA	NA	186,000	186,000
Dissolved Metals						
Arsenic -DISS	UG/L	52	NA	NA	53.9 J	51.8 J
Barium -DISS	UG/L	200 U	NA	NA	115 B	114 B
Calcium -DISS	UG/L	69,000	NA	NA	67,200	64,500
Iron -DISS	UG/L	NA	162	NA	149	189
Lead -DISS	UG/L	3.9	NA	NA	3.0 U	3.0 U
Magnesium -DISS	UG/L	NA	NA	NA	31.9 B	5,000 U
Manganese -DISS	UG/L	NA	2.6	NA	NA	NA
Mercury -DISS	UG/L	0.55	NA	NA	0.20 U	0.20 U
Nickel -DISS	UG/L	40 U	NA	NA	10.2 B	40 U
Potassium -DISS	UG/L	160,000	NA	NA	139,000	144,000
Selenium -DISS	UG/L	5 U	NA	NA	4.4 B	3.6 B
Sodium -DISS	UG/L	130,000	NA	NA	185,000 J	192,000 J
General Chemistry Parameters						
Alkalinity (as CaCO3)	MG/L	360	NA	NA	80.4	83.8

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-14B	MWN-14B	MWN-14B	MWN-14B	MWN-14B
Sample ID		MWN-14B	MWN-14B	MWN-14B	DUP-4	MWN-14B
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		12/15/92	05/09/97	05/19/97	11/09/99	11/09/99
Parameter	Units				FIELD DUPLICATE (1-1)	
General Chemistry Parameters						
Alkalinity (Total)	MG/L	NA	NA	NA	182 J	179 J
Carbonate Alkalinity (as CaCO3)	MG/L	140	110	NA	NA	NA
Chloride	MG/L	290	390	NA	406	408
Cyanide	MG/L	0.44	NA	NA	0.29 J	0.28 J
Dissolved Oxygen	MG/L	NA	NA	0.21	NA	0.7
Field pH	S.U.	12.33	NA	11.55	NA	11.6
Sulfate	MG/L	56	40	NA	55.3	52.3
Total Organic Carbon	MG/L	28	NA	NA	12.7	12.9
Total Dissolved Solids	MG/L	980	NA	NA	1,030	1,030
Total Organic Halogens	MG/L	0.050 UJ,h	NA	NA	0.031 J	0.017 BJ
Total Recoverable Phenolics	MG/L	0.61	NA	NA	0.31	0.30
Turbidity	NTU	NA	NA	42.2	NA	280
Temperature	DEG C	10.17	NA	12.03	NA	13.4
Specific Conductance	UMHOS/CM	NA	NA	1,975	NA	2,300
Dissolved Gases						
Methane	MG/L	NA	11.13	NA	11.6	12.0
Nitrogen	MG/L	NA	11.8	NA	15.1	15.6
Oxygen	MG/L	NA	0.82	NA	0.49	0.53

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-42A
Sample ID		MWN-42A
Matrix		Groundwater
Depth Interval (ft)		-
Date Sampled		12/19/00
Parameter	**Units**	
Volatile Organic Compounds		
Benzene	UG/L	16
Chlorobenzene	UG/L	5.0 U
Toluene	UG/L	3.1 J
Trichloroethene	UG/L	5.0 U
Xylenes, Total	UG/L	13
Semivolatile Organic Compounds		
Acenaphthylene	UG/L	10 U
Anthracene	UG/L	10 U
Benzo(a)anthracene	UG/L	10 U
Chrysene	UG/L	10 U
2,4-Dimethylphenol	UG/L	10 U
bis(2-Ethylhexyl)phthalate	UG/L	10 U
Fluoranthene	UG/L	10 U
Fluorene	UG/L	3.5 J
3-Methylphenol & 4-Methylphenol	UG/L	20 U
2-Methylphenol	UG/L	10 U
Naphthalene	UG/L	9.4 J
Phenanthrene	UG/L	7.5 J
Phenol	UG/L	10 U
Pyrene	UG/L	10 U
Metals		
Antimony	UG/L	1.6 B
Arsenic	UG/L	2.6 U
Barium	UG/L	599

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-42A
Sample ID		MWN-42A
Matrix		Groundwater
Depth Interval (ft)		-
Date Sampled		12/19/00
Parameter	**Units**	
Metals		
Calcium	UG/L	335,000
Chromium	UG/L	5.1
Iron	UG/L	275
Lead	UG/L	1.9 U
Magnesium	UG/L	75.4 B
Manganese	UG/L	NA
Potassium	UG/L	36,600
Selenium	UG/L	2.1 U
Sodium	UG/L	65,200
Dissolved Metals		
Arsenic -DISS	UG/L	NA
Barium -DISS	UG/L	NA
Calcium -DISS	UG/L	NA
Iron -DISS	UG/L	NA
Lead -DISS	UG/L	NA
Magnesium -DISS	UG/L	NA
Manganese -DISS	UG/L	NA
Mercury -DISS	UG/L	NA
Nickel -DISS	UG/L	NA
Potassium -DISS	UG/L	NA
Selenium -DISS	UG/L	NA
Sodium -DISS	UG/L	NA
General Chemistry Parameters		
Alkalinity (as CaCO3)	MG/L	80.6

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 4B
SUMMARY OF DETECTED ANALYTES IN UPGRADIENT WELLS
GROUNDWATER ANALYTICAL RESULTS
SWMU S-18

Location ID		MWN-42A
Sample ID		MWN-42A
Matrix		Groundwater
Depth Interval (ft)		-
Date Sampled		12/19/00
Parameter	**Units**	
General Chemistry Parameters		
Alkalinity (Total)	MG/L	782
Carbonate Alkalinity (as CaCO3)	MG/L	NA
Chloride	MG/L	123 J
Cyanide	MG/L	0.010 UJ
Dissolved Oxygen	MG/L	NA
Field pH	S.U.	12.48
Sulfate	MG/L	98.6
Total Organic Carbon	MG/L	2.6
Total Dissolved Solids	MG/L	932
Total Organic Halogens	MG/L	0.017 BJ
Total Recoverable Phenolics	MG/L	0.051 UJ
Turbidity	NTU	0 U
Temperature	DEG C	11.7
Specific Conductance	UMHOS/CM	3,870
Dissolved Gases		
Methane	MG/L	1.4
Nitrogen	MG/L	26
Oxygen	MG/L	1.4

Flags assigned during chemistry validation are shown.

Only Detected Results Reported.

Detection Limits shown are PQL

TABLE 5
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN (COPCs) SELECTION PROCESS
SURFACE SWMU MATERIAL
SWMU S-18

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]
Semivolatiles							
Benzo(ghi)perylene	2	1	50%	0.11	5.90	NA	No
Fluoranthene	10	5	50%	1.6	12	3,100	No
Benzo(a)anthracene	10	4	40%	1.9	6.7	0.87	No
Benzo(a)pyrene	10	1	10%	2.5	6.0	0.09	No
Benzo(b)fluoranthene	2	1	50%	0.10	12.0	0.87	No
Chrysene	10	4	40%	3.8	4.9	87	No
Indeno(1,2,3-c,d)pyrene	2	1	50%	0.10	6	0.87	No
Naphthalene	10	1	10%	0.029	0.2	1,600	No
Phenanthrene	10	4	40%	0.075	8.1	2,300[c]	No
Pyrene	10	3	30%	1200	10.0	2,300	No
Metals							
Antimony	10	8	80%	150	1	31	**Yes**
Arsenic	10	10	100%	84.9	12	0.43	**Yes**
Barium	10	8	80%	68.4	84.3	5,500	No
Cadmium	10	8	80%	43.2	NA	78	No
Chromium	10	9	90%	253	27	230[d]	**Yes**
Mercury	10	5	50%	3	0.3	23	No
Lead	9	9	100%	18,800	30.0	400[e]	**Yes**
Nickel	3	1	33%	144	27.7	1,600	No
Selenium	10	9	90%	315	0.6	390	No
Silver	10	6	60%	24.4	NA	390	No
Thallium	10	5	50%	34.4	NA	5.5	**Yes**

a USEPA Region III Residential Soil Risk Based Concentration (RBC) (USEPA 2000b).
b Chemicals with a detection frequency greater than 5% and a maximum concentration greater than background and the screening criteria are retained as COPCs.
c The RBC for pyrene is used as a surrogate value for phenanthrene.
d Chromium is conservatively assumed to be in the hexavalent form.
e Lead lacks standard toxicity criteria and RBCs. A value of 400 mg/kg (protective of children) is used for screening purposes (USEPA 1994).
NA indicates not available.

