FINAL SITE INSPECTION REPORT
FOR
BOLIDEN METECH, INC.
PROVIDENCE, RHODE ISLAND

CERCLIS No. RID981885023
TDD No. 9104-42-AWS
Work Assignment No. 09-1JZZ

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Submittal date: February 19, 1993

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2/19/93
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2/19/93
QA Review Date

Work Order No. 4100-09-29-0007

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INTRODUCTION

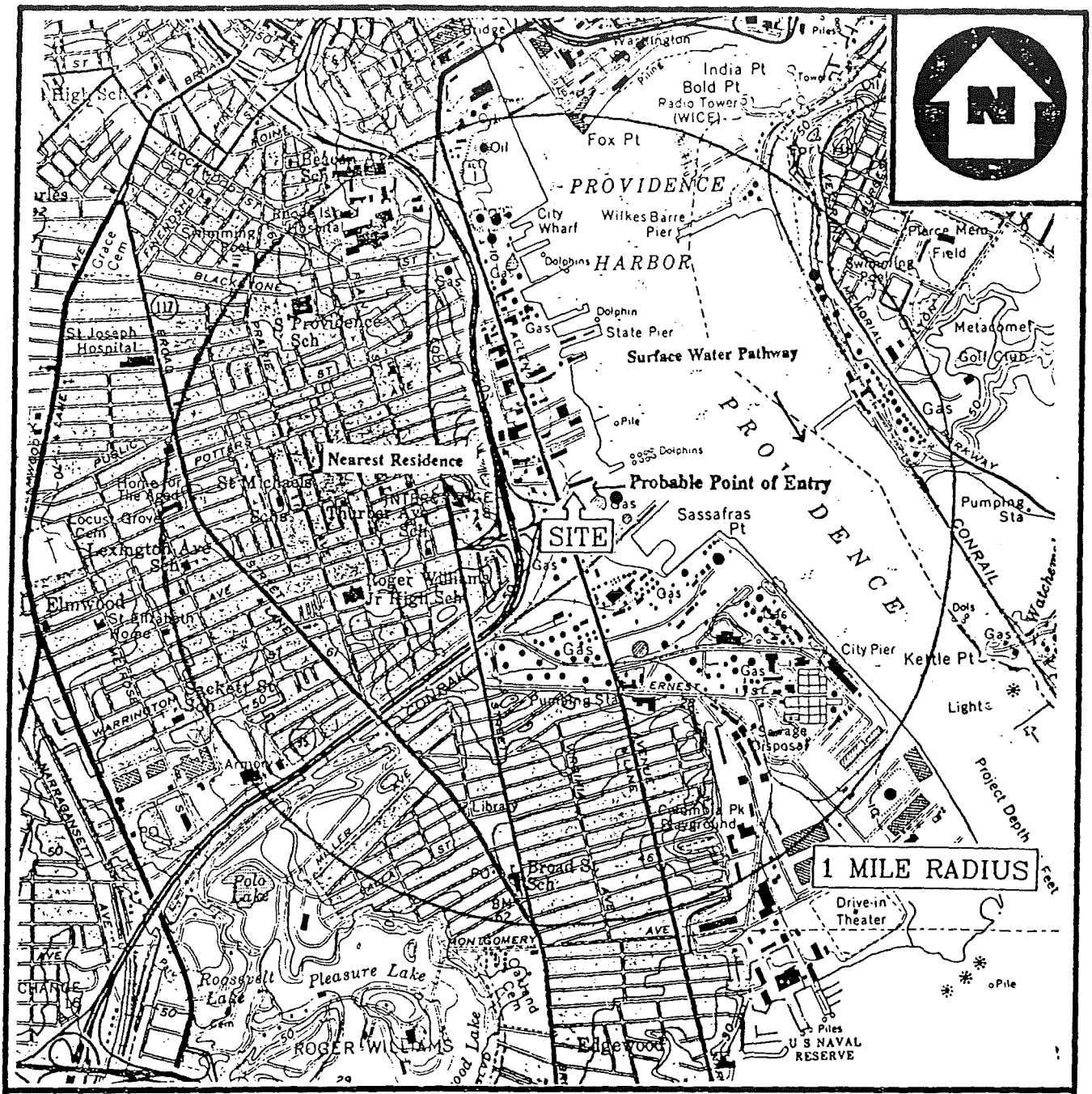
The Roy F. Weston, Inc. Alternative Remedial Contract Strategy (WESTON/ARCS) team was requested by the Region I U.S. Environmental Protection Agency (EPA) Waste Management Division to perform a Site Inspection of the Boliden Metech, Inc. site in Providence, Rhode Island. Tasks were conducted in accordance with the ARCS Contract, the Site Inspection scope of work, and technical specifications provided by the EPA under Work Assignment No. 09-1JZZ, which was issued to WESTON/ARCS on March 26, 1991. A Preliminary Assessment (PA) was prepared by the Rhode Island Department of Environmental Management (RI DEM) in April 1989. The PA reported that on-site metals shredding and storage activities resulted in the release of polychlorinated biphenyls (PCBs) to on-site soils. On the basis of the information provided in the PA report, the Boliden Metech, Inc. Site Inspection was initiated.

Background information used in the generation of this report was obtained through file searches conducted at the RI DEM, telephone interviews with town officials, conversations with persons knowledgeable of the Boliden Metech, Inc. site and conversations with other Federal, State and local agencies. Additional information was collected during the WESTON/ARCS on-site reconnaissance and environmental sampling on July 29, 1992.

This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State, or local regulations. Site Inspections are intended to provide a preliminary screening of sites to facilitate EPA's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

SITE DESCRIPTION AND REGULATORY HISTORY

The Boliden Metech, Inc. (Boliden) site is located at 434 Allens Avenue in Providence, Providence County, Rhode Island at latitude 41° 21′ 36″ and longitude 72° 07′ 04″ (Figure 1) [1]. The Boliden site consists of one parcel of land and an area beyond the mean low water line of the Providence River. According to the Providence Tax Assessor's map, the site corresponds to plat 47, lot 601 and shows land area of approximately 5.3 acres and water area of approximately 6.4 acres [5, 18]. The Boliden site and surrounding waterfront properties along Allens Avenue are zoned for maritime industrial use. Properties on the land side of Allens Avenue are zoned for heavy industrial use [4].



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 U.S.G.S. QUADRANGLE:
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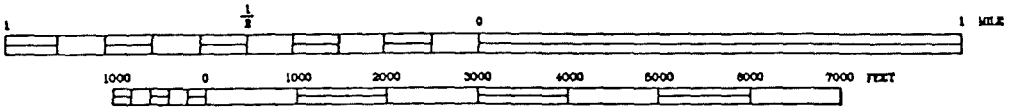


LOCATION MAP

BOLIDEN METECH, INC.
PROVIDENCE, RHODE ISLAND

WESTON MANAGERS DESIGNERS/CONSULTANTS

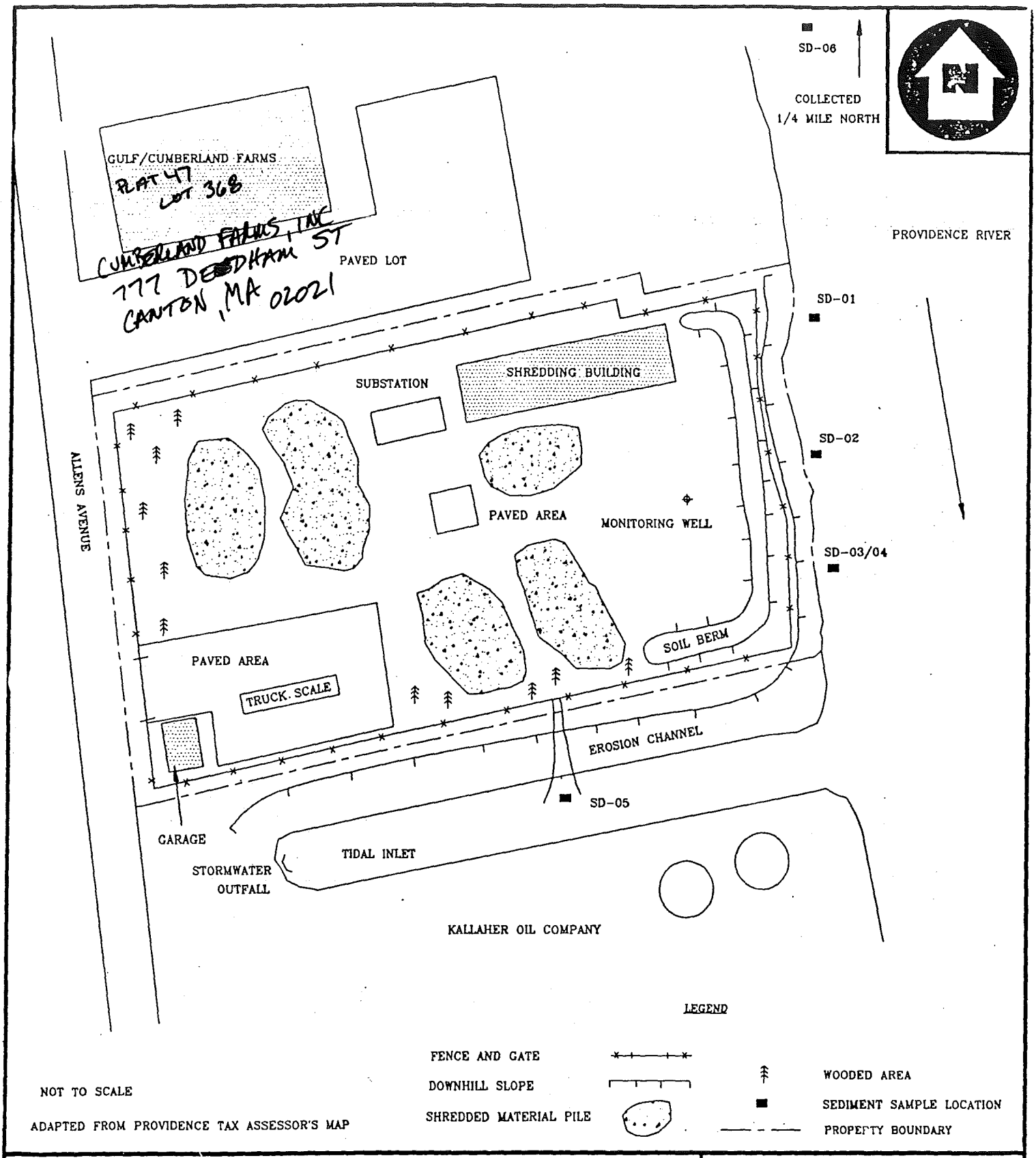
FIGURE 1

The site is bounded by the Providence River to the east, a tidal inlet to the south, Allens Avenue to the west, and property owned by Gulf/Cumberland Farms Company to the north [6]. Site topography is relatively flat but slopes along the intertidal area to the east and south where overland flow from the site is believed to drain to the Providence River [6]. The nearest residential properties are located approximately one-quarter mile west of the site beyond Route 95 [1].

During the WESTON/ARCS sampling trip, there were two buildings located on the Boliden property: a garage located in the southwest corner of the site adjacent to the main gate; and a segregating building located on the north side of the site (Figure 2) [6]. Other features on-site include a truck scale located east of the garage, paved areas located adjacent to the garage and south of the segregating building, and a shredder platform and substation (the shredder appeared to have been removed) located adjacent to the segregating building. The remainder of the site appeared to be unpaved with natural vegetation along the south side of the property. WESTON/ARCS also observed a chain link fence around the entire facility which serves to restrict vehicular and pedestrian traffic (Figure 2).

The Boliden site was formerly used as a metals processing and transfer facility. Prior site activities consisted mainly of shredding scrap computer parts, including circuit boards and capacitors; radios; and selected electronic components. Shredded material was subsequently shipped overseas to an affiliate Boliden facility for precious metals reclamation [2]. The Boliden site was used as a metals processing and transfer facility from 1980, when the hammer mill and rotary shear were installed, to 1989, when the facility discontinued shredding operations [3]. Shredded material piles are still present on-site, but the facility is inactive. According to the most recent file information, approximately 10.4 million pounds of shredded and non-shredded material were stockpiled on-site as of November 1990 [3]. This amount is believed to be the current total as no material has been reportedly taken off-site since then. Land use prior to 1980 could not be determined from available file information.

State and Federal agency involvement with Boliden began on April 25, 1986 when RI DEM conducted an inspection of the property to evaluate potential PCB contamination in piles of shredded materials [7]. During the inspection, RI DEM personnel collected a sample from a pile measuring approximately 10,000 cubic yards which extended into the Providence River [7, 53]. RI DEM returned in September 1986 to collect seven additional samples from shredded stockpiles on-site [8]. Source samples collected by RI DEM revealed elevated levels of PCBs in shredded material stockpiled on-site [7, 8]. In October 1986, RI DEM issued an immediate compliance order directing Boliden to berm or dike the property to prevent PCB migration to the Providence River, cover the contaminated scrap piles with an impervious material to prevent PCBs leaching to soil and groundwater, and submit a sampling plan to characterize the extent of PCB contamination at the site [9]. In December 1986, Boliden entered into a consent agreement with RI DEM to execute the provisions listed in the compliance order and submitted a sampling plan which was subsequently accepted by RI DEM [10, 11].



SITE SKETCH

BOLIDEN METECH, INC.
PROVIDENCE, RHODE ISLAND

WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 2

In November 1986, RI DEM notified EPA of activities at Boliden and requested EPA to determine jurisdiction over site operations [13]. Representatives of EPA and RI DEM performed an inspection of the Boliden site on December 18, 1986 under the Toxic Substances Control Act (TSCA) and collected three samples from on-site soils and shredded material [14]. The inspectors noted 14 piles of shredded material, which were segregated according to the origin or manufacturer of the material, stockpiled on-site at the time of the inspection. Also, a tarp covered one pile in accordance with Boliden's consent agreement with RI DEM.

In January 1987, Boliden contracted Thomas H. Cahill and Associates (Cahill) to conduct site activities in accordance with the sampling plan approved by RI DEM. The purpose of the investigation was to determine if PCB contamination contained in the stockpiles of shredded material was leaching into soils and groundwater. Cahill excavated one test pit under a pile of shredded material and collected groundwater samples from the water table within the test pit and soil samples above and below an identified clay layer in the test pit [12]. Cahill performed analysis of filtered and unfiltered aqueous samples and segregated soil samples by grain size. The report stated that PCBs were contained in the smallest soil particles and were not soluble in groundwater. Cahill concluded that no migration of PCBs had occurred at the Boliden site as a result of past shredding and storage operations [12].

In March 1987, EPA issued a notice of noncompliance to Boliden citing violations of PCB regulations under Title 40 of the Code of Federal Regulations, Part 761. Boliden was charged with disposing PCBs in on-site soils; improper storage, containment, and labeling; and unlawful distribution in commerce [15]. Boliden responded to these allegations asserting that the presence of PCBs at the site has not been adequately demonstrated through the analysis of three samples collected in December 1986 by EPA using gas chromatography/electron capture detection (GC/ECD). Boliden claimed the analytical method was inadequate and therefore denied that the company violated regulations cited by EPA [16].

In January 1988, EPA obtained a magistrate warrant under TSCA to conduct an inspection of the Boliden facility to determine if site activities were in compliance with TSCA and to determine if PCBs have been released into the environment as a result of site operations [17]. During the inspection, several samples were collected including soils samples, capacitor samples, and wipe samples.

On March 10 and 11, 1988, EPA obtained a magistrate warrant under TSCA and CERCLA to collect 134 samples for PCBs and 13 samples for total metals at the Boliden facility [19, 20]. Samples were collected of shredded material piles, on-site soil, dust, and capacitors. At the time, there were 18 piles of shredded material totaling approximately 5.5 million pounds [24]. There were also 10 piles of unshredded material present during the site visit. Based on the analytical data reported from these samples and visual observations made by EPA inspectors, EPA maintained Boliden was in violation of TSCA under Section 40 of the Code of Federal Regulations (CFR), Part 761, Subparts C and D which regulate improper storage, labeling, and disposal of PCB containing materials [19, 20, 21].

In November 1988, Boliden contracted Cahill to satisfy EPA demands to complete an extent of contamination study to characterize PCB migration at the site. Cahill was retained to conduct a site investigation to determine the concentration, chemical form, and the potential migration of PCBs contained in shredded and unshredded stockpiles on-site [2]. The sampling program focused primarily on soil and subsurface samples only, not on actual source samples. Cahill collected 143 fractional samples from seven test pits which were excavated to an average depth of 7 feet. At each test pit, samples were collected of the surface material; defined by Cahill as the upper 6 to 14 inches; and at the upper, middle, and lower intervals of the test pit wall. In addition, three surface material samples were collected in other areas on-site.

Cahill separated each sample into four particle sizes using sieves which segregated sample particles into 4.750 millimeters (mm), 2.000 mm, 0.500 mm, and 0.053 mm sizes. The largest particle fraction samples were analyzed using EPA Methods 625 and 8080 with both a hexane/acetone extraction and deionized water extraction to simulate the leaching of PCBs by rainwater. Analysis of the four particle fractions indicated the smallest particles generally contained higher concentrations of PCBs. The results of the study showed that using the hexane/acetone extraction, only the surface layer had measurable concentrations of total PCBs. The highest level was recorded adjacent to the metal separation building and the lowest concentration was recorded in the western portion of the site. The study concluded that PCBs in the upper layer were not mobile in this horizon and did not appear to be mixing with subsurface soils. These findings were supported by Cahill's water extraction results which indicated that PCBs present in the shredded material piles were not leaching into the subsurface or groundwater under normal rainfall and drainage conditions.

On April 4, 1989, EPA filed a civil complaint against Boliden under TSCA maintaining that the property was contaminated with PCBs as a result of past operations at the site [22]. The complaint demanded that Boliden take immediate interim protective measures to reduce health and environmental risks resulting from PCB contamination, undertake an extent of contamination study to characterize PCB contamination on-site, dispose of PCB contaminated material in accordance with TSCA, and pay civil penalties for past violations of TSCA and the Rivers and Harbors Act [22]. In April 1990, EPA reviewed the 1988 Cahill report and concluded that the data on which the conclusions were based was deficient in several areas, mostly relating to sample detection limits [2].

On April 28, 1989, RI DEM completed a PA of the site under CERCLA [23]. RI DEM noted 13 piles of shredded material and three piles of unshredded material stored on-site. RI DEM did not enter the property, but indicated the site was operational and that a fence and soil berm surrounded the site. The PA consisted of a review of previous work conducted at the site and a perimeter survey. The PA recommended a medium priority Site Inspection.

On November 5, 1990, Boliden entered into a consent decree which settled claims filed in EPA's civil suit of April 1990 [25]. Under the terms of the decree, Boliden agreed to conduct additional site characterization, cleanup, and disposal activities, and to discontinue shredding operations at the site. Past analytical methods used by EPA involved GC/ECD for the determination of PCB oil spills in soils. Boliden contended that this method was

inappropriate in qualifying and quantifying PCB analytes in the complex matrices found on-site. As a result, Boliden developed an analytical method for the determination of PCBs in non-homogeneous solids, such as shredded and non-shredded circuit boards and capacitors, radios, and other electronic components [3]. Boliden is currently working with EPA to fulfill the requirements of the consent decree. To date, Boliden has completed the characterization of the shredded material piles using the analytical method developed by Boliden. Additional work is planned for the disposal of the shredded material piles and surface cover as defined during the site characterization phase.

WESTON/ARCS conducted a site reconnaissance and sediment sampling on July 29, 1992 of the Boliden site. Field work was limited to off-site areas as site access was not granted by the property owner. During the perimeter survey, WESTON/ARCS observed approximately five separate shredded material piles which were covered with tarp and secured by rope and tires. Seven sediment samples were collected at six locations, including reference and duplicate samples. WESTON/ARCS did not observe sediment staining or detect elevated concentrations of organic compounds at any of the sampling locations.

According to file information, EPA RCRA has not been involved in site characterization or remediation at the Boliden facility. The RCRA program is currently evaluating the applicability of RCRA regulations to this facility. According to a site employee, Boliden made one shipment of shredded material in 1986 to an affiliate facility in Sweden. This was reportedly the only shipment made since they purchased the property in 1983 [14]. Boliden was not listed in the RCRA Generators by Town report as of October 28, 1991 and no information was located suggesting Boliden used or generated hazardous substances other than those previously discussed.

Table 1 lists sites reported on the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) which were located within one mile of the Boliden site as of October 13, 1992 [35]. In addition, approximately 697 RCRA notifiers in the City of Providence and approximately 222 RCRA sites in the City of East Providence are located within a one-mile radius of the Boliden site according to the U.S. EPA RCRA Generators in Region I Active and Inactive by Town report as of October 28, 1991 [36].

Table 1

CERCLA Facilities Within One Mile of Boliden Metech, Inc.

Site Name	Facility I.D.	Address	Distance/Direction
Bosco Trucking	RID075705327	Rugby and Pavilion Streets	1 mile southwest
E.W. Audet & Sons, Inc.	RID981885031	169 Bay Street	1/4 mile north/northwest
Fields Point Disposal Area	RID981064058	New York Avenue	3/4 mile southeast
Northland Environmental, Inc.	RID040098352	275 and 252 Allens Avenue	1/4 mile north/northwest
Texaco USA, Inc.	RID059741520	520 Allens Avenue	1/4 mile south/southeast

OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

The Boliden site operated as a resource recovery facility from 1983 to 1989. Boliden was engaged in the reclamation of precious metals and minerals from scrap materials which were received in bulk form, shredded, sampled, categorized, and accumulated for shipment to smelters overseas for pyrometallurgical refining [16]. The primary metals of interest to Boliden were gold, platinum, silver, and copper. Boliden purchased the site from Refine Met International (Refine Met) in 1983. Refine Met reportedly used the property for the same purpose since 1979, including extensive recycling of white goods and scrap metal [23]. No file information was available which described on-site activities while Refine Met occupied the property. However, both Boliden and Refine Met had similar operations in that they may have led to the accumulation of inorganics and petroleum products in on-site soils. From 1972 to 1979, the property was owned by Texaco, Inc. Prior to 1972, the site was owned by various parties including U.S. Lumber Company and Putnam Lumber Company [23]. Information regarding operational history prior to 1979, including when the site was originally developed, was unavailable from existing file records.

