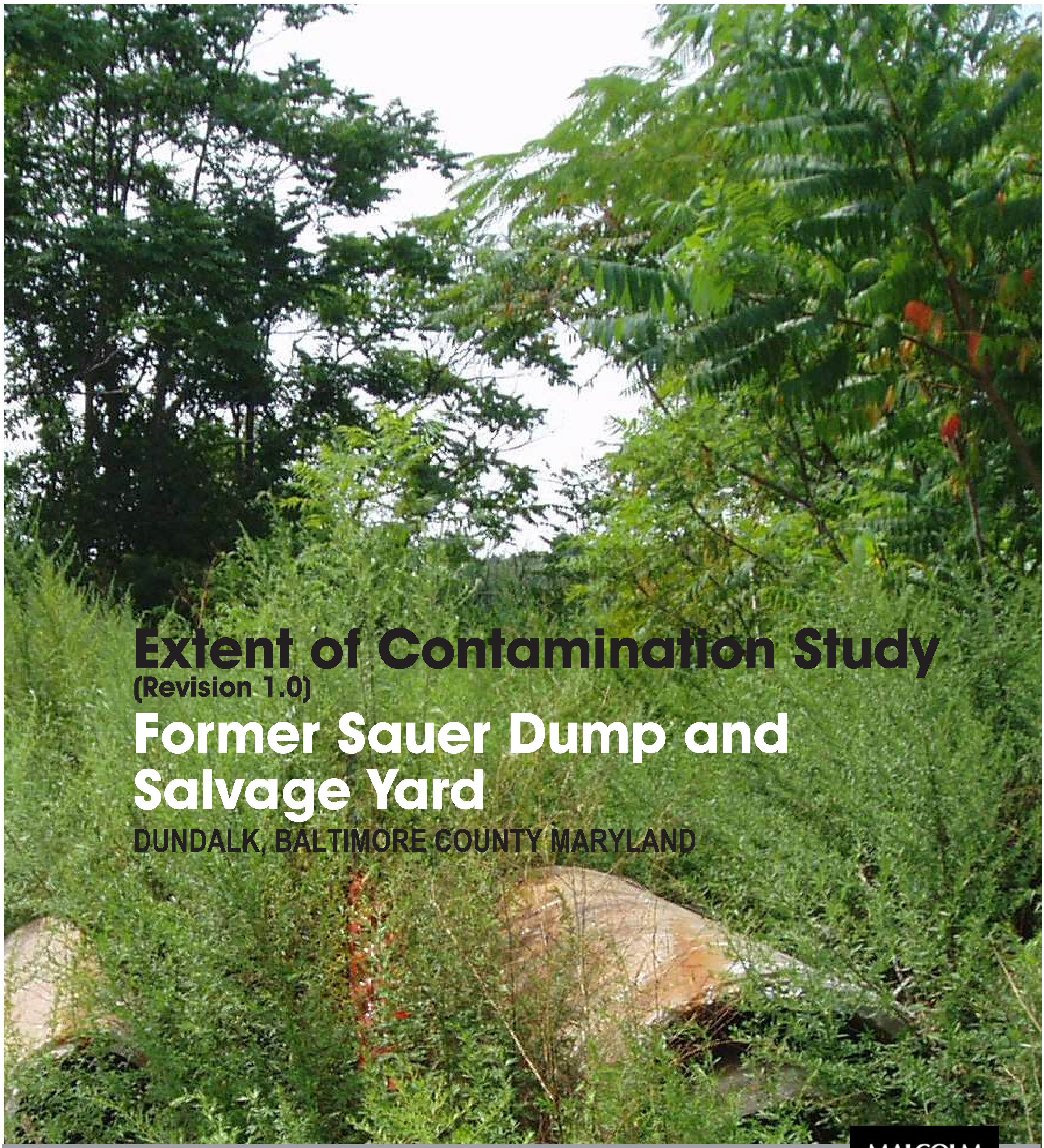

Extent of Contamination Study

(Revision 1.0)

Former Sauer Dump and Salvage Yard

DUNDALK, BALTIMORE COUNTY MARYLAND

JUNE 26, 2007
4320029-610

INDEPENDENT ENVIRONMENTAL ENGINEERS SCIENTISTS AND CONSULTANTS

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FORMER SAUER DUMP and SALVAGE YARD EXTENT OF CONTAMINATION STUDY (Revision 1.0)

DUNDALK, BALTIMORE COUNTY MARYLAND

June 26, 2007

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The Sauer Dump Site Coalition

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1.0 Introduction

This Extent of Contamination Study (EOCS) Report is prepared in response to the U.S. Environmental Protection Agency's (EPA's) Administrative Order for Removal Response Action (EPA Docket No. CERC-03-2006-0239DC) (EPA, 2006A) for the Former Sauer Dump and Salvage Yard (the Site) in Dundalk, Maryland. The Response Action Plan (RAP) (Malcolm Pirnie, 2006) provides the sampling rationale, methodology, parameters, and schedule for the EOCS sampling activities. The EOCS report addresses data gaps identified in the RAP as well as additional data requests from EPA..

The initial EOCS Report was submitted to EPA on April 26, 2007. EPA provided comments on the initial submittal in letter form on June 12, 2007 to the Coalition. This version of the EOCS Report, Version 1.0, revises the initial document based on the Coalition's responses to EPA comments.

This document includes:

- A description of the Sauer Dump Site and previous Site investigations;
- An overview of the goals of the EOCS as outlined in the RAP;
- A summary of the data collection methods, results, and data quality;
- Site data including:
  - Soil boring logs (Appendix A);
  - Laboratory data validation (Appendix B);
  - Laboratory data reports (Appendix C);
  - Monitoring well construction logs (Appendix D); and
- An interpretation of the data results.

An additional section (Section 5.0) has been added to this report which addresses concerns expressed by EPA in their letter dated April 24, 2007, and presents a recommended path forward for Site remediation. This section includes:

- A discussion of the groundwater and sediment/surface water transport of Contaminants of Concern (COCs), adding to the existing Site Conceptual Model presented in the RAP (Malcolm Pirie, 2006);
- A discussion of the relevance of the cleanup goals proposed by EPA in their Action Memorandum (EPA, 2005);
- A presentation of alternative cleanup goals based on appropriate regulations, authority, and precedents;

- A proposed remedial strategy for the Site that is comprehensive for both removal and remedial objective goals; and
- A proposal for a meeting between EPA and the Sauer Dump Site Coalition (Coalition) to discuss the proposed remedial strategy before the next Order is issued.

1.1 Site Description

The Site is located adjacent to and behind 4225 Lynhurst Road, Dundalk, Baltimore County, Maryland. Residential properties border the Site to the northwest, east, and southwest. The Back River, a tributary of the Chesapeake Bay, borders the Site to the south (Figure 1). The majority of the Site lies within Parcel 425 with some overlap onto Parcels 464, 503, 295, 574, and 137 (Figure 2).

A tidal wetland area is present along the southern border of the Site, adjacent to the Back River. Non-tidal dominated wetlands are present on adjacent properties along the northwestern, southwestern, and southeastern borders. For the purposes of the EOCS, the wetland areas have been divided into the following areas: Pond Area, Southwest Finger, Back River Shoreline Area, and Southeast Finger (Figure 2). ENSAT's (2002) review of historic aerial photographic records suggest that the wetland areas begun to form as early as 1974 due to infilling of the Sauer Dump. Furthermore, ENSAT (2002) suggests that by 1982 the Pond Area, Southwest Finger, Southeast Finger, and Back River Shoreline Area were well established. These heavily vegetated features have persisted at the Site over the last 25 years. The vegetation observed within these areas consists predominantly of wetland reeds (fragmites) and the soils are described as hydric, rich in organic material. A wetland delineation conducted by ENSAT, 2002, defined the boundaries of the wetland areas. The Back River Shoreline Area, Southeast Finger, and Southwest Finger were described as one wetland, and the Pond Area was treated as a second. Based on the wetland delineation, the Pond Area is approximately 0.7 acres, the Southeast Finger is approximately 0.2 acres, the Southwest finger is approximately 0.5 acres, and the Back River Shoreline Area is approximately 0.2 acres.

From 1985 to 1999, the Maryland Department of the Environment (MDE) and the EPA conducted Site investigations that reported impacts to soil and sediment from polychlorinated biphenyls (PCBs), metals (lead), semivolatile organic compounds (SVOCs), and pesticides, primarily on Parcel 425. A summary of the previous Site investigations is provided in Section 1.2.

The Site is currently owned by the Wittstadt Hunting Club, Inc. which acquired the property on January 16, 1997. As of April 2007, the Site was observed to be heavily vegetated with tall grasses, reeds, trees, and scrub bushes. Accumulations of miscellaneous debris were observed across the Site. The majority of the Site is currently encompassed by a chain-link fence to limit access. There are locked gates along the northern and southern perimeters of the fence.

1.2 Previous Investigations

A summary of the previous environmental investigations at the Site is provided below. The summaries are based on a review of the Remedial Investigation Report (ENSAT, 2005), Remedial Investigation and Focused Feasibility Study (ENSAT, 2002), Baseline Risk Assessment Datascreen (ENSAT, 2002b), and the EPA Order (EPA, 2006a). A more complete review of the previous investigations is provided in the RAP (Malcolm Pirnie, 2006). The extensive laboratory data sets collected as part of these activities by the EPA and MDE have been compiled into an Access™ database. Spatial attributes of the data are maintained in a Site Geographical Information System (GIS). A summary of each sampling event is described below and includes a list of the media sampled, parameters analyzed, summary of reported results, general conclusions of the reporting agency, and other Site-specific information. The RAP (Malcolm Pirnie, 2006) provides the summarized results (in tabular and visual format) from the previous Site investigations, as well as a description of the Access and GIS databases that were generated to maintain the information.

Historic samples have been collected in the medias of groundwater, surface water, surface soil, subsurface soil, and sediment as part of past field activities. Figure 3 provides a summary of the historic sample locations. The samples have been analyzed for a variety of parameters including PCB compounds (aroclor and congener methods), inorganic metals (both total and dissolved analyses for aqueous media and total analyses for solid media), pesticide compounds, volatile organic compounds (VOCs), and SVOCs.

1.2.1 1985 – 1986: MDE and EPA Site Investigations

MDE conducted a preliminary assessment and EPA conducted a Site investigation at the Site in response to initial concerns identified by the Baltimore County Health Department (BCHD) in 1984. Soil, sediment, and surface water samples were obtained in 1985 for VOCs, SVOCs, total metals, pesticides, and PCBs. 1,659 analytical results are observed for this sampling event and are contained in the analytical database. MDE and EPA reported that impacts to soil, sediment, and surface water were detected above risk-based screening levels.

Salvage and dump operations were observed at the Sauer facility during the Site investigations. The Site was observed as being relatively flat with mounds of dumped domestic and construction debris, burned paint waste, and charred areas. Observed salvage items included scrap metal, empty tanks and drums, abandoned trucks, open roll-off bins, construction equipment, concrete conduit, wood chips, and abandoned automobiles. Oily sheen areas were observed on-Site and in adjacent wetland areas. Mr. Sauer was ordered by the BCHD to close the dump in 1984. By September of 1985 most of the material was removed as required by BCHD. With the exception of the perimeter slopes, the Site was graded and contained little remaining debris.

1.2.2 1990: MDE Site Investigation

MDE collected surface soil samples and sediment samples for analysis of VOCs, total metals, pesticides, and PCBs. 332 analytical results are observed for this sampling event and are contained in the analytical database. The surface soils and sediments were reported by MDE to be impacted by metals and PCBs above risk-based screening levels.

1.2.3 1991 – 1994: EPA Expanded Site Inspection

The EPA conducted an Expanded Site Inspection at the former Sauer Dump between 1991 and 1994. Soil, sediment, and surface water samples were collected in 1992 and analyzed for VOCs, SVOCs, total metals, pesticides, and PCBs. 5,262 analytical results are observed for this sampling event and are contained in the analytical database. EPA reported impacts to soil, sediment, and surface water above respective risk-based screening levels.

In February of 1991, EPA reported that a large portion of the Site had been covered with about 10 feet of fill consisting of soil and debris. Observed Site debris during the ESI included a tractor-truck trailer, concrete, bricks, rebar, tires, drums, furniture, a curing oven, broken asphalt, empty 55 gallon drums, and a 1,000-gallon storage tank. Oily sheens were observed on-Site and in adjacent wetlands.

1.2.4 1996: MDE Continued Site Investigation

MDE collected soil, sediment, and surface water samples for analysis of total metals and PCBs. 396 analytical results are observed for this sampling event and are contained in the analytical database. Impacts to soil, sediment, and surface water were detected above respective risk-based screening levels.

MDE determined that surface water was not impacted as previously reported from 1985 - 1994 due to excess turbidity in these earlier samples. The turbidity likely gave a false positive for COCs. The locations of these earlier sampling events are not reported in Site surveys or previous RI summary reports (i.e., 2002 or 2005 ENSAT reports) performed by MDE; however, the data is maintained in the analytical database.

1.2.5 1999: MDE Continued Site Investigation

MDE collected soil, sediment, groundwater, and surface water samples for analysis of VOCs, SVOCs, total metals, dissolved metals, pesticides, and PCBs. 3,825 analytical results are observed for this sampling event and are contained in the analytical database.

MDE reported impacts to soils, sediment, and surface water above risk-based screening levels.

1.2.6 2001: MDE Continued Site Investigation

MDE collected soil, sediment, and groundwater samples for analysis of VOCs, SVOCs, total metals, dissolved metals, pesticides, and PCBs. A topographic survey of the Site and surrounding lands was conducted. Five shallow groundwater monitor wells were installed (Figure 3). 5,985 analytical results are observed for this sampling event and are contained in the analytical database. MDE reported impacts to soils, sediment, and groundwater above risk-based screening levels. (See Section 3.0)

1.2.7 2002: MDE PCB Hot-Spot Delineation and Groundwater Investigation

MDE collected soil samples for laboratory analyses of PCBs and performed several field based screening assays for PCB hot-spot delineation. A wetland survey was performed to define the extent of the wetland areas at and near the Site. The survey results are included in the Site GIS and are presented on Figure 2. Water level monitoring was performed in the five on-Site groundwater monitoring wells, the Back River, and the pond to the northwest of Parcel 425. 350 analytical results are observed for this sampling event and are contained in the analytical database. Field based screening data for total PCBs is not included in the database. MDE defined the extent of PCB hot spots at two locations above 100 mg/kg in the southeast and south-central portion of the Site (Figure 3). MDE also collected five surface water samples and five groundwater samples that were analyzed for PCB congeners. It should be noted that several of the samples identified by MDE as “surface water” were not representative of any surface water at the Site, as described in the RAP (Malcolm Pirnie, 2006).

Groundwater level monitoring data collected in 2002 at the Site monitor wells were interpreted to indicate a mixed tide within the Back River (i.e. the heights of two successive high tides or two low tides are markedly different). The tide is reported to influence the groundwater elevation in the on-Site monitor wells (with the exception of monitor well MW-5) and the pond (located northwest of Parcel 425). Precipitation events are reported to have an effect on the water level within the monitor wells and the pond. General groundwater gradient at the Site was interpreted to flow to the south toward the Back River.

1.2.8 2004: MDE Data Gap Sampling

MDE collected soil samples for analysis of total metals, SVOCs, pesticides, and PCBs. 1,286 analytical results are observed for this sampling event and are contained in the analytical database. The purpose of this sampling event was to fill data gaps identified from previous investigations primarily in the PCB hot spot areas.

1.2.9 2005: MDE Data Gap Sampling

MDE collected soil samples for analysis of PCBs. 728 analytical results are observed for this sampling event and are contained in the analytical database. The purpose of this sampling event was to fill data gaps identified from previous investigations primarily in the PCB hot spot areas.

1.3 Action Memorandum and Removal Response

The EPA issued an internal Action Memorandum in September 2005 to request a time critical removal action and exemption from the $2 million statutory limit for the Site (EPA, 2005b). The Action Memorandum identified both PCBs and lead as the primary COCs. The memorandum recommended various cleanup levels for the COCs, in the media of sediment and soil, and the installation of a groundwater filtration barrier on the south side of the property.

The EPA issued a Draft Administrative Order for Removal Response in December 2005. The 2005 Order directed Respondents to erect a fence at the Site to restrict access, install a temporary cover system atop contaminated areas to mitigate erosion of surface soils, and take steps to protect the shoreline from erosion. As a result of the 2005 Order, a chain-link fence now restricts access to the majority of the Site, plastic nylon reinforced polyethylene sheeting covers a small area of the Site disturbed during MDE's past remedial investigation, and coir (coconut fiber) logs have been installed at the shoreline to protect the shoreline from erosion. These activities were completed in a cooperative effort to stabilize the Site and allow EPA additional time to search for other Primary Responsible Parties that would participate in the overall Site assessment and remediation.

1.4 Administrative Order for Removal Response

In August of 2006, the EPA issued an Administrative Order for Removal Response (EPA, 2006a). The Order required the respondents to develop a RAP and conduct an EOCS to delineate potential data gaps at the Site. A RAP with addendums (Malcolm Pirnie, 2006) was developed that outlined additional samples that should be collected, sampling methodology, and quality control (QC) procedures. The remainder of this document provides a summary of the EOCS activities.

1.5 EOCS Data Gap Sampling Objectives

The RAP and addendums outline the objectives of the data gap sampling completed as part of the EOCS. Table 1 provides a summary of the samples collected during the EOCS and Figure 4 provides the locations.

The objectives of the EOCS include:

- Collection of additional samples to define of the eastern most extent of total PCB and lead impacted soil on Parcel 137. This area is east of Parcel 425 and the Southeast Finger Area.
- A background investigation of the surface and subsurface soil to the east of the Site for analysis of total PCBs and lead.
- Collection of surface soil samples for lead and PCBs in adjacent Parcels 503 and 464.
- Additional sediment sampling in the southern and northern portions of the Southeast Finger Area to fill potential data gap areas for total PCBs and lead.
- Additional sediment sampling in the Southwest Finger Area to fill potential data gap areas for total PCBs.
- Additional sediment sampling in the Pond Area to fill potential data gap areas.
- Surface water and sediment sampling activities in the Back River Area to confirm results reported in previous investigations.
- An additional round of groundwater sampling to confirm non-detect results of total PCBs and lead.
- A property survey of parcels to the east of Parcel 425 to establish property boundaries.

Figure 4 provides a map of the samples collected as part of the EOCS. The sample locations presented on Figure 4 represent the final locations as approved by EPA during the Site reconnaissance conducted on January 9, 2007. Section 2.0 provides a description of the data collection activities. Section 3.0 provides a summary of the analytical results. Section 4.0 provides an interpretation of the data.

2.0 Field Activities

The EOCS data gap sampling fieldwork was performed from January 8 through February 7, 2007. The data gap sampling was conducted in accordance with the EPA approved RAP (Malcolm Pirnie, 2006) except where noted. The original field schedule proposed in the RAP was modified based on inclement weather during the month of January and drilling contractor availability. A revised schedule was provided to EPA in the Bi-Monthly Status Memo 5 dated January 31, 2007. The following sections describe field activities performed during the EOCS, including Site reconnaissance, sample collection, monitoring well installation and development, and parcel surveying. Table 1 summarizes the samples collected during the sampling effort. Figure 4 provides the EPA approved locations of the EOCS samples.

2.1 Site Reconnaissance

On December 6, 2006, Malcolm Pirnie conducted an initial Site reconnaissance on Parcel 425. The purpose of the Site reconnaissance was to observe the general Site conditions, locate the existing monitor wells, and locate the proposed soil sample locations on Parcel 425. During the Site reconnaissance, the following observations were made:

- The perimeter fence was observed to be in-tact; however, it did not encompass the entirety of Parcel 425,
- Monitor well MW-1 was not located during the Site visit. The remaining four wells (MW-2, MW-3, MW-4, and MW-5) were located,
- The upper 6 feet of the annulus in monitor well MW-4 was left open, possibly compromising this well and the groundwater quality surrounding this well.
- The proposed surface soil locations on Parcel 425, as well as the access road to Parcel 425, were observed to be located on asphalt.
- The Site was observed to be heavily vegetated, especially in the wetland areas.

On January 9, 2007, Malcolm Pirnie, EPA's On-Scene Coordinator Richard Rupert, and Tetra Tech EMI representative, Mrinal Biswas, conducted a second Site reconnaissance of the Sauer Dump Site to assess and approve the final locations of the soil, sediment, and surface water samples. Figure 4 shows the locations of the samples as approved by EPA. During the Site reconnaissance, EPA also indicated that the on-Site monitoring wells may be compromised and should be re-drilled. EPA approved the location of the replacement well (MW-1R) for well MW-1 which could not be located.

2.2 Soil Sampling Procedures

Representatives from EPA's contractor, Tetra Tech EMI, oversaw soil-sampling activities. Figure 4 presents the surface and subsurface soil sample locations. Thirty-two surface soil and 9 subsurface soil samples were collected between January 8 through January 24, 2007. The surface soil samples were analyzed for lead by EPA Method 6010B and PCBs by EPA Method 8082 as stipulated in the EPA approved RAP and addendums. Subsurface soil samples were analyzed for lead by EPA Method 6010B, PCBs by EPA Method 8082, VOCs by EPA Method 8260B, and SVOCs by EPA Method 8270C as stipulated in the EPA approved RAP and addendums. EPA's on-Site contractor collected split samples at the following locations: DG-SS02-0, DG-SS05-0, DG-SS09-0, DG-SS13-0, DG-SS15-0, DG-SS16-0, DG-SS17-0, DG-SS19-0, DG-SS20-0, DG-SS21-0, DG-SS22-0, and DG-SS23-0.

Surface and subsurface soil samples were homogenized after collection by first removing rocks or organic matter and then using the coning and quartering method (American Society for Testing and Materials [ASTM] C702-80).

2.2.1 Surface Soil Samples

Surface soil samples were collected from under the vegetative mat with a disposable trowel in accordance with SOP 2 in Appendix A of the Field Sampling Plan (FSP) (Malcolm Pirnie, 2006). A three-point compoSite of soil from approximately 0 to 6 inches below ground surface (bgs) was placed on a disposable aluminum tray and homogenized.

2.2.2 Subsurface Soil Samples

Subsurface soil samples were collected by driving a 5-foot Macro-Core with a sledgehammer or by hydraulically driving the Macro-Core with the Geoprobe® 6610DT drill rig. The Macro-Core is a 1.5-inch diameter hollow stainless-steel probe rod that contains a clean acetate sampling tube for collection of soil samples. Geoprobe® soil samples were collected in accordance with SOP 4 in the FSP (Malcolm Pirnie, 2006).

The soil cores were logged by Malcolm Pirnie personnel and the boring logs are included in Appendix A. Terra-Core samples for VOC analyses were collected directly from the soil core. The 2- to 3-foot sample interval was then placed on a disposable aluminum tray, homogenized, and then transferred to sample containers for the other analytical parameters.

2.3 Sediment Sampling Procedures

Representatives from EPA's contractor, Tetra Tech EMI, oversaw sediment-sampling activities. Nine sediment samples were analyzed for lead by EPA Method 6010B and PCBs by EPA Methods 8082 and 1668a as stipulated in the EPA approved RAP and addendums. Samples were collected within the top 6-inches of sediment in accordance with SOP 6 in the FSP (Malcolm Pirnie, 2006). Figure 4 presents the sediment sample locations. EPA collected split samples at the following locations: DG-SD06-0.5 and DG-SD08-0.5

Sediment samples were collected from beneath the organic build-up or detritus material. Decomposed organic material present was included in the sample due to the potential for this interval to be impacted due to deposition and adsorption. Sediment samples were collected with a decontaminated stainless steel Wildco-2" liner-type hand corer sediment sampler. Samples were placed on disposable aluminum trays and homogenized using the coning and quartering method.

Offshore sediment samples DG-SD01-0.5 (pond area), DG-SD08-0.5 (Back River), and DG-SD09-0.5 (Back River) were collected from a flat-bottom boat. Sample DG-SD06-0.5 (within the Southeast Finger) was collected with a disposable plastic trowel since the Wildco sampler was unable to retrieve a solid sediment sample.

2.4 Monitoring Well Installation and Development

On January 9, 2007, Malcolm Pirnie, EPA's On-Scene Coordinator Richard Rupert, and Tetra Tech EMI representative, Mrinal Biswas, conducted a Site reconnaissance of the Sauer Dump Site. After inspection of the Site monitoring well network, Malcolm Pirnie, with direction from EPA's On-Scene Coordinator Richard Rupert, assessed that the current monitoring wells were compromised. Four of the monitoring wells (MW-2, MW-3, MW-4, and MW-5) were over-drilled and re-constructed. A replacement well (MW-1R) was installed in place of MW-1 at a location approved by EPA's On-Scene Coordinator. Figure 4 presents the groundwater monitoring well locations.

Representatives from EPA's contractor, Tetra Tech EMI, oversaw monitor well installation activities. The existing monitoring wells were over-drilled and new monitoring wells installed by a Geoprobe® 6610 DT using hollow stem auger (HSA) method (ASTM D1452-80). The HSA method utilizes continuous flight hollow augers with a cutter head mounted on the bottom of the lead auger. Monitoring well borings were drilled with 6.25-inch inner diameter HSAs for the purpose of over-drilling the existing monitoring wells so the PVC well and material would be removed from the well boring. The increased diameter of the larger augers is necessary to prevent bridging of the filter pack during installation.

Once the drilling had reached the proper depth for well installation, the 2-inch diameter Schedule 40 flush-threaded PVC monitoring well was placed inside the HSA as the augers were gradually removed to allow for proper placement of well construction materials. When a monitoring well boring was completed, the Site geologist visually inspected the hole and decided on the depth of the well. The filter pack was installed inside the augers and around the well screen to a height of approximately two feet above the top of the well screen. Bentonite pellets were placed above the filter pack to produce a minimum 1-ft thick bentonite seal. A grout-cement seal consisting of Portland Type II cement and granular bentonite will extend from the top of the bentonite seal to a depth of approximately six inches to one foot bgs. After the grout-cement seal had set (approximately 24 hours), the seal was checked for settlement. No additional grout was necessary. Once grouting operations were completed, a square concrete surface cover extending two feet in all directions was placed from the top of the bentonite grout to 6-inches above the ground surface. An aboveground steel protective casing was sealed in the cement surface cover for all aboveground finished monitoring wells. The monitoring well construction diagrams are included in Appendix D.

The monitoring wells were developed by pumping the groundwater with a submersible pump on January 25 through January 27, 2007. The submersible pump intake was placed below the water level and lowered as the water level drops. The pump was surged to facilitate the removal of fine sediments at the bottom of the monitoring well. Polyethylene tubing, connected to the pump with stainless-steel clamps, was dedicated to each individual well and was disposed of after use. Measurements of water quality parameters were recorded every five-fifteen minutes during monitoring well development. The water quality parameters included pH, temperature, conductivity, dissolved oxygen (DO), turbidity, and oxidation reduction potential (ORP).

Development proceeded until the following conditions were met:

- the well water was clear to the unaided eye;
- stabilization of water quality parameters as defined by the following variances between three successive readings: pH within ± 0.1 percent; conductivity within ± 3 percent; DO, ORP, and turbidity within ± 10 percent; and temperature within ± 1 degrees Celsius;
- at least three well volumes (including the saturated filter material in the annulus) removed from the well;
- turbidity measurements are less than or equal to 10 nephelometric turbidity units (NTUs); and
- sediment was removed from the monitoring well.

Monitoring wells MW-4 and MW-5 were dewatered during the well development process. After repeatedly dewatering, monitoring wells MW-4 and MW-5 were developed to the point where the purged water was visibly clear of sediment.

2.5 Groundwater Sampling Procedures

Representatives from EPA's contractor, Tetra Tech EMI, oversaw monitor well sampling activities. Depth-to-water and well depth measurements were conducted in accordance with SOP 9 in Appendix A of the FSP (Malcolm Pirnie, 2006) prior to collecting groundwater samples. These measurements were obtained using an electronic water level sounding device accurate to ±0.01 feet. All measurements of the depth to groundwater and well depth were referenced to a permanently marked reference point on the monitoring wells (highest point on the top rim of the PVC casing). Prior to measurement, water levels in the monitoring wells were allowed to stabilize for 1 to 2 weeks after well construction and development.

Groundwater samples were collected from the existing monitoring wells in accordance with SOP 7 (EPA Region III Recommended Procedure for Low-Flow Sampling) in Appendix A of the FSP (Malcolm Pirnie, 2006). This sampling procedure involved using a bladder pump placed at the screened interval, with the pump intake kept at least two feet above the bottom of the monitoring well to minimize mobilization of sediment.

During well purging, water quality parameters of temperature, pH, specific conductivity, turbidity, DO, and ORP were measured using a QED multiparameter meter equipped with a flow-through cell. Wells were purged until the field water quality parameters stabilized. Well purge logs are presented in Appendix E. Immediately following purging, the dedicated sample tubing was disconnected from the flow-through cell and samples were collected. Table 2 summarizes the final water quality parameters for the monitoring wells.

For each sample, a total and a filtered sample fraction were submitted to the laboratory for analyses. The filtered sample was collected by field filtering the sample through a 0.45 µm filter. Five ground water samples were collected and analyzed by STL-Pittsburgh for lead by EPA Method 6010B and PCBs by EPA Method 8082 and 1668a.

2.6 Surface Water Sampling Procedures

Due to the close proximity of the sample locations to the shoreline, the surface water samples were collected soon after the peak of high tide. Surface water samples were collected in accordance with SOP 5 in Appendix A of the FSP (Malcolm Pirnie, 2006).

Surface water samples were collected at the same locations as the sediment samples (Figure 4). The surface water samples were collected before the sediment samples to minimize the mobilization of fine-grained substrate. Two surface water samples were collected from the Back River and analyzed by STL-Pittsburgh for lead by EPA Method 6010B and PCBs by EPA Methods 8082 and 1668a. For each sample, a total and a filtered sample fraction were submitted to the laboratory for analyses. The filtered sample was collected by field filtering the sample through a 0.45 µm filter.

A third surface water sample was scheduled to be collected in the Southeast Finger. However, surface water was not observed in this area and the location was not sampled as reported in the bi-weekly status report. EPA was notified of this modification to the RAP in the Bi-Weekly Status Memo 4 dated January 15, 2007. Surface water samples were collected directly into the sample bottles from a boat in the Back River and Pond Area.

2.7 Sample Handling Procedures

Sample containers, sample preservatives (if required), and chain of custody record sheets were provided by STL-Pittsburgh. After collection, the samples were labeled, placed in ice-filled coolers, and transported to STL-Pittsburgh. Chain-of-custody was maintained for the samples immediately after collection through receipt by the laboratory.

2.8 Surveying Procedures

A state-licensed surveyor, Capitol Development Design Inc. (CDDI), conducted a land survey of the property lines and prepared a topographic survey of the Site showing aboveground physical features. CDDI also surveyed horizontal locations and vertical elevations of the five groundwater monitoring wells. The field survey report is provided in Appendix F. The properties are denoted as Baltimore County Assessors property parcels.

A Global Positioning System (GPS) was used to establish the horizontal coordinates of surface soil, surface water, and sediment sampling locations. The Tremble GeoXH unit was used to collect the coordinate information in real-time mode and the data was post-processed using H-Star technology. This data was then incorporated into a GIS. GPS coordinates and maps generate for this study are given in Maryland State Plan in feet, NAD83 datum.

2.9 Equipment Decontamination

The Geoprobe Macro-Core, HSA augers, and the Wildco sediment sampler were decontaminated between sample locations. Decontamination procedures for the Macro-Core and HAS augers consisted of hot water pressure wash. The Wildco sediment sampler was washed with Alconox detergent solution, rinsed with potable water, and then a final rinse with distilled water.

2.10 Investigative Derived Waste Management

Investigative derived waste handling and disposal procedures were performed according to SOP 11 in Appendix A of the FSP (Malcolm Pirnie, 2006). Decontamination water was stored in 55-gallon drums and labeled prior to off-Site disposal. During the drilling process, soil cuttings were placed in 55-gallon drums. Drums were properly labeled, dated, and moved to an on-Site central storage area.

Purged groundwater was discharged to the ground surface adjacent to the monitoring well. Prior to discharging, the purged groundwater was filtered through a bag filter and subsequently through a 5-gallon bucket containing granular activated carbon.

Used gloves, core liners, and any other disposable sampling equipment or personal protective equipment were double bagged and disposed of off-Site as non-hazardous waste.

3.0 Field Observations and Analytical Results

The following sections describe field observations and analytical results from samples collected during the EOCS field activities. These data are interpreted in Sections 4.0 and 5.0 to revise the conceptual understanding of the Site.

3.1 Groundwater Flow Direction and Gradient

Table 3 summarizes the groundwater elevations measured at the Site monitoring wells. Figure 5 presents the groundwater elevations and interpreted groundwater contours. The general groundwater flow is to the south towards the Back River and towards the finger wetland areas. The horizontal hydraulic gradient across the Site, as estimated between monitoring wells MW-5 and MW-1, is approximately 0.003 ft/ft.

3.2 Laboratory Data Validation

Data validation for surface soil, subsurface soil, sediment, surface water, and groundwater samples collected from Site as part of the EOCS are discussed in Appendix B. Laboratory analytical reports are provided in Appendix C and include the initial calibration, continuing calibration, laboratory blank, matrix spike/matrix spike duplicate, field quality control (dup and blank), sample paperwork, holding time, retention time, surrogate recovery, dilution factor, moisture content, chromatograms, mass spectra, and raw data. The data review was performed in accordance with the procedures specified in Appendix E Quality Assurance Project Plan of the RAP – Revision 2 (Final) (Malcolm Pirnie, 2006), EPA Functional Guideline documents for Organic and Inorganic Data Review (EPA, 1999 and 2004), EPA Region III Modifications to National Functional Guideline documents for Organic Data Review (EPA, 1994), and quality assurance and control parameters set by the project laboratories (STL-Pittsburgh and STL-Knoxville). Sample results were subject to an evaluation of the following QC parameters:

- sample receipt temperatures;
- holding times;
- method blanks;
- laboratory control samples;
- matrix spike/matrix spike duplicates (MS/MSD);
- field duplicates; and
- surrogates (for organic parameters).

Laboratory analytical results for the soil, sediment, groundwater, and surface water are considered usable for intended purposes and meet project data quality objectives. Copies of the analytical reports are provided in Appendix C.

The data qualifiers used to qualify analytical results associated with QC parameters are defined below:

J	The analyte was positively identified; however, the result should be considered an estimated value.
UJ	The reporting limit is considered an estimated value.
B	Result not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present; reported value may be biased low.
UL	Not detected; quantitation limit may be higher.
Q	The result is an estimated maximum possible concentration (EMPC).
R	Quality control indicates that the data is not usable.
U	Non-detect result above the laboratory reporting limit.

Results qualified as “J”, “UJ”, “Q”, “B”, “L”, or “UL” are of acceptable data quality and may be used quantitatively to fulfill the objectives of the analytical program, per EPA guidelines.

3.3 Analytical Sample Results

The analytical data results are presented in Tables 4 through 8 and are organized by sampled media (surface soil, sub-surface soil, sediment, surface water, and groundwater). Data interpretations are provided in the following section (Section 4.0) and are organized by Parcel, media, and contaminant of concern. Copies of the analytical reports are provided in Appendix C. The results for all media and analytes are reported in parts per million (mg/L for aqueous and mg/kg non-aqueous media) in the body of the report.

3.3.1 Surface and Subsurface Soil Sample Results

Thirty-two surface soil samples (0 – 0.5 feet bgs) were collected between January 8, 2007 and January 24, 2007 (Figure 6). Nine subsurface soil samples (2 – 3 feet bgs) were collected on January 24, 2007 (Figure 7). Boring logs for the nine borings are presented in Appendix A. The analytic results for surface and subsurface soil samples are presented in Tables 4 and 5 respectively. The results of the soil samples are described below and are organized by COCs.

3.3.1.1 PCBs in Soil

PCBs are detected in varying concentrations in surface and subsurface soil at the EOCS sample locations. PCB soil sample results for the surface and subsurface are presented in

Figures 6 and 7 respectively. The PCB results presented in Figures 6 and 7 are the sum of the aroclors (total PCBs) as presented in Table 4 and 5. The following observations are made from the PCB soil data:

- The analytical results show that the most commonly detected PCB is Aroclor 1260 (see Table 5 and Table 6). Aroclor 1260 is found in 25 of the 32 surface soil and 8 of the 9 subsurface soil samples.
- The highest detected total PCB concentration (DG-SS24-0) is within the fenced boundary of the Site and is located just north of the “Hot Spot” area (Figure 6).
- Total PCBs in surface soils are detected at low concentrations within the backyard of Parcel 503 and range in concentration from 0.0151 J to 0.34 mg/kg (Figure 6).
- Total PCBs are detected in the surface soil at the property boundary along the access road entering Parcel 425 at concentrations ranging from 2.12 to 7.7 mg/kg (Figure 6).
- Total PCBs within surface soils in the backyard and “salvage/storage area” of Parcel 464 are detected at concentrations ranging from 0.49 to 2.41 mg/kg (Figure 6).
- Total PCBs are detected along the driveway between Parcel 503 and 464 and range in concentration from 0.34 to 4.0 mg/kg (Figure 6).
- Total PCBs are detected in surface soil on Parcel 137 near the eastern side of the southeast finger at low concentrations ranging from < 0.037 to 0.26 mg/kg (Figure 6).
- Total PCBs are detected in subsurface soil on Parcel 137 near the eastern side of the southeast finger at concentrations ranging from 0.043 J to 2.24 mg/kg (Figure 7).
- Total PCBs are detected in surface samples within areas along the eastern boundary of Parcel 137 (background areas) at low concentrations ranging from <0.041 to 0.14 mg/kg (Figure 6).
- Total PCBs are detected in subsurface samples within areas along the eastern boundary of Parcel 137 (background areas) at concentrations ranging from <0.03 J to 2.24 mg/kg (Figure 7).

3.3.1.2 Lead in Soil

Lead is detected in varying concentrations in surface and subsurface soil at the EOCS sample locations. Lead soil sample results for the surface and subsurface are presented in Figures 6 and 7 respectively. The following observations are made from the lead soil data:

- Lead is detected in all of the surface and subsurface soil samples (see Table 4 and Table 5).