TABLE 6
SUMMARY OF CHEMCIALS OF POTENTIAL CONCERN (COPC) SELECTION PROCESS
SUBSURFACE SWMU MATERIAL
SWMU S-18

Chemical	Number of Samples	Number of Detects	Detection Frequency	Maximum Detected Concentration (mg/kg)	COPC Screening Level (mg/kg)[a]	Human Health COPC?[b]
Semivolatiles						
Acenaphthalene	3	1	33%	2.0	120[c]	No
Anthracene	3	2	67%	7.3	6.8[c]	**Yes**
Benzo(a)anthracene	3	2	67%	18	0.87	**Yes**
Benzo(a)pyrene	3	2	67%	17	0.09	**Yes**
Bis(2-ethylhexyl)phthalate	3	2	67%	0.23	46	No
Chrysene	3	2	67%	21	87	No
Fluoranthene	3	3	100%	60	3,100	No
Fluorene	3	1	33%	3.5	89[c]	No
Naphthalene	3	3	100%	3.4	180[c]	No
Phenanthrene	3	3	100%	48	2,300[d]	No
Pyrene	3	3	100%	42	2,300	No
Metals						
Antimony	3	3	100%	6.7	31	No
Arsenic	3	3	100%	49.3	0.43	**Yes**
Barium	3	3	100%	51.3	5,500	No
Cadmium	3	3	100%	4.8	78	No
Chromium	3	3	100%	316	230[e]	**Yes**
Mercury	3	3	100%	0.64	23	No
Lead	3	3	100%	1650	400[f]	**Yes**
Selenium	3	3	100%	16.7	390	No
Silver	3	3	100%	2.1	390	No
Thallium	3	2	67%	9.4	5.5	**Yes**

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

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

c Value is 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 The RBC for pyrene is used as a surrogate value for phenanthrene.

e Chromium is conservatively assumed to be in the hexavalent form.

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

NA indicates not available.

TABLE 7
SUMMARY 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 (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	39	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	370[d]	20	**Yes**
Anthracene	259	44	17%	63	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	180[e]	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.
d Acenaphthlene criteria used for acenaphthylene.
e Pyrene criteria used for phenanthrene.
NA Indicates not available.

TABLE 8
REPRESENTATIVE CONCENTRATIONS OF CHEMICALS OF POTENTIAL CONCERN (COPCs)
SWMU S-18

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] (ug/L)
Antimony	150	Arsenic	49	1,1-Dichloroethane	6.1
Arsenic	56	Chromium	316	Acenaphthylene	16
Chromium	253	Lead	1650	Anthracene	12
Lead	11,635	Thallium	9.4	Benzene	67
Thallium	34	Anthracene	7.3	Chlorobenzene	3.6
		Benzo(a)pyrene	17	Ethylbenzene	3.7
		Benzo(a)anthracene	18	Fluorene	14
				Methylene Chloride	6.1
				Naphthalene	198
				Phenanthrene	17
				Pyridine	15
				Toluene	14
				Trichloroethene	4.0
				Xylenes, Total	40

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

TABLE 9
POTENTIAL EXPOSURE SCENARIOS[a]
SWMU S-18

Potential Receptor Scenario	Exposure Media	Potential Pathway of Exposure
Future Commercial/Industrial Worker	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	vapor inhalation
	Zone 4 Groundwater	ambient/indoor vapor inhalation
Current Non-BSC Commercial/Industrial Worker	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	ambient vapor inhalation
Future Utility/Maintenance Worker	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	particulate/vapor inhalation
		ingestion
		dermal contact
	Zone 4 Groundwater	ambient vapor inhalation
Trespasser	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	vapor inhalation
	Zone 4 Groundwater	ambient vapor inhalation
Future Construction Worker	Surface SWMU Material	particulate inhalation
		ingestion
		dermal contact
	Subsurface SWMU Material	particulate/vapor 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-18 are based on those determined in ID No. 2 (BSC 1999b) and the chemicals of potential interest determined in ID No. 1 (BSC 1998).

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

		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 $(mg/kg\text{-}d)^{-1}$	Source	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Source
Inorganics										
Antimony	7440-36-0	4.00E-04	H	4.00E-04	R	--	--	--	--	--
Arsenic	7440-38-2	3.00E-04	I	--	--	A	1.50E+00	I	1.51E+01	I
Chromium[b]	18540-29-9	3.00E-03	I	3.00E-05	I	A	--	--	4.10E+01	H
Lead[c]	71-43-2	--	--	--	--	--	--	--	--	--
Thallium	108-90-7	8.00E-05	I, thallium chloride	8.00E-05	R	--	--	--	--	--
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
Chlorobenzene	75-09-2	2.00E-02	I	1.70E-02	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	--	--	--	--	--
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 The toxicity criteria for hexavalent chromium is conservatively used for chromium.
c 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 included in the Region III RBC Tables (USEPA 2000b).
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 that do not have carcinogenic inhalation toxicity criteria.

TABLE 11
COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-18

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	150	--	>1,000,000
Arsenic	56	>1,000,000	--
Chromium[a]	253	865,000	>1,000,000
Lead	11,635	--	NE
Thallium	34	--	>1,000,000
Inhalation of Ambient Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	--	>1,000,000
Future Commercial/Industrial Worker			
Direct Contact with Surficial SWMU Material (mg/kg)			
Antimony	150	--	50
Arsenic	56	12[b]	37
Chromium[a]	253	863,000	373
Lead[c]	11,635	--	1,545
Thallium	34	--	10
Inhalation of Ambient Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	--	>1,000,000
Inhalation of Indoor Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	--	>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	171	741
Chlorobenzene	0.0036	--	> sol (472)
Ethylbenzene	0.0037	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	5,143	> 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	559	> sol (1,100)
Xylenes, Total	0.040	--	> sol (175)

TABLE 11
COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-18

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Inhalation of Indoor Vapors from Groundwater (mg/L)			
1,1-Dichloroethane	0.0061	--	258
Acenaphthylene	0.016	--	> sol (16.1)
Anthracene	0.012	--	> sol (0.043)
Benzene	0.067	0.64	2.8
Chlorobenzene	0.0036	--	46
Ethylbenzene	0.0037	--	> sol (169)
Fluorene	0.014	--	> sol (2.0)
Methylene Chloride	0.0062	21	2,625
Naphthalene	0.198	--	17.3
Phenanthrene	0.017	--	> sol (1.15)
Pyridine	0.015	--	1.3
Toluene	0.014	--	165
Trichloroethene	0.0040	2.0	6.4
Xylenes, Total	0.040	--	> sol (175)
Future Construction Worker *Direct Contact with Surficial SWMU Material (mg/kg)*			
Antimony	150	--	128
Arsenic	56	16.1	96
Chromium[a]	253	>1,000,000	963
Lead[c]	11,635	--	1,545
Thallium	34	--	26

TABLE 11
COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-18

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Future Construction Worker			
Direct Contact with Subsurface SWMU Material (mg/kg)			
Arsenic	49	16	96
Chromium[a]	316	>1,000,000	963
Lead[c]	1,650	--	1,545
Thallium	9.4	--	26
Anthracene	7.3	--	93,921
Benzo(a)anthracene	18	--	33
Benzo(a)pyrene	17	3.3	--
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	0.0036	--	> sol (472)
Ethylbenzene	0.0037	--	> 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)	> sol (1,100)
Xylenes, Total	0.040	--	> sol (175)
Future Utility/Maintenance Worker			
Direct Contact with Surficial SWMU Material (mg/kg)			
Antimony	150	--	554
Arsenic	56	69	416
Chromium[a]	253	>1,000,000	4,160
Lead[c]	11,635	--	1,545
Thallium	34	--	111
Direct Contact with Subsurface SWMU Material (mg/kg)			
Arsenic	49	69	416
Chromium[a]	316	>1,000,000	4,160
Lead[c]	1,650	--	1,545
Thallium	9.4	--	111
Anthracene	7.3	--	406,647
Benzo(a)anthracene	18	--	142
Benzo(a)pyrene	17	14	--