From 1979 to 1989, on-site operations involved the receipt of scrap computers, radios, copy machines, and other similar items for metals reclamation, some of which contain capacitors [51]. Capacitors manufactured prior to the 1970s frequently contained dielectric fluid composed of PCBs. After shredding, scrap equipment containing PCBs was reduced in size to a few inches in length. In this process, dielectric fluid, contained in the capacitors, was reportedly released to the shredded material. The shredded material was then sorted in piles according to the manufacturer or type of material. The piles were stored directly on soil with no lining material or cover. After years of operation, a surface layer developed over the entire site which was composed of finely shredded material. In November 1988, this layer was reported at depths from 6 to 14 inches below surface and was estimated at 4,800 cubic yards [2]. Past source sampling conducted by EPA and RI DEM documented the presence of PCBs in shredded material piles over regulatory limits. Consequently, the shredded material piles and the surface layer of the site are considered potential sources of PCB contamination. In March 1988, EPA collected 13 source samples for total metals at the Boliden site. Results of these analyses revealed elevated concentrations of cadmium, lead, mercury, selenium, and silver in total metals concentrations. Based on these analyses, the shredded material piles and surface cover material are also considered potential sources of metals contamination. Since site access was not granted, a detailed summary of other on-site potential source areas (if present) could not be identified.

Table 2 presents structures or areas on the Boliden site that are potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

Table 2

Source Evaluation for
Boliden Metech, Inc.

Potential Source Area	Containment Factors	Spatial Location
Shredded Material	Tarp cover with soil berm	Multiple stockpiles on-site
Surface Cover	None	Top 6 to 14 inches of surface cover material

Table 3 summarizes the types of potentially hazardous substances which have been disposed, used or stored on the Boliden property.

Table 3

Hazardous Waste Quantity for
Boliden Metech, Inc.

Substances	Quantity	Years of Storage	Years of Disposal	Source Area
PCBs and metals	10.4 million pounds	1979 to 1989	1979 to 1989	Stockpiled material
PCBs and metals	4,800 cubic yards	1979 to 1989	1979 to 1989	Surface cover

WASTE/SOURCE SAMPLING

From 1986 to 1988, extensive sampling activities have been conducted at the Boliden site by RI DEM, EPA, and Boliden representatives. Samples have included shredded material, ground cover, soil, and groundwater matrices with analyses limited generally to PCBs. Additional analyses have included hazardous substance list metals, dioxin, and dibenzofuran. Table 4 provides a partial summary of maximum concentrations detected during prior sampling activities. Complete analytical results of these data and prior sampling locations, if available, are presented in Attachments A through G. These data indicate the presence of elevated levels of PCBs and total metals in source samples with lower levels detected in subsurface soils. Sampling conducted by EPA and RI DEM focused primarily on source identification to demonstrate the presence of PCBs in shredded material piles.

Table 4

Summary of Analytical Results for Boliden Metech, Inc. Samples Collected by RI DEM, EPA, and Boliden

Sampling Date	Sample Type	Maximum Concentration	Compound or Element Detected	Sampling Location	Sampling Organization
04/25/86	Source pile	48 ppm 153 ppm 0.013 ppm	Aroclor 1254 Aroclor 1242 EP TOX Selenium	Adjacent to river	RI DEM
09/18/86	Source piles	1,400 ppm 370 ppm	Aroclor 1242 Aroclor 1254	Various locations	RI DEM
12/18/86	Source piles	350 ppm	Aroclor 1242/1254	Various locations	EPA TSCA
01/16/87	Surface water	240 ppb 80 ppb	Aroclor 1242 Aroclor 1254	Test Pit No.1	Boliden
01/29/88	Source piles, soil, wipe	780 ppm 560 ppm	Aroclor 1242 Aroclor 1254	Various locations	EPA TSCA
03/10/88	Soil	460 ppm 690 ppm 35 ppm 1,060 ppm 684 ppm 9,150 ppm 283 ppm 94,700 ppm 4,890 ppm 281 ppm 141 ppm 592 ppm 0.93 TE	Aroclor 1242 Aroclor 1254 Arsenic Barium Cadmium Calcium Chromium Copper Lead Mercury Selenium Silver Dioxin/Dibenzofuran	Various locations	EPA TSCA
11/22/88	Source (6 to 12 inches) Soil (upper 3rd) Soil (middle 3rd) Soil (lower 3rd)	567 ppm 7.65 ppm ND 1.54 ppm	Total PCBs Total PCBs Total PCBs Total PCBs	Test Pits 2 to 11	Boliden

EP TOX = Extraction Procedure Toxicity.
TE = Toxicity Equivalents.
ppm = Parts per million.
ppb = Parts per billion.
ND = Not detected.

[2, 7, 8, 12, 14, 17, 21]

Sampling conducted by Cahill has demonstrated that PCBs detected in subsurface soils have considerably lower concentrations than source samples, suggesting that PCBs on-site have low mobility and are insoluble under normal conditions. However, these results also identify data gaps with respect to site characterization and extent of contamination analysis for metals. Most metals detected on-site exceed naturally occurring concentrations, particularly cadmium, mercury, selenium, and silver, which have been detected on-site at 600 to 11,000 times concentrations which occur naturally in soils (Table 4).

GROUNDWATER PATHWAY

Overburden in the area of the Boliden property is mapped as artificial fill [49]. In 1988, Cahill excavated 10 test pits to evaluate PCB migration in subsurface soils. This work indicated that the upper 6 to 14 inches of ground cover at the site is composed of finely shredded material [2]. The subsurface below 14 inches reportedly contains other imported materials, such as construction debris, cinder-like deposits, bricks, and remnants of waterfront piers and bulkheads which were likely deposited over the past century. The test pits show that the subsurface to a depth of seven feet also consists of imported soil and fill material deposited through filling and dumping during the past century. Sand and gravel were predominant in test pits. A clay layer was encountered in one test pit, but was not observed in the other 10 test pits. None of the layers encountered were considered natural soil, nor were sedimentary deposits or stratification encountered in the subsurface horizon. The test pits revealed that groundwater beneath the site is tidally influenced as water levels in open test pits fluctuated with the tides.

Bedrock beneath the property is mapped as Rhode Island Formation, a member of the sedimentary rocks of Narragansett Basin. Bedrock of this formation are a greenish to dark-gray and black graywacke conglomerate with sandstone, shale, and meta-anthracite [50]. During the 1987 and 1990 subsurface investigations, bedrock was not encountered in test pits on-site at depths up to eight feet below ground surface. No other information was available to document depth to bedrock. According to data obtained during the 1987 site investigation, depth to groundwater on the property ranges from 4 to 8 feet below surface [12]. The Boliden site receives an average of 45.3 inches of precipitation per year [42].

No public or private groundwater wells are located within 4 miles of the Boliden site [27, 28, 29, 30, 31, 32, 33, 34]. The closest public water supply source to the site is the Newman Avenue well field located in the Town of Seekonk, Massachusetts approximately 5 miles northeast of the site. The Scituate Reservoir, which is located approximately 10 miles east of the site, supplies the greater Providence area with municipal water. The nearest private drinking water wells are located in the City of Cranston approximately 5 miles west of the site [28, 29, 30, 31].

According to file information, one monitoring well has been installed on-site. However, no file information was available regarding the well's construction or previous sampling events. Boliden has proposed the installation of eight additional monitoring wells under the consent decree with EPA. No additional information was available regarding the groundwater monitoring program at the site.

SURFACE WATER PATHWAY

The site is bounded by the Providence River to the east and a tidal inlet to the south. In November 1988, Cahill reported that no overland pathway, such as ditches, swales, or channels, exists from the site to the adjacent Providence River [2]. Cahill asserted that surface water at the site percolates to subsurface soils and groundwater. A test pit excavated by Cahill in 1987 indicated a direct interaction of shallow groundwater with tidal cycles indicating the presence of a groundwater to surface water pathway and high soil permeability. Based on site conditions, Cahill reported that PCB migration to the Providence River or tidal inlet is dependent on leaching from the shredded piles to groundwater. Results of groundwater samples collected from the test pit showed PCB concentrations up to 23 parts per billion (ppb) in unfiltered samples and less than the 1 ppb detection limit in filtered samples. Cahill concluded that PCBs on-site are insoluble in water and, therefore, could not migrate to the Providence River [2]. WESTON/ARCS could not confirm prior Cahill reports regarding overland flow from the site to the Providence River or tidal inlet. During the WESTON/ARCS sampling trip, a soil berm, which was constructed in 1987, extended the length of the site along the Providence River. No signs of overland flow from the site were observed by WESTON/ARCS while sampling in this area. However, an eroded channel leading from the site was observed along the tidal inlet. The channel was observed originating at the top of the bank directly under the chain link fence surrounding the site. It appeared that a berm was not present in this area and that this represented the probable point of entry (PPE) of overland flow from the site to surface water. According to RI DEM file information, no catch basins are located on-site.

Overland flow and groundwater to surface water entering the Providence River flows approximately 6 miles south to Narragansett Bay, then continues 9 miles south to Hope Island where the 15-mile surface water pathway is completed [38, 39, 40, 41]. The Providence River and Narragansett Bay are primarily utilized for commercial and recreational boating and recreational fishing. The Rhode Island Division of Water Resources has designated surface water uses downstream to Warwick and Popasquash points as suitable for swimming and conditional shellfishing and south of Warwick and Popasquash points as clean water suitable for swimming and shellfishing [37]. Commercial and recreational fishing and lobstering are not restricted along the 15-mile surface water pathway. However, no commercial fishing, shellfishing, or lobstering is believed to occur within 15 downstream miles of Boliden [37]. No drinking water intakes or United States Geological Survey stream gauging stations are located along the 15-mile surface water pathway [43, 47]. The Boliden site is in the 100-year floodplain [46].

The State of Rhode Island Department of Environmental Planning and Development indicated that no State-listed rare or ecologically significant natural communities under their jurisdiction are known to occur in the vicinity of the Boliden site, including tidally influenced areas upstream and 15 miles downstream of the site [44]. The U.S. Department of Interior, Fish and Wildlife Service indicated that no Federally-listed or proposed threatened or endangered species under their jurisdiction are known to occur within a one-mile radius of the site, tidally influenced areas upstream of the site, or along the 15-mile downstream pathway with the exception of occasional transient endangered bald eagles and peregrine falcons [45]. Numerous coastal wetlands and special aquatic sites are located along the 15-mile surface water pathway [38, 39, 40, 41]. These occur primarily along the shorelines, coves, and islands of the Providence River and

Narragansett Bay. The nearest coastal wetland to the PPE is approximately 2 miles downstream along the east shore of Providence River. This wetland has a frontage of approximately 1,200 feet. Other nearby coastal wetlands occur at Gaspee Point and Drown Cove approximately 4 miles downstream of the PPE. Approximately 1.7 miles of coastal wetland frontage occur along the Providence River and approximately 7.8 miles of coastal wetland frontage occur along the Narragansett Bay [38, 39].

On July 29, 1992, the WESTON/ARCS team conducted sampling at the Boliden site. Six sediment samples were collected at five locations beyond mean low tide water, including reference and duplicate samples (Table 5). WESTON/ARCS also collected an equipment rinsate sample using High Purity Liquid Chromatography water and deionized water after collecting sediment samples from location SD-01. A trip blank sample was not prepared as target analyses did not include volatile organic compounds. The samples were collected in accordance with the protocols outlined in the WESTON/ARCS Task Work Plan for On-site Reconnaissance and Soil Sampling [26]. Sediment samples collected by WESTON/ARCS were submitted for PCB/pesticides and total metals through the EPA Contract Laboratory Program (CLP). A change in the WESTON/ARCS Task Work Plan regarding sampling locations occurred due to access problems encountered by WESTON/ARCS. The revised sampling locations are presented in Table 5 and shown on Figure 2. WESTON/ARCS collected six sediment samples from the Providence River (Table 5).

Table 6 is a summary of compounds and elements detected through CLP analyses of WESTON/ARCS samples. For each sample location, a compound or element is listed if it was detected at three times or greater than the reference sample concentration. Compounds or elements which occurred at a concentration three times or greater than the reference concentration (sample location SD-06) are designated by their approximate relative concentration above the reference value. If the element or compound was not detected in the reference sample, that sample's quantitation limit (for organic analyses) or detection limit (for inorganic analyses) is used as the reference value. These compounds or elements are listed only if they occurred at a value equal to or greater than that location's sample quantitation limit or sample detection limit. Compounds whose detected concentrations were less than three times the sample quantitation limit or sample detection limit are listed simply as "Detected."

Complete analytical results of the WESTON/ARCS sampling activities including quantitation and detection limits are presented in Attachment H. Sample results qualified with a "J" on the analytical tables are considered approximate because of limitations identified during the CLP data validation.

No PCBs or pesticides were detected in sediment samples collected by WESTON/ARCS on July 29, 1992. The absence of PCBs in sediment samples at depths of 10 to 15 inches supports earlier Cahill reports which asserted that PCBs on-site are insoluble and not readily mobile. However, these data are inconclusive in eliminating off-site migration entirely as they represent a limited sedimentary horizon and do not account for potential contamination at other depths.

Table 5

Sample Summary: Boliden Metech, Inc.
Samples Collected by WESTON/ARCS on July 29, 1992

Sample Location No.	Traffic Report No.	Time	Remarks	Sample Depth	Sample Source
MATRIX: Sediment					
SD-01	AAQ86 MAW847	1545	Grab	12 to 15 inches	Providence River; 10 feet south of northeast corner of property
SD-02	AAQ87 MAW848	1530	Grab	12 to 15 inches	Providence River; 70 feet south of northeast corner of property (MS/MSD for quality control)
SD-03	AAQ88 MAW849	1510	Grab	12 to 15 inches	Providence River; 150 feet south of northeast corner of property
SD-04	AAQ89 MAW850	1510	Grab	12 to 15 inches	Duplicate of SD-03 for quality control
SD-05	AAQ90 MAW851	1450	Grab	12 to 15 inches	Tidal inlet along south side of property; observed drainage pathway from site
SD-06	AAQ91 MAW852	1430	Grab	12 to 15 inches	Providence River; upstream sediment adjacent to Jet-Line Services, Inc. approximately one-half mile north of site
MATRIX: Aqueous					
RB-07	AAQ92 MAW853	1600	Grab	Not Applicable	Sampling equipment rinsate blank for quality control

MS/MSD = Matrix Spike/Matrix Spike Duplicate.

Table 6

Summary of Analytical Results for Sediment Samples at
Boliden Metech, Inc.

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SD-02 (MAW848)	Calcium	43,500 J ppm	2,270 J ppm	19 x REF
SD-03 (MAW849)	Copper	1,070 J ppm	235 J ppm	4 x REF
SD-05 (MAW851)	Barium	640 J ppm	95.4 J ppm	6 x REF
	Cadmium	7.3 ppm	0.48 SDL ppm	15 x SDL
	Lead	5,700 ppm	357 ppm	15 x REF
	Selenium	4.2 J ppm	1.1 J ppm	3 x REF

REF = Reference Concentration.
SDL = Sample Detection Limit.
J = Quantitation is approximate due to limitations identified during the quality control review.
ppm = Parts per million.

Six elements were detected in sediment samples which revealed concentrations more than three times the reference value. The presence of inorganic elements with concentrations exceeding the reference value was limited to sample locations SD-02, SD-03, and SD-05 which revealed barium, cadmium, calcium, copper, lead, and selenium. Sediments revealed concentrations of barium up to six times the reference value, cadmium up to 15 times the sample detection limit, calcium up to 19 times the reference value, copper up to four times the reference value, lead up to 15 times the reference, and selenium up to three times the reference value. The highest concentration of inorganic elements occurring above the reference value was reported at sample location SD-05, collected in the tidal inlet which bounds the property to the south. The detection of these elements supports a release of site contaminants via overland flow to the tidal inlet and the Providence River. A stormwater outfall located along Allens Avenue may also contribute to the elevated concentrations in the tidal inlet. The Narragansett Bay Commission indicated that this is a combined sewer outfall connected to catch basins along Allens Avenue and occasionally receives raw sewage during heavy rain events. Other potential sources, including Broomfield and Sons, a scrap metal company, are located along Allens Avenue which may contaminate stormwater run-off. According to available file information, no other surface water or sediment samples have been collected from Providence River in connection with the Boliden site.

SOIL EXPOSURE PATHWAY

The nearest residence is approximately 1,100 feet west of the Boliden property beyond Route 95 (Figure 1) [38]. There are no residences, schools or day-care facilities within 200 feet of a

potential source area. There are no on-site workers or on-site terrestrial sensitive environments. An estimated 14,090 people are within one mile of the property [48].

AIR PATHWAY

The nearest individual to the site is located 50 feet west of the property along Allens Avenue at Lehigh Metals Corporation (Figure 2) [2]. Table 7 summarizes the population within 4 miles of the site. There are an estimated 186,894 people within a 4-mile radius of the Boliden site [48, 52]. In addition, there are no State or Federally-listed or proposed threatened or endangered species within 4 miles of the Boliden site with the exception of occasional transient endangered bald eagles and peregrine falcons [45]. Sensitive environments within 4 miles of the site consist of approximately 50 acres of coastal and fresh water wetlands, a majority of which occur 3 to 4 miles east of the site. No wetlands are located within a one-mile radius of the site.

Table 7

Estimated Population Within Four Miles of Boliden Metech, Inc.

Radial Distance From Boliden Metech, Inc. (miles)	Estimated Population
On-site	0
0.00 < 0.25	250
0.25 < 0.50	804
0.50 < 1.00	13,036
1.00 < 2.00	42,974
2.00 < 3.00	62,757
3.00 < 4.00	67,073
TOTAL	186,894

[48]

SUMMARY AND CONCLUSIONS

The Boliden Metech, Inc. (Boliden) site is located at 434 Allens Avenue in Providence, Providence County, Rhode Island at latitude 41° 21′ 36″ and longitude 72° 07′ 04″. The Boliden site consists of one parcel of land with an area beyond the mean low water line. According to the Providence Tax Assessor's map, the site corresponds to plat 47, lot 601 and shows land area of approximately 5.3 acres and water area of approximately 6.4 acres. The Boliden site operated as a resource recovery facility engaged in the reclamation of precious metals and minerals from 1983 to 1989 and is currently inactive. Scrap materials were

received in bulk form, shredded, sampled, categorized, and accumulated for shipment to smelters overseas for pyrometallurgical refining. The primary metals of interest to Boliden were gold, platinum, silver, and copper. Prior site activities consisted mainly of shredding scrap computer parts, including circuit boards and capacitors; radios; and selected electronic components. Capacitors manufactured prior to the 1970s frequently contained dielectric fluid composed of polychlorinated biphenyls (PCBs). Boliden purchased the site from Refine Met International (Refine Met) in 1983. Refine Met reportedly used the property for the same purpose since 1979, including extensive recycling of white goods and scrap metal [23]. No file information was available which described on-site activities while Refine Met occupied the property. However, both Boliden and Refine Met had similar operations in that they may have lead to the accumulation of inorganics and petroleum products in on-site soils. From 1972 to 1979, the property was owned by Texaco, Inc. Prior to 1972, the site was owned by various parties including U.S. Lumber Company and Putnam Lumber Company.

State and Federal agency involvement with Boliden began on April 25, 1986 when the Rhode Island Department of Environmental Management (RI DEM) conducted an inspection of the property which revealed elevated levels of PCBs in stockpiles shredded material. In October 1986, RI DEM issued an immediate compliance order directing Boliden to take immediate measures to prevent PCB migration to the environment. In November 1986, RI DEM notified the U.S. Environmental Protection Agency (EPA) of activities at Boliden and requested EPA to determine jurisdiction over site operations. Subsequently, EPA performed numerous site inspections under the Toxic Substances Control Act (TSCA) which included source sampling. In March 1987, EPA issued a notice of noncompliance to Boliden citing violations of PCB regulations under Title 40 of the Code of Federal Regulations, Part 761. Boliden was subsequently charged with disposing PCBs in on-site soils, improper storage, containment, and labeling, and unlawful distribution in commerce. In April 1989, EPA filed a civil complaint against Boliden under TSCA maintaining that the property was contaminated with PCBs as a result of past operations at the site. In November 1990, Boliden entered into a consent decree which settled claims filed in EPA's civil suit of April 1990. Under the terms of the decree, Boliden agreed to conduct additional site characterization, cleanup, and disposal activities, and to discontinue shredding operations at the site. Boliden is currently working with EPA to fulfill the requirements of the consent decree.

From 1986 to 1988, extensive sampling activities were conducted at the Boliden site by RI DEM, EPA, and Boliden representatives. Samples have included shredded material, soil, site surface water, and groundwater matrices with analyses limited to generally PCBs and total metals. Prior analytical data indicated the presence of elevated levels of PCBs and total metals in source samples with lower levels detected in subsurface soils. Past analyses has detected Aroclor 1242 up to 1,400 parts per million (ppm) and Aroclor 1254 up to 690 ppm. Past metals analysis revealed that a majority of metals detected on-site exceed naturally occurring concentrations, particularly cadmium, mercury, selenium, and silver, which have been detected on-site at 600 to 11,000 times their naturally occurring concentrations.

No public or private groundwater wells are located within 4 miles of the Boliden site. The closest public water supply source to the site is the Newman Avenue well field located in the Town of Seekonk, Massachusetts approximately 5 miles northeast of the site. The nearest private drinking water wells are located in the City of Cranston approximately 5 miles west of the site.

The site is bounded by the Providence River to the east and a tidal inlet to the south. During the Roy F. Weston, Inc. Alternative Remedial Contract Strategy (WESTON/ARCS) sampling trip, an eroded channel leading from the site was observed along the tidal inlet. It appeared that a berm was not present in this area and that this situation represented the probable point of entry (PPE) of overland flow from the site to the surrounding surface water. Overland flow and groundwater entering the Providence River flows approximately six miles south to Narragansett Bay where the 15-mile surface water pathway is completed. The Providence River and Narragansett Bay are primarily utilized for commercial and recreational boating and recreational fishing. The Rhode Island Division of Water Resources has designated water segments along the 15-mile downstream pathway for swimming and commercial shellfishing. Commercial and recreational fishing and lobstering are not restricted along the 15-mile surface water pathway. No drinking water intakes are located along the 15-mile surface water pathway.

The State of Rhode Island Department of Environmental Planning and Development indicated that no State-listed rare or ecologically significant natural communities under their jurisdiction are known to occur in the vicinity of the Boliden site, including tidally influenced areas upstream of the site, and 15 miles downstream of the site. The U.S. Department of Interior, Fish and Wildlife Service indicated that no Federally-listed or proposed threatened or endangered species under their jurisdiction are known to occur within a one-mile radius of the site, tidally influenced upstream areas, or along the 15-mile downstream pathway with the exception of occasional transient endangered bald eagles and peregrine falcons. Numerous coastal wetlands and special aquatic sites are located along the 15-mile surface water pathway. These occur primarily along the shorelines and coves of the Providence River and Narragansett Bay. The closest coastal wetland to the PPE is approximately 2 miles downstream along the east shore of Providence River. Other nearby coastal wetlands occur at Gaspee Point and Drown Cove approximately 4 miles downstream of the PPE.