- The highest detected lead concentration is found in surface soil at sample DG-SS24-0 within the fenced boundary of the Site. This sample is located just north of the "Hot Spot" area and is co-located with the most elevated PCB concentration in surface soil (Figure 6).
- Lead is detected in surface soil along the access road entering Parcel 425 at concentrations ranging from 66.1 to 321 mg/kg (Figure 6).
- Lead is detected within surface soil in the backyard and "salvage/storage area" of Parcel 464 at concentrations ranging from 73.2 to 363 mg/kg (Figure 6).
- Lead is detected in surface soil within the backyard of Parcel 503 at concentration ranging from 55.6 to 116 mg/kg (Figure 6).
- Lead is detected in surface soil along the driveway between Parcel 503 and 464 and ranges in concentration from 106 to 440 mg/kg (Figure 6).
- Lead is detected in surface soil on Parcel 137 near the eastern side of the southeast finger at concentrations ranging from 24.2 to 415 mg/kg (Figure 6).
- Lead is detected in subsurface soil on Parcel 137 near the eastern side of the southeast finger at concentrations ranging from 93.5 to 770 mg/kg. An anomalously high lead concentration is observed at DG-SB02-2 with a concentration of 13,100 mg/kg (Figure 7).
- Lead is detected in surface samples along the eastern boundary of Parcel 137 (background areas) at concentrations ranging from 22.1 to 28.1 mg/kg.
- Lead is detected in subsurface samples along the eastern boundary of Parcel 137 (background areas) at concentrations ranging from 22.3 to 76 mg/kg.

3.3.1.3 VOCs and SVOCs in Subsurface Soil

Low-level concentrations between the method detection limit and the reporting limit (i.e., trace values) were detected for VOCs and SVOCs in several subsurface soil samples (Table 5). Samples DG-SB04-2 and DG-SB05-2 contained SVOC concentrations greater than reporting limits for various polynuclear aromatic hydrocarbon (PAH) analytes, with concentrations ranging up to 17 mg/kg for pyrene (observed in DG-SB05-2). Both of these samples are located in the west side of Parcel 137, adjacent to the Southeast Finger near a vehicle and equipment storage area. Table 5 provides a summary of the detected VOC and SVOC results.

3.3.2 Sediment Sample Results

Nine sediment samples were collected from January 9 through 12, 2007 for lead and PCBs by Methods 8082 and 1668a (Figure 8). The sediment samples were collected in the wetlands or Back River shoreline areas, adjacent to Parcel 425. The sediment sample analytical results are presented in Table 6. Figure 8 provides the total PCB results and lead results. Total PCB results presented on Figure 8 are provided as both the sum of the aroclors (total PCBs method 8082) and homologues (total PCBs method 1668). Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. Table 6 provides the individually qualified homologue results. The following is a summary the analytical results.

3.3.2.1 PCBs in Sediment

PCBs are detected in varying concentrations in sediment at the EOCS sample locations. Sediment sample results for PCBs are presented in Figure 8. The following observations are made from the PCB sediment data:

- Total PCB results as detected by aroclor (EPA 8082) and homologue (EPA 1668) methods are similar in magnitude. However, total homologue values are usually higher than total aroclor.
- Total PCBs detected in the pond area range in concentration from 0.0004186 to 0.33412 mg/kg (Figure 8).
- Total PCBs detected in the Southwest Finger are detected at a concentration of 3.61 for total aroclors and 9.8 for total homologues (Figure 8).
- Total PCBs detected in the Back River range in concentration from 0.000373 to 0.06724 mg/kg.
- Total PCBs detected in the Southeast Finger range in concentration from 0.96 to 38.7 mg/kg (Figure 8). The highest concentrations are near the PCB "Hot Spot" area.

3.3.2.2 Lead in Sediment

Lead is detected in varying concentrations in sediment at the EOCS sample locations. Sediment sample results for lead are presented in Figure 8. The following observations are made from the lead sediment data:

- Lead is detected in all of the sediment results (Figure 8).
- Lead detected in the pond area ranges from 7.5 to 47.1 mg/kg (Figure 8).
- Lead is detected in the southwest finger at a concentration of 370 mg/kg (Figure 8).
- Lead is detected in the Back River at concentrations ranging from 10.1 to 30.1 mg/kg (Figure 8).
- Lead detected in the Southeast Finger ranges in concentration from 30.1 to 4,800 mg/kg. The highest concentrations are near the "Hot Spot" area (Figure 8).

3.3.3 Surface Water Sample Results

Two surface water samples, DG-SW01 and DG-SW02, were collected on January 11, 2007 from the Back River shoreline (Figure 9). The surface water samples are co-located with the sediment samples DG-SD08-0.5 and DG-SD09-0.5. Figure 9 and Table 7 provides a summary of the Surface Water analytical results. Both total and filtered sample fractions were collected for surface water samples. Filtered samples were collected after passing through a 0.45 micron filter and are designated with sample identifications ending in “-F”. The sample identifications for the total sample fractions end in the suffix “-T”. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. Table 7 provides the individually qualified homologue results. The following summarizes the two surface water analytical results.

- Total PCBs using the aroclor method are non-detect for both total and filtered sample fractions (Table 7 and Figure 9).
- Total PCBs using the homologue method are detected at concentrations ranging from 0.000021 to 0.000084 mg/L for the unfiltered samples (Table 7 and Figure 9).
- Total PCBs using the homologue method are detected at concentrations ranging from 0.0000056 to 0.0000031 mg/L for the filtered samples. The filtered samples are an order of magnitude lower than the unfiltered (Table 7 and Figure 9).
- Total lead results for the unfiltered samples range in concentration from 0.0092 to 0.0303 mg/L (Table 7 and Figure 9).
- Total lead results for the filtered samples range in concentration from non-detect to 0.0016 J mg/L. The filtered samples are an order of magnitude lower than the unfiltered (Table 7 and Figure 9).

3.3.4 Groundwater Sample Results

Five groundwater samples were collected from February 7 through 12, 2007. Both total and filtered sample fractions were collected for groundwater samples. Figure 9 and Table 8 provides a summary of the groundwater analytical results. Filtered samples were collected after passing through a 0.45 micron filter and are designated with sample identifications ending in “-F”. The sample identifications for the total sample fractions end in the suffix “-T”. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. Table 8 provides the individually qualified homologue results. The following summarizes the groundwater sample results.

- Total PCBs using the aroclor method are non-detect for all wells, except MW-4, for both total and filtered sample fractions (Table 8 and Figure 9). MW-4 has a detected concentration of 0.00084 J mg/L for the unfiltered sample.
- Total PCBs using the homologue method are detected at concentrations ranging from 0.0000072 to 0.0016899 mg/L for the unfiltered samples (Table 8 and Figure 9).
- Total PCBs using the homologue method are detected at concentrations ranging from 0.0000015 to 0.00025 mg/L for the filtered samples. The filtered samples are an order of magnitude lower than the unfiltered (Table 8 and Figure 9).
- Total lead results for the unfiltered samples range in concentration from non-detect to 0.0057 mg/L (Table 8 and Figure 9).
- Total lead results for the filtered samples are all non-detect (Table 8 and Figure 9).

The highest detected total PCBs in groundwater are observed in up gradient monitor well MW-4 at 0.0016899 mg/L (un-filtered). This well was also the most turbid sample (see Table 2). MW-4 is a low producing well and consistently has turbidity results above 10 NTU. In all cases, the filtered samples produced results less than the unfiltered samples, demonstrating that PCBs were present on filterable solids in the unfiltered samples.

4.0 Interpretations

The data collected during the EOCS is used in the following sections to address the data gaps described in Section 1.3 and to revise the Conceptual Site Model outlined in the RAP (Malcolm Pirnie, 2006). Additionally, the data help address EPA's concerns expressed in the March 30, 2007 meeting between the EPA and the Coalition and EPA's letter to the Coalition dated April 24, 2007. The data used in the following discussions include the historic data collected at the Site (ENSAT, 2005) and that collected as part of the EOCS.

4.1 Site and Surrounding Area Survey

A state-licensed surveyor, CDDI, conducted a land survey of the property lines and prepared a topographic survey of the Site showing aboveground physical features. These features are presented on Figure 2 along with 2-foot contours and the Site boundary. The field survey report is provided in Appendix B. The new survey information has been used throughout this document while describing the results of the EOCS sampling.

4.2 Lead and PCB Impacted Soil – East of Hot Spot Area (Parcel 137)

Ten soil samples (DG-SS31, DG-SS32, DG-SS25, DG-SS26, DG-SS27, DG-SB02, DG-SB03, DG-SB04, DG-SB05, and DG-SB06) were collected to evaluate if the eastern extent of the lead and PCB hot spot area overlapped onto Parcel 137, east of the Southeast Finger. Figure 10 provides the analytical results of these samples for lead and PCBs.

The PCB concentrations observed in the surface and sub-surface soils show that the PCB hot spot area does not appear to extend onto Parcel 137 east of the Southeast Finger Area. Samples collected for total PCBs within the hotspot sample during previous investigations show results consistently above 100 mg/kg. Total PCB concentrations reported for the EOCS samples are all below 1 mg/kg (Figure 10) except for one sub-surface sample location (DG-SB02 at 2.24 mg/kg). The surface sample collected at the same location as DG-SB02 is detected at a concentration of only 0.028 mg/kg (see DG-SS31 on Figure 10). Additionally, five surface samples (DG-SS20, DG-SS19, DG-SS21, DG-SS22, and DG-SS23) collected east of the ten previously mentioned samples have total PCB results well below 1 mg/kg (Figure 10). The results of the new PCB data are used in the proposed remedial strategy discussed in Section 5.0.

The lead concentrations observed in the surface and sub-surface soils show that the lead hot spot area does not appear to extend onto Parcel 137 east of the Southeast Finger Area. Samples collected along the eastern boundary of the hotspot area during previous investigations show results consistently above 1000 mg/kg. The EOCS samples are consistently below 1000 mg/kg, and in most cases below 400 mg/kg, except for one location. Sample DG-SB02 has an anomalously elevated concentration of 13,100 mg/kg. The sample is located behind a converted maintenance building in the subsurface (Figure 10). The surface sample collected at this same location is detected at a concentration of 137 mg/kg (see DG-SS31 on Figure 10). Additionally, five surface samples (DG-SS20, DG-SS19, DG-SS21, DG-SS22, and DG-SS23) collected east of the ten previously mentioned samples have an average lead concentration of 182.6 mg/kg (Figure 10). The results of the new lead data are used in the proposed remedial strategy discussed in Section 5.0.

4.3 Lead and PCBs in Soil – Parcel 425

Four samples (3 surface and 1 sub-surface) were collected on Parcel 425 and include DG-SS03, DG-SS04, DG-SS24, and DG-SB01 (Figure 11). Based on the new Site-survey, samples DG-SS24 and DG-SB01 lie within Parcel 295 and not Parcel 425; however, they are within the fenced boundary of the Site. The purpose of the samples is to fill data gap areas for lead and PCBs. Figure 11 provides the analytical results of these samples for lead and PCBs.

The samples collected at the Site provide new PCB analytical data in the data gap areas. Samples DG-SS03 and DG-SS04 show total PCB concentrations at 2.12 and 7.7 mg/kg near the northeastern property boundary and Site access road (Figure 11). Sample DG-SS24 and DG-SB01 help to refine the northern extent of the PCB hot spot area. The results of the new PCB data are used in the proposed remedial strategy discussed in Section 5.0.

The samples collected at the Site provide new lead analytical data in the data gap areas. Samples DG-SS03 and DG-SS04 show lead concentrations at 66.1 and 321 mg/kg. Based on the results, it is unlikely that lead is being tracked off-Site towards Parcels 503 and 464 at concentrations of concern. Sample DG-SS24 and DG-SB01 help to refine the northern extent of the lead hot spot area (Figure 11). The results of the new lead data are used in the proposed remedial strategy discussed in Section 5.0.

4.4 Lead and PCBs in Soil – Backyard of Parcel 503

Six surface soil samples were collected from the backyard of Parcel 503 to identify potential PCB and lead impacted soil. The samples include Samples DG-SS09, DG-SS10, DG-SS11, DG-SS12, DG-SS13, and DG-SS14 (Figure 12). These samples were requested by the EPA in a meeting held on November 09, 2006.

Total PCB results from the samples collected in the backyard of Parcel 503 show minimal soil impacts with results ranging from 0.015 J to 0.34 mg/kg (Figure 12). The results suggest that the backyard of Parcel 503 is not impacted with PCBs from Site activities.

Lead results from the samples collected in the backyard of Parcel 503 show minimal soil impacts with results ranging from 55.6 to 116 mg/kg (Figure 12). The results suggest that the backyard of Parcel 503 is not impacted with lead from Site activities.

4.5 Lead and PCBs in Soil – Parcel 503 Access Road

Three samples were collected near the access road to the Site to identify potential PCB and lead impacted soil (Samples DG-SS08, DG-SS15, and DGSS16) (Figure 12). These samples were requested by the EPA in a meeting held on November 09, 2006.

Total PCB results for the samples collected along the access road of Parcel 503 show results ranging from 0.34 to 4.0 mg/kg (Figure 12). The results suggest that PCB impacted soil may have been transported to areas along the access road at low concentrations or deposited by vehicles traveling to the Site, specifically near Sample DG-SS16. The results of the new PCB data are used in the proposed remedial strategy discussed in Section 5.0.

Lead results for the samples collected along the access road show results ranging from 106 to 440 mg/kg (Figure 12). The results suggest that lead impacted soil may have been transported to areas along the access road at low concentrations or deposited by vehicles traveling to the Site, specifically near sample DG-SS16. The results of the new lead data are used in the proposed remedial strategy discussed in Section 5.0.

4.6 Lead and PCBs in Soil – Parcel 464

Seven surface soil samples were collected on Parcel 464. Two samples were collected from the backyard of Parcel 464 to identify potential PCB and lead impacted soil (Samples DG-SS17 and DG-SS18) (Figure 12). Five samples were collected from the salvage/storage area in the backyard of Parcel 464 to identify potential PCB and lead impacted soil (Samples DG-SS01, DG-SS02, DG-SS05, DG-SS06, and DG-SS07) (Figure 12). These samples were requested by the EPA in a meeting held on November 09, 2006.

Total PCB results in the backyard of Parcel 464 range from 0.49 to 2.41 mg/kg (Figure 12). The results suggest that PCB impacted soil may have been transported to these areas at low concentrations. The samples collected in the salvage/storage area in the backyard of Parcel 464 show results ranging from 1.0 to 1.62 mg/kg suggesting that PCB impacted soil may have been transported to these areas at low concentrations (Figure 12). The low levels of PCBs may also be related to ongoing salvage activities at the Site as evidenced by the numerous abandoned vehicles, boats, and other miscellaneous debris observed on

Parcel 464. The results of the new PCB data are used in the proposed remedial strategy discussed in Section 5.0.

Lead results from the samples collected in the backyard of Parcel 464 show minimal soil impacts with results ranging from 198 to 363 mg/kg (Figure 12). The results suggest that the backyard of Parcel 464 is not impacted with lead from Site activities. The samples collected in the salvage/storage area in the backyard of Parcel 464 show minimal soil impacts with results ranging from 73.2 to 295 mg/kg (Figure 12). The results suggest that the salvage/storage area of Parcel 464 is not impacted with lead from Site activities.

4.7 Lead and PCBs in Soil – Site Background Investigation on Parcel 137

Six samples (3 subsurface and 3 surface) were collected to evaluate soil for lead and PCBs in Site background areas (pre-Sauer Dump fill areas) on Parcel 137 (Figure 13). A review of the historic aerial photos, completed by ENSAT, 2002, suggests that infilling of Parcel 137 was initiated in 1954 and was completed in 1957. The Site background samples include DG-SS28, DG-SS29, DG-SS30, DG-SB07, DG-SB08, and DG-SB09 (Figure 13).

The PCB concentrations observed in the surface and sub-surface soils show that total PCBs are detected in concentrations ranging from 0.03 mg/kg to 2.24 mg/kg, with an average concentration of 0.44 mg/kg. The highest detected total PCB concentration (2.24 mg/kg) was observed in the subsurface at the southern most sample location (Figure 13). As described above, this sample is collected from fill material that was placed prior to Sauer Dump activities. Therefore, the detected PCB concentrations are unlikely related to activities at the Sauer Dump based on historic aerial photo reviews and suggest that PCBs are detected in Site background soils at low concentrations.

The lead concentrations observed in the surface and sub-surface soils range from 22.1 to 76 mg/kg (Figure 13). The detected lead concentrations are unlikely related to activities at the Sauer Dump based on historic aerial photo reviews (as discussed above) and suggest that lead is present in Site background soils at low concentrations.

4.8 VOCs and SVOCs in Soil

VOC and SVOC samples were collected in the subsurface samples within the fenced boundary (DG-SB01), along Parcel 137 (DG-SB02, DG-SB03, DG-SB04, DG-SB05, DG-SB06), and at the background sample locations (DG-SB07, DG-SB08, DG-SB09).

SVOCs and VOCs were detected at very low levels at most of the sample locations. The most significant detections were PAH (SVOCs) compounds at sample DG-SB05. Sample DG-SB05 is on Parcel 137 near a maintenance storage shed used by the residents. The PAHs are likely related to residential on-Site activities and not related to former salvage activities at the Sauer Dump. Similar detections of PAHs, at lower concentrations, are observed on Parcel 137 at Sample DG-SB04, DG-SB07, and DG-SB02 which are located near storage sheds, garages, or parking areas (Figure 6 and 7). The sample locations do not correlate to significant detected concentrations of lead or PCBs. The sample results for detected SVOCs and VOCs are provided in Table 4 and Table 5.

4.9 Lead and PCBs in Sediments - Southeast Finger

Four sediment samples were collected along the Southeast Finger in data gap locations. These samples include DG-SD04, DG-SD05, DG-SD06, and DG-SD07 (Figure 14). The samples were analyzed for PCBs (using methods 1668 and 8082) and lead. The higher result of the two methods for PCBs is used in the following discussion. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. The individual homologue concentrations are provided in Tables 6, 7, and 8.

The sediment samples directly down slope or down gradient of the hot spot area (DG-SD04, DG-SD05, and DG-SD06) show total PCB results consistent with their proximity to the hot spot area. Their concentrations are detected at a maximum of 38.7 mg/kg. These results are consistent with historic sediment samples in the area which are reported as high as 267 mg/kg (see sample S-3-Channel on Figure 14). Sample DG-SD07, which is further down gradient of the hot spot area, shows a much lower concentration of total PCBs at 1.1 mg/kg (Figure 14). As defined later in Section 4.12, total PCBs are detected at even lower concentrations (0.067 mg/kg) near the mouth of the Southeast Finger in the Back River (Figure 15). The results suggest that PCBs are not being transported off-Site in concentrations of concern. This observation is strengthened as further discussed in Section 5.0, due to the minimal sediment flux off-Site and the finger areas acting as sinks for PCBs and lead. The results also suggest that if the PCB hot spot is removed, the effects of sediment transport will be reduced even further. The results of the new PCB data are used in the proposed remedial strategy discussed in Section 5.0.

The sediment samples directly down slope or down gradient of the hot spot area (DG-SD04, DG-SD05, and DG-SD06) show lead results consistent with their proximity to the hot spot area. Their concentrations are detected at a maximum of 4,800 mg/kg (Figure 14). Sample DG-SD07, which is further down gradient of the hot spot area, shows decreasing concentrations of lead at 150 mg/kg, which is consistent with the PCB data. As defined later in Section 4.12, lead is detected at even lower concentrations (30.1 mg/kg) near the mouth of the Southeast Finger in the Back River (Figure 15). The results suggest that lead is not being transported off-Site in concentrations of concern. Once again, this observation is strengthened in Section 5.0 which discusses the minimal sediment flux off-Site, and the finger areas acting as sinks for PCBs and lead. The results also suggest that if the lead hot spot is removed, the effects of sediment transport will be reduced even further. The results of the new lead data are used in the proposed remedial strategy discussed in Section 5.0.

4.10 Lead and PCBs in Sediments - Southwest Finger

One sediment sample was collected along the Southwest Finger in a data gap location. The sample is DG-SD03 (Figure 14). Additional sediment samples were collected up gradient in the Pond Area and down gradient in the Back River and are discussed in sections 4.11 and 4.12 respectively. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. The individual homologue concentrations are provided in Tables 6, 7, and 8.

Total PCB concentrations of DG-SD03 are 3.61 mg/kg (Method 8082) and 9.86 mg/kg (Method 1668). The results are consistent with nearby historic samples up gradient (SED-07) and down gradient (S-2-Marsh) which show concentrations at 2.0 and 2.95 mg/kg respectively. Up gradient historic sample, SD-15 shows lower results (0.55 mg/kg) than DG-SD03. The historic samples were analyzed using Method 8082. The results of the new PCB data are used in the proposed remedial strategy discussed in Section 5.0.

The lead result for sample DG-SD03 is 370 mg/kg. This result is consistent with historic lead samples up gradient (SD-15) and down gradient (S-2-Marsh), which show concentrations at 288 and 231 mg/kg respectively. As defined later in Section 4.12, lead is detected at even lower concentrations (10.1 mg/kg) near the mouth of the Southeast Finger in the Back River (Figure 15). The results suggest that lead is not being transported off-Site in concentrations of concern. This observation is again strengthened in Section 5.0 which discusses the minimal sediment flux off-Site, and the finger areas acting as sinks for PCBs and lead.

4.11 Lead and PCBs in Upland Sediments - Pond Area

Two sediment samples were collected in the Pond Area in data gap locations, DG-SD01 and DG-SD02 (Figure 14). Sample DG-SD01 was collected towards the deepest portion of the pond. Sample DG-SD02 was collected near the topographic break of the former fill area. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. The individual homologue concentrations are provided in Tables 6, 7, and 8.

Total PCBs results for the sample collected in the center of the pond show very low-level concentrations at 0.00042 mg/kg indicating little to no transportation of PCBs into the center of the pond. Total PCB results for sample DG-SD02, 0.334 mg/kg, are consistent with the closest historic sample, SED-10, which has a concentration of 0.401 mg/kg (Figure 14).

Lead results in both samples report low concentrations at 7.5 mg/kg in the center of the pond and 47.1 mg/kg along the topographic break of the former fill area. The low level of lead detected in sample DG-SD01 is consistent with previous nearby sampling results (31.53 mg/kg at S1-PondSed). The low levels of lead detected in DG-SD02 are lower than previous nearby sampling results (394 mg/kg at SD-22 and 839 at SD-24).

4.12 Lead and PCBs in River Sediments - Back River Area

Two sediment samples were collected in the Back River Area (DG-SD08 and DG-SD09) to confirm the results of previous sampling activities for lead and PCBs (Figure 15). DG-SD08 was collected at that mouth of the southwest finger. DG-SD09 was collected at the mouth of the southeast finger. Samples were analyzed at both locations for total PCBs using Method 1668 and Method 8082. The results of the higher value are used in the following discussion. Figure 15 provides the analytical results as well as historic sampling results for sediments in the Back River Area. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. The individual homologue concentrations are provided in Tables 6, 7, and 8.

Total PCBs at both sediment samples were detected at low levels. Reported total PCBs for DG-SD08 are 0.00034 mg/kg suggesting minimal, if any transport of PCBs from the southwest finger into the Back River. Reported total PCBs for DG-SD09 are 0.067 mg/kg, which similarly suggests minimal transport of PCBs from the Southeast Finger into the Back River (Figure 15). This is further supported by the north-south decreasing trend in concentrations for total PCBs. As observed in Figure 15, the total PCB concentrations decrease from 38.735 mg/kg to 0.06 mg/kg in the samples collected near the southern extent of the Southeast Finger. Additionally, these results are consistent with historic samples in the Back River that show predominantly non-detect concentrations (Method 8082) of PCBs in sediment (Figure 15).

Lead at both sediment sample locations was detected at low levels. Reported lead for DG-SD08 is 10.1 mg/kg suggesting minimal if any transport of lead from the southwest finger into the Back River. Similarly, reported lead for DG-SD09 is 30.1 mg/kg suggesting minimal transport of lead from the Southeast Finger into the Back River (Figure 15). These results are consistent with historic samples in the Back River that show low-level detections for lead in sediment (Figure 15). The lead data is consistent with the PCB data in that sediment transport from the Site has not impacted the sediment in the Back River at concentrations of concern.

4.13 Lead and PCBs in Surface Water - Back River

Surface water samples in the Back River were co-located with the sediment samples discussed in Section 4.12 and include samples DG-SW-01 and DG-SW-02 (Figure 16). PCBs were analyzed using methods 8082 and 1668. Surface water samples were analyzed for both total and dissolved fraction for both PCBs and lead. The results of historic surface water samples SW-1-2002 and SW-2-2002 are also provided on Figure 16. These samples were analyzed for PCBs using method 1668, but were not analyzed for lead. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. The individual homologue concentrations are provided in Tables 6, 7, and 8.

Total PCBs in the EOCS samples are detected at low concentrations for the totals fraction (0.00002 and 0.00008 mg/L) using method 1668 (Figure 16). The dissolved concentrations for total PCBs in the same samples are an order of magnitude lower (0.000006 and 0.000003 mg/L). The results of the EOCS sampling event are consistent with previous sampling for surface water in the Back River which have results that range from 0.00001 to 0.00005 mg/L for unfiltered samples (see Figure 16). The concentrations suggest that PCBs in surface water are not migrating off-Site in concentrations of concern. The results also suggest that the PCBs are sorbed to suspended sediment particles in the water. The MDE has listed PCBs as a contaminant of concern in upriver areas of the Back River. As discussed in the previous section, PCBs are not likely being transported off-Site in concentrations of concern in sediment. Therefore, it is likely that the low levels of PCBs observed in surface water are unrelated to the Sauer Dump, and are generated from upstream sources. This is further illustrated in Section 5.0.

Lead is detected in surface water at concentrations ranging from 0.0092 mg/L to 0.0302 mg/L for unfiltered samples (Figure 16). The dissolved concentrations for lead are an order of magnitude lower (ranging from < 0.003 mg/L to 0.0016 J mg/L). The results suggest that the lead is sorbed to suspended sediment particles in the surface water. As suggested in Section 4.9 and 4.10, lead in sediment does not appear to be transporting off-Site in concentrations of concern. This suggests that lead observed in the surface water samples is not related to Sauer Dump activities and is derived from off-Site sources. This is consistent with the behavior observed in the PCB results. The lack of off-Site transport of lead is discussed further in Section 5.0.

4.14 Lead and PCBs in Groundwater

Groundwater samples were collected from the five on-Site monitor wells MW-1R, MW-2, MW-3, MW-4, and MW-5. PCBs were analyzed using both methods 8082 and 1668. Groundwater samples were analyzed for both total and dissolved fraction for both PCBs and lead. All of the groundwater samples were collected with field turbidity readings near 5 NTUs except for MW-4 which was collected with a turbidity of 15 NTUs. Total PCB concentrations calculated using the homologue sum (method 1668) represent the estimated maximum possible concentration, because the Q, B, and J qualified data are used in the summation. The individual homologue concentrations are provided in Tables 6, 7, and 8.

Figure 9 illustrates the results of total PCBs in groundwater ranging from 0.000007 mg/L to 0.00168 mg/L for unfiltered samples. The results of the dissolved fraction range from 0.000002 mg/L to 0.00025 mg/L. All of the results are below the MCL for PCBs in groundwater (0.0005 mg/L) except for the unfiltered sample at MW-4. MW-4 was collected from a turbid well and is not representative of aquifer conditions at the Site. Because PCBs sorb strongly to sediment particles, a turbid well will produce high-biased results. Additionally, down-gradient monitor wells MW-1, MW-2, and MW-3 all have results below the MCL. The data suggests that PCBs in groundwater are not migrating down-gradient or off-Site towards the Back River in concentrations of concern. This is further illustrated in Section 5.0. As illustrated in Table 9, the PCB homologue results are consistent with, if not slightly lower than, the previous round of groundwater sampling at the wells, except for MW-4 due to the turbidity of the well.

Figure 9 shows the results of lead in groundwater ranging from < 0.003 mg/L to 0.0057 mg/L for the totals fraction. The results of the dissolved fraction are all non-detect (< 0.003 mg/L). All of the results are below the MCL for lead in groundwater (0.015 mg/L) including down-gradient monitoring wells MW-1 and MW-3 near the Back River. The data suggests that lead in groundwater is not migrating down-gradient or off-Site towards the Back River in concentrations of concern.

5.0 Recommended Path Forward Approach

EPA representatives have stated their desire to negotiate a consent agreement requiring the Coalition to initiate a Removal Action this summer that would achieve the cleanup goals set forth in the Action Memorandum (EPA, 2005).

However, as discussed herein, the extensive data obtained from previous investigations and the new data obtained from the EOCS demonstrate that any COCs that may potentially migrate from the Site do not pose an immediate threat to human health or the environment. In particular, the Site data demonstrate that a large, dense, and persistent wetland buffer is limiting or preventing erosion and associated significant transport of COCs from Parcel 425 to the Back River for many years. This buffer continues to prevent such erosion after major hurricanes and other serious storm events.

Pirnie believes, that from a technical perspective, the cleanup goals set forth in the Action Memo are inappropriately low. As a result, it would be appropriate to allow the Coalition sufficient time to conduct a cleanup goal analysis using risk-based methods to develop Site-specific, risk-based cleanup standards in accordance with the process set forth in the Oil and Hazardous Substances National Contingency Plan. Moreover, the Coalition submits that the Removal Action conducted at the Site should be comprehensive of all removal and remedial requirements which would include and address Site-specific cleanup levels, remedial alternative objectives (RAO's), and the future use of the Site. However, if EPA does not allow a reasonable time frame to develop such Site-specific standards, at a minimum, the final cleanup standards for the Site should not be any more stringent than the standards established in the regulations promulgated by EPA under the Toxic Substances Control Act (TSCA) for cleanup of lead contamination and for self-implementing remediation of PCB contamination; standards which are consistent with the cleanup standards established by EPA Region III for many other sites.

Specifically, as described further herein, at a minimum, Pirnie proposes that the soil on the residential properties and Parcel 425 be addressed consistent with the criteria established by TSCA. Specifically, for PCBs, the S*elf-implementing on-site cleanup and disposal of PCB remediation waste* (40 CFR 761.61(a)) sets cleanup levels for the remediation of bulk PCB remediation waste (40 CFR 761.61 (a)(4)(i)). Accordingly , the Coalition proposes that the residential properties be remediated as High Occupancy Areas with a cleanup level of ≤ 1 mg/kg without further conditions (40 CFR761.61 (a)(4)(i)(A)). For Parcel 425, it is proposed that the property be remediated pursuant to the cleanup levels for Low Occupancy Areas (40 CFR 761.61 (a)(4)(i)(B)). Specifically, the Coalition proposes that PCBs in soil at a concentration exceeding 50 mg/kg be excavated and disposed off site and the Site secured by a fenced labeled with the M_L

mark (40 CFR 761.61 (a)(4)(i)(B)(2)). An integral part of this remedial strategy would include the implementation of deed restrictions and maintenance of the fence as per 40 CFR 761.61 (a)(8). Similarly, for lead on the residential properties, a cleanup level of an average of 400 mg/kg pursuant to TSCA guidance; and for soil on Parcel 425, a cleanup level of an average concentration of 1,200 mg/kg, also pursuant to TSCA (40CFR 745.65(c)) is recommended.

For sediment, it is proposed that, at a minimum, the PCB cleanup criterion be 1 mg/kg. This level is consistent with the cleanup criterion selected by EPA at numerous CERCLA listed sites and the cleanup criterion recommended by BTAG specifically for this Site (EPA, 2005a). For the lead cleanup criterion, a level of 130 mg/kg is proposed. This criterion is recommended in the Action Memo. Based on these cleanup criteria, the majority if not all of the sediment remediation will be in the two wetland finger areas. It is important that any remedial actions to be performed in the wetland areas of the Fingers be completed in a manner to minimize disruption to the wetlands since they have been a significant buffer for sediment transport to the Back River.

5.1 Contaminant Transport to the Back River

In discussions with EPA during the March 30, 2007 meeting, EPA expressed concerns for transport of PCBs and Lead via groundwater and surface water/sediment. These concerns were reiterated to the Coalition in a letter from the EPA dated April 24, 2007. The following sub-sections provide a modified understanding of the Site Conceptual Model as presented in the RAP (Malcolm Pirnie, 2006) to address EPA's concerns.

5.1.1 Surface Water and Sediment Transport

Because the Site is adjacent to the Back River, and because the topography suggests that the subwatershed on which the Site is located slopes towards the River, it is important to assess the potential impact of transport of COCs (PCBs and lead) from the Site to the River via surface water/sediment transport. Any significant inputs from the Site to the River could cause impairment in water and sediment quality in the Back River. Therefore, the potential fluxes of COCs to the Back River from the Site need to be evaluated within the relative context of the baseline contaminant fluxes transported within the Back River itself.

The transport of COCs from the watershed via surface runoff and tidal exchange occurs in the dissolved phase and as suspended matter. Suspended matter originates from the erosion of watershed soils and the re-suspension of sediments from the bed of streams and wetlands. The ultimate fate of potential COCs transported in runoff is the Back River. The two COCs associated with the Site, PCBs and lead, have a tendency to partition strongly with the soil or sediments. This is confirmed with Site-specific data (for lead and PCBs) which show order of magnitude differences in analytical results between the dissolved and total fractions for aqueous samples (See Tables 7 and 8). As a result, solid phase transport is the dominant form of transport and is significantly greater than dissolved phase transport. Given the affinity of the COCs for soil/sediments, solids transport via erosion/sediment re-suspension can serve as a surrogate for the COC transport.

Soil erosion and sediment re-suspension depend on the erodability of the soils/sediments, the topography/bathymetry of the area, runoff volume, and vegetation cover. The key question in the analysis of the transport mechanisms to the Back River is to determine whether such transport can significantly impact the water quality in the Back River. As part of the Patapsco/Back River Watershed SWMM Model report, the MDE estimated the surface runoff and sediment transport from the Back River Watershed (MDE, 2002). The annual watershed runoff and sediment load were estimated as 23 million gallons/acre and 200 lb/acre, respectively. Based on topographic maps, the sub-watershed that contains the Site is roughly 350 acres and slopes down towards the Back River. The Site itself, however, is less than 1% of its sub-watershed area.

Assuming for the sake of this discussion that the Site is 2.49 areas in size (the area of Parcel 425) and the sediment runoff characteristics of the Site behave consistent with the rest of the watershed, the potential annual input of water and solids from the Site to the Back River would be approximately 57 MG and 0.22 metric tons per year. In addition, as discussed further below, this is a worst-case scenario because the topography and structural make up of the wetlands act as like a sink, thereby further minimizing sediment transport.

A review of local conditions further supports the small scale of potential transport from the Site, particularly suspended particulate matter. The wetlands adjacent to the Site generally serve as a sink for solids derived from the Site. Similarly, the wetlands themselves are unlikely to yield solids to the Back River. The high organic content of the sediments in the wetlands combined with the dense vegetative cover, as denoted by the wetland delineation report (ENSAT, 2002), will retard the transport of sediment off-Site. With the small watershed and accompanying small volume of runoff, water velocities within these wetlands will not be sufficient to re-suspend a significant mass of soils from the wetlands sediments. Water levels within the wetlands may be influenced to a limited degree by tidal exchange. However, the limited tidal range (approximately 2 ft (ENSAT, 2005)) and the inherent structure of the wetland itself (broad areas with thick vegetative cover) further limit the movement of solids from the wetlands to the Back River. It is likely that the wetlands (Southeast Finger, Pond, and Southwest Finger) adjacent to the Site will be a sink for solids from the Back River.

The above discussion is supported by the historic sediment data (ENSAT, 2005) and new EOCS data collected from the Back River. At least 18 samples have been collected from the sediments of the Back River just south of the shore line of the Site (ENSAT, 2005). PCBs (Aroclor method) from the historic data were non-detect in all samples (with detection limits generally less than 0.030 mg/kg) with the exception of one sample (Figure 15). PCBs (homologue method) detected in the two EOCS sediment samples in the Back River reported concentrations of only 0.0003735 and 0.067 mg/kg. The higher concentration was from a worst-case scenario location, directly down gradient of the hot spot area in the Southeast Finger (Figure 15). The maximum concentration of lead detected for all samples in the Back River was only 68 mg/kg (Figure 15). This empirical data supports the conclusion that the Site, under its past and existing conditions, has not and is not affecting the sediment quality of the Back River at concentrations of concern.

The small scale of any potential solids transport from the Site is further illustrated by a comparison to the total sediment transport in the Back River itself. An estimate of the solids load carried by the Back River requires information on the tidal characteristics, the channel geometry and suspended solids concentrations in the Back River. During water level monitoring in 2002, a maximum daily tide of about 2 ft was reported for the Back River (ENSAT, 2005). The average depth of the Back River at a cross section close to the Site is approximately 6ft. It is estimated that about 1,100 MG of water flows past the Site in the Back River on every tidal cycle. The MDE measurements of suspended solids in the Back River suggest that a median value of about 25 mg/L is a representative long-term concentration (MDE, 2002). Therefore, the total solids transported per tidal cycle past the Site is approximately 103 metric tons. On an annual basis, about 800,000 MG of water and 75,000 metric tons of solids flow past the Site via the Back River. The annual loads from the “sub-watershed area” containing the Site (8,200 MG and 32 metric tons) are also insignificant compared to the tidal exchange that occurs in the Back River. The annual loads from the Site (57 MG flow and 0.22 metric tons) are also insignificant compared to the tidal exchange that occurs in the Back River. The sediment load from the Site represents approximately only 0.0007% of the total sediment load being transported in the Back River. Furthermore, given the preference for sorbing to the particles, dissolved phase concentrations of COCs are an order of magnitude lower than particulate phase and given the small scale of runoff relative to the volume of water in the Back River, it is highly unlikely that the surface water pathway represents an important source of contaminants to the Back River.

In addition to the minimal transport of contaminants via surface water/sediment, the Coalition proposes to remove source areas of PCBs and Lead in soil and sediment as discussed in Section 5.5. As a result, this will further decrease, if not eliminate, the already minimal contribution of COCs into the Back River.