TABLE 11
COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-18

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Future Utility/Maintenance Worker			
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	0.0036	--	> sol (472)
Ethylbenzene	0.0037	--	> 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 with Surficial SWMU Material (mg/kg)			
Antimony	150	--	6,770
Arsenic	56	212	5,080
Chromium[a]	253	>1,000,000	50,800
Lead[c]	11,635	--	1,545
Thallium	34	--	1,360
Inhalation of Ambient Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	--	> sat (10)
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	0.0036	--	> sol (472)
Ethylbenzene	0.0037	--	> 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 11
COMPARISON OF CHEMICALS OF POTENTIAL CONCERN (COPCs) TO RISK-BASED SCREENING LEVELS (RBSLs)
SWMU S-18

Scenarios and COPCs	Representative Concentration	Cancer RBSL	Non-Cancer RBSL
Future Marina Worker			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	150	--	>1,000,000
Arsenic	56	>1,000,000	--
Chromium[a]	253	>1,000,000	>1,000,000
Lead	11,635	--	NE
Thallium	34	--	>1,000,000
Inhalation of Ambient Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	>1,000,000	--
Future Greenway User			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	150	--	>1,000,000
Arsenic	56	>1,000,000	--
Chromium[a]	253	>1,000,000	>1,000,000
Lead	11,635	--	NE
Thallium	34	--	>1,000,000
Inhalation of Ambient Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	>1,000,000	--
Present/Future Fenceline Resident			
Inhalation of Particles from Uncovered SWMUs (mg/kg)			
Antimony	150	--	>1,000,000
Arsenic	56	269,000	--
Chromium[a]	253	98,900	>1,000,000
Lead	11,635	--	NE
Thallium	34	--	>1,000,000
Inhalation of Ambient Vapors from Subsurface SWMU Material (mg/kg)			
Anthracene	7.3	--	>1,000,000

a	All chromium is conservatively considered to be hexavalent chromium; RBSLs were calculated for hexavalent chromium.
b	The RBSL for arsenic is less than the background, therefore, the background concentration (BSC 1999b) was used as the RBSL.
c	Lead RBSL calculation from USEPA Adult Lead Model (USEPA 1996)
--	Not evaluated as there is no toxicity criteria for this pathway.
> sol	The RBSL exceeds the solubility limit in this media, which is indicated in parentheses.
> sat	The RBSL exceeds the saturation limit in this media, which is indicated in parentheses.
	Shaded cell indicates value exceeds the RBSL.
>1,000,000	Calculated RBSL is greater than 1,000,000 parts per million (mg/kg or mg/L).
NE	Not evaluated.

TABLE 12
TIER I RISK ASSESSMENT RESULTS
SWMU S-18

	Representative Concentration (mg/kg)	Cancer RBSL (mg/kg)	Screening Level Cancer Risk (SLCR)	Non-Cancer RBSL (mg/kg)	Screening Level Hazard Quotient (SLHQ)	Primary Target Organ[a]
FUTURE COMMERCIAL/INDUSTRIAL WORKER						
Direct Contact with Surficial SWMU Material						
Antimony	150	--	--	50	3.0	blood
Arsenic[b]	56	0.94	6.0E-05	37	1.5	skin
Lead[c]	11,635	NE	NE	1,545	NE	NE
Thallium	34	--	--	10	3.5	liver, blood, hair
Total			**6E-05**	Total SLHI =	**8.0**	
				Total liver/blood/hair SLHI:	**6.5**	
				Total skin SLHI:	**1.5**	
FUTURE CONSTRUCTION WORKER						
Direct Contact with Surficial SWMU Material (including vapor inhalation)						
Antimony	150	--	--	128	1.2	blood
Arsenic	56	16	3.5E-06	--	--	not applicable
Lead[c]	11,635	NE	NE	1,545	NE	NE
Thallium	34	--	--	26	1.3	liver, blood, hair
Total		SLCR:	**3E-06**	SLHI =	**2.5**	
Direct Contact with Subsurface SWMU Material (including vapor inhalation)						
Arsenic	49	16	3.0E-06	--	--	not applicable
Lead[c]	1,650	NE	NE	1,545	NE	NE
Benzo(a)pyrene	17	3.3	5.2E-06	--	--	
Total		SLCR:	**8E-06**	SLHI =	**NA**	
		Ambient $SLCR_{total}$=	**1E-05**	Total SLHI:	**2.5**	
				Total liver/blood/hair SLHI:	**2.5**	

TABLE 12
TIER I RISK ASSESSMENT RESULTS
SWMU S-18

	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 UTILITY/MAINTENANCE WORKER						
Direct Contact with Surficial SWMU Material (including vapor inhalation)						
Lead[c]	11,635	NE	NE	1,545	NE	NE
Total			--		--	
Direct Contact with Subsurface SWMU Material (including vapor inhalation)						
Lead[c]	1,650	NE	NE	1,545	NE	NE
Benzo(a)pyrene	17	14.2	1.2E-06	--	--	
Total		SLCR:	**1E-06**		**NA**	
TRESPASSER						
Direct Contact with Surficial SWMU Material (including vapor inhalation)						
Lead[c]	11,635	NE	NE	1,545	NE	NE
Total			--		**NA**	

a Primary Target Organ information obtained from IRIS (USEPA 2000a).
b Screening level for arsenic based on risk: Background level is 12 mg/kg.
c The lead RBSL (1,545 mg/kg) for this scenario has been exceed by the representative concentration. As lead is evaluated as neither a carcinogen nor a noncarcinogen, this exceedances is noted here.
-- Not applicable.
SLHI Screening Level Hazard Index
NE Not evaluated as there is no toxicity criteria for this pathway.

APPENDIX A

SWMU INSPECTION FIELD NOTES

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

SWMU #: S-18

SWMU Name: Lime Dust & Kish Landfill R

Date of Inspection: 9/4/96 5 DP

Inspector(s): Dan Butterfield / Jim Hennon

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

Type:

X Landfill _____ Impoundment

_____ Pit/sump/trench _____ Pile

Configuration:

_____ Level
X Above Grade - height ~20 ft
_____ Depression depth_____ft
_____ Interior trench/pit/sump width _____ feet, length_____ ft,
depth_____ ft, height of top above grade_____ft
_____ Free board_____ft
_____ Other (describe)_____

Comments: waste piled, pushed & covered on South side of slag dump (with debris)

SWMU# 5-16

Inspection Date: 9/5/96

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

Material:

_____ Concrete/Asphalt
_____ Grass
_____ Slag
__X__ Other (describe): Waste with some vegetation

_____ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

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 South, distance adjacent ft
_____ Railroad, direction _____, distance _____ ft
_____ Other (describe):

Ground Surface:

_____ Concrete/Asphalt
_____ Grass
_____ Slag
_____ Other (describe): Trace of weeds

__X__ Unvegetated Soil
_____ Trees/Shrubs
_____ Liquid

SWMU# 5-14 DP
5

Inspection Date: 9/4/96

VISUAL EVIDENCE OF RUN ON

_____ No

_X_ Yes, Description: _____

VISUAL EVIDENCE OF RUN OFF:

_____ No

X Yes, Description: runoff from slag pile North of 5-18 runoff from sides of 5-18 + south of eastside.

If Yes, which of following are present?