The WESTON/ARCS team conducted a site reconnaissance and sediment sampling on July 29, 1992 at the Boliden site. Since access to the site was not granted by the property owner, field work was limited to off-site areas. Sediment samples collected by WESTON/ARCS were submitted for PCB/pesticides and total metals analyses through the EPA Contract Laboratory Program. No PCBs or pesticides were detected in sediment samples collected by WESTON/ARCS. The absence of PCBs in sediment samples at depths of 10 to 15 inches supports earlier Thomas H. Cahill and Associates (Cahill) reports which asserted that PCBs on-site are insoluble and not readily mobile. However, these data are inconclusive in eliminating off-site migration entirely as they represent PCB concentrations in a limited sedimentary horizon and do not account for potential contamination at other depths.

Six elements were detected in sediment samples which revealed concentrations more than three times the reference value. The presence of inorganic elements with concentrations exceeding the reference value was limited to sample locations SD-02, SD-03, and SD-05 which revealed barium, cadmium, calcium, copper, lead, and selenium. Sediments revealed concentrations of barium up to 640 ppm, cadmium up to 7.3 ppm, calcium up to 43,500 ppm, copper up to 1,070 ppm, lead up to 5,700 ppm, and selenium up to 4.2 ppm. The highest concentration of inorganic elements occurring above the reference value was reported at sample location SD-05, collected in the tidal inlet which bounds the property to the south. The detection of these elements in the tidal inlet supports the hypothesis that elevated concentrations of metals from on-site source areas are migrating to the Providence River with overland flow or through groundwater to surface water transport.

The nearest residence is approximately 1,100 feet west of the Boliden property. There are no residences, schools or day-care facilities within 200 feet of a potential source area. There are no on-site workers as the facility is currently inactive and an estimated 14,090 people are within one mile of the property. There are no on-site terrestrial sensitive environments.

The nearest individual to the site is located 50 feet west of the property along Allens Avenue at Lehigh Metals Corporation. There are an estimated 186,894 people residing within a 4-mile radius of the Boliden site. There are no State or Federally-listed or proposed threatened or endangered species within 4 miles of the Boliden site with the exception of occasional transient endangered bald eagles and peregrine falcons. Sensitive environments within 4 miles of the site consist of approximately 50 acres of coastal and fresh water wetlands, with the majority of these occurring 3 to 4 miles east of the site. No wetlands are located within a 1-mile radius of the site.

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ATTACHMENT A

RI DEM WASTE/SOURCE ANALYTICAL DATA
JUNE 1986

Chemistry Industrial Hygiene Microbiology Physical Testing

Certificate of Analysis

To:

Rhode Island D.E.M.
Cannon Building
75 Davis Street, Room 204
Providence, RI 02904
Attention: Mr. John P. Leo

Date Reported: May 14, 1986
Date Received: April 25, 1986
Order No. 22932
Case No. 60425-06

Sample Description: One (1) submitted sample Soil designated:

"4-25-86 - JPL-1"

SUBJECT: PCB and E. P. Toxicant - selenium.

METHOD: Appropriate approved procedures to support State Hazardous Waste Regulations and/or USEPA Hazardous Waste and including 40 CFR Part 261 and 136.

RESULTS:

Parameter	Found
1. PCB's, mg/Kg	48 as Aroclor 1254 153 as Aroclor 1242
2. E. P. Toxicant Metal, mg/L	
Selenium	0.013

F. R. Klebacher, Ph.D.
Laboratory Director

NEW ENGLAND TESTING LABORATORY, INC.
1254 Douglas Avenue, North Providence, Rhode Island 02904-5392 • 401-353-3420

ATTACHMENT B

RI DEM WASTE/SOURCE ANALYTICAL DATA
SEPTEMBER 1986

R. I. Analytical Laboratories, Inc.

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R I 02888

PHONE. (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORTED TO: RI Dept. of Environmental Management
204 Cannon Bldg., 75 Davis Street
Providence, RI 02908
Attn: Mr. John Leo

DATE RECEIVED: 9/18/86
DATE REPORTED: 10/09/86
PURCHASE ORDER NO:
RIAL. INV NO: F4136

SAMPLE DESCRIPTION: Eight (8) solid samples

Subject samples have been analyzed by our laboratory with the following results:

SAMPLE	POLYCHLORINATED BIPHENYLS	
	Arochlor 1242	Arochlor 1254
BM #1	10 ppm	ND
BM #2	750 "	370 ppm
BM #3	19 "	85 "
BM #4A	44 "	120 "
BM #4B	74 "	350 "
BM #5	19 "	32 "
BM #6	1,400 "	200 "
BM #7	39 "	29 "

Detection Limits: 1 ppm

Methodology: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U.S. EPA, SW-846, July 1982, second edition.

If you have any questions regarding this work or if we may be of furth assistance, please contact us.

APPROVED BY:

P C B WORKSHEET

INV. # : F4136

SAMPLE TYPE: (S) Solid

CLIENT: RI DEM

DATE REC'D: ~~10~~ 9/18/

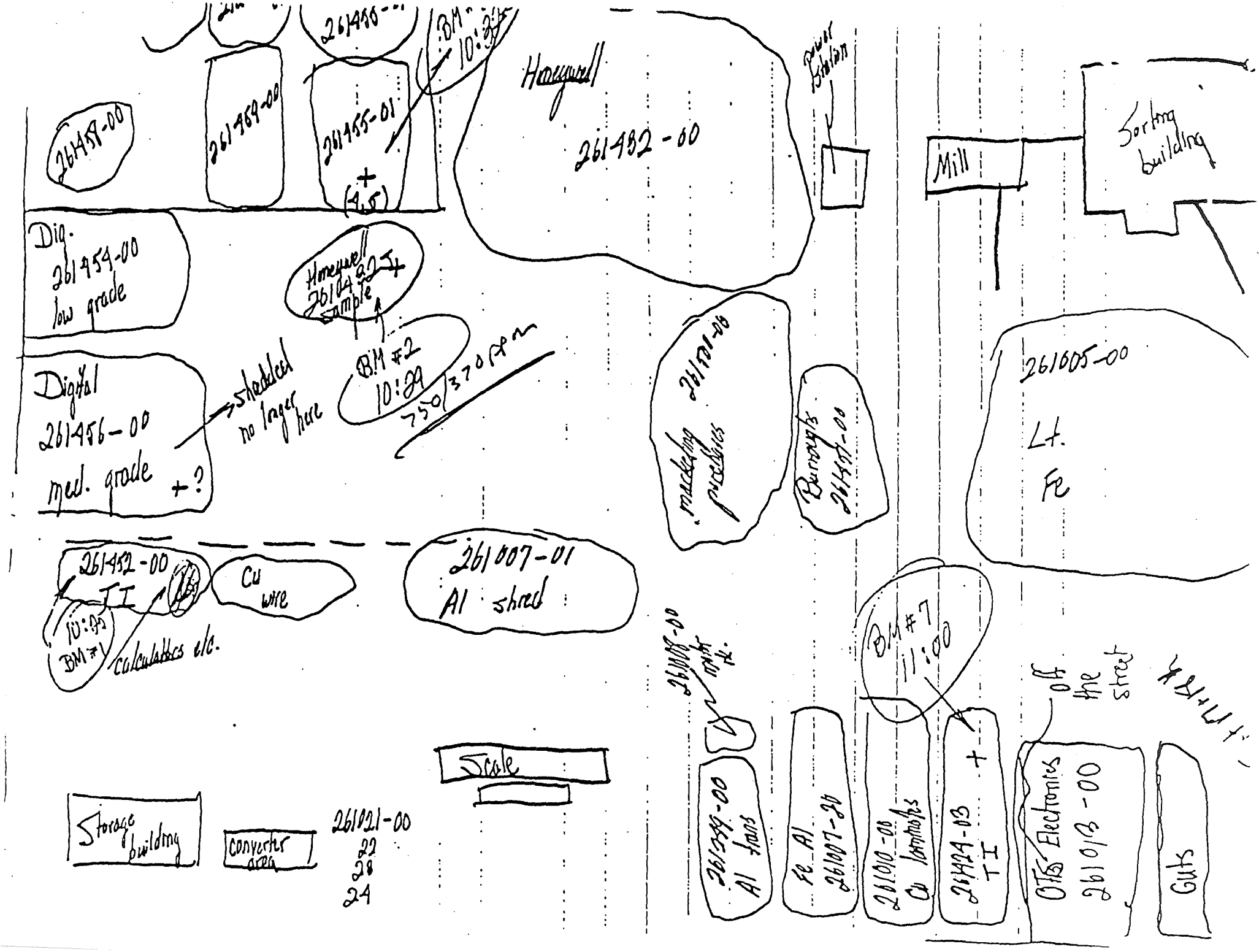
LIMIT OF DETECTION: 1ppm

DATE REPORTED: 10/9/

MPLE #	F4136 .BM1	BM2	BM3	BM4A	BM4B	BM5	BM6	BM7
/VOL.								
CB 1016	ND	ND	ND	ND	ND	ND	ND	ND
CB 1221	↓	↓	↓	↓	↓	↓	↓	↓
CB 1232	↓	↓	↓	↓	↓	↓	↓	↓
CB 1242	10ppm	750ppm	19ppm	44ppm	74ppm	19ppm	1400ppm	31ppm
CB 1248	ND	ND	ND	ND	ND	ND	ND	ND
CB 1254	↓	370ppm	85ppm	120ppm	350ppm	32ppm	200ppm	29ppm
CB 1260	↓	ND	ND	ND	ND	ND	ND	ND

CLEAN UP REQUIRED: (YES) NO METHOD USED: 1) Acid Wash

2) Column Clean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+
(9.5)
BM
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261456-...
Honeywell
261482-00
Power Station
Mill
Sorting building
Dig.
261459-00
low grade
Honeywell
261484
sample
Digital
261456-00
med. grade +?
scheduled no longer here
BM #2
10:39
750/370 cfm
261484-00
261605-00
Lt.
Fe
261482-00
II
10:55
BM #1
calculations etc.
Cu
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Al shred
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Al bars
Fe Al
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261010-00
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Guts
Storage building
converter area
261021-00
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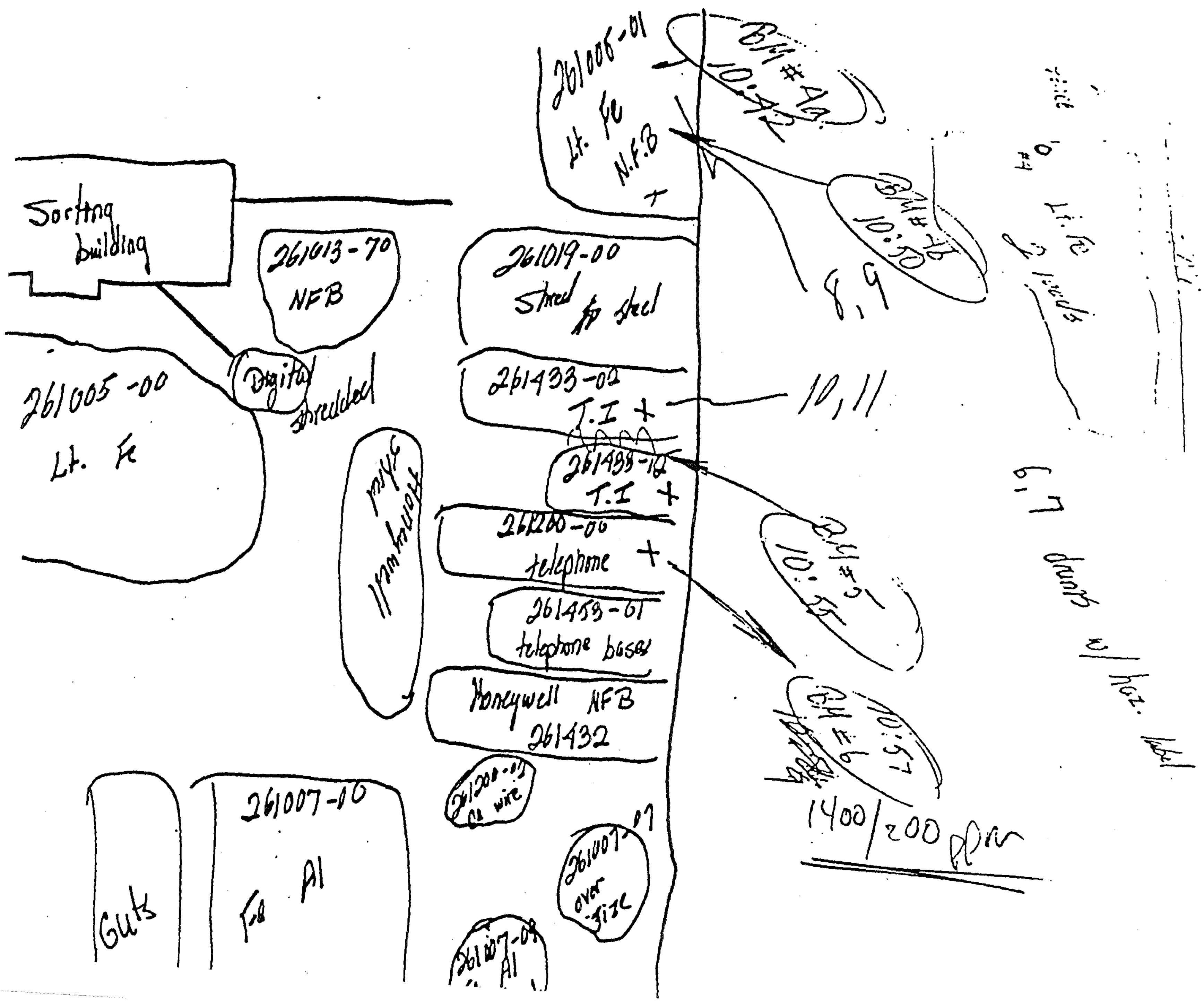
28
24
Scale


Sorting building
261013-70 NFB
Digital shredded
261005-00 Lt. Fe
Honeywell shred
261006-01 Lt. Fe N.F.B
261019-00 Shred to shed
261433-02 T.I
261488-12 T.I
261200-00 telephone
261453-01 telephone bases
Honeywell NFB 261432
261007-10 Fe Al
Guts
261007-07 over size
261007-08 Al
BH #4a 10:42
BH #4b 10:50
8,9
10,11
BH #5 10:55
BH #6 10:57
1400/200 ppm
6,7 drums w/ haz. label
#4 Lt. Fe 2 loads

ATTACHMENT C

EPA TSCA WASTE/SOURCE ANALYTICAL DATA
DECEMBER 1986

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO Dean F. Hill

DATE: February 10, 1987

FROM Art Palomares

SUBJECT: Results of PCB Analysis of Samples from Boliden Metech, Providence, RI

On January 7, 1987 two soil samples were received under official custody seal from Region I. These samples were from Boliden Metech, Providence, RI. Analysis was requested for polychlorinated biphenyls (PCBs).

The two samples contained detectable levels of PCBs. The results are given below.

Sample Number	Type of Sample	Concentration of Total PCBs, ug/g	Major Aroclors Present
121886JMJ01	Soil	350	1254, 1242
121886JMJ03	Soil	130	1254, 1242

The soil results are given on a dry weight basis.

The soil samples were thoroughly mixed and a portion was removed for moisture content analysis. A separate portion was extracted into hexane/acetone which was washed with water to remove the acetone. The hexane was cleaned with sulfuric acid and analyzed by electron-capture gas chromatography.

A soil blank was received and analyzed with the samples and it did not contain any significant interferences. Sample 121886JMJ03 was spiked with 50 ug/g of Aroclor 1254 and the recovery was 109%. Sample 121886JMJ01 was analyzed in duplicate with the following result.

Sample Number	Concentration of Total PCBs, ug/g		
	Result #1	Result #2	Average
121886JMJ01	364	337	350

from 12/18/86 EPA TSCA site visit.

ATTACHMENT D

CAHILL SITE INVESTIGATION ANALYTICAL DATA
FEBRUARY 1987

R. I. Analytical Laboratories, Inc.

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R I 02888

PHONE: (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORT TO: T. Cahill & Associates
104 South High Street
West Chester, PA 19382
Attn: T. Cahill

DATE RECEIVED: 1/16/87
DATE REPORTED: 2/13/87
PURCHASE ORDER NO: P-1
R.I.A.L. INV NO: G1207

SAMPLE DESCRIPTION: Five (5) water samples labelled THCA-8701, Boliden, Providence, RI (1-16-87)

Subject samples have been analyzed by our laboratory with the following results:

SAMPLE	RESULTS	
	Polychlorinated Biphenlys (unfiltered-total)	
	Aroclor 1242	Aroclor 1254
P-1	23 ppb	5 ppb
P-2	<1 "	5 "
S-1	4 "	1 "
S-2	240 "	80 "
S-3	7 "	2 "
	Polychlorinated Biphenlys (filtered-soluble)*	
	Aroclor 1242	Aroclor 1254
P-1	<1 ppb	<1 ppb
P-2	<1 "	<1 "
S-1	<1 "	<1 "
S-2	4 "	1 "
S-3	<1 "	<1 "

Methodology: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, July 1982.

*Analysis performed on 0.45μ filter filtrate

If you have any questions regarding this work or if we may be of furthe assistance, please contact us.

APPROVED BY: Robert J. Bellina
President

R. I. Analytical Laboratories, Inc

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R I 02888

PHONE (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORT TO: T. Cahill & Associates
104 South High Street
West Chester, PA 19382
Attn: Mr. Thomas Cahill

DATE RECEIVED: 2/05/87
DATE REPORTED: 2/24/87
PURCHASE ORDER NO:
RIAL INV NO: G1458

SAMPLE DESCRIPTION: Three (3) soil samples labelled THCA-B701, Boliden, Providence, RI (1-16-87)

Subject samples have been analyzed by our laboratory with the following results:

SAMPLE	POLYCHLORINATED BIPHENLYS
North side - 2" savoy clay	ND
30" deep	ND
North wall - 43" deep	ND

PCB Detection Limit: 200 ppb

Methodology: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U.S. EPA, SW-846, July 1982, second edition.

If you have any questions regarding this work or if we may be of further assistance, please contact us.

APPROVED BY

ATTACHMENT E

EPA TSCA WASTE/SOURCE ANALYTICAL DATA
JANUARY 1988

US ENVIRONMENTAL PROTECTION AGENCY
60 Westview Street
Lexington, MA 02173

DATE: February 3, 1988

SUBJECT: Polychlorinaed Biphenyl Analysis in Transformer Fluid and Waste Oils, Soil/Sediments, and Wipe Samples Holiden-Metech Inc., Providence, RI

FROM: Joseph Montanaro, Chemist JM

TO: Gary Lipson, Water Section

THRU: Dr. William J. Andrade, Chief, Chemistry Section

PROJECT NUMBER: 880068

ANALYTICAL PROCEDURE:

EPA Test Method: The Determination of Polychlorinated Biphenyls in Transformer Fluid and Waste Oils, EPA 600/4-81-045, Sept. 1982, was used for oil sample(s). Analysis of soil samples was performed using the Medium Level Preparation for Screening of PCBs in Sediment/Soil, July 1985. The qualitative analysis of PCBs from capacitor samples was performed using a wipe test with SKC, Inc. acid hardened paper. Results for the wipe samples are reported out to confirm identification of PCB. The extracts were screened on a 6 ft., 3% SE 30 packed column using a Varian 2100 gas chromatograph. Qualitative and quantitative analysis was done on a Hewlett Packard 5880 gas chromatograph with dual 30m, 25 micron film thickness, 0.25mm, capillary columns. [J & W Scientific DB-5 and DB-1701].

Date Samples Received by the Laboratory: 01/29/88

Date Samples Analyzed: 02/02/88 - 02/03/88

Reference Book: 100

US ENVIRONMENTAL PROTECTION AGENCY
60 Westview Street
Lexington, MA 02173

QUALITY CONTROL:

1. One method blank was included in each analysis.

2. Oil and soil samples were spiked with a surrogate compound, decachlorobiphenyl, approximately at 200 ppm. for oil samples and 20 ppm. for soil samples. The results for the surrogate recoveries are reported out with each sample.