5.1.2 Groundwater Transport

In order to evaluate the potential for groundwater containing dissolved PCBs discharging to and negatively impacting the Back River, the data developed as part of this EOCS was reviewed as follows. Figure 17 summarize the reported distribution of PCB homologues in the down gradient monitoring wells at the Site (MW-1R, MW-2 and MW-3). The results are presented as the percentage of each homologue to the total PCB concentration for each sample [(Homologue / Sum of Homologues) x 100)]. For the purposes of this discussion the filtered data was used since the PCBs present in the dissolved state would have the greatest potential to migrate in groundwater and discharge off-Site. Further, only the down gradient wells were summarized (MW-1R, MW-2 and MW-3) since these wells more closely represent the potential groundwater quality discharging to the river. As demonstrated in Figure 17, the PCB signature identified in groundwater is dominated by the Mono, Di, Tri, and Tetra chlorinated biphenyls. Relatively small amounts of the Penta and Hexa chlorinated homologues are present, and essentially none of the more highly chlorinated homologues (Hepta, Octa, Nona, and Deca) are present in groundwater.

Figures 18 present the homologue distribution data for the two filtered surface water samples collected from the Back River as part of the EOCS investigation. These figures demonstrate a dramatically different distribution of the homologues in the Back River samples as compared to groundwater. The Back River distribution reflects the presence of the more highly chlorinated homologues, with significant concentrations of the Penta and Hexa chlorinated species. Further, the Back River water data reflects the presence of the Hepta, Octa, Nona and Deca chlorinated homologues as a more significant percentage of the total PCBs.

Figure 19 provides a comparison of the homologue distribution between groundwater and the Back River water. These data clearly demonstrate that there are other source(s) of PCBs to the Back River and the Site groundwater is likely not a significant contributor to the presence of PCBs in surface water in the Back River. A number of the homologues present in surface water are simply not present in groundwater at the Site and the distribution pattern of the PCB homologues in surface water is different from that in the groundwater.

This data is consistent with the fact that the potential rate of groundwater discharge to the Back River is too insignificant to have any material impact on surface water quality. This is described further as follows.

The diffuse discharge of groundwater to a surface water body is defined by the following equation:

$$Q \quad = (K)(I)(A)$$

Where:

Q = volumetric discharge rate of groundwater (cubic feet per day)
K = hydraulic conductivity of the aquifer (feet per day)
I = groundwater gradient (foot per foot)
A = cross sectional area for the discharge (square feet)

For the Site, the cross sectional area of the discharge is estimated as the approximate 300 foot shoreline at a depth of ten feet, or 3,000 ft^2 ($A = 3,000\ ft^2$). The groundwater gradient was measured at 0.003 ft/ft in the monitoring wells (I = 0.003). In order to estimate the hydraulic conductivity, Site-specific data from the 2005 RI Report by ENSAT were used. These data were the result of geotechnical laboratory testing of samples collected from the borings of the monitoring wells. Hydraulic conductivity testing of five soil samples collected from the aquifer being monitored was conducted. The results ranged from 7.70E-08 cm/sec to 5.30E-05 cm/sec. The mean of the five results was 1.63E-05cm/sec, or 4.62E-02 ft/day (K = 0.0462 ft/day). Based on the above, using the mean hydraulic conductivity for the soil, the estimated rate of groundwater discharge from the Site would only be approximately 0.4158 cubic feet per day (approximately 3.11 gallons per day). Furthermore, if we consider the highest reported total PCB concentration of 0.00019 mg/L (7.197E-4 mg/gallon) recently reported at down gradient well MW-2, this results in a mass flux of only 0.002 mg/day.

For the Back River, as previously discussed, it is estimated that approximately 800,000 MG of water flows past the Site per year (or approximately 2,200 MG per day). Thus, the discharge of groundwater from the Site, approximately 3.11 gallons per day, would be diluted by the 2,200 MG per day of flow past the Site. Therefore, the groundwater discharging from the Site would be diluted by a factor of approximately 707,000,000 (2,200,000,000 divided by 3.11). Intuitively, this rate of dilution is consistent with the small land mass associated with the Site relative to the watershed of the Back River. Given the relatively low concentrations of PCBs detected in the groundwater at the Site, one would not be expected to detect the contribution of the Site on the background concentrations of PCBs identified in the surface water even understanding that there may be a zone of mixing adjacent to the Site. This analysis is consistent with the observations already made above concerning the inconsistent distribution of the PCB homologues in the surface water relative to the groundwater at the Site.

In addition to the minimal transport of PCBs and lead via groundwater, the Coalition proposes to remove source areas of PCBs and lead in soil and sediment as discussed in Section 5.5. As a result, this will further decrease, if not eliminate, the already minimal contribution of PCBs and lead into the Back River.

5.2 Future Use of Parcel 425

EPA has expressed its intention to treat Parcel 425 and the surrounding properties as being part of a "residential setting". While it is apparent that the areas east of Parcel 425 are in a residential setting, the current and likely future use of Parcel 425 should not be treated as a "strictly residential property." The Site has not been a residential Site in the past, nor is it now. Past usage of the area (as provided in the Site history) was for non-residential purposes. This is consistent with EPA's view of Parcel 425 as expressed in a letter dated April 24, 2007 (EPA, 2007a), the Action Memorandum, the absence of residences, and partially fenced perimeter. Furthermore, it is the Coalition's intention, based upon representations made by the current owner of Parcel 425, to place deed restrictions and restrictive covenants on Parcel 425, expand the current fenced area, and maintain the fenced perimeter with placards; thereby preventing residential access/use. It is proposed that portions of Parcel 425, as well as the surrounding Parcels, be remediated as described in Section 5.5.

5.3 Evaluation of EPA's Proposed Cleanup Goals

EPA Region III proposes cleanup levels for a Time Critical Removal Action at the Site in its Action Memorandum of September 27, 2005 (EPA, 2005b).

The cleanup values contained in the Action Memorandum are:

- Soils
    - Lead: 400 mg/kg
    - Total PCBs: greater than 100 mg/kg removed from the Site
      greater than 1 mg/kg capped.
- Sediments
    - Lead: 130 mg/kg
    - Total PCBs: 0.033 mg/kg

As established herein, the Action Memorandum proposed cleanup values depart from values that: (a) were recommended by the Region III Biological Technical Assistance Group for this Site (EPA, 2005a); (b) are set forth in current regulations and EPA guidance[1]; (c) are set forth in established Region III cleanup requirement precedents; and

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[1] Lead in Paint, Dust, and Soil - Interpretive Guidance for the Federal Program TSCA Sections 402/403 - Lists of Q/A Documents. Available at http://www.epa.gov/lead/pubs/iglist.htm #scope and applicability. (last accessed 2 February 2007). The rule notice states on page 1234 that "[t]he 400 mg/kg screening level identified in the OSWER soil lead guidance is consistent with both the children's play area hazard determination identified in this rule and the initial candidate hazard level discussed in this preamble. Site-specific information at hazardous waste sites would provide a basis to identify a different soil lead level that would be protective of health. The TSCA soil hazard levels of 400 mg/kg (play areas) and an average 1,200 kg/mg (rest of yard) should not be understood as a minimum cleanup level for lead in soils at hazardous waste sites and levels greater than these could be consistent with CERCLA requirements, depending on site-specific factors. Soil lead levels less than these still may pose serious health risks and

(d) that would otherwise be developed using site-specific risk-based methods. As a result, and as stated previously, the cleanup levels set forth in the Action Memorandum are considered inappropriately low. Based on the extensive Site characterization data available, Pirnie provides the following specific observations regarding EPA's proposed cleanup levels for the Site.

5.3.1 Lead/Soils

The Action Memorandum identified a 400 mg/kg cleanup level for lead in soil based on OSWER directives 9355.4-12 (issued July 12, 1994) and 9200.4-27P (issued August 1998).

a. Accuracy and Applicability of Cited Regulations for Lead

The Action Memorandum inaccurately presents the soil lead value of 400 mg/kg as an OWSER guidance numerical *cleanup* standard. The 1998 OSWER guidance states (emphasis added):

> *"The existing directive established a streamlined approach for determining protective levels for lead in soil at CERCLA sites and RCRA facilities as follow:*
>
> - *It recommends a 400 mg/kg* ***screening level*** *for lead in soil* ***at residential properties;"***

The 1994 OSWER guidance explains the difference between screening levels and cleanup goals as (bold - emphasis added; capitalized - emphasis in the original):

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may warrant timely response actions including abatement. The hazard standard in this TSCA rule was intended as a ''worst first'' level that will aid in setting priorities to address the greatest lead risks promptly at residential and child-occupied facilities affected by lead-based paint. (emphasis added)"

Lead; Identification of Dangerous Levels of Lead; Final Rule, 66 Fed. Reg. 1206, 1240 (January 5, 2001) (to be codified as 40 C.F.R. pt. 745). Cf. 40 C.F.R. § 745.65(c). "Soil-lead hazard. A soil-lead hazard is bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 parts per million (µg/g) in a play area or average of 1,200 parts per million of bare soil in the rest of the yard based on soil samples."

OSWER Directive 9355.4-12 at 2, 3.

Soil Screening Guidance: User's Guide. OSWER Publication 9355.4-23. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1996. (See § 1.1 Purpose.)

40 C.F.R. § 761.61(a)(4)(i)(B)(3). "Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 mg/kg and ≤100 mg/kg if the site is covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section."

> *"**Screening levels are not cleanup goals**. Rather, these **screening levels may be used as a tool to determine which sites or portions of sites do not require further study** and to encourage voluntary cleanup. Screening levels are defined as a level of contamination above which there may be enough concern to warrant site-specific study of risks. **Levels of contamination above the screening level would NOT automatically require a removal action, nor designate a site as contaminated.**"*

The EPA's soil screening value of 400 mg/kg is specifically developed on the basis of a clearly defined exposure scenario for a child in a residential setting as assessed using the Integrated Exposure Uptake Biokinetic Model (EPA, 1994). This is the same technical approach used by EPA for its TSCA §§ 402/403 guidance[2] and recent "Lead; Identification of Dangerous Levels of Lead" rule[3]. The 1994 OWSER directive clarifies and reconciles the numerical values associated with the TSCA and CERCLA/RCRA programs as follows (emphasis added):

> *"Both the TSCA Section 403 and OSWER programs use a flexible, tiered approach. The **OSWER guidance sets a residential screening level at 400 mg/kg**. As noted above, **this is not intended to be a cleanup level for CERCLA** and RCRA facilities, but only to serve as an indicator that further study is appropriate. The **Section 403 guidance indicates that physical exposure-reduction activities may be appropriate at 400 mg/kg, depending upon site-specific conditions such as use patterns, populations at risk and other factors**. Although worded somewhat differently, the guidances are intended to be similar in effect. **For neither***

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[2] Lead in Paint, Dust, and Soil - Interpretive Guidance for the Federal Program TSCA Sections 402/403 - Lists of Q/A Documents. Available at http://www.epa.gov/lead/pubs/iglist.htm #scope and applicability. (last accessed 2 February 2007). The rule notice states on page 1234 that "[t]he 400 mg/kg screening level identified in the OSWER soil lead guidance is consistent with both the children's play area hazard determination identified in this rule and the initial candidate hazard level discussed in this preamble. Site-specific information at hazardous waste sites would provide a basis to identify a different soil lead level that would be protective of health. The TSCA soil hazard levels of 400 mg/kg (play areas) and an average 1,200 kg/mg (rest of yard) should not be understood as a minimum cleanup level for lead in soils at hazardous waste sites and levels greater than these could be consistent with CERCLA requirements, depending on site-specific factors. Soil lead levels less than these still may pose serious health risks and may warrant timely response actions including abatement. The hazard standard in this TSCA rule was intended as a ''worst first'' level that will aid in setting priorities to address the greatest lead risks promptly at residential and child-occupied facilities affected by lead-based paint. (emphasis added)"

[3] Lead; Identification of Dangerous Levels of Lead; Final Rule, 66 Fed. Reg. 1206, 1240 (January 5, 2001) (to be codified as 40 C.F.R. pt. 745). Cf. 40 C.F.R. § 745.65(c). "Soil-lead hazard. A soil-lead hazard is bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 parts per million (µg/g) in a play area or average of 1,200 parts per million of bare soil in the rest of the yard based on soil samples."

> ***guidance is 400 mg/kg to automatically be considered a cleanup level;*** *instead, it indicates a need for considering further action, but not necessarily for taking action. Neither is meant to indicate that cleanup is necessarily appropriate at 400mg/kg. The greater emphasis in this OSWER guidance on determining the scope of further study reflects the fact that both CERCLA and RCRA cleanups proceed in stages with detailed site characterization preceding response actions in every case.*
>
> *Above the 400 mg/kg level, the Section 403 guidance identifies ranges over which various types of responses are appropriate, commensurate with the level of potential risk reduction, and cost incurred to achieve such risk reduction. For example, in the range of 400 to 5000 mg/kg, limited interim controls are recommended depending, as noted above, on conditions at the site, while above 5000 mg/kg, soil abatement is recommended. ”*[4]

Thus, pursuant to TSCA and other relevant guidance, while an average of 400 mg/kg may be an appropriate clean-up level for play areas on residential properties, a cleanup level of average concentration of 1,200 mg/kg on non-residential properties or low contact areas is also appropriate pursuant to TSCA (40CFR 745.65(c)).

b. Decision Precedents

Notably, EPA Region III has established soil cleanup levels for lead in soils consistent with the regulations and guidance discussed above in Section 5.3.1(a) at several sites as follows:

- Abex Corporation (EPA/AMD/R03-94/190) – 500 mg/kg for residential areas and 1,000 mg/kg for industrial
- Browns Battery Breaking (EPA/ROD/R03-92/150) - 1,000 mg/kg
- Jack’s Creek, Sitkin Smelting and Refining Inc. (EPA/ROD/R03-97/087) - 1,000 mg/kg
- MW Manufacturing (EPA/ROD/R03-98/013) – 1,000 mg/kg
- Westinghouse Electric Corp. (EPA/ROD/r03-00/063) – 1,000 mg/kg
- Tonolli Corp. (EPA/ROD/R03-92/156) – 1,000 mg/kg
- E.I. DuPont Nemours & Co., Inc. (EPA/ROD/03-93/170) – 1,000 mg/kg

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[4] OSWER Directive 9355.4-12 at 2, 3.

5.3.2 PCBs/Soils

The Action Memorandum identifies a tiered PCB cleanup approach for Site soils. All soils with levels above 100 mg/kg are to be removed from the Site, and those soils containing more than 1 mg/kg are to be contiguously capped.

a. Accuracy and Applicability of Cited Regulations

While the Action Memorandum appropriately notes that TSCA's self-implementing cleanup provisions for PCB wastes are not binding on CERCLA removal actions,[5] TSCA does, however, provide procedural and numerical standards for PCB wastes on site. These standards are predicated on the following set of nominal site conditions, as described in § 761.61(a) and which the Coalition submits are consistent with the Site:

> *"**Self-implementing on-site cleanup and disposal of PCB remediation waste**. EPA designed the self-implementing procedure for a general, moderately-sized site where there should be low residual environmental impact from remedial activities. The procedure may be less practical for larger or environmentally diverse sites. For these other sites, the self-implementing procedure still applies, but an EPA Regional Administrator may authorize more practical procedures through paragraph (c) of this section. Any person may conduct self-implementing cleanup and disposal of PCB remediation waste in accordance with the following requirements without prior written approval from EPA."*

Thus, for sites meeting the foregoing conditions for PCBs, the S*elf-implementing on-site cleanup and disposal of PCB remediation waste* (40 CFR 761.61(a)) sets cleanup levels for the remediation of bulk PCB remediation waste (40 CFR 761.61 (a)(4)(i)). Specifically, for High Occupancy Areas a cleanup level of ≤ 1 mg/kg without further conditions is provided for, (40 CFR761.61 (a)(4)(i)(A)), and for Low Occupancy Areas (40 CFR 761.61 (a)(4)(i)(B)), cleanup levels > 25 mg/kg and ≤ 50 mg/kg are acceptable if the site is secured by a fenced and marked with appropriate signage (40 CFR 761.61 (a)(4)(i)(B)(2)).

b. Decision Precedents

Once again, EPA Region III has identified PCB surface soil cleanup levels consistent with the above cited regulations and guidance at other sites as follows:

- 25 mg/kg at the Westinghouse Electric Sharon Plant (EPA/ROD/R03-00/063);

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[5] 40 C.F.R. 761.61(a)(1)(ii). "The self-implementing cleanup provisions shall not be binding upon cleanups conducted under other authorities, including but not limited to, actions conducted under section 104 or section 106 of CERCLA, or section 3004(u) and (v) or section 3008(h) of RCRA."

- 25 mg/kg at Metal Banks (EPA/ROD/R03-98/012);
- 25 mg/kg (industrial) at the Paoli Rail Yard (EPA/ROD/R03-92/151); and
- 25 mg/kg Aberdeen Proving Ground (Edgewood Area) (EPA/ROD/R0396/228).

5.3.3 Lead/Sediments

a. Accuracy and Applicability of Cited Regulations/Authority

EPA's proposed cleanup level of 130 mg/kg for lead in sediments is based on a consensus value (128 mg/kg) derived from study results contained in a large national database. However, as set forth in detail below, past cleanup goals at other sites in EPA Region III range from 30 to 500 mg/kg, reflecting the site-specific variability of conditions that OSWER directives require consideration of in establishing such levels. More specifically, EPA Region III's BTAG issued a memo that specifically recommends a goal of 400 mg/kg as the criteria for marine sediments.

In addition, the shoreline sediments bordering the site in the Back River demonstrate compliance (based on available data) with the Action Memorandum proposed cleanup level; however, the sediments (as defined in the past reports) collected in the uplands area (i.e., Wetland Fingers) do not. As a result, Pirnie believes that the samples collected in the uplands should be differentiated between saturated soils (and thus are more appropriately regulated as soils) which occasionally support standing water, and those that support an aquatic ecosystem. Furthermore, wetlands commonly act as sinks because they contain elevated levels of sulfides and organic carbon. The sulfides limit the bioavailability and toxicity of lead, and methods for adjusting concentrations to account for this reduction in bioavailability should be considered.

b. Review of Decision Precedents

Similar to the discussion above regarding appropriate soil cleanup standards, EPA Records of Decision (RODs) addressing freshwater sediment contamination reinforce the variability associated with freshwater sediment cleanup levels. A review of previous EPA decisions in Region III reveals the following levels have been used:

- C&D Recycling Site in Foster Township, PA (EPA/ROD/R03-92/154): 500 mg/kg
- H&H Inc. Burn Pit in Farrington, VA (EPA/ROD/R03-95/196): 200 mg/kg
- USA Vint Hill Farms Station (EPA/ROD/R03-99/018): 465 mg/kg

5.3.4 PCBs/Sediment

The Action Memorandum proposes a PCB sediment cleanup goal of 0.033 mg/kg. To demonstrate compliance, the Action Memorandum requires total PCB to be calculated using analytical techniques that determine the concentrations of the specific congeners or homologues. These individual congener results are then summed to report a total PCB concentration. The Action Memorandum-proposed sediment cleanup value of 0.033 mg/kg references a document entitled: *Bioaccumulation-based Sediment Quality Criteria for the Protection of Human Health*, published by the Delaware Department of Natural Resources (Green, 1997).

a. Accuracy and Applicability of the Cited Investigation

At the outset, the EPA Region III BTAG coordinator recommended 1 mg/kg sediment PCBs as both the area precedent and a reasonable value for this particular site (EPA, 2005a). This value reflects the BTAG's understanding of both the Site's ecological setting and the nature of the background PCB contamination found in the Back River.

Notwithstanding this recommendation, EPA's proposed cleanup level (0.033 mg/kg) is based on a paper published by the State of Delaware (the Green Paper) that has no statutory authority or precedent. Specifically, the Green Paper was developed and published by the Delaware Department of Natural Resources. The paper is not referenced by the State of Maryland's Hazardous Waste Division as a guidance document, or as a source of information. The State of Delaware does not cite this document in its Remediation Standards Guidance (DDNREC, 1999). The document is not provided or referenced on the State of Delaware's Department of Natural Resources and Environmental Control web site.[6] Furthermore, as set forth herein, this reference work does not comply with current EPA guidance regarding the calculation of human health risks or risk-based cleanup levels.

For the purposes of further discussion, we separate the sediments that exist on the Site as part of wetland environments (e.g., Wetland Fingers and Pond) that are not directly connected to Back River, and those near-shore sediments in the Back River at the Site.

i. Wetland Sediments

In the wetland sediments, the inappropriateness of the Action Memorandum's proposed cleanup level is readily apparent because the exposure pathway the cleanup level is based on does not exist, or exists too infrequently to be considered. The scientific assumptions behind Green (1997) as stated are (emphasis added):

> *"Fish consumption rates for these three groups were taken from a creel study of Delaware anglers conducted in1992/1993. That study covered the **area of the Delaware Estuary between the PA/DE border down to Cape Henlopen**. The average fish consumption rate for the three groups was reported as 0.0175 kg/d, 0.0159 kg/d, and 0.0059 kg/d."*

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[6] http://www.dnrec.delaware.gov/, last accessed 11 February 2007.

> *"For purposes of the carcinogenicity assessment,* ***exposure duration*** *for the two adult groups was assumed to be 30 years..."*
>
> *"For a typical PCB concentration of 1 mg/kg in the edible muscle of striped bass, channel catfish, or white perch, lifetime cancer risk …".*

The small ponds scattered around the uplands portion of the site do not support populations of sport fish similar to those being evaluated in Green (1997) paper. Similarly, sport fish larger than fingerlings are unlikely present in the small wetland fingers bordering Parcel 425. Even if some harvest of biota did occur on this site, it is unreasonable to assume the site could support even a fraction of the use by recreational fishermen as that represented in Green's Delaware River survey.

ii. Near-Shore Back River Sediment

In the Back River itself, recreational sport fishing is a reasonable assumption. Notwithstanding the propriety of a recreational fishing assumption for the Back River, concerns about the appropriateness of the Action Memorandum's proposed cleanup levels in this environment remain. Just as with the wetland fingers, the Action Memorandum's proposed cleanup level as applied to the Back River is inappropriate because: (1) it has not been adjusted to take into account site-specific factors; (2) the ingestion rates are based on a study that has not received external peer review; and (3) the Biota Sediment Accumulation Factors (BSAFs) are not calculated in a scientifically defensible manner.

1. Site-Specific Calculation of Human Health Risks

EPA established risk-based methods for determining human health risks and setting remediation goals to protect human health for various media including sediments with its publication *Risk Assessment Guidance for Superfund.*[7] Exhibit 6-17 of this EPA guidance details the mathematical equation and variables used in calculating exposure to a human receptor via ingestion of contaminated fish and shellfish.

While Green (1997) generally followed this approach; they do not identify or include the variable "FI" defined by EPA as the *Fraction Ingested from Contaminated Source*. The purpose of this variable is to modify the exposure estimate to account for the percentage of total exposure attributable to the site being evaluated. Green (1997) ignores this parameter, in effect setting this parameter value to 100 percent. This results in an assumption that an individual's fish ingestion is entirely from a recreational catch in the Back River at the shoreline of the Site.

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[7] EPA/540/1-89/002.

Green (1997) document identifies a large part of the Delaware River as the paper's study area. As such, it may be more appropriate to assume the recreational fisher interviewed could obtain 100 percent of their fish diet fraction from the catch area. However, by adopting a cleanup level for this Site without accounting for a very limited FI value in its own exposure calculation, EPA has inappropriately and inaccurately applied their guidance. As a result, EPA significantly overestimates the exposure and associated risk to site sediment contaminants and identifies an inappropriate cleanup level for the river sediments.

2. Calculation of Relevant Exposure Factors

In 1997, EPA's National Center for Environmental Assessment published the Exposure Factors Handbook. This reference work is a multi-volume review of available information related to exposure assumptions relevant to human health risk assessments. The document provides EPA recommendations for specific exposure estimates. Volume 10 specifically reviewed the levels of intake for fish and shellfish (EPA, 1997). In its review and selection of appropriate studies, EPA acknowledges the following (emphasis added):

> " *Survey data on fish consumption have been collected using a number of different approaches which need to be considered in interpreting the survey results. Generally, surveys are either* ***creel studies in which fishermen are interviewed while fishing****, or broader population surveys using either mailed questionnaires or phone interviews.*
>
> *The typical survey seeks to draw inferences about a larger population from a smaller sample of that population. This larger population, from which the survey sample is to be taken and to which the results of the survey are to be generalized, is denoted the target population of the survey. In order to generalize from the sample to the target population,* ***the probability of being sampled must be known for each member of the target population.***
>
> …
>
> *In a creel study, the target population is anyone who fishes at the locations being studied; generally, in a creel study,* ***the probability of being sampled is not the same for all members of the target population****. For instance, if the survey is conducted for one day at a site, then it will include all persons who fish there daily, but only about 1/7 of the people who fish there weekly, 1/30th of the people who fish there monthly, etc. In this example, the probability of being sampled (or inverse weight) is seen*

> *to be proportional to the frequency of fishing. However, if the survey involves interviewers revisiting the same site on multiple days, and persons are only interviewed once for the survey, then the probability of being in the survey is not proportional to frequency; in fact, it increases less than proportionally with frequency.*
>
> …
>
> ***In the published analyses of most creel studies, there is no mention of sampling weights****; by default all weights are set to 1, implying equal probability of sampling. However, since the sampling probabilities in a creel study, even with repeated interviewing at a site, are highly dependent on fishing frequency,* ***the fish intake distributions reported for these surveys are not reflective of the corresponding target populations****. Instead,* ***those individuals with high fishing frequencies are given too big a weight and the distribution is skewed to the right****, i.e., it* ***overestimates*** *the target population distribution.*

In Green (1997), they state (emphasis added):

> " *Fish consumption rates for these three groups were taken from* ***a creel study*** *of Delaware anglers conducted in* ***1992/1993****.*"

While Green's specific creel study was unavailable for review at the time this document was drafted, it seems likely given its date the data were collected that the Green authors would not have had the necessary information to appropriately weight their results and extrapolate them in an unbiased manner. Thus, this study very probably overestimates the actual consumption rates, and does not meet the requirements of such studies as expressed by EPA NCEA.

3. Calculation of BSAFs

The BSAF is a quotient used to estimate the amount of a chemical that would bioaccumulate into the tissue of a fish from a known sediment concentration. As stated by Green (1997),

> " *Finally, a value of 1.85 was specified for the BSAF based upon values reported in the technical literature.*"

No reference to the "technical literature" is provided to substantiate this critical variable. Since the Green (1997) paper itself has not been published in a peer reviewed journal, no other authors have had an opportunity to comment or publish alternative or similar findings. Furthermore, since the BSAF, which is a key factor in developing a tissue concentration from sediment is unreferenced; the resulting cleanup level is inadequately documented and certainly does not meet the scientific standards necessary for use in an enforcement action.

In addition to lack of peer review and documentation, the use of a single BSAF to characterize a mixture of 209 known compounds is inappropriate. The potential for each PCB congener to bioaccumulate in the tissues of an organism is unique and quite variable. BSAF values have been reported to have an average value of about 1.7, but they can range up to two orders of magnitude (DiToro, et al, 1991). For example, BSAFs for accumulation of PCBs from marine sediments by mollusks ranged from 1.7 to 4.6 (Lake et al., 1990). (BSAFs for accumulation by mussels ranged from 0.19 (PCB 209) to 4.74 for PCB 118.) As the PCB mixture at any given site may be quite different, assuming a general literature derived value from another site would have substantial uncertainty and be inappropriate as a basis for establishing a site-specific cleanup level EPA recognition of this is reflected in their recent proposed guidance (emph. added):

> *" Because physical, chemical, and biological properties vary among the individual PCDDs, PCDFs, and PCBs,* ***bioaccumulation factors must also be congener- and species-specific****. Hence, exposure assessments performed in conjunction with the toxicity equivalence methodology will require congener-specific fate and transport information, and risk assessors should consider how to acquire such information." (EPA, 2003)*

b. Review of Decision Precedents

Moreover, once again, the value of 0.033 mg/kg is below other values previously used and approved by EPA Region III as follows:

- 10 mg/kg for sediments at the Marine Corps Combat Development Command, Quantico, VA (Record of Decision EPA/ROD/R03-97/093),
- 1 mg/kg at Paoli Rail Yard (EPA/ROD/R03-92/151),
- 1 mg/kg at Metal Banks (EPA/ROD/R03-98/012), and
- 1 mg/kg at H&H Inc., Burn Pit (EPA/ROD/R03-95/196).

Similarly, at the large and well known Fox River site, the risk-based goal for total PCBs in sediments was identified as 1 mg/kg.

5.3.5 Site-Specific Risk Based Assessment

As set forth in detail in Appendix G, Pirnie believes that a site-specific, risk-based assessment of the Site could likely result in a cleanup goals of equal or greater than the goals/levels established by the appropriate regulations and guidance, and as accepted by EPA Region III as set forth above in Sections 5.3.1, 5.3.2, 5.3.3 and 5.3.4.

Further discussion on the appropriateness and relevance of the cleanup levels proposed in the EPA Am is provided in Appendix G.

5.4 Recommended Cleanup Goals

A Site-specific cleanup goal analysis as proposed in the RAP should be considered to develop appropriate risk-based cleanup goals. If such an approach is disallowed or otherwise not sufficiently timely in meeting EPA's concerns for the Site then the use of established regulatory and / or regional cleanup precedents should be employed. This would result (based upon the analysis set forth in Section 5.3) in the following recommended cleanup values for the Site:

Media	PCB Cleanup Goal	Lead Cleanup Goal
Soil – Residential	1 mg/kg	400 mg/kg
Soil – Nonresidential (425)	50 mg/kg	1200 mg/kg
Sediment – Back River	1 mg/kg	130 mg/kg
Sediment – Wetland Fingers	1 mg/kg	130 mg/kg

The following discusses these proposed cleanup levels. These recommendations are divided into three categories; residential (high occupancy area) properties, non-residential (low occupancy) property, and sediment.

Residential Property

For the properties other than Parcel 425, it is proposed that the remedial action goal be 1 mg/kg consistent with the requirements of the self implementing rule of TSCA. 40 CFR 761.61 (a)(4)(i)(A) which states:

> "A) High occupancy areas. The cleanup level for bulk PCB remediation waste in high occupancy areas is ≤1 mg/kg without further conditions."

For lead, the recommended cleanup level is 400 mg/kg in play areas consistent with the TSCA regulation previously cited.

Parcel 425

It is proposed that Parcel 425 be treated as a "low occupancy area" consistent with the requirements of the TSCA self implementing rule for PCBs (40 CFR 761.61(a)(4)(i)(B). Of the various options available for the Site under the Regulations, the option at 40 CFR 761.61(a)(4)(i)(B)(2), is proposed:

> "Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 mg/kg and ≤50 mg/kg if the site is secured by a fence and marked with a sign including the ML mark."

As part of this remedy, the appropriate deed notice and fence maintenance for Parcel 425 will be completed consistent with paragraph 40 CFR 761.61 (a)(8).

For lead, the proposed cleanup level is an average of 1,200 mg/kg as previously discussed for low contact soil.

Sediment

For sediment, the proposed remedial action level is 1 mg/kg for PCBs, which is the value used by EPA Region III has used a numerous Superfund Sites as documented in various RODs. There is no reason why the Site warrants any more stringent criteria than EPA typically applies at larger, more substantial sites. This was also the value recommended by BTAG for this Site.

For lead, the sediment cleanup value in the Action Memorandum of 130 mg/kg is proposed for adoption.

5.5 Implementation of Conceptual Remedial Activities

At the request of EPA to the Coalition in past meetings and teleconferences, the following conceptual remediation plan for the Site is being put forward. This remediation plan would be further refined as the project evolves from the characterization phase (i.e., EOCS) into the cleanup goal analysis and development of the remediation goals (e.g, RAO's) for the site. The intention here is provide a general description of recommended remediation activities that would address the cleanup goals discussed in Section 5.4. Pirnie believes that these recommended activities would address EPA's concern to expeditiously remediate the site, remove the majority of the COC mass presently located on the Site (i.e., hot spot), and address PCB and lead impact to the residential properties at the site and adjacent wetlands.

Thus, based on the current understanding of the Site data and the remedial action criteria recommended above in Section 5.4, the following summarizes the conceptual scope of the remedial activities that are proposed for the Site.

- For the residential parcels, PCBs at a concentration greater than 1 mg/kg will be delineated and excavated. Conceptually, as long as the PCB concentrations do not exceed 50 mg/kg, the excavated soil will be brought back onto Parcel 425. In addition, areas not otherwise excavated for PCBs will be evaluated to determine if the lead concentration on any parcel exceeds 400 mg/kg on average. Additional excavation will be completed on the residential parcels to achieve the average of 400 mg/kg as per the TSCA screening guidance for lead.

- For Parcel 425, PCBs at a concentration exceeding 50 mg/kg will be excavated and disposed of off-Site at a facility consistent with the characteristics of this waste. Areas not otherwise excavated because of the presence of PCBs exceeding the 50 mg/kg criteria will be evaluated to determine if the average lead concentration exceeds 1,200 mg/kg. Additional excavation will be completed to achieve an average concentration of 1,200 mg/kg for lead in surface soil. In addition to the above, the property boundary will be fenced, marked and deed restrictions will be placed on the property consistent with the requirements describe previously.
- For the wetland areas (i.e., Finger Areas), it is proposed to excavate the sediment with PCBs greater than 1 mg/kg and lead greater than 130 mg/kg. As previously stated, the Coalition would like to work with EPA on the scope of this work such that the work can be completed in a manner that minimizes disturbance to these wetlands so that they continue to serve as a buffer to sediment transport from the Site.

All work will be completed pursuant to a work plan and related documents subject to approval by EPA.

5.6 Proposed Meeting

Pirnie recommends that a meeting be held with EPA to review and discuss the contents of the EOCS report prior to the issuance of the next consent agreement. At the meeting, Malcolm Pirnie can present the data and the recommended path forward process in more detail.

6.0 References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.ENSAT, 2002a. Remedial Investigation and Focused Feasibility Study, Sauer Dump, MD-181, 4225 Lynhurst Road, Baltimore, Baltimore County, Maryland, Volume I. July 2002.

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological profile for lead. (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Delaware Department of Natural Resources and Environmental Control (DDNREC, 1999). Remediation Standards Guidance under the Delaware Hazardous Substance Cleanup Act. Revised December 1999. Available at: http://www.dnrec.state.de.us/DNREC2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/RemStnd.pdf. Last accessed 12 April 2007.

DiToro, D.M., C.S.Zarba, D.J.Hansen, W.J.Berry, R.C.Swartz, C.E.Cowan, S.P. Pavlou, H.E.Allen, N.A.Thomas, and P.R.Paquin. 1991. Technical basis for establishing sediment quality criteria for nonionic organic chemicals using equilibrium partitioning. Environ. Toxicol. Chem. 10:1541–1583.31

ENSAT, 2002a. Remedial Investigation and Focused Feasibility Study – Sauer Dump, MD-181, 4225 Lynhurst Road, Baltimore, Baltimore County, Maryland. Volume I and II, July 24, 2002.

ENSAT, 2002b. Baseline Risk Assessment Datascreen for Sauer Dump – Dundalk, Maryland. ENSAT Project No. C01-1490. Environmental Service and Technology Corporation. 8840-D Washington Boulevard, Jessup, Maryland 20794. July 24, 2002.

ENSAT, 2005. Remedial Investigation, Sauer Dump, MD-181, 4225 Lynhurst Road, Baltimore, Baltimore County, Maryland, Volume I and II. August 2005.

EPA, 1991. Risk assessment Guidance for Superfund (RAGS), Volume I – Human Health Evaluation Manual, Part B.

EPA, 1994a. Region III Modifications to National Functional Guideliens for Organic Data Review. September 1994.

EPA, 1994b. Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children. NTIS# PB93-963510, EPA 9285.7-15-1. February, 1994.

EPA, 1997. National Center for Environmental Assessment, Office of Research and Development, EPA Exposure Factors Handbook Volume II, Chapter 10. Intake of Fish and Shellfish.

EPA, 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA 540/R-99/008, October 1999.

EPA, 2003. External Draft Review Copy of the "Framework for Application of the Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans and Biphenyls in Ecological Risk Assessment." EPA/630/P-03/002A.

EPA, 2004. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540/R-04/004, October 2004.

EPA, 2005a. Development of Lead and PCB Sediment Clean Up Levels, Draft Action Memorandum; Sauer Dump; Baltimore, Maryland. Memorandum from Bruce R. Pluta, Coordinator Biological Technical Assistance Group to Richard Rupert (3HS31) Eastern Response Branch. USEPA, 1650 Arch Street, Philadelphia, Pennsylvania 19103-2029. August 30, 2005.

EPA, 2005b. Action Memorandum - Request for Removal Action and Exemption from the $2 Million Statutory Limit at the Sauer Dump Site, Baltimore County, Baltimore. MD. Memorandum from Richard Rupert, On Scene Coordinator Eastern Removal Response Section (3HS31) to Abraham Ferdas, Director Hazardous Sites Cleanup Division (3HSOO), UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION III, 1650 Arch Street, Philadelphia, Pennsylvania 19103-2029. September 26, 2005.

EPA, 2006a. Sauer Dump Site: Administrative Order for Removal Response Action. EPA Docket No. CERC-03-2006-0239DC). August 18, 2006.

EPA, 2006b. Human Health Risk Assessment - Updated Risk Based Concentration Table Cover Memo. U.S. Environmental Protection Agency, REGION 3, 1650 Arch Street, Philadelphia, Pennsylvania 19103. April 2006 Update.

EPA, 2007a. March 30, 2007, Site Status Meeting response letter. April, 24, 2007

EPA, 2007b. Lead in Paint, Dust, and Soil – Interpretive Guidance for the Federal Program TSCA Sections 402/403 – Lists of Q/A Documents. Available at http://www.epa.gov/lead/pubs/iglist.htm#scope%20and%20applicability (last accessed 2 February 2007).

Green, R.W., 1997. Bioaccumulation-based Sediment Quality Criteria for the Protection of Human Health. Delaware Department of Natural Resources and Environmental Control. Dover, DE.

Janssen RPT, Peijnenburg WJGM, Posthuma L, et al. 1997. Equilibrium partitioning of heavy metals in Dutch field soils: I. Relationship between metal partition coefficients and soil characteristics. Environ Toxicol Chem 16(12):2470-2478.

