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Phase I Remedial Investigation Report
Former Copes-Vulcan Facility
601 West Summit Avenue
Charlotte, North Carolina 28203
NCDENR ID# NONCD 000 1097

Submitted to:

The North Carolina Department of Environment and Natural Resources
Division of Waste Management
Inactive Hazardous Sites Branch
Superfund Section
1646 Mail Service Center
Raleigh, NC 27699-1646

Submitted by:

Remediating Party:

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NORTH CAROLINA PROFESSIONAL SEAL 28510 ENGINEER MICHAEL J. LYDEN

March 30, 2005

03/31/2005

Remediating Party Certification Statement (.0306(b)(2)):

"I certify under penalty of law that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this certification, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information."

DOUGLAS E. MIX
(Name of Remediating Party Official)

D. E. Mix
(Signature of Remediating Party Official)

4-5-05
Date

Ohio (Enter State)

Cuyahoga **COUNTY**

I, Sandra Coffey, a Notary Public of said County and State, do hereby certify that Douglas E Mix did personally appear and sign before me this the 5th day of April, 2005.

Sandra Coffey
Notary Public (signature)

(OFFICIAL SEAL)

My commission expires: June 26, 2005.

SANDRA COFFEY
Notary Public, State of Ohio, Cuy. Cty.
My Commission Expires June 26, 2005

Registered Site Manager Certification Statement (.0306(b)(1)):

"I certify under penalty of law that I am personally familiar with the information contained in this submittal, including any and all supporting documents accompanying this certification, and that the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete and complies with the Inactive Hazardous Sites Response Act G.S. 130A-310, et seq, and the voluntary remedial action program Rules 15A NCAC 13C .0300. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information."

Michael J. Lyden, P.E.
(Name of Registered Site Manager)

Michael Lyden
(Signature of Registered Site Manager)

4/5/05
Date

Ohio (Enter State)

Cuyahoga **COUNTY**

I, Sandra Coffey, a Notary Public of said County and State, do hereby certify that Michael J. Lyden PE did personally appear and sign before me this the 5th day of April, 2005.

Sandra Coffey
Notary Public (signature)

(OFFICIAL SEAL)

My commission expires: June 26, 2005.

SANDRA COFFEY
Notary Public, State of Ohio, Cuy. Cty.
My Commission Expires June 26, 2005

North Carolina Department of Environment
and Natural Resources
Division of Waste Management
Superfund Section
Inactive Hazardous Sites Branch

PHASE I REMEDIAL INVESTIGATION COMPLETION CERTIFICATION
15A NCAC 13C.0306(b)(5)(A)

Site Name Copes-Vulcan, Inc. Street Address 601 West Summit Ave.
County Mecklenburg
Site ID No. NONCD 000 1097

The Phase I remedial investigation, which is the subject of this certification has, to the best of my knowledge, been completed in compliance with the Inactive Hazardous Sites Response Act G.S. 130A-310, et seq. and the voluntary remedial action program Rules 15A NCAC 13C .0300, and The Kelly-Buck Company **is in compliance with Rules .0305(b)(2) and .0305(b)(3), of this section. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information.**

RSM Signature — Date: 4/5/05

Michael J. Lyden, P.E.
RSM Name

The Kelly-Buck Company
REC Name

2130 Superior Ave. #3A
Mailing Address

#00109
REC No.

Cleveland, OH 44114
City, State, ZIP

Ohio (Enter State)
Cuyahoga **COUNTY**

I, Sandra Coffey, a Notary Public of said County and State, do hereby certify that Michael J. Lyden PE did personally appear and sign before me this the 5th day of April, 2005.

Sandra Coffey
Notary Public (signature)

(OFFICIAL SEAL)

My commission expires: June 26, 2005.

SANDRA COFFEY
Notary Public, State of Ohio, Cuy. Cty.
My Commission Expires June 26, 2005

Form G - I

EXECUTIVE SUMMARY

A Phase I Remedial Investigation (RI) has been completed at the former Copes-Vulcan manufacturing facility in Charlotte, North Carolina. This work is part of a voluntary remediation being implemented by Electrolux Home Products, Inc. (Electrolux) under the North Carolina Department of Environment and Natural Resources (NCDENR) Registered Environmental Consultant (REC) program. The Kelly-Buck Company (Kelly-Buck) is the REC assigned to this project.

Objectives & Accomplishments

The primary objective of the Phase I RI was to investigate areas of concern in order to determine if releases of hazardous substances had occurred. This objective was accomplished. In addition, because previous site work had indicated the presence of releases in some areas, additional objectives were identified in the Work Plan and accomplished during this project phase. Following is a summary of the work accomplished during the Phase I RI:

- Investigated 13 areas of concern (AOCs) and made determinations as to the presence or absence of releases.
- Completed additional assessment to delineate the extent of soil contamination associated with identified releases.
- Completed a site-wide ground-water investigation to characterize subsurface conditions and delineate the extent of onsite ground-water contamination.
- Completed sampling of surface water and sediment in onsite stream channels to assess the presence or absence, and extent, of contamination from release areas.
- Determined background concentrations for metals in soil, sediment, surface water and ground water.
- Calculated preliminary remediation goals (PRGs) for all detected constituents in all environmental media.
- Performed a full site survey to define property boundaries, improvements and other characteristics, and to establish horizontal and vertical coordinates of soil borings, monitoring wells and other points of interest.

Findings - Primary Concerns

Four primary concerns have been identified at the site. These involving contaminant source areas that are relatively significant in terms of size, contaminant concentration and/or contaminant characteristics (such as toxicity, mobility). In addition, three of the four primary concerns involve contaminant migration from the source areas, resulting in impacts to onsite ground water, surface water and stream sediment. In one instance, there are indications that offsite ground water and surface water may be impacted.

Chlorinated Solvent Contamination

The most significant concern identified at the site involves the release and migration of chlorinated solvents. Work to-date indicates that the releases have occurred in two source-areas: AOCs #4, a former solvent degreaser and solvent handling area in the southeast portion of the building; and AOC #13, an oil storage area near the northwest corner of the building.

In AOC #4, the primary contaminant is tetrachloroethene (PCE), with maximum soil concentrations of 48,000 micrograms per kilogram (ug/Kg), and maximum shallow ground-water concentrations of 9,000 micrograms per liter (ug/L). The extent of source-area soil contamination in AOC#4 has been delineated.

In AOC #13, the primary source-area soil contaminant is also PCE (maximum 130,000 ug/Kg), but trichloroethene is also present (maximum 3,600 ug/Kg), and nearby shallow ground water contains these constituents (PCE at 53,000 ug/L; TCE at 14,000 ug/L), along with several degradation products (cis-1,2-dichloroethene (cis-1,2-DCE) at 59,000 ug/L; vinyl chloride (VC) at 2,100 ug/L). The extent of source-area soil contamination in AOC #13 has not yet been delineated.

Collectively, releases of chlorinated solvents from AOCs #4 and #13 have resulted in significant onsite ground-water impacts. Ground-water monitoring well clusters have been installed and sampled at four locations adjacent to, and downgradient of, these source areas. The well clusters include completion intervals in the uppermost zone of soil saturation (shallow interval); the interface between unconsolidated saprolite regolith and consolidated bedrock (intermediate interval); and consolidated/semi-consolidated, fractured bedrock (deep interval). In all instances, chlorinated solvents have been detected in ground water, and near the downgradient property boundary, total concentrations are on the order of 1,300 ug/L. Lower levels of chlorinated solvents, in the range of 60 ug/L, have been detected in surface water near the downstream property boundary.

Analysis to-date indicates that the area surrounding the property is served by a municipal water supply, and no individual ground-water supply wells have been identified in the area. Ground-water movement from the site is to the west-northwest, flowing beneath Interstate Route 77 (I-77)

and discharging to Irwin Creek, a perennial stream located just to the west of I-77. No environmentally sensitive areas have been identified near the site, and Irwin Creek is designated as an Impaired Water.

Wastewater Discharges

Findings from the Phase I RI indicate that there have been releases of constituents into storm sewers, with some resultant impacts to stream sediment and surface water. For example, mercury was detected at 5.7 ug/Kg in soil adjacent to the south storm sewer (B16-02, 10 ft –11 ft), and was present at 2.6 ug/Kg on the hillside just below the outfall of this storm sewer. However, mercury concentrations in stream sediment downstream of the outfall were at or below background concentrations, and mercury was not detected in surface water or ground water near the downgradient property boundary. Several other constituents were detected near the south and north storm sewer outfalls (e.g., chromium at 210 milligrams per kilogram (mg/Kg), nickel at 48 mg/Kg, polychlorinated biphenyls (PCBs) at 300 and 810 ug/Kg), and persisted in downstream sediment for at least some distance below the outfalls, but were not elevated in surface water or ground water near the west property line.

Chrome Plating Residues

AOC #3 involves a former chromium electroplating operation in the north-central portion of the building. Hexavalent chromium (Cr(VI)) is present in subsurface soil here. Although Cr(VI) was not detected in shallow ground water beneath this area, it was detected in ground water and surface water downgradient of the area (1.0 mg/L in MW-B1-02S; 0.054 mg/L in SW-08). The extent of soil contamination beneath the building is expected to be limited; however, additional source areas may be present outside of the building, resulting in the observed ground-water and surface-water conditions.

Creosote-Treated Flooring

AOC #15 involves approximately 70,000 square feet of area inside the east portion of the building. This area is covered with wood flooring, and asphaltic base materials placed beneath the wood floor contain relatively high concentrations of a group of semivolatile organic compounds (SVOCs) known as polynuclear aromatic hydrocarbons (PAHs). Work completed during the Phase I RI indicates that, throughout most of this area, the occurrence of PAHs at levels exceeding health-based goals is limited to the asphaltic base materials, and possibly a thin (one foot or less) layer of underlying soil. There are limited areas where some of the elevated PAHs extend to greater depths, either due to the greater mobility of the compound (e.g., naphthalene) or to other factors such as co-mingling with PCE solvent contamination. Overall, however, these constituents exhibit low mobility, and under current site conditions (under roof, with flooring undisturbed), represent relatively low risk of contaminant migration and exposure.

Findings - Secondary Concerns

Several additional areas of concern were found to contain localized source-area soil contamination, with no significant ground-water impacts or other indications of migration. While additional delineation and/or source removal may be needed in these areas, they do not appear to represent significant concerns, relative to the primary concerns previously discussed.

Chip Hopper

AOC #1, located just north of the building, exhibits some elevated metals and organic compounds in shallow soil, apparently in association with handling of scrap metal and other wastes. The vertical extent of contamination, and potential ground-water impacts associated with this area, both appear to be limited.

Northeast Dock

Previous sampling in AOC #2 indicated the presence of PCBs in shallow soil (maximum of 9,000 ug/Kg). However, the vertical and horizontal extent is limited, and ground water is not affected.

South-Central Degreaser

AOC #6 was originally identified due to the past presence of a solvent degreaser. Work in this area indicates the presence of two subgrade concrete sumps associated with various past metal cleaning and preparation activities. Residues still present in the sumps contain a number of elevated metals, PCE (up to 44,000 ug/Kg) and PCBs (up to 41,000 ug/Kg). However, soil immediately adjacent to these sumps has not been impacted. The only ground-water impact in this area involves PCE, which may originate from upgradient AOC #4.

Furnace Pit

In AOC #11, which involves a shallow pit with a metal grate in the southwest part of the building, results indicate low levels of PCE (250 ug/Kg) and PCBs (200 ug/Kg) in shallow soil. No significant migration is indicated, however, and localized source removal is a likely remedy.

Steel Wash Tank

Another former sump or pit was present in the north-central portion of the building, and is identified as AOC #12. Several metals and organic compounds were detected in shallow soil in this area. Of primary concern was the detection of PCBs at 670,000 ug/Kg, at a depth of 3 ft to 4 ft. Once again, however, concentrations were significantly lower in soil at depth, and ground-water impacts appear to be limited to PCE originating in other source areas.

Old Steel Drums & Debris

Old steel drums or other debris have been observed at several locations along the hillside in the west portion of the property. This area is designated as AOC #14. Surface soil sampling was conducted at a representative location adjacent to one of the drums, which appeared to be empty. Results indicated the presence of two metals at slightly elevated concentrations (lead at 190 mg/Kg; mercury at 0.26 mg/Kg). Sampling of soil and/or residues at other locations is needed; however, current results do not indicate a significant concern.

Additional Data Requirements & Planned Work

The following objectives and associated work are anticipated in order to complete all required elements of the Remedial Investigation in accordance with REC program requirements:

1. Delineate extent of soil contamination in AOC #13: While VOC contamination has been delineated in AOC #4 (southeast portion of building), additional work is needed in AOC #13 (northwest portion of building), as this area appears to be a primary source of ground-water and surface water impacts involving chlorinated solvents. Approximately 10 soil borings will be completed, with the objective of delineating the limits of soil contamination exceeding PRGs.

2. Assess and delineate offsite impacts: Current data indicate that offsite impacts involving chlorinated solvents is likely, and some additional constituents such as hexavalent chromium may also exhibit limited offsite migration. Ground water, surface water and stream sediment will be investigated downgradient and downstream of the property, in order to confirm the presence or absence of offsite migration and delineate the extent of any such migration. A step-wise approach will be used. Initially, surface water and sediment sampling will be completed in the stream channel from the site to Irwin Creek, and continuing upstream and downstream within Irwin Creek. This work will be done during baseflow conditions, and results will be used to help estimate the approximate limits of ground-water contamination downgradient of the site. Tentative drilling and well installation locations will then be identified, and property owners will be contacted for access permission. At present, approximately three to five drilling locations are estimated, and multiple completion depths may be required.

3. Assess vertical extent of ground-water impacts: Deep-interval monitoring wells installed onsite exhibit chlorinated solvents consistent with shallow and intermediate wells at the same cluster locations. Completion of at least one additional deep well may be required onsite to define the lower limit of contamination. This well would most likely be located at cluster location BG-B5 (downgradient property boundary), and would need to extend beyond the highly weathered transition zone and underlying fractured bedrock, resulting in a depth in excess of 100 to 150 feet.

4. Private Well Survey: Information obtained to-date indicates that properties surrounding the site, and throughout the City of Charlotte, are served by a municipal water supply obtained from surface water reservoirs to the north of the City. The current Mecklenburg County water well database does not identify any wells near the site, and a previous inquiry by Cooper Environmental (in association with closure of an underground storage tank) did not identify any private wells. However, given the nature of ground-water impacts and the potential for offsite migration, a more detailed evaluation is planned to confirm these findings.

5. Sewer Investigation: Sampling and related assessment work will be completed in and around the floor drains, sanitary sewers and storm sewers on the property, to assess whether any high-concentration residues may be present, and be acting as ongoing sources of ground-water, surface-water and/or sediment impacts.

6. Collection & Sampling of Old Drums: Access will be provided into the steep, wooded hillside in the western portion of the site, and a full survey and inventory of any exposed drums or other debris will be completed. For any drums which appear to contain residues, or exhibit indications of past releases to surrounding soil, the drums and contents will be retrieved, placed in suitable containers and moved to a secure storage area onsite. Contents and/or surrounding soil will be sampled to confirm the presence or absence of contaminants.

7. Source Removal in Limited or Well-Defined Areas of Concern: The feasibility of completing source removal work at secondary areas of concern, where contamination is well defined and/or limited in magnitude and extent, will be investigated. Such work would be in lieu of additional sampling, and in advance of corrective action planning for the more significant areas of concern. For example, in AOC #6, the source (residues in concrete sumps) is well defined, the extent of soil contamination adjacent to the source is minimal, and additional assessment beneath the sumps is precluded by the presence of relatively high-concentration residues within the sumps. The work in this area would involve removal and offsite treatment/disposal of the residues, decontamination or removal of the concrete sumps, and confirmatory sampling of surrounding soil. The NCDENR will be consulted in advance to confirm the acceptability of this approach for limited, relatively well-defined source areas.

8. Additional Source-Area Investigation: For other areas of concern, some additional soil sampling may be needed to define the extent of apparent impacts prior to planning and implementation of corrective action. For example, elevated mercury results at location B-16-02 appear to be related to residues in the storm sewer adjacent to that boring; however, it will need to be confirmed that more extensive soil contamination involving another source is not present here. In addition, should additional areas of concern be identified or suspected based on additional work at the site, these areas will be investigated as well.

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PHASE I REMEDIAL INVESTIGATION REPORT
FORMER COPES-VULCAN FACILITY
601 WEST SUMMIT AVE.
CHARLOTTE, NORTH CAROLINA 28203

1.0 INTRODUCTION

This report describes a Phase I Remedial Investigation (RI) completed at the former Copes-Vulcan facility in Charlotte, North Carolina. The work is part of a voluntary remedial action program being implemented by Electrolux Home Products, Inc. (Electrolux), pursuant to an Administrative Agreement between Electrolux and the North Carolina Department of Environment & Natural Resources (NCDENR), dated July 24, 2003 (NCDENR, 2003).

The voluntary remediation program is being implemented in accordance with the NCDENR's Registered Environmental Consultant (REC) Program. The Kelly-Buck Company (Kelly-Buck, NC #00109) is the REC assigned to this project. All Phase I RI work was performed under the supervision and direction of Mr. Michael J. Lyden, P.E., the designated Registered Site Manager (RSM).

The primary objectives of the Phase I RI were to: (a) determine if there have been releases of hazardous substances from the identified areas of concern ("AOCs"); (b) characterize the chemical nature of such releases, if present; and (c) establish preliminary remediation goals for the chemicals and affected environmental media.

In general, the Phase I RI is designed to identify releases, while the Phase II RI focuses on delineating the full extent of contamination. However, since previous studies at the site had identified the presence of releases in some of the areas of concern, a secondary objective of this phase was to begin delineating the extent of contamination.

Details pertaining to the objectives and work scope for this project phase, along with information on the site history and results of previous studies, can be found in the Phase I RI Work Plan prepared for this project and submitted to the NCDENR (Kelly-Buck, 2004).

2.0 BACKGROUND INFORMATION

2.1 Site Location and Description

The Copes-Vulcan site is located at 601 West Summit Avenue, in the City of Charlotte, Mecklenburg County, North Carolina. The property consists of 19 acres located between Interstate 77 and West Summit Avenue (see Figure 1, Site Location Map, and Figure 2, Site Survey). About one-half of the site has been developed, and includes a 185,000 square foot (sq ft) manufacturing and office building, two small steel buildings, paved driveways and parking areas. Approximately 40,000 sq ft of the main building is currently leased to Carocraft, Inc., a commercial wood cabinet maker. The remainder of the building is unoccupied. The undeveloped portion of the site is wooded land, characterized by mature-growth trees and steep-sided ravines with two intermittent streams.

2.2 Description of Surrounding Properties

The subject property is bounded on the north by active railroad tracks and industrial properties along West Summit Avenue. Further to the north-northeast is the central-Charlotte business district, situated inside the I-277 loop. To the west of the property are a small city park known as Wilmore Park, a natural gas pressure-reduction station owned by Piedmont Natural Gas Company, followed by I-77. A residential neighborhood known as Wilmore is present to the south of the property. To the east of the property is Summit Avenue, followed by several industrial and commercial properties, most notably, the Carolina Pipe & Foundry manufacturing complex located to the east-northeast of the site, where ductile iron pipe is manufactured.

2.3 Site History and Ownership

The first record of site development was in the mid-1940's, when The Whitin Machine Works (Whitin) acquired the property and constructed an 80,000 sq ft manufacturing and office building. In order to level the site for initial construction, and for subsequent building additions constructed between the late-1940's and the early-1970's, Whitin placed a substantial volume of fill material in the central portion of the site. According to a former employee who worked at the site from the 1940's until the 1990's, the fill material involved soil excavated from general construction projects in the Charlotte area, and to his knowledge, did not involve waste materials or hazardous substances.

From the 1940's until the 1970's, Whitin manufactured equipment for the textile industry at this location. Whitin's manufacturing activities involved metal fabrication, including cutting, forming, machining, finishing and assembly. In addition to handling steel and other metal stock, Whitin

utilized petroleum lubricants, cleaning solvents (petroleum-based and chlorinated), electroplating solutions and paints. Whitin ceased manufacturing operations at the site in the mid-1970's.

During the late-1970's, manufacturing operations were re-started at the site by Copes-Vulcan, Inc. (Copes-Vulcan). These operations involved the manufacturing of products such as cleaning equipment for industrial boilers (e.g., soot blowers), industrial valves and electronic circuit boards. Once again, the primary operations are believed to have involved metal fabrication, although no records have been found that indicate the continued use of chlorinated solvents or electroplating processes. Copes-Vulcan ceased operations at the site in 1992.

In 1995, the property was sold to Mr. Fred D. Godley, a Charlotte-area resident who owns and leases commercial real estate. Mr. Godley leased portions of the main building to Carocraft and several other commercial tenants, including a building products distributor and a paper recycler. Electrolux repossessed the property from Mr. Godley in 2001, and is the current owner.

2.4 Previous Investigations

Previous environmental investigations completed at the site are summarized below.

- A Phase I Environmental Site Assessment (ESA) was completed in 1992 by CBM Environmental Services, Inc. (CBM), shortly before Copes-Vulcan ceased operations. The report did not identify any discharges or disposal of wastes on the property, but did note a possible release of petroleum associated with a recently removed cutting oil underground storage tank (UST). CBM proceeded to collect soil samples in the vicinity of this UST. Results indicated the presence of petroleum hydrocarbon at up to 500 milligrams per kilogram (mg/kg).

- Kelly-Buck completed a Phase I ESA of the property in early-2002. Results indicated that petroleum and hazardous substances had been handled onsite; however, no indications or reports of releases, discharges or onsite disposal were identified. It was also determined that the former cutting oil UST remained an open issue with the NCDENR.

- In mid-2002, Cooper Environmental, Inc. (Cooper) completed a Phase I Limited Site Assessment (LSA) of the former cutting oil UST area. Results indicated the presence of petroleum-based compounds in shallow soil and ground water. Following the recording of a Deed Notice, a No Further Action determination was issued by NCDENR for the UST site.

- In late-2002, Kelly-Buck completed a Phase II ESA at the site. The work included completion of eighteen soil borings and two monitoring wells, and analysis of soil and ground-water samples for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals and polychlorinated biphenyls (PCBs). Results of this work indicated the presence of soil and ground-water contamination in six areas of concern.

3.0 DESCRIPTION OF PHASE I RI WORK

3.1 Overview

The Phase I RI site work included the following:

- Drilling, soil sampling and ground-water monitoring well installation, which took place during the periods of March 29 through April 2, April 12 through April 16, and May 3 through May 7, 2004.
- Surface-water and sediment sampling, which occurred on April 2 and April 12, 2004.
- Ground-water sampling, which occurred during the period of May 17 through May 21, 2004.
- Ground-water and non-aqueous phase liquid (NAPL) monitoring, which took place on May 6, May 17 and August 12, 2004.
- Surveying of soil borings, monitoring wells, surface-water and sediment sampling locations and other site features, which occurred between May and October, 2004.
- Characterization and disposal of soil and water generated during site drilling and sampling activities, which occurred during August and September, 2004.

Areas of concern identified and investigated during the Phase I RI are shown on Figure 3, and the locations of soil borings, monitoring wells and other sampling points associated with the project are indicated on Figures 4 and 5.

All work completed during the Phase I RI was supervised by Mr. Michael Lyden. P.E., the project RSM. Also participating in the Phase I RI work for Kelly-Buck, under Mr. Lyden's direction, were Ms. Jennifer Zavoda and Ms. Sarah Ballog of Kelly-Buck. Drilling services were provided by Geologic Exploration of Statesville, North Carolina. Laboratory analytical work was performed by Pace Analytical Services, Inc. (Huntersville and Asheville, North Carolina locations). Surveying work was completed by A.G. Zoutewelle Surveyors of Charlotte, North Carolina. Transportation and disposal of soil and water residues were carried out by Shamrock Environmental of Greensboro, North Carolina.

3.2 Work Scope Adjustments

The Phase I RI work scope is described in the project Work Plan (Kelly-Buck, 2004). Minor adjustments and variances are summarized in Table 1.

Table 1. Work Plan Variances

Work Item or Location	Adjustment or Variance	Comments
Surface water & sediment sampling locations #3 and #4	Location moved	Moved locations between 100 ft and 200 ft downstream to intercept baseflow & allow better detection of contaminant discharge from ground water to surface water.
Background monitoring well location #5	Location moved	Moved approximately 90 ft south-southwest. Survey indicated that initial location was off property.
Area 15 boring/test pit location #1; Area 4 location #11	Locations combined	Combined test pit at TP-B15-01 and monitoring well at MW-B4-11S with boring/well at MW-B15-06S. Location identified as B15-01/MW-B15-01S. Multiple locations in close proximity were deemed redundant.
Area 4 boring/well #12	Locations combined	Moved B4-12/MW-B4-12S to location B4-13/MW-B4-13S. Original location too far upgradient to assess ground-water conditions. Multiple locations unnecessary.
Boring locations B12-01 & B13-01	Added wells	Soil contamination indicated. Wells MW-B12-01S & MW-B13-01S were added.
Shallow well installation at B15-02	Deleted well	Shallow ground-water conditions associated with area #15 were deemed to be adequately covered by B15-01/MW-B15-01S and other nearby wells.
Multiple borings at Areas 1 & 3	Deferred	Additional borings deferred to Phase II RI, pending review of all Phase I RI soil, ground-water & other data.
Surface water, sediment & ground-water sampling (second event)	Deferred	Sampling event #2 deferred to Phase II RI.
Ground-water sample preparation for metals	Alternate method used	Standard Method 3030C is to be used for preparation of (potentially turbid) ground-water samples. Eight samples submitted on 05/19/04 were prepared using EPA Method 3010. Results could potentially show higher metals due to turbidity; however, results do not appear to have been affected.

3.3 Subsurface Investigation

Components

The subsurface investigation included drilling and monitoring well installation for purposes of soil sampling and characterization of ground-water conditions. The following tasks were completed:

- Soil samples were collected from undisturbed locations for determination of background metals concentrations.
- Soil sampling was completed in areas of concern that had not been previously investigated, to determine whether or not any releases of hazardous substances to soil has occurred in these areas.

- For areas of concern that had been previously investigated and found to have releases to soil, additional soil sampling was completed to ensure that all appropriate chemicals of concern were tested for in soil, and to better delineate the horizontal and vertical extent of previously identified soil contamination.

- Shallow-interval ground-water monitoring wells were installed in areas of concern where releases to soil had been identified, to determine whether this ground-water zone has been impacted by the releases to soil.

- Monitoring well clusters were installed in shallow-, intermediate- and deep-intervals in Area of Concern (AOC) #4 (previously identified as having shallow ground-water contamination), and at five other locations throughout the site (BG-B1 through BG-B5), in order to provide site-wide characterization of hydrogeologic conditions and ground-water quality.

The subsurface investigation included completion of 42 borings in soil and bedrock, and installation of 24 ground-water monitoring wells. Boring and well locations are shown on Figure 4. Boring and well completion logs are included as Attachment 1.

Identification Numbering System

Boring identification numbers begin the designation for the applicable area of concern or background location, followed by the individual boring number. When a soil or bedrock boring was completed as a ground-water monitoring well, the well identification number includes the same area and boring number information, preceded by "MW," and employing an "S," "I," or "D" suffix for shallow, intermediate or deep interval, respectively. Examples of the numbering system are as follows:

- "B6-08" indicates soil boring #8 in AOC #6.

- "BG-B2/MW-BG-B2(I)" indicates a soil boring and monitoring well completed to the intermediate depth interval (top of bedrock) at background location #2.

Preparation

Prior to the start of drilling and sampling work, the locations of planned soil and bedrock borings and monitoring wells identified in the Work Plan were marked in the field. The locations of underground utilities in the vicinity of these drill sites were reviewed to verify an absence of conflicts.

An equipment decontamination enclosure was established to allow for steam cleaning of drilling and sampling equipment, and for containment and collection of soil and water associated with the cleaning.

Soil Drilling & Sampling

Borings were completed at 25 locations for purposes of sampling unconsolidated soil deposits, and for installation of shallow-interval monitoring wells. These soil borings were completed using one of the following methods: (1) direct-push methods, using an Earthprobe drilling machine mounted on a small all-terrain vehicle; or (2) auger drilling with a truck-mounted hollow-stem auger drilling rig. Locations of the direct-push soil borings were primarily inside the building (AOCs #3, 4, 6, 11, 12, 13 and 15). Soil borings outside the building in AOC #16 were also completed using the Earthprobe. Remaining shallow soil borings located outside the building were completed by augering (AOCs #1 and 2; BG-B1 through BG-B5).

Soil samples were collected at each boring location using either a retrievable 4 ft thin-wall steel tube sampler with plastic liners (Earthprobe), or a 2 ft split spoon sampler (auger rig). Soil samples were inspected and classified in the field using the United Soil Classification System (USCS). Soil characteristics such as color, textural classification, moisture content, odor or staining, and other observations were recorded on the boring logs (see Attachment 1).

Soil samples from selected intervals were split into two portions for field screening and laboratory analysis. Samples intended for laboratory analysis were placed laboratory-supplied sample jars, labeled and placed in an ice-filled cooler to maintain a temperature of approximately 4°C until receipt by the laboratory. Samples collected for field screening were placed in a clean glass jar and sealed with foil, labeled and allowed to equilibrate at ambient temperature. A Thermo Environmental Model 580 EZ photoionization detector (PID), calibrated with 100 part per million (ppm) isobutylene, was then used to measure total volatile organic compound (VOC) concentrations in the headspace of each jar. Measurements were taken by piercing the foil with the PID probe and recording the maximum value (in ppm). Field screening results are included on the boring logs (Attachment 1).

After a soil boring was advanced to the planned depth, it was either sealed by filling with a bentonite grout, or was converted to a monitoring well, as described below.

Bedrock Coring

Borings at background locations #1 through 5, and at AOC #4, were advanced into the upper portion of consolidated bedrock in order to characterize subsurface conditions and install deep-interval monitoring wells. The approach for this work involved: (1) advancing the borehole to

competent bedrock with air or mud rotary drilling methods; (2) installing and grouting a 6-inch diameter galvanized steel surface casing; (3) after allowing the grout to set for a minimum of 72 hours, drilling the grout plug and several feet of rock with a roller cone bit (to confirm competent rock); and (4) rock coring with an NQ-2 wireline system. At two of the locations (background locations #4 and 5), substantial thicknesses of highly fractured, weathered bedrock were encountered (i.e., "transition zone"), and competent bedrock was not present within the target completion interval (i.e., the upper 20 to 40 ft of bedrock). Therefore, rock coring was not possible at these locations, and the boreholes were advanced to the target depths using rotary or auger drilling methods.

Bedrock core runs were typically 10 ft in length, but varied in some cases, depending upon drilling conditions; for example, where the diamond core-bit encountered resistance. Drilling conditions encountered during rock coring were recorded on the boring logs, and included: drill action, penetration rates, hydraulic pressure, drill rotation rate, water recirculation rate and other observations such as discoloration, odor or sheen. After each core run, details associated with the retrieved core samples were noted and recorded. These details included the following: run number, run depth, percent recovery, bedrock lithology, indications of weathering, oxidation, alteration or mineralization, and any jointing or other fractures. The rock quality designation (RQD) was also determined and recorded (RQD is defined as the total length of all core sample pieces greater than four inches, divided by the total length of the core run, expressed as a percentage). Lithologic descriptions, along with joints and fractures, are illustrated on the boring logs (Attachment 1).

All rock core samples and rock fragments retrieved from the borehole were washed and placed in new wooden boxes. Depths were noted on both the samples and the box dividers. Boxes were labeled with the boring number, date and depth interval. Once full, each box was photographed and stored onsite for future reference.

Monitoring Well Design, Installation & Development

A total of 24 ground-water monitoring wells were installed during the Phase I RI, and included 12 shallow-interval wells, 6 intermediate-interval wells and 6 deep-interval wells at background locations and areas of concern. Monitoring well locations are shown on Figure 4, and details associated with well construction are indicated on the boring and well completion logs (Attachment 1).

Monitoring wells were designed and constructed using the following procedures :

- The locations and completion intervals of shallow-interval monitoring wells were designed to coincide with areas of concern where there were indications of a contaminant release to the subsurface, based either on past sampling data or on results obtained during the course of the Phase I RI. These wells were completed (screened) in the uppermost zone of saturation

encountered; i.e., in the upper five to ten feet of saturated soil immediately beneath the ground-water table. Shallow-interval monitoring wells were installed in conjunction with Earthprobe direct-push drilling and 4¼-inch inside-diameter (ID) hollow-stem auger drilling. For Earthprobe borings, the small diameter borehole was first reamed with 4¼-inch ID hollow-stem augers. In both situations, wells were then constructed inside the 4¼-inch augers as they were withdrawn from the borehole.

- Intermediate-interval monitoring wells were designed to assess ground-water flow and contaminant transport conditions just above the soil-bedrock interface. These wells were installed by first advancing a borehole beyond the shallow-interval completion zone, using 8¼-inch inside-diameter (ID) hollow-stem augers. PVC surface casing (6-inch Schedule 40 flush-joint threaded) was then installed inside of the 6¼-inch augers and grouted in place using a cement-bentonite slurry and a 1-inch PVC tremie pipe. Once the grout had set (a minimum of 72 hours following installation), the boring was continued using a roller cone bit and mud rotary drilling methods until indications of competent bedrock were encountered. At that point, a monitoring well was installed, and drilling fluids were pumped and flushed from the borehole. At background locations #1 and 2, PVC surface casing was not installed, as no saturated interval was encountered above the intermediate well completion zone.

- Deep-interval monitoring wells were designed and installed in the upper portion of bedrock – typically within 20 to 30 ft of where the soil-bedrock interface was encountered. Deep well installation began with air rotary drilling to competent bedrock, followed by installation and grouting of 6-inch diameter, threaded, galvanized steel surface casing. After allowing the cement-bentonite grout to set for a minimum of 72 hours, the borehole was continued by coring into bedrock (see *Bedrock Coring* above). The core hole was then reamed to the target well completion depth with an air rotary drill rig, and a monitoring well was installed.

- All monitoring wells employed 2-inch ID, flush-joint, threaded, Schedule 10, grade 304 stainless steel screens and riser pipe.

- Filter packs were installed in the borehole outside of the screened interval, and extending approximately 2 ft above the top of screen, using a bagged, fine silica sand.

- A bentonite seal was installed above the sand filter pack, using granular bentonite hydrated with potable water. The bentonite seal was typically two to four ft in thickness.

- The remaining annular space, extending from the top of the bentonite seal to grade, was then sealed with a cement-bentonite grout, which was mixed and pumped with a 1-inch PVC tremie pipe.

- Locking protective well covers and concrete pads were installed over each well.

- Monitoring wells were developed by surging with disposable or precleaned bailers, and pumping with pre-cleaned submersible pumps.

Equipment Decontamination

All downhole drilling equipment was thoroughly cleaned prior to each boring using a high-pressure steam cleaner and potable water. Split-spoon samplers and other equipment used to collect and handle soil samples were cleaned between each use by washing with a potable water and Liqui-nox soap solution, rinsing with potable water, and then rinsing with distilled water.

Decontamination fluids, drill cuttings, drilling mud and well development water generated during the subsurface investigation were contained and placed in 55-gallon drums, labeled and transferred to a secure storage area onsite pending characterization and disposal (see Section 3.10).

3.4 Surveying

A site survey was completed to define existing site conditions and improvements, and to locate drilling and sampling points associated with the Phase I RI. This work was completed by A.G. Zoutewelle Surveyors, P.A. (Zoutewelle), a North Carolina licensed surveyor, and began with the preparation of a full legal boundary survey of the property, including property limits, legal descriptions and recorded easements. Site features and improvements were also surveyed, including buildings, paved areas, utilities, storm and sanitary sewers, and surface water drainage features. Utility information was obtained through a search of existing information (Charlotte-Mecklenburg Utility Department maps and North Carolina One Call Utility location service), and through site observation. Site topography was mapped using Mecklenburg County GIS data. The horizontal and vertical locations of soil borings, monitoring wells and other sampling points were also determined, and were referenced to horizontal and vertical coordinate systems. Vertical elevations were referenced to the North American Vertical Datum of 1988 (NAVD 88). The final survey document prepared by Zoutewelle is included as Figure 2.

3.5 Ground-Water Assessment

Ground-Water Level Measurements & NAPL Screening

During the Phase I RI, static water levels were measured in each well on three occasions: on May 6, 2004, prior to development of the well; during the period between May 17 and May 20, 2004, in association with well purging and sampling; and on August 12, 2004. Measurements were obtained using a Heron Instruments Model H.01L interface meter with a stainless steel probe and a 100-ft tape, graduated in hundredths of a foot. In addition to measuring water surface elevation, the Heron

probe detects light, non-aqueous phase liquid (LNAPL) layers and dense, non-aqueous phase liquid (DNAPL) layers, with a sensitivity of 1/200th ft (1 millimeter).

The following information was collected and recorded on the field logs:

- depth to water below the top of the 2-inch stainless steel well casing
- total depth of the well below grade
- height of the well casing above or below grade
- indications of LNAPL or DNAPL layers

The probe and tape were thoroughly decontaminated after each use by immersing and washing the full length of tape in a solution of distilled water and Liqui-nox, followed by rinsing with distilled water.

A summary of ground-water level measurements and NAPL screening results is contained in Table 2.

Table 2. Ground-Water Level Measurements & NAPL Screening Results

Well ID	Top of Casing (TOC) Elevation (ft, AMSL)	5/6/04 Depth to Water (ft below TOC)	5/6/04 LNAPL or DNAPL detected	5/6/04 Water Surface Elevation (ft, AMSL)	5/17/04 Depth to Water (ft below TOC)	5/17/04 LNAPL or DNAPL detected	5/17/04 Water Surface Elevation (ft, AMSL)	8/12/04 Depth to Water (ft below TOC)	8/12/04 LNAPL or DNAPL detected	8/12/04 Water Surface Elevation (ft, AMSL)
MW-BG-B1(S)	703.58	Dry	NA	NA	Dry	No	-	Dry	No	-
MW-BG-B1(I)	703.60	NA	NA	NA	11.70	No	691.90	11.84	No	691.76
MW-BG-B1(D)	703.40	NA	NA	NA	11.40	No	692.00	11.54	No	691.86
MW-BG-B2(I)	687.99	5.50	NA	682.49	5.55	No	682.44	5.45	No	682.54
MW-BG-B2(D)	688.06	7.40	NA	680.66	6.53	No	681.53	6.51	No	681.55
MW-BG-B3(S)	689.34	Dry	NA	NA	21.00	No	668.34	21.95	No	667.39
MW-BG-B3(I)	689.69	21.60	NA	668.09	21.99	No	667.70	22.60	No	667.09
MW-BG-B3(D)	689.18	21.30	NA	667.88	21.59	possible L/D	667.59	22.02	No	667.16
MW-BG-B4(S)	688.30	24.88	NA	663.42	25.35	possible L/D	662.95	26.10	No	662.20
MW-BG-B4(I)	687.92	26.89	NA	661.03	27.90	possible L	660.02	28.49	No	659.43
MW-BG-B4(D)	688.35	27.24	NA	661.11	27.75	possible L/D	660.60	28.73	No	659.62
MW-BG-B5(S)	647.99	NA	NA	NA	8.18	No	639.81	9.76	No	638.23
MW-BG-B5(I)	648.23	NA	NA	NA	20.65	No	627.58	10.49	No	637.74
MW-BG-B5(D)	646.87	NA	NA	NA	7.35	possible L/D	639.52	9.30	No	637.57
MW-1 (Cooper)	689.12	10.13	NA	678.99	10.39	No	678.73	-	No	-
MW-B1-02(S)	690.52	22.62	NA	667.90	22.98	No	667.54	23.28	No	667.24
MW-B2-04(S)	686.79	7.30	NA	679.49	7.35	possible L	679.44	7.54	No	679.25
MW-B3-02(S)	690.41	16.00	NA	674.41	16.32	No	674.09	16.13	No	674.28
MW-B4-02(S)	690.86	5.17	NA	685.69	5.55	possible L	685.31	6.78	No	684.08
MW-B4-02(I)	689.80	5.87	NA	683.93	4.19	No	685.61	5.69	No	684.11
MW-B4-02(D)	689.94	Dry	NA	NA	11.45	No	678.49	8.44	No	681.50
MW-B4-06(S)	690.90	6.15	NA	684.75	6.62	No	684.28	7.33	No	683.57
MW-B4-12(S)	693.38	NA	NA	NA	9.50	No	683.88	12.28	possible L	681.10
MW-B6-02(S)	690.24	11.68	NA	678.56	12.02	No	678.22	12.05	No	678.19
MW-B12-01(S)	690.85	23.18	NA	667.67	23.55	No	667.30	23.85	No	667.00
MW-B13-01(S)	690.85	Dry	NA	NA	Dry	No	-	Dry	No	-
MW-B15-01(S)	690.52	13.41	NA	677.11	13.60	No	676.92	13.55	No	676.97

Groundwater Purging & Sampling

Well purging was completed for each well using either a weighted, closed-top 1.6-inch outside diameter (OD) Teflon bailer and new, non-colored 3/16-inch polyester cord, or a Solonist Model 410 peristaltic pump fitted with new 3/8-inch OD Teflon-lined polyethylene tubing and 5/8-inch OD silicone tubing. Care was taken during purging to gently raise and lower the bailer, or to pump at a low flow rate, in order to minimize aeration and agitation in the well.