SAMPLES ANALYZED: Oil samples - 88603

Soil samples - 88604, 88605, 88606

Wipe samples - 88601, 88602

RESULTS: Confirmation of PCB for wipe samples

Sample	PCB Present	Comments
88601	Yes	Arochlor 1242
88602	Yes	Arochlor 1242

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 88603
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

DILUTION FACTOR: 1

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (mg/kg)	Det. Limit (mg/kg)	Comments
12674-11-2	34671	Aroclor-1016	ND	10	
11104-28-2	39488	Aroclor-1221	ND	15	
11141-16-5	39492	Aroclor-1232	ND	10	
53469-21-9	39496	Aroclor-1242	ND	10	
12672-29-6	39500	Aroclor-1248	ND	10	
11097-69-1	39504	Aroclor-1254	ND	5	
11096-82-5	39508	Aroclor-1260	ND	5	
11100-14-4	81650	Aroclor-1262	ND	5	
37324-23-5	81650	Aroclor-1268	ND	5	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	126

Notes:

ND = none detected
~ = approximate
(= less than
) = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 88604
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture: 35%

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (mg/kg)	Det. Limit (mg/kg)	Comments
12674-11-2	34671	Aroclor-1016	ND	0.80	
11104-28-2	39488	Aroclor-1221	ND	1.20	
11141-16-5	39492	Aroclor-1232	ND	0.80	
53469-21-9	39496	Aroclor-1242	780	0.80	
12672-29-6	39500	Aroclor-1248	ND	0.80	
11097-69-1	39504	Aroclor-1254	560	0.40	
11096-82-5	39508	Aroclor-1260	ND	0.40	
11100-14-4	81650	Aroclor-1262	ND	0.40	
37324-23-5	81650	Aroclor-1268	ND	0.40	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	NA

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 88605
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture: 17%

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (mg/kg)	Det. Limit (mg/kg)	Comments
12674-11-2	34671	Aroclor-1016	ND	0.80	
11104-28-2	39488	Aroclor-1221	ND	1.20	
11141-16-5	39492	Aroclor-1232	ND	0.80	
53469-21-9	39496	Aroclor-1242	90	0.80	
12672-29-6	39500	Aroclor-1248	ND	0.80	
11097-69-1	39504	Aroclor-1254	110	0.40	
11096-82-5	39508	Aroclor-1260	ND	0.40	
11100-14-4	81649	Aroclor-1262	ND	0.40	
37324-23-5	81650	Aroclor-1268	ND	0.40	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	NA

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 88606
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture: 25%

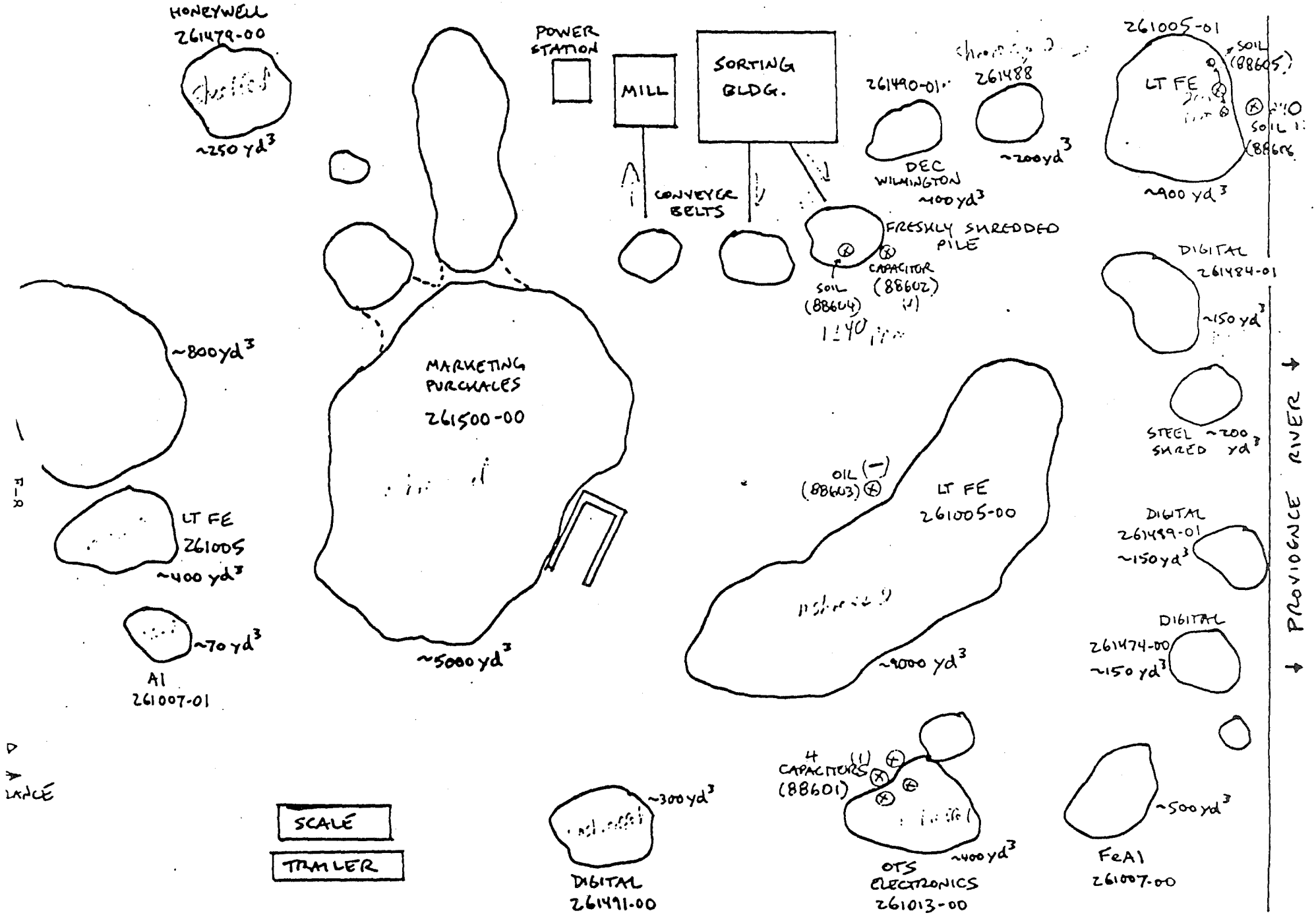
SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (mg/kg)	Det. Limit (mg/kg)	Comments
12674-11-2	34671	Aroclor-1016	ND	0.80	
11104-28-2	39488	Aroclor-1221	ND	1.20	
11141-16-5	39492	Aroclor-1232	ND	0.80	
53469-21-9	39496	Aroclor-1242	70	0.80	
12672-29-6	39500	Aroclor-1248	ND	0.80	
11097-69-1	39504	Aroclor-1254	220	0.40	
11096-82-5	39508	Aroclor-1260	ND	0.40	
11100-14-4	81649	Aroclor-1262	ND	0.40	
37324-23-5	81650	Aroclor-1268	ND	0.40	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	NA

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences


BOLIDEN-METE 1/29/88
HONEYWELL
261479-00
~250 yd3
POWER STATION
MILL
SORTING BLDG.
261490-01
261488
~200yd3
DEC WILMINGTON
~100yd3
261005-01
SOIL (88605)
LT FE
SOIL (88606)
~900 yd3
CONVEYER BELTS
FRESHLY SHREDDED PILE
CAPACITOR (88602)
SOIL (88604)
1:40
DIGITAL
261484-01
~150 yd3
~800yd3
MARKETING PURCHASES
261500-00
STEEL ~200 SHRED yd3
OIL (88603)
LT FE
261005-00
LT FE
261005
~400 yd3
DIGITAL
261499-01
~150yd3
~70 yd3
~5000 yd3
~9000 yd3
DIGITAL
261474-00
~150 yd3
Al
261007-01
PROVIDENCE RIVER
4 CAPACITORS (88601)
~300yd3
~400yd3
~500 yd3
SCALE
TRAILER
DIGITAL
261491-00
OTS ELECTRONICS
261013-00
FeAl
261007-00

ATTACHMENT F

EPA TSCA WASTE/SOURCE ANALYTICAL DATA
OCTOBER 1988

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

DATE May 16, 1988

MEMORANDUM

SUBJECT: Results of PCB Analysis of Samples from Boliden-Metech

FROM: Arturo Palomares

TO: Dean F. Hill

Capacitors

On March 28, 1988 eleven samples were received under official custody seal from Region I. These samples were from Boliden-Metech. Analysis was requested for polychlorinated biphenyls (PCBs).

All of the samples contained detectable levels of PCBs. The results are given below.

Sample Number	Type of Sample	Concentration of Total PCBs	Major Aroclor(s) Present
88607	Oil	4 ug/g	1242
88608	Oil	100 %	1242
88609	Oil	64 ug/g	1242
88610	Oil	100 %	1242
88611	Oil	100 %	1242
88612	Oil	100 %	1242
88613	Oil	100 %	1242
88614	Oil	100 %	1242
88615	Oil	100 %	1242
88616	Oil	100 %	1242
88617	Oil	100 %	1242

Confirmed 2/16/88

Samples 88608, 88609, 88611, 88612, and 88616 appeared to be Aroclor 1016. However, it could not be determined unequivocably.

The oil samples were diluted in hexane which was then cleaned with sulfuric acid and analyzed by electron-capture gas chromatography. All results were rounded down to 100%, except for samples 88607, and 88609.

An EPA Quality Control Sample was analyzed, in duplicate, along with the samples and the results were within the 95% confidence interval.

A blank was not received along with the samples. A reagent blank was analyzed along with the samples and it did not contain any significant interferences.

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79213
SAMPLE LOCATION: WIPE01
DATE OF COLLECTION:
TIME OF COLLECTION: FROM COMMON BELT

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	3.00	
11104-28-2	39488	Aroclor-1221	ND	4.50	
11141-16-5	39492	Aroclor-1232	ND	3.00	
53469-21-9	39496	Aroclor-1242	4.2	3.00	
12672-29-6	39500	Aroclor-1248	ND	3.00	
11097-69-1	39504	Aroclor-1254	1.9	1.50	
11096-82-5	39508	Aroclor-1260	ND	1.50	
11100-14-4	81649	Aroclor-1262	ND	1.50	
37324-23-5	81650	Aroclor-1268	ND	1.50	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	72

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79214
SAMPLE LOCATION: WIPE02
DATE OF COLLECTION:
TIME OF COLLECTION: FROM PAYLOADER

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	3.00	
11104-28-2	39488	Aroclor-1221	ND	4.50	
11141-16-5	39492	Aroclor-1232	ND	3.00	
53469-21-9	39496	Aroclor-1242	3.0	3.00	
12672-29-6	39500	Aroclor-1248	ND	3.00	
11097-69-1	39504	Aroclor-1254	1.6	1.50	
11096-82-5	39508	Aroclor-1260	ND	1.50	
11100-14-4	81649	Aroclor-1262	ND	1.50	
37324-23-5	81650	Aroclor-1268	ND	1.50	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	66

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79215
SAMPLE LOCATION: WIPE03
DATE OF COLLECTION:
TIME OF COLLECTION: BLANK

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	3.00	
11104-28-2	39488	Aroclor-1221	ND	4.50	
11141-16-5	39492	Aroclor-1232	ND	3.00	
53469-21-9	39496	Aroclor-1242	ND	3.00	
12672-29-6	39500	Aroclor-1248	ND	3.00	
11097-69-1	39504	Aroclor-1254	ND	1.50	
11096-82-5	39508	Aroclor-1260	ND	1.50	
11100-14-4	81649	Aroclor-1262	ND	1.50	
37324-23-5	81650	Aroclor-1268	ND	1.50	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	93

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79217
SAMPLE LOCATION: WIPE 05
DATE OF COLLECTION: OUTSIDE CAPACITOR
TIME OF COLLECTION: MARKED 'CHLORINAL'

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	60,000	
11104-28-2	39488	Aroclor-1221	ND	90,000	
11141-16-5	39492	Aroclor-1232	ND	60,000	
53469-21-9	39496	Aroclor-1242	ND	60,000	
12672-29-6	39500	Aroclor-1248	ND	60,000	
11097-69-1	39504	Aroclor-1254	66,000	30,000	
11096-82-5	39508	Aroclor-1260	ND	30,000	
11100-14-4	81649	Aroclor-1262	ND	30,000	
37324-23-5	81650	Aroclor-1268	ND	30,000	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	NA

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychloriated Biphenyls

SAMPLE NO.: 79218 WIP606
SAMPLE LOCATION: FROM SCOOP
DATE OF COLLECTION:
TIME OF COLLECTION:

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	30.00	
11104-28-2	39488	Aroclor-1221	ND	45.00	
11141-16-5	39492	Aroclor-1232	ND	30.00	
53469-21-9	39496	Aroclor-1242	96	30.00	
12672-29-6	39500	Aroclor-1248	ND	30.00	
11097-69-1	39504	Aroclor-1254	69	15.00	
11096-82-5	39508	Aroclor-1260	ND	15.00	
11100-14-4	81649	Aroclor-1262	ND	15.00	
37324-23-5	81650	Aroclor-1268	ND	15.00	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	88

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79126 (soil sample)
SAMPLE LOCATION: DIS004
DATE OF COLLECTION: (DUST)
TIME OF COLLECTION:

Percent Moisture: 1 %

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (mg/kg)	Det. Limit (mg/kg)	Comments
12674-11-2	34671	Aroclor-1016	ND	18.00	
11104-28-2	39488	Aroclor-1221	ND	27.00	
11141-16-5	39492	Aroclor-1232	ND	18.00	
53469-21-9	39496	Aroclor-1242	22	18.00	
12672-29-6	39500	Aroclor-1248	ND	18.00	
11097-69-1	39504	Aroclor-1254	29	9.00	
11096-82-5	39508	Aroclor-1260	ND	9.00	
11100-14-4	81650	Aroclor-1262	ND	9.00	
37324-23-5	81650	Aroclor-1268	ND	9.00	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	105

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

TRIANGLE LABORATORIES, INC.
TOXICITY EQUIVALENTS
FILE # M881345
SAMPLE ID. SAS 3724A-1

File no. 11 - TEF

ISOMER	CONC. OR DL	T/E
12378-PCDD	0.003	0.0015
TOTAL HxCDD	0.028	0.0011
TOTAL PCDF	2.503	0.2503
TOTAL HxCDF	1.668	0.0167
TOTAL HpCDF	0.831	0.0008
2378-TCDD	0.003	0.0030
OTHER TCDD	0.003	0.0000
1234678-HpCDD	0.697	0.0007
OTHER HpCDD	0.591	0.0000
2378-TCDF	0.358	0.0358
OTHER TCDF	0.488	0.0005
TOTAL TOXICITY EQUIVALENTS		0.31

TRIANGLE LABORATORIES, INC.
TOXICITY EQUIVALENTS
FILE # M881348
SAMPLE ID. SAS 3724A-2

Pile no. 11 - Top

ISOMER	CONC. OR DL	T/E
12378-PCDD	0.015	0.0075
TOTAL HxCDD	0.885	0.0354
TOTAL PCDF	1.979	0.1979
TOTAL HxCDF	1.286	0.0129
TOTAL HpCDF	0.283	0.0003
2378-TCDD	0.007	0.0070
OTHER TCDD	0.000	0.0000
1234678-HpCDD	0.272	0.0003
OTHER HpCDD	0.202	0.0000
2378-TCDF	0.157	0.0157
OTHER TCDF	0.201	0.0002
TOTAL TOXICITY EQUIVALENTS		0.28

TRIANGLE LABORATORIES, INC.
TOXICITY EQUIVALENTS
FILE # M881356
SAMPLE ID. SAS 3724A-3 (control)

ISOMER	CONC. OR DL	T/E
12378-PCDD	0.064	0.0320
TOTAL HxCDD	1.401	0.0560
TOTAL PCDF	0.001	0.0001
TOTAL HxCDF	0.001	0.0000
TOTAL HpCDF	0.003	0.0000
2378-TCDD	0.001	0.0010
OTHER TCDD	2.264	0.0226
1234678-HpCDD	2.400	0.0024
OTHER HpCDD	4.266	0.0000
2378-TCDF	0.001	0.0001
OTHER TCDF	0.000	0.0000
TOTAL TOXICITY EQUIVALENTS		0.11

TRIANGLE LABORATORIES, INC.
TOXICITY EQUIVALENTS
FILE # M881355
SAMPLE ID. SAS 3724A-4 Control

ISOMER	CONC. OR DL	T/E
12378-PCDD	0.003	0.0015
TOTAL HxCDD	0.010	0.0004
TOTAL PCDF	0.003	0.0003
TOTAL HxCDF	0.001	0.0000
TOTAL HpCDF	0.007	0.0000
2378-TCDD	0.867	0.8670
OTHER TCDD	5.712	0.0571
1234678-HpCDD	0.074	0.0001
OTHER HpCDD	0.184	0.0000
2378-TCDF	0.001	0.0001
OTHER TCDF	0.001	0.0000
TOTAL TOXICITY EQUIVALENTS		0.93

TRIANGLE LABORATORIES, INC.
TOXICITY EQUIVALENTS

FILE # M881357
SAMPLE ID. SAS 3274A-5 Control

ISOMER	CONC. OR DL	T/E
12378-PCDD	0.003	0.0015
TOTAL HxCDD	0.003	0.0001
TOTAL PCDF	0.003	0.0003
TOTAL HxCDF	0.003	0.0000
TOTAL HpCDF	0.010	0.0000
2378-TCDD	0.003	0.0030
OTHER TCDD	0.000	0.0000
1234678-HpCDD	0.096	0.0001
OTHER HpCDD	0.102	0.0000
2378-TCDF	0.003	0.0003
OTHER TCDF	0.000	0.0000
TOTAL TOXICITY EQUIVALENTS		0.01

CLP INORGANIC ANALYSIS SITE: Boliden-Metech Date Reviewed: 05/19/88
SOIL ANALYTICAL RESULTS (mg/kg,ppm) CASE NO.: 9170
LAB.: Environmental Science & Engineering

SAMPLE LOCATIONS	ST1016	ST1019	ST1004	ST1020	ST1002	ST1018	ST1018	ST1009	ST1015	ST1011
SAMPLE NUMBERS	9170-120	9170-121	9170-122	9170-123	9170-124	9170-125	9710-126	9170-127	9170-128	9170-129
TRAFFIC REPORT NUMBERS	MAJ501	MAJ502	MAJ503	MAJ504	MAJ505	MAJ506	MAJ507	MAJ508	MAJ509	MAJ510
REMARKS						FLD.DUP.	FLD.DUP.			

INORGANIC ELEMENTS		INSTRUMENT DETECTION LIMITS (ug/l,ppb)											CONTRACT DETECTION LIMITS (ug/l,ppb)
ALUMINUM	P	99	10900 J	25600 J	15900 J	81600 J	9160 J	4070 J	7830 J	35300 J	66300 J	35800 J	200
ANTIMONY	P	23	17 J	47 J	22 J	15 J	29 J	16 J	22 J	133 J	168 J	198 J	60
ARSENIC	F	1.3	7.4 J	7.5 J	6.2 J	4.8 J	35 J	[1.5] J	8 J	8.8 J	9.9 J	30 J	10
BARIUM	P	0.4	217 J	241 J	348 J	141 J	245 J	98 J	142 J	641 J	681 J	751 J	200
BERYLLIUM	P	0.9	4.3	7.2	0.21 U	[0.74]	5.5	0.18 U	0.19 U	[0.59]	1.2	1.1	5
CADMIUM	P	4.1	147 J	148 J	150 J	96 J	284 J	42 J	53 J	461 J	462 J	684 J	5
CALCIUM	P	21	3340 J	2070 J	9150 J	2700 J	1600 J	1300 J	1440 J	4400 J	5030 J	5970 J	0
CHROMIUM	P	7.2	223 J	84 J	119 J	72 J	283 J	35 J	45 J	132 J	157 J	209 J	
COBALT	P	8.8	20 J	302 J	341 J	44 J	936 J	56 J	90 J	731 J	786 J	1850 J	
COPPER	P	4.7	1820 J	5710 J	21800 J	94700 J	31500 J	6390 J	2520 J	90100 J	37600 J	15200 J	25
IRON	P	63	32500	62500	99000	22000	426000	56600	47900	70400	93300	132000	100
LEAD	P	60	902	1140	2110	733	975	911	1130	3220	4140	3230	
MAGNESIUM	P	28	1560	1860	1680	1420	[417]	[820]	1390	1110	1630	1660	5000
MANGANESE	P	1	322	576	528	609	2500	291	412	1740	1470	1040	15
MERCURY	CV	0.2	7.3	21	12	4.3	12	3	2.4	52	34	281	0.2
NICKEL	P	37	208	879	1380	566	2190	152	214	1370	1460	2640	40
POTASSIUM	P	196	[666]	[760]	[440]	[491]	[140]	[317]	[448]	[336]	[485]	[441]	5000
SELENIUM	F	2.2	55	61	59	11	24	8.6	11	42	74	101	5
SILVER	P	8.3	77	120	178	44	592	90	78	151	235	362	10
SODIUM	P	50	[304]	[204]	[334]	[185]	[172]	[159]	[172]	[331]	[582]	[642]	5000
THALLIUM	F	1.6	2.2 U	2.2 U	2.2 U	2 U	0.3 U	2.1 U	0.33 U	0.39 U	3.5 U	0.44 U	10
VANADIUM	P	17	22	26	27	29	79	53	58	24	37	36	50
ZINC	P	2.8	2320 J	2940 J	2870 J	3640 J	3750 J	1800 J	2040 J	7200 J	11400 J	10600 J	20
OTHER:													
% SOLIDS			90	85	86	92	94	92	91	76	54	68	

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA

NOTE: J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW).
R - VALUE IS REJECTED.
[ ] - [illegible] TO THE IDL BUT LESS THAN THE CRDL.