Lake, J.L., N.I.Rubinstein, H.I.I.Lee, C.A.Lake, J.Heltshe, and S.Pavignano. 1990. Equilibrium partitioning and bioaccumulation of sediment-associated contaminants by infaunal organisms. Environ.Toxicol. Chem. 9(8):1095–1106.32

Maryland Department of the Environment (MDE) 2001. State of Maryland, Department of the Environment – Cleanup Standards for Soil and Groundwater, August 2001 Interim Final Guidance (Updated No. 1).

Maryland Department of the Environment (MDE) 2002. Patapsco / Back River Watershed SWMM Model Report.

Malcolm Pirnie, 2006 Response Action Plan – Revision 2 (Final), Sauer Dump Site, Dundalk, Baltimore County, Maryland. November 30, 2006.

Table 1
Data Gap Sample Summary
Extent of Contamination Study
Sauer Dump Site

Area of Concern	Media	Number of Samples	COC	Analytical Method[1]	Rationale
Parcel 425 – Sauer Dump	Surface Soil	2	lead	6010	Samples at the access road entrance onto Parcel 425
			PCBs	8082	
	Groundwater[3]	5	lead	6010	Groundwater sampling at re-installed monitoring wells
			PCBs	1668a and 8082	
The Pond Area - Parcel 574 and 425	Sediment	2	lead	6010	Data-gap sample
			PCBs	1668a and 8082	
Southwest Finger Area – Parcel 574	Sediment	1	lead	6010	Data-gap sample
			PCBs	1668a and 8082	
Parcel 137 [2]	Surface Soil	5	lead	6010	Surface soil sampling in residential areas where EPA has requested additional sampling.
			PCBs	8082	
	Surface Soil	3	lead	6010	Samples from areas with fill material prior to Sauer Dump activities according to aerial photo review by ENSAT 2005 (Background).
			PCBs	8082	
	Sub-surface Soil	3	lead	6010	
			PCBs	8082	
			SVOCs and VOCs	8270 and 8260	
	Surface Soil	5	lead	6010	Samples to document the presence or absence of PCBs or Lead. These samples are an extension of the existing grid to the west.
			PCBs	8082	
	Sub-surface Soil	5	lead	6010	
			PCBs	8082	
			SVOCs and VOCs	8270 and 8260	

Table 1
Data Gap Sample Summary
Extent of Contamination Study
Sauer Dump Site

Area of Concern	Media	Number of Samples	COC	Analytical Method[1]	Rationale
Southeast Finger Area - Parcel 137, 295, and 425	Sediment	4	Metals (lead)	6010	Data-gap samples
			PCBs	1668a and 8082	
South of Parcel 425 – Back River Area	Sediment	2	lead	6010	Confirmation sample for previous sediment and surface water sampling events.
			PCBs	1668a and 8082	
	Surface Water[3]	2	lead	6010	Confirmation sample for previous sediment and surface water sampling events.
			PCBs	1668a and 8082	
Parcel 503 [2]	Surface Soil	9	lead	6010	Surface soil sampling in residential areas where EPA has requested additional sampling in the backyard and driveway area of Parcel 503.
			PCBs	8082	
Parcel 464 [2]	Surface Soil	7	lead	6010	Surface soil sampling in residential areas where EPA has requested additional sampling in the backyard and storage/salvage area of Parcel 464.
			PCBs	8082	

Table 1
Data Gap Sample Summary
Extent of Contamination Study
Sauer Dump Site

Area of Concern	Media	Number of Samples	COC	Analytical Method[1]	Rationale
Parcel 295	Surface Soil	1	lead	6010	Samples to help delinate the extent of the hot spot area. These samples were originally placed within the old surveyed boundaries of Parcel 425. The new survey shows this location within Parcel 295; however, it is within the fenced area.
			PCBs	8082	
	Sub-surface Soil	1	lead	6010	
			PCBs	8082	
			SVOCs and VOCs	8270 and 8260	

Notes:

COCs = Contaminants of Concern.

1 = Groundwater, surface water, and sediment samples were analyzed using Method 1668a as requested by EPA. They were also be analyzed by method 8082.

2 = Additional samples were added to these areas as requested by EPA.

3 = Groundwater and surface water samples were collected for both filtered and unfilterd samples for both lead and PCBs.

1668a = PCB analysis for the 10 homologues (The homologues will be summed to provide the total PCBs).

6010 = EPA Method 6010. Aqueous medias will be sampled for total and dissolved.

8082 = EPA Method 8082 for Aroclors

Table 2
Final Water Quality Field Parameters
Extent of Contamination Study
Sauer Dump Site

Well ID	**MW-1R***	**MW-2**	**MW-3**	**MW-4**	**MW-5**
Date	2/8/2007	2/7/2007	2/8/2007	2/12/2007	2/12/2007
pH (SU)	5.92	6.94	6.55	7.22	8.82
Specific conductance (mS/cm)	1.69	2.13	4.37	2.01	1.54
Turbidity (NTU)	5.8	5.4	6.3	15.1**	6.96
Dissolved Oxygen (mg/L)	0.16	0.17	0.1	0.5	3.4
ORP (mV)	-140	-142	-154	64	-48

Notes:

* = MW-1R is the replacement well for MW-1

** = Tubidity below 10 NTU was not achieveable at MW-4.

SU = standard units; mS/cm = millisiemens per centimeter; NTU = nephelometric turbidity units;
mg/L = milligrams per liter; mV = millivolts

Table 3
Groundwater Elevation Measurements
Extent of Contamination Study
Sauer Dump Site

Date	Well ID	TOC Elevation (ft amsl)*	DTW (ft bgs)	Groundwater Elevation (ft amsl)
2/7/2007	MW-1R	7.26	6.16	1.1
2/7/2007	MW-2	6.66	5.78	0.88
2/7/2007	MW-3	14.73	13.06	1.67
2/7/2007	MW-4	14.99	12.39	2.63
2/7/2007	MW-5	12.38	9.9	2.48

Notes:

ft amsl = feet above mean sea level

ft bgs = feet below ground surface

TOC = top of well casing (Measuring Point)

DTW = depth-to-water as measured from the TOC

* = TOC elevation measured by MD certified surveyor (CDDI) to the nearest 0.01 inch

Table 4
Analytical Results for Surface Soil Samples
Extent of Contamination Study
Sauer Dump Site

Sample **Date Collected**	DG-SS01-0 1/8/2007	DG-SS02-0 1/10/2007	DG-SS03-0 1/9/2007	DG-SS04-0 1/9/2007	DG-SS05-0 1/10/2007	DG-SS06-0 1/9/2007	DG-SS07-0 1/9/2007	DG-SS08-0 1/9/2007
Metals (mg/kg)								
Lead	73.2	260 J	66.1	321	269 J	295	153	269
PCBs by 8082 (mg/kg)								
Aroclor 1016	< 0.041 U	< 0.041 U	< 0.41 U	< 0.039 U	< 0.043 U	< 0.038 U	< 0.044 U	< 0.050 U
Aroclor 1221	< 0.041 U	< 0.041 U	< 0.41 U	< 0.039 U	< 0.043 U	< 0.038 U	< 0.044 U	< 0.050 U
Aroclor 1232	< 0.041 U	< 0.041 U	< 0.41 U	< 0.039 U	< 0.043 U	< 0.038 U	< 0.044 U	< 0.050 U
Aroclor 1242	< 0.041 U	< 0.041 U	< 0.41 U	< 0.039 U	< 0.043 U	< 0.038 U	< 0.044 U	0.097
Aroclor 1248	< 0.041 U	< 0.041 U	< 0.41 U	< 0.039 U	< 0.043 U	< 0.038 U	< 0.044 U	< 0.050 U
Aroclor 1254	1.0	0.59	7.7	1.4	< 0.043 U	0.62	0.72	0.65
Aroclor 1260	0.62	0.74	< 0.41 U	0.72	1.2	0.38	0.36	0.37

Sample **Date Collected**	DG-SS09-0 1/10/2007	DG-SS10-0 1/9/2007	DG-SS11-0 1/9/2007	DG-SS12-0 1/9/2007	DG-SS13-0 1/10/2007	DG-SS14-0 1/9/2007	DG-SS15-0 1/10/2007	DG-SS16-0 1/10/2007
Metals (mg/kg)								
Lead	116 J	69.9	55.6	106	64.7 J	55.8	170 J	440 J
PCBs by 8082 (mg/kg)								
Aroclor 1016	< 0.052 U	< 0.047 U	< 0.043 U	< 0.042 U	< 0.045 U	< 0.044 U	< 0.046 U	< 0.150 U
Aroclor 1221	< 0.052 U	< 0.047 U	< 0.043 U	< 0.042 U	< 0.045 U	< 0.044 U	< 0.046 U	< 0.150 U
Aroclor 1232	< 0.052 U	< 0.047 U	< 0.043 U	< 0.042 U	< 0.045 U	< 0.044 U	< 0.046 U	< 0.150 U
Aroclor 1242	< 0.052 U	< 0.047 U	< 0.043 U	< 0.042 U	< 0.045 U	< 0.044 U	< 0.046 U	< 0.150 U
Aroclor 1248	< 0.052 U	< 0.047 U	< 0.043 U	< 0.042 U	< 0.045 U	< 0.044 U	< 0.046 U	< 0.150 U
Aroclor 1254	< 0.052 U	0.012 J	0.0068 J	0.12	< 0.045 U	0.084	< 0.046 U	1.4
Aroclor 1260	0.28	0.019 J	0.0083 J	0.22	0.085	0.054	0.42	2.6

Table 4
Analytical Results for Surface Soil Samples
Extent of Contamination Study
Sauer Dump Site

Sample **Date Collected**	DG-SS17-0 1/11/2007	DG-SS18-0 1/11/2007	DG-SS19-0 1/11/2007	DG-SS20-0 1/11/2007	DG-SS21-0 1/11/2007	DG-SS22-0 1/11/2007	DG-SS23-0 1/11/2007	DG-SS24-0 1/23/2007
Metals (mg/kg)								
Lead	198 J	363 J	114 J	130 J	324 J	140 J	205 J	2720
PCBs by 8082 (mg/kg)								
Aroclor 1016	< 0.055 U	< 0.049 U	< 0.037 U	< 0.043 U	< 0.056 U	< 0.059 U	< 0.053 U	< 4.8 U
Aroclor 1221	< 0.055 U	< 0.049 U	< 0.037 U	< 0.043 U	< 0.056 U	< 0.059 U	< 0.053 U	< 4.8 U
Aroclor 1232	< 0.055 U	< 0.049 U	< 0.037 U	< 0.043 U	< 0.056 U	< 0.059 U	< 0.053 U	< 4.8 U
Aroclor 1242	< 0.055 U	< 0.049 U	< 0.037 U	< 0.043 U	< 0.056 U	< 0.059 U	< 0.053 U	< 4.8 U
Aroclor 1248	< 0.055 U	< 0.049 U	< 0.037 U	< 0.043 U	< 0.056 U	< 0.059 U	< 0.053 U	< 4.8 U
Aroclor 1254	< 0.055 U	0.91	< 0.037 U	< 0.043 U	< 0.056 U	< 0.059 U	0.051 J	48
Aroclor 1260	0.49	1.5	0.041	0.036 J	0.26	0.14	0.12	< 4.8 U

Parameters **Date Collected**	DG-SS25-0 1/23/2007	DG-SS26-0 1/23/2007	DG-SS27-0 1/23/2007	DG-SS28-0 1/23/2007	DG-SS29-0 1/23/2007	DG-SS30-0 1/23/2007	DG-SS31-0 1/24/2007	DG-SS32-0 1/24/2007
Metals (mg/kg)								
Lead	415	188	58.6	24.2	28.1	22.1	137	80.4
PCBs by 8082 (mg/kg)								
Aroclor 1016	< 0.058 U	< 0.052 U	< 0.037 U	< 0.038 U	< 0.046 U	< 0.041 U	< 0.042 U	< 0.044 U
Aroclor 1221	< 0.058 U	< 0.052 U	< 0.037 U	< 0.038 U	< 0.046 U	< 0.041 U	< 0.042 U	< 0.044 U
Aroclor 1232	< 0.058 U	< 0.052 U	< 0.037 U	< 0.038 U	< 0.046 U	< 0.041 U	< 0.042 U	< 0.044 U
Aroclor 1242	< 0.058 U	< 0.052 U	< 0.037 U	< 0.038 U	< 0.046 U	< 0.041 U	< 0.042 U	< 0.044 U
Aroclor 1248	< 0.058 U	< 0.052 U	< 0.037 U	< 0.038 U	< 0.046 U	< 0.041 U	< 0.042 U	< 0.044 U
Aroclor 1254	0.091	< 0.052 U	< 0.037 U	0.14	< 0.046 U	< 0.041 U	< 0.042 U	< 0.044 U
Aroclor 1260	< 0.058 U	< 0.052 U	< 0.037 UJ	< 0.038 U	0.015 J	< 0.041 U	0.028 J	0.037 J

Notes:
mg/kg = milligram per kilogram
J = Estimated value
U = Analyte not detected (reporting limit presented)
UJ = Estimated reporting limit
< = Analyte not detected above listed reporting limit

Table 5
Analytical Results for Subsurface Soil Samples
Extent of Contamination Study
Sauer Dump Site

Parameters	DG-SB01-2 1/24/2007	DG-SB02-2 1/24/2007	DG-SB03-2 1/24/2007	DG-SB04-2 1/24/2007	DG-SB05-2 1/24/2007	DG-SB06-2 1/24/2007	DG-SB07-2 1/24/2007	DG-SB08-2 1/24/2007	DG-SB09-2 1/24/2007
Metals (mg/kg)									
Lead	626	13100	752	770	93.5	323	76	24.9	22.3
PCBs by 8082 (mg/kg)									
Aroclor 1016	< 0.039 UL	< 0.050 U	< 0.068 U	< 0.056 U	< 0.053 U	< 0.053 U	< 0.041 U	< 0.056 U	< 0.059 U
Aroclor 1221	< 0.039 UL	< 0.050 U	< 0.068 U	< 0.056 U	< 0.053 U	< 0.053 U	< 0.041 U	< 0.056 U	< 0.059 U
Aroclor 1232	< 0.039 UL	< 0.050 U	< 0.068 U	< 0.056 U	< 0.053 U	< 0.053 U	< 0.041 U	< 0.056 U	0.84
Aroclor 1242	< 0.039 UL	< 0.050 U	0.031 J	< 0.056 U	< 0.053 U	< 0.053 U	< 0.041 U	0.034 J	< 0.059 U
Aroclor 1248	< 0.039 UL	< 0.050 U	< 0.068 U	< 0.056 U	< 0.053 U	< 0.053 U	< 0.041 U	< 0.056 U	< 0.059 U
Aroclor 1254	0.71 L	1.6	0.063 J	0.35	< 0.053 U	0.12	< 0.041 U	0.098	1.4
Aroclor 1260	0.63 L	0.64	0.034 J	0.2	0.043 J	0.06	0.030 J	0.050 J	< 0.059 U
SVOCs (mg/kg)									
2-Methylnaphthalene	0.036 J	0.058 J	< 1.4 U	0.032 J	0.120 J	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
4-Methylphenol	0.026 J	< 0.990 UJ	< 1.4 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
4-Nitroaniline	0.025 J	< 4.8 UJ	< 6.6 U	< 5.5 U	< 5.2 U	< 5.1 U	< 4.0 U	< 5.4 U	< 5.7 U
Acenaphthene	0.045 J	0.048 J	< 1.4 U	0.250 J	1.5	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Acenaphthylene	0.079 J	< 0.990 UJ	< 1.4 U	0.028 J	0.027 J	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Anthracene	0.150 J	0.087 J	< 1.4 U	0.310 J	2.7	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Benzo(a)anthracene	0.450 J	0.250 J	0.077 J	0.770 J	6.3	0.033 J	0.039 J	< 1.1 U	< 1.2 U
Benzo(a)pyrene	0.300 J	0.170 J	< 1.4 U	0.490 J	7.6	< 1.1 U	0.025 J	< 1.1 U	< 1.2 U
Benzo(b)fluoranthene	0.290 J	0.160 J	0.080 J	0.650 J	8.5	< 1.1 U	0.023 J	< 1.1 U	< 1.2 U
Benzo(ghi)perylene	0.070 J	0.061 J	< 1.4 U	0.190 J	1.7	0.020 J	0.025 J	< 1.1 U	< 1.2 U
Benzo(k)fluoranthene	0.120 J	0.069 J	< 1.4 U	0.270 J	3	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
bis(2-Ethylhexyl) phthalate	0.260 J	0.760 J	< 1.4 U	0.740 J	< 1.1 U	1.700 J	< 0.83 U	< 1.1 U	< 1.2 U
Butyl benzyl phthalate	0.089 J	0.510 J	< 1.4 U	0.087 J	< 1.1 U	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Carbazole	0.056 J	< 0.990 UJ	< 1.4 U	0.190 J	1.1	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Chrysene	0.540 J	0.3 J	0.087 J	0.870 J	6.9	0.040 J	0.060 J	< 1.1 U	< 1.2 U
Dibenz(a,h)anthracene	0.022 J	< 0.990 UJ	< 1.4 U	< 1.1 U	0.400 J	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Dibenzofuran	0.025 J	0.032 J	< 1.4 U	0.071 J	0.490 J	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Fluoranthene	0.580 J	0.360 J	< 1.4 U	1.1	13	< 1.1 U	0.048 J	< 1.1 U	< 1.2 U
Fluorene	0.045 J	< 0.990 UJ	< 1.4 U	0.130 J	0.890 J	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Indeno(1,2,3-cd)pyrene	0.099 J	0.059 J	< 1.4 U	0.220 J	2.1	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Naphthalene	0.039 J	0.063 J	< 1.4 U	0.074 J	0.370 J	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U

Table 5
Analytical Results for Subsurface Soil Samples
Extent of Contamination Study
Sauer Dump Site

Parameters	DG-SB01-2 1/24/2007	DG-SB02-2 1/24/2007	DG-SB03-2 1/24/2007	DG-SB04-2 1/24/2007	DG-SB05-2 1/24/2007	DG-SB06-2 1/24/2007	DG-SB07-2 1/24/2007	DG-SB08-2 1/24/2007	DG-SB09-2 1/24/2007
SVOCs (mg/kg)									
Phenanthrene	0.540 J	0.390 J	0.083 J	1.4	9.8	0.039 J	0.049 J	< 1.1 U	< 1.2 U
Phenol	0.048 J	< 0.990 UJ	< 1.4 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.83 U	< 1.1 U	< 1.2 U
Pyrene	0.740 J	0.350 J	0.100 J	1.5	17	0.046 J	0.097 J	< 1.1 U	< 1.2 U
All other analytes	ND	ND	ND	ND	ND	ND	ND	ND	ND
VOCs (mg/kg)									
Acetone	< 0.023 U	0.0082 BJ	0.025 BJ	< 0.033 U	< 0.031 U	< 0.029 U	0.014 BJ	0.023 BJ	< 0.029 U
Methyl tert-butyl ether	< 0.0057 U	< 0.0075 U	0.0011 J	0.00068 J	< 0.0078 U	< 0.0073 U	< 0.0061 U	< 0.0083 U	< 0.0073 U
Tetrachloroethene	0.0015 J	< 0.0075 U	< 0.010 U	< 0.0082 U	< 0.0078 U	< 0.0073 U	< 0.0061 U	< 0.0083 U	< 0.0073 U
All other analytes	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
mg/kg = milligram per kilogram
J = Estimated value
U = Analyte not detected (reporting limit presented)
UJ = Estimated reporting limit
< = Analyte not detected above listed reporting limit
ND = Analytes not detected
B = Result not detected substantially above level reported in laboratory or field blank
L = Analyte is present. Reported value may be biased low. Actual value is expected to be higher.
UL = Not detected, quantitation limit is probably higher

Table 6
Analytical Results for Sediment Samples
Extent of Contamination Study
Sauer Dump Site

	DG-SD01-0.5	DG-SD02-0.5	DG-SD03-0.5	DG-SD04-0.5	DG-SD05-0.5	DG-SD06-0.5	DG-SD07-0.5	DG-SD08-0.5	DG-SD09-0.5
Parameters	1/9/2007	1/9/2007	1/9/2007	1/10/2007	1/10/2007	1/10/2007	1/11/2007	1/11/2007	1/12/2007
Metals (mg/kg)									
Lead	7.5	47.1	370	488	4800	595	150	10.1	30.1
PCBs by 8082 (mg/kg)									
Aroclor 1016	< 0.048 U	< 0.031 U	1.3	< 0.40 U	< 0.091 U	<1 UL	< 0.075 U	< 0.047 U	< 0.065 U
Aroclor 1221	< 0.048 U	< 0.031 U	< 0.079 U	< 0.40 U	< 0.091 U	<1 UL	< 0.075 U	< 0.047 U	< 0.065 U
Aroclor 1232	< 0.048 U	< 0.031 U	< 0.079 U	< 0.40 U	< 0.091 U	<1 UL	< 0.075 U	< 0.047 U	< 0.065 U
Aroclor 1242	< 0.048 U	< 0.031 U	< 0.079 U	< 0.40 U	< 0.091 U	<1 UL	< 0.075 U	< 0.047 U	< 0.065 U
Aroclor 1248	< 0.048 U	< 0.031 U	< 0.079 U	< 0.40 U	< 0.091 U	<1 UL	< 0.075 U	< 0.047 U	< 0.065 U
Aroclor 1254	< 0.048 U	< 0.031 U	0.91	3.3	0.58	15 L	1.1	< 0.047 U	< 0.065 U
Aroclor 1260	< 0.048 U	0.086	1.4	< 0.40 U	0.51	<1 UL	< 0.075 U	< 0.047 U	0.032 J
PCBs by 1668 (mg/kg)									
Monochlorobiphenyl (total)	0.0000026 BJ	0.00026	0.029	< 0.0096 U	0.0025 QJ	0.003 QJ	0.00071 QJ	0.000012 QBJ	0.00014
Dichlorobiphenyl (total)	0.000052 QBJ	0.0049 Q	0.620 Q	0.0034 QJ	0.015 Q	0.170 Q	0.0079 Q	0.000069 QBJ	0.0011 Q
Trichlorobiphenyl (total)	0.000078 QBJ	0.017 Q	2.2	0.012 QJ	0.069 Q	0.990 Q	0.039 Q	0.000058 QBJ	0.0041 Q
Tetrachlorobiphenyl (total)	0.000097 QBJ	0.066 Q	2.300 Q	0.310 Q	0.230 Q	6.0 Q	0.160 Q	0.000066 QBJ	0.012 Q
Pentachlorobiphenyl (total)	0.000092 QBJ	0.130 Q	1.300 Q	1.400 Q	0.540 Q	18.0 Q	0.380 Q	0.000077 QBJ	0.023 Q
Hexachlorobiphenyl (total)	0.000076 QJ	0.084 Q	1.800 Q	0.900 Q	0.410 Q	11.0 Q	0.280 Q	0.000064 QBJ	0.018 Q
Heptachlorobiphenyl (total)	0.000021 QBJ	0.024 Q	1.200 Q	0.160 Q	0.160 Q	2.1 Q	0.07	0.000027 QBJ	0.006 Q
Octachlorobiphenyl (total)	< 0.000029 U	0.0063 Q	0.35	0.034 Q	0.059	0.380 Q	0.017 Q	< 0.000028 U	0.0017
Nonachlorobiphenyl (total)	< 0.000029 U	0.0014	0.05	0.0073 J	0.011	0.08	0.0057	< 0.000028 U	0.00068
Decachlorobiphenyl	< 0.000029 U	0.00026	0.0073 Q	0.0029 QJ	0.011	0.012 J	0.004	< 0.000028 U	0.00052

Notes:
mg/kg = milligram per kilogram
J = Estaimted value
U = Analyte not detected (reporting limit presented)
UJ = Estimated reporting limit
< = Analyte not detected above listed reporting limit
B = Result not detected substantially above level reported in laboratory or field blank
Q = Estimated maximum possible concentration
L = Analyte is present. Reported value may be biased low. Actual value is expected to be higher.
UL = Not detected, quantitation limit is probably higher

Table 7
Analytical Results for Surface Water Samples
Extent of Contamination Study
Sauer Dump Site

Parameters	DG-SW01-F 1/11/2007	DG-SW01-T 1/11/2007	DG-SW02-F 1/11/2007	DG-SW02-T 1/11/2007
Metals (mg/L)				
Lead	< 0.003 U	0.0092 J	0.0016 J	0.0302
PCBs by 8082 (mg/L)				
Aroclor 1016	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
Aroclor 1221	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
Aroclor 1232	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
Aroclor 1242	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
Aroclor 1248	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
Aroclor 1254	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
Aroclor 1260	< 0.0011 U	< 0.001 U	< 0.0011 U	< 0.001 U
PCBs by 1668 (mg/L)				
Monochlorobiphenyl (total)	0.00000025	0.00000012 J	0.00000022 Q	0.0000005
Dichlorobiphenyl (total)	0.0000006 Q	0.00000062 QJ	0.00000062 Q	0.0000026 Q
Trichlorobiphenyl (total)	0.00000044 Q	0.0000012 QJ	0.0000006 Q	0.000005 Q
Tetrachlorobiphenyl (total)	0.00000087 Q	0.0000035 QJ	0.00000054 Q	0.000015 Q
Pentachlorobiphenyl (total)	0.0000013 Q	0.000006 QJ	0.00000057 Q	0.000031 Q
Hexachlorobiphenyl (total)	0.0000012 Q	0.0000054 QJ	0.0000004 Q	0.000022 Q
Heptachlorobiphenyl (total)	0.00000057 Q	0.0000026 J	0.00000013 QJ	0.0000058 Q
Octachlorobiphenyl (total)	0.00000019 Q	0.00000085 QJ	0.000000024 QJ	0.0000013 Q
Nonachlorobiphenyl (total)	0.000000085	0.00000036	0.0000000082QJ	0.00000047
Decachlorobiphenyl (total)	0.000000076	0.00000032	0.0000000064 J	0.00000032

Notes:
mg/L = milligram per liter
J = Estimated reporting limit
< = Analyte not detected above listed reporting limit
U = Analyte not detected (reporting limit presented)
"-T" = total sample fraction
"-F" = filtered sample fraction
Q = Estimated maximum possible concentration

Table 8
Analytical Results for Groundwater Monitoring Samples
Extent of Contamination Study
Sauer Dump Site

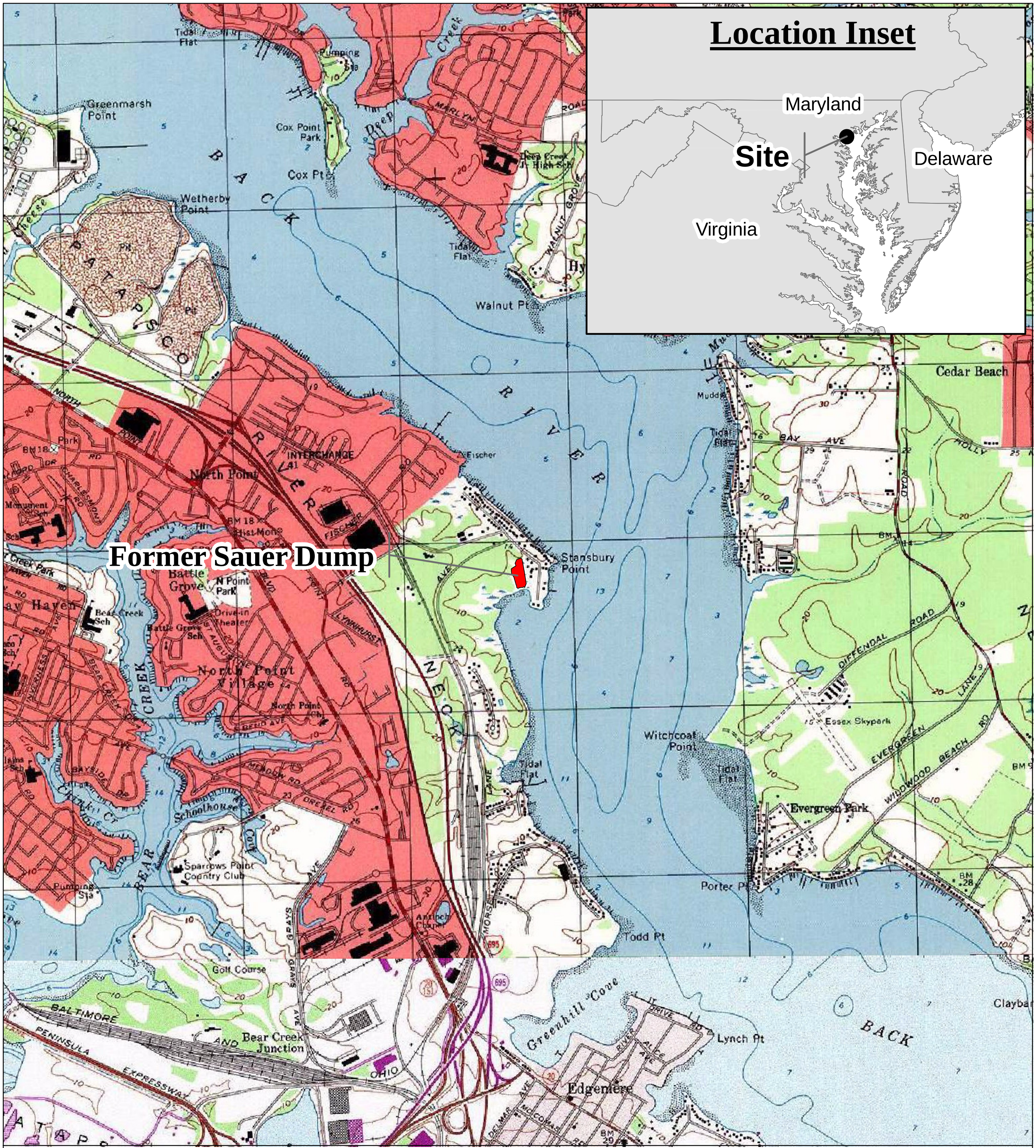
Parameters	MW-1R-F 2/8/2007	MW-1R-T 2/8/2007	MW-2-F 2/7/2007	MW-2-T 2/7/2007	MW-3-F 2/8/2007	MW-3-T 2/8/2007	MW-4-F 2/12/2007	MW-4-T 2/12/2007	MW-5-F 2/12/2007	MW-5-T 2/12/2007
Metals (mg/L)										
Lead	<0.003 U	<0.003 U	<0.003 U	<0.003 U	<0.003 U	0.0017 J	<0.003 U	0.0026 J	<0.003 U	0.0057
PCBs by 8082 (mg/L)										
Aroclor 1016	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	0.00084 J	< 0.00099 U	< 0.00096 U
Aroclor 1221	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	< 0.00097 U	< 0.00099 U	< 0.00096 U
Aroclor 1232	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	< 0.00097 U	< 0.00099 U	< 0.00096 U
Aroclor 1242	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	< 0.00097 U	< 0.00099 U	< 0.00096 U
Aroclor 1248	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	< 0.00097 U	< 0.00099 U	< 0.00096 U
Aroclor 1254	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	< 0.00097 U	< 0.00099 U	< 0.00096 U
Aroclor 1260	< 0.001 U	< 0.001 U	< 0.00095 U	< 0.001 U	< 0.00095 U	< 0.00099 U	< 0.00099 U	< 0.00097 U	< 0.00099 U	< 0.00096 U
PCBs by 1668 (mg/L)										
Monochlorobiphenyl (total)	0.0000021	0.0000041	0.000063 Q	0.00008	0.0000044	0.0000045	0.000002 Q	0.00000063 Q	0.00000013 Q	0.00000026 Q
Dichlorobiphenyl (total)	0.000014 Q	0.000037 Q	0.000091 Q	0.000130 Q	0.000025 Q	0.000034 Q	0.000140 Q	0.00043	0.00000051 Q	0.0000014 Q
Trichlorobiphenyl (total)	0.000013	0.000081	0.000026 Q	0.00005	0.000020 Q	0.000040 Q	0.000095	0.000880 Q	0.00000034 Q	0.0000017 Q
Tetrachlorobiphenyl (total)	0.0000033 Q	0.000063 Q	0.0000063 Q	0.000019 Q	0.000013 Q	0.000035 Q	0.000013 Q	0.000350 Q	0.00000032 Q	0.0000026 Q
Pentachlorobiphenyl (total)	0.0000009 Q	0.000074 Q	0.00000046 Q	0.0000023 Q	0.0000012 Q	0.0000058 Q	0.00000021 Q	0.000021 Q	0.00000012 QJ	0.00000056 Q
Hexachlorobiphenyl (total)	0.00000031 Q	0.000050 Q	0.000000069 QJ	0.00000065 Q	0.00000029 Q	0.0000024 Q	0.000000035 QBJ	0.0000065 Q	0.000000086 QJ	0.00000047 Q
Heptachlorobiphenyl (total)	0.00000005 QJ	0.000016 Q	< 0.00000004 U	0.00000017 Q	0.000000081 QJ	0.00000093 Q	< 0.000000038 U	0.0000014 Q	0.000000031 QJ	0.00000022 Q
Octachlorobiphenyl (total)	< 0.00000004 U	0.0000042 Q	< 0.00000004 U	0.000000051 QJ	< 0.000000038 U	0.00000023 Q	< 0.000000038 U	0.00000032 Q	< 0.000000039 U	0.000000028 J
Nonachlorobiphenyl (total)	< 0.00000004 U	0.00000093	< 0.00000004 U	0.00000001 J	< 0.000000038 U	0.000000018 QJ	< 0.000000038 U	0.000000055 Q	< 0.000000039 U	< 0.000000039 U
Decachlorobiphenyl (total)	0.00000001 QJ	0.00000011	< 0.00000004 U	< 0.00000004 U	< 0.000000038 U	< 0.000000038 U	< 0.000000038 U	0.0000000075 QJ	< 0.000000039 U	< 0.000000039 U

Notes:
mg/L = milligram per liter
J = Estimated value
< = Analyte not detected above listed reporting limit
U = Analyte not detected (reporting limit presented)
"-T" = total sample fraction
"-F" = filtered sample fraction
B = Result not detected substantially above level reported in laboratory or field blank
Q = Estimated maximum possible concentration

Table 9
PCB Groundwater Homologue Comparison
Extent of Contamination Study
Sauer Dump Site

	MW-1	MW-1R	MW-2		MW-3		MW-4		MW-5	
Parameters	8/12/2002	2/8/2007	8/12/2002	2/7/2007	8/12/2002	2/8/2007	8/12/2002	2/12/2007	8/12/2002	2/12/2007
PCBs by 1668 (mg/L)										
Monochlorobiphenyl (total)	0.00000309	0.0000041	0.0000883	0.00008	0.0000393	0.0000045	0.00000543	0.00000063 Q	0.00000197	0.00000026 Q
Dichlorobiphenyl (total)	0.0000333	0.000037 Q	0.000192	0.000130 Q	0.00027	0.000034 Q	0.000133	0.00043	0.00000813	0.0000014 Q
Trichlorobiphenyl (total)	0.0000457	0.000081	0.0000859	0.00005	0.000207	0.000040 Q	0.000164	0.000880 Q	0.00000986	0.0000017 Q
Tetrachlorobiphenyl (total)	0.0000658	0.000063 Q	0.000327	0.000019 Q	0.000143	0.000035 Q	0.0000408	0.000350 Q	0.00000793	0.0000026 Q
Pentachlorobiphenyl (total)	0.0000834	0.000074 Q	0.0000102	0.0000023 Q	0.0000241	0.0000058 Q	0.00000373	0.000021 Q	0.00000217	0.00000056 Q
Hexachlorobiphenyl (total)	0.0000649	0.000050 Q	0.00000537	0.00000065 Q	0.0000093	0.0000024 Q	0.0000014	0.0000065 Q	0.00000164	0.00000047 Q
Heptachlorobiphenyl (total)	0.0000303	0.000016 Q	0.000002	0.00000017 Q	0.000002750	0.00000093 Q	0.000000361	0.0000014 Q	0.000000836	0.00000022 Q
Octachlorobiphenyl (total)	0.00000823	0.0000042 Q	0.000000607	0.000000051 QJ	0.000000376	0.00000023 Q	0.00000007160	0.00000032 Q	0.000000182	0.000000028 J
Nonachlorobiphenyl (total)	0.00000152	0.00000093	0.000000119	0.00000001 J	0.000000030	0.000000018 QJ	0.00000000821	0.000000055 Q	0.000000027	< 0.000000039 U
Decachlorobiphenyl (total)	0.000000135	0.00000011	1.62E-08	< 0.00000004 U	0.000000006	< 0.000000038 U	ND	0.0000000075 QJ	0.000000013	< 0.000000039 U
TOTAL	0.0003364	0.0003303	0.0007115	0.0002822	0.0006959	0.0001229	0.0003488	0.0016899	0.0000328	0.0000072

Notes:
mg/L = milligram per liter
J = Estimated value
< = Analyte not detected above listed reporting limit
U = Analyte not detected (reporting limit presented)
ND = Non-detect data reported from the historic sampling event in 2002
Total = Sum of the detected homologues
Q = Estimated maximum possible concentration



Source: USGS 7.5 Minute Series Topographic Maps

LEGEND

🟥 Former Sauer Dump Site

N

0.25 0.125 0 0.25 0.5 0.75 1

Miles

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Site Location Map
Extent of Contamination Study
Sauer Dump Site

June 2007

Figure 1

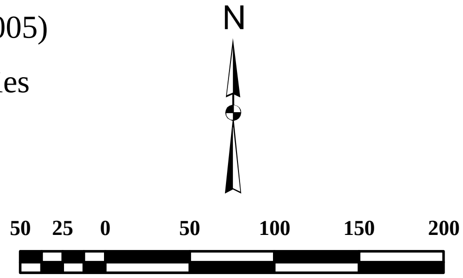
GIS/Projects_MXD/RAP/Figure 1 - Site Location.mxd

Airphoto Source: Baltimore County

LEGEND

▨ Surveyed Wetlands (ENSAT, 2005)

— 2007 Surveyed Parcel Boundaries



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Site Detail Map
Extent of Contamination Study
Sauer Dump Site