_X_ Erosion scars on SWMU

_X_ Sediments near SWMU in runoff areas

_____ Staining in SWMU runoff areas

_____ Distressed vegetation in SWMU runoff areas

DOES RUNOFF REACH SURFACE WATER BODY? N/A

If yes, provide description: _____

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

DAILY INSPECTION REPORT

DATE 6/5/00

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 SWMU S-18
OWNER Bethlehem Steel Corporation
CONTRACT No.
URS GREINER JOB No. 42000.8BSC.15
URS GREINER PROJECT MANAGER Gary Robinson

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks

VISITORS

Time	Representating	Representating	Remarks
10:00AM	Mark Colmerauer - URS	Kyle Jackson - URS	

EQUIPMENT AT THE SITE

None

~~CONSTRUCTION ACTIVITIES~~ Investigation of SWMU S-18

SWMU S-18 is bigger than what was described in earlier draft reports. It can be divided into 3 Areas.

Area 1 - Main pile area

This is the general area which included in the previous draft SWMU reports. It presently consists of five small piles of lime and kiln ranging in volume from approximately 350 ft³ to 2,000 ft³. The piles are on top of a ramped "mound" of debris that appears to be mostly lime and kiln. The mound is approximately 150' long by 75 feet wide and anywhere from 1 to 10 feet high.

Area 2 - Miscellaneous Piles North

This Area is North of Area 1 and consists of 12 to 13 piles of lime and

SHEET 1 OF

BY Kyle Jackson TITLE

REVIEWED BY: PROJECT ENGINEER

DAILY INSPECTION REPORT (cont'd)

PROJECT BSC SWMU S-18 REPORT No. _____

URS GREINER JOB No. 42000088SC.15 DATE 6/5/00

~~CONSTRUCTION ACTIVITIES (cont'd)~~ Investigation of SWMU S-18 (con'd)

Kish ranging from approximately 200ft³ to 3,000ft³. Monitoring wells MWN-5D, 5B, and 5A are present on the west downgradient edge, although two piles are further west of the wells.

Note: Both Areas 1 and 2 are within a slag fill "bowl" which collects runoff to the center where it would appear to drain into the slag - Run-off can leave the "bowl" area from the south end (ramp) of Area 1. Figure 1 shows a sketch of all 3 areas and typical drainage.

Area 3 - Miscellaneous "Piles in Slag Valley"

- This Area is located east of the Area 1 mound and consists of several piles of lime in a valley between two slag/debris piles. The stormwater run off is to the east and flows over a cliff into the former slag reclamation area. One pile is located along the edge of the cliff and appears to have lime run-off along the cliff edge.

SHEET 2 OF 3

BY Kyle Jackson TITLE _____

URSF-01-2 CF 3.GCCONREP REVIEWED BY: _____ PROJECT ENGINEER

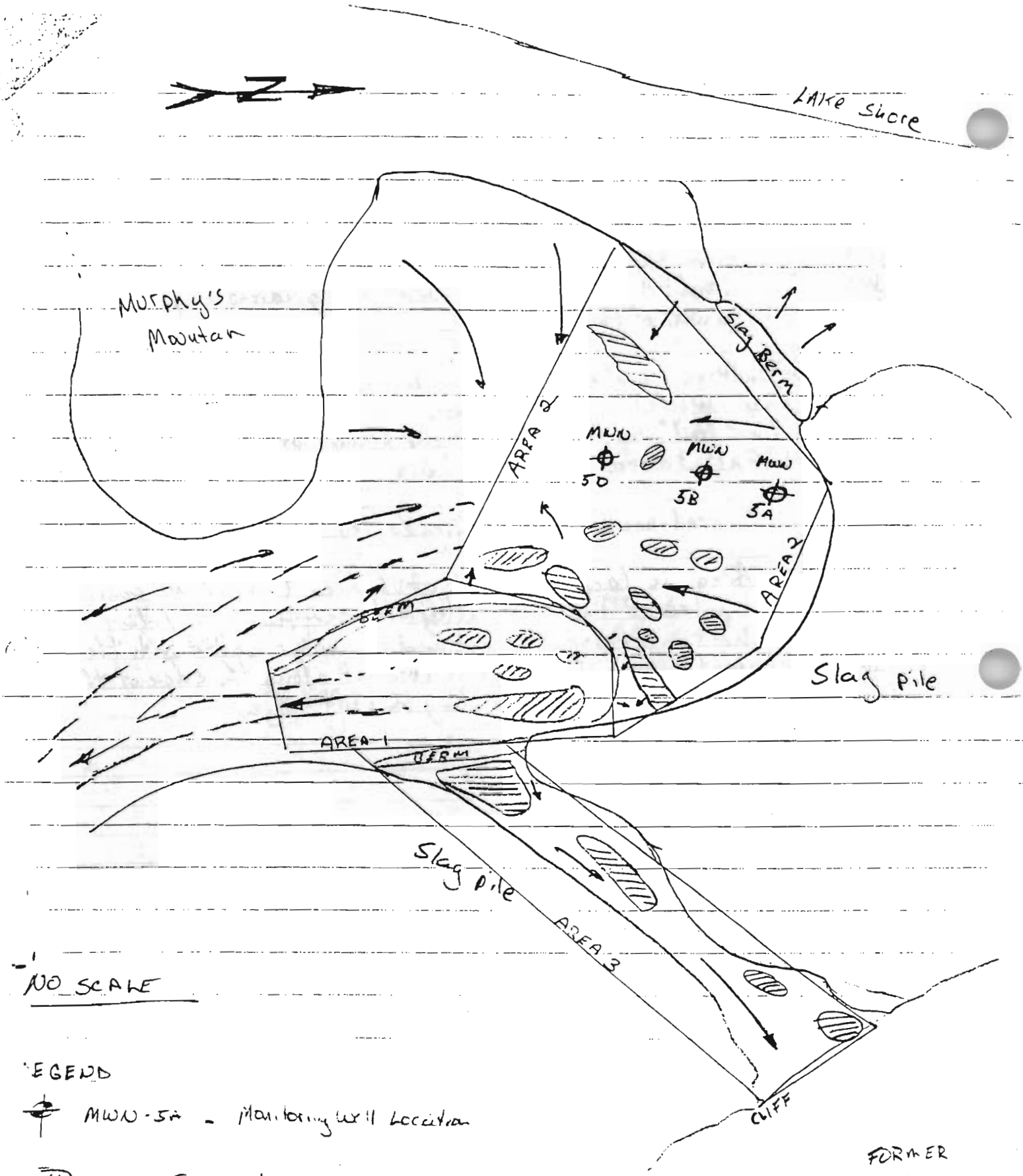

N
Lake Shore
Murphy's Mountain
AREA 2
MWN 5D
MWN 5B
MWN 5A
Slag Berm
AREA 2
BERM
Slag pile
AREA 1
BERM
Slag pile
AREA 3
CLIFF
NO SCALE
LEGEND
MWN-5A - Monitoring well Location
Slag pile
surface water drainage direction
FORMER SLAG RECLAMATION AREA

FIG. 1

APPENDIX B

1994 PHASE IIB

AND

2000 SUPPLEMENTAL INVESTIGATION

SAMPLING RECORDS

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00610-173-152 JOB NAME : BSC PHASE IIB DATE : 6/15/94
JOB LOCATION : LACKAWANNA, NY TIME : 15:00

SAMPLE ID : SWMU-51B-LIME
SAMPLE LOCATION : SWMU-51B "LIME DUST"

SAMPLERS : K. IGNASIAK 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 : WHITE TO GRAYISH WHITE CLAYEY SILT (MOIST)(SOFT)[FILL]

SAMPLE ANALYSIS

SAMPLE ID : SWMU-51B-LIME (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : CN, VOX, DNT, METALS (ALL TCA)
PHYSICAL APPEARANCE & ODOR : SEE ABOVE

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

WEATHER : SUNNY, MOD. WIND, 90°
COMMENTS : ALL SAMPLES GRABBED FROM SURFACE

DAMES & MOORE

SOIL/SEDIMENT SAMPLE RECORD

JOB No.: 00120-173-152 JOB NAME : BSC PHASE IIB DATE : 6/15/94
JOB LOCATION : LACKAWANNA, NY TIME : 15:00

SAMPLE ID : SWMU-518-KISH
SAMPLE LOCATION : SWMU-518 "KISH PILES"

SAMPLERS : K. IGNASIAK 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 : DARK GRAY TO GRAY FINE TO COARSE GRAINED SILTY SAND WITH FINE GRADED GRAVEL (MOIST)(LOOSE)[FILL](SLAG AND STEEL FRAGMENTS)