Purged water was collected in clean plastic buckets and transferred to 55-gallon drums for characterization and disposal (see Section 3.10).

Each well was purged until a minimum of three times the volume of water standing in the well had been removed (or until dry). Once three volumes had been purged, a minimum of three consecutive readings of the water being purged were obtained for temperature (degrees Celsius, or °C), pH (standard units, or S.U.) and specific conductivity (millisiemens per centimeter, or mS/cm) using a Horiba Model U10 water quality meter. An adequate purge volume was achieved when the temperature, pH and specific conductivity readings were observed to have stabilized (i.e., readings generally within about 10 percent of one other). Sample turbidity (in nephelometric turbidity units, or NTU's) was also measured and recorded on the field sampling logs.

Once purging was completed, ground-water samples were collected. If a well was purged or pumped dry, it was allowed to adequately recover before sampling. Laboratory-supplied containers were labeled and filled in the following order: metals, cyanide, hexavalent chromium, semivolatile compounds (SVOCs), polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs). If purging of the well was completed using a dedicated bailer, this method was used for ground-water sampling for all parameters. If purging was completing using a peristaltic pump, the pump was used to collect samples for metals, cyanide, hexavalent chromium and PCBs. Samples for SVOC and VOC analyses were then collected using a clean Teflon bailer and polyester cord. Ground water was bailed or pumped slowly into each container, careful not to displace any preservative in the container. Once sample containers were filled, they were sealed, placed in a laboratory-supplied cooler and maintained at a temperature of approximately 4°C pending receipt by the laboratory. Proper chain-of-custody procedures were followed for laboratory delivery, as described in the Work Plan.

During purging and sampling, the tubing, bailer and cord were kept clean and away from the ground or other surface. Typically, clean plastic sheeting was placed around each well to provide a clean working area. Once sampling was completed, the Teflon and silicone tubing used with the pumps was properly decontaminated and placed in a clean plastic bag, sealed and labeled for possible future use. The bailer and cord were disposed of after each well sampling.

3.6 Surface Water & Sediment Sampling

Surface water and sediment samples were collected from eight locations within the intermittent stream channels onsite. The locations are designated as SW/SE-01 through SW/SE-08, and are shown on Figure 5. Each location was staked and marked prior to sampling, and sampling was completed on April 2, 2004 (SW-1 and SW-7 were sampled on April 12, due to a lack of flow during the first event).

Samples were initially taken at the furthest downstream portion of each stream channel, and progressing upstream, in order to avoid cross-contamination. The surface water sample was collected first at each location, followed by the sediment sample. Surface water samples were collected by directly filling each laboratory-supplied container, careful not to displace any preservative or disturb stream sediment. Sediment samples were collected using a pre-cleaned stainless steel trowel, avoiding collection of the first one to two inches of sediment. Sediment at each location was collected just at the edge of the submerged stream channel. Containers were handled, labeled and preserved according to protocols discussed in the Work Plan. A sampling log was completed for each location, and characteristics such as flow, turbidity, sheen or odor were noted.

3.7 Other Sampling & Analysis

Surficial soil samples were collected from three locations using hand sampling methods: B-10-05 and B-10-06, corresponding to storm sewer outfalls associated with AOC #10; and B-14-01, corresponding to an area of old steel drums and debris to the west of the building. Soil samples were collected using a pre-cleaned, stainless steel trowel, placed into laboratory-supplied sample containers and stored in an ice-filled cooler pending delivery to the laboratory.

3.8 Laboratory Analysis

All samples of soil, ground water, surface water and sediment collected for analysis were transported to Pace Analytical Services, Inc. (Pace Analytical) facilities in Huntersville and Asheville, North Carolina. Pace Analytical is certified under 15A NCAC Subchapter 2H .0800 to perform the analyses required for this project. Laboratory analytical methods followed those specified in REC program guidelines (15A NCAC 13C .0306 (c)(2)(A)), and in general, involved the most recent version of USEPA SW-846 methods, combined with Pace's Standard Operating Procedures. Analyses included all or portions of the following parameters, depending on location and objectives:

- EPA Target Compound List (TCL) volatile and semivolatile organic compounds (VOCs & SVOCs), plus Library Search, per SW846-8260 and SW846-8270.

- Polychlorinated biphenyls (PCBs) per SW846-8082.
- Metals (Ag, As, Ba, Be, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Se, Tl, and Zn) by Methods 200.7/6010 and 7470/7471.
- Hexavalent chromium by Methods 3500-Cr D Modified.
- Cyanide by Methods 335.3 Modified.
- Toxicity Characteristic Leaching Procedure (TCLP) preparation

Tabulated analytical results are included in Attachment 2, and the full laboratory reports are found in Attachment 3.

3.9 Reporting of Tentatively Identified Compounds

As per REC guidelines, Pace Analytical performed library searches on samples analyzed for VOCs and SVOCs. Each library search was required to ascertain tentatively identified compounds (TICs) for at least the ten largest peaks in each analysis. As indicated by the laboratory, these TICs have reasonable agreement with reference spectra (i.e., relative intensities of major ions agree within 20%), and are exclusive of laboratory control sample compounds, surrogates, matrix spike compounds, internal standards, system monitoring compounds and target compounds.

The list below summarizes all TICs reported by Pace in more than one sample:

<u>Volatile Organic Compounds (CAS Number)</u>
Decane (124-18-5)
Decane, 4-methyl- (2847-72-5)
Dodecane (112-40-3)
Benzene, 4-ethenyl-1,2-dime (27831-13-6)
Benzene, 1-ethyl-3-methyl- (620-14-4)
Benzene, 1-methyl-2-(2-prop (1587-04-8)
Benzo(b)thiophene (95-15-8)
Benzo(c)thiophene (270-82-6)
Biphenyl (92-52-4)
Cyclohexane, pentyl- (4292-92-6)
Cyclotrisiloxane, hexamethy (541-05-9)
Indane (496-11-7)
Indene (95-13-6)
Naphthalene, 1,2-dimethyl- (573-98-8)
Naphthalene, 1,3-dimethyl- (575-41-7)
Naphthalene, 1,5-dimethyl- (571-61-9)
Naphthalene, 1,6-dimethyl- (575-43-9)
Naphthalene, 1,7-dimethyl- (575-37-1)
Naphthalene, 2,3-dimethyl- (581-40-8)

Naphthalene, 2,6-dimethyl- (581-42-0)
Naphthalene, 2,7-dimethyl- (582-16-1)
Naphthalene, 2-ethenyl- (827-54-3)
Naphthalene, 1-ethyl- (1127-76-0)
Naphthalene, 1-methyl- (90-12-0)
Naphthalene, 2-methyl- (91-57-6)
2-Octene, 2,6-dimethyl- (4057-42-5)
Propene (115-07-1)
1-Propene, 2-methyl- (115-11-7)

Semivolatile Organic Compounds (CAS Number)
Dimethylnaphthalene isomer (-)
Methyldibenzofuran isomer (-)
Methylnaphthalene isomer (-)
Pentachlorobiphenyl isomer (-)

The laboratory will be directed to obtain the necessary standards for analysis of these compounds, and they will be included in future sampling and analytical work at the site, per REC requirements (library searches will also performed on samples from B10-05, B10-06, B14-01 and future surface water/sediment locations, as these were not previously completed).

3.10 Management of Residues, Drill Cuttings, Purge Water & Decontamination Water

Investigation-derived residues generated during the project included drill cuttings, decontamination water, well development water and well purge water. These residues were collected and transferred to 116, 55-gallon steel drums, which were sealed and stored in a secure onsite location.

In order to ensure proper management and disposal, the residues were characterized in accordance with the following guidelines: (1) *Management of Remediation Waste Under RCRA* (EPA, 1998); and (2) *"Contained-in" Policy for Soil Contaminated with Listed Hazardous Waste* (NCDENR, 2004). The focus of this characterization was to classify the residues as either non-hazardous or hazardous for disposal purposes.

On August 11, 2004, samples of the drummed residues were collected for laboratory analysis. Soil samples were collected using a clean stainless steel sampling probe, and water samples were collected with a clean polyethylene bailer. Samples were placed in laboratory-prepared containers and stored in an iced cooler pending transfer to the laboratory. Samples were analyzed by Pace Analytical for total and/or leachable concentrations of the applicable constituents of concern, based on prior analytical results and requirements of the disposal facility. Sample analytical results are summarized in Table 3, and the full laboratory reports are included in Attachment 3.

Results of the residue characterization are summarized as follows:

No listed hazardous wastes identified: EPA policy states that, in instances where the original disposal occurred prior to the effective date of RCRA land disposal restrictions (1984), or if the original disposal date cannot be determined, it can be assumed that no listed hazardous wastes are involved and land disposal restrictions do not apply (EPA, 1998). Available information indicates that the sources of contamination at the site that could potentially be associated with RCRA listed hazardous wastes (i.e., chromium electroplating, tetrachloroethene degreasing) were present from the late-1940's until the early-1970's (as indicated on a 1956 Whitin Machine Works drawing), but were not present in the 1980's and 1990's (absent on a 1981 Copes-Vulcan drawing).

Analytical results are below Federal and State limits: EPA's "contained-in" policy indicates that environmental media such as soil and ground water are not themselves hazardous waste, but are to be managed as hazardous waste (a) if they exhibit a hazardous waste characteristic; or (b) if they contain listed hazardous waste above health-based levels (to be set by each State). North Carolina's Hazardous Waste Section provides guidelines for managing soil contaminated with listed hazardous waste, including "contained-out" levels for disposal in a municipal solid waste landfill (NCDENR, 2004). Analyses of the drummed residues indicate that they do not exhibit any RCRA hazardous waste characteristics, and do not have constituents present above North Carolina's contained-out levels.

Therefore, on the basis of the above interpretation and sample analytical results, the residues were classified as non-hazardous, and deemed suitable for disposal in a municipal solid waste landfill (soil) and municipal/industrial wastewater treatment facility (water). On September 23, 2004, 76 drums of soil were transported to the BFI-CMS municipal solid waste disposal facility in Harrisburg, North Carolina for disposal, and 40 drums of water were transported to Shamrock Environmental Corp. in Greensboro, North Carolina for processing in an industrial wastewater treatment facility.

Table 3. Characterization of Investigation-Derived Residues

Constituent	C-01 (unmarked soil drums)	C-03 (all soil drums)	C-04 (all water drums)	B3-02 soil	BG-B4S soil	B12-01 soil	B13-01 soil	B15-01 soil	EPA limit	NCDENR contained out limit (soil)
Total VOCs (ug/Kg; ug/L water)										
Chloroform	NA	NA	1.4	NA	NA	NA	NA	NA	NA	120,000
cis-1,2-Dichloroethene	NA	NA	33	NA	NA	NA	NA	NA	NA	140,000
Tetrachloroethene	6.1	NA	28	NA	NA	NA	12	NA	NA	14,000
Trichloroethene	NA	NA	7.0	NA	NA	NA	NA	NA	NA	10,000
Other VOCs by EPA 8260	NA	NA	ND(1)	NA	NA	NA	NA	NA	NA	NA
TCLP VOCs (mg/L)										
Tetrachloroethene	<0.010	0.16	NA	NA	NA	NA	0.010	NA	0.7	<0.7
Other VOCs by EPA TCLP/8260	NA	<0.010	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/L; ug/L water))										
Total SVOCs by EPA 3510/8270	NA	NA	ND(1)	NA	NA	NA	NA	NA	NA	NA
TCLP SVOCs by EPA 3510/8270	NA	ND(1)	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (ug/Kg; ug/L water)										
PCB-1254	NA	140	<1.0	NA	NA	4500	NA	NA	50,000	50,000
Other PCBs by EPA 3545/8082	NA	<46	<1.0	NA	NA	<40	NA	NA	50,000	50,000
Total Metals (mg/Kg; mg/L water)										
Arsenic	NA	NA	<0.0050	NA	NA	NA	NA	NA	NA	100
Barium	NA	NA	0.12	NA	NA	NA	NA	NA	NA	2,000
Cadmium	<0.12	NA	<0.001	NA	NA	NA	NA	NA	NA	20
Chromium (total)	12	NA	0.011	240(3)	NA	42	NA	8.2	NA	100
Chromium (+6)	<5.99	NA	NA	<6.01	NA	<6.10	NA	<6.05	NA	64
Lead	5.6	NA	<0.0050	NA	18	NA	10	NA	NA	100
Mercury	<0.0056	NA	<0.00020	NA	NA	NA	NA	NA	NA	4
Selenium	NA	NA	0.0071	NA	NA	NA	NA	NA	NA	20
Silver	NA	NA	<0.0020	NA	NA	NA	NA	NA	NA	100

Constituent	C-01 (unmarked soil drums)	C-03 (all soil drums)	C-04 (all water drums)	B3-02 soil	BG-B4S soil	B12-01 soil	B13-01 soil	B15-01 soil	EPA limit	NCDENR contained out limit (soil)
TCLP Metals (mg/L)										
Arsenic	NA	0.30	NA	NA	NA	NA	NA	NA	5.0	<5
Barium	NA	0.78	NA	NA	NA	NA	NA	NA	100.0	<100
Cadmium	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	1.0	<1
Chromium	<0.010	<0.010	NA	2.5	NA	<0.010	NA	0.012	5.0	<5
Lead	<0.025	<0.025	NA	NA	<0.025	NA	<0.025	NA	5.0	<5
Mercury	<0.00020	<0.00020	NA	NA	NA	NA	NA	NA	0.2	<0.2
Selenium	NA	0.030	NA	NA	NA	NA	NA	NA	1.0	<1
Silver	NA	<0.010	NA	NA	NA	NA	NA	NA	5.0	<5
Other										
Reactive cyanide (mg/Kg)	NA	<1.4	NA	NA	NA	NA	NA	NA	250(2)	NA
Reactive sulfide (mg/Kg)	NA	<14	NA	NA	NA	NA	NA	NA	500(2)	NA
Flash point (°F)	NA	>140	NA	NA	NA	NA	NA	NA	<140	NA
pH (S.U.)	NA	10.2	NA	NA	NA	NA	NA	NA	≤2; ≥12.5	NA
Paint filter – free liquids (ml/5 min)	NA	<1.0	NA	NA	NA	NA	NA	NA	any	NA

(1) Detection limits vary – see laboratory reports
(2) EPA interim guidance limit
(3) Total concentration exceeded NCDENR contained out limit; however, subsequent TCLP result was below NCDENR & EPA limits

3.11 Quality Assurance & Quality Control Procedures

Field quality assurance and quality control (QA/QC) procedures followed during the Phase I RI were consistent with those described in the project Work Plan, including the Sampling and Analytical Plan and the Quality Assurance Project Plan (QAPP). These procedures, in turn, reflect those described in the EPA Region 4 document titled *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual* (EPA, 2001), and procedures described the REC program guidelines. Selected field QA/QC procedures are summarized below.

- A total of 19 field QA/QC samples, including duplicate samples, field equipment rinse blanks and trip blanks, were prepared and submitted to the laboratory to help assess sampling procedures. The targeted frequency of QA/QC samples was one rinse blank and one VOC trip blank per matrix, for every 10 samples collected, and one duplicate sample per day of sampling. Overall, this frequency was achieved; however, due to a lack of sufficient sample volume, duplicate soil samples were not collected on several of the days when soil sampling occurred.

- Samples for VOC analysis were collected into separate sample containers without mixing.

- Sampling locations were staked with steel posts and their locations surveyed for future reference.

- All surveying work was performed by a North Carolina-registered land surveyor.

- All samples were assigned a unique identifier code - for example, B4-01 (1.5 ft - 2.0 ft) - to trace samples from collection through laboratory analysis and reporting.

- All samples selected for analysis were placed in the appropriate laboratory containers, labeled with a unique identification number on a label securely fixed to the container, and maintained in iced coolers at approximately 4° C, pending transfer to the laboratory. An entry for each sample was made on the chain-of-custody form, which was signed by the field sampling personnel at the time of sample collection. Sample coolers were kept in the possession of sampling personnel, or when left unattended, were placed in a locked area. Upon transfer to the laboratory representative, the custody forms were signed by both the courier and the sampling personnel. Completed chain-of-custody forms are included in Attachment 4.

Laboratory procedures implemented by Pace Analytical were consistent with SW-846 and other applicable EPA methods, and with procedures detailed in the project Quality Assurance Project Plan (QAPP). In addition, in order to corroborate laboratory data with REC guidelines, a checklist system was developed and used to verify proper procedures. The checklist identified items required in each lab report, per REC guidelines. Each item was checked as completed, notes or comments were added, and if necessary, corrective actions were taken.

4.0 RESULTS

4.1 Environmental Setting

Physiography, Topography and Surface Water Hydrology

The Charlotte area is located within the Piedmont physiographic province, which lies between the relatively flat Coastal Plain province to the east and the mountainous Blue Ridge province to the west. Land is characterized as a mature erosional surface developed over crystalline igneous and metamorphic bedrock. The typical terrain involves gently rolling hillsides dissected by a network of closely spaced perennial streams (Eddins & Crawford, 1984; Harned, 1989; LeGrand, 2004).

In Mecklenburg County, the land surface generally slopes to the east and southeast, and most areas range in elevation between 600 ft and 700 ft above sea level. Streams within the Charlotte area typically flow to the south-southwest, and are part of the Catawba River drainage basin, a roughly 3,000 square mile watershed located in the southwest portion of the state.

The eastern portion of the Copes-Vulcan site slopes gently to the west at about 50 feet per mile, while the western portion of the site involve areas of steeper topography, in some places sloping to the west at several hundred feet per mile. A particularly steep slope is present in the western third of the property, and corresponds to the western limit of fill material that was placed onsite between the 1940's and the early 1970's. Land surface elevation onsite ranges from 640 feet above mean sea level (AMSL) at the west property line, to 710 feet AMSL near the southeast property line along Merriman Avenue. A topographic map of the site is included on the site survey (see Figure 2).

The site is within a roughly 60 acre sub-watershed area that discharges to Irwin Creek approximately 800 ft to the west of the property. Surface water drainage across the site is generally from east to west. The most prominent surface water drainage features include two stream channels located in the north and south portions of the property, respectively. These channels are classified as ephemeral streams across much of the eastern portion of the site; that is, flow occurs only in direct response to precipitation. In the western portion of the site, where the channels intercept the ground-water table, the channels are classified as intermittent streams, having sustained periods of flow during portions of the year.

Geology

The bedrock geology of the North Carolina Piedmont is relatively complex, involving folded and fractured metamorphosed sedimentary and igneous rock, along with numerous episodes of igneous intrusions. The Piedmont is subdivided into a series of northeast-trending litho-tectonic regions known as belts. Mecklenburg County is located within the Charlotte Belt, which is characterized by medium- to high-rank metamorphic rocks and a complicated sequence of igneous intrusions (Butler,

1965). Bedrock in the site vicinity has been mapped and described by the U.S. Geological Survey (USGS) as gray, medium-grained, massive to weakly foliated granodiorite and related granitoids, composed mostly of plagioclase and quartz with lesser amounts of potassium feldspar, biotite and possibly hornblende (Goldsmith, 1988).

Unconsolidated deposits overlying bedrock in the Piedmont are referred to as regolith, and include soil, highly weathered bedrock known as saprolite, and in some areas associated with past or present stream activity, alluvial deposits. Saprolite is the primary component of the regolith, and varies in characteristics, depending on the nature of the bedrock from which it was derived. Bedrock high in quartz content tends to weather to a sandy saprolite, while bedrock with a high proportion of feldspar and other soluble minerals tends to produce clayey saprolite (LeGrand, 2004).

Subsurface work completed during the Phase I RI included soil borings and bedrock corings throughout the Copes-Vulcan site. Results indicate that the site is underlain by unconsolidated deposits consisting of soil and saprolite, and in some areas, fill from onsite or offsite locations. In addition, the unconsolidated deposits include a "transition zone," which involves highly fractured rock that still retains bedrock characteristics. The unconsolidated deposits vary in thickness from less than 20 feet at Background Location #1 (BG-1) in the southeast portion of the property, to greater than 60 – 80 feet in north-central (BG-4) and western (BG-5) locations. A hydrogeologic cross-section has been prepared to illustrate subsurface conditions across the property (see Figure 6), and additional details are included with the soil boring and rock coring logs (Attachment 1). In addition, Table 4 summarizes subsurface geologic conditions encountered during the Phase I RI.

Table 4. Summary of Site Geologic Conditions

Location	Thickness of fill (ft)	Thickness of saprolite (ft)	Thickness of transition zone (ft)	Depth to competent bedrock (ft below grade)	Thickness of competent bedrock penetrated (ft)
BG-01 (southeast)	0	9	11	20	20
BG-02 (northeast)	0	18	8	26	18
B4-02 (east-central)	0	37	2	39	20
BG-03 (southwest)	20	20	8	48	30
BG-04 (northwest)	15	33	> 40	> 88	0
BG-05 (west)	0	40	> 22	> 62	0

Hydrogeology

The ground-water flow system in the North Carolina Piedmont consists of four principal components, described as follows (Harned, 1989):

Regolith Unsaturated Zone – This interval includes topsoil and saprolite deposits, and extends from land surface to the water table. Depending on factors such as position in the watershed (e.g. hilltop versus floodplain), this zone can range in thickness from 5 to 50 ft. Hydraulic conductivity values for topsoil typically ranges between about 5 and 10 ft/day, and for saprolite, values can be on the order of 1 to 20 ft/day.

Regolith Saturated Zone – This interval generally involves saturated saprolite deposits, extending from the water table to the underlying transition zone between unconsolidated deposits and bedrock. The thickness of this zone also varies as a function of topography – in one North Carolina study it ranged from about 28 ft beneath valley bottoms to 9 ft along hilltops (Daniel, 1987). Due to its significantly higher porosity and specific yield than for crystalline bedrock, the regolith saturated zone provides the majority of water storage volume in the Piedmont ground-water system.

Transition Zone – In some areas of the Piedmont, an interval of weathered rock, boulders and saprolite is present between the regolith and competent bedrock. When present, this transition zone can exhibit much greater permeability than other intervals within the ground-water system, due to the presence of highly fractured, but still relatively unaltered rock fragments. As a result, the transition zone is capable of transmitting large quantities of ground water, and may be the primary pathway for significant contaminant movement. Well-defined transition zones are typically associated with highly foliated metamorphics, while massive igneous bedrock often produces poorly defined transition zones, where voids between unweathered rock fragments may be filled with clayey saprolite.

Fractured Bedrock Zone – Because crystalline bedrock exhibits very low values of hydraulic conductivity and effective porosity within the rock mass itself, ground-water flow is restricted to secondary permeability associated with fractures which occur within the bedrock. Such fractures tend to have larger openings and are more numerous near the upper bedrock surface, decreasing with depth. Fractures also tend to be more numerous beneath valleys, draws and surface depressions, as these features often reflect zones of preferential weathering. Studies have indicated that few fractures are typically present at depths below about 300 to 400 ft (Heath, 1984).

Several other important characteristics are emphasized with respect to the typical ground-water flow and contaminant transport system in the North Carolina Piedmont (Harned, 1989; Daniel and Dahlen, 2002; LeGrand, 2004):

- Due to its relatively large effective porosity, the regolith serves as a storage reservoir for water and associated contaminants, with gradual movement downward to fractured bedrock. The fractured bedrock, in turn, serves as a complex network of interconnected conduits, transmitting ground water from recharge areas (uplands and hillsides) to discharge areas (streams).

- Where present, the more permeable transition zone may provide a preferred pathway for ground-water transmission from recharge to discharge areas. Most of the natural ground-water

flow system is likely to be restricted to the transition zone and the upper 30 feet or so of fractured bedrock.

- In the Piedmont terrain, with its network of small sub-watershed areas and closely spaced perennial streams, the direction ground-water flow is expected to closely follow the surface topography, and ground-water flow gradients will be similar to, although more subdued than, surface relief. Therefore, surface topography can be used to predict flow direction within shallow and intermediate ground-water flow systems.

- That portion of ground-water flow occurring in deeper bedrock fractures may be more strongly influenced by regional topography, regional recharge-discharge relationships and bedrock structure, and may be more difficult to predict. In addition, the anisotropy of non-horizontal fractured bedrock flow systems may result in significant dispersion and/or assymetrical flow behavior.

- Gemorphological analysis and surface water sampling under base flow conditions may be helpful in identifying preferential pathways for ground-water flow and contaminant transport.

Hydrogeologic conditions at the Copes-Vulcan site are consistent with those previously described for the typical Piedmont setting. That is, all four of the primary zones – regolith unsaturated, regolith saturated, transition and fractured bedrock – are present throughout the property. The depth, thickness and other attributes of these zones vary across the site, however. For example, the combined thickness of the saturated regolith and transition zones is only about 10 feet in the upland area near the southeast site margin (BG-B1), but exceeds 60 to 80 feet in the west and northwest portions of the site (BG-B4 and BG-B5).

Ground-water flow in the shallow (regolith saturated), intermediate (transition) and deep (transition/upper fractured bedrock) aquifer zones at the site are depicted on the potentiometric surface maps (Figures 7, 8 and 9). As indicated, ground-water flow in each zone is generally to the west-northwest, following the surface drainage patterns toward Irwin Creek. While Irwin Creek is south-flowing, the ground-water flow direction appears to have a more northerly component over much of the site. Observations during drilling and surface reconnaissance in the northwest portion of the site indicate that upper bedrock is highly fractured in this area, apparently resulting in a preferential ground-water flow path.

4.2 Laboratory Analytical Data

Laboratory analytical results associated with soil, surface-water, sediment and ground-water samples are summarized in the data tables found in Attachment 2. Full laboratory reports associated with these samples, along with laboratory quality assurance and quality control (QA/QC)

documentation, are included in Attachment 3. Results are discussed in the following sections, beginning with a determination of background concentrations of metals (Section 4.3), followed by development of preliminary remediation goals for the detected constituents (Section 4.4), and finally, an area-by-area discussion of results.

4.3 Determination of Background Metals

Background concentrations of certain chemical constituents of concern may be present at a site due to either naturally occurring or anthropogenic (human-induced) sources. Naturally occurring concentrations of many metals are typically present in soil, stream sediment, ground water and surface water, as a result of soil and bedrock weathering. Anthropogenic background constituents might involve, for example, contaminant migration in ground water, surface streams or air, from offsite sources. Work during the Phase I RI focused on identifying naturally occurring background concentrations of metals in soil, surface water, stream sediment and ground water.

Background Metals in Soil

Background soil borings were completed at five locations on the property, designated as BG-B1 through BG-B5 (see Figure 4). These locations were selected in areas which did not appear to have been impacted by manufacturing, waste management and other site activities, and would therefore be representative of background conditions. At each location, soil samples were collected at approximately two-foot intervals extending from surface to 8 - 10 feet below grade. The samples were submitted for laboratory analysis of EPA's Target Analyte List (TAL) metals, including: antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc. A total of 20 samples were collected and analyzed by the laboratory.

Laboratory results associated with these analyses are summarized in Attachment 2. A statistical analysis (EPA, 1995) of this data set was completed in order to provide an estimated upper boundary of background concentrations for each metal. This analysis is summarized as follows:

1. The mean (X), variance (S^2) and standard deviation (S) of the background data set were computed. Censored data (i.e., not detected) were taken as one-half of the laboratory reporting limit.

2. The distribution of the data set was evaluated by computing the coefficient of variation (CV), which should not exceed a value of 1.0 for normally distributed data. In the case of lead and mercury, the CV values were above 1.0 (1.19 for lead; 1.05 for mercury). These data sets were evaluated in greater detail (log-normal plot, studentized range test), and the assumption of normality were not rejected (i.e., the analysis was considered valid).

3. The upper limit of background concentration was calculated for each analyte as the mean plus three standard deviations.

The statistical analysis and resulting maximum background concentrations for metals in site soil, as computed by this method, are summarized in Table 5.

Table 5. Soil Background Metals Concentrations

Analyte	Mean (X)	Variance (S2)	Standard Deviation (S)	Coefficient of Variation (CV = S/X)	Maximum Background Concentration in Site Soil (X + 3S)
Antimony	0.302	0.0010	0.031	0.104	**0.4**
Arsenic	1.846	1.88	1.372	0.743	**6.0**
Barium	104.318	4667.75	68.321	0.655	**309**
Beryllium	0.330	0.02	0.142	0.432	**0.8**
Cadmium	0.060	0.00	0.006	0.106	**0.08**
Chromium	27.423	214.31	14.639	0.534	**71**
Copper	34.327	212.39	14.574	0.425	**78**
Lead	31.491	1398.82	37.401	1.188	**144**
Manganese	396.682	47436.51	217.799	0.549	**1,050**
Mercury	0.043	0.00	0.045	1.054	**0.2**
Nickel	9.505	45.29	6.730	0.708	**30**
Selenium	0.302	0.00	0.031	0.104	**0.4**
Silver	0.121	0.00	0.013	0.104	**0.16**
Thallium	0.600	0.00	0.064	0.106	**0.8**
Zinc	68.768	4163.78	64.527	0.938	**262**

(all values in mg/Kg)

Background Metals in Surface Water and Stream Sediment

Sampling of surface water and sediment in the onsite stream channels included two background sampling locations: one at the upstream end of the southern stream channel (SW/SE-01) and one at the upstream end of the northern stream channel (SW/SE-06). Concentrations of metals detected in these upstream samples are considered to be indicative of background conditions; however, the number of upstream samples is limited, and additional background sampling of surface water and sediment may be necessary in the future in order to develop a more representative data set. Summaries of background concentrations of metals in surface water and stream sediment are listed in Tables 6 and 7, respectively.

Table 6. Surface-Water Background Metals Concentrations

Analyte	Maximum Observed Background Concentration in Surface Water
Antimony	<0.005
Arsenic	<0.005
Barium	0.075
Beryllium	<0.001
Cadmium	<0.001
Chromium	0.019
Copper	0.033
Lead	0.065
Manganese	0.24
Mercury	0.0021
Nickel	0.0072
Selenium	<0.005
Silver	<0.002
Thallium	<0.01
Zinc	0.15

Table 7. Sediment Background Metals Concentrations

Analyte	Maximum Observed Background Concentration in Stream Sediment
Antimony	20
Arsenic	5.0
Barium	170
Beryllium	<0.21
Cadmium	1.9
Chromium III	45
Chromium VI	<62.4
Copper	96
Lead	610
Manganese	650
Mercury	0.14
Nickel	29
Selenium	<1.0
Silver	<0.42
Thallium	<2.1
Zinc	540

Background Metals in Ground Water

Two ground-water monitoring locations were selected to represent upgradient conditions: BG-B1 (near southeast property boundary) and BG-B2 (near northeast property boundary). Table 8 summarizes metals and other constituents detected in ground-water samples from these locations.

Table 8. Ground-Water Background Constituents

Analyte	Maximum Background Concentration in Surface Water (based on maximum detection at upgradient locations)
Antimony	<0.005
Arsenic	<0.005
Barium	0.086
Beryllium	<0.001
Cadmium	<0.001
Chromium	<0.002
Copper	0.0097
Lead	<0.005
Manganese	0.96
Mercury	<0.0002
Nickel	0.0087
Selenium	<0.005
Silver	<0.002
Thallium	<0.01
Zinc	0.07

4.4 Preliminary Remediation Goals

Site-specific preliminary remediation goals (PRGs) were computed using procedures described in the REC program guidelines. The computed PRGs include values for soil (health-based and protection of ground water – see Tables 9 and 10, respectively), sediment (Table 11), surface water (Table 12) and ground water (Table 13).

These remediation goals are considered preliminary, and assume unrestricted (residential) land use. At present, the primary function of the PRGs is to serve as the basis for delineating the extent of contamination during the RI. At the same time, an objective under the REC program is to maintain these PRGs as final site remediation goals where possible – for example, unless no feasible remedial alternative can be identified during the feasibility study, and land use restrictions must be imposed. Following are several notes with respect to development of the PRGs:

- Remediation goals for metals are not more stringent than site background concentrations.

- Should other constituents such as organic compounds be determined to originate from background sources, then their corresponding background concentrations will be considered in the future during establishment of final remediation goals. At present, however, no organic constituents have been identified as originating from background sources.

- Soil PRGs for protection of ground water are currently taken as 20 times the corresponding ground-water remediation goal, representing one option available under the REC program. Another option for applying ground-water protection soil PRGs under the REC program involves the use of leachate testing, such as the Toxicity Characteristic Leaching Procedure (TCLP), with results compared directly to ground-water remediation goals. TCLP testing was employed to a limited degree during the Phase I RI; therefore, leachate-based PRGs have been tabulated, and are referenced where applicable. It is anticipated that more extensive TCLP testing will be conducted in areas of concern during subsequent project phases, in order to help assess soil conditions relative to ground-water protection goals.

Table 9. Soil Preliminary Remediation Goals – Health-Based

Analyte	Computed Background Concentration in Site Soil	Inactive Hazardous Sites Branch Soil Remediation Goal (January 2005 Update)	Preliminary Remediation Goal for Soil (Health-Based)
Metals (mg/Kg)			
Antimony	0.4	**6.2**	**6.2**
Arsenic	**6.0**	4.4	**6.0**
Barium	309	**1,080(1)**	**1,080**
Beryllium	0.8	**30**	**30**
Cadmium	0.08	**7.4**	**7.4**
Chromium III	71	**24,000**	**24,000**
Chromium VI	NA	**30**	**30**
Copper	78	**620**	**620**
Lead	144	**400**	**400**
Manganese	**1,050**	360	**1,050**
Mercury	0.2	**4.6**	**4.6**
Nickel	30	**320**	**320**
Selenium	0.4	**78**	**78**
Silver	0.16	**78**	**78**
Thallium	0.8	**1.04**	**1.04**
Zinc	262	**4,600**	**4,600**
Other Inorganics (mg/Kg)			
Cyanide	NA	**240**	**240**
Volatile Organic Compounds (ug/Kg)			
Acetone	NA	**2,800,000**	**2,800,000**
Benzene	NA	**640**	**640**
2-Butanone (MEK)	NA	**4,400,000**	**4,400,000**
n-Butylbenzene	NA	**48,000(1)**	**48,000(1)**
sec-Butylbenzene	NA	**44,000(1)**	**44,000(1)**
tert-Butylbenzene	NA	**78,000(1)**	**78,000(1)**
Chloroethane	NA	**3,000**	**3,000**
Chloroform	NA	**220**	**220**

Analyte	Computed Background Concentration in Site Soil	Inactive Hazardous Sites Branch Soil Remediation Goal (January 2005 Update)	Preliminary Remediation Goal for Soil (Health-Based)
Chloromethane	NA	**9,400**	**9,400**
1,2-Dibromo-3-chloropropane	NA	**460**	**460**
1,2-Dichlorobenzene	NA	**220,000**	**220,000**
1,4-Dichlorobenzene	NA	**3,400**	**3,400**
1,1-Dichloroethane	NA	**102,000**	**102,000**
1,1-Dichloroethene	NA	**24,000**	**24,000**
cis-1,2-Dichloroethene	NA	**8,600**	**8,600**
trans-1,2-Dichloroethene	NA	**13,800**	**13,800**
Ethylbenzene	NA	**380,000**	**380,000**
Isopropylbenzene (Cumene)	NA	**114,000**	**114,000**
p-Isopropyltoluene	NA	**14,600,000(2)**	**14,600,000(2)**
Methylene chloride	NA	**9,100**	**9,100**
Naphthalene	NA	**11,200**	**11,200**
n-Propylbenzene	NA	**48,000(1)**	**48,000(1)**
1,1,1,2-Tetrachloroethane	NA	**3,200**	**3,200**
1,1,2,2-Tetrachloroethane	NA	**410**	**410**
Tetrachloroethene	NA	**480**	**480**
Toluene	NA	**132,000**	**132,000**
1,1,1-Trichloroethane	NA	**400,000**	**400,000**
1,1,2-Trichloroethane	NA	**730**	**730**
Trichloroethene	NA	**53**	**53**
Trichlorofluoromethane	NA	**78,000**	**78,000**
1,2,4-Trimethylbenzene	NA	**10,400(1)**	**10,400(1)**
1,3,5-Trimethylbenzene	NA	**4,200(1)**	**4,200(1)**
Vinyl chloride	NA	**79**	**79**
Xylene (Total)	NA	**54,000**	**54,000**
Semivolatile Organic Compounds (ug/Kg)			
Acenaphthene	NA	**740,000**	**740,000**
Acenaphthylene	NA	**460,000(3)**	**460,000(3)**
Anthracene	NA	**4,400,000**	**4,400,000**
Benzo(k)fluoranthene	NA	**6,200**	**6,200**
Benzo(b)fluoranthene	NA	**620**	**620**
Benzo(a)anthracene	NA	**620**	**620**
Benzo(g,h,i)perylene	NA	**460,000(3)**	**460,000(3)**
Benzo(a)pyrene	NA	**62**	**62**
Chrysene	NA	**62,000**	**62,000**
Dibenzofuran	NA	**30,000**	**30,000**
bis(2-Ethylhexyl)phthalate	NA	**35,000**	**35,000**
Fluoranthene	NA	**460,000**	**460,000**
Fluorene	NA	**540,000**	**540,000**
Indeno(1,2,3-cd)pyrene	NA	**620**	**620**
2-Methylnaphthalene	NA	**11,200**	**11,200**

Analyte	Computed Background Concentration in Site Soil	Inactive Hazardous Sites Branch Soil Remediation Goal (January 2005 Update)	Preliminary Remediation Goal for Soil (Health-Based)
Naphthalene	NA	**11,200**	**11,200**
Phenanthrene	NA	**460,000(3)**	**460,000(3)**
Pyrene	NA	**460,000**	**460,000**
Polychlorinated Biphenyls (ug/Kg)			
PCBs (total)	NA	**1,000**	**1,000**

(1) No NCDENR SRG available; therefore, value was computed from USEPA Region 9 Preliminary Remediation Goal tables (October 2004 update). For non-carcinogens, the Region 9 value is divided by 5.
(2) No NCDENR SRG, USEPA Region 9 PRG or USEPA Integrated Risk Information System (IRIS) values available for p-Isopropyltoluene. PRG obtained from an Agency for Toxic Substances and Disease Registry public health assessment for another site (ATSDR, 2003), and divided by 5 (non-carcinogen).
(3) PRG for pyrene is used for non-carcinogenic PAHs where no NCDENR SRG or USEPA Region 9 PRG value is available.