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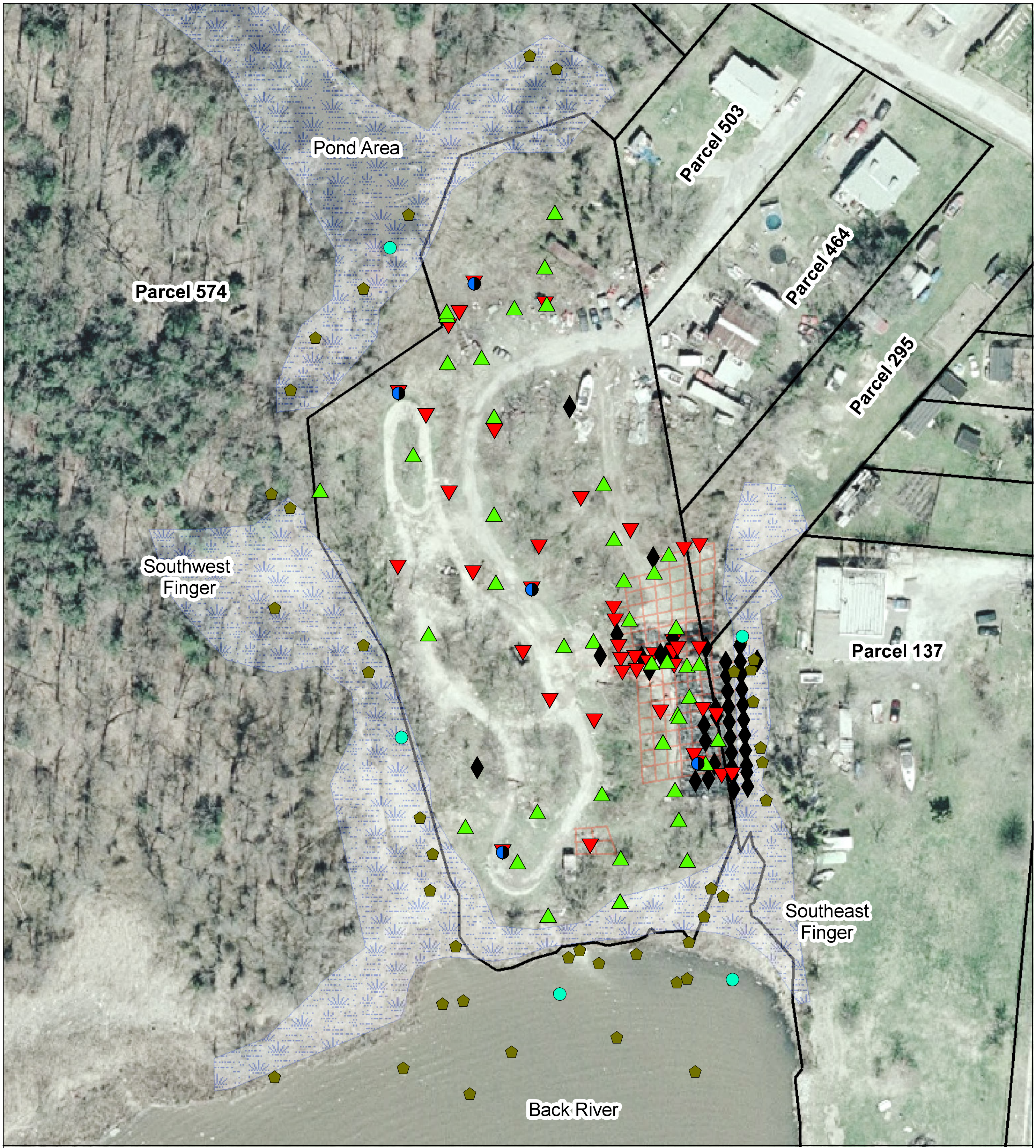
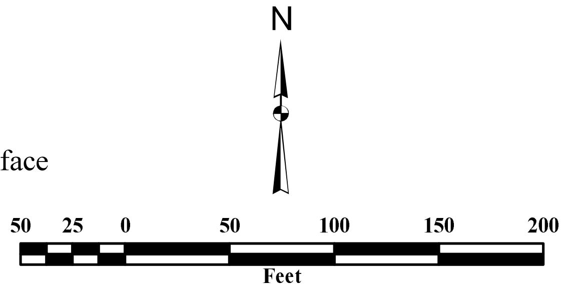
Figure 2



LEGEND

- ◐ Groundwater
- ● Surfacewater
- ⬟ Sediment
- ◆ Soil - Surface and Subsurface
- ▼ Subsurface Soil
- ▲ Surface Soil



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Historic Sample Locations
Extent of Contamination Study
Sauer Dump Site

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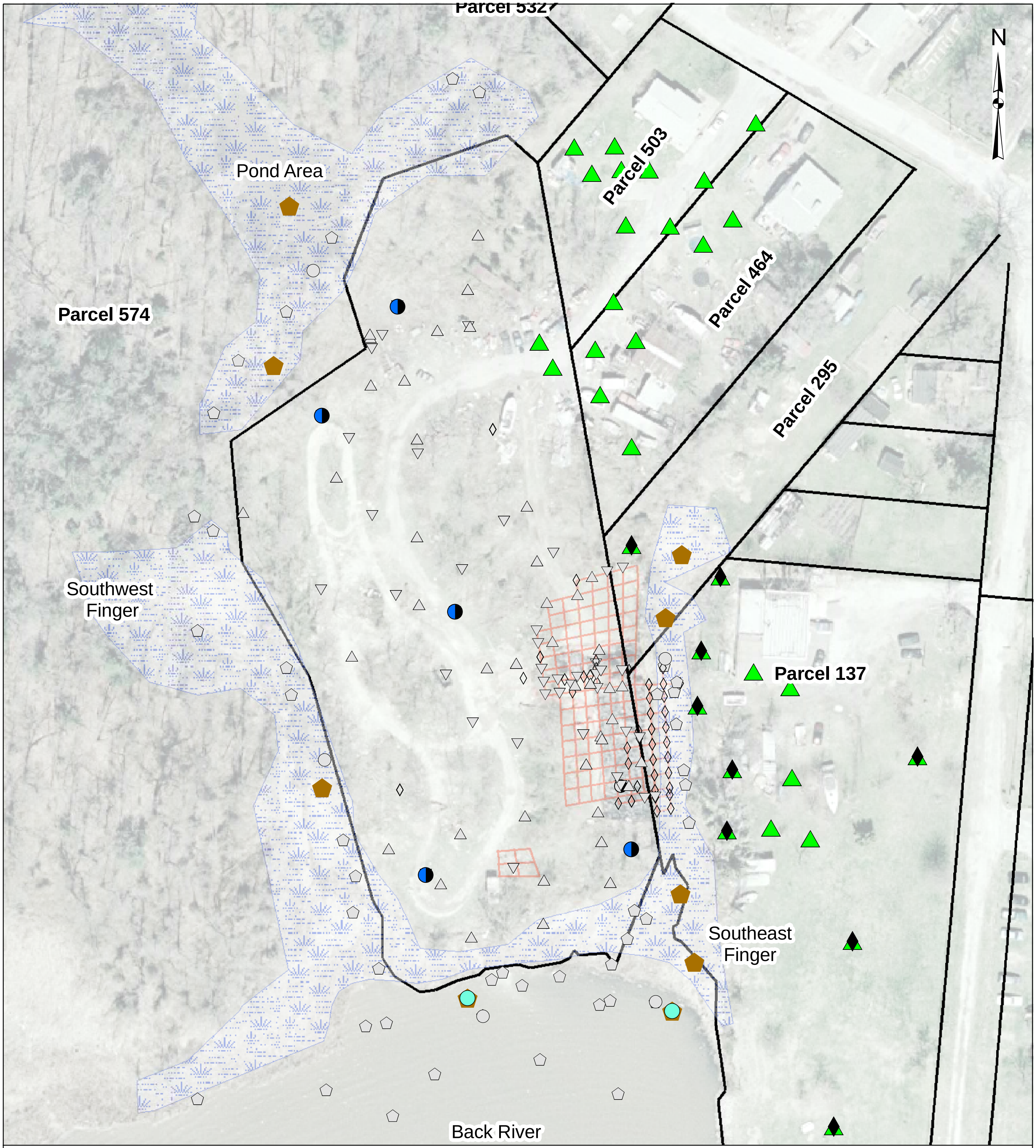
Figure 3



LEGEND

Historic Samples

- ◑ Groundwater
- ○ Surface Water
- ⬠ Sediment
- ◊ Soil - Surface and Subsurface
- ▽ Subsurface Soil
- △ Surface Soil

Data Gap Samples - EOCS

- ● Surface Water
- ⬟ Sediment
- ♦ Soil - Surface and Subsurface
- ▲ Surface Soil
- ◑ Monitoring Wells

50 25 0 50 100 150 200

Feet

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EOCS Data Gap Sample Locations
Extent of Contamination Study
Sauer Dump Site

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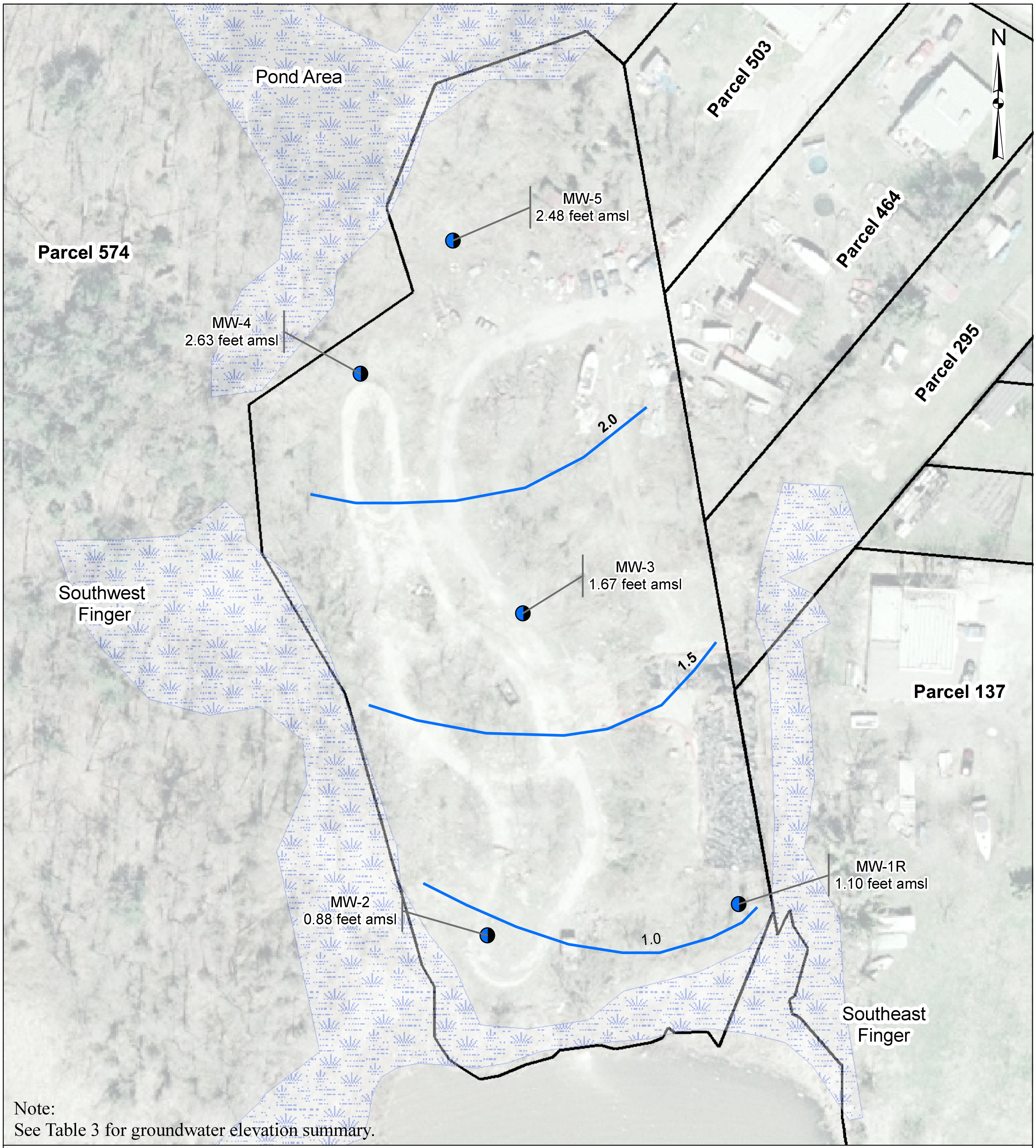
Figure 4

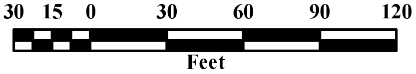


Note:
See Table 3 for groundwater elevation summary.

LEGEND

— Water Level Contours (feet amsl)

◐ Monitoring Wells (February 7, 2007)



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Groundwater Elevations
February 7, 2007
Extent of Contamination Study
Sauer Dump Site

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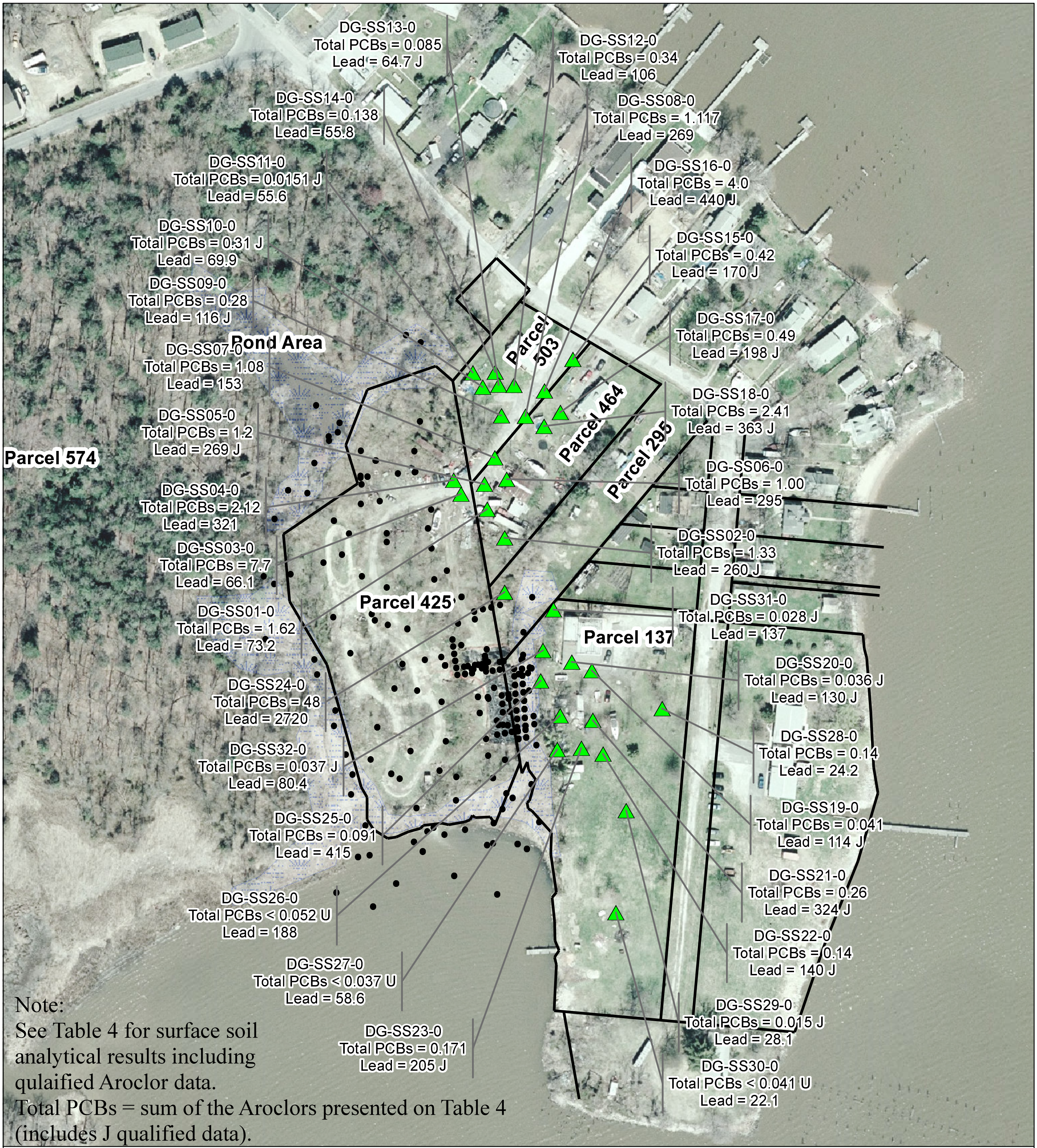
Figure 5



Note:
See Table 4 for surface soil analytical results including qulaified Aroclor data.
Total PCBs = sum of the Aroclors presented on Table 4 (includes J qualified data).

LEGEND

▲ Surface Soil (Results in mg/kg)

● Existing Sample Locations

▨ Surveyed Wetlands (ENSAT, 2005)

N

0 50 100 200 300 400 500
Feet

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EOCS Surface Soil Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

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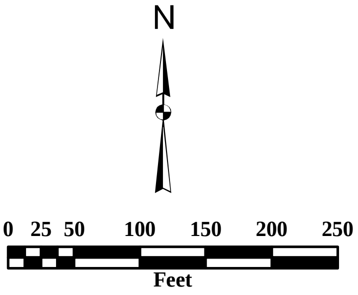
Figure 6

Note:
See Table 5 for subsurface soil analytical results including qualified Aroclor data.
Total PCBs = sum of the Aroclors presented on Table 5 (includes J and L qualified data).

LEGEND

▼	Subsurface Soil (Results in mg/kg)
●	Existing Sample Locations
▨	Wetlands (ENSAT, 2005)



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EOCS Sub-surface Soil Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

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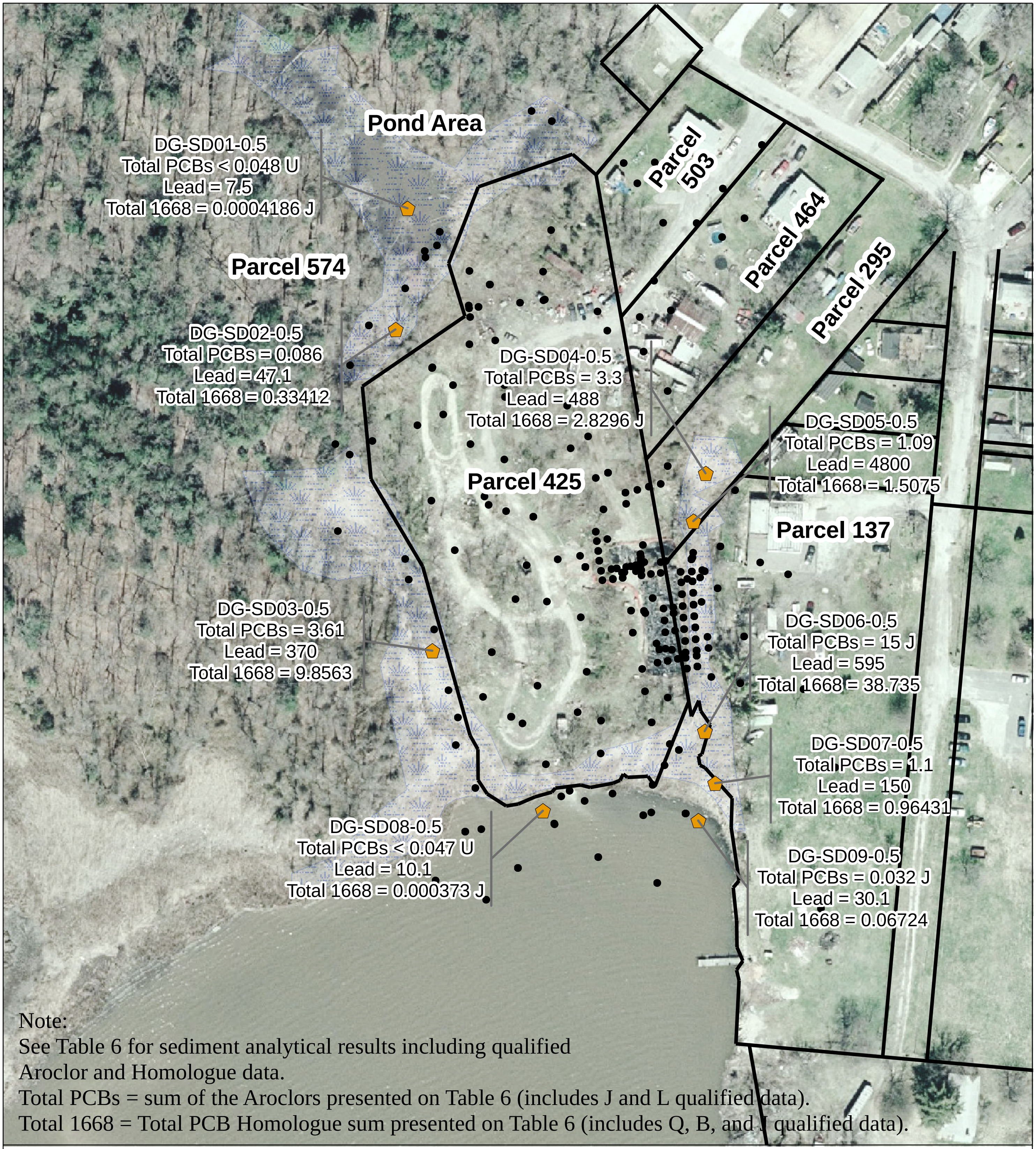
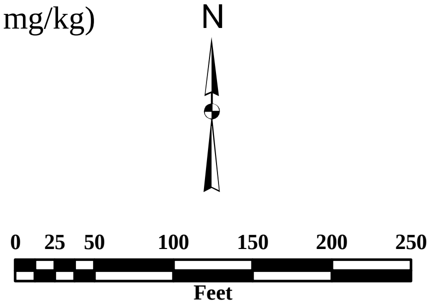
Figure 7



Note:
See Table 6 for sediment analytical results including qualified Aroclor and Homologue data.
Total PCBs = sum of the Aroclors presented on Table 6 (includes J and L qualified data).
Total 1668 = Total PCB Homologue sum presented on Table 6 (includes Q, B, and J qualified data).

LEGEND

⬟ Prliminary Sediment (Results in mg/kg)
● Existing Sample Locations
▨ Wetlands (ENSAT, 2005)



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EOCS Sediment Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

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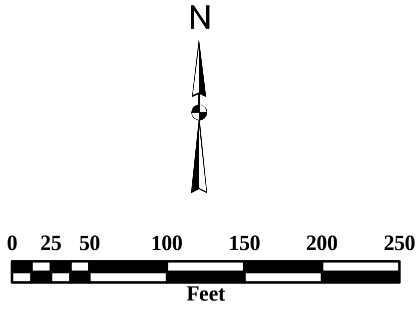
Figure 8

Note:
See Table 7 for surface water analytical results including qualified Aroclor and Homologue data.
See Table 8 for groundwater analytical results including qualified Aroclor and Homologue data
Total PCBs = sum of the Aroclors presented on Table 7 and 8 (includes J and L qualified data).
Total 1668 = Total PCB homologue sum on Table 7 and 8 (includes Q, B, and J qualified data).
Dissolved = Field filtered sample results

LEGEND

◐	Monitoring Wells (Results in mg/L)
●	Surface Water (Results in mg/L)
•	Existing Sample Locations
▨	Wetlands (ENSAT, 2005)



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EOCS Surface Water and Groundwater Results Lead and PCBs Extent of Contamination Study Sauer Dump Site

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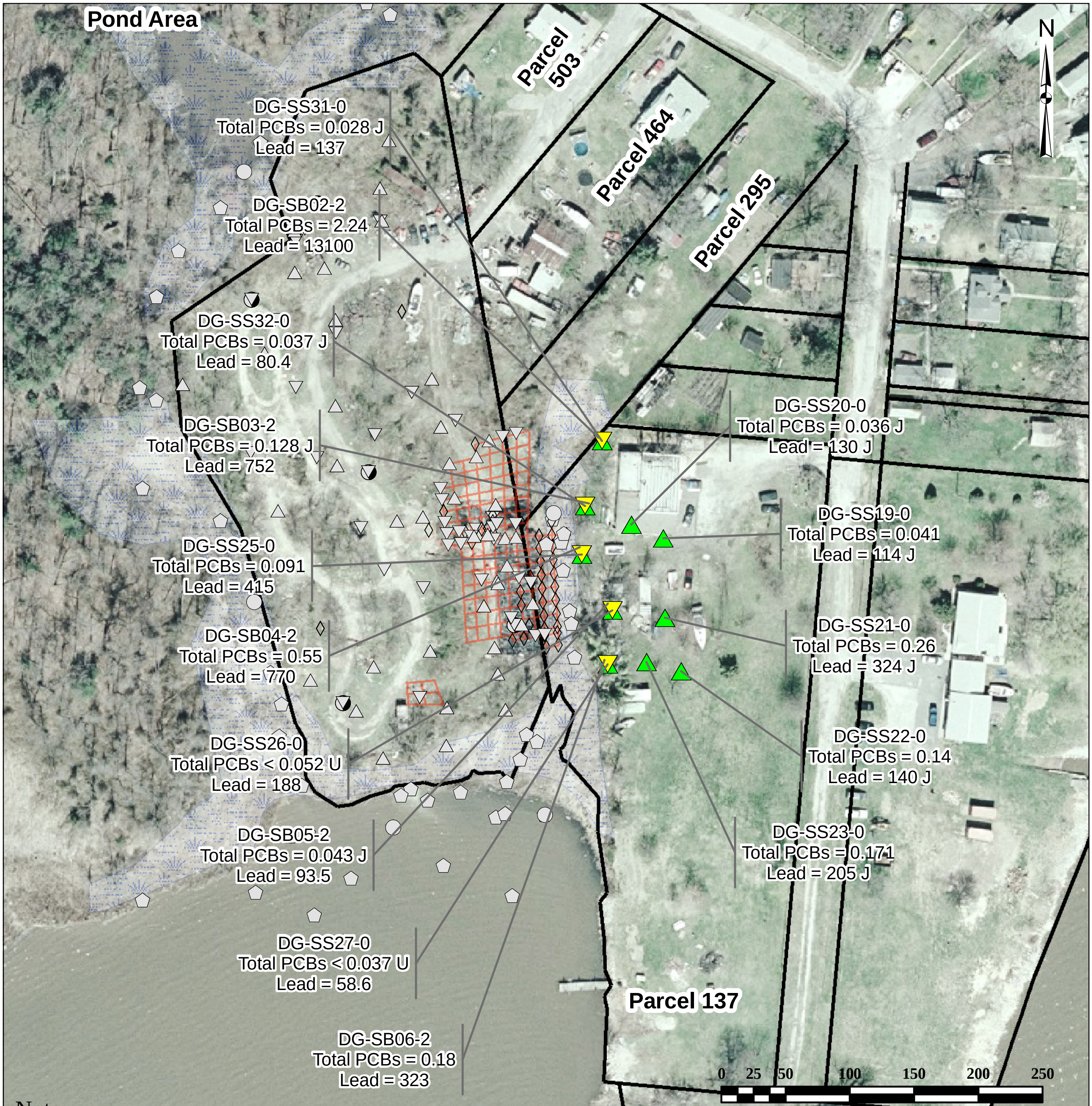
Figure 9



Note:
See Table 4 for surface soil analytical results including qualified Aroclor Data.
See Table 5 for subsurface soil analytical results including qualified Aroclor Data.
Total PCBs = sum of the Aroclors presented on Table 4 and 5 (includes J and L qualified data).

LEGEND

▲	Surface Soil (Results in mg/kg)
▼	Subsurface Soil (Results in mg/kg)
—	PCB Hot-Spot Investigation Area
▨	Surveyed Wetlands (ENSAT, 2005)

Historic Samples

◑	Groundwater
○	Surface Water
⬠	Sediment
◊	Soil - Surface and Subsurface
▽	Subsurface Soil
△	Surface Soil

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Parcel 137 Soil Results
Surface and Subsurface
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

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Figure 10

Note:
See Table 4 for surface soil analytical results including qualified Aroclor Data.
See Table 5 for subsurface soil analytical results including qualified Aroclor Data.
Total PCBs = sum of the Aroclors presented on Table 4 and 5 (includes J and L qualified data).

LEGEND

- ▲ Surface Soil (Results in mg/kg)
- ▼ Subsurface Soil (Results in mg/kg)
- ― PCB Hot-Spot Investigation Area
- ▨ Surveyed Wetlands (ENSAT, 2005)

Historic Samples

- ◐ Groundwater
- ○ Surface Water
- ⬠ Sediment
- ◊ Soil - Surface and Subsurface
- ▽ Subsurface Soil
- △ Surface Soil

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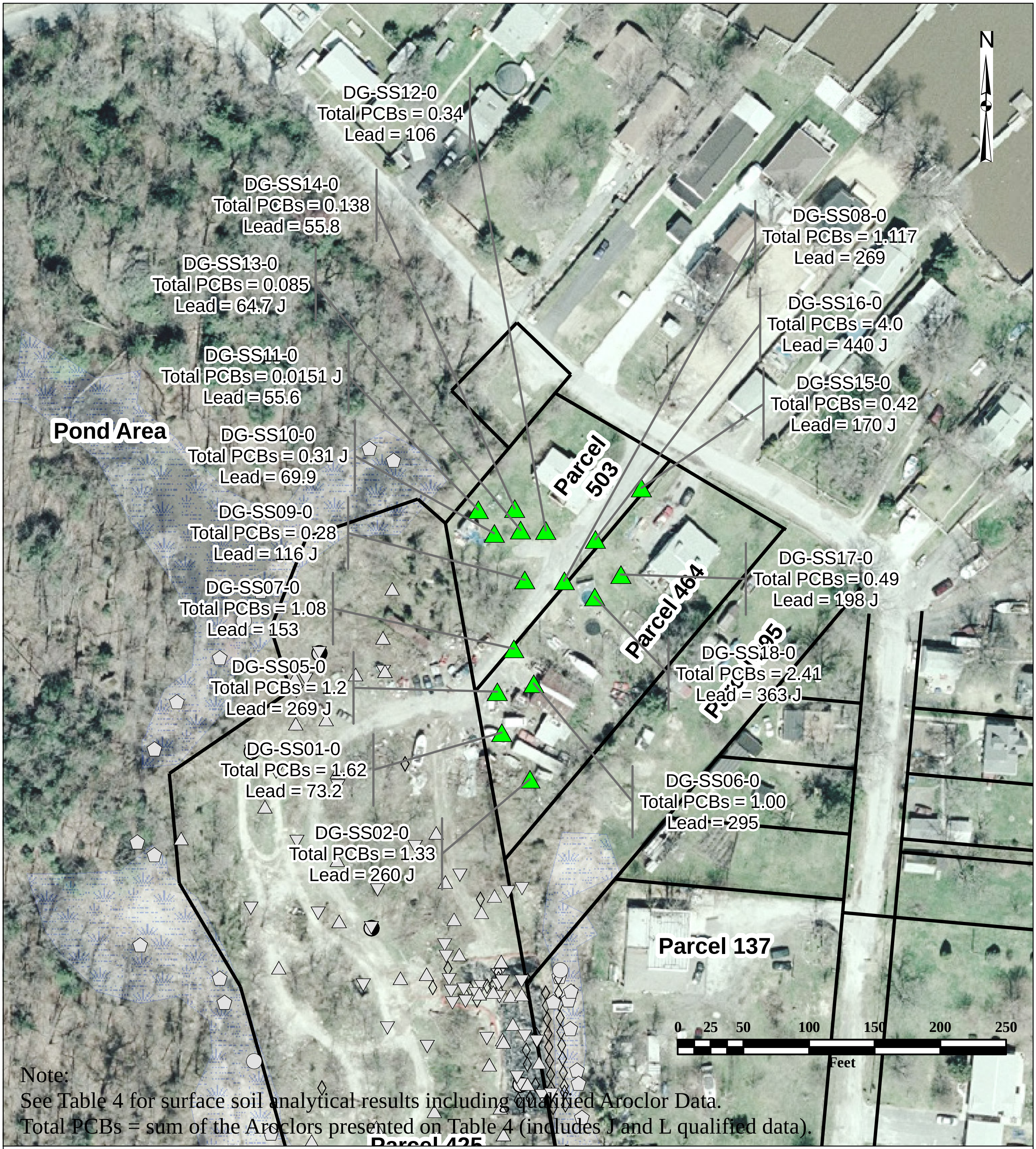
Parcel 425 Soil Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

June 2007

Figure 11



Note:
See Table 4 for surface soil analytical results including quantified Aroclor Data.
Total PCBs = sum of the Aroclors presented on Table 4 (includes J and L qualified data).

LEGEND

▲ Surface Soil (Results in mg/kg)

▨ Surveyed Wetlands (ENSAT, 2005)

Historic Samples

◐ Groundwater

○ Surface Water

⬠ Sediment

◊ Soil - Surface and Subsurface

▽ Subsurface Soil

△ Surface Soil

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Parcels 503 and 464 Soil Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

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Figure 12

Note:
See Table 4 for surface soil analytical results including qualified Aroclor Data.
See Table 5 for subsurface soil analytical results including qualified Aroclor Data.
Total PCBs = sum of the Aroclors presented on Table 4 and 5 (includes J and L qualified data).

LEGEND

▲ Surface Soil (Results in mg/kg)
▼ Subsurface Soil (Results in mg/kg)
▨ Surveyed Wetlands (ENSAT, 2005)

Historic Samples
◑ Groundwater
○ Surface Water
⬠ Sediment
◊ Soil - Surface and Subsurface
▽ Subsurface Soil
△ Surface Soil

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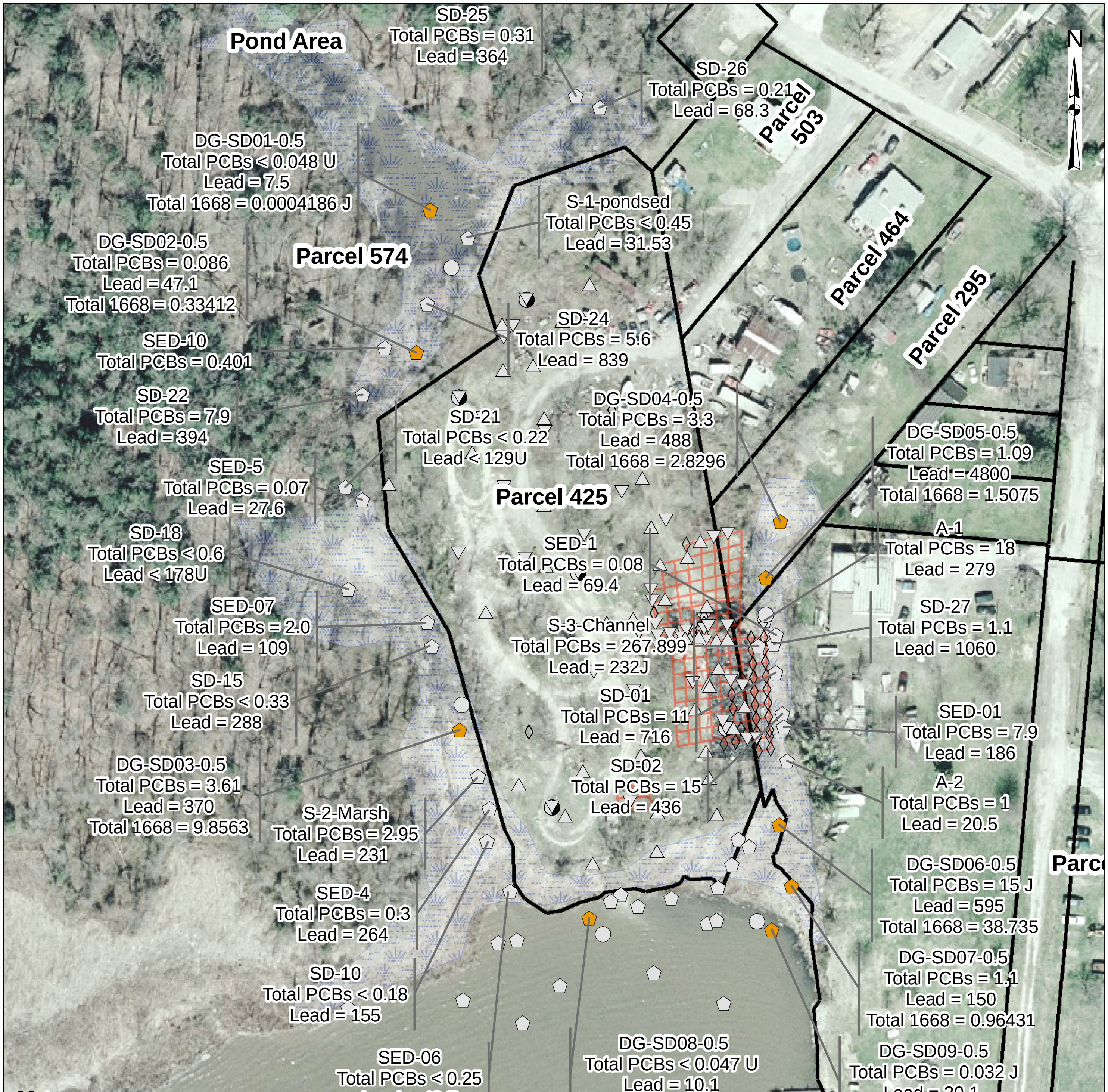
Background Soil Results
Parcel 137
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

June 2007

Figure 13



Note:
See Table 6 for EOCS sediment analytical results including qualified Aroclor and Homologue data.
Historic sediment analytical resutls are from (ENSAT, 2005).
Total PCBs = sum of the Aroclors (including J and L qualified data).
Total 1668 = PCB homologue sum (including Q, B, and J qualified data).