SAMPLE ANALYSIS

SAMPLE ID : SWMU-518-KISH (AS SHOWN ON CHAIN OF CUSTODY)
TEST FOR : CN, RNA, VOX, METALS (ALL TCG)
PHYSICAL APPEARANCE & ODOR : SEE ABOVE

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

WEATHER : SUNNY, MOD. WIND, 90°
COMMENTS : ALL SAMPLES GRABBED FROM SURFACE

FIELD SAMPLING REPORT

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

LOCATION: S18 PROJECT NO.: 42000088SC.15

SITE: BETHLEHEM STEEL, LACKAWANNA, NY

SAMPLE INFORMATION

MATRIX: WASTE SAMPLE ID: S18-B-2 (2-4) KISH

SAMPLING METHOD: SS DUP.REP. OF: —

BEGINNING DEPTH: 2' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 4' YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-26-00 TIME: 1130

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
ENCORE	3	—			8260B
8OZ	2	—			TCLP SVOA Metal SPLP SVOA Metal CN
16OZ	1	—			SVOA, METAL, CN, CL, SO4, PHENOLICS
4OZ	6	—			(1) SPLP VOA (1) TCLP VOA
					(2) TOX (2) TOC

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st —	COLOR: REDBRN	
2nd —	ODOR: —	
	OTHER: —	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION S AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL LAB

COMMENTS: KISH

SAMPLER: JENCARUSO OBSERVER: ___

MATRIX TYPE CODES

DC = DRILL CUTTINGS	SL = SLUDGE
WG = GROUND WATER	SO = SOIL
LH = HAZARDOUS LIQUID WASTE	GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE	WS = SURFACE WATER
SE = SEDIMENT	SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER	G = GRAB
BR = BRASS RING	HA = HAND AUGER
CS = COMPOSITE SAMPLE	H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER	HP = HYDRO PUNCH
DT = DRIVEN TUBE	SS = SPLIT SPOON
W = SWAB/WIPE	SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

URS Greiner
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5

LOCATION: S18 PROJECT NO.: 42000088SC.15

SITE: BETHLEHEM STEEL

SAMPLE INFORMATION

MATRIX: WASTE SAMPLE ID: S18-B-2(2-4) LIME

SAMPLING METHOD: SS DUP.REP. OF: —

BEGINNING DEPTH: 2 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 4 YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-26-00 TIME: 1200

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
16oz	1	—			SVOA, Metals, CN, Cl, Sulphenols
8oz	2	—			TCLP SVOA Metals SPLP SVOA Metals CN
4oz	6	—			TCLP VOA, SPLP VOA (2) TOX, (2) TOS
Encore	3	—			PAKEOB

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st —	COLOR: white	
2nd —	ODOR: —	
	OTHER: —	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ____ WIND DIRECTION S AMBIENT TEMP. 70 °F

SHIPMENT VIA: FED-X X HAND DELIVER ____ COURIER ____ OTHER ____

SHIPPED TO: STL LAB

COMMENTS: LIME

SAMPLER: J. Christy OBSERVER: ____

MATRIX TYPE CODES

DC = DRILL CUTTINGS
WG = GROUND WATER
LH = HAZARDOUS LIQUID WASTE
SH = HAZARDOUS SOLID WASTE
SE = SEDIMENT
SL = SLUDGE
SO = SOIL
GS = SOIL GAS
WS = SURFACE WATER
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
BR = BRASS RING
CS = COMPOSITE SAMPLE
C = CONTINUOUS FLIGHT AUGER
DT = DRIVEN TUBE
W = SWAB/WIPE
G = GRAB
HA = HAND AUGER
H = HOLLOW STEM AUGER
HP = HYDRO PUNCH
SS = SPLIT SPOON
SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

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

LOCATION: S-18 #BM1 PROJECT NO.: 42000008BSC.15

SITE: BETHLEHEM STEEL, CACKAWANNA, NY

SAMPLE INFORMATION

MATRIX: WASTE SAMPLE ID: S18-B-1 (2-4') KISH

SAMPLING METHOD: SPLIT SPOON DUP.REP. OF: —

BEGINNING DEPTH: 2' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 4' YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-25-00 TIME: 1600

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
ENCORE	3	—			VOA 8260B
160Z	1	ICE			SVOA, METALS, CL, SO4, CN, PHENOLICS
80Z	2				TCLP SVOA (1) SPLP SVOA (1)
40Z	6				TCLP VOA (1) SPLP VOA (1)
					(2) TOX (2) TOC

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st —	COLOR: Red Brown	
2nd —	ODOR: —	
	OTHER: —	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION S AMBIENT TEMP. 65 F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL LAB

COMMENTS: KISH

SAMPLER: J. CHRISTY OBSERVER: ___

MATRIX TYPE CODES

DC = DRILL CUTTINGS
WG = GROUND WATER
LH = HAZARDOUS LIQUID WASTE
SH = HAZARDOUS SOLID WASTE
SE = SEDIMENT
SL = SLUDGE
SO = SOIL
GS = SOIL GAS
WS = SURFACE WATER
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
BR = BRASS RING
CS = COMPOSITE SAMPLE
C = CONTINUOUS FLIGHT AUGER
DT = DRIVEN TUBE
W = SWAB/WIPE
G = GRAB
HA = HAND AUGER
H = HOLLOW STEM AUGER
HP = HYDRO PUNCH
SS = SPLIT SPOON
SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

URS
282 Delaware Avenue
Buffalo, New York 142
(716) 856-5636

LOCATION: SWMU S-18 PROJECT NO.: 42-00008SC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) SAMPLE ID: S18-LIME-GRAB1

SAMPLING METHOD: Grab - Trowel DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 2' YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-24-00 TIME: 1415

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
Glass/2oz	3		TOTALS	VOC	8260B
16oz	1			SVOC, METALS Cl, SO_4, Cyanide	8270
8oz	2			TOC	
8oz	2			TOX	
16oz	2		TCLP/SPLP	TCLP/SPLP SVOC, / METALS	8270
2oz	2		TCLP/SPLP	TCLP/SPLP VOC's	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st	COLOR: Bright white - wet	
2nd NA	ODOR: None	
	OTHER:	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS	SL = SLUDGE
WG = GROUND WATER	SO = SOIL
LH = HAZARDOUS LIQUID WASTE	GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE	WS = SURFACE WATER
SE = SEDIMENT	SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER	G = GRAB
BR = BRASS RING	HA = HAND AUGER
CS = COMPOSITE SAMPLE	H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER	HP = HYDRO PUNCH
DT = DRIVEN TUBE	SS = SPLIT SPOON
W = SWAB/WIPE	SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

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

LOCATION: SWMU S-18 PROJECT NO.: 42-00008BSC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) SAMPLE ID: S18-LIME-GRAB2

SAMPLING METHOD: Grab - Trowel DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 2' YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-24-00 TIME: 1445

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
Glass / 2oz	3		TOTALS	VOC	8260B
16oz	1			SVOC, METALS Cl, SO4, Cyanide	8270
8oz.	2			TOC	
8oz	2			TOX	
16oz	2		TCLP/SPLP	TCLP/SPLP SVOCs/METALS	8270
2oz	2		TCLP/SPLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st NA	COLOR: Bright white - wet	
2nd	ODOR: None	
	OTHER:	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS	SL = SLUDGE
WG = GROUND WATER	SO = SOIL
LH = HAZARDOUS LIQUID WASTE	GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE	WS = SURFACE WATER
SE = SEDIMENT	SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER	G = GRAB
BR = BRASS RING	HA = HAND AUGER
CS = COMPOSITE SAMPLE	H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER	HP = HYDRO PUNCH
DT = DRIVEN TUBE	SS = SPLIT SPOON
W = SWAB/WIPE	SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

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

LOCATION: SWMU S-18 PROJECT NO.: 42-00008BSC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) SAMPLE ID: S18-KISH-GRAB1

SAMPLING METHOD: GRAB TROWEL DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 1.5' YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-24-00 TIME: 1350