Table 10. Soil Preliminary Remediation Goals – Protection of Ground Water

Analyte	Computed Background Concentration in Site Soil	State & Federal Drinking Water Standards	20 Times State & Federal Drinking Water Standards	Preliminary Remediation Goal for Soil (Protection of Ground Water, Based on Total Analysis)	Preliminary Remediation Goal for Soil (Protection of Ground Water, Based on TCLP Analysis)
Metals (mg/Kg for background soil & total concentration PRG; mg/L for drinking water standards & TCLP PRG)					
Antimony	**0.4**	0.006(1)	0.12	**0.4**	**0.006**
Arsenic	**6.0**	0.010	0.2	**6.0**	**0.010**
Barium	**309**	2.0	40	**309**	**2.0**
Beryllium	**0.8**	0.004(1)	0.08	**0.8**	**0.004**
Cadmium	0.08	0.005	**0.1**	**0.1**	**0.005**
Chromium III	**71**	0.05	1	**71**	**0.05**
Chromium VI	NA	0.05	**1**	**1**	**0.05**
Copper	**78**	1.0	20	**78**	**1.0**
Lead	**144**	0.015	0.3	**144**	**0.015**
Manganese	**1,050**	0.05	1	**1,050**	**0.05**
Mercury	**0.2**	0.0011	0.022	**0.2**	**0.0011**
Nickel	**30**	0.1	2	**30**	**0.1**
Selenium	0.4	0.05	**1**	**1**	**0.05**
Silver	0.16	0.018	**0.36**	**0.36**	**0.018**
Thallium	**0.8**	0.002(1)	0.04	**0.8**	**0.002**

Analyte	Computed Background Concentration in Site Soil	State & Federal Drinking Water Standards	20 Times State & Federal Drinking Water Standards	Preliminary Remediation Goal for Soil (Protection of Ground Water, Based on Total Analysis)	Preliminary Remediation Goal for Soil (Protection of Ground Water, Based on TCLP Analysis)
Zinc	**262**	2.1	42	**262**	**2.1**
Other Inorganics (mg/Kg; mg/L for GW goal & TCLP)					
Cyanide	NA	0.154	**3.08**	**3.08**	**0.154**
Volatile Organic Compounds (ug/Kg; ug/L for GW goal & TCLP)					
Acetone	NA	700	**14,000**	**14,000**	**700**
Benzene	NA	1	**20**	**20**	**1**
2-Butanone (MEK)	NA	170	**3,400**	**3,400**	**170**
n-Butylbenzene	NA	70	**1,400**	**1,400**	**70**
sec-Butylbenzene	NA	70	**1,400**	**1,400**	**70**
tert-Butylbenzene	NA	70	**1,400**	**1,400**	**70**
Chloroethane	NA	2,800	**56,000**	**56,000**	**2,800**
Chloroform	NA	0.19	**3.80**	**3.80**	**0.19**
Chloromethane	NA	2.6	**52**	**52**	**2.6**
1,2-Dibromo-3-chloropropane	NA	0.025	**0.5**	**0.5**	**0.025**
1,2-Dichlorobenzene	NA	600	**12,000**	**12,000**	**600**
1,4-Dichlorobenzene	NA	75	**1,500**	**1,500**	**75**
1,1-Dichloroethane	NA	700	**14,000**	**14,000**	**700**
1,1-Dichloroethene	NA	7	**140**	**140**	**7**
cis-1,2-Dichloroethene	NA	70	**1,400**	**1,400**	**70**
trans-1,2-Dichloroethene	NA	70	**1,400**	**1,400**	**70**
Ethylbenzene	NA	29	**580**	**580**	**29**
Isopropylbenzene (Cumene)	NA	70	**1,400**	**1,400**	**70**
p-Isopropyltoluene	NA	14(2)	**280**	**280**	**14**
Methylene chloride	NA	5	**100**	**100**	**5**
Naphthalene	NA	21	**420**	**420**	**21**
n-Propylbenzene	NA	70	**1,400**	**1,400**	**70**
1,1,1,2-Tetrachloroethane	NA	0.43(3)	**8.6**	**8.6**	**0.43**
1,1,2,2-Tetrachloroethane	NA	0.055(3)	**1.1**	**1.1**	**0.055**
Tetrachloroethene	NA	0.7	**14**	**14**	**0.7**
Toluene	NA	1,000	**20,000**	**20,000**	**1,000**
1,1,1-Trichloroethane	NA	200	**4,000**	**4,000**	**200**
1,1,2-Trichloroethane	NA	0.2	**4**	**4**	**0.2**
Trichloroethene	NA	2.8	**56**	**56**	**2.8**
Trichlorofluoromethane	NA	2,100	**42,000**	**42,000**	**2,100**

Analyte	Computed Background Concentration in Site Soil	State & Federal Drinking Water Standards	20 Times State & Federal Drinking Water Standards	Preliminary Remediation Goal for Soil (Protection of Ground Water, Based on Total Analysis)	Preliminary Remediation Goal for Soil (Protection of Ground Water, Based on TCLP Analysis)
1,2,4-Trimethylbenzene	NA	350	**7,000**	**7,000**	**350**
1,3,5-Trimethylbenzene	NA	350	**7,000**	**7,000**	**350**
Vinyl chloride	NA	0.015	**0.3**	**0.3**	**0.015**
Xylene (Total)	NA	530	**10,600**	**10,600**	**530**
Semivolatile Organic Compounds (ug/Kg; ug/L for GW goal & TCLP)					
Acenaphthene	NA	80	**1600**	**1600**	**80**
Acenaphthylene	NA	210	**4,200**	**4,200**	**210**
Anthracene	NA	2,100	**42,000**	**42,000**	**2,100**
Benzo(k)fluoranthene	NA	0.479	**9.58**	**9.58**	**0.479**
Benzo(b)fluoranthene	NA	0.0479	**0.958**	**0.958**	**0.0479**
Benzo(a)anthracene	NA	0.0479	**0.958**	**0.958**	**0.0479**
Benzo(g,h,i)perylene	NA	210	**4,200**	**4,200**	**210**
Benzo(a)pyrene	NA	0.00479	**0.0958**	**0.0958**	**0.00479**
Chrysene	NA	4.79	**95.8**	**95.8**	**4.79**
Dibenzofuran	NA	2.4	**48**	**48**	**2.4**
bis(2-Ethylhexyl)phthalate	NA	3	**60**	**60**	**3**
Fluoranthene	NA	280	**5600**	**5600**	**280**
Fluorene	NA	280	**5600**	**5600**	**280**
Indeno(1,2,3-cd)pyrene	NA	0.0479	**0.958**	**0.958**	**0.0479**
2-Methylnaphthalene	NA	14	**280**	**280**	**14**
Naphthalene	NA	21	**420**	**420**	**21**
Phenanthrene	NA	210	**4,200**	**4,200**	**210**
Pyrene	NA	210	**4,200**	**4,200**	**210**
Polychlorinated Biphenyls (ug/Kg; ug/L for GW goal & TCLP)					
PCBs (total)	NA	0.5	**10**	**10**	**0.5**

(1) Federal Maximum Contaminant Level (MCL)
(2) No NCDENR SRG, USEPA Region 9 PRG or USEPA Integrated Risk Information System (IRIS) values available for p-Isopropyltoluene. PRG obtained from an Agency for Toxic Substances and Disease Registry public health assessment for another site (ATSDR, 2003), and divided by 5 (non-carcinogen).
(3) Computed from USEPA Region 9 Preliminary Remediation Goal tables (October 2004 update). For non-carcinogens, the Region 9 value is divided by 5. No adjustment for carcinogens.

Table 11. Sediment Preliminary Remediation Goals

Analyte	Maximum Background Concentration in Sediment	Inactive Hazardous Sites Branch Soil Remediation Goal (January 2005 Update)	Preliminary Remediation Goal for Sediment
Metals (mg/Kg)			
Antimony	**20**	6.2	**20**
Arsenic	**5.0**	4.4	**5.0**
Barium	170	**1,080(1)**	**1,080**
Beryllium	<0.21	**30**	**30**
Cadmium	1.9	**7.4**	**7.4**
Chromium III	45	**24,000**	**24,000**
Chromium VI	<62.4	**30**	**30**
Copper	96	**620**	**620**
Lead	**610**	400	**610**
Manganese	**650**	360	**650**
Mercury	0.14	**4.6**	**4.6**
Nickel	29	**320**	**320**
Selenium	<1.0	**78**	**78**
Silver	<0.42	**78**	**78**
Thallium	<2.1	**1.04**	**1.04**
Zinc	540	**4,600**	**4,600**
Other Inorganics (mg/Kg)			
Cyanide	NA	**240**	**240**
VOCs (ug/Kg)			
Acetone	NA	**2,800,000**	**2,800,000**
Benzene	NA	**640**	**640**
2-Butanone (MEK)	NA	**4,400,000**	**4,400,000**
n-Butylbenzene	NA	**48,000(1)**	**48,000**
sec-Butylbenzene	NA	**44,000(1)**	**44,000**
tert-Butylbenzene	NA	**78,000(1)**	**78,000**
Chloroform	NA	**220**	**220**
Chloromethane	NA	**9,400**	**9,400**
1,2-Dibromo-3-chloropropane	NA	**460**	**460**
1,2-Dichlorobenzene	NA	**220,000**	**220,000**
1,4-Dichlorobenzene	NA	**3,400**	**3,400**
1,1-Dichloroethane	NA	**102,000**	**102,000**
1,1-Dichloroethene	NA	**24,000**	**24,000**
cis-1,2-Dichloroethene	NA	**8,600**	**8,600**
trans-1,2-Dichloroethene	NA	**13,800**	**13,800**
Ethylbenzene	NA	**8,900**	**8,900**
Isopropylbenzene (Cumene)	NA	**114,000**	**114,000**
p-Isopropyltoluene	NA	**14,600,000(2)**	**14,600,000**
Methylene chloride	NA	**9,100**	**9,100**
Naphthalene	NA	**11,200**	**11,200**
n-Propylbenzene	NA	**48,000(1)**	**48,000**
1,1,1,2-Tetrachloroethane	NA	**3,200**	**3,200**
1,1,2,2-Tetrachloroethane	NA	**410**	**410**

Analyte	Maximum Background Concentration in Sediment	Inactive Hazardous Sites Branch Soil Remediation Goal (January 2005 Update)	Preliminary Remediation Goal for Sediment
Tetrachloroethene	NA	**480**	**480**
Toluene	NA	**132,000**	**132,000**
1,1,1-Trichloroethane	NA	**400,000**	**400,000**
1,1,2-Trichloroethane	NA	**730**	**730**
Trichloroethene	NA	**53**	**53**
Trichlorofluoromethane	NA	**78,000**	**78,000**
1,2,4-Trimethylbenzene	NA	**10,400(1)**	**10,400**
1,3,5-Trimethylbenzene	NA	**4,200(1)**	**4,200**
Vinyl chloride	NA	**79**	**79**
Xylene (Total)	NA	**54,000**	**54,000**
SVOCs (ug/Kg)			
Acenaphthene	NA	**740,000**	**740,000**
Acenaphthylene	NA	**460,000(3)**	**460,000**
Anthracene	NA	**4,400,000**	**4,400,000**
Benzo(k)fluoranthene	NA	**6,200**	**6,200**
Benzo(b)fluoranthene	NA	**620**	**620**
Benzo(a)anthracene	NA	**620**	**620**
Benzo(g,h,i)perylene	NA	**460,000(3)**	**460,000**
Benzo(a)pyrene	NA	**62**	**62**
Chrysene	NA	**62,000**	**62,000**
Dibenzofuran	NA	**30,000**	**30,000**
bis(2-Ethylhexyl)phthalate	NA	**35,000**	**35,000**
Fluoranthene	NA	**460,000**	**460,000**
Fluorene	NA	**540,000**	**540,000**
Indeno(1,2,3-cd)pyrene	NA	**620**	**620**
2-Methylnaphthalene	NA	**11,200**	**11,200**
Naphthalene	NA	**11,200**	**11,200**
Phenanthrene	NA	**460,000(3)**	**460,000**
Pyrene	NA	**460,000**	**460,000**
PCBs (ug/Kg)			
PCBs (total)	NA	**1,000**	**1,000**

*Note: As per 03/24/05 memo from Ms. Hanna Assefa, NCDENR Toxicologist, sediment in a non-perennial stream with no associated wetlands is treated like soil; i.e., background concentrations and human health soil PRGs are considered, while ecological screening levels are not. Current and future surface water sampling results will be used to assess potential impacts to surface water from leaching.

(1) No NCDENR SRG. Computed from USEPA Region 9 Preliminary Remediation Goal tables (October 2004 update). For non-carcinogens, the Region 9 value is divided by 5.

(2) No NCDENR SRG, USEPA Region 9 PRG or USEPA Integrated Risk Information System (IRIS) values available for p-Isopropyltoluene. PRG obtained from an Agency for Toxic Substances and Disease Registry public health assessment for another site (ATSDR, 2003), and divided by 5 (non-carcinogen).

(3) No NCDENR SRG or USEPA Region 9 PRG value available. PRG for pyrene is used for non-carcinogenic PAHs.

Table 12. Surface Water Preliminary Remediation Goals(1)

Analyte	Maximum Background Concentration in Surface Water	State & Federal Surface Water Quality Standards & Screening Criteria	Draft Preliminary Remediation Goal for Surface Water
Metals (mg/L)			
Antimony	<0.005	**1.7**	**1.7**
Arsenic	<0.005	**0.01**	**0.01**
Barium	0.075	**1.4**	**1.4**
Beryllium	<0.001	**0.000117**	**0.000117**
Cadmium	<0.001	**0.002**	**0.002**
Chromium III (as total Cr)	0.019	**0.04885**	**0.04885**
Chromium VI	<0.050	**0.011(2)**	**0.011**
Copper	**0.033**	0.007	**0.033**
Lead	**0.065**	0.025	**0.065**
Manganese	**0.24**	0.1(2)	**0.24**
Mercury	**0.0021**	0.000012	**0.0021**
Nickel	0.0072	**0.088**	**0.088**
Selenium	<0.005	**0.005**	**0.005**
Silver	<0.002	**0.00006**	**0.00006**
Thallium	<0.01	**0.0013**	**0.0013**
Zinc	**0.15**	0.050	**0.150**
Other Inorganics (mg/L)			
Cyanide	<0.002	**0.005**	**0.005**
Volatile Organic Compounds (ug/L)			
Acetone	NA	**2,000**	**2,000**
Benzene	NA	**71.4**	**71.4**
2-Butanone (MEK)	NA	**26,000**	**26,000**
n-Butylbenzene	NA	**3**	**3**
sec-Butylbenzene	NA	**NA**	**NA**
tert-Butylbenzene	NA	**NA**	**NA**
Chloroform	NA	**470**	**470**
Chloromethane	NA	**27,500**	**27,500**
1,2-Dibromo-3-chloropropane	NA	**1,000**	**1,000**
1,2-Dichlorobenzene	NA	**NA**	**NA**
1,4-Dichlorobenzene	NA	**NA**	**NA**
1,1-Dichloroethane	NA	**19,500**	**19,500**
1,1-Dichloroethene	NA	**6,900**	**6,900**
cis-1,2-Dichloroethene	NA	**13,000(2)**	**13,000**
trans-1,2-Dichloroethene	NA	**11,000**	**11,000**
Ethylbenzene	NA	**520**	**520**
Isopropylbenzene (Cumene)	NA	**310**	**310**
p-Isopropyltoluene	NA	**320**	**320**
Methylene chloride	NA	**1,600**	**1,600**
Naphthalene	NA	**78**	**78**
n-Propylbenzene	NA	**77**	**77**
1,1,1,2-Tetrachloroethane	NA	**10.8**	**10.8**

Analyte	Maximum Background Concentration in Surface Water	State & Federal Surface Water Quality Standards & Screening Criteria	Draft Preliminary Remediation Goal for Surface Water
1,1,2,2-Tetrachloroethane	NA	**10.8**	**10.8**
Tetrachloroethene	NA	**8.85(2)**	**8.85**
Toluene	NA	**11**	**11**
1,1,1-Trichloroethane	NA	**2,460**	**2,460**
1,1,2-Trichloroethane	NA	**42**	**42**
Trichloroethene	NA	**92.4(2)**	**92.4**
Trichlorofluoromethane	NA	**179,000**	**179,000**
1,2,4-Trimethylbenzene	NA	**380**	**380**
1,3,5-Trimethylbenzene	NA	**620**	**620**
Vinyl chloride	NA	**525(2)**	**525**
Xylene (Total)	NA	**780**	**780**
Semivolatile Organic Compounds (ug/L)			
Acenaphthene	NA	**2,700**	**2,700**
Acenaphthylene	NA	**85**	**85**
Anthracene	NA	**110,000**	**110,000**
Benzo(k)fluoranthene	NA	**0.0311**	**0.0311**
Benzo(b)fluoranthene	NA	**0.0311**	**0.0311**
Benzo(a)anthracene	NA	**0.0311**	**0.0311**
Benzo(g,h,i)perylene	NA	**NA**	**NA**
Benzo(a)pyrene	NA	**0.0311**	**0.0311**
Chrysene	NA	**0.0311**	**0.0311**
Dibenzofuran	NA	**94**	**94**
bis(2-Ethylhexyl)phthalate	NA	**5.9**	**5.9**
Fluoranthene	NA	**370**	**370**
Fluorene	NA	**14,000**	**14,000**
Indeno(1,2,3-cd)pyrene	NA	**0.0311**	**0.0311**
2-Methylnaphthalene	NA	**72**	**72**
Naphthalene	NA	**78**	**78**
Phenanthrene	NA	**0.7**	**0.7**
Pyrene	NA	**NA**	**NA**
Polychlorinated Biphenyls (ug/L)			
PCBs (total)	NA	**0.000079**	**0.000079**

(1) Values taken from NCDENR Division of Water Quality "US EPA and NC Criteria Table" updated 10/31/04 (http://h2o.enr.state.nc.us/csu/). As indicated for Class C waters, values represent the lower of the "Freshwater" and "Human Health" entries.
(2) Value specified by Ms. Hanna Assefa, Environmental Toxicologist with NCDENR Inactive Hazardous Sites Branch, in 03/24/05 memo to M. Lyden.

Table 13. Ground Water Preliminary Remediation Goals

Analyte	Maximum Upgradient Concentration in Ground Water	State & Federal Drinking Water Standards	Preliminary Remediation Goal for Ground Water
Metals (mg/L)			
Antimony	<0.005	**0.006(1)**	**0.006**
Arsenic	<0.005	**0.010**	**0.010**
Barium	0.086	**2.0**	**2.0**
Beryllium	<0.001	**0.004(1)**	**0.004**
Cadmium	<0.001	**0.005**	**0.005**
Chromium III	<0.002	**0.05**	**0.05**
Chromium VI	NA	**0.05**	**0.05**
Copper	0.0097	**1.0**	**1.0**
Lead	<0.005	**0.015**	**0.015**
Manganese	**0.96**	0.05	**0.96**
Mercury	<0.0002	**0.0011**	**0.0011**
Nickel	0.0087	**0.1**	**0.1**
Selenium	<0.005	**0.05**	**0.05**
Silver	<0.002	**0.018**	**0.018**
Thallium	<0.01	**0.002(1)**	**0.002**
Zinc	0.07	**2.1**	**2.1**
Other Inorganics (mg/L)			
Cyanide	0.012	**0.154**	**0.154**
Volatile Organic Compounds (ug/L)			
Acetone	NA	**700**	**700**
Benzene	NA	**1**	**1**
2-Butanone (MEK)	NA	**170**	**170**
n-Butylbenzene	NA	**70**	**70**
sec-Butylbenzene	NA	**70**	**70**
tert-Butylbenzene	NA	**70**	**70**
Chloroform	NA	**0.19**	**0.19**
Chloromethane	NA	**2.6**	**2.6**
1,2-Dibromo-3-chloropropane	NA	**0.025**	**0.025**
1,2-Dichlorobenzene	NA	**600**	**600**
1,4-Dichlorobenzene	NA	**75**	**75**
1,1-Dichloroethane	NA	**700**	**700**
1,1-Dichloroethene	NA	**7**	**7**
cis-1,2-Dichloroethene	NA	**70**	**70**
trans-1,2-Dichloroethene	NA	**70**	**70**
Ethylbenzene	NA	**29**	**29**
Isopropylbenzene (Cumene)	NA	**70**	**70**
p-Isopropyltoluene	NA	**14(2)**	**14**
Methylene chloride	NA	**5**	**5**
Naphthalene	NA	**21**	**21**
n-Propylbenzene	NA	**70**	**70**
1,1,1,2-Tetrachloroethane	NA	**0.43(3)**	**0.43**
1,1,2,2-Tetrachloroethane	NA	**0.055(3)**	**0.055**

Analyte	Maximum Upgradient Concentration in Ground Water	State & Federal Drinking Water Standards	Preliminary Remediation Goal for Ground Water
Tetrachloroethene	NA	**0.7**	**0.7**
Toluene	NA	**1,000**	**1,000**
1,1,1-Trichloroethane	NA	**200**	**200**
1,1,2-Trichloroethane	NA	**0.2**	**0.2**
Trichloroethene	NA	**2.8**	**2.8**
Trichlorofluoromethane	NA	**2,100**	**2,100**
1,2,4-Trimethylbenzene	NA	**350**	**350**
1,3,5-Trimethylbenzene	NA	**350**	**350**
Vinyl chloride	NA	**0.015**	**0.015**
Xylene (Total)	NA	**530**	**530**
Semivolatile Organic Compounds (ug/L)			
Acenaphthene	NA	**80**	**80**
Acenaphthylene	NA	**210**	**210**
Anthracene	NA	**2,100**	**2,100**
Benzo(k)fluoranthene	NA	**0.479**	**0.479**
Benzo(b)fluoranthene	NA	**0.0479**	**0.0479**
Benzo(a)anthracene	NA	**0.0479**	**0.0479**
Benzo(g,h,i)perylene	NA	**210**	**210**
Benzo(a)pyrene	NA	**0.00479**	**0.00479**
Chrysene	NA	**4.79**	**4.79**
Dibenzofuran	NA	**2.4**	**2.4**
bis(2-Ethylhexyl)phthalate	NA	**3**	**3**
Fluoranthene	NA	**280**	**280**
Fluorene	NA	**280**	**280**
Indeno(1,2,3-cd)pyrene	NA	**0.0479**	**0.0479**
2-Methylnaphthalene	NA	**14**	**14**
Naphthalene	NA	**21**	**21**
Phenanthrene	NA	**210**	**210**
Pyrene	NA	**210**	**210**
Polychlorinated Biphenyls (ug/L)			
PCBs (total)	NA	**0.5**	**0.5**

(1) Federal Maximum Contaminant Level (MCL)
(2) No NCDENR SRG, USEPA Region 9 PRG or USEPA Integrated Risk Information System (IRIS) values available for p-Isopropyltoluene. PRG obtained from an Agency for Toxic Substances and Disease Registry public health assessment for another site (ATSDR, 2003), and divided by 5 (non-carcinogen).
(3) Computed from USEPA Region 9 Preliminary Remediation Goal tables (October 2004 update). For non-carcinogens, the Region 9 value is divided by 5. No adjustment for carcinogens.

4.5 Area-by-Area Summary of Results

AOC #1 (Chip Hopper)

AOC #1 is located in the north-central portion of the property, just north of the main manufacturing building. This area has been referred to as the Chip Hopper, due to the presence of an above-ground storage bin located along the edge of the building, which was used to collect scrap metal shavings from manufacturing activities. The location was designated as an area of concern due to the presence of oil-stained soil and metal chip residues. Previous investigation during the Phase II ESA indicated the presence of several VOCs and potentially elevated metals in shallow soil here; most notably tetrachloroethene (PCE) at 1,000 ug/kg and lead at 180 milligrams per kilogram (mg/kg). Contamination appeared to be limited to the uppermost several feet of soil.

During the Phase I RI, soil boring #B1-02 was advanced in this area in order to help define the vertical extent of contamination and evaluate whether other chemicals of concern are present. Shallow interval monitoring well #MW-B1-02S was also installed and sampled to assess whether ground water was impacted. Analytical data associated with soil and ground-water samples collected in AOC #1, along with the corresponding PRGs for the detected constituents, are provided in Tables 14 and 15.

Results for AOC #1 are summarized as follows:

- Shallow soil in AOC #1 contains constituents in excess of health-based and/or ground-water protection PRGs, including: metals (arsenic, barium, cadmium, total chromium, copper, lead and nickel); VOCs (naphthalene, PCE and TCE); SVOCs (PAHs and dibenzofuran); and PCBs (Aroclor-1254). Of greatest significance are the constituents exceeding health-based PRGs: arsenic (0 to 0.5 ft); naphthalene and other PAHs (0 to 2 ft); and PCBs (0 to 4 ft).

- The vertical extent of contamination exceeding PRGs is, for the most part, limited to the upper several feet of soil. The horizontal extent of soil contamination exceeding PRGs appears to be relatively limited, based on observed surface conditions and the apparent source of contamination (handling of metal chips in a specific location), but has not yet been defined.

- Shallow ground water in AOC #1 shows that PRG were exceeded for total and hexavalent chromium, manganese, nickel, and PCE. While it is possible that these ground-water results are associated with shallow soil contamination here; it appears more likely that they originate elsewhere. This conclusion is based on the observation that deeper soil samples in AOC #1 indicate that contamination has not migrated to the water table, coupled with the fact that AOCs #3 and #4, which are known sources of ground-water contamination involving chromium and PCE, respectively, are located upgradient of AOC #1.

- In summary, AOC #1 exhibits shallow soil contamination exceeding PRGs, but does not appear to be a significant source of ground-water impacts.

Additional data requirements for this area are as follows:

(1) Due to the presence of elevated total chromium levels in shallow soil at location B1-01/B1-02 (at a depth of approximately 1 to 2 ft), re-sample this interval and analyze for hexavalent chromium to determine if present.

(2) Obtain additional soil samples from location B1-01/B1-02 and analyze for leachable (TCLP) metals, VOCs, SVOCs and PCBs, at shallow (1 to 2 ft) and deeper (3 to 4 ft) intervals. These results will allow a more accurate evaluation of whether ground-water protection PRGs are exceeded in this area.

(3) Complete approximately four additional soil borings surrounding location B1-01/B1-02 to delineate the extent of soil contamination exceeding PRGs. At a minimum, this will include constituents detected in shallow soil that exceed health-based PRGs (i.e., arsenic from 0 to 0.5 ft; naphthalene and other PAHs from 0 to 2 ft; and PCBs from 0 to 4 ft. Other constituents and/or depths may need to be analyzed, depending on whether the results of TCLP testing in #(2) above indicate that ground-water protection PRGs are exceeded.

Table 14. Summary of Soil Sampling Results & PRGs – AOC #1 (Chip Hopper)

Analyte	B1-02 (1'-2')	B1-02 (1'-2') DUPLIC.	B1-02 (3'-4')	B1-02 (10'-11')	B1-01 (0.0-0.5')(1)	B1-01 (1.0-1.5')(1)	B1-01 (2.0-2.5')(1)	B1-01 (7.0-7.5')(1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)										
Antimony	<0.59	<0.61	<0.63	<0.69	NA	NA	NA	NA	**6.2**	**0.4**
Arsenic	**2.4**	**2.5**	**1.4**	<0.69	**14☆▽**	**2.6**	**1.9**	**0.93**	**6.0**	**6.0**
Barium	**200**	**250**	**290**	**250**	**93**	**250**	**340▽**	**350▽**	**1,080**	**309**
Beryllium	**0.36**	**0.13**	<0.13	<0.14	NA	NA	NA	NA	**30**	**0.8**
Cadmium	**2.1▽**	**2.8▽**	**1.5▽**	**1.0▽**	**0.53▽**	<0.12	<0.12	<0.11	**7.4**	**0.1**
Chromium (total)	**110▽**	**130▽**	**23**	**7.5**	**96▽**	**180▽**	**170▽**	**26**	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	**52**	**85▽**	**38**	**21**	NA	NA	NA	NA	**620**	**78**
Lead	**3.8**	**7.7**	**9.4**	**7.9**	**180▽**	**8.3**	**3.8**	**6.5**	**400**	**144**
Manganese	**630**	**580**	**640**	**600**	NA	NA	NA	NA	**1,050**	**1,050**
Mercury	**0.0068**	**0.020**	<0.0061	<0.0072	**0.01**	**0.01**	**0.01**	<0.0044	**4.6**	**0.2**
Nickel	**43▽**	**48▽**	**11**	**8.0**	NA	NA	NA	NA	**320**	**30**
Selenium	<0.59	<0.61	<0.63	<0.69	<0.57	<0.61	<0.58	<0.54	**78**	**1**
Silver	<0.24	<0.25	<0.25	<0.28	<0.23	<0.24	<0.23	<0.22	**78**	**0.36**
Thallium	<1.2	<1.2	<1.3	<1.4	NA	NA	NA	NA	**1.04**	**0.8**
Zinc	**120**	**120**	**71**	**56**	NA	NA	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg)										
Cyanide	<0.60	<0.62	<0.66	<0.68	NA	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)										
Acetone	**840**(2)	<130	**330**(2)	**190**(2)	ND	ND	ND	ND	**2,800,000**	**14,000**

Analyte	B1-02 (1'-2')	B1-02 (1'-2') DUPLIC.	B1-02 (3'-4')	B1-02 (10'-11')	B1-01 (0.0-0.5')(1)	B1-01 (1.0-1.5')(1)	B1-01 (2.0-2.5')(1)	B1-01 (7.0-7.5')(1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
n-Butylbenzene	<6.3	<6.6	<6.3	<7.2	<6.1	18	130	<6.1	48,000	1,400
sec-Butylbenzene	<6.3	9.2	<6.3	<7.2	<6.1	13	90	<6.1	44,000	1,400
1,1-Dichloroethane	9.7	<6.6	<6.3	<7.2	<6.1	<6.5	<6.4	<6.1	102,000	14,000
cis-1,2-Dichloroethene	31	18	<6.3	<7.2	<6.1	<6.5	<6.4	<6.1	8,600	1,400
Ethylbenzene	26	15	<6.3	<7.2	<6.1	<6.5	33	<6.1	380,000	580
Isopropylbenzene (Cumene)	7.1	<6.6	<6.3	<7.2	ND	ND	ND	ND	114,000	1,400
p-Isopropyltoluene	49	22	<6.3	<7.2	<6.1	12	83	<6.1	14,600,000	280
Methylene chloride	43(2)	28(2)	10(2)	39(2)	20(2)	16(2)	150(2)▽	<6.1	9,100	100
Naphthalene	54,000☆▽	60,000☆▽	550▽	<7.2	8.6	84	270	<6.1	11,200	420
n-Propylbenzene	<6.3	8.1	<6.3	<7.2	<6.1	<6.5	100	<6.1	48,000	1,400
Tetrachloroethene	490☆▽	240▽	<6.3	<7.2	<6.1	100▽	1,000☆▽	8.1	480	14
Toluene	10	8.2	<6.3	<7.2	<6.1	7.1	42	<6.1	132,000	20,000
1,1,1-Trichloroethane	8.3	<6.6	<6.3	<7.2	ND	ND	ND	ND	400,000	4,000
Trichloroethene	17	9.4	<6.3	<7.2	<6.1	6.7	61☆▽	<6.1	53	56
1,2,4-Trimethylbenzene	440	190	<6.3	<7.2	<6.1	37	370	<6.1	10,400	7,000
1,3,5-Trimethylbenzene	250	110	<6.3	<7.2	<6.1	36	340	<6.1	4,200	7,000
Xylene (Total)	170	100	<6.3	<7.2	ND	ND	140	ND	54,000	10,600
Semivolatile Organic Compounds (ug/Kg)										
Acenaphthene	18,000▽	19,000▽	1,000	<480	NA	NA	NA	NA	740,000	1,600
Anthracene	6,200	<10,000	480	<480	NA	NA	NA	NA	4,400,000	42,000
Dibenzofuran	15,000▽	17,000▽	830▽	<480	NA	NA	NA	NA	30,000	48
Fluoranthene	11,000▽	14,000▽	880	<480	NA	NA	NA	NA	460,000	5,600
Fluorene	18,000▽	19,000▽	1,000	<480	NA	NA	NA	NA	540,000	5,600

Analyte	B1-02 (1'-2')	B1-02 (1'-2') DUPLIC.	B1-02 (3'-4')	B1-02 (10'-11')	B1-01 (0.0-0.5')(1)	B1-01 (1.0-1.5')(1)	B1-01 (2.0-2.5')(1)	B1-01 (7.0-7.5')(1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
2-Methylnaphthalene	**24,000☆▽**	**30,000☆▽**	**1,300▽**	<480	NA	NA	NA	NA	**11,200**	**280**
Naphthalene	**93,000☆▽**	**78,000☆▽**	**3,300▽**	<480	NA	NA	NA	NA	**11,200**	**420**
Phenanthrene	**29,000☆▽**	**32,000☆▽**	**2,000**	<480	NA	NA	NA	NA	**460,000**	**4,200**
Pyrene	**11,000☆▽**	**12,000☆▽**	**1,400**	<480	NA	NA	NA	NA	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)										
PCB-1254	**16,000**	**1,600**	**4,000**	**68**	NA	NA	NA	NA	--	--
PCB-1260	<500	<440	<420	<48	NA	NA	NA	NA	--	--
PCBs (total)	**16,000☆▽**	**1,600☆▽**	**4,000☆▽**	**68▽**	NA	NA	NA	NA	**1,000**	**10**

(1) Data from previous site investigation.
(2) Suspected laboratory contaminant.
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 15. Summary of Ground-Water Sampling Results & PRGs – AOC #1 (Chip Hopper)

Analyte	MW-B1-02S	Ground-Water PRG
Metals (mg/L)		
Antimony	<0.005	**0.006**
Arsenic	<0.005	**0.010**
Barium	**0.49**	**2.0**
Beryllium	<0.001	**0.004**
Cadmium	<0.001	**0.005**
Chromium (total)	**1.6♣**	**0.05**
Chromium VI	**1.0♣**	**0.05**
Copper	**0.10**	**1.0**
Lead	**0.0092**	**0.015**
Manganese	**2.9♣**	**0.96**
Mercury	<0.00020	**0.0011**
Nickel	**0.18♣**	**0.1**
Selenium	<0.0050	**0.05**
Silver	<0.0020	**0.018**
Thallium	<0.010	**0.002**
Zinc	**0.29**	**2.1**
Other Inorganics (mg/L)		
Cyanide	<0.0020	**0.154**
Volatile Organic Compounds (ug/L)		
1,1-Dichloroethene	**2.9**	**7**
cis-1,2-Dichloroethene	**1.5**	**70**
Naphthalene	**3.9**	**21**
Tetrachloroethene	**68♣**	**0.7**
Trichloroethene	**2.3**	**2.8**
Semivolatile Organic Compounds (ug/L)	ND	- -
Polychlorinated Biphenyls (ug/L)		
PCBs (total)	ND	**0.5**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

AOC #2 (Northeast Dock)

AOC #2 is a loading dock located in the northeast corner of the main building. During the Phase II ESA, soil samples were collected from three soil borings here (#B2-01 through #B2-03), involving oil-stained areas near hydraulic dock leveler equipment. Results indicated the presence of PCBs (9 ppm) and VOCs (primarily naphthalene).

Soil boring and monitoring well #B2-04/MW-B2-04S was completed in this area during the Phase I RI to better define the vertical extent of soil contamination, allow for analysis of all applicable REC chemicals of concern, and assess whether ground water has been affected. Laboratory results associated with AOC #2 are summarized in Tables 16 and 17.

Results for AOC #2 are as follows:

- Soil sampling completed several feet to the east of the loading dock and the earlier boring locations did not indicate the presence of PCBs.

- No organic constituents were detected above PRGs.

- Cadmium concentrations in soil were above ground-water protection PRGs. The levels (2 to 4 mg/Kg) are consistent with values observed throughout much of the site, however, and may not necessarily be indicative of a cadmium release in this area.

- PCE was detected in ground water at 2 ug/L, in excess of the PRGs. PCE was not detected in soil samples in this area; therefore, its presence in ground water is most likely associated with migration from AOC #4.

- In summary, soil exhibiting PCBs above PRGs is present in close proximity to the loading docks. The horizontal and vertical extent of this contamination appears to be limited, however, and PCBs have not migrated to ground water.

Additional data requirements in AOC #2 are as follows:

(1) Collect samples of oil and/or oily residues from the hydraulic dock leveler equipment to assess whether this was the original source of PCB contamination in this area.
(2) Complete approximately four additional soil borings in the area surrounding B2-01 and B2-03, to delineate the extent of PCB contamination in soil.
(3) Re-sample soil in the area of B2-04 (0 to 2 ft) for total and TCLP cadmium analysis, to evaluate whether elevated levels are present, and whether they exceed the ground-water protection PRG.

Table 16. Summary of Soil Sampling Results & PRGs – Area 2 (NE Dock)

Analyte	B2-04 (0'-2')	B2-04 (2'-4')	B2-04 (4'-6')	B2-04 (6'-8')	B2-01 (1.0-1.5')(1)	B2-01 (4.0-4.5')(1)	B2-01 (8.0-8.5')(1)	B2-02 (2.5-3.0')(1)	B2-03 (2.5-3.0')(1)	B2-03 (4.0-4.5')(1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)												
Antimony	<0.68	<0.69	<0.65	<0.64	NA	NA	NA	NA	NA	NA	**6.2**	**0.4**
Arsenic	**0.99**	**0.82**	**1.0**	**1.1**	NA	NA	NA	NA	NA	NA	**6.0**	**6.0**
Barium	**270**	**190**	**170**	**230**	NA	NA	NA	NA	NA	NA	**1,080**	**309**
Beryllium	<0.14	<0.14	<0.13	<0.13	NA	NA	NA	NA	NA	NA	**30**	**0.8**
Cadmium	**3.7▽**	**3.1▽**	**1.9▽**	**2.5▽**	NA	NA	NA	NA	NA	NA	**7.4**	**0.1**
Chromium (total)	**4.0**	**4.2**	**3.6**	**6.0**	NA	NA	NA	NA	NA	NA	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	**38**	**18**	**29**	**54**	NA	NA	NA	NA	NA	NA	**620**	**78**
Lead	**11**	**8.4**	**8.7**	**13**	NA	NA	NA	NA	NA	NA	**400**	**144**
Manganese	**1000**	**610**	**400**	**680**	NA	NA	NA	NA	NA	NA	**1,050**	**1,050**
Mercury	**0.057**	<0.0067	<0.0063	<0.0066	NA	NA	NA	NA	NA	NA	**4.6**	**0.2**
Nickel	**8.1**	**6.6**	**5.6**	**5.9**	NA	NA	NA	NA	NA	NA	**320**	**30**
Selenium	<0.68	<0.69	<0.65	<0.64	NA	NA	NA	NA	NA	NA	**78**	**1**
Silver	<0.27	<0.28	<0.26	<0.26	NA	NA	NA	NA	NA	NA	**78**	**0.36**
Thallium	<1.4	<1.4	<1.3	<1.3	NA	NA	NA	NA	NA	NA	**1.04**	**0.8**
Zinc	**84**	**71**	**56**	**69**	NA	NA	NA	NA	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg)												
Cyanide	<0.74	<0.70	<0.65	<0.63	NA	NA	NA	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)												
Acetone	**270**(2)	<140	**500**(2)	**190**(2)	ND	ND	ND	ND	ND	ND	**2,800,000**	**14,000**

Analyte	B2-04 (0'-2')	B2-04 (2'-4')	B2-04 (4'-6')	B2-04 (6'-8')	B2-01 (1.0-1.5')(1)	B2-01 (4.0-4.5')(1)	B2-01 (8.0-8.5')(1)	B2-02 (2.5-3.0')(1)	B2-03 (2.5-3.0')(1)	B2-03 (4.0-4.5')(1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
1,1-Dichloroethane	<7.4	<7.2	<6.8	<4.9	<6.2	<6.4	<6.2	<6.6	**110**	<5.8	**102,000**	**14,000**
Methylene chloride	**46**(2)	**42**(2)	**59**(2)	**13**(2)	**27**(2)	**8.7**(2)	<6.2	<6.6	**300(2)**▽	<5.8	**9,100**	**100**
Naphthalene	<7.4	<7.2	<6.8	<4.9	**77**	**150**	<6.2	<6.6	**440**▽	<5.8	**11,200**	**420**
Toluene	<7.4	<7.2	<6.8	<4.9	**9.7**	<6.4	<6.2	<6.6	<6.3	<5.8	**132,000**	**20,000**
Semivolatile Organic Compounds (ug/Kg)	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	- -	- -
Polychlorinated Biphenyls (ug/Kg)												
PCB-1254	<49	<47	<45	<45	**1,900**	**4,400**	<1.2	<1.3	**9,000**	**200**	- -	- -
PCB-1260	<49	<47	<45	<45	<1.2	<1.3	<1.2	<1.3	<1.3	<1.2	- -	- -
PCBs (total)	ND	ND	ND	ND	**1,900**☆▽	**4,400**☆▽	ND	ND	**9,000**☆▽	**200**▽	**1,000**	**10**

(1) Data from previous site investigation.
(2) Suspected laboratory contaminant.
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 17. Summary of Ground-Water Sampling Results & PRGs – Area 2 (NE Dock)

Analyte	MW-B2-04S	Ground-Water PRG
Metals (mg/L)		
Antimony	<0.0050	**0.006**
Arsenic	<0.0050	**0.010**
Barium	**0.050**	**2.0**
Beryllium	<0.0010	**0.004**
Cadmium	<0.0010	**0.005**
Chromium (total)	<0.0020	**0.05**
Chromium VI	<0.050	**0.05**
Copper	**0.0058**	**1.0**
Lead	<0.0050	**0.015**
Manganese	**0.062**	**0.96**
Mercury	<0.00020	**0.0011**
Nickel	<0.0050	**0.1**
Selenium	<0.0050	**0.05**
Silver	<0.0020	**0.018**
Thallium	<0.010	**0.002**
Zinc	<0.010	**2.1**
Other Inorganics (mg/L)		
Cyanide	**0.013**(3)	**0.154**
Volatile Organic Compounds (ug/L)		
Tetrachloroethene	**2.0**♣	**0.7**
Semivolatile Organic Compounds (ug/L)	ND	- -
Polychlorinated Biphenyls (ug/L)		
PCBs (total)	ND	**0.5**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

Area #3 (Former Chrome Plating Area)

AOC #3 is located inside the north wall of the main building, and was previously the site of a small chromium electroplating operation. The plating operation appears to have been located inside of a 12 ft by 24 ft above-floor containment structure (block wall enclosure) that has since been removed. No subfloor pits or sumps appear to have penetrated the concrete floor slab, and no surface residues or staining are evident on the concrete slab here.