LEGEND

⬠ EOCS Sediment (Results in mg/kg)
▨ Wetlands (ENSAT, 2005)
— PCB Hot-Spot Investigation Area

Historic Samples
◑ Groundwater
○ Surface Water
⬠ Sediment
◊ Soil - Surface and Subsurface
▽ Subsurface Soil
△ Surface Soil

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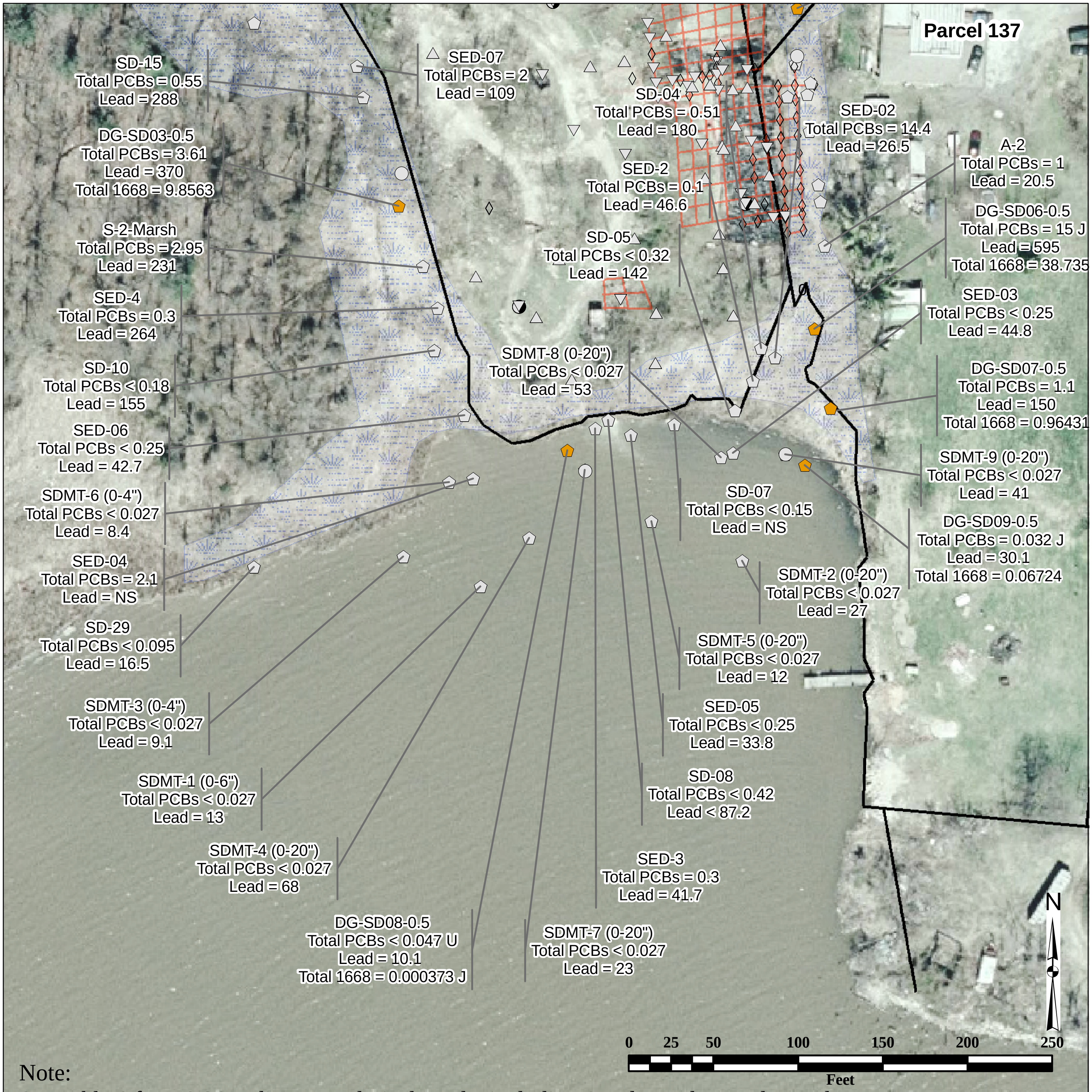
Site Wide Sediment Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

June 2007

Figure 14



Note:
See Table 6 for EOCS sediment analytical results including Aroclor and Homologue data.
Historic sediment analytical resutls are from (ENSAT, 2005).
Total PCBs = sum of the Aroclors presented on Table 6 (includes J and L qualified data).
Total 1668 = PCB homologue sum presented on Table 6 (includes Q, B, and J qualified data).

LEGEND

⬟ EOCS Sediment (Results in mg/kg)

▨ Wetlands (ENSAT, 2005)

— PCB Hot-Spot Investigation Area

Historic Samples

◑ Groundwater

○ Surface Water

⬠ Sediment

◊ Soil - Surface and Subsurface

▽ Subsurface Soil

△ Surface Soil

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Back River Sediment Results
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

June 2007

Figure 15

Note:

See Table 6 for EOCS sediment analytical results including qualified Aroclor and Homologue data.

See Table 7 for EOCS surface water analytical results including qualified Aroclor and Homologue data.

Historic sediment and surface water analytical resutls are from (ENSAT, 2005).

Total PCBs = sum of the Aroclors presented on Table 6 and 7 (including J and L qualified data).

Total 1668 = PCB homologue sum presented on Table 6 and 7 (includes Q, B, and J qualified data).

LEGEND

⬟	Back River Sediment (Resutls in mg/kg)		Historic Samples
●	Surface Water (Results in mg/L)	◑	Groundwater
▨	Wetlands (ENSAT, 2005)	○	Surface Water
		⬠	Sediment
		◊	Soil - Surface and Subsurface
		▽	Subsurface Soil
		△	Surface Soil

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Surface Water and Sediments
Lead and PCBs
Extent of Contamination Study
Sauer Dump Site

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Figure 16

Figure 17
Homologue Distribution - Groundwater
Extent of Contamination Study
Sauer Dump Site

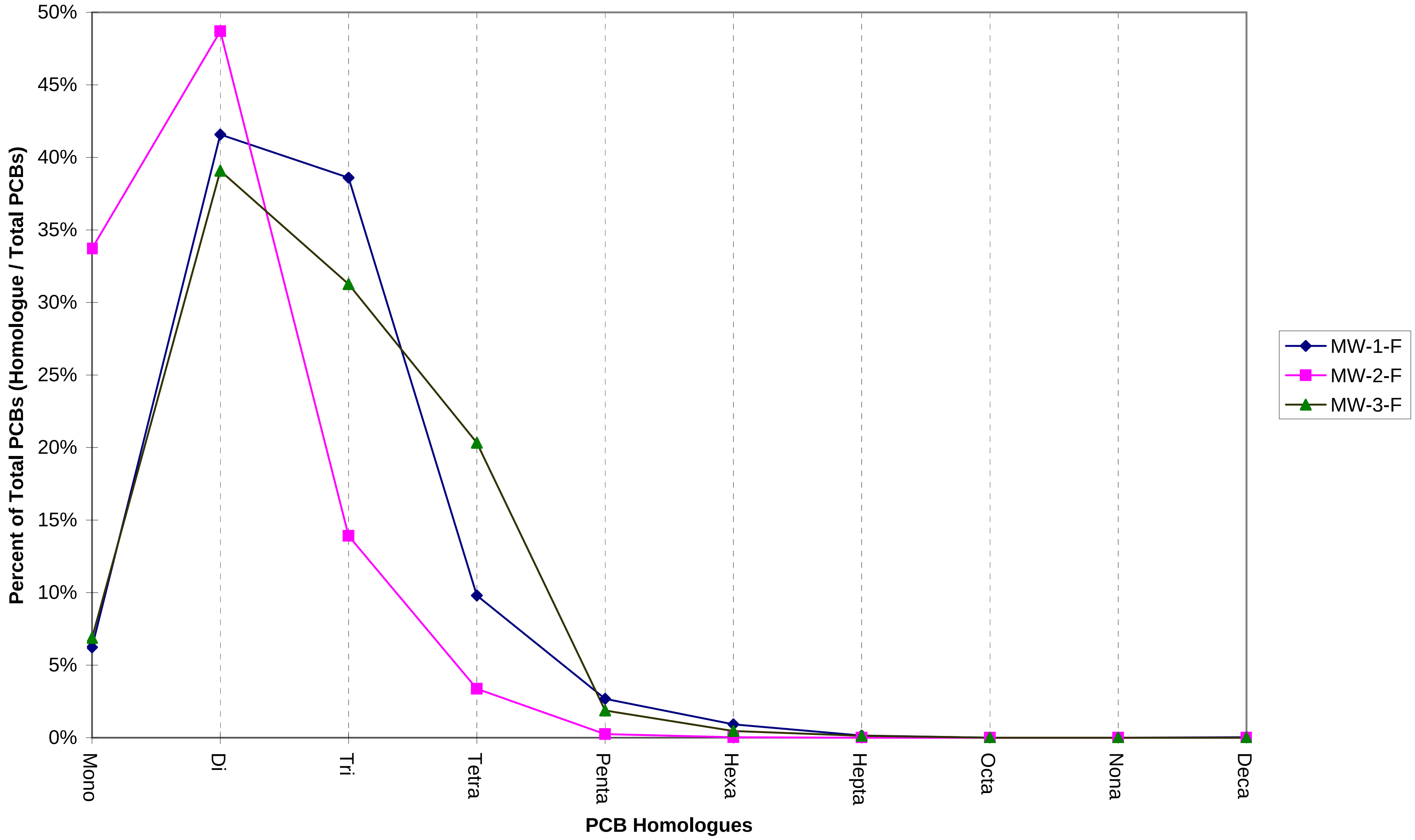


Figure 18
Homologue Distribution - Back River Surface Water
Extent of Contamination Study
Sauer Dump Site

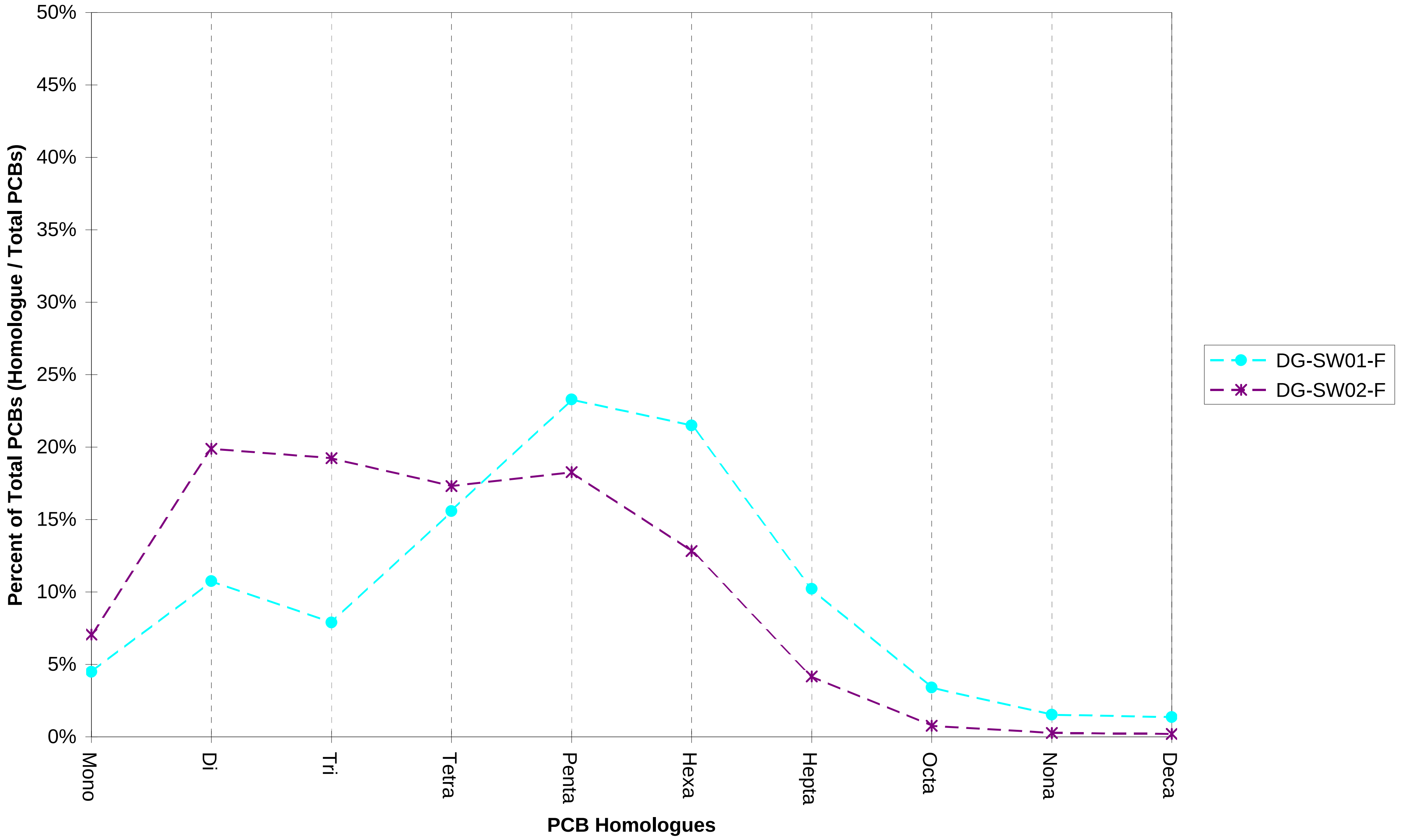
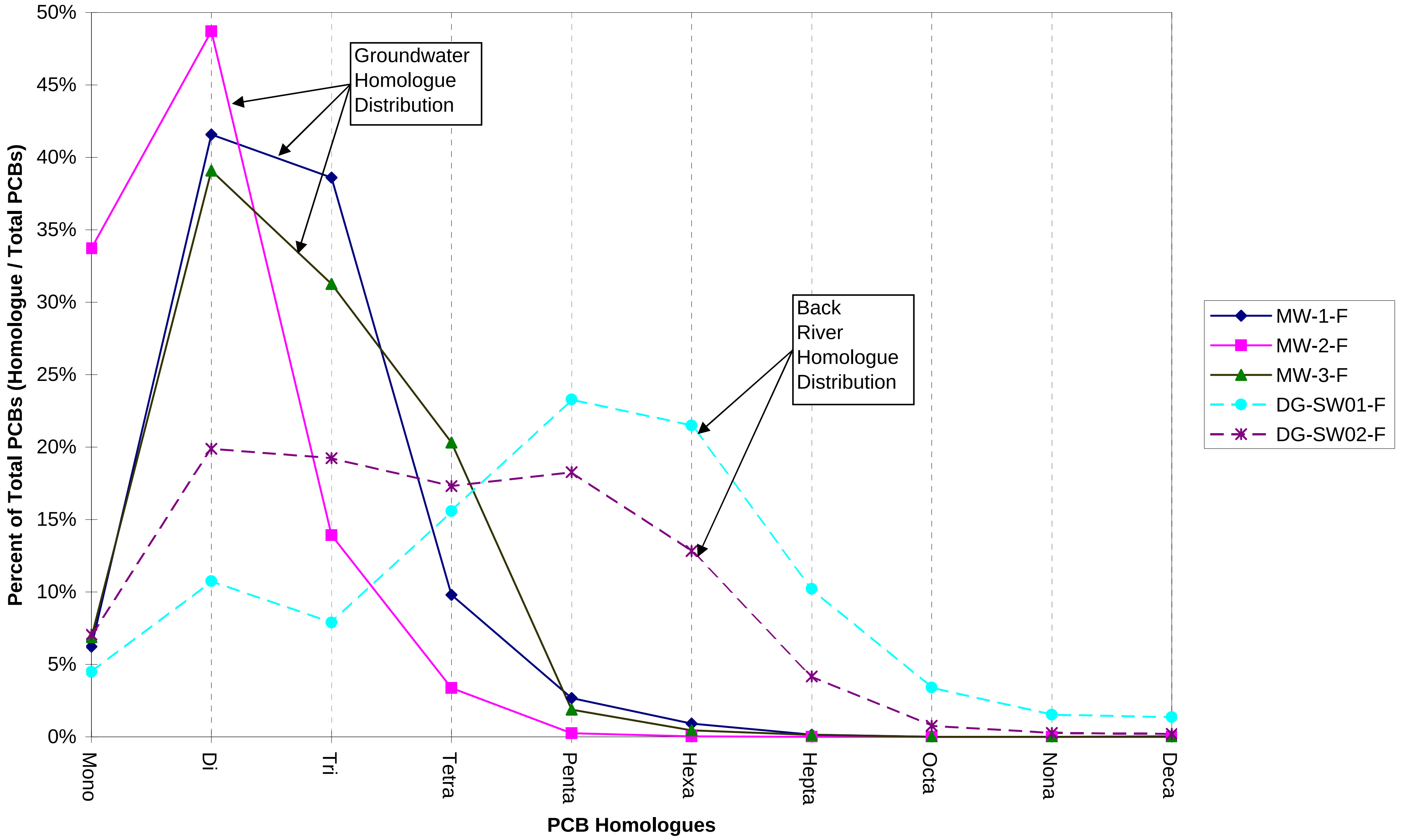


Figure 19
Homologue Distribution Comparison Between Groundwater and the Back River
Extent of Contamination Study
Sauer Dump Site



Appendix A:

Soil Boring Logs

Extent of Contamination Study

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC. **BORING DG-SB01**

824 MARKET STREET, WILMINGTON, DELAWARE 19801

PROJECT NAME: SAUER DUMP		**DATE:**	**1/24/2007**
JOB NUMBER: 4320029		**LOCATION:**	**DUNDALK, MD**
DRILLING FIRM: SGS GROUP		**WEATHER:**	
DRILLING METHOD: 5' MACRO CORE (2") HAMMMERED INTO GROUND		**ELEVATION:**	
DRILLER: Jeff Qusa		**DATUM:**	
HELPER:		**BORING LOGGED BY:**	**KEVIN BURN**

SAMPLE INFORMATION									USCS	
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	SYMBOL	REMARKS
			AUGER							
1	0-5	5'/5'					0-1	ORGANIC SILT, LOOSE NON PLASTIC AND ORGANIC DEBRIS (TWIGS, ROOTS)	OL	PID = 0.0
							1-5	FILL - SILTY CLAY, BRICK, CRUSHED STONE, CONCRETE, TWIGS		
								TERMINATE DRILLING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC. **BORING DG-SB02**

824 MARKET STREET, WILMINGTON, DELAWARE 19801

PROJECT NAME: SAUER DUMP **DATE: 1/24/2007**
JOB NUMBER: 4320029 **LOCATION: DUNDALK, MD**
DRILLING FIRM: SGS GROUP **WEATHER:**
DRILLING METHOD: 5' MACRO CORE (2") HAMMMERED INTO GROUND **ELEVATION:**
DRILLER: Jeff Qusa **DATUM:**
HELPER: **BORING LOGGED BY: KEVIN BURN**

SAMPLE INFORMATION										
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	USCS SYMBOL	REMARKS
			AUGER							
1	0-5	32"/5'					0-0.5	ROOT MAT		
							0.5-1	CLAYEY SILT, MEDIUM STIFF, NON PLASTIC, ORANGE-BROWN	ML	WET AT 1'
							1-5	FILL - BRICK, CRUSHED STONE, CONCRETE, PLASTIC PIECES	FL	
								TERMINATE BORING AT 5'		

MALCOLM PIRNIE, INC.

824 MARKET STREET, WILMINGTON, DELAWARE 19801

BORING DG-SB03

PROJECT NAME: SAUER DUMP	**DATE: 1/24/2007**
JOB NUMBER: 4320029	**LOCATION: DUNDALK, MD**
DRILLING FIRM: SGS GROUP	**WEATHER:**
DRILLING METHOD: 5' MACRO CORE (2") HAMMMERED INTO GROUND	**ELEVATION:**
DRILLER: Jeff Qusa	**DATUM:**
HELPER:	**BORING LOGGED BY: KEVIN BURN**

SAMPLE INFORMATION									USCS	
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	SYMBOL	REMARKS
			AUGER							
1	0-5	46"/5'					0-0.5	ROOT MAT		
							0.5-1	CLAYEY SILT, MED STIFF, NON PLASTIC, ORANGE-BROWN	ML	
							1-2	FILL - ROCK FRAGMENTS, BRICK, CLAYEY SILT, PINOGRAVEL, TWIGS, ROOTS	FL	
							2-3	SILT, TRACE VERY FINE SAND, SOFT, NON PLASTIC, WHITE, LAMINA (DARK ORGANIC SOIL), ORGANIC DECAY ODORS, WET	ML	
							3-5	PEAT, WET, ORGANIC DECAY ODORS	OL	
								TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.
824 MARKET STREET, WILMINGTON, DELAWARE 19801

BORING DG-SB04

PROJECT NAME: SAUER DUMP		**DATE:**	**1/24/2007**
JOB NUMBER: 4320029		**LOCATION:**	**DUNDALK, MD**
DRILLING FIRM: SGS GROUP		**WEATHER:**	
DRILLING METHOD: 5' MACRO CORE (2") HAMMMERED INTO GROUND		**ELEVATION:**	
DRILLER: Jeff Qusa		**DATUM:**	
HELPER:		**BORING LOGGED BY:**	**KEVIN BURN**

SAMPLE INFORMATION									**USCS**	
No.	**Depth**	**Rec**	**Blows per 6"**				**Depth**	**SOIL DESCRIPTION**	**SYMBOL**	**REMARKS**
			AUGER							
1	0-5	44"/5'					0-0.5	ROOT MAT		
							0.5-1	CLAYEY SILT, MEDIUM STIFF, NON PLASTIC, ORANGE-BROWN	ML	
							1-2.5	FILL - BRICK, GLASS, CRUSHED STONE, CONCRETE		
							2.5-4.5	SILT, TRACE VERY FINE SAND, LAMINA (DARK GREEN ORGANIC SOIL), SOFT, NON PLASTIC, ORGANIC DECAY ODORS, WET	ML/OL	
							4.5-5	PEAT, ORGANIC DECAY ODORS, WET	OL	
								TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC. **BORING DG-SB05**

824 MARKET STREET, WILMINGTON, DELAWARE 19801

PROJECT NAME: SAUER DUMP **DATE: 1/24/2007**
JOB NUMBER: 4320029 **LOCATION: DUNDALK, MD**
DRILLING FIRM: SGS GROUP **WEATHER:**
DRILLING METHOD: 5' MACRO CORE (2") HAMMMERED INTO GROUND **ELEVATION:**
DRILLER: Jeff Qusa **DATUM:**
HELPER: **BORING LOGGED BY: KEVIN BURN**

SAMPLE INFORMATION									USCS	
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	SYMBOL	REMARKS
			AUGER							
1	0-5	49"/5'					0-0.5	ROOT MAT		
							0.5-3	SILT, SOFT, NON PLASTIC, BLOCKY, HOMOGENEOUS, LIGHT GRAY, NO ODORS	ML	
							3-3.5	PEAT	OL	
							3.5-5	SILT, LAMINA (DARK GREEN ORGANIC SOIL), SOFT, NON PLASTIC, WET, ORGANIC DECAY ODORS	ML/OL	
								TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.

BORING DG-SB06

824 MARKET STREET, WILMINGTON, DELAWARE 19801

PROJECT NAME: SAUER DUMP **DATE: 1/24/2007**
JOB NUMBER: 4320029 **LOCATION: DUNDALK, MD**
DRILLING FIRM: SGS GROUP **WEATHER:**
DRILLING METHOD: 5' MACRO CORE (2") HAMMMERED INTO GROUND **ELEVATION:**
DRILLER: Jeff Qusa **DATUM:**
HELPER: **BORING LOGGED BY: KEVIN BURN**

SAMPLE INFORMATION									USCS	
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	SYMBOL	REMARKS
			AUGER							
1	0-5	34"/5'					0-0.5	ROOT MAT		
							0.5-1	CLAYEY SILT, SOFT, LOW PLASTICITY, ORANGE-BROWN		
							1-2	SILT, VERY SOFT, NON PLASTIC WITH TWIGS AND ROOTS (20%), DARK BROWN-BLACK		
							2-4.5	CLAYEY SILT, MEDIUM STIFF, LOW PLASTICITY, LOW TOUGHNESS, RAPID DILATENCY, LIGHT GRAY, HOMOGENEOUS, WET, NO ODORS		
							4.5-5	SILT, LAMINA (DARK GREEN, ORGANIC SOIL), SOFT, NON PLASTIC, WHITE, WET, NO ODORS		
								TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.

824 MARKET STREET, WILMINGTON, DELAWARE 19801

BORING DG-SB07

PROJECT NAME: SAUER DUMP		**DATE:**	**1/24/2007**
JOB NUMBER: 4320029		**LOCATION:**	**DUNDALK, MD**
DRILLING FIRM: SGS GROUP		**WEATHER:**	
DRILLING METHOD: GEOPROBE 6610 DT ATW, 5' MACRO CORE		**ELEVATION:**	
DRILLER: Jeff Qusa		**DATUM:**	
HELPER:		**BORING LOGGED BY:**	**KEVIN BURN**

SAMPLE INFORMATION									USCS	
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	SYMBOL	REMARKS
			AUGER							
1	0-5	5'/5'					0-4.5	FILL - SLAG, BRICK, WOOD CHUNKS, GLASS, CRUSHED STONE, REDDISH BROWN, POORLY GRADED SAND		
							4.5-5	SILT, LAMINA (DARK GREEN, ORGANIC SOIL), SOFT, NON PLASTIC, LOW TOUGHNESS, WHITE, ORGANIC DECAY ODORS, WET TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC. **BORING DG-SB08**

824 MARKET STREET, WILMINGTON, DELAWARE 19801

PROJECT NAME: SAUER DUMP	DATE: 1/24/2007
JOB NUMBER: 4320029	LOCATION: DUNDALK, MD
DRILLING FIRM: SGS GROUP	WEATHER:
DRILLING METHOD: GEOPROBE 6610 DT ATW, 5' MACRO CORE	ELEVATION:
DRILLER: Jeff Qusa	DATUM:
HELPER:	BORING LOGGED BY: KEVIN BURN

SAMPLE INFORMATION										
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	USCS SYMBOL	REMARKS
			AUGER							
1	0-5	50"/5'					0-0.5	ROOT MAT		
							0.5-1	CLAYEY SILT, MEDIUM STIFF, LOW TOUGHNESS, NON PLASTIC, ORANGE-BROWN	ML	
							1-1.5	FILL - DARK BROWN-BLACK, SILT, GLASS, SLAG, ROOTS	FL	
							1.5-4	SILT, SOFT, NON PLASTIC, LOW TOUGHNESS, RAPID DILATENCY, BLOCKY, LAMINA (ORANGE-BROWN AND DARK BROWN), LIGHT GRAY, WET, NO ODORS		
							4-5	SILT, LAMINA (DARK GREEN ORGANIC SOIL) SOFT, NON PLASTIC, BLOCKY, WHITE, WET, ORGANIC DECAY ODORS		
								TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.
824 MARKET STREET, WILMINGTON, DELAWARE 19801

BORING DG-SB09

PROJECT NAME: SAUER DUMP	**DATE:** 1/24/2007
JOB NUMBER: 4320029	**LOCATION:** DUNDALK, MD
DRILLING FIRM: SGS GROUP	**WEATHER:**
DRILLING METHOD: GEOPROBE 6610 DT ATW, 5' MACRO CORE	**ELEVATION:**
DRILLER: Jeff Qusa	**DATUM:**
HELPER:	**BORING LOGGED BY:** KEVIN BURN

SAMPLE INFORMATION									USCS	
No.	Depth	Rec	Blows per 6"				Depth	SOIL DESCRIPTION	SYMBOL	REMARKS
			AUGER							
1	0-5	50"/5'					0-0.5	ROOT MAT		
							0.5-1	FILL - DARK BROWN-BLACK, SILT, GLASS, SLAG, ROOTS	FL	
							1-4.5	SILT, SOFT, NON PLASTIC, LOW TOUGHNESS, BLOCKY, RAPID DILATENCY, LAMINA (ORANGE-BROWN AND DARK BROWN) LIGHT GRAY, WET, NO ODORS		
							4.5-5	SILT, LAMINA (DARK GREEN, ORGANIC SOIL), SOFT, NON PLASTIC, BLOCKY, WET, WHITE, ORGANIC DECAY ODORS		
								TERMINATE BORING AT 5'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.

824 MARKET STREET, WILMINGTON, DELAWARE 19801

BORING MW-1R

PROJECT NAME: SAUER DUMP	**DATE: 1/23/2007**
JOB NUMBER: 4320029	**LOCATION: DUNDALK, MD**
DRILLING FIRM: SGS GROUP	**WEATHER:**
DRILLING METHOD: GEOPROBE 6610 DT ATW, 5' MACRO CORE	**ELEVATION:**
DRILLER: Jeff Qusa	**DATUM:**
HELPER:	**BORING LOGGED BY: KEVIN BURN**

SAMPLE INFORMATION										
No.	**Depth**	**Rec**	**Blows per 6"**				**Depth**	**SOIL DESCRIPTION**	**USCS SYMBOL**	**REMARKS**
			AUGER							
1	0-5	25"/5'					0-5	FILL - CONCRETE, CRUSHED STONE, SILT, SAND, FINE GRADED WITH TWIGS, LEAVES, WET AT 4', NO ODORS	FL	
2	5-10	25"/5'					5-10	FILL - ASPHALT, CRUSHED STONE, BRICK, CONCRETE, WET, NO ODORS	FL	
							10-10.5	PEAT	OL	
3	10-15	48"/5'					10.5-13.5	ORGANIC SOIL, SILTY CLAY AND ORGANIC DEBRIS (TWIGS, WOOD), SOFT, MODERATE PLASTICITY, LOW TOUGHNESS, NO DILATENCY, GRAY, WET, NO ODORS	CL/OL	
							13.5-15	SILTY CLAY, SOFT, MODERATE PLASTICITY, MEDIUM TOUGHNESS, HOMOGENEOUS, NO DILATENCY, GRAY, NO ODORS	CL	
								TERMINATE BORING AT 15'		

Appendix A
Soil Boring Logs
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.
824 MARKET STREET, WILMINGTON, DELAWARE 19801

BORING MW-4(NEW)

PROJECT NAME: SAUER DUMP		**DATE:**	**1/22/2007**
JOB NUMBER: 4320029		**LOCATION:**	**DUNDALK, MD**
DRILLING FIRM: SGS GROUP		**WEATHER:**	
DRILLING METHOD: GEOPROBE 6610 DT ATW, 5' MACRO CORE		**ELEVATION:**	
DRILLER: Jeff Qusa		**DATUM:**	
HELPER:		**BORING LOGGED BY:**	**KEVIN BURN**

SAMPLE INFORMATION									USCS	
No.	**Depth**	**Rec**	**Blows per 6"**				**Depth**	**SOIL DESCRIPTION**	**SYMBOL**	**REMARKS**
			AUGER							
1	0-5	38"/5'					0-0.5	SILTY CLAY WITH ROOT MAT, SOFT, MEDIUM PLASTIC, ORANGE-BROWN, WET		
							0.5-2	CONCRETE	FL	
							2-5	SILTY SAND WITH WOOD CHUNKS AND ROCK FRAGMENTS, DARK BROWN-BLACK, DRY, NO ODORS	FL	
2	5-10	28"/5'					5-10	FILL - CONCRETE AND CRUSHED STONE, MOIST, NO ODORS		
3	10-15	42"/5'					10-10.5	FILL - CONCRETE AND CRUSHED STONE, MOIST, NO ODORS		
							10.5-15	CLAYEY SILT, NON TO LOW PLASTICITY, MEDIUM STIFF, RAPID DILATENCY, LOW TOUGHNESS, VARIEGATED GRAY AND ORANGE-BROWN, WET, NO ODORS	ML	PERCENTAGE OF SILT INCREASES TO 15' BGS
4	15-29	42"/5'					15-18	CLAYEY SILT, NON TO LOW PLASTICITY, MEDIUM STIFF, RAPID DILATENCY, LOW TOUGHNESS, GRAY WITH LAMINA (ORANGE-BROWN, VERY FINE SAND), WET, NO ODORS		
							18-20	SILTY SAND, MEDIUM DENSE, POORLY GRADED VERY FINE TO FINE, TAN, WET, NO ODORS		
								TERMINATE BORING AT 20'		

Appendix B:

Data Validation Summary

Extent of Contamination Study

1.0 INTRODUCTION

This summary presents data verification results for surface soil, subsurface soil, sediment, surface water, and groundwater samples collected from Sauer Dump Site during Janurary through February 2007. The data review was performed in accordance with the procedures specified in Appendix E Quality Assurance Project Plan of the Response Action Plan – Revision 2 (Final) (Malcolm Pirnie, 2006), USEPA Functional Guideline documents for Organic and Inorganic Data Review (USEPA, 1999 and 2002), USEPA Region III Modifications to National Functional Guidelines for Organic Data Review (USEPA, Spetember 1994), and quality assurance and control parameters set by the project laboratories (STL-Pittsburgh and STL-Knoxville).

The following summarizes the number of samples and analytical parameters submitted to the laboratories for analysis:

Sample Type	# of Samples	Parameters	Analytical Method
Surface Soils	32	Lead PCBs	6010B 8082
Subsurface Soils	9	Lead PCBs VOCs SVOCs	6010B 8082 8260B 8270C
Sediment	9	Lead PCBs	6010B 8082 and 1668a
Groundwater	5	Lead PCBs	6010B 8082 and 1668a
Surface Water	2	Lead PCBs	6010B 8082 and 1668a

Notes: PCBs = Polychlorinated Biphenyls; VOCs = Volatile Organic Compounds; SVOCs = Semivolatile Organic Compounds

Additionally, seven field quality assurance samples (i.e., field duplicates and trip blank) were collected and analyzed as part of the project. Table B-1 lists the samples and associated analytical parameters.

1.1 Data Quality Assessment

Sample results were subject to data review that includes an evaluation of the following quality control (QC) parameters:

- sample receipt temperatures;
- holding times;
- method blanks;

- laboratory control samples (LCS);
- matrix spike/matrix spike duplicates (MS/MSD);
- field duplicates;
- surrogates (for organic parameters);
- instrument performance criteria; and
- calibration criteria.

For the PCB homolog data, chromatograms and raw data were also reviewed qualitatively. Results that required qualification based on the data verification are summarized in Table B-2. Appendix C provides the initial calibration, continuing calibration, laboratory blank, matrix spike/matrix spike duplicate, field quality control (dup and blank), sample paperwork, holding time, retention time, surrogate recovery, dilution factor, moisture content, chromatograms, mass spectra, and raw data.

1.2 Data Qualifiers

The data qualifiers used to qualify analytical results associated with QC parameters are defined below:

J	The analyte was positively identified; however, the result should be considered an estimated value.
UJ	The reporting limit is considered an estimated value.
B	Result not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present; reported value may be biased low.
UL	Not detected; quantitation limit may be higher.
Q	The result is an estimated maximum possible concentration (EMPC).
R	Quality control indicates that the data is not usable.
U	Non-detect result above the laboratory reporting limit.

Results qualified as “J”, “UJ”, “Q”, “B”, “L”, or “UL” are of acceptable data quality and may be used quantitatively to fulfill the objectives of the analytical program, per EPA guidelines.

1.3 Sample Preservation and Temperature Upon Laboratory Receipt

Samples were received intact and at the correct temperature (4±2 degrees Celsius) at the project laboratories.

1.4 Holding Times

Samples were extracted and analyzed within the holding time limits set by the respective USEPA methods.

1.5 Blank Contamination

Method blanks and trip blanks were performed at the required frequencies. Target compounds were not detected in the blanks with the following exception:

- The VOC method blank in the analytical batch 7028012 contained acetone at 5.3 ug/kg. Samples associated with this method blank that had detected concentrations of acetone were qualified "B" to indicate a potential high bias. Acetone is also considered a common laboratory contaminant.
- The PCB homologs method blank in the analytical batch 7023115 contained trace detections of monochlorobophenyl, dichlorobiphenyl, trichlorobiphenyl, tetrachlorobiphenyl, pentachlorobiphenyl, hexachlorobiphenyl, heptachlorobiphenyl and octachlorobiphenyl. Associated samples that contained concentrations less than five times the method blank concentrations were qualified "B" to indicate a potential high bias.
- The PCB homologs method blank in the analytical batch 7054165 contained trace detections of monochlorobophenyl, dichlorobiphenyl, trichlorobiphenyl, tetrachlorobiphenyl, pentachlorobiphenyl, hexachlorobiphenyl, and heptachlorobiphenyl. Associated samples that contained concentrations less than five times the method blank concentrations were qualified "B" to indicate a potential high bias.
- The PCB homologs method blank in the analytical batch 7022118 contained trace detections of dichlorobiphenyl, trichlorobiphenyl, tetrachlorobiphenyl, pentachlorobiphenyl, hexachlorobiphenyl, and heptachlorobiphenyl. Data qualification was not required since the associated samples contained concentrations that were greater than five times the method blank concentrations.

1.6 LCS/LCS Duplicate Recovery and Relative Percent Difference

Percent recoveries and RPDs for the LCS/LCS duplicate were within acceptance limits. LCS/LCS duplicates were performed at the required frequency and were evaluated based on the following criteria:

- If the analyte recovery was above acceptance limits for LCS or LCS duplicate but the analyte was not detected in the associated batch, then data qualification was not required.
- If the analyte recovery was above acceptance limits for LCS or LCS duplicate and the analyte was detected in the associated batch, then the analyte results were qualified “J”.
- If the analyte recovery was below acceptance limits for LCS or LCS duplicate then the analyte results in the associated analytical batch were qualified (“UJ” for non-detects and “J” for detected results).
- If the analyte recovery was less than 10 percent, the analyte results in the associated analytical batch were rejected and qualified “R”.

1.7 MS/MSD Recovery and RPD

MS/MSD samples were performed at the required frequency and were evaluated by the following criteria:

- If MS or MSD recovery for an analyte is above acceptance limits but the analyte is not detected in the associated analytical batch, then data qualification was not required.
- If MS or MSD recovery for an analyte is above acceptance limits and the analyte is detected in the associated analytical batch, the analyte results were qualified “J”.
- Low MS/MSD recoveries for inorganic parameters result in sample qualification of the associated analytical batch.
- Low MS/MSD recoveries for organic parameters result in the data qualification of the unspiked sample rather than the analytical batch.
- Results were not qualified based on non-project specific MS/MSD (i.e., batch QC) recoveries.

Percent recoveries and RPDs for the MS/MSD duplicate were within acceptance limits except for the following:

- The lead MS/MSD recoveries (292 and 248 percent) associated with the analytical batch 7031322 were above acceptance limits (75 to 125 percent). The associated samples with lead detections were qualified “J” to indicate a potential high bias.

- The Method 1668 MS/MSD for samples DG-SD07-0.5 and MW-1R-T had recoveries outside of acceptance limits for several congeners. Data qualification was not required since the MS and LCS recoveries were acceptable or the majority of the congeners for the homolog were within acceptance limits.