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
GLASS/2oz	3		TOTALS	VOC	8260B
16oz	1			SVOC, METALS CN, SO4, Cyanide	8270
8oz	2	ICE		TOC	
8oz	2	ICE		TOX	
16oz	2		TCLP/SPLP	TCLP/SPLP SVOCs/METALS	~~8270~~ 8270
2oz	2		TCLP/SPLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st	COLOR: Bright Red/ORANGE	
2nd NA	ODOR: None	
	OTHER: very fine + Dusty, dry	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS	SL = SLUDGE
WG = GROUND WATER	SO = SOIL
LH = HAZARDOUS LIQUID WASTE	GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE	WS = SURFACE WATER
SE = SEDIMENT	SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER	G = GRAB
BR = BRASS RING	HA = HAND AUGER
CS = COMPOSITE SAMPLE	H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER	HP = HYDRO PUNCH
DT = DRIVEN TUBE	SS = SPLIT SPOON
W = SWAB/WIPE	SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

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

LOCATION: SWMU S-18 PROJECT NO.: 42-00008SC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (soil) SAMPLE ID: S18-1SISH-GRAB2

SAMPLING METHOD: Grab-Trowel DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 1.5' YES ( ) NO (X)

GRAB (X) COMPOSITE ( ) DATE: 10-24-00 TIME: 1510

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
Glass/ 2oz	3	/	TOTALS	VOC	8260B
16oz	1	/		SVOC, METALS CL, SO4, Cyanide	8270
8oz.	2	...		TOC	
8oz	2	...		TOX	
16oz	2	...	TCLP/SPLP	TCLP/SPLP SVOCs/METALS	8270
2oz	2	1	TCLP/SPLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st /	COLOR: Bright Red/ORANGE	
2nd	ODOR: None	
	OTHER: Fine dust - Dry	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER: ___

MATRIX TYPE CODES

DC = DRILL CUTTINGS	SL = SLUDGE
WG = GROUND WATER	SO = SOIL
LH = HAZARDOUS LIQUID WASTE	GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE	WS = SURFACE WATER
SE = SEDIMENT	SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER	G = GRAB
BR = BRASS RING	HA = HAND AUGER
CS = COMPOSITE SAMPLE	H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER	HP = HYDRO PUNCH
DT = DRIVEN TUBE	SS = SPLIT SPOON
W = SWAB/WIPE	SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

URS
282 Delaware Avenue
Buffalo, New York 14
(716) 856-56

LOCATION: SWMU S-18 PROJECT NO.: 42-00008BSC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) SAMPLE ID: S18-LIME-COMP 1

SAMPLING METHOD: Trowel DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 1.5' YES ( ) NO (X)

GRAB ( ) COMPOSITE (X) DATE: 10-24-00 TIME: 1130

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
Glass/2oz	3		TOTALS	VOC	8260B
16oz	1			SVOC, METALS Cr, SO4, Cyanide	8270
8oz	2			TOC	
8oz	2			TOX	
16oz	2		TCLP/SPLP	TCLP/SPLP SVOCs/METALS	8270
2oz	2		TCLP/SPLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st N/A	COLOR: Bright white - wet	comp. of 26 lime pile pts
2nd	ODOR: No odor	
	OTHER:	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
SO = SOIL
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
G = GRAB
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

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

LOCATION: SWMU S-18 PROJECT NO.: 42-00008SC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) SAMPLE ID: S18-LIME-COMP2

SAMPLING METHOD: Trowel DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 1.5' YES ( ) NO (X)

GRAB ( ) COMPOSITE (X) DATE: 10-24-00 TIME: 1145

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
Glass / 2oz	3		TOTALS	VOC	8260B
16oz	1			SVOC, METALS Cl, SO_4, Cyanide	8270
8oz	2			TOC	
8oz	2			TOX	
16oz	2		SPLP/TCLP	TCLP/SPLP SVOCs/METALS	8270
2oz	2		SPLP/TCLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st	COLOR: Bright white - wet	Composite of 26
2nd N/A	ODOR: None	lime pilas
	OTHER:	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS	SL = SLUDGE
WG = GROUND WATER	SO = SOIL
LH = HAZARDOUS LIQUID WASTE	GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE	WS = SURFACE WATER
SE = SEDIMENT	SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER	G = GRAB
BR = BRASS RING	HA = HAND AUGER
CS = COMPOSITE SAMPLE	H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER	HP = HYDRO PUNCH
DT = DRIVEN TUBE	SS = SPLIT SPOON
W = SWAB/WIPE	SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

URS
282 Delaware Avenue
Buffalo, New York 14
(716) 856-5

LOCATION: SWMU S-18 PROJECT NO.: 42-00008BSC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) (WASTE) SAMPLE ID: S18-KISH-COMP 2

SAMPLING METHOD: TROWEL DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 1.5' YES ( ) NO (X)

GRAB ( ) COMPOSITE (X) DATE: 10-24-00 TIME: 1245

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
Glass/2oz	3		TOTALS	VOC	8260B
8oz	1			SVOC, METALS Cl, SO4, Cyanide	8270
8oz	2			TOC	
8oz	2			TOX	
16oz	2		TCLP/SPLP	TCLP/SPLP SVOCs/METALS	8270
2oz	2		TCLP/SPLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st N/A	COLOR: DRY - Bright Red/ORANGE	Composite of
2nd	ODOR: None	9 Kish piles
	OTHER: Very Fine + Dusty	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
SO = SOIL
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
G = GRAB
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

FIELD SAMPLING REPORT

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

LOCATION: SWMU S-18 PROJECT NO.: 42-00008BSC.15

SITE: BSC - LACKAWANNA

SAMPLE INFORMATION

MATRIX: SO (Soil) SAMPLE ID: S18-KISH-COMP1

SAMPLING METHOD: TROWEL DUP.REP. OF:

BEGINNING DEPTH: 1' MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: 1.5' YES ( ) NO (X)

GRAB ( ) COMPOSITE (X) DATE: 10-24-00 TIME: 1230

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS
GLASS/2oz	3		Totals	VOC	8260B
16oz	1			SVOC, METALS Cl, SO4, Cyanide	8270
8oz	2			TOC	
8oz	2			TOX	
16oz	2		TCLP/SPLP	TCLP/SPLP SVOCs/METALS	8270
2oz	2		TCLP/SPLP	TCLP/SPLP VOCs	8260B

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st	COLOR: Dry Bright Red/ORANGE	Composite of
2nd NA	ODOR: NONE	9 Kish piles
	OTHER: Very Fine + Dusty	

GENERAL INFORMATION

WEATHER: SUN/CLEAR X OVERCAST/RAIN ___ WIND DIRECTION ___ AMBIENT TEMP. 70°F

SHIPMENT VIA: FED-X X HAND DELIVER ___ COURIER ___ OTHER ___

SHIPPED TO: STL - Pittsburgh, PA

COMMENTS:

SAMPLER: M. Colmerauer OBSERVER:

MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
SO = SOIL
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
G = GRAB
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