During the previous ESA, a soil boring was advanced adjacent to a sanitary sewer manhole within the limits of the former enclosure, and two soil samples were collected from beneath the floor slab. Laboratory results indicated the presence of elevated total chromium (up to 1,100 mg/kg) in this area.

As part of the Phase I RI, soil boring and monitoring well #B3-02/MW-B3-02S was completed adjacent to the previous boring location, for analysis of all REC parameters and assessment of ground water. Analytical results and corresponding PRGs are summarized in Tables 18 and 19.

Results for AOC #3 are summarized as follows:

- Chromium concentrations in soil, both total and hexavalent exceed both health-based and ground-water protection PRGs. Shallow ground water just beneath this impacted soil interval has not been adversely affected, however. This may be due to the area being situated beneath the building and floor slab, where vertical movement of water is minimal. It is noted, however, that ground-water and surface-water samples collected downgradient of this area (i.e., at MW-B1-02S and SW-08) indicate the presence of hexavalent chromium. This suggests that some chromium migration is occurring – either from beneath the building, or possibly from past waste handling areas outside the building and/or storm or sanitary sewers leaving this area.

- Concentrations of arsenic, barium and cadmium in soil also show values exceeding PRGs, but no conclusive evidence of releases are indicated. Specifically, while several results for total barium and cadmium exceed the corresponding ground-water protection PRG, the TCLP levels are below ground-water protection PRGs. Also, two arsenic TCLP results exceed ground-water protection PRGs, but the total concentrations are well below background.

- Levels of PCBs above ground-water protection PRGs were detected in soil. No PCBs were detected in ground water beneath this area, however.

- In summary, contamination involving total and hexavalent chromium is present in AOC #3, and will require further assessment and corrective action. Low levels of PCBs are also present in soil, but are not expected to be a significant concern, and may not exceed PRGs following TCLP analysis.

Data requirements in AOC #3 are as follows:

(1) Complete a soil boring in the area of B3-01 and B3-02 for deeper (8 to 16 ft) soil sampling, to delineate the vertical extent of total, hexavalent and leachable chromium.

(2) Complete approximately three additional soil borings in the area inside the building, surrounding B3-01 and B3-02, to delineate the horizontal extent of chromium contamination in soil. Samples should also be analyzed for total and TCLP PCBs to better assess ground-water protection PRGs.

(3) Investigate this area for other potential sources of chromium contamination detected downgradient. This may include collection of soil samples outside the building adjacent to concrete pads (possible storage tanks locations), and areas where soil discoloration is observed. Also, floor drains, storm sewers and sanitary sewers leading from this area should be evaluated and sampled if appropriate.

Table 18. Summary of Soil Sampling Results & PRGs – AOC #3 (Chrome Plating)

Analyte	B3-02 (0'-2')	B3-02 (0'-2')	B3-02 (2'-4')	B3-02 (4'-6')	B3-02 (6'-8')	B3-02 (6'-8')	B3-01 (0.5-1.0') (1)	B3-01 (4.5-5.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Metals (mg/Kg for total; mg/L for TCLP)											
Antimony	<0.59	NA	NA	NA	<0.56	NA	NA	NA	**6.2**	**0.4**	**0.006**
Arsenic	**1.8**	**0.029**(3)▽	<0.025(3)	<0.025(3)	**0.87**	**0.041**(3)▽	<0.53	**7.4**☆▽	**6.0**	**6.0**	**0.010**
Barium	**84**	**0.60**(3)	**0.60**(3)	**1.5**(3)	**170**	**2.0**(3)	**91**	**360**▽	**1,080**	**309**	**2.0**
Beryllium	<0.12	NA	NA	NA	<0.11	NA	NA	NA	**30**	**0.8**	**0.004**
Cadmium	**4.0**▽	<0.005(3)	<0.005(3)	<0.005(3)	**1.5**▽	<0.005(3)	<0.11	**0.27**▽	**7.4**	**0.1**	**0.005**
Chromium (total)	**1,200**▽	**13**(3)▽	**6.9**(3)▽	**4.4**(3)▽	**95**▽	**5.9**(3)▽	**1,100**▽	**270**▽	**24,000**	**71**	**0.05**
Chromium VI	**186**☆▽	NA	**223**☆▽	**56.5**☆▽	**43.1**☆▽	NA	NA	NA	**30**	**1**	**0.05**
Copper	**70**	NA	NA	NA	**43**	NA	NA	NA	**620**	**78**	**1.0**
Lead	**11**	<0.025(3)	<0.025(3)	<0.025(3)	**5.0**	<0.025(3)	**12**	**22**	**400**	**144**	**0.015**
Manganese	**570**	NA	NA	NA	**310**	NA	NA	NA	**1,050**	**1,050**	**0.05**
Mercury	**0.032**	<0.0002(3)	<0.0002(3)	<0.0002(3)	<0.0056	<0.0002(3)	**0.051**	**0.025**	**4.6**	**0.2**	**0.0011**
Nickel	**12**	NA	NA	NA	**6.5**	NA	NA	NA	**320**	**30**	**0.1**
Selenium	<0.59	<0.025(3)	<0.025(3)	<0.025(3)	<0.56	**0.031**(3)	<0.53	<0.51	**78**	**1**	**0.05**
Silver	<0.24	<0.01(3)	<0.01(3)	<0.01(3)	<0.23	<0.01(3)	<0.21	<0.20	**78**	**0.36**	**0.018**
Thallium	<1.2	NA	NA	NA	<1.1	NA	NA	NA	**1.04**	**0.8**	**0.002**
Zinc	**43**	NA	NA	NA	**58**	NA	NA	NA	**4,600**	**262**	**2.1**
Other Inorganics (mg/Kg)											
Cyanide	<0.58	NA	<0.59	<0.58	<0.60	NA	NA	NA	**240**	**3.08**	**0.154**
Volatile Organic Compounds (ug/Kg)											

Analyte	B3-02 (0'-2')	B3-02 (0'-2')	B3-02 (2'-4')	B3-02 (4'-6')	B3-02 (6'-8')	B3-02 (6'-8')	B3-01 (0.5-1.0') (1)	B3-01 (4.5-5.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Acetone	190(2)	NA	NA	NA	300(2)	NA	NA	NA	2,800,000	14,000	700
Methylene chloride	59(2)	NA	NA	NA	28(2)	NA	NA	NA	9,100	100	5
Naphthalene	<6.2	NA	NA	NA	9.1	NA	NA	NA	11,200	420	21
Xylene (Total)	7.7	NA	NA	NA	<6.0	NA	NA	NA	54,000	10,600	530
Semivolatile Organic Compounds (ug/Kg)	ND	NA	NA	NA	ND	NA	NA	NA			
Polychlorinated Biphenyls (ug/Kg)											
PCB-1254	52	NA	NA	NA	100	NA	NA	NA	- -	- -	- -
PCB-1260	<41	NA	NA	NA	<39	NA	NA	NA	- -	- -	- -
PCBs (total)	52 ∇	NA	NA	NA	100 ∇	NA	NA	NA	1,000	10	0.5

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) TCLP analysis
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 19. Summary of Ground-Water Sampling Results & PRGs – AOC #3 (Chrome Plating)

Analyte	MW-B3-02S	Ground-Water PRG
Metals (mg/L)		
Antimony	<0.005	**0.006**
Arsenic	<0.005	**0.010**
Barium	**0.066**	**2.0**
Beryllium	<0.001	**0.004**
Cadmium	<0.001	**0.005**
Chromium (total)	**0.0088**	**0.05**
Chromium VI	<0.05	**0.05**
Copper	**0.012**	**1.0**
Lead	<0.005	**0.015**
Manganese	**0.15**	**0.96**
Mercury	<0.0002	**0.0011**
Nickel	**0.0055**	**0.1**
Selenium	<0.005	**0.05**
Silver	<0.002	**0.018**
Thallium	<0.010	**0.002**
Zinc	<0.010	**2.1**
Other Inorganics (mg/L)		
Cyanide	<0.002	**0.154**
Volatile Organic Compounds (ug/L)		
Chloroform	**1.0**♣	**0.19**
1,1-Dichloroethane	**1.8**	**700**
1,1-Dichloroethene	**7.4**♣	**7**
cis-1,2-Dichloroethene	**1.2**	**70**
Tetrachloroethene	**54**♣	**0.7**
Trichloroethene	**3.5**♣	**2.8**
Semivolatile Organic Compounds (ug/L)	ND	- -
Polychlorinated Biphenyls (ug/L)		
PCBs (total)	ND	**0.5**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

AOC #4 (Former Degreaser in Southeast Portion of Building)

AOC #4 is located inside the southeast portion of the main manufacturing building, and represents a location where a PCE solvents had been used. Prior investigation of AOC #4 during the Phase II ESA included soil sampling at five boring locations (B4-01 through B4-05), and ground-water sampling at one location (MW-B4-02S). Results indicated the presence of PCE in soil (up to 48,000 ug/kg) and shallow ground water (2,800 ug/L).

As part of the Phase I RI, 19 soil samples were collected from six additional soil borings (B4-06 through B4-11) completed in and around AOC #4. Also, four additional ground-water monitoring wells were installed in this area and sampled (MW-B4-02I, MW-B4-02D, MW-B4-06S and MW-B4-12S). Laboratory analytical data associated with this work, along with comparisons to applicable PRGs for the detected constituents, are listed in Tables 20 and 21. Also, Figures 10, 11 and 12 have been prepared to summarize the detected concentrations of PCE in soil and ground water in AOC #4, and throughout the site.

Results and conclusions for AOC #4 are summarized as follows:

- The extent of PCE contamination in soil exceeding PRGs has been delineated. The overall area measures approximately 100 feet (north to south) by 60 feet (east to west).

- Within this overall area, PCE in soil exceeding both health-based and ground-water protection PRGs appears to be limited to smaller areas, or to localized "hot spots," where PCE handled inside the building appears to have been spilled onto, and leaked through, the wood flooring and into shallow soil. The primary hot spot involves soil boring B4-05, where PCE was detected at 48,000 ug/Kg in the 1½ to 2 foot interval, but was not detected in the 4½ to 5 foot interval. Also, at boring B4-04, located approximately 15 feet to the south of B4-05, PCE was detected at 8,200 ug/Kg in the 1½ to 2 foot interval, but was not detected in the 4½ to 5 foot sample. A third hot spot appears to be located near boring B4-01, where PCE was not detected in soil above the water table, but was present at 6,900 ug/Kg in the 11 to 11½ foot sample (below the water table). The area encompassing soil PCE concentrations that exceed both health-based and ground-water protection PRGs measures approximately 40 feet by 40 feet.

- Shallow ground water in AOC #4 exhibits PCE concentrations on the order of 6,000 ug/L (MW-B4-02S) to 9,000 ug/L (MW-B4-06S). PCE has also migrated into intermediate and deep ground-water intervals in AOC #4, as indicated by sampling results for MW-B4-02I (7.8 ug/L) and MW-B4-02D (20 ug/L), respectively. The horizontal and vertical limits of PCE in ground water associated with AOC #4 have not yet been defined. This is due in part to PCE detections in all but one monitoring well installed during the Phase I RI and located downgradient of AOC #4. Another factor complicating this delineation, however, appears to involve the presence of at

least one other significant PCE source area, as indicated by sampling results in the vicinity of B13-01 and MW-BG-B4(S).

- Other constituents detected in soil in AOC #4 above PRGs include: cadmium; polynuclear aromatic hydrocarbons (PAHs); dibenzofuran; and 1,2-dibromo-3-chloropropane (one sample). Cadmium levels were between 0.58 and 3.9 mg/Kg in the four samples analyzed for metals, exceeding the ground-water protection PRG of 0.1 mg/Kg; however, it is not clear that these values represent contamination. The semivolatile PAH and dibenzofuran compounds are associated with the creosote-treated wood flooring and underlying base materials, and are discussed in detail under AOC #15.

The overall horizontal and vertical extent of soil contamination in AOC #4 has been defined; therefore, no additional data requirements have been identified for this source area. With respect to ground-water, surface-water and sediment contamination originating in AOC #4 and other site locations, additional work is planned, as discussed under Ground-Water Results, Surface-Water Results and Sediment Results.

Table 20. Summary of Soil Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	B4-06 (0'-2')	B4-06 (0'-2')	B4-06 (2'-4')	B4-06 (2'-4')	B4-06 (4'-6')	B4-06 (4'-6')	B4-06 (6'-8')	B4-06 (6'-8')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Metals (mg/Kg for total; mg/L for TCLP)											
Antimony	<0.70	NA	<0.80	NA	<0.58	NA	<0.59	NA	6.2	0.4	0.006
Arsenic	<0.70	NA	1.5	NA	1.1	NA	<0.59	NA	6.0	6.0	0.010
Barium	37	NA	54	NA	220	NA	160	NA	1,080	309	2.0
Beryllium	<0.14	NA	0.20	NA	<0.12	NA	<0.12	NA	30	0.8	0.004
Cadmium	3.9 ∇	NA	3.4 ∇	NA	0.74 ∇	NA	0.58 ∇	NA	7.4	0.1	0.005
Chromium (total)	43	NA	50	NA	5.4	NA	6.0	NA	24,000	71	0.05
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	30	1	0.05
Copper	34	NA	38	NA	25	NA	23	NA	620	78	1.0
Lead	21	NA	18	NA	8.1	NA	9.2	NA	400	144	0.015
Manganese	81	NA	49	NA	320	NA	390	NA	1,050	1,050	0.05
Mercury	0.16	NA	0.031	NA	0.010	NA	0.020	NA	4.6	0.2	0.0011
Nickel	3.2	NA	3.9	NA	4.1	NA	3.8	NA	320	30	0.1
Selenium	<0.70	NA	<0.80	NA	<0.58	NA	<0.59	NA	78	1	0.05
Silver	<0.28	NA	<0.32	NA	<0.23	NA	<0.24	NA	78	0.36	0.018
Thallium	<1.4	NA	<1.6	NA	<1.2	NA	<1.2	NA	1.04	0.8	0.002
Zinc	15	NA	17	NA	43	NA	36	NA	4,600	262	2.1
Other Inorganics (mg/Kg for total; mg/L for TCLP)											
Cyanide	<0.70	NA	NA	NA	<0.62	NA	NA	NA	240	3.08	0.154
Volatile Organic											

Analyte	B4-06 (0'-2')	B4-06 (0'-2')	B4-06 (2'-4')	B4-06 (2'-4')	B4-06 (4'-6')	B4-06 (4'-6')	B4-06 (6'-8')	B4-06 (6'-8')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Compounds (ug/Kg for total; ug/L for TCLP)											
Acetone	**290**(2)	**210**(2,3)	<160	**37**(2,3)	**440**(2)	NA	<120	NA	**2,800,000**	**14,000**	**700**
1,2-Dibromo-3-chloropropane	<7.0	NA	<8.0	NA	<6.3	NA	<6.2	NA	**460**	**0.5**	**0.025**
Methylene chloride	**11**(2)	<20(2,3)	**12**(2)	<20(2,3)	**46**(2)	NA	**6.4**(2)	NA	**9,100**	**100**	**5**
Naphthalene	**340**	**240**(3)▽	**220**	**11**(3)	<6.3	NA	<6.2	NA	**11,200**	**420**	**21**
Tetrachloroethene	**7.0**	<10(3)	**130**▽	<10(3)	<6.3	<10(3)	<6.2	<10(3)	**480**	**14**	**0.7**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)											
Acenaphthene	**670**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**740,000**	**1,600**	**80**
Acenaphthylene	**670**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**460,000**	**4,200**	**210**
Anthracene	**790**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**4,400,000**	**42,000**	**2,100**
Benzo(k)fluoranthene	**1,300**▽	<50(3)	<790	<50(3)	<410	NA	<410	NA	**6,200**	**10**	**0.479**
Benzo(b)fluoranthene	**1,100**☆▽	<50(3)	<790	<50(3)	<410	NA	<410	NA	**620**	**1**	**0.0479**
Benzo(a)anthracene	**1,100**☆▽	<50(3)	<790	<50(3)	<410	NA	<410	NA	**620**	**1**	**0.0479**
Benzo(g,h,i)perylene	<460	<50(3)	<790	<50(3)	<410	NA	<410	NA	**460,000(3)**	**4,200**	**210**
Benzo(a)pyrene	**1,100**☆▽	<50(3)	<790	<50(3)	<410	NA	<410	NA	**62**	**0.0958**	**0.00479**
Chrysene	**980**▽	<50(3)	<790	<50(3)	<410	NA	<410	NA	**62,000**	**96**	**4.79**
Dibenzofuran	**1,100**▽	<50(3)	<790	<50(3)	<410	NA	<410	NA	**30,000**	**48**	**2.4**
Fluoranthene	**2,700**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**460,000**	**5,600**	**280**
Fluorene	**830**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**540,000**	**5,600**	**280**

Analyte	B4-06 (0'-2')	B4-06 (0'-2')	B4-06 (2'-4')	B4-06 (2'-4')	B4-06 (4'-6')	B4-06 (4'-6')	B4-06 (6'-8')	B4-06 (6'-8')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Indeno(1,2,3-cd)pyrene	<460	<50(3)	<790	<50(3)	<410	NA	<410	NA	**620**	**0.958**	**0.0479**
2-Methylnaphthalene	**890 ▽**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**11,200**	**280**	**14**
Naphthalene	**980 ▽**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**11,200**	**420**	**21**
Phenanthrene	**3,100**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**460,000**	**4,200**	**210**
Pyrene	**2,500**	<50(3)	<790	<50(3)	<410	NA	<410	NA	**460,000**	**4,200**	**210**
Polychlorinated Biphenyls (ug/Kg)	ND	NA	NA	NA	ND	NA	NA	NA	**1,000**	**10**	**0.5**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) TCLP analysis
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 20. Summary of Soil Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	B4-07 (2.5-3.5')	B4-07 (5-7')	B4-07 (7-9')	B4-08 (2.5-3.5')	B4-08 (5-7')	B4-08 (7-9')	B4-09 (2.5-3.5')	B4-09 (5-7')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg for total; mg/L for TCLP)										
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	**6.2**	**0.4**
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	**6.0**	**6.0**
Barium	NA	NA	NA	NA	NA	NA	NA	NA	**1,080**	**309**
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**0.8**

Analyte	B4-07 (2.5-3.5')	B4-07 (5-7')	B4-07 (7-9')	B4-08 (2.5-3.5')	B4-08 (5-7')	B4-08 (7-9')	B4-09 (2.5-3.5')	B4-09 (5-7')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	**7.4**	**0.1**
Chromium (total)	NA	NA	NA	NA	NA	NA	NA	NA	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	NA	NA	NA	NA	NA	NA	NA	NA	**620**	**78**
Lead	NA	NA	NA	NA	NA	NA	NA	NA	**400**	**144**
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	**1,050**	**1,050**
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	**4.6**	**0.2**
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	**320**	**30**
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	**78**	**1**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	**78**	**0.36**
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	**1.04**	**0.8**
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg for total; mg/L for TCLP)										
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)										
Acetone	**250(2)**	**460(2)**	**280(2)**	**600(2)**	**470(2)**	**680(2)**	**220(2)**	<130	**2,800,000**	**14,000**
1,2-Dibromo-3-chloropropane	<5.9	<6.5	<7.2	<5.8	**9.2▽**	<6.9	<6.6	<6.4	**460**	**0.5**
Methylene chloride	**24(2)**	**55(2)**	**63(2)**	**23(2)**	**29(2)**	**50(2)**	**13(2)**	<6.4	**9,100**	**100**
Naphthalene	**45**	<6.5	**14,000☆▽**	**12**	**1,900▽**	**3,200▽**	**84**	**840▽**	**11,200**	**420**
Tetrachloroethene	<5.9	**27▽**	<7.2	<5.8	<6.3	<6.9	<6.6	<6.4	**480**	**14**

Analyte	B4-07 (2.5-3.5')	B4-07 (5-7')	B4-07 (7-9')	B4-08 (2.5-3.5')	B4-08 (5-7')	B4-08 (7-9')	B4-09 (2.5-3.5')	B4-09 (5-7')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)										
Acenaphthene	<390	<430	**3,300 ∇**	<380	**3,600 ∇**	**1,300**	<430	**2,200 ∇**	**740,000**	**1,600**
Acenaphthylene	<390	<430	**2,600**	<380	**3,400**	**1,100**	<430	**1,800**	**460,000**	**4,200**
Anthracene	<390	<430	**3,500**	**510**	**6,000**	**1,500**	<430	**2,100**	**4,400,000**	**42,000**
Benzo(k)fluoranthene	<390	<430	**3,800 ∇**	**520 ∇**	**3,900 ∇**	**1,600 ∇**	<430	**2,500 ∇**	**6,200**	**10**
Benzo(b)fluoranthene	<390	<430	**4,600 ☆ ∇**	**540 ∇**	**4,700 ☆ ∇**	**1,700 ☆ ∇**	<430	**2,600 ☆ ∇**	**620**	**1**
Benzo(a)anthracene	<390	<430	**4,400 ☆ ∇**	**720 ☆ ∇**	**7,400 ☆ ∇**	**2,300 ☆ ∇**	<430	**3,000 ☆ ∇**	**620**	**1**
Benzo(g,h,i)perylene	<390	<430	<470	**380**	**1,500**	<460	<430	<420	**460,000(3)**	**4,200**
Benzo(a)pyrene	<390	<430	**3,700 ☆ ∇**	**580 ☆ ∇**	**5,700 ☆ ∇**	**1,700 ☆ ∇**	<430	**2,200 ☆ ∇**	**62**	**0.0958**
Chrysene	<390	<430	**3,500 ∇**	**640 ∇**	**6,800 ∇**	**2,000 ∇**	<430	**2,300 ∇**	**62,000**	**96**
Dibenzofuran	<390	<430	**8,100 ∇**	**640 ∇**	**8,400 ∇**	**2,500 ∇**	<430	**3,700 ∇**	**30,000**	**48**
Fluoranthene	<390	<430	**13,000 ∇**	**2,100**	**20,000 ∇**	**4,600**	<430	**8,900 ∇**	**460,000**	**5,600**
Fluorene	<390	<430	**3,200**	**410**	**4,100**	**1,300**	<430	**2,000**	**540,000**	**5,600**
Indeno(1,2,3-cd)pyrene	<390	<430	<470	<380	**1,700 ☆ ∇**	**480 ∇**	<430	<420	**620**	**0.958**
2-Methylnaphthalene	<390	<430	**8,000 ∇**	**620 ∇**	**9,700 ∇**	**3,100 ∇**	<430	**6,700 ∇**	**11,200**	**280**
Naphthalene	<390	<430	**11,000 ∇**	**450 ∇**	**8,200 ∇**	**2,800 ∇**	<430	**7,000 ∇**	**11,200**	**420**
Phenanthrene	<390	<430	**19,000 ∇**	**2,700**	**31,000 ∇**	**6,200 ∇**	<430	**13,000 ∇**	**460,000**	**4,200**
Pyrene	<390	<430	**10,000 ∇**	**1,800**	**16,000 ∇**	**4,500 ∇**	<430	**6,900 ∇**	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA	NA	NA	**1,000**	**- -**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 20. Summary of Soil Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	B4-09 (7'-9') (5/3/04)	B4-10 (2.5-3.5') (5/3/04)	B4-10 (5'-7') (5/3/04)	B4-10 (7-9') (5/3/04)	B4-11 (2.5'-3.5') (5/4/04)	B4-11 (5-7') (5/4/04)	B4-11 (7'-9') (5/4/04)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg for total; mg/L for TCLP)	NA	NA	NA	NA	NA	NA	NA	- -	- -
Other Inorganics	NA	NA	NA	NA	NA	NA	NA	- -	- -
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)									
Acetone	**850**(2)	**120**(2)	**120**(2)	**180**(2)	**220**(2)	**280**(2)	**300**(2)	**2,800,000**	**14,000**
1,2-Dibromo-3-chloropropane	<6.4	<5.6	<5.5	<5.7	<9.6	<8.0	<6.0	**460**	**0.5**
Methylene chloride	**22**(2)	**11**(2)	**9.5**(2)	<5.7	**78**(2)	<8.0	**32**(2)	**9,100**	**100**
Naphthalene	**1,500**∇	<5.6	<5.5	<5.7	**220**	<8.0	**970**∇	**11,200**	**420**
Tetrachloroethene	<6.4	<5.6	<5.5	<5.7	<9.6	<8.0	<6.0	**480**	**14**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)									
Acenaphthene	**2,800**	<370	<360	<370	<1300	<1100	**870**	**740,000**	**1,600**
Acenaphthylene	**2,200**	<370	<360	<370	<1300	<1100	**400**	**460,000**	**4,200**
Anthracene	**2,900**	<370	<360	<370	<1300	<1100	**1,100**	**4,400,000**	**42,000**
Benzo(k)fluoranthene	**3,100**∇	<370	<360	<370	<1300	<1100	**1,000**∇	**6,200**	**10**
Benzo(b)fluoranthene	**3,400**☆∇	<370	<360	<370	<1300	<1100	**840**☆∇	**620**	**1**
Benzo(a)anthracene	**4,100**☆∇	<370	<360	<370	<1300	<1100	**1,200**☆∇	**620**	**1**
Benzo(g,h,i)perylene	<420	<370	<360	<370	<1300	<1100	<400	**460,000(3)**	**4,200**
Benzo(a)pyrene	**2,900**☆∇	<370	<360	<370	<1300	<1100	**960**☆∇	**62**	**0.0958**

Analyte	B4-09 (7'-9') (5/3/04)	B4-10 (2.5-3.5') (5/3/04)	B4-10 (5'-7') (5/3/04)	B4-10 (7-9') (5/3/04)	B4-11 (2.5'-3.5') (5/4/04)	B4-11 (5-7') (5/4/04)	B4-11 (7'-9') (5/4/04)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Chrysene	**2,800** ∇	<370	<360	<370	<1300	<1100	**1,100** ∇	**62,000**	**96**
Dibenzofuran	**7,000** ∇	<370	<360	<370	<1300	<1100	**1,300** ∇	**30,000**	**48**
Fluoranthene	**11,000** ∇	510	<360	<370	**2,800**	<1100	**2,800**	**460,000**	**5,600**
Fluorene	**2,400**	<370	<360	<370	<1300	<1100	**890**	**540,000**	**5,600**
Indeno(1,2,3-cd)pyrene	<420	<370	<360	<370	<1300	<1100	<400	**620**	**0.958**
2-Methylnaphthalene	**8,700** ∇	<370	<360	<370	<1300	<1100	**780** ∇	**11,200**	**280**
Naphthalene	**10,000** ∇	<370	<360	<370	<1300	<1100	**650** ∇	**11,200**	**420**
Phenanthrene	**17,000** ∇	**770**	<360	<370	**4,100**	<1100	**3,700**	**460,000**	**4,200**
Pyrene	**9,200** ∇	<370	<360	<370	**2,000**	<1100	**2,600**	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA	NA	**1,000**	--

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 20. Summary of Soil Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	B4-01 (1.5-2.0') (1)	B4-01 (4.5-5.0') (1)	B4-01 (7.5-8.0') (1)	B4-01 (11.0-11.5') (1)	B4-01 (14.5-15.0') (1)	B4-02 (4.5-5.0') (1)	B4-02 (7.5-8.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals	NA	NA	NA	NA	NA	NA	NA	--	--
Other Inorganics	NA	NA	NA	NA	NA	NA	NA	--	--
Volatile Organic Compounds (ug/Kg for									

Analyte	B4-01 (1.5-2.0') (1)	B4-01 (4.5-5.0') (1)	B4-01 (7.5-8.0') (1)	B4-01 (11.0-11.5') (1)	B4-01 (14.5-15.0') (1)	B4-02 (4.5-5.0') (1)	B4-02 (7.5-8.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
total; ug/L for TCLP)									
Acetone	ND	ND	ND	ND	ND	ND	ND	**2,800,000**	**14,000**
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	**460**	**0.5**
Methylene chloride	<6.6(2)	**13**(2)	**8.9**(2)	**27**(2)	<5.8	**15**(2)	<6.2	**9,100**	**100**
Naphthalene	**860**	**11,000**▽	**44**	**13,000**☆▽	<5.8	<5.7	<6.2	**11,200**	**420**
Tetrachloroethene	<6.6	<6.7	<7.0	**6,900**☆▽	<5.8	<5.7	<6.2	**480**	**14**
Toluene	<6.6	<6.7	<7.0	**21**	<5.8	<5.7	<6.2	**132,000**	**20,000**
1,2,4-Trimethylbenzene	<6.6	<6.7	<7.0	**16**	<5.8	<5.7	<6.2	**10,400**	**7,000**
1,3,5-Trimethylbenzene	<6.6	<6.7	<7.0	<7.5	<5.8	<5.7	<6.2	**4,200**	**7,000**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)									
Acenaphthene	**1,500**	**13,000**▽	<460	**20,000**▽	<380	<370	<410	**740,000**	**1,600**
Acenaphthylene	**990**	**5,800**▽	<460	**7,500**▽	<380	<370	<410	**460,000**	**4,200**
Anthracene	**1,700**	**13,000**	<460	**21,000**	<380	<370	<410	**4,400,000**	**42,000**
Benzo(k)fluoranthene	**1,800**▽	**5,100**▽	<460	**5,500**▽	<380	<370	<410	**6,200**	**10**
Benzo(b)fluoranthene	**1,300**☆▽	**5,000**☆▽	<460	**6,800**☆▽	<380	<370	<410	**620**	**1**
Benzo(a)anthracene	**1,500**☆▽	**8,400**☆▽	<460	**12,000**☆▽	<380	<370	<410	**620**	**1**
Benzo(g,h,i)perylene	<430	**2,600**	<460	**2,600**	<380	<370	<410	**460,000(3)**	**4,200**
Benzo(a)pyrene	**1,300**☆▽	**5,600**☆▽	<460	**6,400**☆▽	<380	<370	<410	**62**	**0.0958**
Chrysene	**1,300**▽	**7,400**▽	<460	**9,500**▽	<380	<370	<410	**62,000**	**96**
Dibenzofuran	**2,300**▽	**17,000**▽	<460	**43,000**☆▽	<380	<370	<410	**30,000**	**48**
Fluoranthene	**3,700**	**30,000**▽	<460	**60,000**▽	<380	<370	<410	**460,000**	**5,600**
Fluorene	**1,700**	**14,000**▽	<460	**23,000**▽	<380	<370	<410	**540,000**	**5,600**

Analyte	B4-01 (1.5-2.0') (1)	B4-01 (4.5-5.0') (1)	B4-01 (7.5-8.0') (1)	B4-01 (11.0-11.5') (1)	B4-01 (14.5-15.0') (1)	B4-02 (4.5-5.0') (1)	B4-02 (7.5-8.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Indeno(1,2,3-cd)pyrene	<430	**2,600☆∇**	<460	**2,700☆∇**	<380	<370	<410	**620**	**0.958**
2-Methylnaphthalene	**1,700∇**	**17,000☆∇**	<460	**46,000☆∇**	<380	<370	<410	**11,200**	**280**
Naphthalene	**1,700∇**	**17,000☆∇**	<460	**70,000☆∇**	<380	<370	<410	**11,200**	**420**
Phenanthrene	**8,300∇**	**52,000∇**	**740**	**120,000∇**	<380	<370	<410	**460,000**	**4,200**
Pyrene	**4,000**	**18,000∇**	<460	**45,000∇**	<380	<370	<410	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA	NA	- -	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 20. Summary of Soil Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	B4-03 (1.5-2.0') (1)	B4-03 (4.5-5.0') (1)	B4-03 (7.5-8.0') (1)	B4-03 (11.0-11.5') (1)	B4-03 (14.5-15.0') (1)	B4-04 (1.5-2.0') (1)	B4-04 (4.5-5.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals	NA	NA	NA	NA	NA	NA	NA	- -	- -
Other Inorganics	NA	NA	NA	NA	NA	NA	NA	- -	- -
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)									
Acetone	ND	ND	ND	ND	ND	ND	ND	**2,800,000**	**14,000**
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	**460**	**0.5**

Analyte	B4-03 (1.5-2.0') (1)	B4-03 (4.5-5.0') (1)	B4-03 (7.5-8.0') (1)	B4-03 (11.0-11.5') (1)	B4-03 (14.5-15.0') (1)	B4-04 (1.5-2.0') (1)	B4-04 (4.5-5.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Methylene chloride	<330	<330	<6.4	<6.9	<5.7	<5.9	<340	9,100	100
Naphthalene	930▽	4,500▽	770▽	170	6.1	3,000▽	1,500▽	11,200	420
Tetrachloroethene	<330	<330	<6.4	260▽	<5.7	8,200☆▽	<340	1,500	14
Toluene	<330	<330	<6.4	<6.9	<5.7	<5.9	<340	132,000	20,000
1,2,4-Trimethylbenzene	<330	<330	<6.4	<6.9	<5.7	<5.9	<340	10,400	7,000
1,3,5-Trimethylbenzene	<330	<330	<6.4	<6.9	<5.7	<5.9	<340	4,200	7,000
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)									
Acenaphthene	<2200	2,400▽	960	<460	<380	2,200▽	2,300▽	740,000	1,600
Acenaphthylene	<2200	2,300	770	<460	<380	1,800	1,700	460,000	4,200
Anthracene	<2200	3,000	1,100	<460	<380	2,700	2,400	4,400,000	42,000
Benzo(k)fluoranthene	<2200	3,300▽	750▽	<460	<380	1,600▽	1,400▽	6,200	10
Benzo(b)fluoranthene	<2200	2,500☆▽	680☆▽	<460	<380	2,500☆▽	1,600☆▽	620	1
Benzo(a)anthracene	<2200	2,800☆▽	1,100☆▽	<460	<380	2,700☆▽	2,200☆▽	620	1
Benzo(g,h,i)perylene	<2200	<430	<420	<460	<380	800	610	460,000(3)	4,200
Benzo(a)pyrene	<2200	2,300☆▽	830☆▽	<460	<380	2,300☆▽	1,700☆▽	62	0.0958
Chrysene	<2200	2,300▽	910▽	<460	<380	2,300▽	1,800▽	62,000	96
Dibenzofuran	<2200	3,900▽	1,500▽	<460	<380	3,600▽	3,400▽	30,000	48
Fluoranthene	3,200	8,300▽	2,800	<460	<380	11,000▽	10,000▽	460,000	5,600
Fluorene	<2200	2,700	1,100	<460	<380	2,700	2,700	540,000	5,600
Indeno(1,2,3-cd)pyrene	<2200	<430	<420	<460	<380	870☆▽	630☆▽	620	0.958
2-Methylnaphthalene	<2200	4,900▽	1,700▽	<460	<380	3,200▽	3,600▽	11,200	280
Naphthalene	<2200	7,800▽	2,300▽	<460	<380	2,400▽	2,800▽	11,200	420
Phenanthrene	5,300▽	13,000▽	4,100	<460	<380	16,000▽	17,000▽	460,000	4,200

Analyte	B4-03 (1.5-2.0') (1)	B4-03 (4.5-5.0') (1)	B4-03 (7.5-8.0') (1)	B4-03 (11.0-11.5') (1)	B4-03 (14.5-15.0') (1)	B4-04 (1.5-2.0') (1)	B4-04 (4.5-5.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Pyrene	**2,700**	**6,600 ▽**	**2,200**	<460	<380	**8,500 ▽**	**4,300 ▽**	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA	NA	- -	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 20. Summary of Soil Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	B4-04 (7.5-8.0') (1)	B4-04 (11.0-11.5') (1)	B4-04 (14.5-15.0') (1)	B4-05 (1.5-2.0') (1)	B4-05 (4.5-5.0') (1)	B4-05 (7.5-8.0') (1)	B4-05 (14.5-15.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals	NA	NA	NA	NA	NA	NA	NA	- -	- -
Other Inorganics	NA	NA	NA	NA	NA	NA	NA	- -	- -
VOCs (ug/Kg for total; ug/L for TCLP)									
Acetone	ND	ND	ND	ND	ND	ND	ND	**2,800,000**	**14,000**
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	**460**	**0.5**
Methylene chloride	<5.7	<6.1	<5.5	<360	<6.3	**7.6(2)**	<5.6	**9,100**	**100**
Naphthalene	**72**	**570 ▽**	**15**	**63,000☆▽**	**130**	**4,800 ▽**	**11**	**11,200**	**420**
Tetrachloroethene	<5.7	<6.1	<5.5	**48,000☆▽**	<6.3	**230 ▽**	<5.6	**480**	**14**
Toluene	<5.7	<6.1	<5.5	<360	<6.3	<6.2	<5.6	**132,000**	**20,000**
1,2,4-Trimethylbenzene	<5.7	<6.1	<5.5	**980**	<6.3	**42**	<5.6	**10,400**	**7,000**
1,3,5-Trimethylbenzene	<5.7	<6.1	<5.5	**430**	<6.3	**11**	<5.6	**4,200**	**7,000**

Analyte	B4-04 (7.5-8.0') (1)	B4-04 (11.0-11.5') (1)	B4-04 (14.5-15.0') (1)	B4-05 (1.5-2.0') (1)	B4-05 (4.5-5.0') (1)	B4-05 (7.5-8.0') (1)	- B4-05 (14.5-15.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
SVOCs (ug/Kg for total; ug/L for TCLP)									
Acenaphthene	<370	**1,100**	<360	**1,000**	<420	**2,800 ∇**	<370	**740,000**	**1,600**
Acenaphthylene	<370	**910**	<360	**1,300**	<420	**3,500**	<370	**460,000**	**4,200**
Anthracene	<370	**1,200**	<360	**2,700**	<420	**12,000**	<370	**4,400,000**	**42,000**
Benzo(k)fluoranthene	<370	**710 ∇**	<360	**2,100 ∇**	<420	**3,200 ∇**	<370	**6,200**	**10**
Benzo(b)fluoranthene	<370	**720☆ ∇**	<360	**2,600☆ ∇**	<420	**11,000☆ ∇**	<370	**620**	**1**
Benzo(a)anthracene	<370	**1,100☆ ∇**	<360	**4,200☆ ∇**	<420	**15,000☆ ∇**	<370	**620**	**1**
Benzo(g,h,i)perylene	<370	<400	<360	**790**	<420	**1,700**	<370	**460,000(3)**	**4,200**
Benzo(a)pyrene	<370	**840☆ ∇**	<360	**1,700☆ ∇**	<420	**14,000☆ ∇**	<370	**62**	**0.0958**
Chrysene	<370	**900 ∇**	<360	**3,100 ∇**	<420	**14,000 ∇**	<370	**62,000**	**96**
Dibenzofuran	<370	**1,800 ∇**	<360	**4,700 ∇**	<420	**8,900 ∇**	<370	**30,000**	**48**
Fluoranthene	**740**	**2,600**	<360	**21,000 ∇**	**780**	**33,000 ∇**	<370	**460,000**	**5,600**
Fluorene	<370	**1,300**	<360	**3,300**	<420	**3,900**	<370	**540,000**	**5,600**
Indeno(1,2,3-cd)pyrene	<370	<400	<360	**940 ∇**	<420	**1,900 ∇**	<370	**11,200**	**280**
2-Methylnaphthalene	<370	**1,800 ∇**	<360	**16,000☆ ∇**	<420	**3,500 ∇**	<370	**11,200**	**280**
Naphthalene	<370	**1,500 ∇**	<360	**27,000☆ ∇**	<420	**3,500 ∇**	<370	**11,200**	**420**
Phenanthrene	**1,200**	**4,200**	<360	**31,000 ∇**	**920**	**37,000 ∇**	<370	**460,000**	**4,200**
Pyrene	**550**	**2,200**	<360	**17,000 ∇**	**610**	**28,000 ∇**	<370	**460,000**	**4,200**
Polychlorinated Biphenyls	NA	NA	NA	NA	NA	NA	NA	- -	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 21. Summary of Ground-Water Sampling Results & PRGs – AOC #4 (SE Degreaser)

Analyte	MW-B4-02S (11/22/02) (1)	MW-B4-02S (5/18/04)	MW-B4-02S DUPLIC. (5/18/04)	MW-B4-02I (5/18/04)	MW-B4-02D (5/18/04)	MW-B4-06S (5/20/04)	MW-B4-06S DUPLIC. (5/20/04)	MW-B4-12S (5/17/04)	Ground-Water PRG
Metals (mg/L)									
Antimony	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.006**
Arsenic	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.0087**	<0.0050	**0.010**
Barium	NA	**0.077**	**0.076**	**0.061**	**0.12**	**0.26**	**0.27**	**0.11**	**2.0**
Beryllium	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.004**
Cadmium	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.005**
Chromium (total)	NA	<0.0020	<0.0020	<0.0020	**0.090♣**	**0.019**	**0.019**	**0.0045**	**0.05**
Chromium VI	NA	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	**0.05**
Copper	NA	0.0023	<0.0020	**0.0023**	**0.093**	**0.039**	**0.038**	**0.025**	**1.0**
Lead	NA	<0.0050	<0.0050	<0.0050	**0.015**	**0.014**	**0.015**	<0.0050	**0.015**
Manganese	NA	**0.11**	**0.10**	**0.35**	**0.51**	**0.93**	**0.93**	**3.9♣**	**0.96**
Mercury	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	**0.0011**
Nickel	NA	<0.0050	<0.0050	**0.0051**	**0.042**	**0.025**	**0.022**	**0.012**	**0.1**
Selenium	NA	<0.0050	<0.0050	<0.0050	<0.0050	**0.013**	**0.013**	<0.0050	**0.05**
Silver	NA	<0.0020	<0.0020	<0.0020	0.0058	<0.0020	<0.0020	<0.0020	**0.018**
Thallium	NA	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.002**
Zinc	NA	**0.021**	**0.022**	**0.022**	**0.64**	**0.063**	**0.076**	<0.010	**2.1**
Other Inorganics (mg/L)									
Cyanide	NA	<0.0020	0.0030(3)	<0.0020	<0.0020	0.0090(3)	<0.0020	<0.0020	**0.154**
Volatile Organic Compounds (ug/L)									
Chloromethane	ND	<1.0	<1.0	<1.0	<1.0	**1.9**	<1.0	<1.0	**2.6**
cis-1,2-Dichloroethene	<1.0	**2.3**	**1.9**	**6.1**	**2.0**	**5.4**	**5.0**	**3.3**	**70**

Analyte	MW-B4-02S (11/22/02) (1)	MW-B4-02S (5/18/04)	MW-B4-02S DUPLIC. (5/18/04)	MW-B4-02I (5/18/04)	MW-B4-02D (5/18/04)	MW-B4-06S (5/20/04)	MW-B4-06S DUPLIC. (5/20/04)	MW-B4-12S (5/17/04)	Ground-Water PRG
Methylene chloride	ND	<2.0	<2.0	<2.0	<2.0	**380♣**	**230♣**	<2.0	**5**
Naphthalene	ND	<1.0	<1.0	<1.0	<1.0	**18.**	**22♣**	<1.0	**21**
1,1,1,2-Tetrachloroethane	ND	<1.0	<1.0	<1.0	<1.0	<1.0	**2.5♣**	<1.0	**0.43**
Tetrachloroethene	**2,800♣**	**6,600♣**	**6,200♣**	**7.8♣**	**20♣**	**8,000♣**	**9,000♣**	**2.1♣**	**0.7**
Toluene	**1.1**	<1.0	<1.0	<1.0	<1.0	**6.8**	**5.2**	<1.0	**1,000**
1,1,2-Trichloroethane	ND	<1.0	<1.0	<1.0	<1.0	**1.2♣**	**1.1♣**	<1.0	**0.2**
Trichloroethene	**1.2**	**4.4♣**	**4.0♣**	**2.3**	**1.6**	**22♣**	**23♣**	**1.6**	**2.8**
Trichlorofluoromethane	ND	<1.0	<1.0	**69**	<1.0	<1.0	<1.0	<1.0	**2,100**
Semivolatile Organic Compounds (ug/L)	NA	ND	ND	ND	ND	ND	ND	ND	- -
Polychlorinated Biphenyls (ug/L)	NA	ND	ND	ND	ND	ND	ND	ND	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

AOC #6 (Former Degreaser in South-Central Portion of Building)

AOC #6 is located approximately 160 feet west of AOC #4, along the south wall inside the main building. This location was originally identified as an area of potential concern due to the past presence of a PCE solvent degreaser system, along with several other tanks used for metal cleaning and preparation. Earlier work in this area indicated that two rectangular pits or sumps were present below the concrete floor, and several VOCs were detected in soil and ground water in the vicinity of the sumps.