1.8 Field Duplicates

Two field duplicate was collected during this monitoring event and submitted for analysis. The RPD between the field duplicate and its associated samples was calculated and presented in Table B-3. Field duplicates were evaluated by the following criteria:

- If an analyte is detected at a concentration greater than five times the method reporting limit, the RPD should be less than 25 percent.
- If an analyte is detected between the sample and field duplicate less than five times the method reporting limit, the difference between the sample and the field duplicate should not exceed the method reporting limit.

Field duplicates RPDs that required data qualification are summarized in Table B-2.

1.9 Surrogates

Surrogates for all organic parameters were recovered within acceptance limits with the following exceptions:

- Method 8082 surrogates for samples DG-SS24-0 and DG-SS03-0 were recovered below acceptance criteria. Data qualification was not required since these samples were analyzed at or greater than 1:10 dilutions.
- Method 8082 surrogates for samples DG-SD06-0.5, DUP011007, and DG-SB01-2 were recovered below acceptance limits. Sample results were qualified “L” for detects or “UL” for non-detects to indicate potential low bias.
- The Method 8270 surrogate terphenyl-d14 was recovered below acceptance limits for samples DG-SB05-2. Data qualification was not required since the other SVOC surrogates were recovered within acceptance limits.

1.10 Instrument Performance Checks and Calibration Criteria

Discrepancies were not noted for instrument performance checks and calibration criteria in the case narratives provided in the laboratory reports.

2.0 Completeness Summary

Two types of completeness were calculated for this project: contract and technical. As specified in the project DQOs, the goal for completeness for the site is 90 percent. Results indicated as not reportable by the laboratory are not included in the completeness calculations. The following equations are used to calculate the two types of completeness.

% Contract Completeness =
(Number of contract compliant results/
Number of reported results)
x 100

% Technical Completeness =
(Number of usable results/Number of reported results)
x 100

The overall contract completeness included the evaluation of the protocol and contract deviations for holding times, blanks, MS/MSD, and LCS. The technical completeness, which included all QC parameters, attained for the field samples was 100 percent. The completeness results are provided in Table A-4. All of the results were considered usable for the intended purposes and the project DQOs have been met.

Table B-1
Sampling and Analysis Schedule
Extent of Contamination Study
Sauer Dump Site

Sample ID	Lab ID	Collected	Sample Type	Parameters
DG-SS01-0	C7A110281-01	1/8/2007	N	Lead, PCBs (8082)
DG-SS03-0	C7A110281-02	1/9/2007	N	Lead, PCBs (8082)
DG-SS04-0	C7A110281-03	1/9/2007	N	Lead, PCBs (8082)
DG-SS06-0	C7A110281-04	1/9/2007	N	Lead, PCBs (8082)
DG-SS07-0	C7A110281-05	1/9/2007	N	Lead, PCBs (8082)
DG-SS08-0	C7A110281-06	1/9/2007	N	Lead, PCBs (8082)
DG-SS10-0	C7A110281-07	1/9/2007	N	Lead, PCBs (8082)
DUP010907	C7A110281-08	1/9/2007	FD of DG-SS10-0	Lead, PCBs (8082)
DG-SS11-0	C7A110281-09	1/9/2007	N	Lead, PCBs (8082)
DG-SS12-0	C7A110281-10	1/9/2007	N	Lead, PCBs (8082)
DG-SS14-0	C7A110281-11	1/9/2007	N	Lead, PCBs (8082)
DG-SD01-0.5	C7A110284-001	1/9/2007	N	Lead, PCBs (8082 and 1668a)
DG-SD02-0.5	C7A110284-002	1/10/2007	N	Lead, PCBs (8082 and 1668a)
DG-SD03-0.5	C7A110284-003	1/10/2007	N	Lead, PCBs (8082 and 1668a)
DG-SS02-0	C7A130135-001	1/10/2007	N	Lead, PCBs (8082)
DG-SS05-0	C7A130135-002	1/10/2007	N	Lead, PCBs (8082)
DG-SS09-0	C7A130135-003	1/10/2007	N	Lead, PCBs (8082)
DG-SS13-0	C7A130135-004	1/10/2007	N	Lead, PCBs (8082)
DG-SS15-0	C7A130135-005	1/10/2007	N	Lead, PCBs (8082)
DG-SS16-0	C7A130135-006	1/10/2007	N	Lead, PCBs (8082)
DG-SS17-0	C7A130135-007	1/11/2007	N	Lead, PCBs (8082)
DG-SS18-0	C7A130135-008	1/11/2007	N	Lead, PCBs (8082)
DUP011107	C7A130135-009	1/11/2007	FD of DG-SS18-0	Lead, PCBs (8082)
DG-SS19-0	C7A130135-010	1/11/2007	N	Lead, PCBs (8082)
DG-SS20-0	C7A130135-011	1/11/2007	N	Lead, PCBs (8082)
DG-SS21-0	C7A130135-012	1/11/2007	N	Lead, PCBs (8082)
DG-SS22-0	C7A130135-013	1/11/2007	N	Lead, PCBs (8082)
DG-SS23-0	C7A130135-014	1/11/2007	N	Lead, PCBs (8082)
DG-SW01-T	C7A130135-015	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SW01-F	C7A130135-016	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SW02-T	C7A130135-017	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SW02-F	C7A130135-018	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SWDUP01-T	C7A130135-019	1/11/2007	FD of DG-SW01-T	Lead, PCBs (8082 and 1668a)
DG-SD05-0.5	C7A130138-001	1/10/2007	N	Lead, PCBs (8082 and 1668a)
DG-SD04-0.5	C7A130138-002	1/10/2007	N	Lead, PCBs (8082 and 1668a)
DG-SD06-0.5	C7A130138-003	1/10/2007	N	Lead, PCBs (8082 and 1668a)
DUP011007	C7A130138-004	1/10/2007	FD of DG-SD06-0.5	Lead, PCBs (8082 and 1668a)
DG-SD07-0.5	C7A130138-005	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SD08-0.5	C7A130138-006	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SD09-0.5	C7A130138-007	1/11/2007	N	Lead, PCBs (8082 and 1668a)
DG-SS24-0	C7A240133-001	1/23/2007	N	Lead, PCBs (8082)
DG-SS25-0	C7A240133-002	1/23/2007	N	Lead, PCBs (8082)
DG-SS26-0	C7A240133-003	1/23/2007	N	Lead, PCBs (8082)
DG-SS27-0	C7A240133-004	1/23/2007	N	Lead, PCBs (8082)
DUP012307	C7A240133-005	1/23/2007	FD of DG-SS27-0	Lead, PCBs (8082)

Table B-1
Sampling and Analysis Schedule
Extent of Contamination Study
Sauer Dump Site

Sample ID	Lab ID	Collected	Sample Type	Parameters
DG-SS28-0	C7A240133-006	1/23/2007	N	Lead, PCBs (8082)
DG-SS29-0	C7A240133-007	1/23/2007	N	Lead, PCBs (8082)
DG-SS30-0	C7A240133-008	1/23/2007	N	Lead, PCBs (8082)
DG-SS31-0	C7A250145-001	1/24/2007	N	Lead, PCBs (8082)
DG-SS32-0	C7A250145-002	1/24/2007	N	Lead, PCBs (8082)
DG-SB01-2	C7A250145-003	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DG-SB02-2	C7A250145-004	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DG-SB03-2	C7A250145-005	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
TB012407	C7A250145-006	1/24/2007	TB	VOCs
DG-SB04-2	C7A250145-007	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DG-SB05-2	C7A250145-008	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DG-SB06-2	C7A250145-009	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DG-SB07-2	C7A250145-010	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DUP012407	C7A250145-011	1/24/2007	FD of DG-SB07-2	Lead, PCBs (8082), SVOCs, VOCs
DG-SB08-2	C7A250145-012	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
DG-SB09-2	C7A250145-013	1/24/2007	N	Lead, PCBs (8082), SVOCs, VOCs
MW-2-T	C7B080261-001	2/7/2007	N	Lead, PCBs (8082 and 1668a)
MW-2-F	C7B080261-002	2/7/2007	N	Lead, PCBs (8082 and 1668a)
DUP020707-T	C7B080261-003	2/7/2007	FD of MW-2-T	Lead, PCBs (8082 and 1668a)
DUP020707-F	C7B080261-004	2/7/2007	FD of MW-2-F	Lead, PCBs (8082 and 1668a)
MW-1R-T	C7B090142-001	2/8/2007	N	Lead, PCBs (8082 and 1668a)
MW-1R-F	C7B090142-002	2/8/2007	N	Lead, PCBs (8082 and 1668a)
MW-3-T	C7B090142-003	2/8/2007	N	Lead, PCBs (8082 and 1668a)
MW-3-F	C7B090142-004	2/8/2007	N	Lead, PCBs (8082 and 1668a)
MW-5-T	C7B130171-001	2/12/2007	N	Lead, PCBs (8082 and 1668a)
MW-5-F	C7B130171-002	2/12/2007	N	Lead, PCBs (8082 and 1668a)
MW-4-T	C7B130171-003	2/12/2007	N	Lead, PCBs (8082 and 1668a)
MW-4-F	C7B130171-004	2/12/2007	N	Lead, PCBs (8082 and 1668a)

Notes:
N = normal field sample
FD = Field duplicate
TB = Trip blank
PCBs = Polychlorinated Biphenyls; analyzed by Methods 8082 or 1668a
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
T = Total sample fraction
F = Filtered sample fraction

Table B-2
Qualified Data
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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB01-2	1/24/2007	2-Methylnaphthalene	36	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	4-Methylphenol	26	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	4-Nitroaniline	25	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Acenaphthene	45	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Acenaphthylene	79	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Anthracene	150	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Benzo(a)anthracene	450	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Benzo(a)pyrene	300	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Benzo(b)fluoranthene	290	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Benzo(ghi)perylene	70	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Benzo(k)fluoranthene	120	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB01-2	1/24/2007	bis(2-Ethylhexyl)phthalate	260	ug/kg	J	Qualified due to high internal standard area, trace value (reported between the reporting limit and the method detection limit), and common laboratory contaminant
DG-SB01-2	1/24/2007	Butyl benzyl phthalate	89	ug/kg	J	Qualified due to high internal standard area, trace value (reported between the reporting limit and the method detection limit), and common laboratory contaminant
DG-SB01-2	1/24/2007	Carbazole	56	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Chrysene	540	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Dibenz(a,h)anthracene	22	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Dibenzofuran	25	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Fluoranthene	580	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Fluorene	45	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Indeno(1,2,3-cd)pyrene	99	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Naphthalene	39	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Phenanthrene	540	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB01-2	1/24/2007	Phenol	48	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Pyrene	740	ug/kg	J	Qualified due to high internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Tetrachloroethene	1.5	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB01-2	1/24/2007	Arochlor 1016	<39	ug/kg	UL	Qualified due to low surrogate recovery
DG-SB01-2	1/24/2007	Arochlor 1221	<39	ug/kg	UL	Qualified due to low surrogate recovery
DG-SB01-2	1/24/2007	Arochlor 1232	<39	ug/kg	UL	Qualified due to low surrogate recovery
DG-SB01-2	1/24/2007	Arochlor 1242	<39	ug/kg	UL	Qualified due to low surrogate recovery
DG-SB01-2	1/24/2007	Arochlor 1248	<39	ug/kg	UL	Qualified due to low surrogate recovery
DG-SB01-2	1/24/2007	Arochlor 1254	710	ug/kg	L	Qualified due to low surrogate recovery
DG-SB01-2	1/24/2007	Arochlor 1260	630	ug/kg	L	Qualified due to low surrogate recovery
DG-SB02-2	1/24/2007	2-Methylnaphthalene	58	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Acenaphthene	48	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Acetone	8.2	ug/kg	BJ	Qualified due to method blank contamination and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	All Other SVOC Analytes	ND	ug/kg	UJ	Qualified due to low internal standard area.
DG-SB02-2	1/24/2007	Anthracene	87	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Benzo(a)anthracene	250	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB02-2	1/24/2007	Benzo(a)pyrene	170	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Benzo(b)fluoranthene	160	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Benzo(ghi)perylene	61	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Benzo(k)fluoranthene	69	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	bis(2-Ethylhexyl)phthalate	760	ug/kg	J	Qualified due to low internal standard area, trace value (reported between the reporting limit and the method detection limit), and common laboratory contaminant
DG-SB02-2	1/24/2007	Butyl benzyl phthalate	510	ug/kg	J	Qualified due to low internal standard area, trace value (reported between the reporting limit and the method detection limit), and common laboratory contaminant
DG-SB02-2	1/24/2007	Chrysene	300	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Dibenzofuran	32	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Fluoranthene	360	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Indeno(1,2,3-cd)pyrene	59	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Naphthalene	63	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)

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Extent of Contamination Study
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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB02-2	1/24/2007	Phenanthrene	390	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB02-2	1/24/2007	Pyrene	350	ug/kg	J	Qualified due to low internal standard area and trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Acetone	25	ug/kg	BJ	Qualified due to method blank contamination and trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Aroclor 1242	31	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Aroclor 1254	63	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Aroclor 1260	34	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Benzo(a)anthracene	77	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Benzo(b)fluoranthene	80	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Chrysene	87	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Methyl tert-butyl ether	1.1	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Phenanthrene	83	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB03-2	1/24/2007	Pyrene	100	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	2-Methylnaphthalene	32	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Acenaphthene	250	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Acenaphthylene	28	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB04-2	1/24/2007	Anthracene	310	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Benzo(a)anthracene	770	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Benzo(a)pyrene	490	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Benzo(b)fluoranthene	650	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Benzo(ghi)perylene	190	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Benzo(k)fluoranthene	270	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	bis(2-Ethylhexyl)phthalate	740	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit) and common laboratory contaminant
DG-SB04-2	1/24/2007	Butyl benzyl phthalate	87	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit) and common laboratory contaminant
DG-SB04-2	1/24/2007	Carbazole	190	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Chrysene	870	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Dibenzofuran	71	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Fluorene	130	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Indeno(1,2,3-cd)pyrene	220	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Methyl tert-butyl ether	0.68	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB04-2	1/24/2007	Naphthalene	74	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)

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Qualified Data
Extent of Contamination Study
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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB05-2	1/24/2007	2-Methylnaphthalene	120	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB05-2	1/24/2007	Acenaphthylene	27	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB05-2	1/24/2007	Aroclor 1260	43	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB05-2	1/24/2007	Dibenz(a,h)anthracene	400	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB05-2	1/24/2007	Dibenzofuran	490	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB05-2	1/24/2007	Fluorene	890	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB05-2	1/24/2007	Naphthalene	370	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB06-2	1/24/2007	Benzo(a)anthracene	33	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB06-2	1/24/2007	Benzo(ghi)perylene	20	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB06-2	1/24/2007	bis(2-Ethylhexyl)phthalate	1700	ug/kg	J	Qualified due to common laboratory contaminant
DG-SB06-2	1/24/2007	Chrysene	40	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB06-2	1/24/2007	Phenanthrene	39	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB06-2	1/24/2007	Pyrene	46	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Acetone	14	ug/kg	BJ	Qualified due to method blank contamination and trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Aroclor 1260	30	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Benzo(a)anthracene	39	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)

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Extent of Contamination Study
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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SB07-2	1/24/2007	Benzo(a)pyrene	25	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Benzo(b)fluoranthene	23	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Benzo(ghi)perylene	25	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Chrysene	60	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Fluoranthene	48	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Phenanthrene	49	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB07-2	1/24/2007	Pyrene	97	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB08-2	1/24/2007	Acetone	23	ug/kg	BJ	Qualified due to method blank contamination and trace value (reported between the reporting limit and the method detection limit)
DG-SB08-2	1/24/2007	Aroclor 1242	34	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SB08-2	1/24/2007	Aroclor 1260	50	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SD01-0.5	1/9/2007	Dichlorobiphenyl	0.052	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD01-0.5	1/9/2007	Heptachlorobiphenyl	0.021	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD01-0.5	1/9/2007	Hexachlorobiphenyl	0.076	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SD01-0.5	1/9/2007	Monochlorobiphenyl	0.0026	ng/g	BJ	Qualified due to method blank contamination and trace value (reported between the reporting limit and the method detection limit).
DG-SD01-0.5	1/9/2007	Pentachlorobiphenyl	0.092	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD01-0.5	1/9/2007	Tetrachlorobiphenyl	0.097	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD01-0.5	1/9/2007	Trichlorobiphenyl	0.078	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD02-0.5	1/10/2007	Dichlorobiphenyl	4.9	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD02-0.5	1/10/2007	Heptachlorobiphenyl	24	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD02-0.5	1/10/2007	Hexachlorobiphenyl	84	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD02-0.5	1/10/2007	Octachlorobiphenyl	6.3	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD02-0.5	1/10/2007	Pentachlorobiphenyl	130	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD02-0.5	1/10/2007	Tetrachlorobiphenyl	66	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD02-0.5	1/10/2007	Trichlorobiphenyl	17	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD03-0.5	1/10/2007	Decachlorobiphenyl	7.3	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD03-0.5	1/10/2007	Dichlorobiphenyl	620	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SD03-0.5	1/10/2007	Heptachlorobiphenyl	1200	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD03-0.5	1/10/2007	Hexachlorobiphenyl	1800	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD03-0.5	1/10/2007	Pentachlorobiphenyl	1300	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD03-0.5	1/10/2007	Tetrachlorobiphenyl	2300	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD04-0.5	1/10/2007	Decachlorobiphenyl	2.9	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DG-SD04-0.5	1/10/2007	Dichlorobiphenyl	3.4	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DG-SD04-0.5	1/10/2007	Heptachlorobiphenyl	160	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD04-0.5	1/10/2007	Hexachlorobiphenyl	900	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD04-0.5	1/10/2007	Nonachlorobiphenyl	7.3	ng/g	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SD04-0.5	1/10/2007	Octachlorobiphenyl	34	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD04-0.5	1/10/2007	Pentachlorobiphenyl	1400	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD04-0.5	1/10/2007	Tetrachlorobiphenyl	310	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD04-0.5	1/10/2007	Trichlorobiphenyl	12	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SD05-0.5	1/10/2007	Dichlorobiphenyl	15	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD05-0.5	1/10/2007	Heptachlorobiphenyl	160	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD05-0.5	1/10/2007	Hexachlorobiphenyl	410	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD05-0.5	1/10/2007	Monochlorobiphenyl	2.5	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DG-SD05-0.5	1/10/2007	Pentachlorobiphenyl	540	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD05-0.5	1/10/2007	Tetrachlorobiphenyl	230	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD05-0.5	1/10/2007	Trichlorobiphenyl	69	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD06-0.5	1/10/2007	Aroclor 1016	<1000	ug/kg	UL	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Aroclor 1221	<1000	ug/kg	UL	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Aroclor 1232	<1000	ug/kg	UL	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Aroclor 1242	<1000	ug/kg	UL	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Aroclor 1248	<1000	ug/kg	UL	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Aroclor 1254	15000	ug/kg	L	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Aroclor 1260	<1000	ug/kg	UL	Qualified due to low surrogate recovery
DG-SD06-0.5	1/10/2007	Decachlorobiphenyl	12	ng/g	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SD06-0.5	1/10/2007	Dichlorobiphenyl	170	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD06-0.5	1/10/2007	Heptachlorobiphenyl	2100	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD06-0.5	1/10/2007	Hexachlorobiphenyl	11000	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SD06-0.5	1/10/2007	Monochlorobiphenyl	3.0	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DG-SD06-0.5	1/10/2007	Octachlorobiphenyl	380	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD06-0.5	1/10/2007	Pentachlorobiphenyl	18000	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD06-0.5	1/10/2007	Tetrachlorobiphenyl	6000	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD06-0.5	1/10/2007	Trichlorobiphenyl	990	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD07-0.5	1/11/2007	Dichlorobiphenyl	7.9	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD07-0.5	1/11/2007	Hexachlorobiphenyl	280	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD07-0.5	1/11/2007	Monochlorobiphenyl	0.71	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DG-SD07-0.5	1/11/2007	Octachlorobiphenyl	17	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD07-0.5	1/11/2007	Pentachlorobiphenyl	380	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD07-0.5	1/11/2007	Tetrachlorobiphenyl	160	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD07-0.5	1/11/2007	Trichlorobiphenyl	39	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD08-0.5	1/11/2007	Dichlorobiphenyl	0.069	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SD08-0.5	1/11/2007	Heptachlorobiphenyl	0.027	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD08-0.5	1/11/2007	Hexachlorobiphenyl	0.064	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD08-0.5	1/11/2007	Monochlorobiphenyl	0.012	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD08-0.5	1/11/2007	Pentachlorobiphenyl	0.077	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD08-0.5	1/11/2007	Tetrachlorobiphenyl	0.066	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD08-0.5	1/11/2007	Trichlorobiphenyl	0.058	ng/g	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SD09-0.5	1/11/2007	Aroclor 1260	32	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SD09-0.5	1/11/2007	Dichlorobiphenyl	1.1	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD09-0.5	1/11/2007	Heptachlorobiphenyl	6.0	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD09-0.5	1/11/2007	Hexachlorobiphenyl	18	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SD09-0.5	1/11/2007	Pentachlorobiphenyl	23	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD09-0.5	1/11/2007	Tetrachlorobiphenyl	12	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SD09-0.5	1/11/2007	Trichlorobiphenyl	4.1	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SS02-0	1/10/2007	Lead	260	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS05-0	1/10/2007	Lead	269	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS09-0	1/10/2007	Lead	116	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS10-0	1/9/2007	Aroclor 1254	12	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS10-0	1/9/2007	Aroclor 1260	19	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS11-0	1/9/2007	Aroclor 1254	6.8	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS11-0	1/9/2007	Aroclor 1260	8.3	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS13-0	1/10/2007	Lead	64.7	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS15-0	1/10/2007	Lead	170	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS16-0	1/10/2007	Lead	440	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS17-0	1/11/2007	Lead	198	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS18-0	1/11/2007	Lead	363	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS19-0	1/11/2007	Lead	114	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS20-0	1/11/2007	Aroclor 1260	36	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS20-0	1/11/2007	Lead	130	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS21-0	1/11/2007	Lead	324	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS22-0	1/11/2007	Lead	140	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS23-0	1/11/2007	Aroclor 1254	51	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS23-0	1/11/2007	Lead	205	mg/kg	J	Qualified due to high MS/MSD recovery
DG-SS27-0	1/23/2007	Aroclor 1260	<37	ug/kg	UJ	Qualified due to high field duplicate RPD

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SS29-0	1/23/2007	Aroclor 1260	15	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS31-0	1/24/2007	Aroclor 1260	28	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SS32-0	1/24/2007	Aroclor 1260	37	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SW01-F	1/11/2007	Dichlorobiphenyl	0.60	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-F	1/11/2007	Heptachlorobiphenyl	0.57	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-F	1/11/2007	Hexachlorobiphenyl	1.2	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-F	1/11/2007	Octachlorobiphenyl	0.19	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-F	1/11/2007	Pentachlorobiphenyl	1.3	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-F	1/11/2007	Tetrachlorobiphenyl	0.87	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-F	1/11/2007	Trichlorobiphenyl	0.44	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW01-T	1/11/2007	Dichlorobiphenyl	0.62	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SW01-T	1/11/2007	Heptachlorobiphenyl	2.6	ng/L	J	Qualified due to high field duplicate RPD
DG-SW01-T	1/11/2007	Hexachlorobiphenyl	5.4	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SW01-T	1/11/2007	Lead	9.2	ug/L	J	Qualified due to high field duplicate RPD
DG-SW01-T	1/11/2007	Monochlorobiphenyl	0.12	ng/L	J	Qualified due to high field duplicate RPD
DG-SW01-T	1/11/2007	Octachlorobiphenyl	0.85	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SW01-T	1/11/2007	Pentachlorobiphenyl	6.0	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SW01-T	1/11/2007	Tetrachlorobiphenyl	3.5	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SW01-T	1/11/2007	Trichlorobiphenyl	1.2	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SW02-F	1/11/2007	Decachlorobiphenyl	0.0064	ng/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SW02-F	1/11/2007	Dichlorobiphenyl	0.62	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-F	1/11/2007	Heptachlorobiphenyl	0.13	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SW02-F	1/11/2007	Hexachlorobiphenyl	0.40	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-F	1/11/2007	Lead	1.6	ug/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DG-SW02-F	1/11/2007	Monochlorobiphenyl	0.22	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-F	1/11/2007	Nonachlorobiphenyl	0.0082	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SW02-F	1/11/2007	Octachlorobiphenyl	0.024	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
DG-SW02-F	1/11/2007	Pentachlorobiphenyl	0.57	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-F	1/11/2007	Tetrachlorobiphenyl	0.54	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-F	1/11/2007	Trichlorobiphenyl	0.60	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-T	1/11/2007	Dichlorobiphenyl	2.6	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DG-SW02-T	1/11/2007	Heptachlorobiphenyl	5.8	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-T	1/11/2007	Hexachlorobiphenyl	22	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-T	1/11/2007	Octachlorobiphenyl	1.3	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-T	1/11/2007	Pentachlorobiphenyl	31	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-T	1/11/2007	Tetrachlorobiphenyl	15	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SW02-T	1/11/2007	Trichlorobiphenyl	5.0	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
DG-SWDUP01-T	1/11/2007	Dichlorobiphenyl	2.1	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Heptachlorobiphenyl	4.7	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Hexachlorobiphenyl	16	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Lead	28.7	ug/L	J	Qualified due to high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Monochlorobiphenyl	0.43	ng/L	J	Qualified due to high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Octachlorobiphenyl	1.5	ng/L	J	Qualified due to high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Pentachlorobiphenyl	23	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Tetrachlorobiphenyl	12	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DG-SWDUP01-T	1/11/2007	Trichlorobiphenyl	3.7	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and high field duplicate RPD
DUP010907	1/9/2007	Aroclor 1254	24	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP010907	1/9/2007	Aroclor 1260	43	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP011007	1/10/2007	Aroclor 1016	<910	ug/kg	UL	Qualified due to low surrogate recovery
DUP011007	1/10/2007	Aroclor 1221	<910	ug/kg	UL	Qualified due to low surrogate recovery

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
DUP011007	1/10/2007	Aroclor 1232	<910	ug/kg	UL	Qualified due to low surrogate recovery
DUP011007	1/10/2007	Aroclor 1242	<910	ug/kg	UL	Qualified due to low surrogate recovery
DUP011007	1/10/2007	Aroclor 1248	<910	ug/kg	UL	Qualified due to low surrogate recovery
DUP011007	1/10/2007	Aroclor 1254	13000	ug/kg	L	Qualified due to low surrogate recovery
DUP011007	1/10/2007	Aroclor 1260	<910	ug/kg	UL	Qualified due to low surrogate recovery
DUP011007	1/10/2007	Decachlorobiphenyl	14	ng/g	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP011007	1/10/2007	Dichlorobiphenyl	180	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DUP011007	1/10/2007	Heptachlorobiphenyl	1800	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DUP011007	1/10/2007	Hexachlorobiphenyl	9400	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DUP011007	1/10/2007	Monochlorobiphenyl	15	ng/g	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DUP011007	1/10/2007	Pentachlorobiphenyl	15000	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DUP011007	1/10/2007	Tetrachlorobiphenyl	5000	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DUP011007	1/10/2007	Trichlorobiphenyl	850	ng/g	Q	Qualified due to estimated maximum possible concentration (EMPC).
DUP011107	1/11/2007	Lead	276	mg/kg	J	Qualified due to high MS/MSD recovery
DUP012307	1/23/2007	Aroclor 1260	180	ug/kg	J	Qualified due to high field duplicate RPD
DUP012407	1/24/2007	Acetone	5.9	ug/kg	BJ	Qualified due to method blank contamination and trace value (reported between the reporting limit and the method detection limit)
DUP012407	1/24/2007	Aroclor 1260	31	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP012407	1/24/2007	Benzo(a)pyrene	15	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)

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DUP012407	1/24/2007	Fluoranthene	30	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP012407	1/24/2007	Phenanthrene	39	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP012407	1/24/2007	Pyrene	56	ug/kg	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP020707-F	2/7/2007	Dichlorobiphenyl	82	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-F	2/7/2007	Hexachlorobiphenyl	0.059	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
DUP020707-F	2/7/2007	Monochlorobiphenyl	61	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-F	2/7/2007	Pentachlorobiphenyl	0.36	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-F	2/7/2007	Tetrachlorobiphenyl	6.0	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-F	2/7/2007	Trichlorobiphenyl	23	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-T	2/7/2007	Heptachlorobiphenyl	0.15	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-T	2/7/2007	Hexachlorobiphenyl	0.57	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-T	2/7/2007	Lead	1.7	ug/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP020707-T	2/7/2007	Nonachlorobiphenyl	0.013	ng/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
DUP020707-T	2/7/2007	Octachlorobiphenyl	0.041	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)

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DUP020707-T	2/7/2007	Pentachlorobiphenyl	2.4	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-T	2/7/2007	Tetrachlorobiphenyl	19	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
DUP020707-T	2/7/2007	Trichlorobiphenyl	52	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-F	2/8/2007	Decachlorobiphenyl	0.01	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-1R-F	2/8/2007	Dichlorobiphenyl	14	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-F	2/8/2007	Heptachlorobiphenyl	0.05	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-1R-F	2/8/2007	Hexachlorobiphenyl	0.31	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-F	2/8/2007	Pentachlorobiphenyl	0.9	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-F	2/8/2007	Tetrachlorobiphenyl	3.3	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-T	2/8/2007	Dichlorobiphenyl	37	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-T	2/8/2007	Heptachlorobiphenyl	16	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-T	2/8/2007	Hexachlorobiphenyl	50	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-T	2/8/2007	Octachlorobiphenyl	4.2	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-1R-T	2/8/2007	Pentachlorobiphenyl	74	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)

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Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
MW-1R-T	2/8/2007	Tetrachlorobiphenyl	63	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-F	2/7/2007	Dichlorobiphenyl	91	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-F	2/7/2007	Hexachlorobiphenyl	0.069	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-2-F	2/7/2007	Monochlorobiphenyl	63	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-F	2/7/2007	Pentachlorobiphenyl	0.46	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-F	2/7/2007	Tetrachlorobiphenyl	6.3	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-F	2/7/2007	Trichlorobiphenyl	26	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-T	2/7/2007	Dichlorobiphenyl	130	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-T	2/7/2007	Heptachlorobiphenyl	0.17	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-T	2/7/2007	Hexachlorobiphenyl	0.65	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-T	2/7/2007	Nonachlorobiphenyl	0.01	ng/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
MW-2-T	2/7/2007	Octachlorobiphenyl	0.051	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-2-T	2/7/2007	Pentachlorobiphenyl	2.3	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-2-T	2/7/2007	Tetrachlorobiphenyl	19	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)

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MW-3-F	2/8/2007	Dichlorobiphenyl	25	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-F	2/8/2007	Heptachlorobiphenyl	0.081	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-3-F	2/8/2007	Hexachlorobiphenyl	0.29	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-F	2/8/2007	Pentachlorobiphenyl	1.2	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-F	2/8/2007	Tetrachlorobiphenyl	13	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-F	2/8/2007	Trichlorobiphenyl	20	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-T	2/8/2007	Dichlorobiphenyl	34	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-T	2/8/2007	Heptachlorobiphenyl	0.93	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-T	2/8/2007	Hexachlorobiphenyl	2.4	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-T	2/8/2007	Lead	1.7	ug/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
MW-3-T	2/8/2007	Nonachlorobiphenyl	0.018	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-3-T	2/8/2007	Octachlorobiphenyl	0.23	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-T	2/8/2007	Pentachlorobiphenyl	5.8	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-3-T	2/8/2007	Tetrachlorobiphenyl	35	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)

Table B-2
Qualified Data
Extent of Contamination Study
Sauer Dump Site

Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
MW-3-T	2/8/2007	Trichlorobiphenyl	40	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-F	2/12/2007	Dichlorobiphenyl	140	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-F	2/12/2007	Hexachlorobiphenyl	0.035	ng/L	QBJ	Qualified due to method blank contamination, estimated maximum possible concentration (EMPC), and trace value (reported between the reporting limit and the method detection limit)
MW-4-F	2/12/2007	Monochlorobiphenyl	2.0	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-F	2/12/2007	Pentachlorobiphenyl	0.21	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-F	2/12/2007	Tetrachlorobiphenyl	13	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-T	2/12/2007	Aroclor 1016	0.84	ug/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
MW-4-T	2/12/2007	Decachlorobiphenyl	0.0075	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-4-T	2/12/2007	Heptachlorobiphenyl	1.4	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-T	2/12/2007	Hexachlorobiphenyl	6.5	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-T	2/12/2007	Lead	2.6	ug/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
MW-4-T	2/12/2007	Monochlorobiphenyl	0.63	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-T	2/12/2007	Nonachlorobiphenyl	0.055	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).
MW-4-T	2/12/2007	Octachlorobiphenyl	0.32	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC).