CLP INORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS (mg/kg,ppm)

Boliden-Metech
CASE NO.: 9170
Environmental Science & Engineering

Date Reviewed: 05/19/88

SAMPLE LOCATIONS		ST1017	ST2002	ST3003	TRP.BLK.
SAMPLE NUMBERS		9170-130	9170-131	9170-132	9170-133
TRAFFIC REPORT NUMBERS		MAJ511	MAJ512	MAJ513	MAJ514
REMARKS					ug/l
INORGANIC ELEMENTS	INSTRUMENT DETECTION LIMITS (ug/l,ppb)				CONTRACT DETECTION LIMITS (ug/l,ppb)
ALUMINUM	P	99	17700 J	7910 J	17200 J	[134] J	200
ANTIMONY	P	23	49 J	20 J	18 J	J	60
ARSENIC	F	1.3	22 J	5.5 J	20 J	J	10
BARIUM	P	0.4	1060 J	245 J	289 J	[30] J	200
BERYLLIUM	P	0.9	1.7	[0.81]	[0.40]		5
CADMIUM	P	4.1	98 J	93 J	83 J	J	5
CALCIUM	P	21	8070 J	3480 J	3100 J	[38] J	5000
CHROMIUM	P	7.2	181 J	74 J	71 J	[7.2] J	10
COBALT	P	8.8	186 J	23 J	41 J	J	50
COPPER	P	4.7	21800 J	3950 J	11700 J	43 J	25
IRON	P	63	133000	39600	38000	112	100
LEAD	P	60	4890	1120	1730		5
MAGNESIUM	P	28	3120	2090	1840		5000
MANGANESE	P	1	931	344	457	[1.2]	15
MERCURY	CV	0.2	14	6.7	12		0.2
NICKEL	P	37	655	222	1740		40
POTASSIUM	P	196	[739]	[861]	[525]		5000
SELENIUM	F	2.2	141	46	96		5
SILVER	P	8.3	215	74	76		10
SODIUM	P	50	1280	[508]	[313]	[254]	5000
THALLIUM	F	1.6	2.2 U	0.37 U	2.4 U		10
VANADIUM	P	17	67	22	40		50
ZINC	P	2.8	17500 J	2280 J	2900 J	26 J	20
OTHER:							
% SOLIDS			87	83	82	NA	

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR

NOTE:

CLP EXTRACTABLE ORGANIC ANALYSIS

SITE:BOLIDEN, METECH, PROVIDENCE, RI

CASE:9170

	CRDL	ST1018	ST1018	ST1004	ST1005	ST1011	ST1017	ST1034	ST1024	ST1032	ST1030
SAMPLE NUMBER:		AK541	AK542	AK543	AK544	AK545	AK546	AK547	AK548	AK549	AK550
TRAFFIC REPORT NUMBER:		9170-90	9170-91	9170-92	9170-93	9170-94	9170-95	9170-96	9170-97	9170-98	9170-99
DATE RECEIVED:		3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88
DATE EXTRACTED:		3/30/88	3/30/88	3/30/88	3/30/88	3/30/88	3/30/88	3/30/88	3/30/88	3/30/88	3/30/88
DATE ANALYZED:		4/1/88	4/1/88	4/1/88	4/1/88	4/1/88	4/1/88	4/1/88	4/1/88	4/1/88	4/1/88
CONCENTRATION UNITS:		~~ug/kg~~	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
DILUTION FACTOR:		2.0	2.0	100.0	4.0	4.0	10.0	4.0	2.0	2.0	4.0
COMPOUND											
ALPHA-BHC	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
BETA-BHC	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
DELTA-BHC	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
GAMMA-BHC(LINDANE)	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
HEPTACHLOR	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
ALDRIN	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
HEPTACHLOR EPOXIDE	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
ENDOSULFAN I	8.0	18u	17u	1300u	46u	44u	100u	38u	18u	18u	38u
DIELDRIN	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
4,4'-DDE	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
ENDRIN	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
ENDOSULFAN II	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
4,4'-DDD	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
ENDRIN ALDEHYDE	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
ENDOSULFAN SULFATE	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
4,4'-DDT	16	36u	34u	2600u	91u	88u	200u	76u	35u	34u	77u
METHOXYCHLOR	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
ENDRIN KETONE	16	36u	34u	2600u	91u	88u	200u	76u	35u	37u	77u
ALPHA-CHLORDANE	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
GAMMA-CHLORDANE	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
TOXAPHENE	160	360u	340u	26000u	910u	880u	2000u	760u	350u	370u	770u
AROCLOR-1016	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
AROCLOR-1221	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
AROCLOR-1232	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
AROCLOR-1242	80	8200	6000	460000	44000	56000	100000	52000	20000	83000	86000
AROCLOR-1248	80	180u	170u	13000u	460u	440u	1000u	380u	180u	180u	380u
AROCLOR-1254	160	~~3900~~	2100	690000	50000	15000	86000	43000	~~10000~~	~~7100~~	~~11000~~
AROCLOR-1260	160	360u	340u	26000u	910u	880u	2000u	760u	350u	370u	770u

CLP EXTRACTABLE ORGANIC ANALYSIS

SITE:BOLIDEN, METECH, PROVIDENCE,RI
CASE:9170

		ST2002	ST2008	ST2010	ST2010	ST2004	ST2005	ST2011	ST2009	ST2007	ST2001
SAMPLE NUMBER:		AA351	AA352	AA353	AA354	AA355	AA356	AA357	AA358	AA359	AA360
TRAFFIC REPORT NUMBER:		9170-100	9170-101	9170-102	9170-103	9170-104	9170-105	9170-106	9170-107	9170-108	9170-109
DATE RECEIVED:		3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88	3/18&25/88
DATE EXTRACTED:		3/30/88	3/31/88	3/31/88	3/31/88	3/31/88	3/31/88	3/31/88	3/31/88	3/31/88	3/31/88
DATE ANALYZED:		4/2/88	4/2/88	4/2/88	4/2/88	4/2/88	4/7/88	4/2/88	4/2/88	4/2/88	4/2/88
CONCENTRATION UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
DILUTION FACTOR:		1.0	10.0	4.0	4.0	20.0	10.0	4.0	10.0	20.0	4.0
COMPOUND	CRDL										
ALPHA-BHC	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
BETA-BHC	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
DELTA-BHC	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
GAMMA-BHC(LINDANE)	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
HEPTACHLOR	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
ALDRIN	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
HEPTACHLOR EPOXIDE	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
ENDOSULFAN I	8.0	9.6u	120u	36u	36u	180u	92u	37u	91u	190u	43u
DIELDRIN	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
4,4'-DDE	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
ENDRIN	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
ENDOSULFAN II	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
4,4'-DDD	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
ENDRIN ALDEHYDE	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
ENDOSULFAN SULFATE	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
4,4'-DDT	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
METHOXYCHLOR	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
ENDRIN KETONE	16	19u	240u	72u	73u	360u	180u	74u	180u	380u	86u
ALPHA-CHLORDANE	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
GAMMA-CHLORDANE	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
TOXAPHENE	160	190u	2400u	720u	730u	3600u	1800u	740u	1800u	3800u	860u
AROCLOR-1016	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
AROCLOR-1221	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
AROCLOR-1232	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
AROCLOR-1242	80	9800	200000	38000	40000	44000	13000	33000	100000	110000	48000
AROCLOR-1248	80	96u	1200u	360u	360u	1800u	920u	370u	910u	1900u	430u
AROCLOR-1254	160	4200	190000	20000	24000	9100	9800	12000	22000	68000	18000
AROCLOR-1260	160	190u	2400u	720u	730u	3600u	1800u	740u	1800u	3800u	860u

CLP EXTRACTABLE ORGANIC ANALYSIS

SITE:Boliden, Metech, Providence, RI
CASE:9170

		ST3003	ST3002	ST3004	ST3004	D1S001	D1S002	D1S003	D1S005	D1S006	Blank
SAMPLE NUMBER		AK561	AK562	AK563	AK564	AK565	AK566	AK567	AK568	AK569	AK570
SAMPLE LOCATION		9170-110	9170-111	9170-112	9170-113	9170-114	9170-115	9170-116	9170-117	9170-118	9170-119
DATE RECEIVED		3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88	3-18&25-88
DATE EXTRACTED		3-31-88	3-31-88	3-29-88	3-29-88	3-29-88	3-29-88	3-29-88	3-29-88	3-29-88	3-29-88
DATE ANALYZED		4-8-88	4-3-88	3-31-88	3-31-88	3-31-88	3-31-88	3-31-88	3-31-88	3-31-88	4-12-88
CONCENTRATION UNITS		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
DILUTION FACTOR		4.0	4.0	2.0	2.0	2.0	2.0	4.0	40	10	1.0
COMPOUND	CRDL										
ALPHA-BHC	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
BETA-BHC	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
DELTA-BHC	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
GAMMA-BHC(LINDANE)	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
HEPTACHLOR	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
ALDRIN	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
HEPTACHLOR EPOXIDE	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
ENDOSULFAN I	8.0	38u	32u	18u	18u	17u	17u	38u	330u	240u	8.0u
DIELDRIN	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
4,4'-DDE	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
NDRIN	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
DOSULFAN II	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
,4'-DDD	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
NDRIN ALDEHYDE	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
ENDOSULFAN SULFATE	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
4,4'-DDT	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
METHOXYCHLOR	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
ENDRIN KETONE	16	76u	65u	36u	35u	35u	34u	76u	650u	470u	16u
ALPHA-CHLORDANE	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
GAMMA-CHLORDANE	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
TOXAPHENE	160	760u	650u	360u	350u	350u	340u	760u	6500u	4700u	160u
AROCLOR-1016	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
AROCLOR-1221	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
AROCLOR-1232	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
AROCLOR-1242	80	22000	80000	10000	8300	10000	12000	25000	95000	79000	80u
AROCLOR-1248	80	380u	320u	180u	180u	170u	170u	380u	3300u	2400u	80u
AROCLOR-1254	160	7900.	8800	2300	3300	11000	4500	13000	81000	4700u	160u
AROCLOR-1260	160	760u	650u	360u	350u	350u	340u	760u	6500u	4700u	160u

CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) mg/kg
PAGE THREE

		232004	312004	063004	150004	246005	328005	166005	042005	078006	078006A	137006
Sampling Location		9170-50	9170-51	9170-52	9170-53	9170-54	9170-55	9170-56	9170-57	9170-58	9170-59	9170-60
Sample Number												
Traffic Report Number		AK501	AK502	AK503	AK504	AK505	AK506	AK507	AK508	AK509	AK510	AK511
Remarks % Moisture	Contract Required	30	40	55	23	32	29	19	37	7	21	27
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	~~0.27~~ 0.12	0.86U	1.9U	2.6U	1.5U	1.7U	17U	1.4U	1.8U	12U	14U	16U
Beta-BHC												
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	1.7U	3.9U	5.2U	3.0U	3.4U	33U	2.9U	3.7U	25U	29U	32U
4,4-DDE												
Endrin												
Endosulfan N												
4,4-DDD												
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	1.7U	3.9U	5.2U	3.0U	3.4U	33U	2.9U	3.7U	25U	29U	32U
4,4-DDT												
Methoxychlor	1.2	8.6U	19U	26U	15U	17U	170U	14U	18U	120U	140U	160U
Endrin Ketone	0.24	1.7U	3.9U	5.2U	3.0U	3.4U	33U	2.9U	3.7U	25U	29U	32U
Chlordane	1.2	8.6U	19U	26U	15U	17U	170U	14U	18U	120U	140U	160U
Toxaphene	2.4	17U	39U	53U	30U	34U	330U	29U	37U	250U	290U	320U
Aroclor-1016	1.2	8.6U	19U	26U	15U	17U	170U	14U	18U	120U	140U	160U
Aroclor-1221												
Aroclor-1232												
Aroclor-1242		15	32	86	30	92 J	390	60	93	140	720	770
Aroclor-1248		8.6U	19U	26U	15U	17U	170U	14U	18U	120U	140U	160U
Aroclor-1254	2.4	17U	39U	53U	30U	30 J	330U	29U	36 J	87 J	450	530
Aroclor-1260						34U		29U	37U	250U	290U	320U
Concentration/Dilution factor		1.0	10	10	10	10	100	10	10	100	100	100
Date received by lab		3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88
Date sample extracted		3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88
Date of analysis		3/25/88	4/4/88	4/4/88	4/4/88	4/4/88	4/4/88	4/4/88	4/4/88	4/4/88	4/4/88	4/4/88
Instrument used for analysis												

U-3

Notes:

- U Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality control review (data validation).

CLP E...RACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) MG/KG
PAGE THREE

		345006	215006	192007	315007	025007	129007	273008	149008	195008	195AMP	317008
Sampling Location		9170-61	9170-62	9170-63	9170-64	9170-65	9170-66	9170-67	9170-68	9170-69	9170-X	9170-71
Sample Number												
Traffic Report Number		AKS12	AKS13	AKS14	AKS15	AKS16	AKS17	AKS18	AKS19	AKS20	AKS21	AKS22
Remarks % Moisture	Contract Required	14	18	55	61	21	44	37	29	33	38	35
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	0.12	70u	29u	13u	3.1u	1.5u	11u	19u	8.5u	1.8u	1.9u	1.8u
Beta-BHC												
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	140u	59u	27u	6.2u	3.0u	21u	38u	17u	3.6u	3.9u	3.7u
4 4-DDE												
Endrin												
Endosulfan N												
4, 4-DDD												
Endrin Aldehyde	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Endosulfan Sulfate	0.24	140u	59u	27u	6.2u	3.0u	21u	38u	17u	3.6u	3.9u	3.7u
4, 4-DDT												
Methoxychlor	1.2	700u	290u	130u	31u	15u	110u	190u	85u	18u	19u	18u
Endrin Ketone	0.24	140u	59u	27u	6.2u	3.0u	21u	38u	17u	3.6u	3.9u	3.7u
Chlordane	1.2	700u	290u	130u	31u	15u	110u	190u	85u	18u	19u	18u
Toxaphene	2.4	1400u	590u	270u	62u	30u	210u	380u	170u	36u	39u	37u
Aroclor-1016	1.2	700u	290u	130u	31u	15u	110u	190u	85u	18u	19u	18u
Aroclor-1221												
Aroclor-1232												
Aroclor-1242		1500	460	420 J	130	59	170					65
Aroclor-1248		700u	290u	130u	31u	15u	110u		160 J	58 J	83	18u
Aroclor-1254	2.4	680 J	170 J	76u J	51 J	26 J	52 J	580	230	52	36 J	25 J
Aroclor-1260		1400u	590u	270u	62u	30u	210u	380u	170u	36u	39u	37u
Concentration/Dilution factor		500	200	50	10	10	50	100	50	10	10	10
Date received by lab		3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88
Date sample extracted		3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88
Date of analysis		4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88
Instrument used for analysis												

Notes:

- Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality control review (data validation).
- * Value is rejected due to other contractual criteria examined during

CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) mg/kg
PAGE THREE

		142009	359009	247009	318009	325010	237010	064010	107010	ST1029	ST1016	ST1031
Sampling Location		9170-72	9170-73	9170-74	9170-75	9170-76	9170-77	9170-78	9170-79	9170-80	9170-81	9170-82
Sample Number												
Traffic Report Number		AKS23	AKS24	AKS25	AKS26	AKS27	AKS28	AKS29	AKS30	AKS31	AKS32	AKS33
Remarks		17	20	8	22	22	21	28	11	13	10	6
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	0.12	29U	75U	65U	77U	15U	15U	33U	6.7U	14U	13U	6.4U
Beta-BHC	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	58U	150U	130U	150U	31U	30U	67U	13U	28U	27U	13U
4 4-DDE												
Endrin												
Endosulfan N												
4, 4-DDD	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	58U	150U	130U	150U	31U	30U	67U	13U	28U	27U	13U
4-DDT	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Methoxychlor	1.2	290U	750U	650U	770U	150U	150U	330U	67U	140U	130U	64U
Endrin Ketone	0.24	58U	150U	130U	150U	31U	30U	67U	13U	28U	27U	13U
Chlordane	1.2	290U	750U	650U	770U	150U	150U	330U	67U	140U	130U	64U
Toxaphene	2.4	580U	1500U	1300U	1500U	310U	300U	670U	130U	280U	270U	130U
Aroclor-1016	1.2	290U	750U	650U	770U	150U	150U	330U	67U	140U	130U	64U
Aroclor-1221												
Aroclor-1232												
Aroclor-1242					↓	220	↓	↓	94	160	120J	110
Aroclor-1248	↓	↓	↓	↓	710J	150U	190	480*	67U	140U	130U	64U
Aroclor-1254	2.4	100J	1500	760J	1500	98J	99J	160J	51J	58J	75J	35J
Aroclor-1260	↓	580U	1500U	1300U	1500U	310U	300U	670U	130U	280U	270U	130U
Concentration/Dilution factor		200	500	500	500	100	100	200	50	100	100	50
Date received by lab		3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88	3/18/88
Date sample extracted		3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88
Date of analysis		4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88
Instrument used for analysis												

Notes:

- U Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality control review (data validation).
- * Value is rejected due to other contractual criteria examined during the quality control review.

'LP EXTRACTABLE ORGANIC ANALYSIS
OIL ANALYTICAL RESULTS
ppm) MG/KG
'AGE THREE

		ST1019	ST1033	ST1023	ST1004	ST1020	ST1002	Blank			333011	225011
ampling Location		9170-83	9170-84	9170-85	9170-86	9170-87	9170-88	9170-89			9170-1	9170-2
ample Number												
raffic Report Number		AK534	AK535	AK536	AK537	AK538	AK539	AK540			AK551	AK552
emarks % Moisture		14	13	23	16	7	12	0			45	21
emivolatile Compound	Detection Limit (ppm)							Empty and Rinsate				
Alpha-BHC	0.12	28u	14u	7.8u	29u	1.3u	6.8u	12u			22u	15u
Beta-BHC												
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	26u	28u	16u	57u	2.6u	14u	2.4u			44u	30u
4 4-DDE												
Endrin												
Endosulfan N												
4, 4-DDD												
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	56u	28u	16u	57u	2.6u	14u	2.4u			44u	30u
. 4-DDT												
Methoxychlor	1.2	280u	140u	78u	290u	13u	68u	12u			220u	150u
ndrin Ketone	0.24	56u	28u	16u	57u	2.6u	14u	2.4u			44u	30u
hlordane	1.2	280u	140u	78u	290u	13u	68u	12u			220u	150u
oxaphene	2.4	560u	280u	160u	570u	26u	140u	24u			440u	300u
Aroclor-1016	1.2	280u	140u	78u	290u	13u	68u	12u			220u	150u
Aroclor-1221												
Aroclor-1232												
Aroclor-1242		210 J		120	500	16	99				1300 J	1100 J
Aroclor-1248		880u		78u	290u	13u	68u				220u	150u
Aroclor-1254	24	120 J	28u	37 J	99 J	9.5 J	33 J	24u			1000 J	730 J
Aroclor-1260		560u		160u	570u	26u	140u				440u	300u
Concentration/Dilution factor		200	10	20	200	10	20	10			100	100
Date received by lab		3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88			3/15/88	3/15/88
Date sample extracted		3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88	3/23/88			3/22/88	3/22/88
Date of analysis		4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/5/88	4/6/88			3/30/88	3/30/88
Instrument used for analysis												

Notes:

- Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality control review (data validation).
- u Value is rejected due to other contractual criteria examined during

CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) mg/kg
PAGE THREE

		225A11	111011	017011	324012	175012	023012	110012	232013	3/2013	063013	150013
Sampling Location		9170-3	9170-4	9170-5	9170-6	9170-7	9170-8	9170-9	9170-10	9170-11	9170-12	9170-13
Sample Number												
Traffic Report Number		AK753	AK754	AK755	AK756	AK757	AK758	AK759	AK760	AK761	AK762	AK763
Remarks % Moisture	Contract Required	29	13	27	17	14	16	10	34	53	42	Y-
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	0.12	17u	14u	16u	14u	7u	14u	1.3u	1.8u	5.1u	2.0u	2.1u
Beta-BHC	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Dieldrin	0.24	34u	28u	33u	29u	14u	29u	2.7u	3.6u	10u	4.1u	4.1u
4,4-DDE	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Endrin												
Endosulfan N												
4,4-DDD	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	34u	28u	33u	29u	14u	29u	2.7u	3.6u	10u	4.1u	4.1u
4,4-DDT	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Methoxychlor	1.2	170u	140u	160u	140u	70u	140u	13u	18u	51u	20u	21u
Endrin Ketone	0.24	34u	28u	33u	29u	14u	29u	2.7u	3.6u	10u	4.1u	4.1u
Chlordane	1.2	170u	140u	160u	140u	70u	140u	13u	18u	51u	20u	21u
Toxaphene	2.4	340u	280u	330u	290u	140u	290u	27u	36u	100u	41u	41u
Aroclor-1016	1.2	170u	140u	160u	140u	70u	140u	13u	18u	51u	20u	21u
Aroclor-1221	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Aroclor-1232												
Aroclor-1242		2000 J	530	1100 J	710	↓	↓	↓	↓	160	75	51u
Aroclor-1248	↓	170u	140u	160u	140u	190	630	110 J	120	51u	20u	21u
Aroclor-1254	2.4	620	490	330	290u	800 J	75 J	21 J	12 J	100u	41u	41u
Aroclor-1260	↓	340u	280u	330u	290u	140u	290u	27u	36u	100u	41u	41u
Concentration/Dilution factor		100	100	100	100	50	100	10	10	20	10	10
Date received by lab		3/1/88	3/1/88	3/1/88	3/1/88	3/1/88	3/1/88	3/1/88	3/1/88	3/1/88	3/1/88	3/1/88
Date sample extracted		3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88
Date of analysis		3/23/88	3/23/88	3/23/88	3/23/88	3/24/88	3/23/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88
Instrument used for analysis												

Notes:

- u Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality control review (data validation).
- R Value is rejected due to other contractual criteria examined during

CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) mg/kg
PAGE THREE

		246014	246A014	328014	166014	042014	078015	137015	345015	215015	192016	315(
Sampling Location		9190-14	9190-15	9190-16	9190-17	9190-18	9190-19	9190-20	9190-21	9190-22	9190-23	9190-24
Sample Number												
Traffic Report Number		AK764	AK765	AK766	AK767	AK768	AK769	AK770	AK771	AK772	AK773	AK774
Remarks % Moisture	Contract Required	11	15	36	36	36	62	53	35	44	23	27
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	0.12	2.7u	1.4u	3.8u	1.9u	3.8u	1.6u	5.1u	0.93u	0.43u	1.6u	1.6u
Beta-BHC												
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	5.4u	2.8u	7.5u	3.7u	7.5u	3.2u	10u	1.8u	0.86u	3.1u	3.1u
4,4-DDE												
Endrin												
Endosulfan N												
4,4-DDD												
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	5.4u	2.8u	7.5u	3.7u	7.5u	3.2u	10u	1.8u	0.86u	3.1u	3.1u
4,4-DDT												
Methoxychlor	1.2	27u	14u	38u	19u	38u	16u	51u	9.2u	4.3u	16u	16u
Endrin Ketone	0.24	5.4u	2.8u	7.5u	3.7u	7.5u	3.2u	10u	1.8u	0.86u	3.1u	3.1u
Chlordane	1.2	27u	14u	38u	19u	38u	16u	51u	9.2u	4.3u	16u	16u
Toxaphene	2.4	54u	28u	75u	37u	75u	32u	100u	18u	8.6u	31u	31u
Aroclor-1016	1.2	27u	14u	38u	19u	38u	16u	51u	9.2u	4.3u	16u	16u
Aroclor-1221												
Aroclor-1232												
Aroclor-1242		80	51	130	44	82	43	49 J	24	8.0	57	39
Aroclor-1248		27u	14u	38u	19u	38u	16u	51u	9.2u	4.3u	16u	16u
Aroclor-1254	2.4	54u	28u	75u	37u	75u	32u	100u	18u	8.6u	31u	31u
Aroclor-1260				28u			32u					
Concentration/Dilution factor		20	10	20	10	20	5	20	5	2	10	10
Date received by lab		3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88
Date sample extracted		3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88
Date of analysis		3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88
Instrument used for analysis												

Notes:

- Compound was not detected.
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CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) MG/KG
PAGE THREE