During the Phase I RI, five additional soil borings (B6-05 through B6-09) were completed in AOC #6. Boring #B6-05 was completed within the east sump, and borings #B6-06 and #B6-07 were completed within the west sump. For these borings, the probe was advanced through the concrete flooring to the bottom of the two sumps, at depths of approximately 5 to 6 feet. Sediment samples were collected from the bottom of each sump (B6-06 and B6-07 were combined into the sample identified as "Area 6 West Pit"). Borings #B6-08 and #B6-09 were completed through native soil just outside the sumps. Previously installed monitoring well #MW-B6-02S was also re-sampled during the Phase I RI. Laboratory analytical data associated with this work, along with comparisons to applicable PRGs, are summarized in Tables 22 and 23.

Results for AOC #6 are as follows:

- Residues present in the bottoms of the two concrete sumps contain concentrations of various metals, VOCs (primarily PCE) and PCBs above ground-water protection and/or health-based PRGs.

- Soil adjacent to the sumps is free of most of the detected constituents. Only PCE was detected in soil outside of the sumps at levels above PRGs. PCE was also detected in ground-water samples in nearby shallow interval monitoring well #MW-B6-02S. However, the PCE detections in this area may be attributable to migration from upgradient AOC #4.

- The concentration of PCE in MW-B6-02S decreased significantly between the initial sampling in 2002 (2,800 ug/L) and re-sampling in 2004 (16 ug/L).

The presence of solid residues inside the concrete sumps, and the concrete sump linings themselves, make it difficult to sample underlying soil. Therefore, the residues and concrete linings should be removed, properly characterized and disposed of. Following this, confirmatory soil sampling should be completed to verify that underlying soil is not impacted.

Table 22. Summary of Soil Sampling Results & PRGs – AOC #6 (South-Central Degreaser)

Analyte	B6-05 (4.5') (sediment in east pit)	B6-08 (6.0') (soil adjacent to east pit)	AREA 6 WEST PIT (sediment in west pit)	B6-09 (6.0') (soil adjacent to west pit)	B6-01 (8.5-9.0') (1)	B6-01 (11.5-12.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg for total; mg/L for TCLP)								
Antimony	**1.5**▽	<0.62	**1.2**▽	<0.62	NA	NA	**6.2**	**0.4**
Arsenic	**16**☆▽	**2.2**	**13**☆▽	**2.4**	NA	NA	**6.0**	**6.0**
Barium	**720**▽	**84**	**1,100**☆▽	**68**	NA	NA	**1,080**	**309**
Beryllium	**0.33**	<0.12	**0.30**	**0.34**	NA	NA	**30**	**0.8**
Cadmium	**34**☆▽	<0.12	**17**☆▽	<0.12	NA	NA	**7.4**	**0.1**
Chromium (total)	**430**▽	**46**	**220**▽	**24**	NA	NA	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	**1,800**☆▽	**42**	**430**▽	**18**	NA	NA	**620**	**78**
Lead	**870**☆▽	**16**	**690**☆▽	**19**	NA	NA	**400**	**144**
Manganese	**3,300**☆▽	**280**	**2,100**☆▽	**430**	NA	NA	**1,050**	**1,050**
Mercury	**27**☆▽	**0.040**	**9.2**☆▽	**0.082**	NA	NA	**4.6**	**0.2**
Nickel	**350**☆▽	**16**	**4,900**☆▽	**4.9**	NA	NA	**320**	**30**
Selenium	<0.76	<0.62	<0.68	<0.62	NA	NA	**78**	**1**
Silver	**9.6**▽	<0.25	**1.7**▽	<0.25	NA	NA	**78**	**0.36**
Thallium	<1.5	<1.2	<1.4	<1.2	NA	NA	**1.04**	**0.8**
Zinc	**1,300**▽	**56**	**3,300**▽	**21**	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg for total; mg/L for TCLP)								
Cyanide	<0.86	<0.38	**8.9**▽	<0.56	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)								

Analyte	B6-05 (4.5') (sediment in east pit)	B6-08 (6.0') (soil adjacent to east pit)	AREA 6 WEST PIT (sediment in west pit)	B6-09 (6.0') (soil adjacent to west pit)	B6-01 (8.5-9.0') (1)	B6-01 (11.5-12.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Acetone	**5,900**(2)	<120	<150	**160**(2)	ND	ND	**2,800,000**	**14,000**
2-Butanone (MEK)	**210**	<120	<150	<120	ND	ND	**4,400,000**	**3,400**
sec-Butylbenzene	**25**	<6.2	<7.3	<6.2	<5.8	<5.8	**44,000**	**1,400**
cis-1,2-Dichloroethene	<8.3	<6.2	<7.3	<6.2	**9.3**	<5.8	**8,600**	**1,400**
p-Isopropyltoluene	**130**	<6.2	<7.3	<6.2	<5.8	<5.8	**14,600,000**	**280**
Methylene chloride	**270**(2) ∇	**15**	<7.3	**14**	<5.8	**7.0**	**9,100**	**100**
Naphthalene	36	<6.2	<7.3	<6.2	<5.8	<5.8	**11,200**	**420**
Tetrachloroethene	**44,000**☆∇	<6.2	**44**∇	**17**∇	**85**∇	<5.8	**480**	**14**
Toluene	9.4	<6.2	<7.3	<6.2	<5.8	<5.8	**132,000**	**20,000**
Trichloroethene	**120**☆∇	<6.2	<7.3	<6.2	**12**	<5.8	**53**	**56**
1,2,4-Trimethylbenzene	93	<6.2	<7.3	<6.2	<5.8	<5.8	**10,400**	**7,000**
1,3,5-Trimethylbenzene	140	<6.2	<7.3	<6.2	<5.8	<5.8	**4,200**	**7,000**
Xylene (Total)	39	<6.2	<7.3	<6.2	ND	ND	**54,000**	**10,600**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)								
bis(2-Ethylhexyl)phthalate	<1100	<410	<480	**650**(2) ∇	NA	NA	**35,000**	**60**
Polychlorinated Biphenyls (ug/Kg)								
PCB-1254	**41,000**	<41	**660**	<410	NA	NA	- -	- -
PCB-1260	<11000	<41	**850**	<410	NA	NA	- -	- -
PCBs (total)	**41,000**☆∇	ND	**1,510**☆∇	ND	NA	NA	**1,000**	**10**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 22. Summary of Soil Sampling Results & PRGs – AOC #6 (South-Central Degreaser)

Analyte	B6-01 (14.0-14.5') (1)	B6-01 (17.0-17.5') (1)	B6-01 (18.5-19.0') (1)	B6-01 (19.5-20.0') (1)	B6-02 (8.5-9.0') (1)	B6-02 (11.5-12.0') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)
Metals	NA	NA	NA	NA	NA	NA	- -	- -
Other Inorganics	NA	NA	NA	NA	NA	NA	- -	- -
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)								
cis-1,2-Dichloroethene	<5.9	**12**	<6.3	<6.2	<6.2	<6.1	**8,600**	**1,400**
Methylene chloride	**9.7**	<6.0	<6.3	<6.2	<6.2	<6.1	**9,100**	**100**
Naphthalene	<5.9	<6.0	<6.3	**9.9**	<6.2	<6.1	**11,200**	**420**
Tetrachloroethene	<5.9	**450 ∇**	<6.3	<6.2	<6.2	<6.1	**480**	**14**
Trichloroethene							**53**	**56**
Semivolatile Organic Compounds	NA	NA	NA	NA	NA	NA	- -	- -
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA	- -	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 22. Summary of Soil Sampling Results & PRGs – AOC #6 (South-Central Degreaser)

Analyte	B6-03 (8.5-9.0') (1)	B6-03 (11.5-12.0') (1)	B6-03 (14.0-14.5') (1)	B6-04 (8.5-9.0') (1)	B6-04 (11.5-12.0') (1)	B6-04 (14.0-14.5') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals	NA	NA	NA	NA	NA	NA		
Other Inorganics	NA	NA	NA	NA	NA	NA		
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)								
cis-1,2-Dichloroethene	<5.7	<6.8	<7.3	<5.6	<6.2	<6.7	**8,600**	**1,400**
Methylene chloride	<5.7	<6.8	<7.3	<5.6	<6.2	<6.7	**9,100**	**100**
Naphthalene	<5.7	<6.8	<7.3	<5.6	<6.2	<6.7	**11,200**	**420**
Tetrachloroethene	<5.7	<6.8	<7.3	**55▽**	<6.2	<6.7	**480**	**14**
Trichloroethene	<5.7	<6.8	<7.3	<5.6	<6.2	<6.7	**53**	**56**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)								
Acenaphthene	NA	NA	NA	<370	<410	<440	**740,000**	**1,600**
Acenaphthylene	NA	NA	NA	<370	<410	<440	**460,000**	**4,200**
Anthracene	NA	NA	NA	<370	**540**	<440	**4,400,000**	**42,000**
Benzo(k)fluoranthene	NA	NA	NA	**650▽**	**610▽**	<440	**6,200**	**10**
Benzo(b)fluoranthene	NA	NA	NA	**530▽**	**840☆▽**	<440	**620**	**1**
Benzo(a)anthracene	NA	NA	NA	**610▽**	**1,100☆▽**	<440	**620**	**1**
Benzo(g,h,i)perylene	NA	NA	NA	<370	**410**	<440	**460,000(3)**	**4,200**
Benzo(a)pyrene	NA	NA	NA	**470☆▽**	**760☆▽**	<440	**62**	**0.0958**
Chrysene	NA	NA	NA	**560▽**	**950▽**	<440	**62,000**	**96**
Dibenzofuran	NA	NA	NA	<370	<410	<440	**30,000**	**48**
Fluoranthene	NA	NA	NA	**1,400**	**2,300**	**500**	**460,000**	**5,600**

Analyte	B6-03 (8.5-9.0') (1)	B6-03 (11.5-12.0') (1)	B6-03 (14.0-14.5') (1)	B6-04 (8.5-9.0') (1)	B6-04 (11.5-12.0') (1)	B6-04 (14.0-14.5') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Fluorene	NA	NA	NA	<370	<410	<440	**540,000**	**5,600**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	<370	**440** ▽	<440	**620**	**0.958**
2-Methylnaphthalene	NA	NA	NA	<370	<410	<440	**11,200**	**280**
Naphthalene	NA	NA	NA	<370	<410	<440	**11,200**	**420**
Phenanthrene	NA	NA	NA	**1,300**	**2,000**	**450**	**460,000**	**4,200**
Pyrene	NA	NA	NA	**1,400**	**2,000**	**490**	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA		

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 23. Summary of Ground-Water Sampling Results & PRGs – AOC #6 (South-Central Degreaser)

Analyte	MW-B6-02S (11/22/02) (1)	MW-B6-02S (5/17/04)	Ground-Water PRG
Metals (mg/L)			
Antimony	NA	<0.0050	**0.006**
Arsenic	NA	<0.0050	**0.010**
Barium	NA	**0.031**	**2.0**
Beryllium	NA	<0.0010	**0.004**
Cadmium	NA	<0.0010	**0.005**
Chromium (total)	NA	<0.0020	**0.05**
Chromium VI	NA	<0.050	**0.05**
Copper	NA	<0.0020	**1.0**
Lead	NA	<0.0050	**0.015**
Manganese	NA	**0.0059**	**0.96**
Mercury	NA	<0.00020	**0.0011**
Nickel	NA	<0.0050	**0.1**
Selenium	NA	<0.0050	**0.05**
Silver	NA	<0.0020	**0.018**
Thallium	NA	<0.010	**0.002**
Zinc	NA	**0.021**	**2.1**
Other Inorganics (mg/L)			
Cyanide	NA	<0.0020	**0.154**
Volatile Organic Compounds (ug/L)			
1,1-Dichloroethene	**9.6♣**	<1.0	**7**
cis-1,2-Dichloroethene	**1.7**	<1.0	**70**
Tetrachloroethene	**2,800♣**	**16♣**	**0.7**
Toluene	**1.1**	<1.0	**1,000**
Trichloroethene	**1.2**	**1.3**	**2.8**
Semivolatile Organic Compounds (ug/L)	NA	ND	**- -**
Polychlorinated Biphenyls (ug/L)	NA	<1.0	**0.5**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

AOC #10 (Storm Sewer Outfall Locations)

Storm sewers extend along the north and south sides of the main building, and discharge to the two onsite stream channels in the central portion of the property. These storm sewers collect and convey storm-water runoff from the building roof and paved areas of the property. In addition, as indicated on a 1950's facility drawing, these storm sewers previously received some process (non-sanitary) wastewater discharges from floor drains and manufacturing operations inside the building.

During the Phase I RI, surface soil samples were collected from locations where these storm sewers currently outlet and discharge to the ground surface. The samples are identified as B10-05 (south outfall) and B10-06 (north outfall). In addition, earlier sampling during the Phase II ESA included collection of four surface soil samples from these areas and/or nearby locations, as follows: location #B12-Northeast corresponds to B10-06, the current outlet of the north storm sewer; location #B12-Northwest involves a former outlet point approximately 20 feet downstream of B10-06, which is now inactive due to hillside erosion and resulting separation of portions of the storm sewer pipe; locations #B12-Southeast and #B12-Southwest involve deeply eroded areas at the top of the slope where storm sewer lines were believed to outlet (flow testing during the Phase I RI indicates that these locations may be upstream from the actual outlet locations).

Laboratory analytical data associated with this work, along with comparisons to applicable PRGs for the detected constituents, are summarized in Table 24.

Results for AOC #10 are summarized as follows:

- Several constituents associated with the outfall soil samples exceeded ground-water protection PRGs; however, no health-based soil PRGs were exceeded.

- Regarding the north storm sewer, soil at the active outfall exhibits PCBs and several metals (beryllium, chromium and nickel) above ground-water protection PRGs. Prior (Phase II ESA) sampling downstream of the current outfall (at the former outfall location) showed elevated cadmium, lead, mercury, silver and PCE.

- Sampling location B10-05 is representative of conditions near the active south storm sewer outfall. Results from this area indicate concentrations of PCBs and mercury above ground-water protection PRGs.

- Sediment samples collected in the ephemeral/intermittent stream channels several hundred feet downstream of the outfall locations (see locations SE-03 and SE-08, Table 34) show low levels of PCBs, which may be associated with the outfalls. Also, mercury was detected above the health-based PRG in soil sample #B16-02 (10'-11') adjacent to the south storm sewer lines near the outfall, possibly reflecting migration of residues from the sewer lines.

Data needs associated with AOC #10 are subdivided into two areas: additional sampling near the outfalls; and assessment in the storm sewers and process wastewater sewer lines upstream of the outfalls. Near the outfall, additional soil samples should be collected and analyzed for TCLP-extractable concentrations of the constituents of concern (PCBs, PCE, various metals). With respect to the sewers themselves, water discharging from the active outfalls during periods of precipitation should be sampled to assess whether any contaminants are being discharged; and sampling of residues inside the sewer lines, along with soil adjacent to the lines, should be conducted to assess whether higher concentrations of contaminants may be present.

Table 24. Summary of Soil Sampling Results & PRGs – AOC #10 (Storm Sewer Outfalls)

Analyte	B10-05 (South)	B10-06 (North)	B10-06 Duplicate	B12 Southeast (1)	B12 Southwest (1)	B12 Northwest (1)	B12 Northeast (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg for total; mg/L for TCLP)									
Antimony	<0.68	<0.69	<0.74	NA	NA	NA	NA	**6.2**	**0.4**
Arsenic	**3.2**	**1.2**	**1.8**	**3.4**	**4.3**	**3.4**	**2.2**	**6.0**	**6.0**
Barium	**82**	**110**	**110**	**80**	**120**	**120**	**92**	**1,080**	**309**
Beryllium	**0.49**	**0.63**	**0.83 ▽**	NA	NA	NA	NA	**30**	**0.8**
Cadmium	<0.14	<0.14	<0.15	**0.62 ▽**	**0.59 ▽**	**3.8 ▽**	<0.14	**7.4**	**0.1**
Chromium (total)	**59**	**210 ▽**	**150 ▽**	**49**	**57**	**250 ▽**	**140 ▽**	**24,000**	**71**
Chromium VI	<13.8	<37.0	<38.4	NA	NA	NA	NA	**30**	**1**
Copper	**64**	**74**	**63**	NA	NA	NA	NA	**620**	**78**
Lead	**86**	**12**	**13**	**72**	**100**	**400 ▽**	**11**	**400**	**144**
Manganese	**740**	**320**	**350**	NA	NA	NA	NA	**1,050**	**1,050**
Mercury	**2.6 ▽**	**0.043**	**0.034**	**0.063**	**0.074**	**3.1 ▽**	**0.038**	**4.6**	**0.2**
Nickel	**22**	**48 ▽**	**40 ▽**	NA	NA	NA	NA	**320**	**30**
Selenium	<0.68	<0.69	<0.74	<0.46	<0.65	<0.53	<0.69	**78**	**1**
Silver	<0.27	<0.27	<0.30	<0.18	<0.26	**0.53 ▽**	<0.28	**78**	**0.36**
Thallium	<1.4	<1.4	<1.5	NA	NA	NA	NA	**1.04**	**0.8**
Zinc	220	65	85	NA	NA	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg)									
Cyanide	<0.13	<0.15	<0.16	NA	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)									

Analyte	B10-05 (South)	B10-06 (North)	B10-06 Duplicate	B12 Southeast (1)	B12 Southwest (1)	B12 Northwest (1)	B12 Northeast (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Chloroethane	<14	<15	<15	<13	<13	**12**	<15	**3,000**	**56,000**
Ethylbenzene	<6.9	<7.4	<7.7	<6.3	**11**	**20**	<7.3	**380,000**	**580**
Methylene chloride	**31**(2)	**20**(2)	**29**(2)	**7.3**(2)	**51**(2)	**51**(2)	**17**(2)	**9,100**	**100**
Naphthalene	<6.9	<7.4	<7.7	<6.3	**460**▽	**110**	<7.3	**11,200**	**420**
Tetrachloroethene	<6.9	<7.4	<7.7	<6.3	<6.7	**120**▽	<7.3	**480**	**14**
Toluene	<6.9	<7.4	<7.7	<6.3	**12**	**34**	<7.3	**132,000**	**20,000**
Trichloroethene	<6.9	<7.4	<7.7	<6.3	**16**	**27**	<7.3	**53**	**56**
Xylene (Total)	ND	ND	ND	ND	**57**	**72**	ND	**54,000**	**10,600**
Semivolatile Organic Compounds (ug/Kg)	ND	ND	ND	NA	NA	NA	NA		
Polychlorinated Biphenyls (ug/Kg)									
PCB-1254	<46	<49	<51	NA	NA	NA	NA	- -	- -
PCB-1260	**810**	**300**	**110**	NA	NA	NA	NA	- -	- -
PCBs (total)	**810**▽	**300**▽	**110**▽	NA	NA	NA	NA	**1,000**	**10**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) TCLP analysis
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

AOC #11 (Furnace Pit)

AOC #11 involves a shallow (approximately 12-inch deep) pit beneath the concrete floor in the southwest portion of the main building. The pit measures approximately 10 feet by 10 feet, has a concrete base that is about 4-inches thick, and is covered by a metal grate. A plant drawing from the 1950s identifies this as a "furnace pit," apparently involving an above-ground furnace or oven for metal processing. No previous sampling was conducted in this area, although soil borings were completed at former degreaser areas located nearby (see borings #B8-01 and #B9-01). During the Phase I RI, soil boring #B11-01 was advanced to a depth of 16 feet through the northwest corner of this pit, and two soil samples were collected and analyzed to determine the presence or absence of contamination.

Laboratory analytical data and associated PRGs are listed in Table 25. Results and conclusions for AOC #11 are summarized as follows:

- Analysis of the shallow soil sample, collected at a depth of 1.5 to 2.5 feet (i.e., just below the concrete floor of the pit), indicated the presence of cadmium, PCE and PCBs above ground-water protection PRGs. The deeper sample, collected at a depth of 6 to 7 feet, showed lower levels of cadmium and PCE, but still above ground-water protection PRGs. No PCBs were detected in the deeper soil sample.

- Given the relatively low levels of contamination in the shallow subsurface, their decrease with depth, and absence in nearby soil borings (PCE), it does not appear that AOC #11 is a significant area of soil contamination, nor does it appear that ground-water has been impacted.

No additional data needs are indicated for AOC #11. The anticipated course of action for this area would be to complete soil removal to a depth of approximately 3 to 5 feet, followed by confirmatory sampling and TCLP analysis to assess whether leachate-based ground-water protection PRGs have been achieved.

Table 25. Summary of Soil Sampling Results & PRGs – AOC #11 (Furnace Pit)

Analyte	B11-01 (1.5'-2.5')	B11-01 (6'-7')	B8-01 (0.5-1.0') (1,4)	B8-01 (9.0-9.5') (1,4)	B9-01 (0.5-1.0') (1,5)	B9-01 (9.5-10.0') (1,5)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)								
Antimony	<0.61	<0.57	NA	NA	NA	NA	**6.2**	**0.4**
Arsenic	**1.1**	**1.1**	NA	NA	NA	NA	**6.0**	**6.0**
Barium	**78**	**32**	NA	NA	NA	NA	**1,080**	**309**
Beryllium	<0.12	<0.11	NA	NA	NA	NA	**30**	**0.8**
Cadmium	**2.3▽**	**0.73▽**	NA	NA	NA	NA	**7.4**	**0.1**
Chromium (total)	**35**	**38**	NA	NA	NA	NA	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	**59**	**14**	NA	NA	NA	NA	**620**	**78**
Lead	**9.9**	**11**	NA	NA	NA	NA	**400**	**144**
Manganese	**390**	**200**	NA	NA	NA	NA	**1,050**	**1,050**
Mercury	**0.085**	**0.022**	NA	NA	NA	NA	**4.6**	**0.2**
Nickel	**9.1**	**3.4**	NA	NA	NA	NA	**320**	**30**
Selenium	<0.61	<0.57	NA	NA	NA	NA	**78**	**1**
Silver	<0.24	<0.23	NA	NA	NA	NA	**78**	**0.36**
Thallium	<1.2	<1.1	NA	NA	NA	NA	**1.04**	**0.8**
Zinc	**39**	**8.4**	NA	NA	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg)								
Cyanide	<0.63	<0.58	NA	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)								
Acetone	**890(2)**	<120	ND	ND	ND	ND	**2,800,000**	**14,000**
2-Butanone (MEK)	**350**	<120	ND	ND	ND	ND	**4,400,000**	**3,400**

Analyte	B11-01 (1.5'-2.5')	B11-01 (6'-7')	B8-01 (0.5-1.0') (1,4)	B8-01 (9.0-9.5') (1,4)	B9-01 (0.5-1.0') (1,5)	B9-01 (9.5-10.0') (1,5)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
1,1-Dichloroethane	**11**	**8.3**	<6.3	<5.7	<6.1	<6.7	**102,000**	**14,000**
cis-1,2-Dichloroethene	**8.1**	**6.8**	<6.3	**62**	<6.1	<6.7	**8,600**	**1,400**
Ethylbenzene	**11**	<6.0	<6.3	<5.7	<6.1	<6.7	**380,000**	**580**
p-Isopropyltoluene	**8.5**	<6.0	<6.3	<5.7	<6.1	<6.7	**14,600,000**	**280**
Methylene chloride	**26**(2)	**19**(2)	<6.3	**15**(2)	<6.1	<6.7	**9,100**	**100**
Naphthalene	**8.7**	<6.0	**18**	**29**	<6.1	<6.7	**11,200**	**420**
n-Propylbenzene	**6.6**	<6.0	<6.3	<5.7	<6.1	<6.7	**48,000**	**1,400**
Tetrachloroethene	**250** ∇	**36** ∇	<6.3	<5.7	<6.1	<6.7	**480**	**14**
Toluene	**26**	<6.0	<6.3	**9.1**	<6.1	<6.7	**132,000**	**20,000**
1,1,1-Trichloroethane	**50**	<6.0	ND	ND	ND	ND	**400,000**	**4,000**
Trichloroethene	**11**	<6.0	<6.3	**39**	<6.1	<6.7	**53**	**56**
1,2,4-Trimethylbenzene	**50**	<6.0	<6.3	<5.7	<6.1	<6.7	**10,400**	**7,000**
1,3,5-Trimethylbenzene	**17**	<6.0	<6.3	<5.7	<6.1	<6.7	**4,200**	**7,000**
Xylene (Total)	**53**	ND	ND	ND	ND	ND	**54,000**	**10,600**
SVOCs (ug/Kg)	ND	ND	NA	NA	NA	NA		
Polychlorinated Biphenyls (ug/Kg)								
PCB-1254	**200**	<39	NA	NA	NA	NA	- -	- -
PCB-1260	<40	<39	NA	NA	NA	NA	- -	- -
PCBs (total)	**200** ∇	ND	NA	NA	NA	NA	**1,000**	**10**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) TCLP analysis
(4) Located approximately 25 ft east of B11-01
(5) Located approximately 65 ft west of B11-01
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

AOC #12 – Steel Wash Tank

AOC #12 involves a former sump located near the north wall of the main building. A past facility drawing labeled this as a "steel wash tank." A patched concrete area is present in this area, indicating that the tank was below floor level, and has been filled in. On April 14, 2004, soil boring # B12-01 was advanced to a depth of 20 feet just outside the southwest corner of the patched floor area. Soil samples collected at depths of 3 to 4 feet and 11 to 12 feet were submitted for laboratory analysis. Based on initial laboratory results, monitoring well #MW-B12-01S was installed adjacent to the soil boring location and sampled.

Laboratory results are listed in Tables 26 and 27, and summarized as follows:

- A relatively high concentration of PCBs, 670,000 ug/Kg, exceeding both ground-water protection and health-based PRGs, was detected in the upper soil sample collected at 3 to 4 feet. Concentrations of arsenic, cadmium, manganese and nickel were also present in this sample above both soil PRGs. Several other constituents – specifically chromium, copper, benzene and PCE – were detected in this soil sample above ground-water protection PRGs, but did not exceed health-based PRGs.

- In the deeper soil sample, all constituent concentrations were significantly reduced or absent, and only cadmium and PCBs remained above ground-water protection PRGs.

- Analysis of ground-water collected from well #MW-B12-01S indicated the presence of PCE and TCE above PRGs; however, because these constituents were absent (TCE) or detected only at low levels in the shallow soil sample (PCE), and because the ground-water table in this area is greater than 20 feet below grade (see Table 2), the presence of these VOCs in ground water may be due to another source, such as AOC #4 or AOC #1.

Data requirements for AOC #12 are as follows:

(1) Collect a soil sample from the area of elevated total chromium (B12-01, 3 to 4 ft) and analyze for hexavalent chromium.

(2) Complete a soil boring within the limits of the wash tank, to assess whether any concentrated residues remain in this structure.

(3) Complete approximately three additional soil borings at varying distances extending outward from the tank, to delineate the extent of contamination exceeding health-based PRGs. Also include TCLP testing to assess conditions with respect to ground-water protection PRGs.

Following this work, it appears that some source-area soil removal will be necessary in AOC #12; however, it does not appear that this area represents a source of ground-water impacts.

Table 26. Summary of Soil Sampling Results & PRGs – AOC #12 (Steel Wash Tank)

Analyte	B12-01 (3'-4')	B12-01 (11'-12')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)				
Antimony	<0.53	<0.65	**6.2**	**0.4**
Arsenic	**18☆▽**	**0.70**	**6.0**	**6.0**
Barium	**110**	**200**	**1,080**	**309**
Beryllium	<0.11	**0.77**	**30**	**0.8**
Cadmium	**17☆▽**	**1.8▽**	**7.4**	**0.1**
Chromium (total)	**490▽**	**17**	**24,000**	**71**
Chromium VI	NA	NA	**30**	**1**
Copper	**250▽**	**68**	**620**	**78**
Lead	**91**	**6.4**	**400**	**144**
Manganese	**1,500☆▽**	**770**	**1,050**	**1,050**
Mercury	**0.015**	<0.0057	**4.6**	**0.2**
Nickel	**730☆▽**	**13**	**320**	**30**
Selenium	<0.53	<0.65	**78**	**1**
Silver	<0.21	<0.26	**78**	**0.36**
Thallium	<1.1	<1.3	**1.04**	**0.8**
Zinc	**48**	**78**	**4,600**	**262**
Other Inorganics (mg/Kg)				
Cyanide	<0.11	<0.66	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)				
Acetone	**2,500(2)**	<130	**2,800,000**	**14,000**
Benzene	**24▽**	<6.5	**640**	**20**
2-Butanone (MEK)	**300**	<130	**4,400,000**	**3,400**
n-Butylbenzene	**54**	<6.5	**48,000**	**1,400**
Ethylbenzene	**37**	<6.5	**380,000**	**580**
p-Isopropyltoluene	**89**	<6.5	**14,600,000**	**280**
Methylene chloride	**9.4(2)**	<6.5	**9,100**	**100**
Naphthalene	**120**	<6.5	**11,200**	**420**
n-Propylbenzene	**59**	<6.5	**48,000**	**1,400**
Tetrachloroethene	**47▽**	<6.5	**480**	**14**
Toluene	**25**	<6.5	**132,000**	**20,000**
1,2,4-Trimethylbenzene	**380**	<6.5	**10,400**	**7,000**
1,3,5-Trimethylbenzene	**180**	<6.5	**4,200**	**7,000**
Xylene (Total)	**83**	ND	**54,000**	**10,600**

Analyte	B12-01 (3'-4')	B12-01 (11'-12')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Semivolatile Organic Compounds (ug/Kg)	ND	ND		
Polychlorinated Biphenyls (ug/Kg)				
PCB-1254	**670,000**	**140**	- -	- -
PCB-1260	<1800	<43	- -	- -
PCBs (total)	**670,000☆▽**	**140▽**	**1,000**	**10**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 27. Summary of Ground-Water Sampling Results & PRGs – AOC #12 (Steel Wash Tank)

Analyte	MW-B12-01 (5/20/04)	Ground-Water PRG
Metals (mg/L)		
Antimony	<0.0050	**0.006**
Arsenic	<0.0050	**0.010**
Barium	**0.097**	**2.0**
Beryllium	<0.0010	**0.004**
Cadmium	<0.0010	**0.005**
Chromium (total)	**0.0054**	**0.05**
Chromium VI	<0.050	**0.05**
Copper	**0.028**	**1.0**
Lead	<0.0050	**0.015**
Manganese	**0.50**	**0.96**
Mercury	<0.00020	**0.0011**
Nickel	**0.022**	**0.1**
Selenium	<0.0050	**0.05**
Silver	<0.0020	**0.018**
Thallium	<0.010	**0.002**
Zinc	**0.044**	**2.1**
Other Inorganics (mg/L)		
Cyanide	<0.0020	**0.154**
Volatile Organic Compounds (ug/L)		
1,1-Dichloroethane	**1.6**	**700**
1,1-Dichloroethene	**4.1**	**7**
cis-1,2-Dichloroethene	**2.7**	**70**
Tetrachloroethene	**170**♣	**0.7**
Trichloroethene	**4.2**♣	**2.8**
Semivolatile Organic Compounds (ug/L)	ND	- -
Polychlorinated Biphenyls (ug/L)	ND	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

AOC #13 – Oil Storage Hut

AOC #13 involves the site of a 30 ft by 40 ft storage building previously located beneath what is now the northwest portion of the main building. This structure was present in the 1950s and 1960s, prior to construction of the final addition to the main building in 1973. A 1950s facility drawing shows a floor drain in the northeast corner of this former building, with a discharge flowing to the northwest.

During the Phase I RI, soil boring #B13-01 was completed in the area of this former structure and floor drain, and monitoring well #MW-B13-01S was installed at this location. Soil samples collected at depth intervals of 4 to 5 feet and 10 to 11 feet were submitted for laboratory analysis. The monitoring well was dry.

Laboratory results for soil samples collected in AOC #13 are summarized in Table 28. Findings are summarized as follows:

- Concentrations of PCE, TCE and PCBs were detected in the shallow soil sample at concentrations exceeding health-based and ground-water protection PRGs. Additional detections in this sample exceeding ground-water protection PRGs included antimony, cadmium, chromium, lead, p-isopropyltoluene and vinyl chloride.

- In the deeper soil sample, PCBs remained above both health-based and ground-water protection PRGs, and cadmium remained above ground-water protection PRGs.

- The magnitude of PCE and several other VOCs detected here suggests that this location may be near a significant source area for chlorinated solvent contamination in ground-water, particularly as reflected in the monitoring well cluster #MW-BG-B4, located approximately 200 feet to the west. An absence of VOCs in the deeper soil sample suggests that the source may be centered elsewhere.

- The elevated levels of other constituents in soil here, particularly those such as PCBs and cadmium, which persist to a greater depth, may also be of concern. However, no impacts involving these constituents have been detected in downgradient monitoring wells.

Additional soil assessment is needed throughout this area, and extending to the west to monitoring well cluster #MW-BG-B4, in order to define the extent of this area of concern. If possible, additional shallow ground-water monitoring wells should be installed to better assess conditions, although the presence of the building limits access for larger drilling equipment.

Table 28. Summary of Soil Sampling Results & PRGs – AOC #13 (Oil Storage Hut)

Analyte	B13-01 (4'-5')	B13-01 (10'-11')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)				
Antimony	**2.3 ▽**	<0.68	**6.2**	**0.4**
Arsenic	**2.9**	**1.6**	**6.0**	**6.0**
Barium	**120**	**200**	**1,080**	**309**
Beryllium	**0.17**	<0.14	**30**	**0.8**
Cadmium	**2.3 ▽**	**2.4 ▽**	**7.4**	**0.1**
Chromium (total)	**86 ▽**	**68**	**24,000**	**71**
Chromium VI	NA	NA	**30**	**1**
Copper	**73**	**61**	**620**	**78**
Lead	**360 ▽**	**12**	**400**	**144**
Manganese	**1,000**	**550**	**1,050**	**1,050**
Mercury	<0.0058	**0.052**	**4.6**	**0.2**
Nickel	**30**	**22**	**320**	**30**
Selenium	<0.57	<0.68	**78**	**1**
Silver	<0.23	<0.27	**78**	**0.36**
Thallium	<1.1	<1.4	**1.04**	**0.8**
Zinc	**160**	**66**	**4,600**	**262**
Other Inorganics (mg/Kg)				
Cyanide	<0.12	<0.13	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)				
Acetone	**690(2)**	<140	**2,800,000**	**14,000**
n-Butylbenzene	**510**	<7.0	**48,000**	**1,400**
sec-Butylbenzene	**400**	<7.0	**44,000**	**1,400**
1,4-Dichlorobenzene	**34**	<7.0	**3,400**	**1,500**
cis-1,2-Dichloroethene	**1,300**	<7.0	**8,600**	**1,400**
trans-1,2-Dichloroethene	**7.8**	<7.0	**13,800**	**1,400**
Ethylbenzene	**310**	<7.0	**380,000**	**580**
Isopropylbenzene (Cumene)	**18**	<7.0	**114,000**	**1,400**
p-Isopropyltoluene	**420 ▽**	<7.0	**14,600,000**	**280**
Methylene chloride	**57(2)**	<7.0	**9,100**	**100**
Naphthalene	**140**	<7.0	**11,200**	**420**
n-Propylbenzene	**90**	<7.0	**48,000**	**1,400**
Tetrachloroethene	**130,000 ☆ ▽**	<7.0	**480**	**14**
Toluene	**17**	<7.0	**132,000**	**20,000**
Trichloroethene	**3,600 ☆ ▽**	<7.0	**53**	**56**

Analyte	B13-01 (4'-5')	B13-01 (10'-11')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
1,2,4-Trimethylbenzene	**510**	<7.0	**10,400**	**7,000**
1,3,5-Trimethylbenzene	**500**	<7.0	**4,200**	**7,000**
Vinyl chloride	**20** ∇	<14	**79**	**0.3**
Xylene (Total)	**1,050**	ND	**54,000**	**10,600**
Semivolatile Organic Compounds (ug/Kg)	ND	ND	- -	- -
Polychlorinated Biphenyls (ug/Kg)				
PCB-1254	**22,000**	**1,700**	- -	- -
PCB-1260	<410	<110	- -	- -
PCBs (total)	**22,000** ☆ ∇	**1,700** ☆ ∇	**1,000**	**10**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

AOC #14 – Old Steel Drums & Debris

AOC #14 involves several old steel drums and small amounts of debris that have been observed along the heavily wooded, steep hillside in the west part of the property. A surface soil sample was collected from beneath a representative drum during the Phase I RI. Analytical results are summarized in Table 29, and indicate the presence of lead and mercury above ground-water protection PRGs.