URS

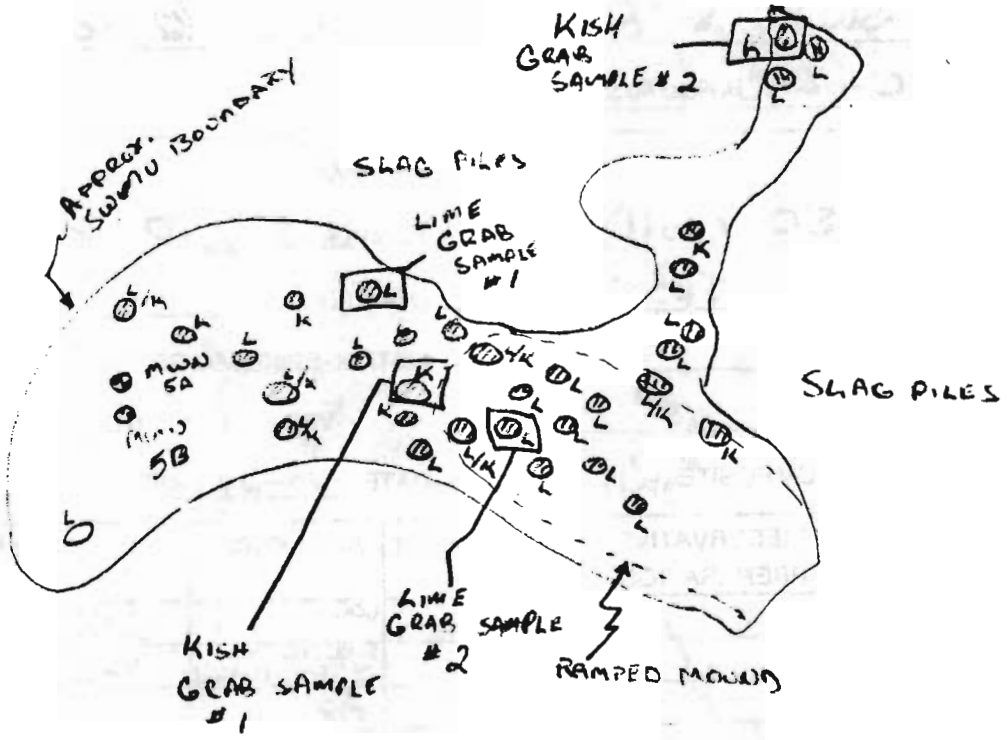
Page 1 of 1

Job BSC - LACKAWANNA, NY | Project No. 42.0008BS.15 | Sheet ___ of ___

Description SWMU S-18 SAMPLING LOCATIONS | Computed by MJC | Date 10/24/00

Checked by ___ | Date ___

Reference



(SWMU) - Approximate SWMU site location

L = LIME

K = KISH

LOCATION		SAMPLE NAME	DATE
Lime #1	=	S18 - LIME - GRAB 1	10/24/00
Lime #2	=	S18 - LIME - GRAB 2	
KISH #1	=	S18 - KISH - GRAB 1	
KISH #2	=	S18 - KISH - GRAB 2	

APPENDIX C

1992 ANALYTICAL DATA

ecology and environment, inc.
ANALYTICAL SERVICES CENTER, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-631-0360
International Specialists in the Environment

June 25, 1992

Mr. James Scherer
Bethlehem Steel Corporation
P.O. Box 310
Lackavanna, New York 14218

RE: 9201.459

Dear Mr. Scherer:

Attached is the laboratory report of the analysis conducted on one sample received at the Analytical Services Center on June 17, 1992. Analysis was performed by according to the procedures set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, U.S. EPA, 1986.

Under separate cover, you will be receiving an invoice for Job 9201.459.

The chain of custody form provided herein is integral to this report and must be included with the analytical results forms upon transferral to another data user.

The accuracy of all analyses depends upon the representative nature of the sample and the reliability of collection procedures as well as the accuracy of the laboratory analysis of the sample as submitted. Ecology and Environment, Inc.'s activity and representations with respect to this sample are limited solely to the laboratory analysis of the sample presented to us.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of $1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

Very truly yours,

Gary Hahn/kr

Gary Hahn, Manager
Analytical Services Center

GH/kr
Enclosure

ecology and environment, inc.

300 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 14086, TEL. 716/684-8060
International Specialists in the Environment

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Project No.: 256 | Project Name: SWMU- S-18 COMPOSITE | Project Manager: J SCHERER

Signature: (Signature) J Scherer | Field Team Leader:

STATION NUMBER	DATE	TIME	SAMPLE TYPE: COMP	GRAB	AIR	SAMPLE INFORMATION: EXPECTED COMPOUNDS (Concentration)*	STATION LOCATION	NUMBER OF CONTAINERS	REMARKS
1	6/17/92	1000	X			TCLP Metals	S-18	1	

Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Ship Via:
J Scherer	6/17/92					
Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Relinquished By: (Signature)	Date/Time	Received By: (Signature)	
Relinquished By: (Signature)	Date/Time: 6/17/92 1415	Received For Laboratory By: (Signature)	Relinquished By: (Signature)	Date/Time	Received For Laboratory By: (Signature)	Bill No. (Shipment) / Bolet

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

* CONCENTRATION RANGE on back of form.

234066

JUN 1992 RECEIVED

JOB NUMBER : 9201.459

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

LAB SAMPLE ID	CLIENT SAMPLE ID	TEST CODE	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
41449.01	S-18	STCHG 1	06/17/92	06/23/92	06/22/92
		STCICP1	06/17/92	06/23/92	06/23/92

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF TCLP SOLID SAMPLES

9201.459

(mg/L)

Parameter	E & E Laboratory No. 92-41449	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Arsenic		ND	ND	NC
Barium		ND	ND	NC
Cadmium		ND	ND	NC
Chromium		ND	ND	NC
Lead		ND	ND	NC
Selenium		ND	ND	NC
Silver		ND	ND	NC

ND = NOT DETECTED

NC = NOT CALCULABLE

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY FOR SPIKED TCLP SOLID SAMPLES

9201.459

(mg/L)

Parameter	E & E Laboratory No. 92-41449	Sample Result	Spiked Sample Result	Spike Amount	Percent Recovery
Arsenic		ND	5.2	5.0	104
Barium		ND	49	50	98
Cadmium		ND	0.90	1.0	90
Chromium		ND	4.6	5.0	91
Lead		ND	4.5	5.0	90
Selenium		ND	5.6	5.0	113
Silver		ND	0.85	1.0	85

ND = NOT DETECTED

NOTE: ALTHOUGH RESULTS ARE REPORTED AS ROUNDED VALUES, PERCENT RECOVERIES ARE CALCULATED DIRECTLY FROM THE RAW DATA.

Results of Analysis of TCLP Extracts Job Number :9201.459
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : BETHLEHEM STEEL CORPORATION
SAMPLE ID LAB : METHOD BLANK
MATRIX: SOLID
UNITS : MG/L

PARAMETER	RESULTS	Q	QUANTITATION LIMIT	REGULATORY LEVEL
Mercury	ND		0.020	0.20
Arsenic	ND		0.50	5.0
Barium	ND		5.0	100
Cadmium	ND		0.10	1.0
Chromium	ND		0.50	5.0
Lead	ND		0.50	5.0
Selenium	ND		0.50	1.0
Silver	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED QNT. LIMIT

ATTACHMENT 1

USEPA COMMENTS TO SWMU S-18
PRELIMINARY SWMU REPORT

RECVD. 7/12/93
RBA.

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

JUL 08 1993

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 completed the review of eight (8) Preliminary Solid Waste Management Units (SWMU) Assessment Reports, submitted by Bethlehem Steel Corporation (BSC). These assessment reports are:

1. Surface Impoundment B (SWMU S-2) dated 8/15/92
2. Surface Impoundment D (SWMU S-4) dated 8/15/92
3. Surface Impoundment F (SWMU S-6) dated 8/13/92
4. Surface Impoundment H (SWMU S-8) dated 8/15/92
5. Asbestos Landfill (SWMU S-12) dated 8/15/92
6. Lime Dust & Kish Landfill (SWMU S-18) dated 8/15/92
7. Landfill AA (SWMU S-19) dated 7/31/92
8. Surface Impoundment G (SWMU S-7) and Drying Area for Sludge from Impoundment F (SWMU S-20) dated 10/29/92.

In each of the eight 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. BSC recommends "no further action" for each SWMU.

The agencies disagree with BSC's conclusions in the assessment reports that all these SWMUs do not contain hazardous wastes and are not releasing hazardous constituents to the environmental media, and that no further investigatory action is necessary. Specific comments regarding these reports are attached to this letter. Section 2.0 of the attachment provides a summary of major issues identified during the review of these reports.

BSC needs to fully investigate SWMUs S-2, S-4, S-6, S-8, S-12, S-18, S-19 and S-7/S-20 in the RFI. Therefore, BSC needs to provide a workplan that will characterize the materials associated with each of the SWMUs along with any contamination originating from the SWMUs for agencies review and approval. Such workplan must be provided within 45 days of receipt of this letter.