025016 129016 129A016 273017 149017 195017 317017 147018 359018 247018 318018

Sampling Location		9170-25	9170-26	9170-27	9170-28	9170-29	9170-30	9170-31	9170-32	9170-33	9170-34	9170-35
Sample Number												
Traffic Report Number		AK775	AK776	AK777	AK778	AK779	AK780	AK781	AK782	AK783	AK784	AK785
Remarks % Moisture	Contract Required	38	27	33	1	5	1	7	44	32	26	14
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	0.12	0.88u	1.6u	0.90u	0.61u	0.63u	0.61u	0.26u	0.43u	0.88u	0.81u	7.0U
Beta-BHC												
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	1.8u	3.3u	1.8u	1.2u	1.3u	1.2u	0.52u	0.86u	1.8u	1.6u	1.4u
4,4-DDE												
Endrin												
Endosulfan II												
4,4-DDD												
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	1.8u	3.3u	1.8u	1.2u	1.3u	1.2u	0.52u	0.86u	1.8u	1.6u	1.4u
4,4-DDT												
Methoxychlor	1.2	8.8u	16u	9.0u	6.1u	6.3u	6.1u	2.6u	4.3u	8.8u	8.1u	7.0u
Endrin Ketone	0.24	1.8u	3.3u	1.8u	1.2u	1.3u	1.2u	0.52u	0.86u	1.8u	1.6u	1.4u
Chlordane	1.2	8.8u	16u	9.0u	6.1u	6.3u	6.1u	2.6u	4.3u	8.8u	8.1u	7.0u
Toxaphene	2.4	18u	33u	18u	12u	13u	12u	5.2u	8.6u	18u	16u	14u
Aroclor-1016	1.2	8.8u	16u	9.0u	6.1u	6.3u	6.1u	2.6u	4.3u	8.8u	8.1u	7.0u
Aroclor-1221												
Aroclor-1232												
Aroclor-1242		21	53	36	12	16	32	12	13	27	33	22
Aroclor-1248		8.8u	16u	9.0u	6.1u	6.3u	6.1u	2.6u	4.3u	8.8u	8.1u	7.0u
Aroclor-1254	2.4	35	35	21	6.2 J	6.8 J	13	5.1 J	8.9	21 J	14 J	14u
Aroclor-1260		18u	33u	18u	12u	13u	12u	5.2u	8.6u	18u	16u	
Concentration/Dilution factor		5	10	5	5	5	5	2	2	5	5	5
Date received by lab		3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88	3/15/88
Date sample extracted		3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88
Date of analysis		3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/24/88	3/25/88	3/24/88	3/24/88	3/24/88	3/24/88
Instrument used for analysis												

Notes:

- Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality control review (data validation).
- * Value is rejected due to other contractual criteria examined during the quality control review.
- ** Value is rejected due to blank contamination identified during the

CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) mg/kg
PAGE THREE

		325001	137001	064001	107001	237001	333002	225002	111002	017002	324003	175003
Sampling Location		9170-36	9170-37	9170-38	9170-39	9170-40	9170-41	9170-42	9170-43	9170-44	9170-45	9170-46
Sample Number												
Traffic Report Number		AK786	AK787	AK788	AK789	AK790	AK791	AK792	AK793	AK794	AK795	AK796
Remarks % Moisture	Contract required	25	20	15	14	25	38	14	54	35	14	16
Semivolatile Compound	Detection Limit (ppm)											
Alpha-BHC	0.12	1.6u	7.5u	7.1u	0.70u	3.2u	3.9u	7.0u	5.2u	3.7u	2.8u	2.9u
Beta-BHC												
Delta-BHC												
Gamma-BHC (Lindane)												
Heptachlor												
Aldrin												
Heptachlor Epoxide												
Endosulfan I												
Dieldrin	0.24	3.2u	15u	14u	1.4u	6.4u	7.7u	14u	10u	7.4u	5.6u	5.7u
4,4-DDE												
Endrin												
Endosulfan N												
4,4-DDD												
Endrin Aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	0.24	3.2u	15u	14u	1.4u	6.4u	7.7u	14u	10u	7.4u	5.6u	5.7u
4,4-DDT												
Methoxychlor	1.2	16u	75u	71u	7.0u	32u	39u	70u	52u	37u	28u	29u
Endrin Ketone	0.24	3.2u	15u	14u	1.4u	6.4u	7.7u	14u	10u	7.4u	5.6u	5.7u
Chlordane	1.2	16u	75u	71u	7.0u	32u	39u	70u	52u	37u	28u	29u
Toxaphene	24	32u	150u	140u	14u	64u	77u	140u	100u	74u	56u	58u
Aroclor-1016	1.2	16u	75u	71u	7.0u	32u	39u	70u	52u	37u	28u	29u
Aroclor-1221												
Aroclor-1232												
Aroclor-1242		54 J	540 J	420 J	74	110 J			110	63		110
Aroclor-1248		16u	75u	71u	7.0u	32u	68	150 J	52u	37u		29u
Aroclor-1254	2.4	40	120 J	180	5.2 J	76	77u	210	100u	39 J	98	44 J
Aroclor-1260	2.4	32u	150u	140u	14u	64u		140u		74u	56u	58u
Concentration/Dilution factor		10	50	50	5	20	20	50	20	20	20	20
Date received by lab		3/16/88	3/16/88	3/16/88	3/16/88	3/16/88	3/16/88	3/16/88	3/16/88	3/16/88	3/16/88	3/16/88
Date sample extracted		3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88	3/22/88
Date of analysis		3/25/88	3/25/88	3/25/88	3/25/88	3/25/88	3/25/88	3/25/88	3/25/88	3/25/88	3/25/88	3/25/88
Instrument used for analysis												

Notes:

- **Compound was not detected.**
- **J Quantitation is approximate due to limitations identified during the**

CLP EXTRACTABLE ORGANIC ANALYSIS
SOIL ANALYTICAL RESULTS
(ppm) mg/kg
PAGE THREE

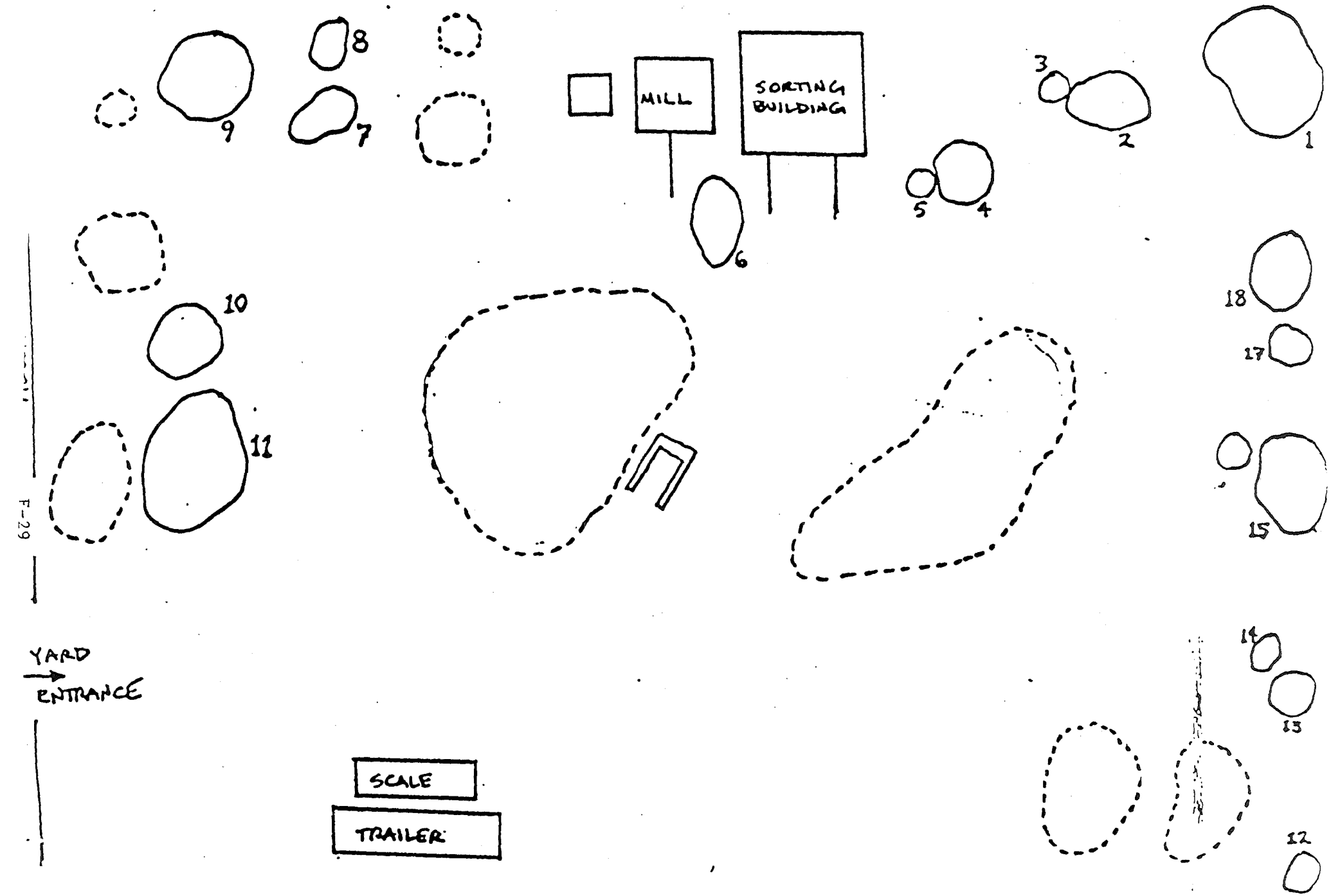
023003 023A003 110003

Sampling Location		9170-47	9170-48	9170-49
Sample Number				
Traffic Report Number		AK797	AK798	AK799
Remarks % Moisture	Contract Required	21	20	21
Semivolatile Compound	Detection Limit (ppm)			
Alpha-BHC	0.12	3.0U	3.0U	7.6U
Beta-BHC	↓	↓	↓	↓
Delta-BHC	↓	↓	↓	↓
Gamma-BHC (Lindane)	↓	↓	↓	↓
Heptachlor	↓	↓	↓	↓
Aldrin	↓	↓	↓	↓
Heptachlor Epoxide	↓	↓	↓	↓
Endosulfan I	↓	↓	↓	↓
Dieldrin	0.24	6.1U	6.0U	15U
4 4-DDE	↓	↓	↓	↓
Endrin	↓	↓	↓	↓
Endosulfan N	↓	↓	↓	↓
4, 4-DDD	↓	↓	↓	↓
Endrin Aldehyde	NA	NA	NA	NA
Endosulfan Sulfate	0.24	6.1U	6.0U	15U
4, 4-DDT	↓	↓	↓	↓
Methoxychlor	1.2	30U	30U	76U
Endrin Ketone	0.24	6.1U	6.0U	15U
Chlordane	1.2	30U	30U	76U
Toxaphene	2.4	61U	60U	150U
Aroclor-1016	1.2	30U	30U	76U
Aroclor-1221	↓	↓	↓	↓
Aroclor-1232	↓	↓	↓	↓
Aroclor-1242	↓	↓	110	300
Aroclor-1248	↓	85	30U	76U
Aroclor-1254	2.4	43 J	41 J	110 J
Aroclor-1260	↓	61U	60U	150U
Concentration/Dilution factor		20	20	50
Date received by lab		3/16/88	3/16/88	3/16/88
Date sample extracted		3/23/88	3/23/88	3/23/88
Date of analysis		3/25/88	3/25/88	3/25/88
Instrument used for analysis				

Notes:

- **Compound was not detected.**
- **J Quantitation is approximate due to limitations identified during the quality control review (data validation).**
- **R Value is rejected due to other contractual criteria examined during**

BOLIDEN - MC JH 3/10-11/88



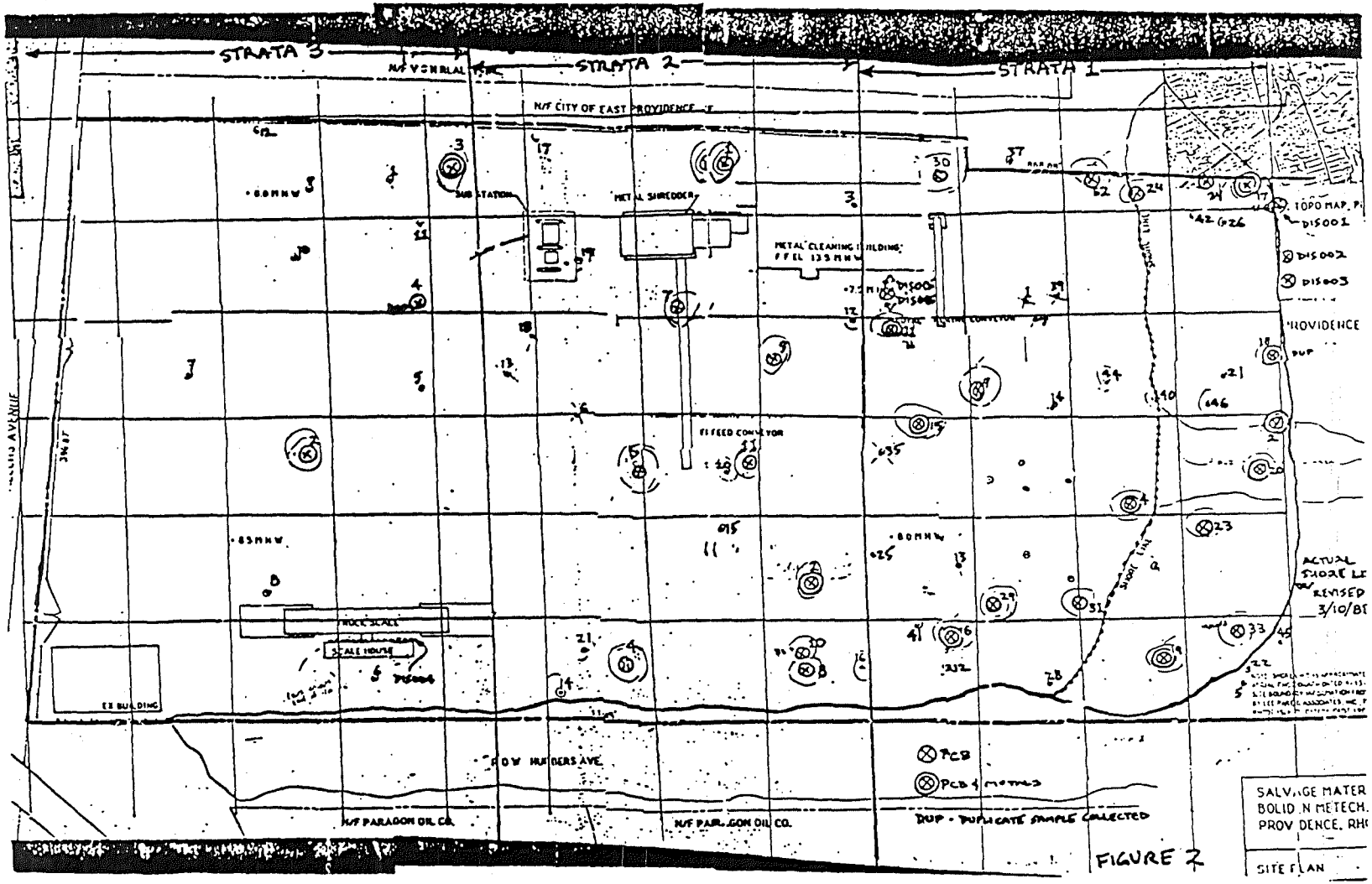

STRATA 3
STRATA 2
STRATA 1
N/F CITY OF EAST PROVIDENCE
SUB STATION
METAL SHREDDER
METAL CLEANING BUILDING
FEED CONVEYOR
SCALE HOUSE
ROCK SCALE
EX BUILDING
ROW HUNTERS AVE
N/F PARAGON OIL CO.
N/F PARAGON OIL CO.
TOPO MAP, P.
DIS001
DIS002
DIS003
PROVIDENCE
DUP
ACTUAL SHORE LI
REVISED 3/10/8
PCB
PCB & METALS
DUP - DUPLICATE SAMPLE COLLECTED
SALVAGE MATER
BOLID N METECH.
PROV DENCE, RH
SITE PLAN

FIGURE 2

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

OCT 1 [illegible]

TOXIC SUBSTANCES

DATE October 14, 1988

MEMORANDUM

SUBJECT: Results of Polychlorinated Biphenyls Analyses

FROM: Dean F. Hill, Chief
Pesticides & Toxic Substances Branch

TO: Marvin Rosenstein, Chief
Pesticides & Toxic Substances , Region I

Attached is the analytical report for the determination of polychlorinated biphenyls (PCBs) in samples taken by your office in connection with an official investigation at the following site:

Boliden Metech

In summary, one of the circuit boards contained detectable levels of PCBs.

Please advise if you have any questions regarding these analyses and when we may dispose of the remainder of the samples.

Attachment

cc: Robert A. DiBiccaro, Regional Council, EPA Region I

Copy to [illegible] 10.21.88

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER COLORADO 80225

DATE
October 14, 1988

MEMORANDUM

SUBJECT: Results of PCB analysis of sample from Boliden Metech

FROM: Arturo Palomares

TO: Dean F. Hill

On August 29, 1988 (Chain of Custody Record was received on September 21, 1988) two circuit boards were received under official custody seal from Region I. These samples were from Boliden Metech.

Analysis was requested for polychlorinated biphenyls (PCBs).

One of the samples contained detectable levels of PCBs.

The results are given below:

Sample Number	Type of Sample	Concentration of Total PCBs	Major Aroclor(s) Present
7920001	Circuit Board	ND	----------
7920002	Circuit Board	7 ug	1242/1260

The detection limit for sample number 7920001 was 2 ug.

The circuit boards were washed with hexane. The hexane was cleaned with sulfuric acid and analyzed by electron-capture gas chromatography.

A reagent blank was analyzed along with the samples and it did not contain any significant interferences.

An EPA Quality Control Sample was analyzed in duplicate and the results were within the acceptable limits.

L-2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

January 31, 1989

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

John G. Coffey, Jr.
Coffey, McGovern & Noel, Ltd.
20 Washington Place
Providence, Rhode Island 02903

RE: Boliden Metech, Analysis Results from Samples Taken March 10-11, 1988

Dear Mr. Coffey:

Pursuant to 42 U.S.C. § 9604(e)(4)(B), enclosed are results of analyses the Environmental Protection Agency made of the samples taken at the Boliden Metech, Inc. Allens Avenue facility in Providence, Rhode Island.

The analyses reported in the memorandum dated November 18, 1988 are minor corrections to the analyses EPA sent you on October 3, 1988. The memorandum dated October 14, 1988 contains the results of analyses of two circuit boards collected from the Allens Avenue facility.

If you have any questions concerning these materials, please call me at 617-565-3334.

Sincerely,

Timothy L. Williamson
Assistant Regional Counsel

Enclosures

bcc: Robert Maher Marged Harris
Tony Palermo Susan Studlien (without enclosures)

OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

OCT 1 6 1988

DATE: October 14, 1988

MEMORANDUM

SUBJECT: Results of Polychlorinated Biphenyls Analyses

FROM: Dean F. Hill, Chief
Pesticides & Toxic Substances Branch

TO: Marvin Rosenstein, Chief
Pesticides & Toxic Substances , Region I

Attached is the analytical report for the determination of polychlorinated biphenyls (PCBs) in samples taken by your office in connection with an official investigation at the following site:

Boliden Metech

In summary, one of the circuit boards contained detectable levels of PCBs.

Please advise if you have any questions regarding these analyses and when we may dispose of the remainder of the samples.

Attachment

cc: Robert A. DiBiccaro, Regional Council, EPA Region I

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

DATE
October 14, 1988

MEMORANDUM

SUBJECT: Results of PCB analysis of sample from Boliden Metech

FROM: Arturo Palomares

TO: Dean F. Hill

On August 29, 1988 (Chain of Custody Record was received on September 21, 1988) two circuit boards were received under official custody seal from Region I. These samples were from Boliden Metech.

Analysis was requested for polychlorinated biphenyls (PCBs).

One of the samples contained detectable levels of PCBs.

The results are given below:

Sample Number	Type of Sample	Concentration of Total PCBs	Major Aroclor(s) Present
7920001	Circuit Board	ND	----------
7920002	Circuit Board	7 ug	1242/1260

The detection limit for sample number 7920001 was 2 ug.

The circuit boards were washed with hexane. The hexane was cleaned with sulfuric acid and analyzed by electron-capture gas chromatography.

A reagent blank was analyzed along with the samples and it did not contain any significant interferences.

An EPA Quality Control Sample was analyzed in duplicate and the results were within the acceptable limits.

US ENVIRONMENTAL PROTECTION AGENCY
60 Westview Street
Lexington, MA 02173

DATE: November 18, 1988

SUBJECT: Amendment To Report Dated - March 28, 1988
Polychlorinated Biphenyl Analysis in
Soil/Sediments, and Wipe Samples.
Roliden-Metech Inc., Providence, RI

FROM: Joseph Montanaro, Chemistry Section JM

TO: Gary Lipson, Oil and Hazardous Section

THRU: Dr. William J. Andrews, Chief, Chemistry Section BS for Bill Andrews

PROJECT NUMBER: 630083

ANALYTICAL PROCEDURE:

EPA Test Method: The Determination of Polychlorinated Biphenyls in soil samples was performed using the Medium Level Preparation for Screening of PCBs in Sediment/Soil, July 1985. The qualitative analysis of PCB wipe samples was performed using S&C, Inc. acid hardened paper and cotton swabs. Results for the soil samples are reported out in dry weight, (mg/kg). Results for the wipe samples are reported out in concentration per sample, (ug/sample). This is justified by the presence of more than one wipe in some samples. The extracts were screened on a 6 ft., 2% SE 30 packed column using a Varian 2100 gas chromatograph. Qualitative and quantitative analysis was done on a Hewlett Packard 5850 gas chromatograph with dual 30m, .25 micron film thickness, 0.25mm, capillary columns, J & W Scientific DB-5 and DB-1701.

Date Samples Received by the Laboratory: 03/16/88

Date Samples Analyzed: 03/18/88 - 03/21/88

Reference Book: 31

cc: Richard Siscanaw

US ENVIRONMENTAL PROTECTION AGENCY
60 Westview Street
Lexington, MA 02173

QUALITY CONTROL:

1. One method blank was included in the analysis.

2. Soil and wipe samples were spiked with a surrogate compound decachlorobiphenyl, approximately at 20 ppm. the results for the surrogate recoveries are reported out with each sample.