Additional work for AOC #14 should include a detailed reconnaissance and marking of all other drums and any debris of potential concern. Drums should be removed to a secure area for characterization and disposal of contents, if any, and soil underlying the drums should be sampled.

Table 29. Summary of Soil Sampling Results & PRGs – AOC #14 (Old Drums & Debris)

Analyte	B14-01	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)			
Antimony	<0.60	**6.2**	**0.4**
Arsenic	**5.7**	**6.0**	**6.0**
Barium	**120**	**1,080**	**309**
Beryllium	**0.45**	**30**	**0.8**
Cadmium	<0.12	**7.4**	**0.1**
Chromium (total)	**36**	**24,000**	**71**
Chromium VI	NA	**30**	**1**
Copper	**54**	**620**	**78**
Lead	**190** ∇	**400**	**144**
Manganese	**370**	**1,050**	**1,050**
Mercury	**0.26** ∇	**4.6**	**0.2**
Nickel	**17**	**320**	**30**
Selenium	<0.60	**78**	**1**
Silver	<0.24	**78**	**0.36**
Thallium	<1.2	**1.04**	**0.8**
Zinc	**250**	**4,600**	**262**
Other Inorganics (mg/Kg)			
Cyanide	<0.12	**240**	**3.08**
VOCs (ug/Kg)			
Methylene chloride	**28(2)**	**9,100**	**100**
SVOCs (ug/Kg)	ND	- -	- -
PCBs (ug/Kg)	ND	- -	- -

(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

AOC #15 – Creosote-Treated Flooring

AOC #15 refers to the eastern portion of the building interior, approximately 70,000 square feet in area, which was originally constructed in the 1940s with a creosote-treated wood flooring system. The system includes several layers of treated wood flooring and subflooring, underlain by granular (cinders and gravel) base layers that contain a heavy, asphalt-like binder. Prior assessment completed during the Phase II ESA indicated the presence of semivolatile organic compounds (SVOCs) - primarily polynuclear aromatic hydrocarbons (PAHs) and dibenzofuran - in shallow soil beneath this flooring system.

Additional soil and ground-water assessment was completed during the Phase I RI, including completion of four soil borings (#B15-01, #B15-03, #B15-04 and #B15-05), a shallow "test pit" to characterize the flooring materials (#B15-01), and installation and sampling of a shallow monitoring well (#MW-B15-01S). The "test pit" at B15-01 involved cutting a roughly 2 ft by 2 ft section of wood flooring and sub-flooring away, removing and sampling the underlying, creosote-treated cinders and gravel base materials, cleaning those materials out of the opening, and then proceeding with the soil boring.

Sampling results associated with this work are summarized on Tables 30 and 31. Findings associated with AOC #15 are as follows:

- The highest levels of SVOCs occur in the cinder and gravel base layers beneath the wood flooring. Total concentrations are on the order of 8,000,000 ug/Kg (8,000 mg/Kg) for the cinder material, and 3,000,000 ug/Kg (3,000 mg/Kg) for the underlying gravel. Results for a number of the individual PAH compounds and dibenzofuran exceed both health-based and ground-water protection PRGs. TCLP testing of these layers indicate that leachate-based PRGs are also exceeded for at least several of the PAH compounds.

- Concentrations of SVOCs in soil underlying the flooring system are somewhat variable. For example, in test pit/soil boring #B15-01, results exceed PRGs only for the uppermost one-half foot of soil beneath the base material. Similar conditions were observed in B15-03, B15-04 and B5-01. In other areas, however, the PAHs persist to greater depths. For example, at soil boring location #B15-03, PRGs are exceeded to a depth of at least 7 feet

- Ground-water does not appear to have been impacted by the creosote flooring materials.

The limits of the creosote-treated flooring system and associated shallow soil contamination are well defined, and no additional data requirements are identified at present. The depth of soil impacts exceeding PRGs is somewhat variable, and may require further delineation; however, this cannot be effectively done while the high concentration granular base materials are present, as they have the potential to collapse into the borehole and result in artificially high levels at depth.

Assuming that the wood flooring and creosote-treated base materials are removed in the future, additional soil sampling, possibly involving TCLP testing for evaluation of ground-water protection PRGs, can be completed at that time.

Table 30. Summary of Soil Sampling Results & PRGs – AOC #15 (Creosote-Treated Flooring)

Analyte	B15-01 CINDERS	B15-01 CINDERS (TCLP)	B15-01 GRAVEL	B15-01 GRAVEL (TCLP)	B15-01 (0'-0.5')	B15-01 (0'-0.5') (TCLP)	B15-01 (1.0'-1.5')	B15-01 (1.0'-1.5') (TCLP)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Metals (mg/Kg for total; mg/L for TCLP)											
Antimony	<0.47	NA	<0.50	NA	<0.81	NA	<0.70	NA	**6.2**	**0.4**	**0.006**
Arsenic	**1.3**	NA	**2.1**	NA	**1.9**	NA	<0.70	NA	**6.0**	**6.0**	**0.010**
Barium	**1.5**	NA	**2.7**	NA	**31**	NA	**21**	NA	**1,080**	**309**	**2.0**
Beryllium	**0.14**	NA	<0.10	NA	**0.17**	NA	**0.18**	NA	**30**	**0.8**	**0.004**
Cadmium	**0.22▽**	NA	**0.24▽**	NA	**3.8▽**	NA	**2.7▽**	NA	**7.4**	**0.1**	**0.005**
Chromium (total)	**1.4**	NA	**4.5**	NA	**82▽**	NA	**79▽**	NA	**24,000**	**71**	**0.05**
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**1**	**0.05**
Copper	**0.50**	NA	**7.7**	NA	**37**	NA	**28**	NA	**620**	**78**	**1.0**
Lead	**2.7**	NA	**2.2**	NA	**12**	NA	**10**	NA	**400**	**144**	**0.015**
Manganese	**3.9**	NA	**65**	NA	**160**	NA	**160**	NA	**1,050**	**1,050**	**0.05**
Mercury	**0.012**	NA	**0.092**	NA	**0.073**	NA	**0.11**	NA	**4.6**	**0.2**	**0.0011**
Nickel	**0.67**	NA	**5.6**	NA	**5.0**	NA	**3.5**	NA	**320**	**30**	**0.1**
Selenium	<0.47	NA	<0.50	NA	<0.81	NA	<0.70	NA	**78**	**1**	**0.05**
Silver	<0.19	NA	<0.20	NA	<0.32	NA	<0.28	NA	**78**	**0.36**	**0.018**
Thallium	<0.93	NA	<1.0	NA	<1.6	NA	<1.4	NA	**1.04**	**0.8**	**0.002**
Zinc	**7.7**	NA	**12**	NA	**14**	NA	**11**	NA	**4,600**	**262**	**2.1**
Other Inorganics (mg/Kg for total; mg/L for TCLP)											
Cyanide	<0.099	NA	<0.11	NA	<0.17	NA	NA	NA	**240**	**3.08**	**0.154**

Analyte	B15-01 CINDERS	B15-01 CINDERS (TCLP)	B15-01 GRAVEL	B15-01 GRAVEL (TCLP)	B15-01 (0'-0.5')	B15-01 (0'-0.5') (TCLP)	B15-01 (1.0'-1.5')	B15-01 (1.0'-1.5') (TCLP)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)											
Acetone	<100	NA	<100	NA	<170	NA	<140	NA	**2,800,000**	**14,000**	**700**
Methylene chloride	21(2)	NA	<5.0	NA	**20**(2)	NA	**21**(2)	NA	**9,100**	**100**	**5**
Naphthalene	**480**▽	NA	**81**	NA	**22**	NA	**15**	NA	**11,200**	**420**	**21**
Tetrachloroethene	**28**▽	**28**(3)▽	<5.0	<10(3)	<8.7	<10(3)	<7.0	<10(3)	**480**	**14**	**0.7**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)											
Acenaphthene	**240,000**▽	**160**(3)▽	**55,000**▽	**89**(3)▽	<6900	<50(3)	<460	<50(3)	**740,000**	**1,600**	**80**
Acenaphthylene	<34,000	<50(3)	**14,000**▽	<50(3)	<6900	<50(3)	<460	<50(3)	**460,000**	**4,200**	**210**
Anthracene	**320,000**▽	<50(3)	**180,000**▽	<50(3)	**9,300**	<50(3)	<460	<50(3)	**4,400,000**	**42,000**	**2,100**
Benzo(k)fluoranthene	**510,000**☆▽	<50(3)	**250,000**☆▽	<50(3)	**18,000**☆▽	<50(3)	<460	<50(3)	**6,200**	**10**	**0.479**
Benzo(b)fluoranthene	**460,000**☆▽	<50(3)	**210,000**☆▽	<50(3)	**16,000**☆▽	<50(3)	<460	<50(3)	**620**	**1**	**0.0479**
Benzo(a)anthracene	**410,000**☆▽	<50(3)	**190,000**☆▽	<50(3)	**18,000**☆▽	<50(3)	<460	<50(3)	**620**	**1**	**0.0479**
Benzo(g,h,i)perylene	<34,000	<50(3)	**12,000**▽	<50(3)	<6,900	<50(3)	<460	<50(3)	**460,000**	**4,200**	**210**
Benzo(a)pyrene	**320,000**☆▽	<50(3)	**150,000**☆▽	<50(3)	**15,000**☆▽	<50(3)	<460	<50(3)	**62**	**0.0958**	**0.00479**
Chrysene	**340,000**☆▽	<50(3)	**210,000**☆▽	<50(3)	**19,000**▽	<50(3)	<460	<50(3)	**62,000**	**96**	**4.79**

Analyte	B15-01 CINDERS	B15-01 CINDERS (TCLP)	B15-01 GRAVEL	B15-01 GRAVEL (TCLP)	B15-01 (0'-0.5')	B15-01 (0'-0.5') (TCLP)	B15-01 (1.0'-1.5')	B15-01 (1.0'-1.5') (TCLP)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection - Total)	Soil PRG (Ground-Water Protection - TCLP)
Dibenzofuran	**340,000☆▽**	190(3)▽	**78,000☆▽**	100(3)▽	<6,900	<50(3)	<460	<50(3)	**30,000**	**48**	**2.4**
Fluoranthene	**1,400,000☆▽**	<50(3)	**590,000☆▽**	<50(3)	**41,000▽**	<50(3)	**460**	<50(3)	**460,000**	**5,600**	**280**
Fluorene	**250,000▽**	**110**(3)	**64,000▽**	67(3)	<6,900	<50(3)	<460	<50(3)	**540,000**	**5,600**	**280**
Indeno(1,2,3-cd)pyrene	**40,000☆▽**	<50(3)	**16,000☆▽**	<50(3)	<6,900	<50(3)	<460	<50(3)	**620**	**0.958**	**0.0479**
2-Methylnaphthalene	**95,000☆▽**	76(3)▽	**19,000☆▽**	<50(3)	<6,900	<50(3)	<460	<50(3)	**11,200**	**280**	**14**
Naphthalene	**20,000☆▽**	52(3)▽	**4,800▽**	<50(3)	<6,900	<50(3)	<460	<50(3)	**11,200**	**420**	**21**
Phenanthrene	**2,000,000☆▽**	240(3)▽	**720,000☆▽**	230(3)▽	**33,000▽**	<50(3)	**610**	<50(3)	**460,000**	**4,200**	**210**
Pyrene	**1,200,000☆▽**	<50(3)	**520,000☆▽**	<50(3)	**33,000▽**	<50(3)	<460	<50(3)	**460,000**	**4,200**	**210**
Polychlorinated Biphenyls (ug/Kg)	ND	NA	ND	NA	ND	NA	NA	NA	**1,000**	**10**	**0.5**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) TCLP analysis
☆ Soil (Health-Based) PRG Exceeded
▽ Soil (Ground-Water Protection) PRG Exceeded

Table 30. Summary of Soil Sampling Results & PRGs – AOC #15 (Creosote-Treated Flooring)

Analyte	B15-01 (3'-4')	B15-01 (5'-6')	B15-01 (7'-8')	B15-01 (11'-12')	B15-03 (2.5-3.5)	B15-03 (5-7)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg for total; mg/L for TCLP)								
Antimony	<0.71	<0.79	<0.65	<0.57	NA	NA	**6.2**	**0.4**
Arsenic	**1.0**	**2.5**	**1.1**	**1.6**	NA	NA	**6.0**	**6.0**
Barium	**50**	**160**	**150**	**160**	NA	NA	**1,080**	**309**
Beryllium	<0.14	<0.16	<0.13	<0.11	NA	NA	**30**	**0.8**
Cadmium	**3.1** ▽	**1.4** ▽	**1.5** ▽	**2.2** ▽	NA	NA	**7.4**	**0.1**
Chromium (total)	**190** ▽	**13**	**15**	**4.4**	NA	NA	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	**60**	**35**	**80** ▽	**77**	NA	NA	**620**	**78**
Lead	**11**	**6.3**	**6.5**	**6.2**	NA	NA	**400**	**144**
Manganese	**1,200** ▽	**270**	**380**	**670**	NA	NA	**1,050**	**1,050**
Mercury	**0.018**	<0.0070	<0.0061	<0.0056	NA	NA	**4.6**	**0.2**
Nickel	**24**	**4.0**	**3.2**	**5.6**	NA	NA	**320**	**30**
Selenium	<0.71	<0.79	<0.65	<0.57	NA	NA	**78**	**1**
Silver	<0.28	<0.32	<0.26	<0.23	NA	NA	**78**	**0.36**
Thallium	<1.4	<1.6	<1.3	<1.1	NA	NA	**1.04**	**0.8**
Zinc	**59**	**46**	**45**	**68**	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg for total; mg/L for TCLP)								
Cyanide	NA	NA	<0.13	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg								

Analyte	B15-01 (3'-4')	B15-01 (5'-6')	B15-01 (7'-8')	B15-01 (11'-12')	B15-03 (2.5-3.5)	B15-03 (5-7)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
for total; ug/L for TCLP)								
Acetone	**200**(2)	<160	<130	**160**(2)	**260**(2)	**160**(2)	**2,800,000**	**14,000**
Methylene chloride	**29**(2)	**9.7**(2)	**33**(2)	**22**(2)	**42**(2)	**23**(2)	**9,100**	**100**
Naphthalene	<7.4	<7.9	<6.5	<5.8	**190**	**15,000☆▽**	**11,200**	**420**
Tetrachloroethene	<7.4	<7.9	<6.5	<5.8	<6.4	<5.4	**480**	**14**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)								
Acenaphthene	<490	<520	<430	<380	**910**	**1,100**	**740,000**	**1,600**
Acenaphthylene	<490	<520	<430	<380	**560**	**750**	**460,000**	**4,200**
Anthracene	<490	<520	<430	<380	**950**	**1,100**	**4,400,000**	**42,000**
Benzo(k)fluoranthene	<490	<520	<430	<380	**830▽**	**1,000▽**	**6,200**	**10**
Benzo(b)fluoranthene	<490	<520	<430	<380	**660☆▽**	**1,000☆▽**	**620**	**1**
Benzo(a)anthracene	<490	<520	<430	<380	**960☆▽**	**1,200☆▽**	**620**	**1**
Benzo(g,h,i)perylene	<490	<520	<430	<380	<420	<360	**460,000**	**4,200**
Benzo(a)pyrene	<490	<520	<430	<380	**760☆▽**	**920☆▽**	**62**	**0.0958**
Chrysene	<490	<520	<430	<380	**940▽**	**1,100▽**	**62,000**	**96**
Dibenzofuran	<490	<520	<430	<380	**1,600▽**	**1,900▽**	**30,000**	**48**
Fluoranthene	<490	<520	<430	<380	**2,600**	**2,800**	**460,000**	**5,600**
Fluorene	<490	<520	<430	<380	**960**	**1,100**	**540,000**	**5,600**
Indeno(1,2,3-cd)pyrene	<490	<520	<430	<380	<420	<360	**620**	**0.958**
2-Methylnaphthalene	<490	<520	<430	<380	**1,100▽**	**1,800▽**	**11,200**	**280**

Analyte	B15-01 (3'-4')	B15-01 (5'-6')	B15-01 (7'-8')	B15-01 (11'-12')	B15-03 (2.5-3.5)	B15-03 (5-7)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Naphthalene	<490	<520	<430	<380	**700 ∇**	**1,400 ∇**	**11,200**	**420**
Phenanthrene	<490	<520	<430	<380	**4,100**	**4,400 ∇**	**460,000**	**4,200**
Pyrene	<490	<520	<430	<380	**2,400**	**2,700**	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	ND	NA	NA	NA	- -	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 30. Summary of Soil Sampling Results & PRGs – AOC #15 (Creosote-Treated Flooring)

Analyte	B15-04 (2-3')	B15-04 (3-5')	B15-05 (2-3')	B15-05 (4-6')	B5-01 (0.5-1.0') (1)	B5-01 (3.5-4.0') (1)	B5-01 (9.5-10.0') (1)	B5-01 (14.5-15') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg for total; mg/L for TCLP)										
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	**6.2**	**0.4**
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	**6.0**	**6.0**
Barium	NA	NA	NA	NA	NA	NA	NA	NA	**1,080**	**309**
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**0.8**
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	**7.4**	**0.1**
Chromium (total)	NA	NA	NA	NA	NA	NA	NA	NA	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	**30**	**1**
Copper	NA	NA	NA	NA	NA	NA	NA	NA	**620**	**78**
Lead	NA	NA	NA	NA	NA	NA	NA	NA	**400**	**144**

Analyte	B15-04 (2-3')	B15-04 (3-5')	B15-05 (2-3')	B15-05 (4-6')	B5-01 (0.5-1.0') (1)	B5-01 (3.5-4.0') (1)	B5-01 (9.5-10.0') (1)	B5-01 (14.5-15') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	**1,050**	**1,050**
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	**4.6**	**0.2**
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	**320**	**30**
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	**78**	**1**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	**78**	**0.36**
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	**1.04**	**0.8**
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	**4,600**	**262**
Other Inorganics (mg/Kg for total; mg/L for TCLP)										
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	**240**	**3.08**
Volatile Organic Compounds (ug/Kg for total; ug/L for TCLP)										
Acetone	NA	NA	NA	NA	ND	ND	ND	ND	**2,800,000**	**14,000**
Methylene chloride	NA	NA	NA	NA	<5.8	<6.1	<5.7	<5.9	**9,100**	**100**
Naphthalene	NA	NA	NA	NA	**330**	**190**	**9.8**	<5.9	**11,200**	**420**
Tetrachloroethene	NA	NA	NA	NA	<5.8	<6.1	<5.7	<5.9	**480**	**14**
Semivolatile Organic Compounds (ug/Kg for total; ug/L for TCLP)										
Acenaphthene	<470	<440	<410	<390	<1900	<400	<380	<390	**740,000**	**1,600**
Acenaphthylene	<470	<440	<410	<390	<1900	<400	<380	<390	**460,000**	**4,200**
Anthracene	<470	<440	<410	<390	**4,800**	<400	<380	<390	**4,400,000**	**42,000**

Analyte	B15-04 (2-3')	B15-04 (3-5')	B15-05 (2-3')	B15-05 (4-6')	B5-01 (0.5-1.0') (1)	B5-01 (3.5-4.0') (1)	B5-01 (9.5-10.0') (1)	B5-01 (14.5-15') (1)	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Benzo(k)fluoranthene	<470	<440	<410	<390	**3,200 ∇**	<400	<380	<390	**6,200**	**10**
Benzo(b)fluoranthene	<470	<440	<410	<390	**2,900 ☆ ∇**	<400	<380	<390	**620**	**1**
Benzo(a)anthracene	<470	<440	**470**	<390	**4,600 ☆ ∇**	<400	<380	<390	**620**	**1**
Benzo(g,h,i)perylene	<470	<440	<410	<390	<1900	<400	<380	<390	**460,000**	**4,200**
Benzo(a)pyrene	<470	<440	**410 ☆ ∇**	<390	**3,800 ☆ ∇**	<400	<380	<390	**62**	**0.0958**
Chrysene	<470	<440	**420**	<390	**3,800 ∇**	<400	<380	<390	**62,000**	**96**
Dibenzofuran	<470	<440	**480**	<390	**3,200 ∇**	<400	<380	<390	**30,000**	**48**
Fluoranthene	<470	<440	**1,200**	<390	**10,000 ∇**	**930**	<380	<390	**460,000**	**5,600**
Fluorene	<470	<440	<410	<390	**2,900**	<400	<380	<390	**540,000**	**5,600**
Indeno(1,2,3-cd)pyrene	<470	<440	<410	<390	<1900	<400	<380	<390	**620**	**0.958**
2-Methylnaphthalene	<470	<440	**530**	<390	<1900	<400	<380	<390	**11,200**	**280**
Naphthalene	<470	<440	**520**	<390	<1900	<400	<380	<390	**11,200**	**420**
Phenanthrene	<470	<440	**1,600**	<390	**14,000 ∇**	**1,300**	<380	<390	**460,000**	**4,200**
Pyrene	<470	<440	**1,000**	<390	**8,800 ∇**	**980**	<380	<390	**460,000**	**4,200**
Polychlorinated Biphenyls (ug/Kg)	NA	NA	NA	NA	NA	NA	NA	NA	--	--

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Table 31. Summary of Ground-Water Sampling Results & PRGs – AOC #15 (Creosote-Treated Flooring)

Analyte	MW-B15-01	Ground-Water PRG
Metals (mg/L)		
Antimony	<0.0050	**0.006**
Arsenic	<0.0050	**0.010**
Barium	**0.10**	**2.0**
Beryllium	<0.0010	**0.004**
Cadmium	<0.0010	**0.005**
Chromium (total)	**0.0057**	**0.05**
Chromium VI	<0.050	**0.05**
Copper	**0.024**	**1.0**
Lead	<0.0050	**0.015**
Manganese	**0.31**	**0.96**
Mercury	<0.00020	**0.0011**
Nickel	**0.012**	**0.1**
Selenium	<0.0050	**0.05**
Silver	<0.0020	**0.018**
Thallium	<0.010	**0.002**
Zinc	**0.016**	**2.1**
Other Inorganics (mg/L)		
Cyanide	**0.010**(3)	**0.154**
Volatile Organic Compounds (ug/L)		
1,1-Dichloroethene	**25**♣	**7**
cis-1,2-Dichloroethene	**1.4**	**70**
Tetrachloroethene	**400**♣	**0.7**
Trichloroethene	**2.9**♣	**2.8**
Semivolatile Organic Compounds (ug/L)	ND	- -
Polychlorinated Biphenyls (ug/L)	ND	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

AOC #16 – Hazardous Material Storage Buildings

Area of concern #16 (AOC #16) includes two former hazardous material storage buildings located south of the main building. Soil borings #B16-01 and #B16-02 were completed in these areas to assess whether contamination may be present.

Analytical results are summarized in Table 32, and overall, do not indicate the presence of constituents exceeding PRGs. The main exception involves a mercury detection of 5.7 mg/Kg in B16-02 (10 to 11 ft), exceeding both health-based and ground-water protection PRGs. This detection may reflect either a surface release here, or possibly migration from nearby storm sewers.

Data requirements include additional soil sampling for elevated metals (mercury, cadmium and lead), including shallow soil intervals (0 to 10 ft) at B16-02, and one to two borings extending to the east and west of B16-02. TCLP testing would also be conducted to better assess ground-water protection PRGs.

Table 32. Summary of Soil Sampling Results & PRGs – AOC #16 (Hazardous Material Storage Buildings)

Analyte	B16-01 (11'-12')	B16-01 (14'-15')	B16-02 (10'-11')	B16-02 (15'-16')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
Metals (mg/Kg)						
Antimony	<0.65	<0.61	<0.55	<0.68	**6.2**	**0.4**
Arsenic	**1.5**	**0.80**	**3.1**	**1.9**	**6.0**	**6.0**
Barium	**54**	**160**	**130**	**16**	**1,080**	**309**
Beryllium	**0.26**	<0.12	**0.41**	<0.14	**30**	**0.8**
Cadmium	**0.96▽**	**2.5▽**	**0.95▽**	**2.6▽**	**7.4**	**0.1**
Chromium (total)	**29**	**13**	**16**	**19**	**24,000**	**71**
Chromium VI	NA	NA	NA	NA	**30**	**1**
Copper	**41**	**41**	**31**	**20**	**620**	**78**
Lead	**13**	**7.3**	**150▽**	**10**	**400**	**144**
Manganese	**210**	**230**	92	**120**	**1,050**	**1,050**
Mercury	**0.016**	<0.0062	**5.7☆▽**	**0.015**	**4.6**	**0.2**
Nickel	**18**	**5.5**	**4.3**	**1.8**	**320**	**30**
Selenium	<0.65	<0.61	<0.55	<0.68	**78**	**1**
Silver	<0.26	<0.24	<0.22	<0.27	**78**	**0.36**
Thallium	<1.3	<1.2	<1.1	<1.4	**1.04**	**0.8**
Zinc	**43**	**51**	**100**	**16**	**4,600**	**262**
Other Inorganics (mg/Kg)						
Cyanide	<0.67	<0.59	<0.56	<0.70	**240**	**3.08**
Volatile Organic Compounds (ug/Kg)						
Acetone	**430(2)**	**170(2)**	**520(2)**	**400(2)**	**2,800,000**	**14,000**
sec-Butylbenzene	**49**	<6.2	<5.8	<6.8	**44,000**	**1,400**

Analyte	B16-01 (11'-12')	B16-01 (14'-15')	B16-02 (10'-11')	B16-02 (15'-16')	Soil PRG (Health-Based)	Soil PRG (Ground-Water Protection)
1,1-Dichloroethane	<6.5	<6.2	**22**	<6.8	**102,000**	**14,000**
Methylene chloride	**58(2)**	**29(2)**	**98(2)**	**45(2)**	**9,100**	**100**
Xylene (Total)	**10**	**6.4**	**9.6**	**8.1**	**54,000**	**10,600**
Semivolatile Organic Compounds (ug/Kg)	ND	ND	ND	ND	- -	- -
Polychlorinated Biphenyls (ug/Kg)	ND	ND	ND	ND	- -	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) TCLP analysis
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

AOC #17 – Oil Compressor

Inactive air compressor equipment is present in the central portion of the building, and the area was identified as a possible area of concern. A close inspection in this area during the Phase I RI indicated that the primary concern appears to be limited to past compressor condensate discharges to a nearby roof downspout and associated storm sewer. In particular, the concern would involve PCBs being present in the compressor oil, as PCBs have been detected at the storm sewer outfalls and stream channels. As a result, composite samples of oil and water were collected from the condensate drain lines and compressor equipment for analysis of PCBs. Results indicated no detectable PCBs in either sample (see B17-01 (oil) and B17-01 (water) in Attachments 2 and 3).

Surface Water & Sediment Results

As previously discussed, surface water and sediment sampling was conducted in the two intermittent stream channels located on the property. Laboratory results are summarized in Tables 33 and 34 below. Results indicate the following:

Surface Water

- Hexavalent chromium (0.054 mg/L versus a PRG of 0.011 mg/L) was detected in surface water at SW-08, the downstream sampling point in the north stream channel. This detection appears to be associated with hexavalent chromium contamination indicated in soil at AOC #3, and in shallow ground-water downgradient of AOC #3 (MW-B1-02S).

- Manganese concentrations in surface water exceeded the PRG of 0.24 mg/L at three locations in the south stream channel: SW-2 (0.30 mg/L), SW-4 (0.38 mg/L) and SW-5 (1.0 mg/L). These detections may be linked with elevated manganese levels in ground water at upgradient locations MW-BG-B3S, MW-BG-B3I and MW-BG-B5I. However, it is not yet clear if the apparently elevated manganese levels are attributable to a contaminant source area, as opposed to other factors such as background conditions.

- A slightly elevated zinc concentration was indicated at SW-7 (0.22 mg/L versus a PRG of 0.15 mg/L).

- Several VOCs were detected in surface water samples collected in the south channel, including PCE, TCE, cis-1,2-dichloroethene and vinyl chloride. The detections, which were below the PRGs, appear to be associated with the discharge of contaminated ground water flowing westward across the property toward Irwin Creek.

- No SVOCs or PCBs were detected in any of the surface water samples, indicating that while these compounds were detected in various areas of concern at the site, and in several stream sediment samples, their potential for impacting site surface water appears to be minimal.

Sediment

- Sediment results show concentrations of a number of metals above PRGs. However, at least several of these appear to be attributable to upstream sources. Specifically, detections of antimony, copper, lead and zinc at upstream property line point SE-06, and cadmium at upstream points SE-01 and SE-06, are highest at the properly line and rapidly decrease downstream from there. Levels of cadmium, copper and zink exceeded ground-water protection PRGs only, so TCLP testing will assist in evaluating these constituents. Antimony and lead at

SE-06 exceeded both ground-water protection and human health PRGs; therefore, further delineation (downstream, upstream and vertical profiling) will be necessary.

- In addition to the metals in sediment that appear to originate upstream, there were several detections of metals that are more likely associated with onsite conditions. Copper and nickel exceeded the ground-water protection PRG at SE-04, and arsenic exceeded both ground-water protection and human health PRGs at SE-07. Once again, TCLP testing and/or further delineation will be necessary.

- Volatile organic compounds were reported in several sediment samples. Acetone and methylene chloride were reported, but are considered as suspected laboratory contaminants. Cis-1,2-dichloroethene was present in sediment at SE-05, although below PRGs.

- Other organic compounds exceeding sediment PRGs included several PAHs at SE03 and SE07, and PCBs at SE03, SE7 and SE08. Results at SE03 and SE08 may be attributable to storm-water and wastewater discharges entering the stream channels upstream of these points. Results at SE07 may be due to run-on from onsite sources such as the nearby railroad tracks.

As discussed above, Phase II data requirements associated with surface water and sediment will include further delineation of the extent of contamination exceeding PRGs, and other evaluations such as TCLP testing of sediment exceeding ground-water protection goals. Work will include the following:

- Additional episodes of onsite surface water and sediment sampling, including variable flow conditions, to confirm current results.

- Surface water and sediment sampling sampling extending downstream to Irwin Creek, and in Irwin Creek upstream and downstream of the confluence, to delineate the extent of any constituents exceeding PRGs, and to assess whether Irwin Creek may have been impacted.

- TCLP testing of sediment exceeding ground-water protection PRGs.

- Focused delineation in the vicinity of areas where human health PRGs are exceeded (and ground-water protection PRGs, subject to TCLP results).

Table 33. Summary of Surface-Water Sampling Results & PRGs

Analyte	SW-01	SW-02	SW-03	SW-04	SW-05	SW-05 Duplicate	SW-06	SW-07	SW-08	Surface-Water PRG
Metals (mg/L)										
Antimony	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**1.7**
Arsenic	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.01**
Barium	**0.071**	**0.073**	**0.11**	**0.067**	**0.064**	**0.064**	**0.075**	**0.049**	**0.025**	**1.4**
Beryllium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.000117**
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.002**
Chromium (total)	**0.019**	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	**0.0032**	**0.0045**	<0.0020	**0.04885**
Chromium VI	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	**0.054**♠	**0.011**
Copper	**0.025**	**0.0025**	**0.0032**	<0.0020	<0.0020	<0.0020	**0.033**	**0.023**	**0.015**	**0.033**
Lead	**0.050**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.065**	**0.055**	**0.0052**	**0.065**
Manganese	**0.18**	**0.30**♠	**0.15**	**0.38**♠	**1.0**♠	**1.0**♠	**0.24**	**0.077**	**0.011**	**0.24**
Mercury	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	**0.0021**	<0.00020	<0.00020	**0.0021**
Nickel	**0.0072**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.088**
Selenium	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.005**
Silver	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	**0.00006**
Thallium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.0013**
Zinc	**0.15**	**0.029**	**0.080**	**0.012**	**0.024**	**0.013**	**0.13**	**0.22**♠	**0.022**	**0.150**
Other Inorganics (mg/L)										
Cyanide	<0.0020	<0.0020	<0.0020	**0.0020**	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	**0.005**
Volatile Organic Compounds (ug/L)										
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0	**8.1**	**53**	**41**	<1.0	<1.0	<1.0	**13,000**

Analyte	SW-01	SW-02	SW-03	SW-04	SW-05	SW-05 Duplicate	SW-06	SW-07	SW-08	Surface-Water PRG
Tetrachloroethene	<1.0	<1.0	**1.3**	**5.6**	**5.9**	**4.8**	<1.0	<1.0	<1.0	**8.85**
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.0**(1)	<1.0	**11**
Trichloroethene	<1.0	<1.0	<1.0	<1.0	**3.7**	**3.1**	<1.0	<1.0	<1.0	**92.4**
Vinyl chloride	<1.0	<1.0	<1.0	<1.0	**3.5**	**2.7**	<1.0	<1.0	<1.0	**525**
Semivolatile Organic Compounds (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	- -
Polychlorinated Biphenyls (ug/L)										
PCB-1254	<1.0	<0.56	<0.50	<0.56	<0.53	<0.50	<0.56	<1.0	<0.53	- -
PCB-1260	<1.0	<0.56	<0.50	<0.56	<0.53	<0.50	<0.56	<1.0	<0.53	- -
PCBs (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.000079**

(1) Detected in field equipment rinse blank
♤ Surface-Water PRG Exceeded

Table 34. Summary of Sediment Sampling Results and Comparison to PRGs

Analyte	SE-01*	SE-02	SE-03	SE-04	SE-05	SE-05 Duplicate	SE-06*	SE-07	SE-08	Sediment PRG (3)	Soil PRG (Health-Based) (4)	Soil PRG (Ground-Water Protection) (4)
Metals (mg/Kg)												
Antimony	<0.89	<0.60	<0.73	<0.60	<0.64	<0.61	**20☆▽**	**3.8**	<0.63	**20**	**6.2**	**0.4**
Arsenic	**3.8**	<0.60	**1.0**	**1.8**	**0.76**	**1.0**	**5.0**	**33♤☆▽**	**0.83**	**5.0**	**6.0**	**6.0**
Barium	**100**	**32**	**59**	**81**	**24**	**19**	**170**	**130**	**43**	**1,080**	**1,080**	**309**
Beryllium	<0.18	**0.18**	<0.15	**0.61**	**0.18**	<0.12	<0.21	**0.35**	**0.21**	**30**	**30**	**0.8**
Cadmium	**1.9▽**	<0.12	<0.15	<0.12	<0.13	<0.12	**1.1▽**	<0.12	<0.13	**7.4**	**7.4**	**0.1**
Chromium (total)	**25**	**23**	**34**	**100▽**	**47**	**36**	**45**	**55**	**29**	**24,000**	**24,000**	**71**
Chromium VI	<4.74	<4.25	<3.67	<42.7	<4.65	<44.6	<62.4	<4.14	<2.14	**30**	**30**	**1**
Copper	**40**	**10**	**30**	**42**	**10**	**8.9**	**96▽**	**66**	**29**	**620**	**620**	**78**
Lead	**110**	**14**	**54**	**9.3**	**11**	**16**	**610☆▽**	**180▽**	**26**	**610**	**400**	**144**
Manganese	**300**	**430**	**240**	**390**	**310**	**270**	**650**	**580**	**350**	**650**	**1,050**	**1,050**
Mercury	**0.040**	<0.0058	**0.052**	**0.016**	**0.0072**	<0.0057	**0.14**	0.096	<0.0065	**4.6**	**4.6**	**0.2**
Nickel	**9.0**	**5.9**	**12**	**41▽**	**11**	**6.8**	**29**	**23**	**12**	**320**	**320**	**30**
Selenium	<0.89	<0.60	<0.73	<0.60	<0.64	<0.61	<1.0	<0.61	<0.63	**78**	**78**	**1**
Silver	<0.36	<0.24	<0.29	<0.24	<0.26	<0.25	<0.42	<0.25	<0.25	**78**	**78**	**0.36**
Thallium	<1.8	<1.2	<1.5	<1.2	<1.3	<1.2	<2.1	<1.2	<1.3	**1.04**	**1.04**	**0.8**
Zinc	**210**	**31**	**170**	**44**	**37**	**30**	**540▽**	**190**	**52**	**4,600**	**4,600**	**262**
Other Inorganics (mg/Kg)												
Cyanide	<0.18	<0.12	<0.14	<0.14	<0.13	<0.12	<0.23	<0.13	<0.15	**240**	**240**	**3.08**
VOCs (ug/Kg)												
Acetone	<180	<130	<150	**500**(2)	<130	<130	<210	<130	<130	**2,800,000**	**2,800,000**	**14,000**

Analyte	SE-01*	SE-02	SE-03	SE-04	SE-05	SE-05 Duplicate	SE-06*	SE-07	SE-08	Sediment PRG (3)	Soil PRG (Health-Based) (4)	Soil PRG (Ground-Water Protection) (4)
cis-1,2-Dichloroethene	<8.9	<6.4	<7.3	<6.4	**17**	**100**	<10	<6.5	<6.7	**8,600**	**8,600**	**1,400**
Methylene chloride	**31**(2)	**20**(2)	**40**(2)	**29**(2)	**20**(2)	<6.5	**130(2)** ∇	**93**(2)	**20**(2)	**9,100**	**9,100**	**100**
SVOCs (ug/Kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Benzo(k)fluoranthene	<590	<420	**720** ∇	<420	<420	<430	<14000	**800** ∇	<440	**6,200**	**6,200**	**9.58**
Benzo(b)fluoranthene	<590	<420	**810** ♤ ☆ ∇	<420	<420	<430	<14000	**880** ♤ ☆ ∇	<440	**620**	**620**	**0.958**
Benzo(a)anthracene	<590	<420	**540** ∇	<420	<420	<430	<14000	<430	<440	**620**	**620**	**0.958**
Benzo(a)pyrene	<590	<420	**540** ♤ ☆ ∇	<420	<420	<430	<14000	**490** ♤ ☆ ∇	<440	**62**	**62**	**0.0958**
Chrysene	<590	<420	**660** ∇	<420	<420	<430	<14000	**570** ∇	<440	**62,000**	**62,000**	**95.8**
Fluoranthene	<590	<420	**1,300**	<420	<420	<430	<14000	**920**	<440	**460,000**	**460,000**	**5,600**
Phenanthrene	<590	<420	**1,100**	<420	<420	<430	<14000	<430	<440	**460,000**	**460,000**	**4,200**
Pyrene	<590	<420	**1,300**	<420	<420	<430	<14000	**910**	<440	**460,000**	**460,000**	**4,200**
PCBs (ug/Kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	- -	- -	- -
PCB-1254	<59	<42	<48	<42	<42	<43	<69	<43	<44	- -	- -	- -
PCB-1260	<59	<42	**99**	<42	<42	<43	<69	**340**	**110**	- -	- -	- -
PCBs (total)	ND	ND	**99** ∇	ND	ND	ND	ND	**340** ∇	**110** ∇	**1,000**	**1,000**	**10**

* Upstream sampling location
(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Sediment PRG represents soil human health PRG, or upstream (background) sediment concentration, if higher.
(4) As per 03/30/2005 communication w/Mr. Kim Caulk (NCDENR REC Program), sediment results associated with non-perennial streams should be evaluated using REC criteria for soil.
♤ Sediment PRG Exceeded
☆ Soil (Health-Based) PRG Exceeded
∇ Soil (Ground-Water Protection) PRG Exceeded

Ground-Water Results

Results of ground-water sample analyses associated with the BG-series well clusters are listed in Table 35, and summarized as follows:

- VOCs, including PCE, TCE, cis-1,2-Dichloroethene and vinyl chloride, were detected in monitoring wells at locations BG-02 through BG-05, reflecting migration from source areas AOC #4 and AOC #13. Ground-water PRGs for these constituents were exceeded at well cluster # BG-05, located near the downgradient property boundary.