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

Sincerely yours,

Andrew Bellina, P.E.
Chief, Hazardous Waste Facilities Branch
Air & Waste Management Division
USEPA, 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

Enclosures

cc: Stanley Radon, YSDEC, Region 9 w/encls.
Roger Murphy, NYSDEC w/encls.
Larry Thomas, NYSDEC w/encls.

2.0 SUMMARY OF MAJOR ISSUES

In each of the eight 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 SWMU. BSC recommends "no further action" for each SWMU based on one or more of the following claims:

- there is no record of hazardous wastes or constituents being deposited in the SWMU, and/or wastes deposited in the SWMU do not exhibit hazardous waste characteristics;
- analytical testing conducted on samples collected from the SWMU demonstrated that no hazardous constituents are present at or above appropriate regulatory levels; and
- RFI ground water monitoring data indicate that there exists no impact on ground water quality as a result of materials placed in the unit.

Several significant problems were identified regarding BSC's conclusions and recommendations for "no further action," including:

- Sufficient data exist to indicate that hazardous wastes and/or constituents were deposited in each SWMU. The RCRA Facility Assessment and other references on steel industry wastes (EPA, 1982; EPA, 1979) indicate that the materials deposited in SWMUs S-2, S-4, S-6, S-12, and S-7/S-20 contain hazardous constituents and/or wastes that are of concern to EPA; and that SWMUs S-8, S-18, and S-19 are suspected to contain hazardous constituents.

  In addition, Toxicity Characteristic Leaching Procedure (TCLP) and Extraction Procedure (EP) Toxicity[1] results confirm the presence of several hazardous constituents in SWMUs S-2, S-4, S-6, S-19, and S-7/S-20. The constituents detected include toluene, 1,1,1-trichloroethane, arsenic, barium, cadmium, chromium, lead, mercury, and selenium.

  Finally, data presented in Appendix A of the Preliminary SWMU Assessment Report for SWMU S-7/S-20 show samples collected from

[1] The TCLP data provided in the Preliminary SWMU Assessment Reports for SWMUs S-2, S-4, S-6, and S-7/S-20 are questionable. It appears that the TCLP extraction holding times for the majority of the parameters were exceeded. Thus, the TCLP results presented in these assessment reports are likely to be underestimates. In addition, the TCLP and EP Toxicity volatile organic compound results for SWMUs S-2, S-4, S-6, S-8, and S-7/S-20 are questionable and may also be underestimates because the samples were composited.

SWMUs S-2, S-4, S-6, and S-7 with lead levels ranging from 800 to 4000 parts per million (ppm).

- The analytical data presented in the Preliminary SWMU Assessment Reports do not demonstrate the absence of hazardous constituents at or above appropriate regulatory levels for any of the SWMUs. For SWMUs S-2, S-4, S-6, S-8, S-18, S-19, and S-7/S-20, BSC has only provided TCLP and/or EP Toxicity results for one or two composited waste samples. These methods are not appropriate for identifying and quantifying all hazardous constituents that may pose a hazard to human health or the environment. No analytical data were provided for SWMU S-12.

- The Phase I RCRA Facility Investigation (RFI) ground water monitoring data indicate that the materials deposited in SWMUs S-4 and S-7/S-20 may be impacting ground water quality. Several hazardous constituents, which could be originating from these SWMUs, have been consistently detected in samples collected from downgradient monitoring wells.

  Whether or not the remaining six SWMUs are impacting ground water cannot be evaluated at the present time, due to the absence of monitoring wells directly downgradient from each of these SWMUs.

Based on the RCRA Facility Assessment, technical references, and BSC's TCLP and EP Toxicity results it is clear that SWMUs S-2, S-4, S-6, S-18, S-19, and S-7/S-20 contain hazardous constituents that could pose a threat to human health and the environment. Therefore, a "no further action" determination for these units is inappropriate.

A "no further action" determination for SWMU S-12 is inappropriate since this unit contains asbestos and may also contain hazardous constituents as a result of other miscellaneous materials that were disposed in the unit. SWMU S-8 may contain hazardous constituents and warrants further investigation as well.

BSC needs to fully investigate SWMUs S-2, S-4, S-6, S-8, S-12, S-18, S-19, and S-7/S-20 in the RFI. The materials associated with each SWMU need to be fully characterized along with any contamination originating from the SWMU.

To adequately characterize the material in each SWMU, a representative number of individual grab samples need to be analyzed for the complete hazardous constituent list (Appendix A of the Phase I Final Work Plan, dated May 1990). The grab samples need to be collected at several locations and depths, including below the vertical extent of the waste. Samples should also be collected from any unique strata identified within the waste.

All samples must be analyzed using EPA-approved standard methods for direct constituent analysis of solid wastes (SW-846), and the resulting analytical data

to the atmosphere. The impact of this unit on ground water will need to be assessed as well.

Page 3, ¶2 Any asbestos which is not encapsulated or covered with soil or other materials could be dispersed by wind/air currents. BSC needs to identify all possible migration pathways and determine whether or not there has been a release of asbestos to these pathways.

8.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - LIME DUST AND KISH LANDFILL R (SWMU S-18)

8.1 General Comments

BSC states that there have been no releases of hazardous wastes or hazardous constituents to the environment from SWMU S-18, and therefore, recommends "no further action." However, the information provided in the Preliminary SWMU Assessment Report does not substantiate this recommendation.

8.2 Page-Specific Comments

Page 2, ¶2 It is not clear if the material placed in the Lime Dust and Kish Landfill R is at an elevation of 25 feet above lake level, or if the slag on which it was placed is at that elevation.

It is recommended that BSC calculate the approximate volume of material deposited in SWMU S-18.

Page 2, ¶4 The text states that an analysis for EP Toxicity Metals was performed on the composite sample; however, the data provided in Appendix A indicates that the sample was analyzed using the TCLP method.

BSC has not adequately identified and quantified the hazardous constituents contained in SWMU S-18. BSC has only provided TCLP metal results for one composited waste sample collected from SWMU S-18.

Additionally, BSC does not describe the locations from which the one composite sample was collected. It is stated that the composite sample was obtained from the "piles" but neither specific locations nor depths from which these samples were collected are identified.

To accurately characterize the material at SWMU S-18, a

representative number of individual grab samples need to be collected and analyzed for the complete hazardous constituent list. The grab samples should be collected at several locations and depths, including below the vertical extent of the waste. Samples should also be collected from any unique strata identified within the waste.

Page 2, ¶5 Although the steel slag may become "cementatous" in nature, it has a relatively high permeability and, therefore, would likely not act as a barrier to the migration of any contaminants via ground water flow. The RCRA Facility Assessment states that permeability tests conducted on the slag fill material yielded relatively high values that were approximately equivalent to values for sand and gravel.

Visual site inspections are useful for evaluating the surface conditions at sites but provide little or no information regarding subsurface conditions, especially in regards to contaminant migration. The discussion of the results of the visual inspection should clearly present the specific information that was obtained during the inspection (e.g., evidence of surface contamination, stability of the material deposited in the SWMU, dust generated by the discarded materials, any vegetation that may be present, etc.) and not make ambiguous statements about the results.

9.0 REVIEW OF PRELIMINARY SWMU ASSESSMENT REPORT - LANDFILL AA (SWMU S-19)

9.1 General Comment

BSC concludes that there have been no releases of hazardous wastes or hazardous constituents to the environment from SWMU S-19, and therefore, recommends "no further action." The Preliminary SWMU Assessment Report does not substantiate this conclusion and recommendation. A "no further action" determination is inappropriate for the following reasons.

- The RCRA Facility Assessment indicates that this unit received discarded materials from plant operations that may have contained hazardous constituents.

- Although the materials in SWMU S-19 have not yet been analyzed for total hazardous constituents, the TCLP results presented in Appendix B of the Preliminary SWMU Assessment Report demonstrate the presence of arsenic, barium, cadmium, and chromium in leachate samples of materials deposited in SWMU S-19 (i.e., steelmaking and ironmaking slag).

ATTACHMENT 2

DEED RESTRICTION

DECLARATION
OF
CONDITIONS, COVENANTS AND RESTRICTIONS

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

Dated: February 20, 1996

1-RC 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.