3. One wipe sample was spiked with a matrix compound Aroclor 1260, at approximately 5 ppm. The recovery is listed below.

Compound	Recovery (%)
Aroclor 1260	64

SAMPLES ANALYZED: Soil samples - 79126

Wipe samples - 79213, 79214, 79215
79216, 79217, 79218

[illegible]

US EN[illegible] PROTECTION AGENCY
[illegible]
[illegible]

SAMPLE [illegible] 75[illegible]
SAMPLE [illegible]
DATE OF COLLECTION:
[illegible]

Sample [illegible]
Percent Moisture: [illegible]%

SAMPLE [illegible]

[illegible] NO.	[illegible] NO.	[illegible]	Conc. ([illegible])	Det. Limit ([illegible])	Comments
[illegible]	[illegible]	Aroclor-[illegible]	ND	[illegible].00	
[illegible]	[illegible]	[illegible]	ND	87.00	
[illegible]	[illegible]	Aroclor-[illegible]	ND	16.00	
53469-[illegible]	[illegible]	Aroclor-1242	22	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
11097-[illegible]	[illegible]	Aroclor-1254	29	[illegible]	
1096-[illegible]	[illegible]	Aroclor-[illegible]	ND	5.00	
[illegible]	81650	[illegible]	[illegible]	[illegible]	
[illegible]7324-23-5	[illegible]	Aroclor-[illegible]	ND	5.00	

Sample Recovery for Surrogate Compound		Observed Recoveries (%)
	Decachlorobiphenyl	105

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79217
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture:

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	60,000	
11104-28-2	39488	Aroclor-1221	ND	90,000	
11141-16-5	39492	Aroclor-1232	ND	60,000	
53469-21-9	39496	Aroclor-1242	66,000	60,000	←
12672-29-6	39500	Aroclor-1248	ND	60,000	
11097-69-1	39504	Aroclor-1254	ND	30,000	
11096-82-5	39508	Aroclor-1260	ND	30,000	
37100-14-4	81649	Aroclor-1262	ND	30,000	
37324-23-5	81650	Aroclor-1268	ND	30,000	

Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	NA

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79213
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture:

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (mg/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	3.00	
11104-28-2	39488	Aroclor-1221	ND	4.50	
11141-16-5	39492	Aroclor-1232	ND	3.00	
53469-21-9	39496	Aroclor-1242	4.2	3.00	
12672-29-6	39500	Aroclor-1248	ND	3.00	
11097-69-1	39504	Aroclor-1254	1.9	1.50	
11096-82-5	39508	Aroclor-1260	ND	1.50	
100-14-4	81649	Aroclor-1262	ND	1.50	
324-23-5	81650	Aroclor-1268	ND	1.50	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	72

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 73214
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture:

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	3.00	
11104-28-2	39488	Aroclor-1221	ND	4.50	
11141-16-5	39492	Aroclor-1232	ND	3.00	
53469-21-9	39496	Aroclor-1242	3.0	3.00	
12672-29-6	39500	Aroclor-1248	ND	3.00	
11097-69-1	39504	Aroclor-1254	1.6	1.50	
096-82-5	39508	Aroclor-1260	ND	1.50	
.00-14-4	81649	Aroclor-1262	ND	1.50	
324-23-5	81650	Aroclor-1268	ND	1.50	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	66

Notes:

ND = none detected
~ = approximate
(= less than
) = greater than
NA = not applicable due to high sample dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 73215
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture:

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	3.00	
11104-28-2	39468	Aroclor-1221	ND	4.50	
11141-16-5	39492	Aroclor-1232	ND	3.00	
53469-21-9	39496	Aroclor-1242	ND	3.00	
12672-29-6	39500	Aroclor-1248	ND	3.00	
11097-69-1	39504	Aroclor-1254	ND	1.50	
11096-82-5	39508	Aroclor-1260	ND	1.50	
11100-14-4	81649	Aroclor-1262	ND	1.50	
37324-23-5	81650	Aroclor-1268	ND	1.50	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	93

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sa
dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79216
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture:

SAMPLE RESULTS:

CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	12.00	
11104-28-2	39488	Aroclor-1221	ND	18.00	
11141-16-5	39492	Aroclor-1232	ND	12.00	
53469-21-9	39496	Aroclor-1242	15	12.00	
12672-29-6	39500	Aroclor-1248	ND	12.00	
11097-69-1	39504	Aroclor-1254	22	6.00	
11096-82-5	39508	Aroclor-1260	ND	6.00	
100-14-4	61643	Aroclor-1262	ND	6.00	
1324-23-5	61650	Aroclor-1268	ND	6.00	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	76

Notes:

ND = none detected
~ = approximate
< = less than
> = greater than
NA = not applicable due to high sa
dilutions or sample interferences

FACILITY SAMPLED:

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
Polychlorinated Biphenyls

SAMPLE NO.: 79218
SAMPLE LOCATION:
DATE OF COLLECTION:
TIME OF COLLECTION:

Sample pH:
Percent Moisture:

SAMPLE RESULTS:

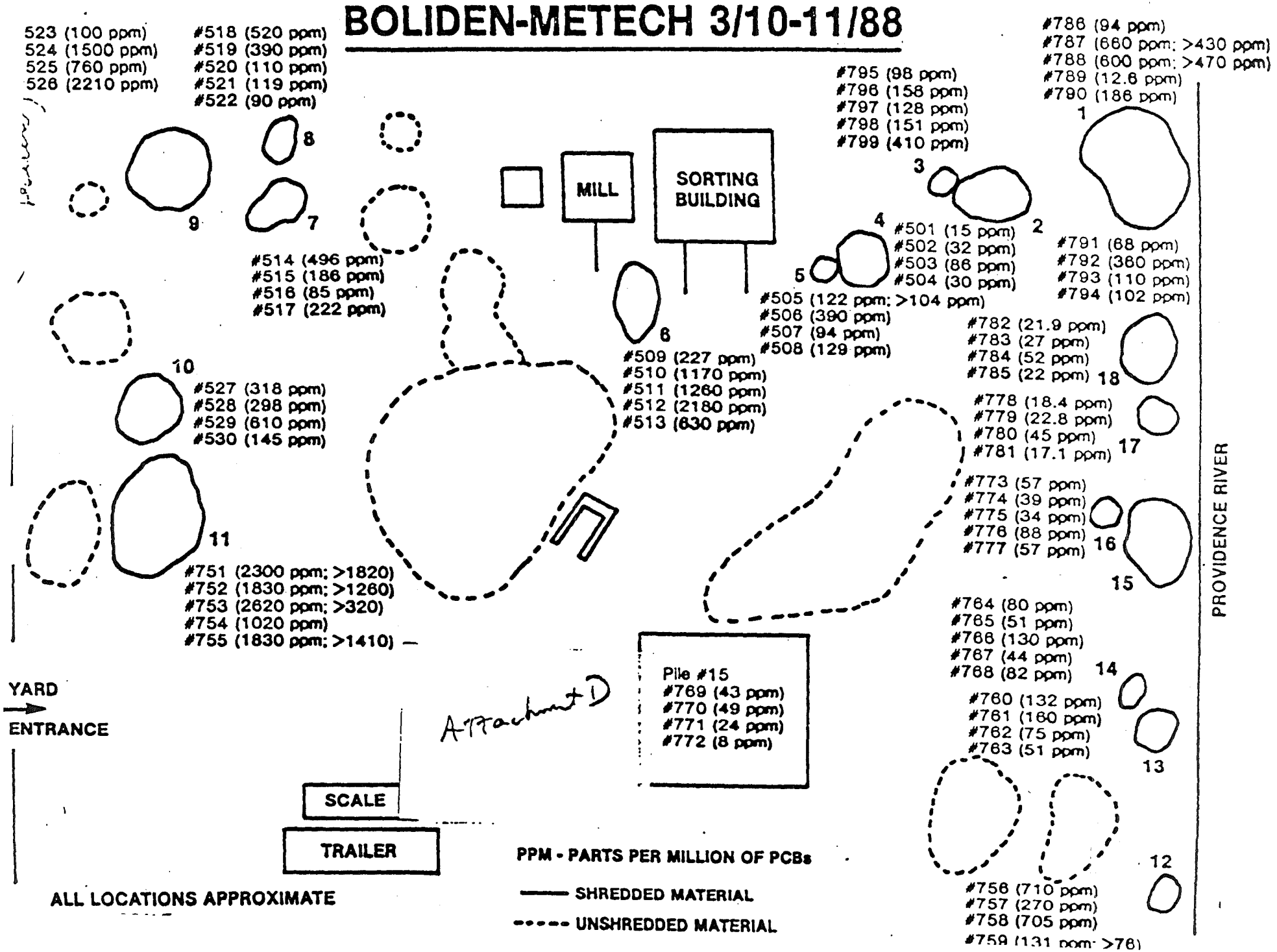
CAS NO.	STORET NO.	Compound	Conc. (ug/sample)	Det. Limit (ug/sample)	Comments
12674-11-2	34671	Aroclor-1016	ND	30.00	
11104-28-2	39488	Aroclor-1221	ND	45.00	
11141-16-5	39492	Aroclor-1232	ND	30.00	
53469-21-9	39496	Aroclor-1242	96	30.00	
12672-29-6	39500	Aroclor-1248	ND	30.00	
11097-69-1	39504	Aroclor-1254	69	15.00	
1096-82-5	39508	Aroclor-1260	ND	15.00	
1100-14-4	81649	Aroclor-1262	ND	15.00	
37324-23-5	81650	Aroclor-1268	ND	15.00	

Sample Recovery for Surrogate Compound	Observed Recoveries (%)
Decachlorobiphenyl	88

Notes:

ND = none detected
~ = approximate
(= less than
) = greater than
NA = not applicable due to high sample dilutions or sample interferences

BOLIDEN-METECH 3/10-11/88



Attachment D

ATTACHMENT G

CAHILL SITE INVESTIGATION ANALYTICAL DATA
APRIL 1990

TABLE 1. CHEMICAL ANALYSIS OF SOLID SAMPLES - SOLVENT EXTRACTION

Bolliden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #2)

ANALYSIS: **Soxlet**

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#2 Surface	+4	54.17	0.301	142	42.74	14	4.21	46.96
	+10	31.09	0.091	54	4.91	6	0.55	5.46
	+35	30.63	0.17	120	20.40	12	2.04	22.44
	+270	67.36	0.374	101	37.77	17	6.36	44.13
	-270	20.95	0.065	100	6.50	10	0.65	7.15
			100%		112.33		13.81	126.14
#2 A (14")	+4	12.10	0.03	0 (1)	0.00	0 (1)	0.00	0.00
	+10/+35	94.37	0.25	0 (1)	0.00	0 (1)	0.00	0.00
	+270	241.94	0.65	0 (1)	0.00	0 (1)	0.00	0.00
	-270	25.19	0.07		0.00		0.00	0.00
					0.00		0.00	0.00
#2 B (33")	+4	23.45	0.14	0 (1)	0.00	0 (1)	0.00	0.00
	+10	16.69	0.06	0 (1)	0.00	0 (1)	0.00	0.00
	+35	36.89	0.14	0 (1)	0.00	0 (1)	0.00	0.00
	+270	110.42	0.43		0.00		0.00	0.00
	-270	59.35	0.23		0.00		0.00	0.00
					0.00		0.00	0.00
#2 C (60")	+4	37.78	0.28	0 (1)	0.00	0 (1)	0.00	0.00
	+10	29.53	0.22	0 (1)	0.00	0 (1)	0.00	0.00
	+35	32.43	0.24	0 (1)	0.00	0 (1)	0.00	0.00
	+270/-270	36.42	0.26		0.00		0.00	0.00
					0.00		0.00	0.00

(1) Reported as <3 ppm.

Bolden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #3)

ANALYSIS: Soxlet

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#3 Surface	+4	106.82	0.49	110	53.90	59	28.91	82.81
	+10	32.86	0.09	53	4.77	18	1.62	6.39
	+35	37.14	0.17	62	10.54	28	4.76	15.30
	+270	46.58	0.21	95	19.95	50	10.50	30.45
	-270	19.48	0.04	142	5.68	55	2.20	7.88
					94.84		47.99	142.83
#3 A (21")	+4	123.59	0.47	0 (1)	0.00	0 (1)	0.00	0.00
	+10	31.02	0.06	0 (1)	0.00	0 (1)	0.00	0.00
	+35	33.61	0.13	0 (1)	0.00	0 (1)	0.00	0.00
	+270	75.36	0.29		0.00		0.00	0.00
	-270	22.32	0.05		0.00		0.00	0.00
					0.00		0.00	0.00
#3 B	+4	107.60		0 (1)	0.00	0 (1)	0.00	0.00
	+10			0 (1)	0.00	0 (1)	0.00	0.00
	+35			0 (1)	0.00	0 (1)	0.00	0.00
	+270				0.00		0.00	0.00
	-270				0.00		0.00	0.00
					0.00		0.00	0.00
#3 C (83")	+4	32.70	0.25	0 (2)	0.00	0 (2)	0.00	0.00
	+10	28.99	0.15	0 (4)	0.00	0 (4)	0.00	0.00
	+35	45.76	0.23	0 (4)	0.00	0 (4)	0.00	0.00
	+270	51.78	0.26	0 (4)	0.00	0 (4)	0.00	0.00
	-+270	20.98	0.11	0 (4)	0.00	0 (4)	0.00	0.00
					0.00		0.00	0.00

(1) Reported as <3 ppm.
(2) Reported as <10 ppm
(4) Reported as <40 ppm.

Bolden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #4)

ANALYSIS: **Soxlet**

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#4 Surface	+4	111.04	0.54	20	10.80	29	15.66	26.46
	+10	23.44	0.07	67	4.69	28	1.96	6.65
	+35	22.48	0.11	93	10.23	22	2.42	12.65
	+270	44.18	0.22	141	31.02	7	1.54	32.56
	-270	17.74	0.06	201	12.06	77	4.62	16.68
					68.80		26.20	95.00
#4 A (21")	+4	27.37	0.15	0 (1)	0.00	0 (1)	0.00	0.00
	+10	---			0.00		0.00	0.00
	+35	42.14	0.24	9	7.65	0 (1)	0.00	7.65
	+270	107.40	0.61		0.00		0.00	0.00
	-270	---			0.00		0.00	0.00
					7.65		0.00	7.65
#4 B (45")	+4	46.68	0.30	0 (2)	0.00	0 (2)	0.00	0.00
	+10	18.91	0.12	0 (3)	0.00	0 (3)	0.00	0.00
	+35	30.03	0.19	0 (3)	0.00	0 (3)	0.00	0.00
	+270	48.70	0.31		0.00		0.00	0.00
	-270	13.15	0.08		0.00		0.00	0.00
					0.00		0.00	0.00
#4 C (92")	+4	52.59	0.37	0 (2)	0.00	0 (2)	0.00	0.00
	+10	23.30	0.13	0 (4)	0.00	0 (4)	0.00	0.00
	+35	25.83	0.18	0 (4)	0.00	0 (4)	0.00	0.00
	+270	29.43	0.21		0.00		0.00	0.00
	-+270	14.77	0.11		0.00		0.00	0.00
					0.00		0.00	0.00

(1) Reported as <3 ppm.
(2) Reported as <10 ppm
(3) Reported as <20 ppm.
(4) Reported as <40 ppm.

Boliden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #5)

ANALYSIS: **Soxlet**

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#5 Surface	+4	347.5	0.72	16	11.52	7	5.04	16.56
	+10	25.17	0.05	51	2.55	9	0.45	3.00
	+35	35.33	0.07	59	4.13	15	1.05	5.18
	+270	63.12	0.13	88	11.44	29	3.77	15.21
	-270	24.95	0.03	244	7.32	55	1.65	8.97
					36.96		11.96	48.92
#5 A (21")	+4	26.19	0.19	0 (1)	0.00	0 (1)	0.00	0.00
	+10/+35	50.47	0.37	0 (1)	0.00	0 (1)	0.00	0.00
	+270/-270	59.34	0.44	0 (1)	0.00	0 (1)	0.00	0.00
					0.00		0.00	0.00
#5 B (53")	+4	87.61	0.39	0 (1)	0.00	0 (1)	0.00	0.00
	+10	20.45	0.06	0 (1)	0.00	0 (1)	0.00	0.00
	+35	39.01	0.12	0 (1)	0.00	0 (1)	0.00	0.00
	+270	126.85	0.38		0.00		0.00	0.00
	-270	17.62	0.05		0.00		0.00	0.00
					0.00		0.00	0.00
#5 C (78")	+4	36.98	0.34	0 (2)	0.00	0 (2)	0.00	0.00
	+10	15.65	0.14	11	1.54	0 (1)	0.00	1.54
	+35	34.05	0.31	11	0.00	0 (1)	0.00	0.00
	+270/-270	23.28	0.21		0.00		0.00	0.00
					1.54		0.00	1.54

(1) Reported as <3 ppm.
(2) Reported as <10 ppm

Boliden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #6)

ANALYSIS: Soxlet

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#6 Surface	+4	96.2	0.42	28	11.76	4	1.68	13.44
	+10	20.54	0.11	10	1.10	9	0.99	2.09
	+35	33.72	0.15	47	7.05	5	0.75	7.80
	+270	47.53	0.27	60	16.20	7	1.89	18.09
	-270	11.94	0.05	174	8.70	23	1.15	9.85
					44.81		6.46	51.27
#6 A (21")	+4	47.49	0.28	0 (1)	0.00	0 (1)	0.00	0.00
	+10	15.40	0.06	4	0.24	0 (1)	0.00	0.24
	+35	40.97	0.16	} 4	0.00	} 0 (1)	0.00	0.00
	+270	110.49	0.43		0.00		0.00	0.00
	-270	16.67	0.07		0.00		0.00	0.00
					0.24		0.00	0.24
#6 B (49")	+4	36.98	0.37	0 (1)	0.00	0 (1)	0.00	0.00
	+10	18.95	0.18	0 (1)	0.00	0 (1)	0.00	0.00
	+35	26.11	0.26	} 0 (1)	0.00	} 0 (1)	0.00	0.00
	+270/-270	19.05	0.19		0.00		0.00	0.00
					0.00		0.00	0.00
#6 C (78")	+4	60.18	0.56	0 (1)	0.00	0 (2)	0.00	0.00
	+10/+35	31.97	0.30	} 0 (1)	0.00	} 0 (1)	0.00	0.00
	+270/-270	14.47	0.14		0.00		0.00	0.00
					0.00		0.00	0.00

(1) Reported as <3 ppm.
(2) Reported as <10 ppm

Boliden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #7)

ANALYSIS: Soxlet

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#7 Surface	+4	117.05	0.6	138	82.80	17	10.20	93.00
	+10	23.21	0.09	777	69.93	878	79.02	148.95
	+35	24.15	0.12	425	51.00	4	0.48	51.48
	+270/-270	36.18	0.19	1364	259.16	78	14.82	273.98
					462.89		104.52	567.41
#7 A (26")	+4	68.19	0.35	0 (1)	0.00	0 (1)	0.00	0.00
	+10	31.15	0.16	0 (1)	0.00	0 (1)	0.00	0.00
	+35	41.69	0.22	0 (1)	0.00	0 (1)	0.00	0.00
	+270/-270	51.12	0.27		0.00		0.00	0.00
					0.00		0.00	0.00
#7 B (41")	+4	24.24	0.15	0 (1)	0.00	0 (1)	0.00	0.00
	+10	13.87	0.06	0 (1)	0.00	0 (1)	0.00	0.00
	+35	47.00	0.19	0 (1)	0.00	0 (1)	0.00	0.00
	+270	126.92	0.52		0.00		0.00	0.00
	-+270	19.57	0.08		0.00		0.00	0.00
					0.00		0.00	0.00
#7 C (78")	+4	47.15	0.40	0 (1)	0.00	0 (2)	0.00	0.00
	+10	14.34	0.12	0 (1)	0.00	0 (1)	0.00	0.00
	+35	21.85	0.19	0 (1)	0.00	0 (1)	0.00	0.00
	+270/-270	33.60	0.29		0.00		0.00	0.00
					0.00		0.00	0.00

(1) Reported as <3 ppm.

Boliden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Test Pit #8)

ANALYSIS: Soxlet

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#8 Surface.	+4	60.92	0.39	163	63.57	34	13.26	76.83
	+10	24.19	0.15	187	28.05	13	1.95	30.00
	+35	26.52	0.17	92	15.64	41	6.97	22.61
	+270/-270	45.28	0.29	154	44.66	14	4.06	48.72
					151.92		26.24	178.16
#8 A (17")	+4	28.78	0.10	0 (1)	0.00	0 (1)	0.00	0.00
	+10	28.90	0.07	0 (1)	0.00	0 (1)	0.00	0.00
	+35	95.20	0.23		0.00		0.00	0.00
	+270	223.47	0.53	0 (1)	0.00	0 (1)	0.00	0.00
	-270	31.02	0.07		0.00		0.00	0.00
					0.00		0.00	0.00
#8 B (43")	+4	> 20	0.12	0 (1)	0.00	0 (1)	0.00	0.00
	+10	15.16	0.09	0 (1)	0.00	0 (1)	0.00	0.00
	+35	31.12	0.19		0.00		0.00	0.00
	+270	82.57	0.50	0 (1)	0.00	0 (1)	0.00	0.00
	-+270	17.41	0.10		0.00		0.00	0.00
					0.00		0.00	0.00
#8 C (63")	+4	35.68	0.17	0 (1)	0.00	0 (2)	0.00	0.00
	+10	25.62	0.08	0 (1)	0.00	0 (1)	0.00	0.00
	+35	95.90	0.30		0.00		0.00	0.00
	+270	104.98	0.32	0 (1)	0.00	0 (1)	0.00	0.00
	-270	42.90	0.13		0.00		0.00	0.00
					0.00		0.00	0.00

(1) Reported as <3 ppm.

Boliden Metech Storage Yard, Providence RI
Results of Test Pit Samples (Surface Pits #9, #10, & #11))

ANALYSIS: Soxlet

Sample Number	Grain Size (Sieve No.)	Total Weight of Sample (gms)	Grain Size Distribution (%)	1242 Concentration (ppm)	Weighted Average (ppm)	1254 Concentration (ppm)	Weighted Average (ppm)	Total Concentration (ppm)
#9 Surface	+4	140.98	0.54	147	79.38	34	18.36	97.74
	+10	37.91	0.1	92	9.20	15	1.50	10.70
	+35	50.63	0.13	384	49.92	43	5.59	55.51
	+270	71.52	0.18	321	57.78	47	8.46	66.24
	-270	20.71	0.05	597	29.85	112	5.60	35.45
					226.13		39.51	265.64
#10 Surface	+4	33.06	0.20	16	3.20	6	1.20	4.40
	+10	24.86	0.10	92	9.20	15	1.50	10.70
	+35	56.71	0.23	26	5.98	0 (1)	0.00	0.00
	+270	97.26	0.39	73	28.47	10	3.90	32.37
	-270	21.34	0.08	219	17.52	31	2.48	20.00
					64.37		9.08	67.47
#11 Surface	+4	58.61	0.28	12	3.36	3	0.84	4.20
	+10	29.09	0.09	56	5.04	62	5.58	10.62
	+35	73.00	0.23	4	0.92	0 (1)	0.00	0.92
	+270	103.01	0.33	5	1.65	0 (1)	0.00	1.65
	-270	21.34	0.07	109	7.63	22	1.54	9.17
					18.60		7.96	26.56

(1) Reported as <3 ppm.