- Several metals – specifically, chromium, lead and manganese – were detected above PRGs in shallow ground-water at BG-03, and elevated manganese was detected in shallow ground water at BG-04. The manganese concentration was also marginally above the ground-water PRG at downgradient well MW-BG-B5I.

Offsite migration of VOCs in ground water is indicated, and additional monitoring well installation and sampling will need to be completed to the west of the property in order to confirm this, and to delineate the full extent of ground water exceeding PRGs. Detailed surface water sampling in Irwin Creek under baseflow conditions should be conducted prior to selecting offsite well locations, to help optimize placement. Following this, it is anticipated that approximately three to five monitoring well cluster locations will be necessary. An additional deep well will also be needed, most likely at onsite location BG-05, to define the lower limit of VOC impacts. Finally, additional episodes of ground-water sampling and analysis, to include close inspection for DNAPLs at source areas AOC #4 and AOC #13/BG-04, will be needed to verify ground-water conditions.

Table 35. Summary of Ground-Water Sampling Results & PRGs – BG-Series Wells

Analyte	MW-BG-B1I (5/18/04)	MW-BG-B1D (5/18/04)	MW-BG-B2I (5/18/04)	MW-BG-B2D (5/18/04)	MW-BG-B3S (5/19/04)	MW-BG-B3I (5/19/04)	MW-BG-B3D (5/19/04)	Ground-Water PRG
Metals (mg/L)								
Antimony	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.006**
Arsenic	<0.0050	<0.0050	<0.0050	<0.0050	**0.0078**	<0.0050	**0.0073**	**0.010**
Barium	**0.086**	**0.082**	**0.074**	**0.058**	**0.40**	**0.16**	**0.077**	**2.0**
Beryllium	<0.0010	<0.0010	<0.0010	<0.0010	**0.0039**	<0.0010	<0.0010	**0.004**
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	**0.0015**	<0.0010	<0.0010	**0.005**
Chromium (total)	<0.0020	<0.0020	<0.0020	<0.0020	**0.21♣**	**0.11♣**	**0.029**	**0.05**
Chromium VI	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	**0.05**
Copper	**0.0097**	**0.0078**	**0.0041**	**0.014**	**0.14**	**0.035**	**0.034**	**1.0**
Lead	<0.0050	<0.0050	<0.0050	<0.0050	**0.23♣**	<0.0050	**0.014**	**0.015**
Manganese	**0.035**	**0.12**	**0.96**	**0.15**	**14♣**	**7.9♣**	**0.35**	**0.96**
Mercury	<0.00020	<0.00020	<0.00020	<0.00020	**0.00031**	<0.00020	<0.00020	**0.0011**
Nickel	<0.0050	**0.0081**	<0.0050	**0.0087**	**0.058**	**0.068**	**0.031**	**0.1**
Selenium	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.05**
Silver	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	**0.0030**	**0.018**
Thallium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.002**
Zinc	**0.032**	**0.070**	<0.010	**0.070**	**0.24**	**0.056**	**1.7**	**2.1**
Other Inorganics (mg/L)								
Cyanide	**0.0030**(3)	**0.0060**(3)	**0.012**(3)	**0.011**(3)	**0.0080**(3)	<0.0020	**0.0050**(3)	**0.154**
Volatile Organic Compounds (ug/L)								
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**
Chloroform	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.19**
Chloromethane	<1.0	<1.0	<1.0	<1.0	**1.4**	**1.6**	<1.0	**2.6**

Analyte	MW-BG-B1I (5/18/04)	MW-BG-B1D (5/18/04)	MW-BG-B2I (5/18/04)	MW-BG-B2D (5/18/04)	MW-BG-B3S (5/19/04)	MW-BG-B3I (5/19/04)	MW-BG-B3D (5/19/04)	Ground-Water PRG
1,2-Dichlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**600**
1,1-Dichloroethane	<1.0	<1.0	<1.0	**6.1**	**3.2**	**6.6**	**2.1**	**700**
1,1-Dichloroethene	<1.0	<1.0	**1.4**	**17♣**	<1.0	<1.0	<1.0	**7**
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0	**1.7**	**21.**	**55.**	**210♣**	**70**
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	**6.9**	**17.**	**5.0**	**70**
Ethylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**29**
Naphthalene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**21**
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.43**
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.055**
Tetrachloroethene	<1.0	<1.0	**1.7♣**	**5.8♣**	<1.0	**6.6♣**	**540♣**	**0.7**
Toluene	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	**1,000**
1,1,2-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.2**
Trichloroethene	<1.0	<1.0	**1.7**	**9.2♣**	<1.0	**3.5♣**	**100♣**	**2.8**
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**350**
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**350**
Vinyl chloride	<1.0	<1.0	<1.0	<1.0	**5.1♣**	**11♣**	<1.0	**0.015**
Xylene (Total)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**530**
Semivolatile Organic Compounds (ug/L)								
bis(2-Ethylhexyl)phthalate	<11.	<11.	<11.	**150(2)♣**	<12.	<12.	<12.	**3**
Polychlorinated Biphenyls (ug/L)	ND	ND	ND	ND	ND	ND	ND	- -

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
(3) Detected in field equipment rinse blank
♣ Ground-Water PRG Exceeded

Table 35. Summary of Ground-Water Sampling Results & PRGs – BG-Series Wells

Analyte	MW-BG-B4S (5/19/04)	MW-BG-B4I (5/19/04)	MW-BG-B4D (5/19/04)	MW-BG-B5S (5/19/04)	MW-BG-B5I (5/19/04)	MW-BG-B5D (5/19/04)	MW-BG-B5D Duplicate (5/19/04)	Ground-Water PRG
Metals (mg/L)								
Antimony	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.006**
Arsenic	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.0056**	<0.0050	**0.010**
Barium	**0.20**	**0.037**	**0.021**	**0.073**	**0.20**	**0.048**	**0.053**	**2.0**
Beryllium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.004**
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.005**
Chromium (total)	**0.012**	**0.048**	**0.026**	<0.0020	**0.047**	<0.0020	**0.0037**	**0.05**
Chromium VI	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	**0.05**
Copper	**0.039**	**0.024**	**0.0048**	**0.0044**	**0.13**	**0.0047**	**0.0061**	**1.0**
Lead	<0.0050	<0.0050	<0.0050	<0.0050	**0.0052**	<0.0050	<0.0050	**0.015**
Manganese	**1.2♣**	**0.36**	**0.44**	**0.15**	**1.5♣**	**0.040**	**0.041**	**0.96**
Mercury	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	**0.0011**
Nickel	**0.036**	**0.044**	**0.017**	<0.0050	**0.080**	<0.0050	**0.0050**	**0.1**
Selenium	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.05**
Silver	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	**0.018**
Thallium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.002**
Zinc	**0.050**	<0.010	<0.010	<0.010	**0.10**	<0.010	<0.010	**2.1**
Other Inorganics (mg/L)								
Cyanide	**0.0070**(3)	**0.011**(3)	**0.0070**(3)	<0.0020	<0.0020	<0.0020	<0.0020	**0.154**
Volatile Organic Compounds (ug/L)								
Benzene	**3.7♣**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**

Analyte	MW-BG-B4S (5/19/04)	MW-BG-B4I (5/19/04)	MW-BG-B4D (5/19/04)	MW-BG-B5S (5/19/04)	MW-BG-B5I (5/19/04)	MW-BG-B5D (5/19/04)	MW-BG-B5D Duplicate (5/19/04)	Ground-Water PRG
Chloroform	<1.0	**1.9♣**	**1.2♣**	<1.0	<1.0	<1.0	<1.0	**0.19**
Chloromethane	**1.2**	<1.0	**2.0**	<1.0	<1.0	<1.0	<1.0	**2.6**
1,2-Dichlorobenzene	**6.5**	**1.1**	<1.0	**6.0**	**1.3**	<1.0	<1.0	**600**
1,1-Dichloroethane	<1.0	**1.3**	**1.4**	**1.5**	**1.4**	**1.3**	**2.2**	**700**
1,1-Dichloroethene	**54♣**	**6.8**	**5.3**	**3.4**	**4.1**	**4.2**	**6.4**	**7**
cis-1,2-Dichloroethene	**59,000♣**	**2,300♣**	**760♣**	**200♣**	**490♣**	**500♣**	**440♣**	**70**
trans-1,2-Dichloroethene	**570♣**	**41**	**17**	**4.9**	**8.5**	**8.1**	**12**	**70**
Ethylbenzene	**6.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**29**
Naphthalene	**5.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**21**
1,1,1,2-Tetrachloroethane	**4.5♣**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.43**
1,1,2,2-Tetrachloroethane	**1.2♣**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.055**
Tetrachloroethene	**53,000♣**	**2,800♣**	**1,100♣**	**400♣**	**710♣**	**700♣**	**700♣**	**0.7**
Toluene	**19**	<1.0	<1.0	<1.0	<1.0	**1.2**	**1.4**	**1,000**
1,1,2-Trichloroethane	**4.3♣**	**1.9♣**	<1.0	<1.0	<1.0	<1.0	<1.0	**0.2**
Trichloroethene	**14,000♣**	**530♣**	**180♣**	**100♣**	**130♣**	**120♣**	**190♣**	**2.8**
1,2,4-Trimethylbenzene	**7.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**350**
1,3,5-Trimethylbenzene	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**350**
Vinyl chloride	**2,100♣**	**70♣**	**24♣**	**3.2♣**	**8.7♣**	**2.9♣**	**4.5♣**	**0.015**
Xylene (Total)	**44**	**1.3**	**1.1**	<1.0	<1.0	<1.0	<1.0	**530**
Semivolatile Organic Compounds (ug/L)								**- -**
bis(2-Ethylhexyl)phthalate	<11.	<11.	<11.	<11.	<11.	**35(2)♣**	**51(2)♣**	**3**
PCBs (ug/L)	ND	ND	ND	ND	ND	ND	ND	**- -**

(1) Data from previous site investigation
(2) Suspected laboratory contaminant
♣ Ground-Water PRG Exceeded

6.0 REFERENCES

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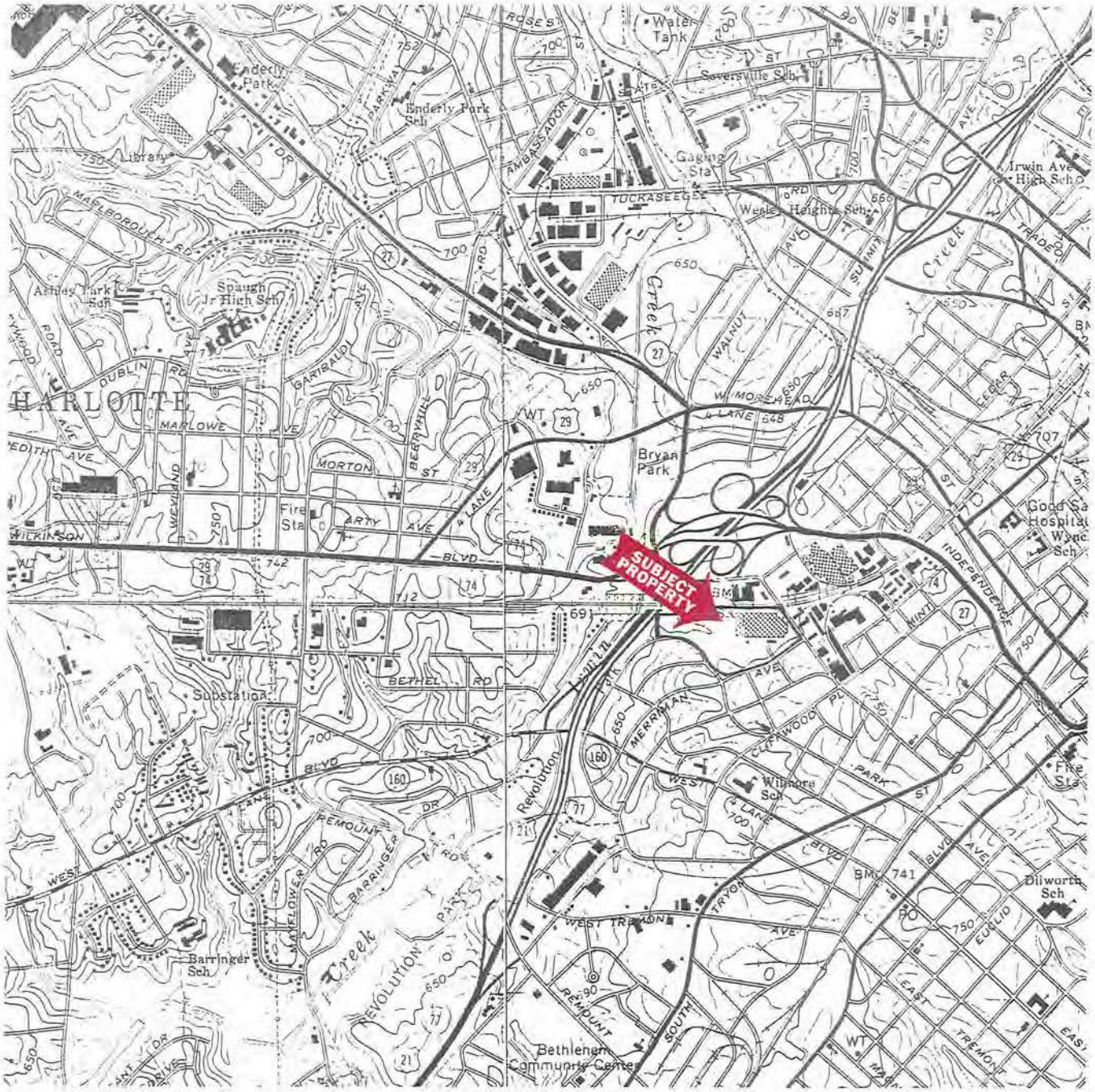

APPROXIMATE NORTH

APPROXIMATE SCALE 1 INCH = 2,000 FEET

Map Source: U.S. GEOLOGICAL SURVEY

FIGURE 1. SITE LOCATION MAP

SUBJECT PROPERTY
CHARLOTTE, NORTH CAROLINA

Project No. 2001.01.07.10

The Kelly-Buck Company
2130 Superior Avenue #3-A
Cleveland, Ohio 44114
(216) 861-1716

KELLY-BUCK

This plat is not subject to the provisions of the City of Charlotte Subdivision Ordinance and does not require the approval of the Charlotte-Mecklenburg Planning Commission. Further subdivision of this property may be subject to these provisions.

Planning Commission Staff   Date

I, ______________ Review Officer of City of Charlotte, certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

Review Officer   Date

THIS SURVEY IS CERTIFIED TO ONLY ELECTROLUX HOME PRODUCTS, INC.:

STATE OF NORTH CAROLINA, Mecklenburg County

This is to certify that this map or plat and the survey on which it is based were made in accordance with "Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys," jointly established and adopted by ALTA, ACSM and NSPS in 1999, and includes items 1-4, 6, 7a, 8-10, and 11a of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA, NSPS, and ACSM and in effect on the date of this certification, undersigned further certifies that proper field procedures, instrumentation, and adequate survey personnel were employed in order to achieve results comparable to those outlined in the "Minimum Angle, Distance, and Closure Requirements for Survey Measurements Which Control Land Boundaries for ALTA/ACSM Land Title Surveys.

I, Andrew G. Zoutewelle, do hereby certify that this map was drawn from an actual field survey performed under my supervision; that the precision is 1:15,000; that the angular precision is less than 7.5 seconds per angle; that this map meets GS-47 recording requirements.

10/14/04

Andrew G. Zoutewelle L-3098

NORTH CAROLINA PROFESSIONAL SEAL L-3098 LAND SURVEYOR ANDREW G. ZOUTEWELLE

Node ID	Description	Northing	Easting	Elevation
5	MW B12-01	5028.10	4592.13	691.23
8	MW B2-04	5016.63	4897.90	687.44
23	MW BG-B2D	4997.66	4986.54	688.49
24	MW BG-B2I	4990.32	4983.50	688.34
37	B12-01	5030.94	4597.48	691.14
39	MW B15-01	4887.50	4671.02	691.06
42	MW B3-02S	5035.55	4722.19	691.08
43	MW B13-01	5044.90	4414.29	691.36
44	B13-01	5045.39	4412.11	691.30
56	B6-01	4764.32	4673.45	691.17
57	B6-05	4764.67	4669.98	691.13
58	B6-08	4784.34	4676.15	691.19
59	B6-06	4774.31	4647.81	691.19
60	B6-07	4790.73	4648.90	691.16
61	B6-09	4783.18	4652.08	691.18
65	MW-1	4685.57	4536.15	689.24
69	B11-01	4801.08	4488.61	690.63
74	MW B4-06S	4753.81	4667.34	690.99
91	B16-02	4660.30	4404.04	685.38
95	MW B4-12S PAD	4676.08	4618.83	690.16
96	MW B4-12S CAP	4676.05	4618.94	693.38
108	MW BG-B4S PAD	5050.55	4193.40	685.35
113	MW BG-B4S CAP	5050.67	4193.13	688.30
109	MW BG-B4I PAD	5048.53	4182.29	684.99
112	MW BG-B4I CAP	5048.68	4181.90	687.92
110	MW BG-B4D PAD	5038.67	4170.72	685.38
111	MW BG-B4D CAP	5038.51	4170.51	688.35
121	MW BG-B3D PAD	4719.12	4252.81	687.11
127	MW BG-B3D CAP	4719.24	4252.47	689.18
122	MW BG-B3I PAD	4723.84	4236.26	686.59
126	MW BG-B3I CAP	4723.82	4235.94	689.69
123	MW BG-B3S PAD	4726.39	4227.30	686.45
125	MW BG-B3S CAP	4726.39	4227.02	689.34
136	MW B5D PAD	4909.51	3558.57	645.10
141	MW B5D CAP	4909.91	3558.72	646.87
137	MW B5I PAD	4895.95	3553.77	645.33
140	MW B5I CAP	4896.31	3553.76	648.23
138	MW B5S PAD	4887.17	3553.64	645.42
139	MW B5S CAP	4887.39	3553.77	647.99
150	SWSE 05	4949.09	3588.93	640.99
173	SWSE 08	5100.97	3896.46	661.63
182	B10-06	5099.48	4186.65	671.60
193	B1-02	5062.77	4652.84	687.55
194	MW B1-02S PAD	5062.90	4649.41	687.69
195	MW B1-02S CAP	5062.97	4649.13	690.52
203	SWSE 04	4885.22	3852.10	649.41
223	SWSE 03	4673.31	4154.04	669.37
229	B10-05	4631.56	4368.89	674.49
234	SWSE 02	4578.50	4409.64	677.76
245	MW B4-02D	4738.51	4822.24	690.60
246	MW B4-02I	4737.77	4836.93	690.57
247	MW B4-02S	4748.07	4829.48	691.11
255	SWSE 01	4580.11	4720.94	693.29
266	MW BG-B1I	4679.23	5141.80	704.10
267	MW BG-B1D	4685.67	5151.59	703.96
268	MW BG-B1S	4696.58	5169.45	703.85
292	SWSE 06	5128.79	4902.79	686.98
293	SWSE 07	5122.86	4563.97	682.68
294	BORING	4756.65	4829.88	691.27
295	B4-06	4793.82	4837.67	691.36
296	B4-10	4770.38	4897.05	691.25
297	B4-11	4933.35	4853.49	691.26
313	B16-01	4667.80	4557.76	690.00
315	B4-09	4839.02	4876.18	691.24
316	B4-08	4895.35	4840.15	691.19
317	B4-07	4843.47	4832.31	691.21
320	B15-05	4911.81	4983.31	691.17
324	B15-04	4834.48	4975.41	691.10
326	B14-01	4876.90	3924.49	668.49
328	B15-03	4878.91	4919.77	691.20

GENERAL NOTES:

1. Source of title is recorded in Deed Book 13251 Page 604 and Deed Book 14172 Page 689. See plats recorded in Map Book 230 Page 297 and Map Book 332 Page 286. No record of abandonment of 10-foot alleyways and 45-foot Walnut Street (now Larch Street) was found; however, portions of these alleyways and Walnut Street have been removed from Mecklenburg County tax maps and GIS. Also see abandonment language in Deed Book 1161 Page 115.
2. This survey does not reflect a complete title examination, which may reveal additional easements and restrictions. An attorney should verify the title to this property prior to design or construction.
3. Utility locations shown hereon are based on markings provided by the North Carolina One-Call Utility Locating Service at the time of the fieldwork for this survey. Contractors should contact the North Carolina One-Call Utility Locating Center at 1-800-632-4949 before any digging or excavation is begun.
4. This property is zoned R-8 (single family residential), I-1 (light industrial) and I-2 (heavy industrial) per Mecklenburg County GIS. This survey does not reflect a zoning analysis.
5. Total area of this property is 826,300 s.f. or 18.9692 acres (including existing Alleyway, of a portion of Walnut Street areas, and Railroad R/W area), as computed by coordinates.
6. See Gas Easement recorded in Deed Book 8320 page 104. Also see easements as follows:
7. This survey is of an existing parcel of land within the City of Charlotte which has a subdivision ordinance.

The following matters are reflected on title insurance policy issued by Lawyers Title of North Carolina, Inc., Policy No. 136-00-328501-0 dated March 15, 1995:

2. Easement(s) to Southern Bell Telephone and Telegraph Company recorded in Book 777 Page 553, Mecklenburg County Registry. Not shown because of insufficient description. See also Southern Bell utilities depicted on Map Book 3 Page 581.
3. Easement(s) to Southern Bell Telephone and Telegraph Company recorded in Book 790 Page 307, Mecklenburg County Registry. Located within alleys which are shown hereon.
4. Easement(s) to Southern Bell Telephone and Telegraph Company recorded in Book 1091 Page 429, Mecklenburg County Registry. Not shown because of insufficient description; easement is for 1 pole anchor.
5. Easement(s) to Duke Power Company recorded in Book 1197 Page 219, Mecklenburg County Registry. Shown hereon.
7. Deed recorded in Book 1161 Page 115, Mecklenburg County Registry, dedicates a strip of land at the westerly margin of the subject property to public use. Shown hereon.

FLOOD NOTES:
* The subject property is not located within a Special Flood Hazard Area as per FIRM Panel No. 370159 0186E dated February 4, 2004.

TOPO NOTE:
* The contour lines shown hereon were taken from City of Charlotte topographic map which is based upon aerial photography and should be considered approximate NAVD 1988 datum.

LEGAL DESCRIPTION

BEING all that certain tract or parcel of land located within the City of Charlotte, Mecklenburg County, N.C. and being more particularly described as follows:

BEGINNING at a new pk nail located at the intersection of the southwesterly margin of West Summit Avenue, said right of way having a width of 60 feet as recorded in Map Book 230 Page 297 of the Mecklenburg County Registry, and the northwesterly right of way margin of Merriman Avenue, said right of way having a width of 50 feet as recorded in Map Book 332 Page 286 of the Mecklenburg County Registry, and running thence from said point and place of BEGINNING along the northwesterly margin of the said Merriman Avenue South 56-30-25 West 195.17 feet to an existing iron pipe; thence South 33-31-09 East 4.31 feet to a new iron pipe located on the northwesterly right of way margin of the said Merriman Avenue as it narrows in width to 40 feet as recorded in Map Book 230 Page 297; thence continuing with the northwesterly margin of the said Merriman Avenue South 56-30-25 West 109.78 feet to an existing iron pipe; thence following the northeasterly boundary of Lot 23 of Wilmore Section #2 as recorded in the said Map Book 230 Page 297 of the Mecklenburg County Registry North 33-31-09 West 154.94 feet to a new iron pipe located in the northwesterly margin of a 10-foot alley as shown on the said Map Book 230 Page 297 of the Mecklenburg County Registry; thence following the northwesterly margin of the said 10-foot alley the following six (6) calls: (1) South 56-30-00 West 100.00 feet to a new iron pipe, (2) South 64-01-12 West 45.38 feet to an existing iron pin, (3) following the arc of a circular curve to the right having a radius of 643.00 feet and an arc length of 230.39 feet (chord bearing South 70-53-33 West 229.16 feet) to a point, (4) South 81-08-00 West 52.05 feet to a point, (5) following the arc of a circular curve to the left having a radius of 1,042.87 feet and an arc length of 374.65 feet (chord bearing South 70-50-30 West 372.64 feet) to a point and (6) South 60-33-00 West 52.63 feet to an existing iron pin; thence following the northwesterly right of way margin of Spruce Street, said right of way having a width of 40 feet as recorded in the said Map Book 230 Page 297, the following two (2) calls: (1) following the arc of a circular curve to the left having a radius of 430.00 feet and an arc length of 33.95 feet (chord bearing North 49-37-34 West 33.94 feet) to an existing iron pin and (2) following the arc of a circular curve to the right having a radius of 305.00 feet and an arc length of 189.18 feet (chord bearing North 34-43-38 West 186.16 feet) to a new iron

(continued above)

(Legal Description continued)

pipe; thence North 74-27-41 East 10.00 feet to a new iron pipe; thence following the northeasterly right of way margin of the said Spruce Street as it has been widened to 50 feet in width as recorded in Map Book 7 Page 291 of the Mecklenburg County Registry the following two (2) calls: (1) following the arc of a circular curve to the left having a radius of 377.78 feet and an arc length of 289.23 feet (chord bearing North 37-28-18 West 282.22 feet) to a point and (2) following the arc of a circular curve to the left having a radius of 495.00 feet and an arc length of 237.73 feet (chord bearing North 73-48-21 West 235.45 feet) to a new iron pipe; thence along the easterly boundary of the Mecklenburg County property as recorded in Deed Book 9276 Page 437 of the Mecklenburg County Registry and along the westerly boundary of a Public Street Right of Way as recorded in Deed Book 1161 Page 115 of the Mecklenburg County Registry North 00-45-29 West 126.87 feet to an existing iron pin; thence along the southerly and easterly boundaries of Piedmont Natural Gas Company as recorded in Deed Book 8095 Page 329 the following four (4) calls: (1) North 89-23-22 East 73.12 feet to an existing iron pin, (2) following the arc of a circular curve to the left having a radius of 573.69 feet and an arc length of 243.04 feet (chord bearing South 89-25-58 East 241.23 feet) to a new iron pipe, (3) following the arc of a circular curve to the right having a radius of 151.66 feet and an arc length of 26.53 feet (chord bearing North 83-42-08 East 26.50 feet to a new iron pipe and (4) North 02-34-17 East (passing existing iron pins at 14.29 feet and an additional 125.01 feet) a total distance of 238.90 feet to an existing iron pin located in the centerline of the Norfolk-Southern Railway Southbound track; thence following the centerline of the said Norfolk-Southern Railway Southbound track the following two (2) calls: (1) South 87-31-48 East 628.44 feet and (2) following the arc of a circular curve to the left having a radius of 3,288.38 feet and an arc length of 365.43 feet (chord bearing North 89-37-59 East 365.24 feet) to a new iron pipe set at the intersection of the centerline of the said Norfolk-Southern Railway and the southwesterly right of way margin of the aforesaid West Summit Avenue; thence along the southwesterly right of way margin of the said West Summit Avenue South 33-30-00 East 552.13 feet to the point and place of BEGINNING, containing 18.9692 acres as shown on a survey prepared by Andrew G. Zoutewelle dated March 25, 2004.

LEGEND

- ch. chord
- L,R curve length & radius
- s.f. square feet (by coordinates)
- I.PIN/I.PIPE iron survey stake
- conc. concrete
- c/c air conditioner
- MB, DB record map and deed references
- SSMH Sanitary Sewer Manhole
- MH Manhole
- PM Power meter
- NIP New Iron Pin/Pipe set
- Light Pole
- Power Pole
- Ground light
- Catch basin
- Gas valve
- Water valve
- Water meter
- Fire Hydrant
- —W— Underground water line
- —GAS— Underground gas line
- —T— Underground Telephone line
- monitoring well (see detail)
- soil boring location
- spot elevation
- surface water/sediment sample

A.G. ZOUTEWELLE SURVEYORS
1418 East Fifth St. Charlotte, NC 28204
Phone: 704-372-9444 Fax: 704-372-9555

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PHYSICAL SURVEY OF 601 WEST SUMMIT AVENUE

CHARLOTTE, MECKLENBURG COUNTY, N.C.
for ELECTROLUX HOME PRODUCTS, Inc.
Survey Date: March 25, 2004

Revised: July 21, 2004 (additional scope: spots, borings, etc.)
Revised: August 25, 2004 (additional boring, drain info.)
Revised: September 7, 2004 (additional mon. well/utility info)
Revised: October 8, 2004 (overlay city topo information)

60 0 60 120 180
Scale: 1" = 60'

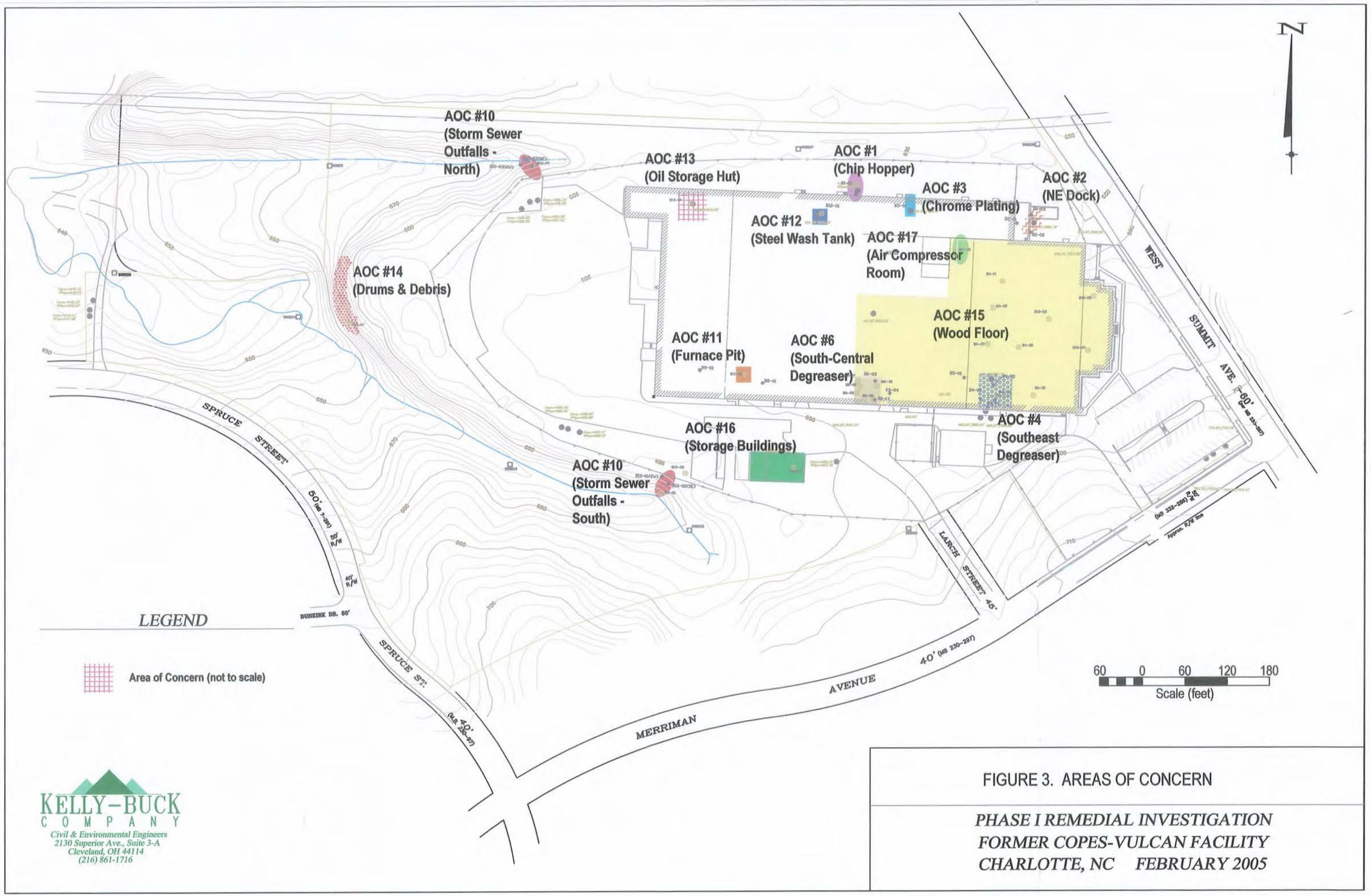

FIGURE 3. AREAS OF CONCERN

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CHARLOTTE, NC FEBRUARY 2005

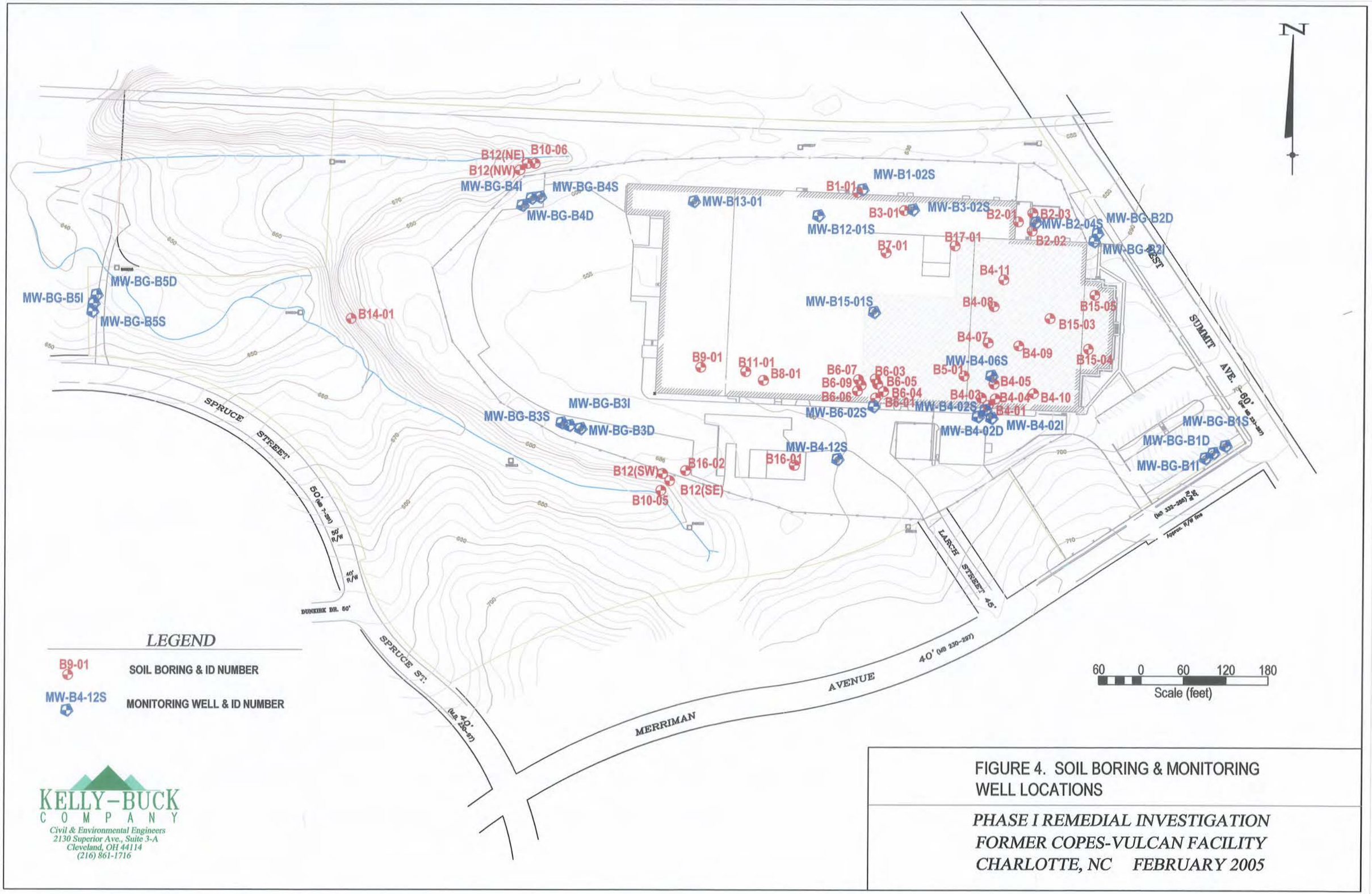

FIGURE 4. SOIL BORING & MONITORING WELL LOCATIONS

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FORMER COPES-VULCAN FACILITY
CHARLOTTE, NC FEBRUARY 2005

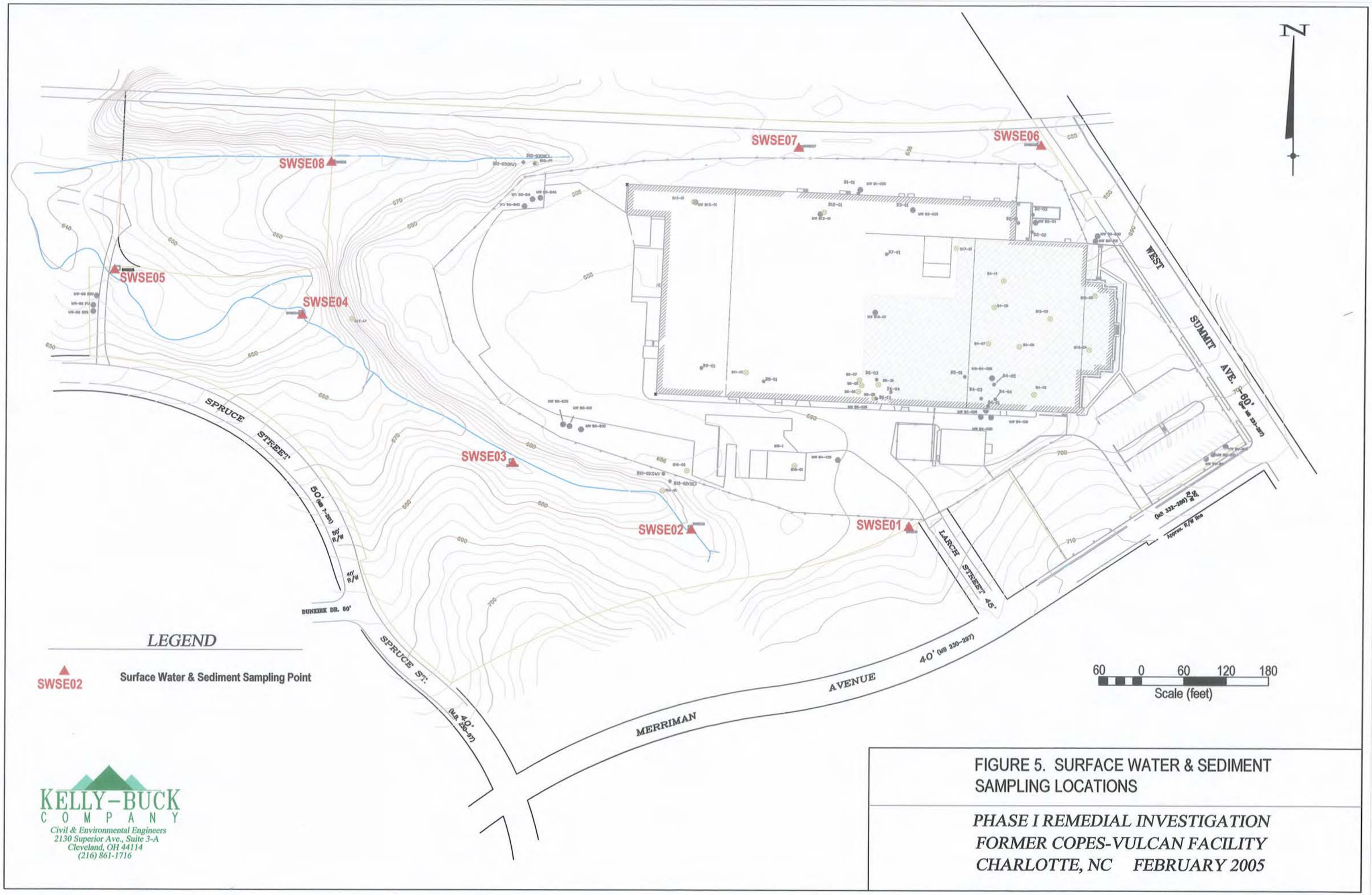

FIGURE 5. SURFACE WATER & SEDIMENT SAMPLING LOCATIONS

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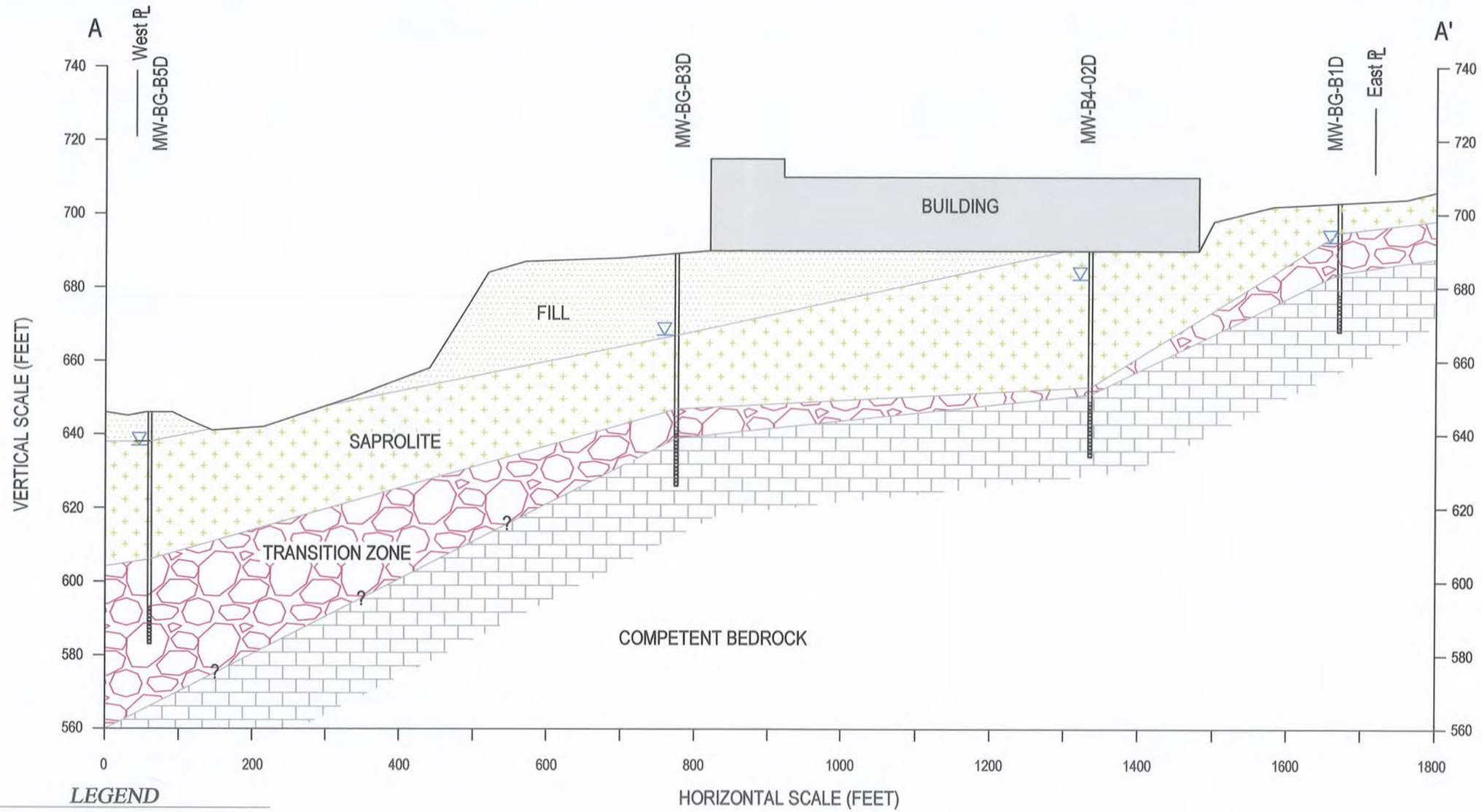
CHARLOTTE, NC FEBRUARY 2005



LEGEND

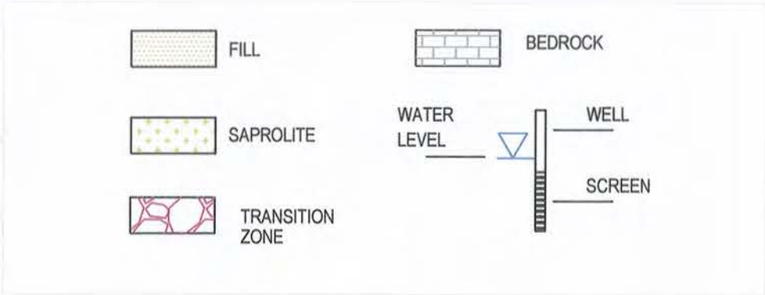


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FIGURE 6. HYDROGEOLOGIC CROSS-SECTION

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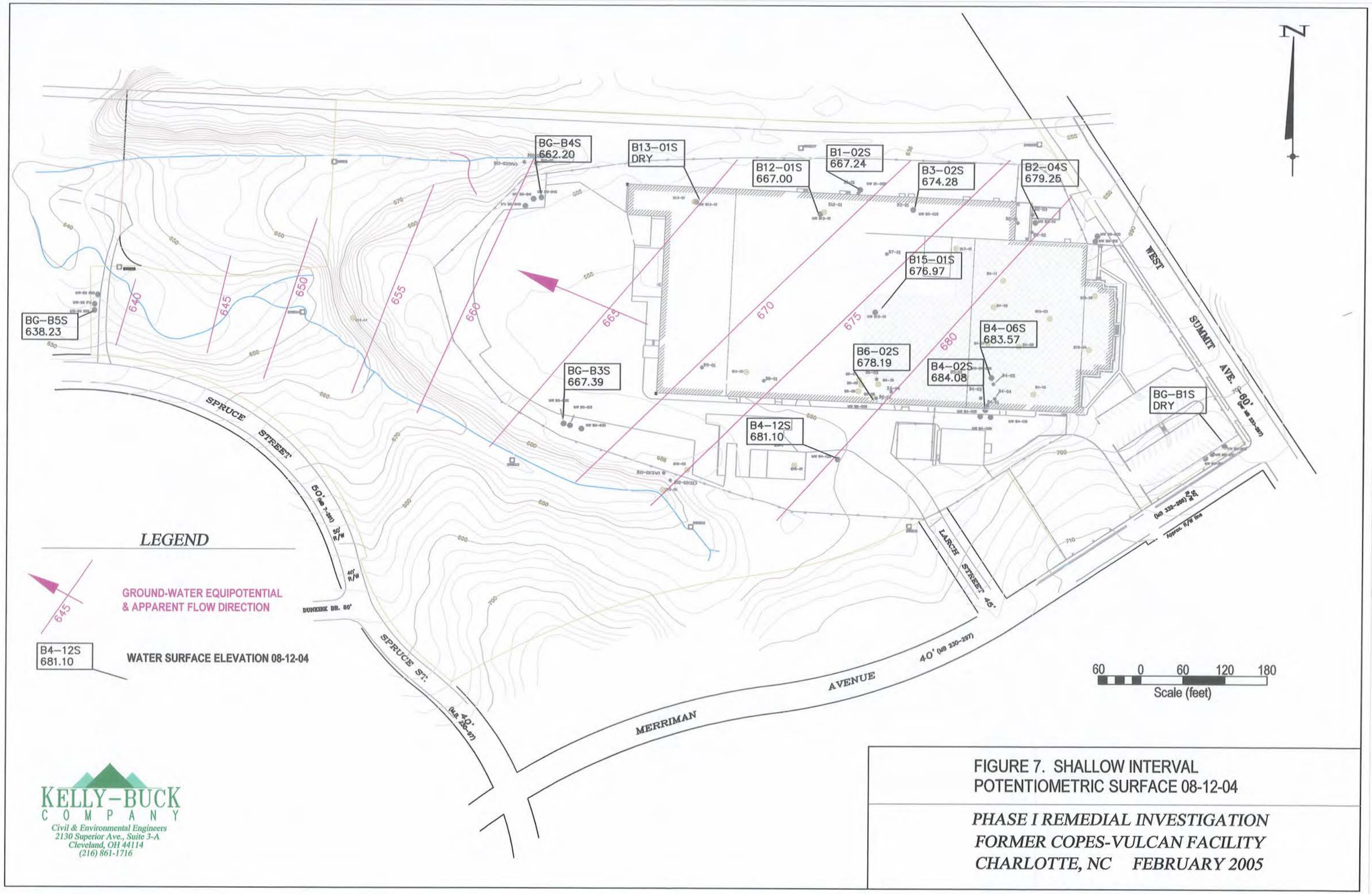

FIGURE 7. SHALLOW INTERVAL POTENTIOMETRIC SURFACE 08-12-04

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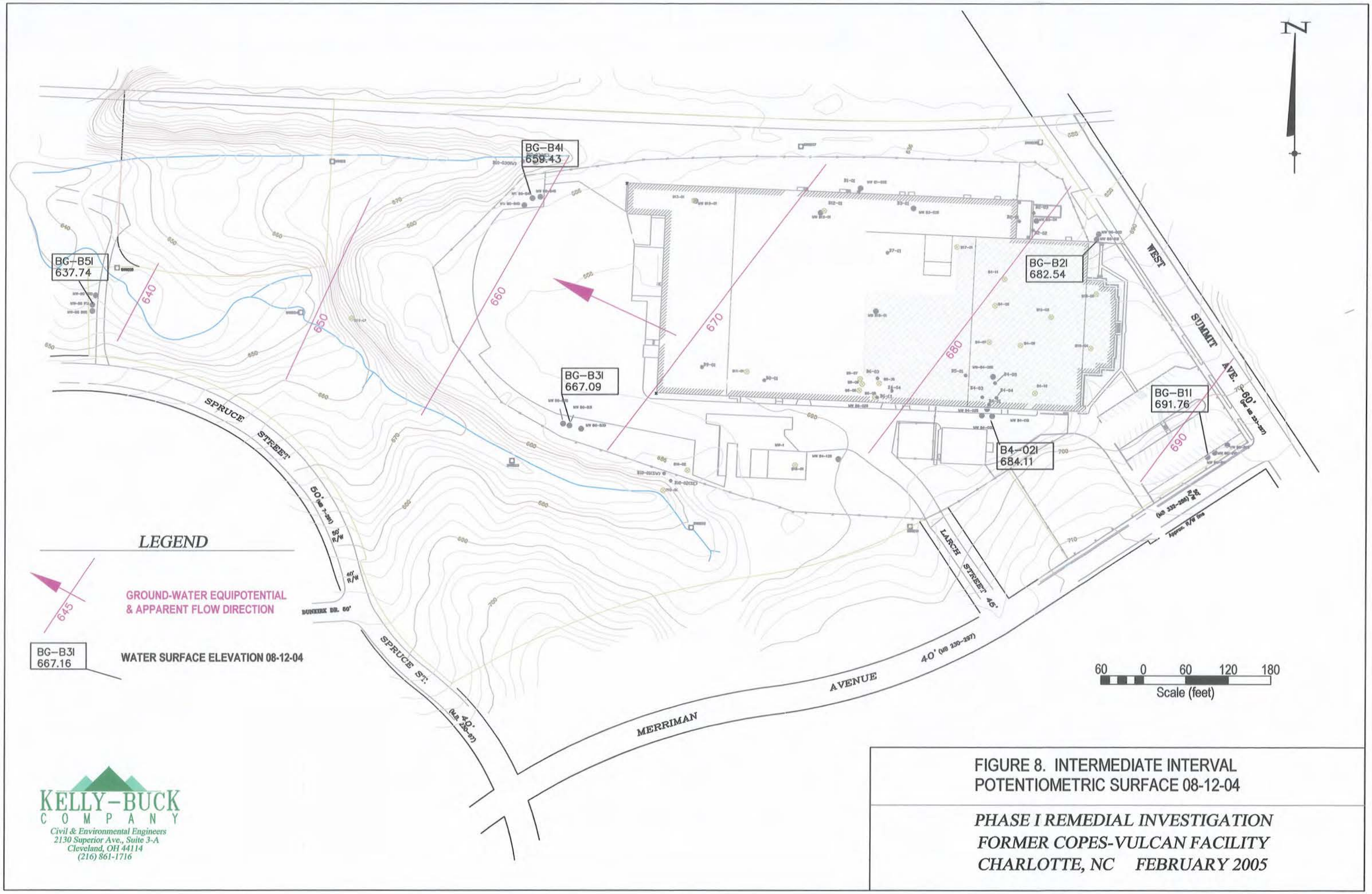

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FIGURE 8. INTERMEDIATE INTERVAL POTENTIOMETRIC SURFACE 08-12-04

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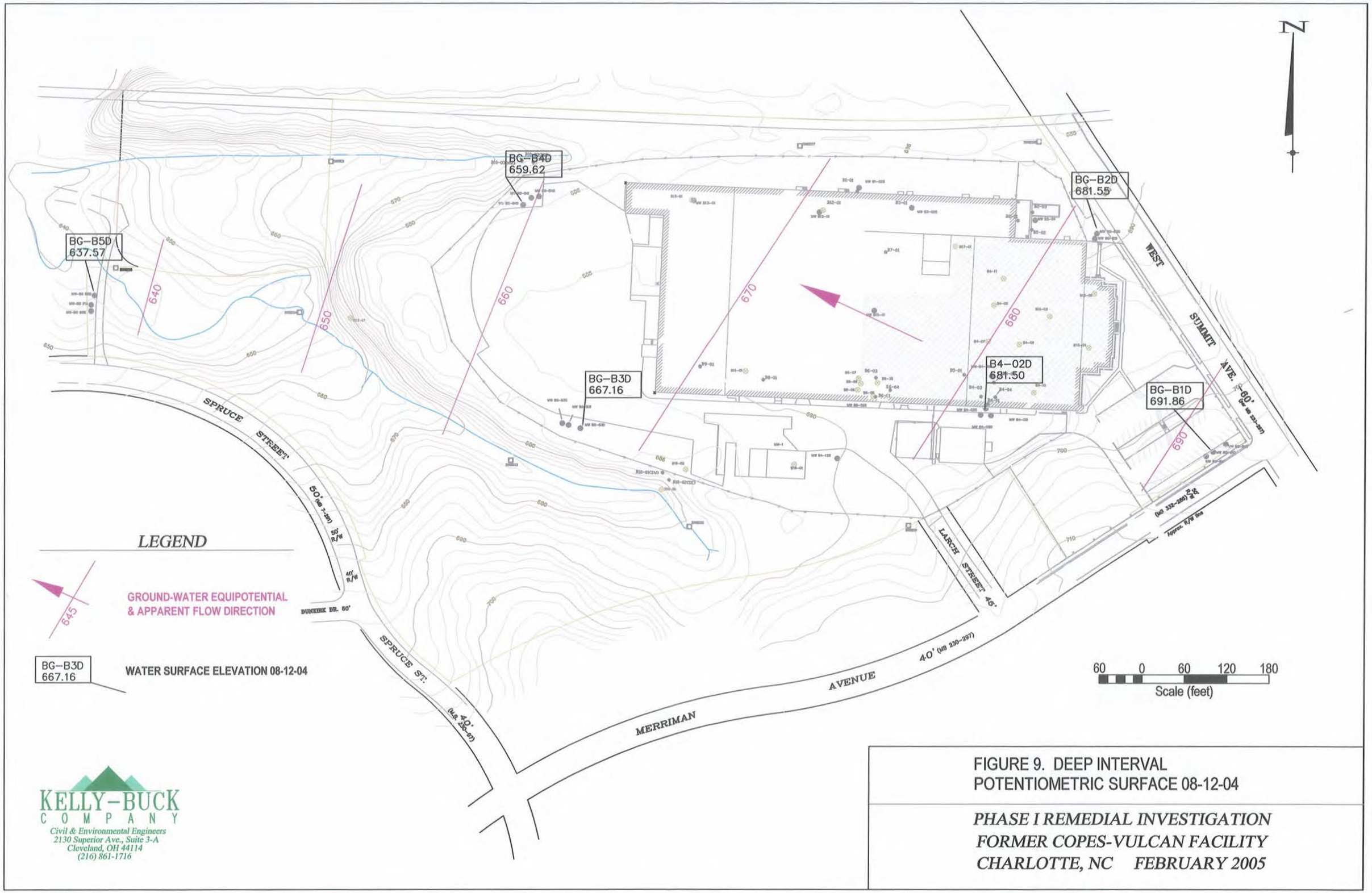

FIGURE 9. DEEP INTERVAL
POTENTIOMETRIC SURFACE 08-12-04

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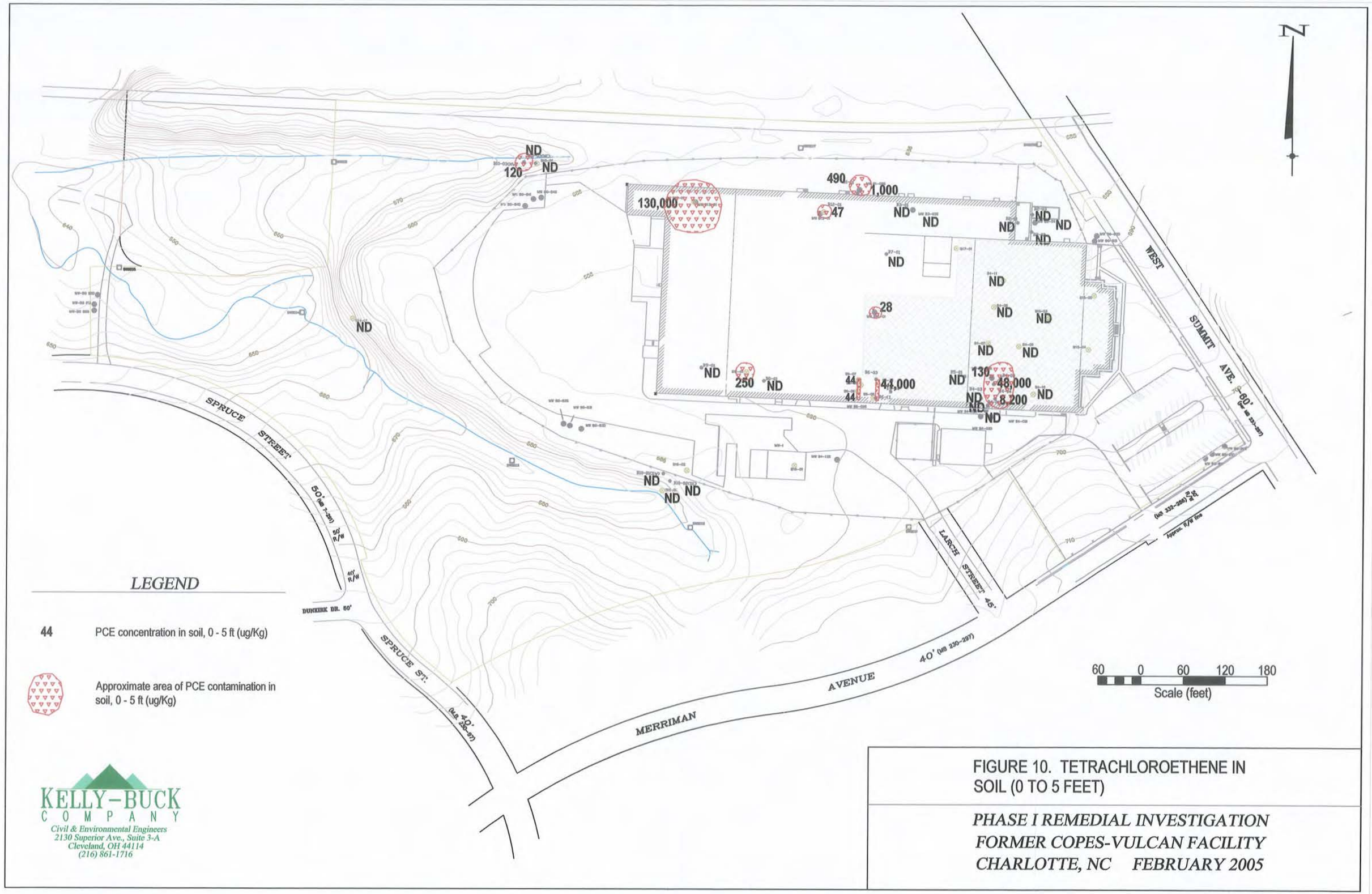

FIGURE 10. TETRACHLOROETHENE IN SOIL (0 TO 5 FEET)

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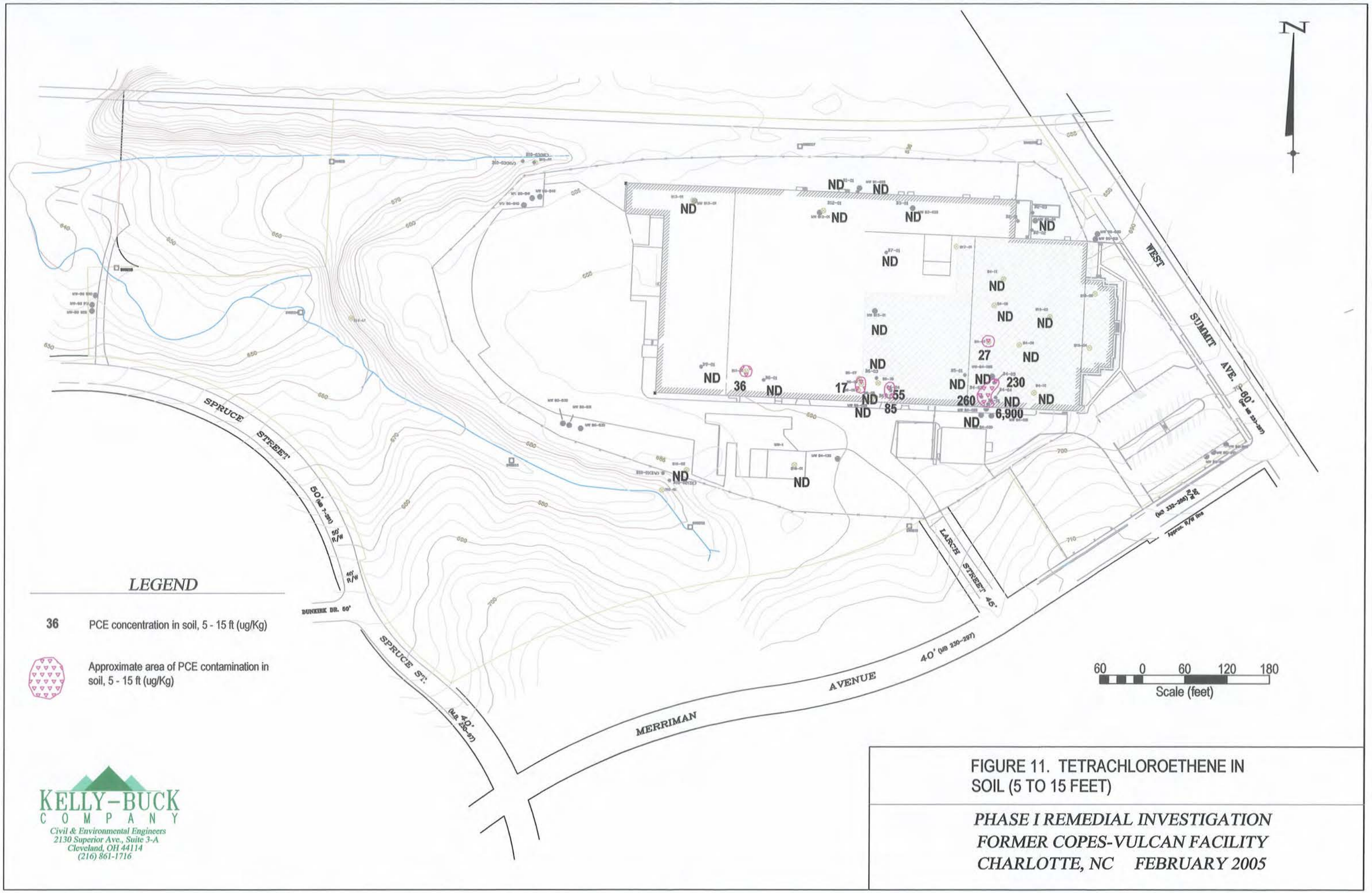

FIGURE 11. TETRACHLOROETHENE IN SOIL (5 TO 15 FEET)

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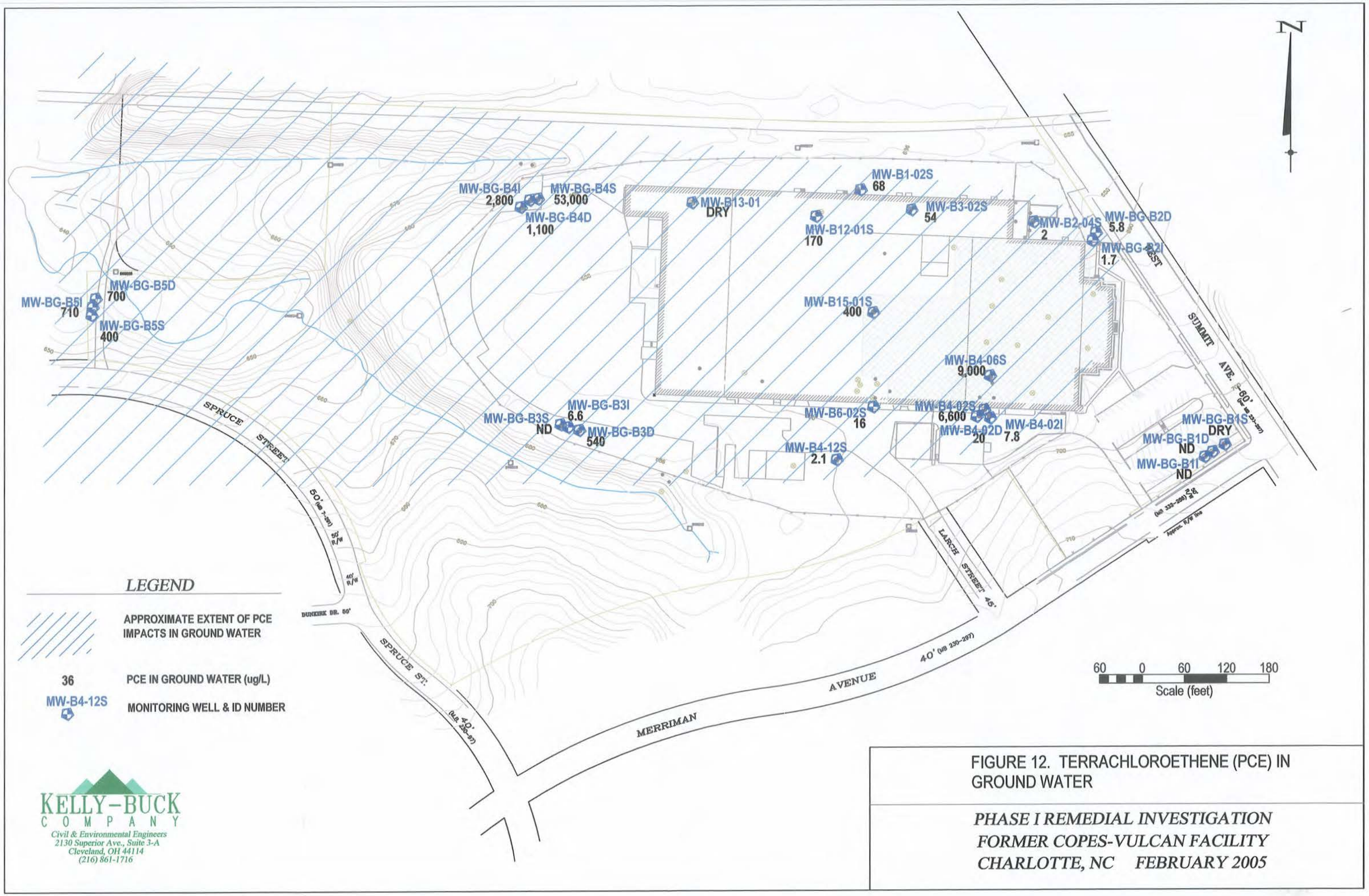

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FIGURE 12. TERRACHLOROETHENE (PCE) IN GROUND WATER

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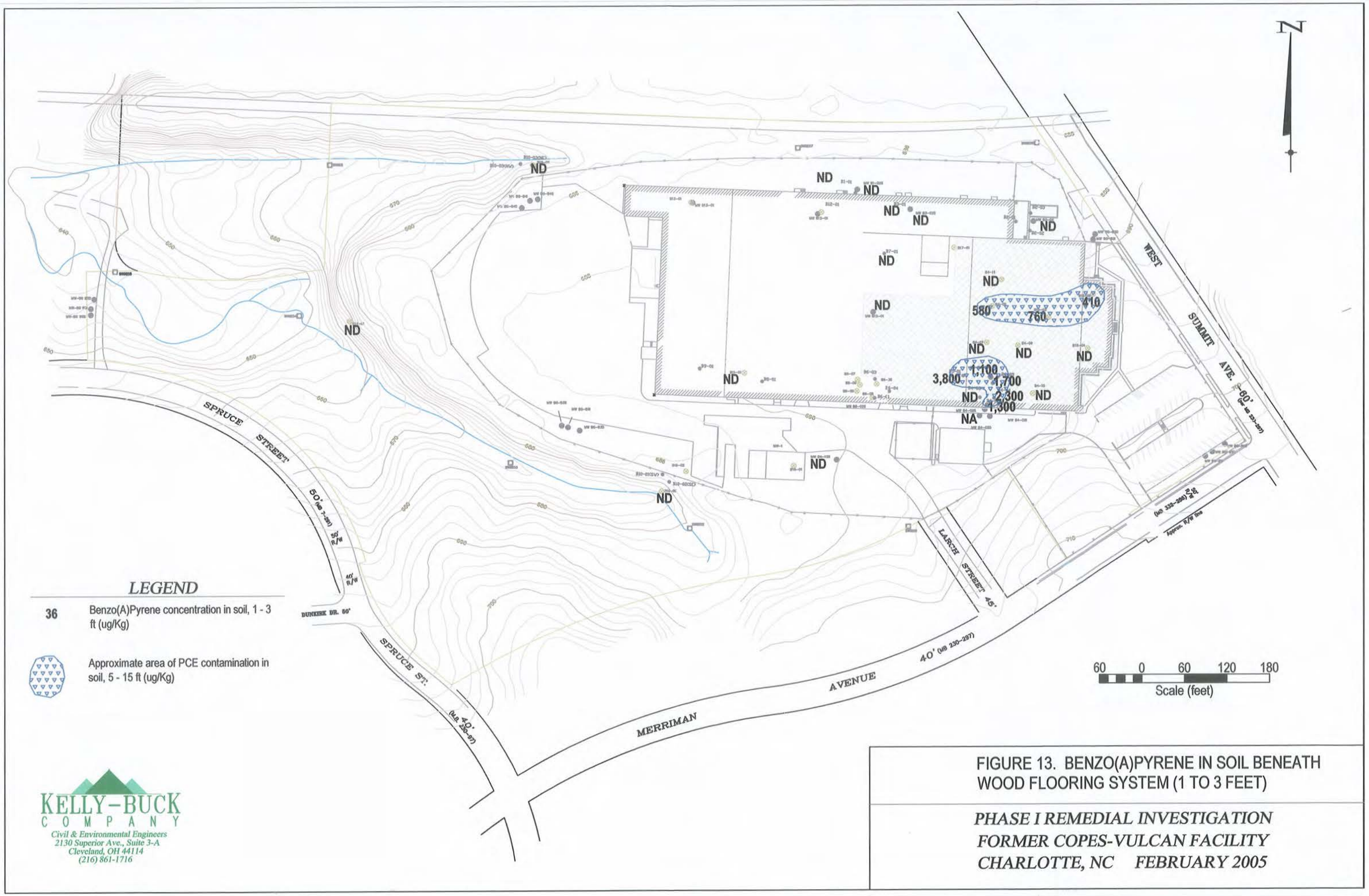

FIGURE 13. BENZO(A)PYRENE IN SOIL BENEATH WOOD FLOORING SYSTEM (1 TO 3 FEET)

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FORMER COPES-VULCAN FACILITY
CHARLOTTE, NC FEBRUARY 2005

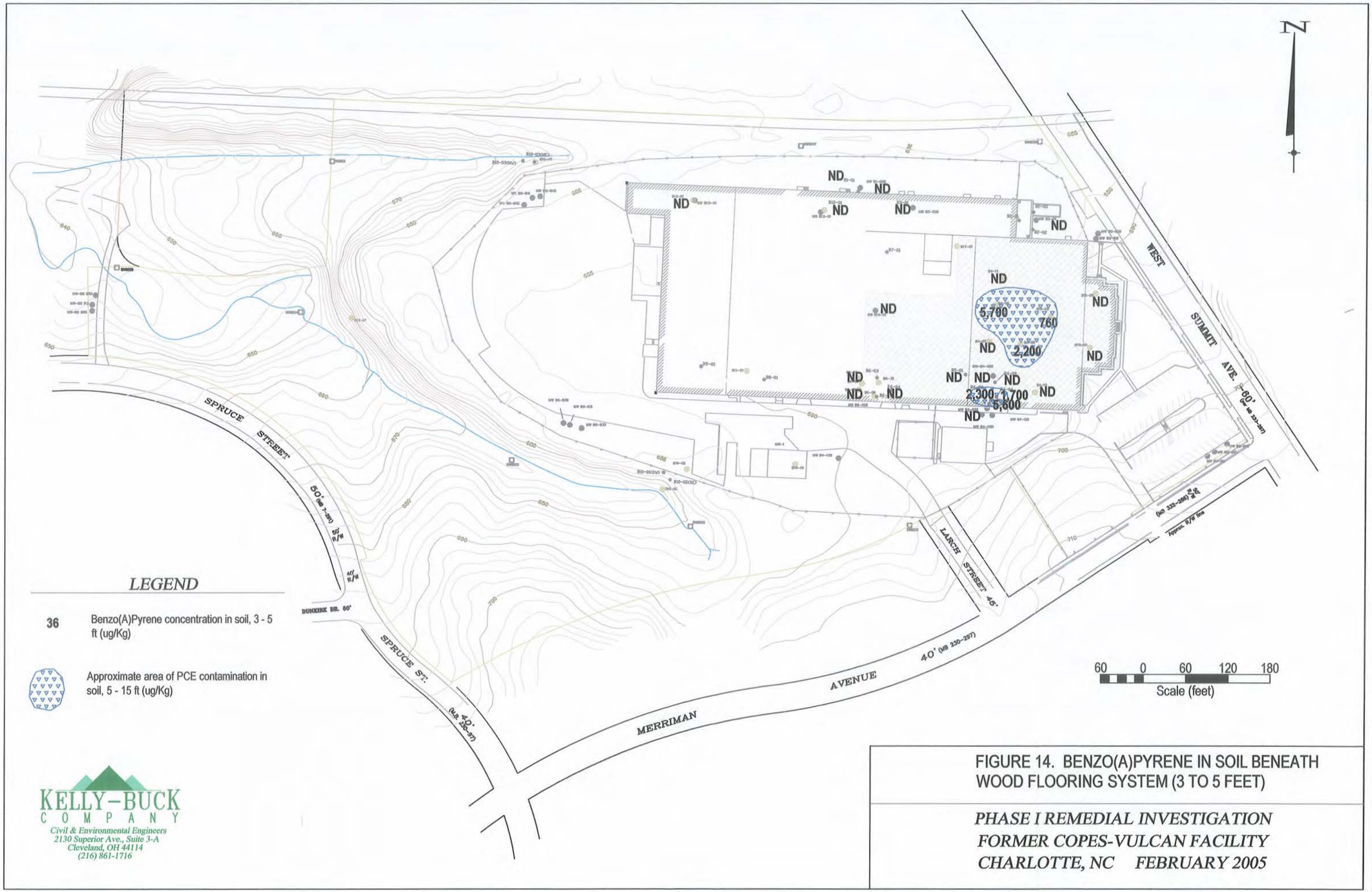

FIGURE 14. BENZO(A)PYRENE IN SOIL BENEATH WOOD FLOORING SYSTEM (3 TO 5 FEET)

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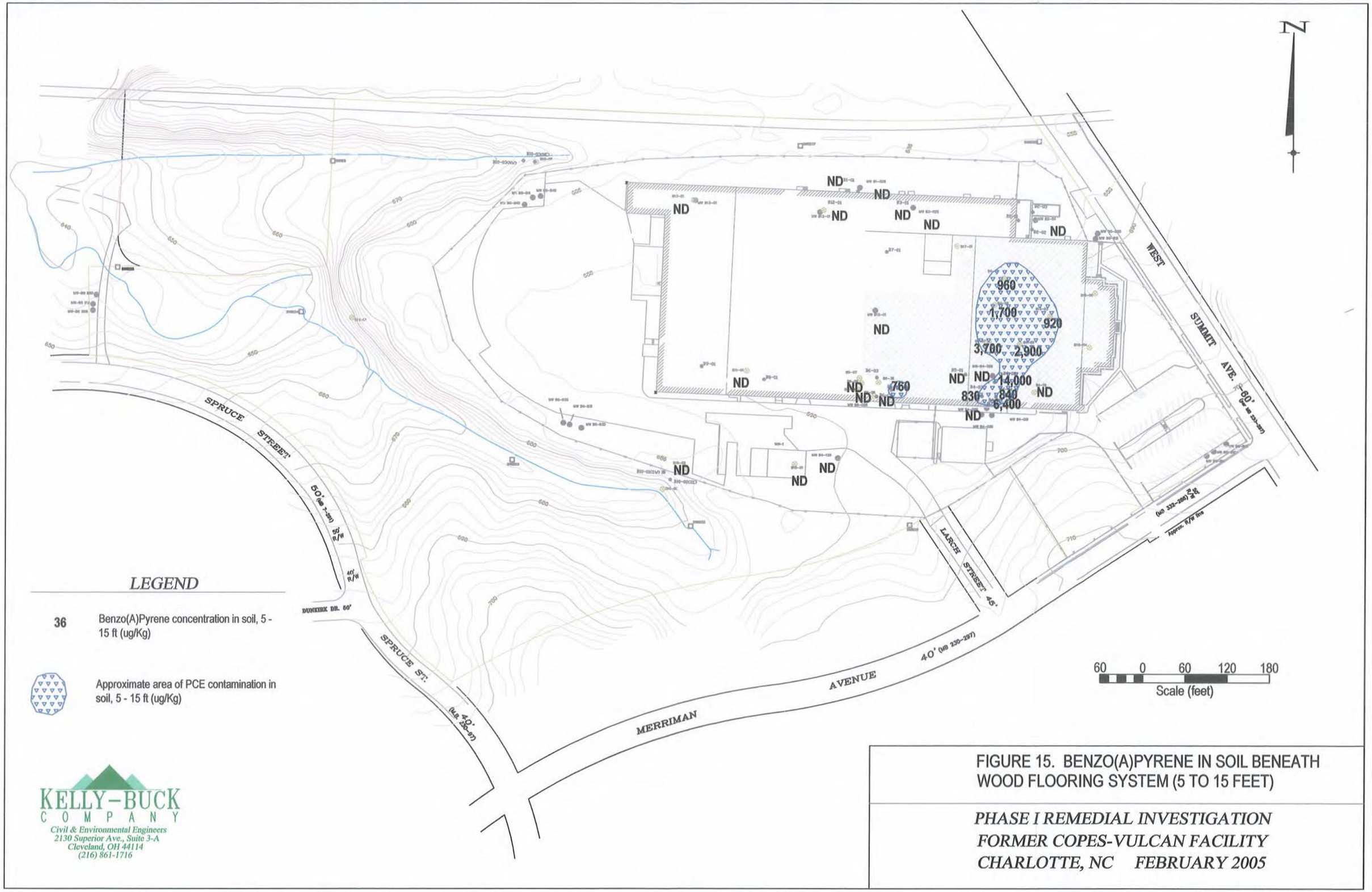

FIGURE 15. BENZO(A)PYRENE IN SOIL BENEATH WOOD FLOORING SYSTEM (5 TO 15 FEET)

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