PCB Analysis	Soxhlet Extract	Water Extract	Water extraction in Soxhlet
#2 Surface; +4 = 54.17g		2 ppb (PCB 1242)	
PCB 1242	142 ppm		215 ppm
PCB 1254	14 ppm		27 ppm
#3 Surface; +4 = 106.82g		<1 ppb	
PCB 1242	110 ppm		60 ppm
PCB 1254	59 ppm		30 ppm
#3 B + 4; B-horizon; TP#3; +4 mesh; 107.6g	<3 ppm	---	---
#4 Surface; +4 = 111.04g		1 ppb (PCB 1242)	
PCB 1242	20 ppm		96 ppm
PCB 1254	29 ppm		19 ppm
#5 Surface; +4 = 347.50g		1 ppb (PCB 1242)	
PCB 1242	16 ppm		40 ppm
PCB 1254	7 ppm		16 ppm
#6 Suface; +4 = 96.2g		1 ppb (PCB 1242)	
PCB 1242	28 ppm		23 ppm
PCB 1254	4 ppm		5 ppm
#8 Surface; +4 = 60.92g		2 ppb (PCB 1242)	
PCB 1242	163 ppm		217 ppm
PCB 1254	34 ppm		31 ppm
#9 Surface; +4 = 140.98g		1 ppb (PCB 1242)	
PCB 1242	147 ppm		88 ppm
PCB 1254	34 ppm		18 ppm
#10 Surface; +4 = 33.06g		<1 ppb	
PCB 1242	16 ppm		95 ppm
PCB 1254	6 ppm		13 ppm
#11 Surface; +4 = 58.61g		<1 ppb	
PCB 1242	12 ppm		22 ppm
PCB 1254	3 ppm		5 ppm

TABLE 2. Comparison of Solvent Extraction with Water Extraction

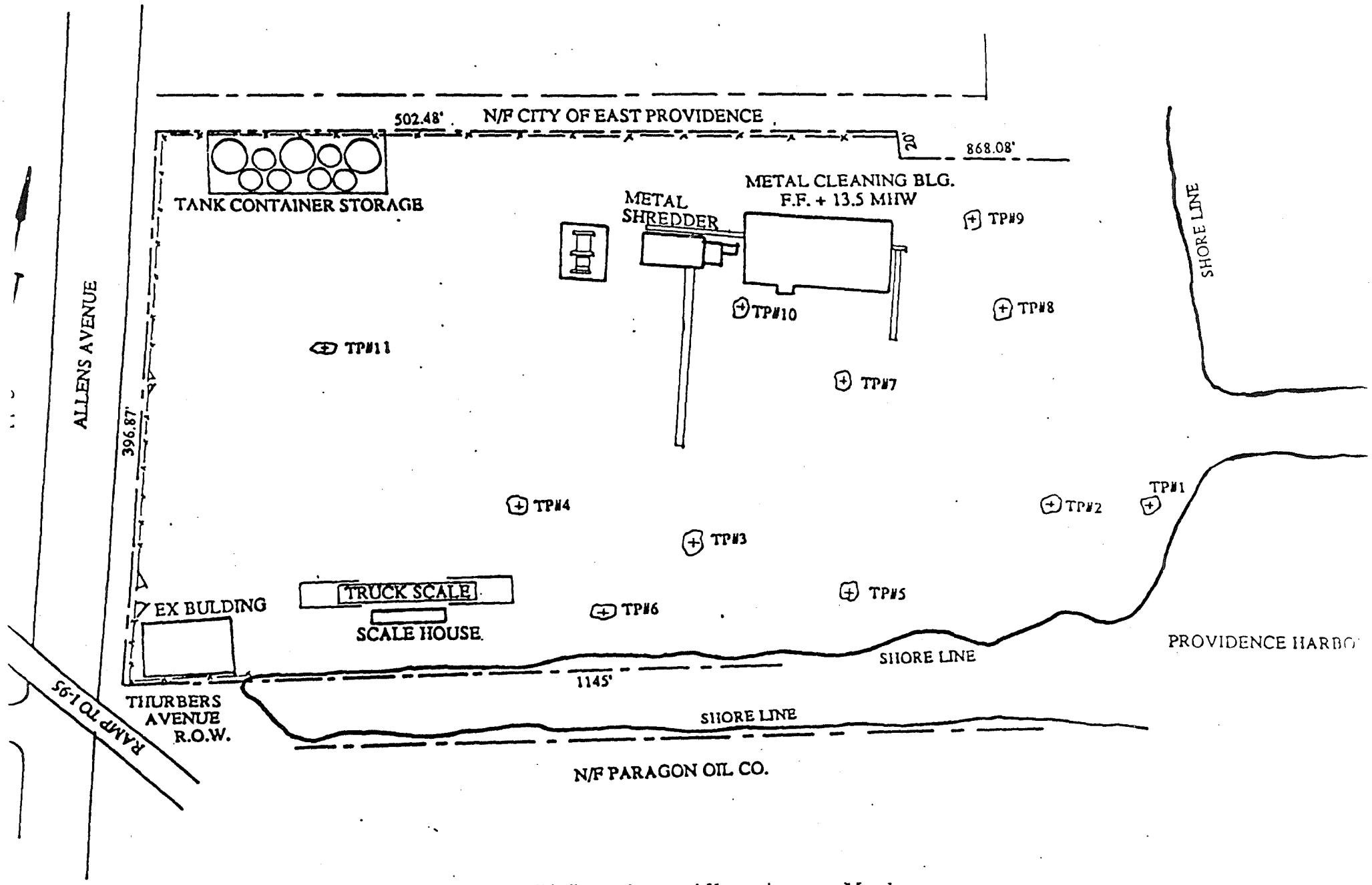


Figure3 . Test Pit Locations - Allens Avenue Yard

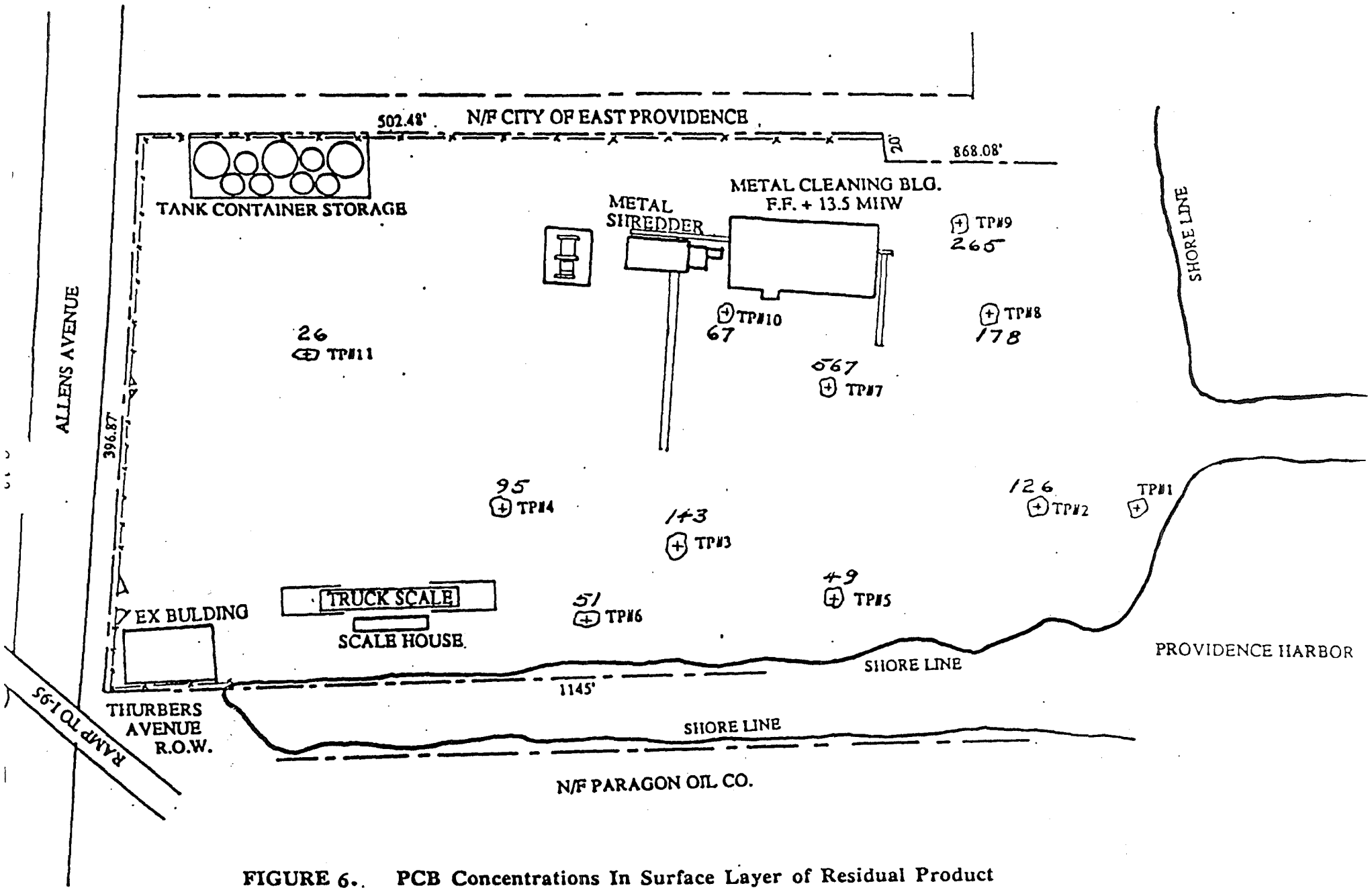


FIGURE 6.. PCB Concentrations In Surface Layer of Residual Product

ATTACHMENT H

WESTON/ARCS SEDIMENT SAMPLE RESULTS
JULY 1992

Pesticide/PCB Soil Analysis
µg/Kg

Site: Boliden Metech, Inc.
Case: 18525 SDG: AAQ86

Sample Number:		AAQ86	AAQ87	AAQ88	AAQ89	AAQ90	AAQ91
Sample Location:		SD-01	SD-02	SD-03	SD-04	SD-05	SD-06
Laboratory Number:		9207963	92070964	92070965	92070966	92070967	92070968
COMPOUND	CRQL						
alpha-BHC	1.7	20 U	21 U	22 U	22 U	26 U	27 U
beta-BHC	1.7	20 U	21 U	22 U	22 U	26 U	27 U
delta-BHC	1.7	20 U	21 U	22 U	22 U	26 U	27 U
gamma-BHC(Lindane)	1.7	20 U	21 U	22 U	22 U	26 U	27 U
Heptachlor	1.7	20 U	21 U	22 U	22 U	26 U	27 U
Aldrin	1.7	20 U	21 U	22 U	22 U	26 U	27 U
Heptachlor Epoxide	1.7	20 U	21 U	22 U	22 U	26 U	27 U
Endosulfan I	3.3	38 U	40 U	43 U	43 U	50 U	52 U
Dieldrin	3.3	38 U	40 U	43 U	43 U	50 U	52 U
4,4'-DDE	3.3	38 U	40 U	43 U	43 U	50 U	52 U
Endrin	3.3	38 U	40 U	43 U	43 U	50 U	52 U
Endosulfan II	3.3	38 U	40 U	43 U	43 U	50 U	52 U
4,4'-DDD	3.3	38 U	40 U	43 U	43 U	50 U	52 U
Endosulfan Sulfate	3.3	38 U	40 U	43 U	43 U	50 U	52 U
4,4'-DDT	17.0	200 U	210 U	220 U	220 U	260 U	270 U
Methoxychlor	3.3	38 U	40 U	43 U	43 U	50 U	52 U
Endrin Ketone	3.3	38 U	40 U	43 U	43 U	50 U	52 U
drin-Aldehyde	1.7	20 U	21 U	22 U	22 U	26 U	27 U
ha-Chlordane	1.7	20 U	21 U	22 U	22 U	26 U	27 U
ma-Chlordane	170.0	2000 U	2100 U	2200 U	2200 U	2600 U	2700 U
xaphene	33.0	380 U	400 U	430 U	430 U	500 U	520 U
Aroclor 1016	67.0	770 U	820 U	870 U	870 U	1000 U	1000 U
Aroclor 1221	33.0	380 U	400 U	430 U	430 U	500 U	520 U
Aroclor 1232	33.0	380 U	400 U	430 U	430 U	500 U	520 U
Aroclor 1242	33.0	380 U	400 U	430 U	430 U	500 U	520 U
Aroclor 1248	33.0	380 U	400 U	430 U	430 U	500 U	520 U
Aroclor 1254	33.0	380 U	400 U	430 U	430 U	500 U	520 U
Aroclor 1260							
Dilution Factor:		10	10	10	10	10	10
Date Sampled:		7/29/92	7/29/92	7/29/92	7/29/92	7/29/92	7/29/92
Date Extracted:		8/5/92	8/5/92	8/5/92	8/5/92	8/5/92	8/5/92
Date Analyzed:		8/15/92	8/15/92	8/15/92	8/15/92	8/15/92	8/15/92
% Moisture:		13	18	23	23	34	36

41000929\18525PS.WK1

Pesticide/PCB Aqueous Analysis
µg/L

Site: Boliden Metech, Inc.
Case: 18525 SDG: AA086

Sample Number:	AA092
Sample Location:	RB-07
Laboratory Number:	92070969

COMPOUND	CRQL	
alpha-BHC	0.05	0.05 U
beta-BHC	0.05	0.05 U
delta-BHC	0.05	0.05 U
gamma-BHC(Lindane)	0.05	0.05 U
Heptachlor	0.05	0.05 U
Aldrin	0.05	0.05 U
Heptachlor Epoxide	0.05	0.05 U
Endosulfan I	0.05	0.05 U
Dieldrin	0.10	0.10 U
4,4'-DDE	0.10	0.10 U
Endrin	0.10	0.10 U
Endosulfan II	0.10	0.10 U
4,4'-DDD	0.10	0.10 U
Endosulfan Sulfate	0.10	0.10 U
4,4'-DDT	0.10	0.10 U
Methoxychlor	0.5	0.5 U
Endrin Ketone	0.10	0.10 U
Endrin-Aldehyde	0.10	0.10 U
alpha-Chlordane	0.05	0.05 U
gamma-Chlordane	0.05	0.05 U
Toxaphene	5.0	5.0 U
Aroclor 1016	1.0	1.0 U
Aroclor 1221	2.0	2.0 U
Aroclor 1232	1.0	1.0 U
Aroclor 1242	1.0	1.0 U
Aroclor 1248	1.0	1.0 U
Aroclor 1254	1.0	1.0 U
Aroclor 1260	1.0	1.0 U

Dilution Factor:	1
Date Sampled:	7/29/92
Date Extracted:	8/5/92
Date Analyzed:	8/15/92

41000929\18525PA.WK1

SITE: Boliden Metech, Inc.

INORGANIC SOIL ANALYSIS
(mg/Kg)

CASE: 18525 SDG: MAW847
LABORATORY: SKINNER & SHERMAN LABS

SAMPLE NUMBER:		MAW847	MAW848	MAW849	MAW850	MAW851	MAW852	
SAMPLE LOCATION:		SD-01	SD-02	SD-03	SD-04	SD-05	SD-06	
LABORATORY NUMBER:		07277-01	07277-02	07277-03	07277-04	07277-05	07277-06	
% SOLIDS		79.7	77.8	79.5	76.4	62.4	60.9	
INORGANIC ELEMENTS		INSTRUMENT DETECTION LIMITS (mg/Kg)						CONTRACT DETECTION LIMITS (mg/Kg)
ALUMINUM	P	4.8	5280	3370	4320	4990	3840	4870	40.0
ANTIMONY	P	3.3	3.9 U	4.2 U	4.0 U	4.1 U	5.5 U	5.1 U	12.0
ARSENIC	F	0.44	5.0	2.6	4.2	6.0	19.2	8.8	2.0
BARIUM	P	0.92	74.6 J	26.3 J	66.3 J	64.6 J	640 J	95.4 J	40.0
BERYLLIUM	P	0.14	0.25 U	0.16 U	0.54 U	0.18 U	0.29 U	0.44 U	1.0
CADMIUM	P	0.30	0.36 U	0.63 U	0.82 U	0.98 U	7.3	2.3 U	1.0
CALCIUM	P	3.1	4630 J	43500 J	5490 J	5510 J	2070 J	2270 J	1000
CHROMIUM	P	0.98	17.5 U	10.2 U	16.2 U	15.3 U	63.1	82.5	2.0
COBALT	P	0.70	3.7	3.2	4.9	3.7	4.5	4.1	10.0
COPPER	P	0.76	117 J	128 J	1070 J	196 J	497 J	235 J	5.0
IRON	P	1.5	26200	12600	13900	18800	26600	19300	20.0
LEAD	F	0.34	200	322	290	305	5700	357	1.0
MAGNESIUM	P	8.0	3790	2510	3910	4120	1410	3770	1000
MANGANESE	P	0.88	158 J	133 J	117 J	136 J	87.5 J	143 J	3.0
MERCURY	CV	0.02	0.21 J	0.53 J	0.60 J	0.60 J	0.71 J	0.75 J	0.10
NICKEL	P	0.78	62.2	32.0	25.3	19.4	11.8	30.3	8.0
POTASSIUM	P	53.1	774	447	684	772	619	1080	1000
SELENIUM	F	0.56	2.0 J	1.0 J	3.2 J	1.7 J	4.2 J	1.1 J	1.0
SILVER	P	0.96	2.1 J	1.8 J	1.8 J	2.0 J	3.8 J	3.7 J	2.0
SODIUM	P	6.3	1650 J	2700	2290	2390	744 U	6150	1000
THALLIUM	F	0.86	1.1 UJ	1.0 UJ	0.99 UJ	1.1 UJ	1.3 UJ	1.3 UJ	2.0
VANADIUM	P	0.48	20.9	12.1	17.6	15.9	17.3	24.7	10.0
ZINC	P	0.58	219	207	271	324	1250	468	4.0

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
AS - SEMI AUTOMATED SPECTROPHOTOMETRIC

NOTE: J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW).
-- VALUE IS NON-DETECTED
U - VALUE IS NON-DETECTED AND DETECTION LIMIT IS RAISED.
UJ- VALUE IS NON-DETECTED AND DETECTION LIMIT IS ESTIMATED.

VOLUMES USED IN PREPARING SAMPLE FOR ANALYSIS: Hg 0.10 L, AA & ICP 0.20 L.

WET WEIGHTS OF SAMPLES: 1.00 G FOR AA & ICP
0.20 G FOR Hg

B:\18525.WK1

SITE: Boliden Metech, Inc.

CASE: 18525 SDG: MAW847
LABORATORY: SKINNER & SHERMAN LABS

SAMPLE NUMBER:	MAW853
SAMPLE LOCATION:	RB-07
LABORATORY NUMBER:	07277-07

INORGANIC ELEMENTS		INSTRUMENT DETECTION LIMITS (ug/l,ppb)		CONTRACT DETECTION LIMITS (ug/l,ppb)
ALUMINUM	P	23.9	192	200
ANTIMONY	P	16.3	--	60.0
ARSENIC	F	2.2	--	10.0
BARIUM	P	4.6	5.5 J	200
BERYLLIUM	P	0.70	--	5.0
CADMIUM	P	1.5	--	5.0
CALCIUM	P	15.5	111	5000
CHROMIUM	P	4.9	22.5	10.0
COBALT	P	3.5	3.5 U	50.0
COPPER	P	3.8	6.3 J	25.0
IRON	P	7.6	71.8	100
LEAD	F	1.7	9.7	3.0
MAGNESIUM	P	40.1	42.9 UJ	5000
MANGANESE	P	4.4	--	15.0
MERCURY	CV	0.20	--	0.20
NICKEL	P	3.9	5.3 J	40.0
POTASSIUM	P	266	--	5000
SELENIUM	F	2.8	UJ	5.0
SILVER	P	4.8	--	10.0
SODIUM	P	31.3	1010	5000
THALLIUM	F	4.3	UJ	10.0
VANADIUM	P	2.4	--	50.0
ZINC	P	2.9	11.4 UJ	20.0

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORIMETRIC

NOTE J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED QUALITY CONTROL REVIEW (DATA REVIEW).
-- VALUE IS NON-DETECTED.
UJ - VALUE IS NON-DETECTED AND DETECTION LIMIT ESTIMATED.
U - VALUE IS NON-DETECTED AND DETECTION LIMIT IS RAISED.

18525HOH.WK1

SITE: Bolidon Metech, Inc.

CASE: 18525 SDG: MAW847
LABORATORY: SKINNER & SHERMAN LABS

SAMPLE NUMBER:	MAW853
SAMPLE LOCATION:	RB-07
LABORATORY NUMBER:	07277-07

INORGANIC ELEMENTS		INSTRUMENT DETECTION LIMITS (ug/l,ppb)		CONTRACT DETECTION LIMITS (ug/l,ppb)
ALUMINUM	P	23.9	192	200
ANTIMONY	P	16.3	--	60.0
ARSENIC	F	2.2	--	10.0
BARIUM	P	4.6	5.5 J	200
BERYLLIUM	P	0.70	--	5.0
CADMIUM	P	1.5	--	5.0
CALCIUM	P	15.5	111	5000
CHROMIUM	P	4.9	22.5	10.0
COBALT	P	3.5	3.5 U	50.0
COPPER	P	3.8	6.3 J	25.0
IRON	P	7.6	71.8	100
LEAD	F	1.7	9.7	3.0
MAGNESIUM	P	40.1	42.9 UJ	5000
MANGANESE	P	4.4	--	15.0
MERCURY	CV	0.20	--	0.20
NICKEL	P	3.9	5.3 J	40.0
POTASSIUM	P	266	--	5000
SELENIUM	F	2.8	UJ	5.0
SILVER	P	4.8	--	10.0
SODIUM	P	31.3	1010	5000
THALLIUM	F	4.3	UJ	10.0
VANADIUM	P	2.4	--	50.0
ZINC	P	2.9	11.4 UJ	20.0

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORIMETRIC

NOTE J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED QUALITY CONTROL REVIEW (DATA REVIEW).
-- VALUE IS NON-DETECTED.
UJ - VALUE IS NON-DETECTED AND DETECTION LIMIT ESTIMATED.
U - VALUE IS NON-DETECTED AND DETECTION LIMIT IS RAISED.

18525HOH.WK1