Table B-2
Qualified Data
Extent of Contamination Study
Sauer Dump Site

Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
MW-4-T	2/12/2007	Pentachlorobiphenyl	21	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-T	2/12/2007	Tetrachlorobiphenyl	350	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-4-T	2/12/2007	Trichlorobiphenyl	880	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-F	2/12/2007	Dichlorobiphenyl	0.51	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-F	2/12/2007	Heptachlorobiphenyl	0.031	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-5-F	2/12/2007	Hexachlorobiphenyl	0.086	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-5-F	2/12/2007	Monochlorobiphenyl	0.13	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-F	2/12/2007	Pentachlorobiphenyl	0.12	ng/L	QJ	Qualified due to estimated maximum possible concentration (EMPC) and trace value (reported between the reporting limit and the method detection limit)
MW-5-F	2/12/2007	Tetrachlorobiphenyl	0.32	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-F	2/12/2007	Trichlorobiphenyl	0.34	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-T	2/12/2007	Dichlorobiphenyl	1.4	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-T	2/12/2007	Heptachlorobiphenyl	0.22	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-T	2/12/2007	Hexachlorobiphenyl	0.47	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)

Table B-2
Qualified Data
Extent of Contamination Study
Sauer Dump Site

Sample ID	Date Collected	Analyte	Result	Units	Data Qualifier	Comments
MW-5-T	2/12/2007	Monochlorobiphenyl	0.26	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-T	2/12/2007	Octachlorobiphenyl	0.028	ng/L	J	Qualified due to trace value (reported between the reporting limit and the method detection limit)
MW-5-T	2/12/2007	Pentachlorobiphenyl	0.56	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-T	2/12/2007	Tetrachlorobiphenyl	2.6	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)
MW-5-T	2/12/2007	Trichlorobiphenyl	1.7	ng/L	Q	Qualified due to estimated maximum possible concentration (EMPC)

Notes:

mg/L - milligram per liter
ug/L = microgram per liter
ng/L = nanogram per liter
UJ = Estimated reporting limit
RPD = Relative Percent Difference
MS/MSD = Matrix spike/matrix spike duplicate
EMPC = estimated maximum possible concentration

mg/kg = milligram per kilogram
ug/kg = microgram per kilogram
ng/g = nanogram per gram
J = Estimated result
L = Analyte is present. Reported value may be biased low. Actual value is expected to be higher.
UL = Not detected, quantitation limit is probably higher

Table B-3
Field Duplicate Summary
Extent of Contamination Study
Sauer Dump Site

Sample ID / Field Duplicate ID	Parameters	Sample Result	Field Duplicate Result	RPD (%)
DG-SS10-0/ DUP010907	**Metals (mg/kg)**			
	Lead	69.9	66.7	4.7
	PCBs by 8082 (ug/kg)			
	Aroclor 1016	<47	<45	NC
	Aroclor 1221	<47	<45	NC
	Aroclor 1232	<47	<45	NC
	Aroclor 1242	<47	<45	NC
	Aroclor 1248	<47	<45	NC
	Aroclor 1254	12 J	24 J	NC
	Aroclor 1260	19 J	43 J	NC
DG-SS18-0 / DUP011107	**Metals (mg/kg)**			
	Lead	363	276	27
	PCBs by 8082 (ug/kg)			
	Aroclor 1016	<49	<43	NC
	Aroclor 1221	<49	<43	NC
	Aroclor 1232	<49	<43	NC
	Aroclor 1242	<49	<43	NC
	Aroclor 1248	<49	<43	NC
	Aroclor 1254	910	1100	19
	Aroclor 1260	1500	1300	14
DG-SS27-0 / DUP012307	**Metals (mg/kg)**			
	Lead	59	66	12
	PCBs by 8082 (ug/kg)			
	Aroclor 1016	<37	<37	NC
	Aroclor 1221	<37	<37	NC
	Aroclor 1232	<37	<37	NC
	Aroclor 1242	<37	<37	NC
	Aroclor 1248	<37	<37	NC
	Aroclor 1254	<37	<37	NC
	Aroclor 1260	<37	180	NC*
DG-SB07-2 / DUP012407	**Metals (mg/kg)**			
	Lead	76.0	68.5	10
	PCBs by 8082 (ug/kg)			
	Aroclor 1016	<41	<41	NC
	Aroclor 1221	<41	<41	NC
	Aroclor 1232	<41	<41	NC
	Aroclor 1242	<41	<41	NC
	Aroclor 1248	<41	<41	NC
	Aroclor 1254	<41	<41	NC
	Aroclor 1260	30 J	31 J	NC
	VOCs (ug/kg)			
	Acetone	14 J	5.9 J	NC

Table B-3
Field Duplicate Summary
Extent of Contamination Study
Sauer Dump Site

Sample ID / Field Duplicate ID	Parameters	Sample Result	Field Duplicate Result	RPD (%)
	All Other Analytes	ND	ND	NC

Table B-3
Field Duplicate Summary
Extent of Contamination Study
Sauer Dump Site

Sample ID / Field Duplicate ID	Parameters	Sample Result	Field Duplicate Result	RPD (%)
DG-SB07-2 / DUP012407 (cont.)	**SVOCs (ug/kg)**			
	Benzo(a)anthracene	39 J	<810	NC
	Benzo(a)pyrene	25 J	15 J	NC
	Benzo(b)fluoranthene	23 J	<810	NC
	Benzo(ghi)perylene	25 J	<810	NC
	Chrysene	60 J	<810	NC
	Fluoranthene	48 J	30 J	NC
	Phenanthrene	49 J	39 J	NC
	Pyrene	97 J	56 J	NC
	All Other Analytes	ND	ND	NC
DG-SD06-0.5 / DUP011007	**Metals (mg/kg)**			
	Lead	595	606.0	1.8
	PCBs by 8082 (ug/kg)			
	Aroclor 1016	<1000	<910	NC
	Aroclor 1221	<1000	<910	NC
	Aroclor 1232	<1000	<910	NC
	Aroclor 1242	<1000	<910	NC
	Aroclor 1248	<1000	<910	NC
	Aroclor 1254	15000	13000	14
	Aroclor 1260	<1000	<910	NC
	PCBs by 1668 (ng/g)			
	Monochlorobiphenyl	3.0 Q,B,J	15 Q,B,J	NC
	Dichlorobiphenyl	170 Q,B	180 Q,B	5.7
	Trichlorobiphenyl	990 B,Q	850 Q,B	15
	Tetrachlorobiphenyl	6000 B,Q	5000 Q,B	18
	Pentachlorobiphenyl	18000 B,Q	15000 Q,B	18
	Hexachlorobiphenyl	11000 B,Q	9400 Q,B	15
	Heptachlorobiphenyl	2100 B,Q	1800 B,Q	15
	Octachlorobiphenyl	380 Q,B	340 B	11
	Nonochlorobiphenyl	80	66	19
	Decachlorobiphenyl	12 J	14 J	NC
DG-SW01-T / DG-SWDUP01-T	**Metals (ug/L)**			
	Lead	9.2	28.7	103*
	PCBs by 8082 (ug/L)			
	Aroclor 1016	<1.0	<0.98	NC
	Aroclor 1221	<1.0	<0.98	NC
	Aroclor 1232	<1.0	<0.98	NC
	Aroclor 1242	<1.0	<0.98	NC
	Aroclor 1248	<1.0	<0.98	NC
	Aroclor 1254	<1.0	<0.98	NC
	Aroclor 1260	<1.0	<0.98	NC

Table B-3
Field Duplicate Summary
Extent of Contamination Study
Sauer Dump Site

Sample ID / Field Duplicate ID	Parameters	Sample Result	Field Duplicate Result	RPD (%)
DG-SW01-T / DG-SWDUP01-T (cont.)	**PCBs by 1668 (ng/L)**			
	Monochlorobiphenyl	0.12	0.43	113*
	Dichlorobiphenyl	0.62 B,Q	2.1 B,Q	109*
	Trichlorobiphenyl	1.2 B,Q	3.7 B,Q	102*
	Tetrachlorobiphenyl	3.5 B,Q	12 B,Q	110*
	Pentachlorobiphenyl	6.0 Q,B	23 B,Q	117*
	Hexachlorobiphenyl	5.4 B,Q	16 B,Q	99*
	Heptachlorobiphenyl	2.6 B	4.7 B,Q	56*
	Octachlorobiphenyl	0.85 Q	1.5	55*
	Nonochlorobiphenyl	0.36	0.43	18
	Decachlorobiphenyl	0.32	0.28	13
MW-2-T / DUP020707-T	**Metals (ug/L)**			
	Lead	<3.0	1.7 J	NC
	PCBs by 8082 (ug/L)			
	All Analytes	<1.0	<0.96	NC
MW-2-F / DUP020707-F	**Metals (ug/L)**			
	Lead	<3.0	<3.0	NC
	PCBs by 8082 (ug/L)			
	All Analytes	<0.95	<0.95	NC

Notes:
RPD = Relative percent difference; [(difference)/(average)]*100
NC = Not calculated; RPD values were not calculated for non-detects or trace values
ND = No analytes detected
mg/kg = milligram per kilogram
ug/kg = microgram per kilogram
ng/g = nanogram per gram
ug/L = micrograms per liter
ng/L = nanogram per liter
PCBs = Polychlorinated Biphenyls
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
* = Field Duplicate RPD Outliers

Table B-4
Completeness Summary
Extent of Contamination Study
Sauer Dump Site

Parameters	Total Number of Samples	Number in Contractual Compliance	Percent Contractual Compliance	Number of Usable Results	Percent Technical Compliance
Metals					
Lead	72	56[a,b]	78	72	100
PCBs by 8082					
Aroclor 1016	72	70[c]	97	72	100
Aroclor 1221	72	70[c]	97	72	100
Aroclor 1232	72	70[c]	97	72	100
Aroclor 1242	72	70[c]	97	72	100
Aroclor 1248	72	70[c]	97	72	100
Aroclor 1254	72	70[c]	97	72	100
Aroclor 1260	72	68[b,c]	94	72	100
PCBs by 1668					
Monochlorobiphenyl	27	12[b,d,e]	44	27	100
Dichlorobiphenyl	27	2[b,d,e]	7	27	100
Trichlorobiphenyl	27	3[b,d,e]	11	27	100
Tetrachlorobiphenyl	27	0[b,d,e]	0	27	100
Pentachlorobiphenyl	27	0[b,d,e]	0	27	100
Hexachlorobiphenyl	27	0[b,d,e]	0	27	100
Heptachlorobiphenyl	27	4[b,d,e]	15	27	100
Octachlorobiphenyl	27	13[b,d]	48	27	100
Nonachlorobiphenyl	27	24[d]	89	27	100
Decachlorobiphenyl	27	23[d]	85	27	100
Volatile Organic Compounds					
Acetone	10	5[e]	50	10	100
All Other Analytes	10	10	100	10	100
Semivolatile Organic Compounds					
2-Methylnaphthalene	10	8[f]	100	10	100
4-Methylphenol	10	9[f]	90	10	100
4-Nitroaniline	10	9[f]	90	10	100
Acenaphthene	10	8[f]	80	10	100
Acenaphthylene	10	9[f]	90	10	100
Anthracene	10	8[f]	80	10	100
Benzo(a)anthracene	10	8[f]	80	10	100
Benzo(a)pyrene	10	8[f]	80	10	100
Benzo(b)fluoranthene	10	8[f]	80	10	100
Benzo(ghi)perylene	10	8[f]	80	10	100
Benzo(k)fluoranthene	10	8[f]	80	10	100
bis(2-Ethylhexyl)phthalate	10	7[f,g]	70	10	100
Butyl benzyl phthalate	10	7[f,g]	70	10	100
Carbazole	10	9[f]	90	10	100

Table B-4
Completeness Summary
Extent of Contamination Study
Sauer Dump Site

Parameters	Total Number of Samples	Number in Contractual Compliance	Percent Contractual Compliance	Number of Usable Results	Percent Technical Compliance
Chrysene	10	8[f]	80	10	100
Dibenz(a,h)anthracene	10	9[f]	90	10	100
Dibenzofuran	10	8[f]	80	10	100
Fluoranthene	10	8[f]	80	10	100
Fluorene	10	9[f]	90	10	100
Indeno(1,2,3-cd)pyrene	10	8[f]	80	10	100
Naphthalene	10	8[f]	80	10	100
Phenanthrene	10	8[f]	80	10	100
Phenol	10	9[f]	90	10	100
Pyrene	10	8[f]	80	10	100
All Other SVOC Analytes	10	9[f]	90	10	100

Notes:

Number of samples used in completeness calculations includes field duplicates but does not include trip blanks. Data qualified as estimated value due to detections between the reporting limit and method detection limit are counted as being in contractual compliance.

Percent Contractual Compliance = (Number of contract compliant results/Number of reported results) * 100

Percent Technical Compliance = (Number of usable results/Number of reported results) * 100

[a] = Qualified due to matrix spike/matrix spike duplicate recoveries outside of acceptance limits

[b] = Qualified due to high field duplicate relative percent difference

[c] = Qualified due to surrogate recoveries outside of acceptance limits

[d] = Qualified due to estimated maximum possible concentration (EMPC)

[e] = Qualified due to method blank contamination

[f] = Internal standards recovered outside of acceptance limits

[g] = Qualified due to analyte is considered a common laboratory contaminant

Appendix C:

Laboratory Analytical Reports

Extent of Contamination Study

`Note: Laboratory reports are provided on CDs in the Hard Copy`

Appendix D:

Monitoring Well Construction

Extent of Contamination Study

Appendix D
Well Construction Diagrams
Extend of Contamination Study
Sauer Dump Site

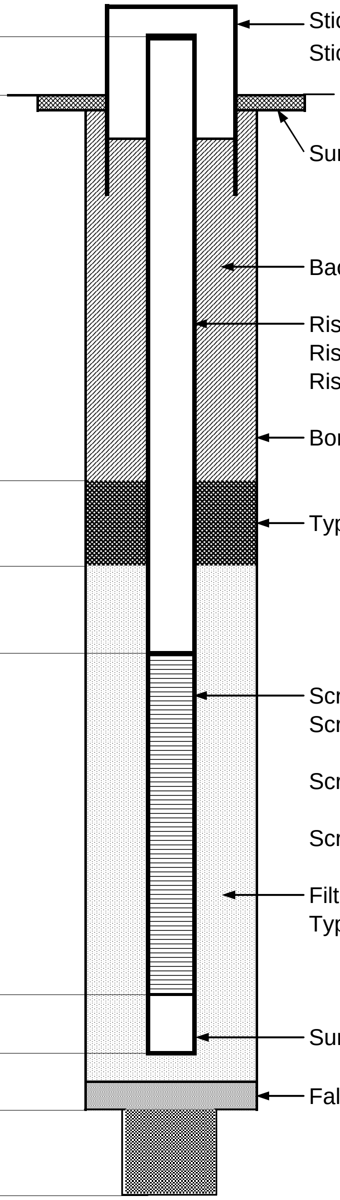
MALCOLM PIRNIE, INC.

OVERBURDEN WELL/PIEZOMETER MW-IR

Project:	SAUER DUMP	**Job Number:**	4320029
Client:	Smurfit-Stone Container Corp	**Date:**	1/23/07
Subcontractor:	SGS Group		
Drilling Method: Hollow Stem Auger (HAS)			
Development Method:	Surge & electrosubmersible pump.		
Construction Dates:	1/23/2007	to	1/23/2007

Measuring Point
Type: GROUND SURFACE
Elevation (ft): 4.6

Item	Depth, below Measuring Point	Elevation (ft)
Riser Pipe	-2.7	7.3
Grade	0.0	4.6
Top of Seal	2.0	2.6
Top of Filter Pack	3.0	1.6
Top of Screen	5.0	-0.4
Base of Screen	15.0	-10.4
End Cap	15.0	-10.4
Drilled Depth		
Total Depth	15.0	-10.4



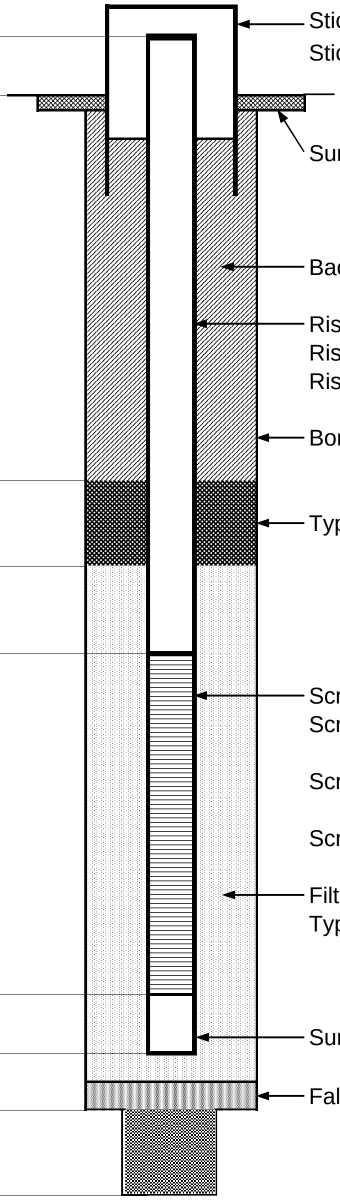
Description	
Stickup Type:	Steel
Stickup Diameter:	4 (in.)
Surface Seal Type:	Concrete pad
Backfill/Grout Type:	Cement-Sakrete
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	2 (in.)
Riser Pipe Length:	5 (ft)
Borehole Diameter:	8 (in.)
Type of Seal:	Hydrated Bentonite DSI Shur Plug 3/8"
Screen Type:	Schedule 40 PVC
Screen ID:	2 (in.)
Screen Slot Size:	Factory-Slotted 0.01"
Screen Length:	10 (ft)
Filter/Sand Pack Type:	Fil Pro W.G. 1&2
Sump:	NA
Fallback/Backfill:	NA

Notes:

Appendix D
Well Construction Diagrams
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.			**OVERBURDEN WELL/PIEZOMETER MW-2**
Project: SAUER DUMP		**Job Number:** 4320029	
Client: Smurfit-Stone Container Corp		**Date:** 1/23/07	**Subcontractor:** SGS Group
Drilling Method: Hollow Stem Auger (HAS)			**Measuring Point**
Development Method: Surge & electrosubmersible pump.			**Type:** GROUND SURFACE
Construction Dates: 1/23/2007 to 1/23/2007			**Elevation (ft):** 3.81

Item	Depth, below Measuring Point	Elevation (ft)
Riser Pipe	-2.9	6.7
Grade	0.0	3.8
Top of Seal	2.0	1.8
Top of Filter Pack	3.0	0.8
Top of Screen	5.0	-1.2
Base of Screen	15.0	-11.2
End Cap	15.0	-11.2
Drilled Depth		
Total Depth	15.0	-11.2



Description

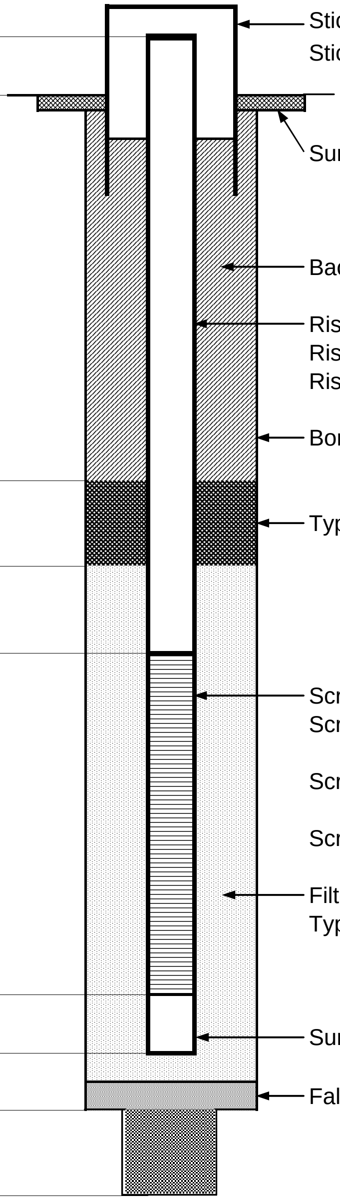
Stickup Type:	Steel
Stickup Diameter:	4 (in.)
Surface Seal Type:	Concrete pad
Backfill/Grout Type:	Cement-Sakrete
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	2 (in.)
Riser Pipe Length:	5 (ft)
Borehole Diameter:	8 (in.)
Type of Seal:	Hydrated Bentonite DSI Shur Plug 3/8"
Screen Type:	Schedule 40 PVC
Screen ID:	2 (in.)
Screen Slot Size:	Factory-Slotted 0.01"
Screen Length:	10 (ft)
Filter/Sand Pack Type:	Fil Pro W.G. 1&2
Sump:	NA
Fallback/Backfill:	NA

Notes:

Appendix D
Well Construction Diagrams
Extend of Contamination Study
Sauer Dump Site

MALCOLM PIRNIE, INC.			**OVERBURDEN WELL/PIEZOMETER MW-3**
Project: SAUER DUMP		**Job Number:** 4320029	
Client: Smurfit-Stone Container Corp		**Date:** 1/23/07	**Subcontractor:** SGS Group
Drilling Method: Hollow Stem Auger (HAS)			**Measuring Point**
Development Method:	Surge & electrosubmersible pump.		**Type:** GROUND SURFACE
Construction Dates:	1/23/2007 to 1/23/2007		**Elevation (ft):** 11.77

Item	Depth, below Measuring Point	Elevation (ft)
Riser Pipe	-3.0	14.7
Grade	0.0	11.8
Top of Seal	2.0	9.8
Top of Filter Pack	3.0	8.8
Top of Screen	5.0	6.8
Base of Screen	20.0	-8.2
End Cap	20.0	-8.2
Drilled Depth		
Total Depth	20.0	-8.2



Description

Stickup Type:	Steel
Stickup Diameter:	4 (in.)
Surface Seal Type:	Concrete pad
Backfill/Grout Type:	Cement-Sakrete
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	2 (in.)
Riser Pipe Length:	5 (ft)
Borehole Diameter:	8 (in.)
Type of Seal:	Hydrated Bentonite DSI Shur Plug 3/8"
Screen Type:	Schedule 40 PVC
Screen ID:	2 (in.)
Screen Slot Size:	Factory-Slotted 0.01"
Screen Length:	15 (ft)
Filter/Sand Pack Type:	Fil Pro W.G. 1&2
Sump:	NA
Fallback/Backfill:	NA

Notes:

Appendix D
Well Construction Diagrams
Extend of Contamination Study
Sauer Dump Site

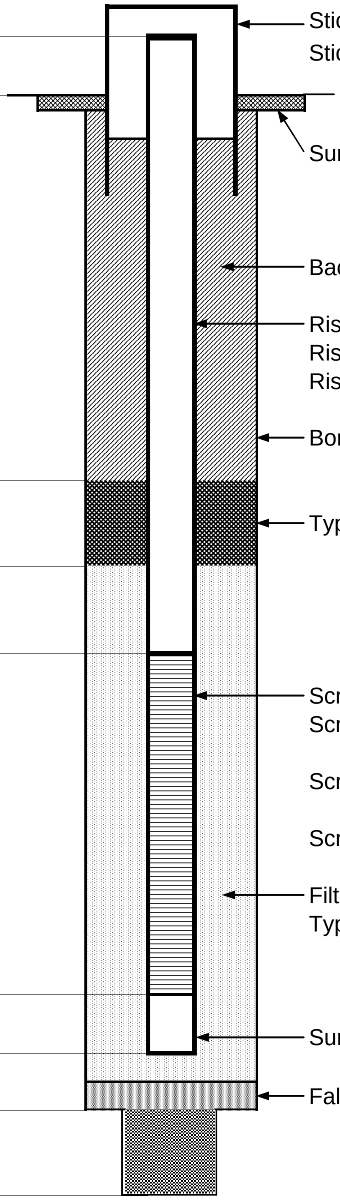
MALCOLM PIRNIE, INC.

OVERBURDEN WELL/PIEZOMETER MW-4 (NEW)

Project: SAUER DUMP
Job Number: 4320029
Client: Smurfit-Stone Container Corp
Date: 1/22/07
Subcontractor: SGS Group
Drilling Method: Hollow Stem Auger (HAS)
Development Method: Surge & electrosubmersible pump.
Construction Dates: 1/22/2007 to 1/22/2007

Measuring Point
Type: GROUND SURFACE
Elevation (ft): 12.03

Item	Depth, below Measuring Point	Elevation (ft)
Riser Pipe	-3.0	15.0
Grade	0.0	12.0
Top of Seal	2.0	10.0
Top of Filter Pack	3.0	9.0
Top of Screen	5.0	7.0
Base of Screen	20.0	-8.0
End Cap	20.0	-8.0
Drilled Depth		
Total Depth	20.0	-8.0



Description

Stickup Type:	Steel
Stickup Diameter:	4 (in.)
Surface Seal Type:	Concrete pad
Backfill/Grout Type:	Cement-Sakrete
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	2 (in.)
Riser Pipe Length:	5 (ft)
Borehole Diameter:	8 (in.)
Type of Seal:	Hydrated Bentonite DSI Shur Plug 3/8"
Screen Type:	Schedule 40 PVC
Screen ID:	2 (in.)
Screen Slot Size:	Factory-Slotted 0.01"
Screen Length:	15 (ft)
Filter/Sand Pack Type:	Fil Pro W.G. 1&2
Sump:	NA
Fallback/Backfill:	NA

Notes:

Appendix D
Well Construction Diagrams
Extend of Contamination Study
Sauer Dump Site

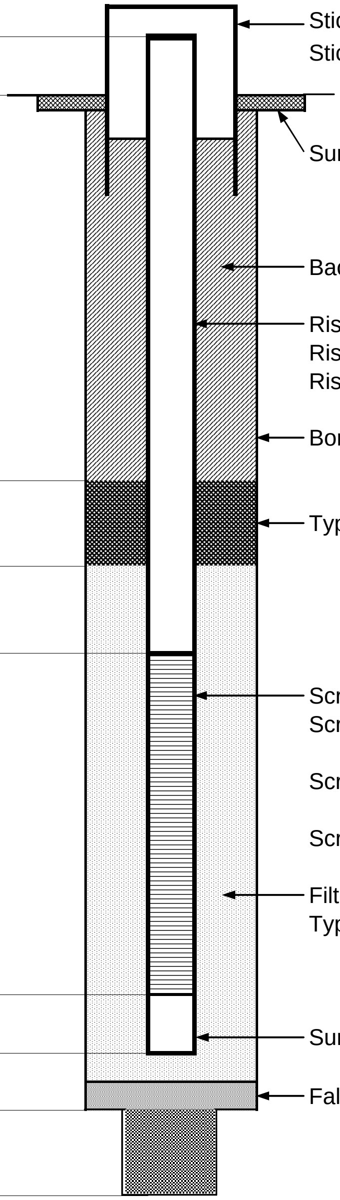
MALCOLM PIRNIE, INC.

OVERBURDEN WELL/PIEZOMETER MW-5

Project: SAUER DUMP
Job Number: 4320029
Client: Smurfit-Stone Container Corp
Date: 1/22/07
Subcontractor: SGS Group
Drilling Method: Hollow Stem Auger (HAS)
Development Method: Surge & electrosubmersible pump.
Construction Dates: 1/22/2007 to 1/22/2007

Measuring Point
Type: GROUND SURFACE
Elevation (ft): 9.61

Item	Depth, below Measuring Point	Elevation (ft)
Riser Pipe	-2.8	12.4
Grade	0.0	9.6
Top of Seal	2.0	7.6
Top of Filter Pack	3.0	6.6
Top of Screen	5.0	4.6
Base of Screen	20.0	-10.4
End Cap	20.0	-10.4
Drilled Depth		
Total Depth	20.0	-10.4



Description

Stickup Type: Steel
Stickup Diameter: 4 (in.)
Surface Seal Type: Concrete pad
Backfill/Grout Type: Cement-Sakrete
Riser Pipe Type: Schedule 40 PVC
Riser Pipe ID: 2 (in.)
Riser Pipe Length: 5 (ft)
Borehole Diameter: 8 (in.)
Type of Seal: Hydrated Bentonite DSI Shur Plug 3/8"
Screen Type: Schedule 40 PVC
Screen ID: 2 (in.)
Screen Slot Size: Factory-Slotted 0.01"
Screen Length: 15 (ft)
Filter/Sand Pack Type: Fil Pro W.G. 1&2
Sump: NA
Fallback/Backfill: NA

Notes:

Appendix E:

Groundwater Field Logs

Extent of Contamination Study

MALCOLM PIRNIE
824 Market Street, STE 820 Wilmington, DE 19801

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4320029
PROJECT NAME: Sauer Dump
SITE LOCATION: Dundalk, MD
SITE CONTACT:
DATE: Feb [illegible] 2007
SAMPLERS: Kevin Burns
Alex M
WEATHER: Cold

WELL IDENTIFICATION NUMBER: MW- 1R

PERMIT:

WELL HEADSPACE READING: 0.0
PID MODEL/LAMP: MiniRAE 2000
DEPTH TO WATER (Before Purging): 6.19 FEET FROM TOP OF CASING
WELL DEPTH: FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: FEET
WATER IN ONE WELL VOLUME: GALLONS
PURGE TIME (start/finish): 0920/ 1030
PURGE RATE: 450 mL/min
WELL EVACUATION DEVICE: QED MP15 & MicroPurge Pump
SAMPLING TIME (start/finish): 1040/
SAMPLE RATE: ~~4~~ 200mL/min
SAMPLE COLLECTION DEVICE:
SAMPLE APPEARANCE: Clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)		0930	0940	0950	1005	1015	1027			
pH (SU)		6.33	6.41	5.91	6.39	5.96	5.92			
specific conductivity (mS)		1.80	1.67	1.66	1.71	1.70	1.69			
turbidity (NTU's)		23	14	8.2	6.2	4.6	5.8			
dissolved oxygen (mg/l)		0.48	0.22	0.18	0.22	0.15	.16			
temperature (degrees C)		10.07	10.45	10.37	10.15	10.13	10.23			
redox potential (mv)		-64	-93	-114	-151	-136	-140			
depth to water (feet)		6.19	6.19	6.19	6.19	6.19	6.19			
volume purged (gallon)										

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: PCBs (8082/1688) Pd
LABORATORY: STL Baltimore
CONTACT:

Casing Diameter/Volume conversions
(inches) (gallons per foot)

NOTES:

MALCOLM PIRNIE 824 Market Street, STE 820 Wilmington, DE 19801

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER:	4320029	DATE:	Feb 7, 2007
PROJECT NAME:	Sauer Dump	SAMPLERS:	Kevin Burns
SITE LOCATION:	Dundalk, MD		Alex M
SITE CONTACT:		WEATHER:	Cold

WELL IDENTIFICATION NUMBER: MW- 2 **PERMIT:**

WELL HEADSPACE READING: 0.0 PID MODEL/LAMP: MiniRAE 2000
DEPTH TO WATER (Before Purging): 5.75 FEET FROM TOP OF CASING
WELL DEPTH: FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: FEET
WATER IN ONE WELL VOLUME: GALLONS
PURGE TIME (start/finish): 1200/1255 PURGE RATE: 400 mL/min
WELL EVACUATION DEVICE: QED MP15 Micro Purge Pump
SAMPLING TIME (start/finish): SAMPLE RATE: 200 mL/min
SAMPLE COLLECTION DEVICE:
SAMPLE APPEARANCE: Clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)		1210	1225	1235	1245	1250				
pH (SU)		7.24	6.48	6.98	7.00	6.94				
specific conductivity (mS)		2.15	2.14	2.13	2.13	2.12				
turbidity (NTU's)		28	11	8.0	5.1	5.4				
dissolved oxygen (mg/l)		0.53	0.34	0.20	0.17	0.17				
temperature (degrees C)		8.9	7.79	8.65	8.44	8.65				
redox potential (mv)		-121	-130	-139	-141	-142				
depth to water (feet)			5.75	5.75	5.75	5.75				
volume purged (gallon)										

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: PCBs (8082, 81668) & Pb

LABORATORY: STL-Baltimore
CONTACT:

Casing Diameter/Volume conversions	
(inches)	(gallons per foot)
2	

NOTES:

1- 443- 772- 9955 8131 Pulaski [illegible]

MALCOLM PIRNIE

824 Market Street, STE 820 Wilmington, DE 19801

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER:	4320029	DATE:	Feb 8, 2007
PROJECT NAME:	Sauer Dump	SAMPLERS:	Kevin Burns
SITE LOCATION:	Dundalk, MD		Alex M
SITE CONTACT:		WEATHER:	Cold, windy 27°/15°

WELL IDENTIFICATION NUMBER: MW- 3 **PERMIT:**

WELL HEADSPACE READING: 0.0 PID MODEL/LAMP: MiniRAE 2000
DEPTH TO WATER (Before Purging): 13.09 FEET FROM TOP OF CASING
WELL DEPTH: FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: FEET
WATER IN ONE WELL VOLUME: GALLONS
PURGE TIME (start/finish): 1153/1630 PURGE RATE: 400 mL/min
WELL EVACUATION DEVICE: QED MP15 w/ micropurge Pump
SAMPLING TIME (start/finish): 1630/1700 SAMPLE RATE: 200 mL/min
SAMPLE COLLECTION DEVICE: QED MP15 w/ micro purge pump
SAMPLE APPEARANCE: clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	12:15	12:32	1535	15:45	16:03	16:12	16:25	16:35		
pH (SU)	6.95	6.77	6.76	6.65	6.41	6.44	6.50	6.55		
specific conductivity (mS)	4.70	4.30	5.27	5.22	5.06	4.70	4.50	4.37		
turbidity (NTU's)	80	25	7.5	6.4	7.1	8.3	9.7	6.3		
dissolved oxygen (mg/l)	.40	.21	0.53	0.18	0.14	.11	.10	.10		
temperature (degrees C)	13.56	13.6	12.53	12.48	12.50	12.24	12.59	12.59		
redox potential (mv)	-129	-147	-105	-111	-123	-138	-149	-154		
depth to water (feet)	13.2	13.2	13.12	13.12	13.12	13.12	13.12	13.12		
volume purged (gallon)										

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: PCBs (8082 & 1668) JPD

LABORATORY: STL-Baltimore
CONTACT:

Casing Diameter/Volume conversions
(inches) (gallons per foot)

NOTES: Ran out of CO_2 after 1st reading

MALCOLM PIRNIE

824 Market Street, STE 820 Wilmington, DE 19801

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER:	4320029	DATE:	Feb 12, 2007
PROJECT NAME:	Sauer Dump	SAMPLERS:	Kevin Burns
SITE LOCATION:	Dundalk, MD		Alex M
SITE CONTACT:		WEATHER:	Cold

WELL IDENTIFICATION NUMBER: MW- 4 **PERMIT:**

WELL HEADSPACE READING: 0.0 PID MODEL/LAMP: MiniRAE 2000
DEPTH TO WATER (Before Purging): 12.34 FEET FROM TOP OF CASING
WELL DEPTH: FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: FEET
WATER IN ONE WELL VOLUME: GALLONS
PURGE TIME (start/finish): 1230 / 1555 PURGE RATE: 200 ml/min
WELL EVACUATION DEVICE: QED MP10 & micro purge pump
SAMPLING TIME (start/finish): 1555/ 174 SAMPLE RATE: 200 ml/min
SAMPLE COLLECTION DEVICE: ↓
SAMPLE APPEARANCE: Clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	12:55	1:07	1330	1400	1415	14:47	1500	1520	1535	1555
pH (SU)	10.06	8.39	7.37	6.44	645	7.46	823	771	720	7.22
specific conductivity (mS)	2.05	2.02	2.02	2.11	2.14	2.10	2.05	2.02	2.02	2.01
turbidity (NTU's)	327	320	198	70.3	55.5	36	24	15.3	14.7	15.1
dissolved oxygen (mg/l)	.95	.86	0.40	0.78	0.61	0.52	0.47	0.53	0.50	0.50
temperature (degrees C)	13.03	13.65	14.25	12.68	11.31	10.42	10.49	10.35	10.41	10.28
redox potential (mv)	58	71	66	52	49	56	54	62	64	64
depth to water (feet)	13.25	13.6	13.90	13.76	13.95	14.02	14.21	1425	14.45	14.7
volume purged (gallon)										

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: PCBs (8082 & 1668) & Pb

LABORATORY: STL-Baltimore
CONTACT:

Casing Diameter/Volume conversions (inches)	(gallons per foot)

NOTES:

MALCOLM PIRNIE 824 Market Street, STE 820 Wilmington, DE 19801

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4320029
PROJECT NAME: Sauer Dump
SITE LOCATION: Dundalk, MD
SITE CONTACT:

DATE: Feb 12 2007
SAMPLERS: Kevin Burns
Alex M
WEATHER: Cold

WELL IDENTIFICATION NUMBER: MW- 5
PERMIT:

WELL HEADSPACE READING: 0.0
PID MODEL/LAMP: MiniRAE 2000
DEPTH TO WATER (Before Purging): 9.65 FEET FROM TOP OF CASING
WELL DEPTH: FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: FEET
WATER IN ONE WELL VOLUME: GALLONS
PURGE TIME (start/finish): 0930/1100
PURGE RATE: 200 ml/min
WELL EVACUATION DEVICE: QED MP-10 [illegible] Bladder Pump
SAMPLING TIME (start/finish): 1100/1205
SAMPLE RATE:
SAMPLE COLLECTION DEVICE: ~~Glass~~ ↓
SAMPLE APPEARANCE: clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	922	0945	1005	1015	1035	1050	1100			
pH (SU)	10.03	9.36	9.54	7.98	7.92	8.80	8.82			
specific conductivity (mS)	1.92	1.83	1.78	1.65	1.60	1.57	1.57			
turbidity (NTU's)	~~[illegible]~~ 849	210	154	33.8	12.8	8.15	6.96			
dissolved oxygen (mg/l)	1.33	0.34	0.72	3.36	3.13	3.29	3.40			
temperature (degrees C)	12.20	11.26	11.40	11.61	11.68	12.12	12.24			
redox potential (mv)	-107	-116	-100	-61	-50	-44	-48			
depth to water (feet)	9.65	14.45	14.35	14.35	14.35	14.35	14.35			
volume purged (gallon)										

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: PCBs (8082 [illegible]) & Pd

LABORATORY: STL Baltimore
CONTACT:

Casing Diameter/Volume conversions
(inches) (gallons per foot)

NOTES:

Appendix F:

Site Survey Report

Extent of Contamination Study

CAPITOL DEVELOPMENT DESIGN INC.

ENGINEERS ● PLANNERS ● SURVEYORS

19 February 2007

Mr. Kevin Burns
Malcolm Pirnie, Inc.
824 Market Street, Suite 820
Wilmington, DE 19801

Re: Lusk Property (Project 06136) Boundary Survey Report:

Regarding the above survey, the following facts are in evidence, accompanied by its boundary determination and notable results:

1) All deed descriptions (subject property, Robinson property and properties northerly of subject along Lynhurst Road), except Wittstadt Hunting Club, Inc., are written in the same horizontal datum.
2) All the above properties are part of the original outline described in Liber 1151 at Folio 112.
3) Along Back River, Liber 1151, Folio 112 calls for "the waters of Back River"; Back River is tidal (and therefore "navigable" according to Maryland law); the underlying lands of navigable water are under sovereign title to The State of Maryland; the upland limits of this title is defined by law as the Mean High Water Line; the Mean High Water Line elevation (0.6 feet: NGVD88) for this survey has been interpolated from data published by The National Ocean Service and The National Geodetic Survey for Baltimore, Fort McHenry, Patapsco River Station 8574680 and Betterton, Sassafras River Station 8573704; two exceptions to the said Line are two boat launches on the property which are obvious artificial alterations of said Line.
4) By examination of the deed descriptions listed in number 1 above, the underlying fee title to Lynhurst Road (40 feet wide) appears to remain in Liber 1151 at Folio 112, rights of way for its use having been granted to most (including the subject property), if not all, properties adjoining it; no research has been performed by the surveyor to conclusively verify this; the 40 feet wide right of way (first conveyed in Liber 3393 at Folio 74) passing through the subject property and shown on the survey is for the benefit of the Robinson property to the south.
5) No title examination report has been furnished to the surveyor and this survey does not, therefore, attempt to present a comprehensive record of encumbrances or appurtenances currently in effect for the subject property.

6) Physical boundary evidence found in the vicinity is sparse despite very diligent search; some of this evidence closely matches deed descriptions while other evidence seems to bear little resemblance to same; evidence found:
    A) 1 rebar found at northeast corner of Wittstadt Hunting Club, Inc., and two along the original outline of Liber 1151 at Folio 112 aforesaid (extending northeasterly out of said corner).
    B) An iron pipe found near the southeasterly corner of Wittstadt Hunting Club, Inc.
    C) An iron pipe found approximately 8 feet westerly of the southwesterly corner of those lands of Nodonly east of Lynhurst Road.
    D) An iron pipe and 3 "T-bars" (appear to be sawed-off "T"-section steel fence posts)found along the northwesterly line of those lands of Nodonly west of Lynhurst Road.
    E) Fences along the 2 northerly lines of the subject property and an erratic fence along the southern line of same.
7) Determination:
    A) Deed description outlines were best-fitted to the pipes and rebars found in A and B above; this is the aforementioned evidence which closely matches said descriptions.
    B) The pipe at C above was rejected as being grossly out of position (possible "homemade survey").
    C) The pipe and "T-bars" in D above were closely scrutinized relative to the possibility of their marking the northwesterly line of Nodonly, even though they are at least 10 feet away from reasonably marking any corner along said line; said "T-bars" are of questionable origin since surveyor's do not normally set these; efforts to hold the line through the pipe at D above and still maintain angular integrity elsewhere brings the northerly subject property lines further south of the fences, even further south of the pipe at C above, encroaches the concrete near the westerly subject property house and even further encroaches the Robinson property.
    D) Lacking better evidence and rather than deepen apparent encroachments based on weaker evidence, it was determined to hold the solution at A and reproduce the deed outlines from that base.
8) Results to note:
    A) Along the northerly subject lines, the fences appear to belong to Nodonly and, if so, are not evidence of encroachment.
    B) Evidence of encroachment along southerly subject line includes wire fencing (both ways) and part of a frame shed onto the subject property; fencing ownership is unknown to the surveyor.
    C) Evidence of encroachment on east and west sides of subject property: permanent wooden docks onto the Maryland sovereign title lands of Back River.

If I can be of further assistance, please call.

Sincerely,

Daryl E. Morgan
Property Line Surveyor
Maryland Registration 482

For Capitol Development Design, Inc.

Appendix G:

Cleanup Goal Review and Assessment

Extent of Contamination Study

EXECUTIVE SUMMARY

This document evaluates the appropriateness and applicability of EPA's proposed cleanup levels for a Time Critical Removal Action at the Sauer Dump Site. The EPA's proposed levels are contained in its Action Memorandum (AM) of September 27, 2005. Site characterization activities have generated a significant data set against which EPA's and other possible preliminary cleanup levels may be compared and contrasted. Based on these site characterization data, Malcolm Pirnie, Inc (Pirnie) provides the following observations:

Lead

- **Soil:** EPA's proposed cleanup level of 400 mg/kg is at the low end of the range commonly identified for sites in EPA Region III. For the Site, this number is inappropriately low. A site-specific cleanup level would focus future remedies in the southeast area of Parcel 425.

- **Sediment:** EPA's proposed cleanup level of 130 mg/kg is based on a consensus value derived from study results contained in a large national database. Past cleanup goals at other sites in EPA Region III range from 30 to 500 mg/kg, reflecting the site-specific variability of conditions that OSWER directives require consideration of in establishing such levels. The shoreline sediments bordering the site in the Back River demonstrate compliance (based on available data) with the AM proposed cleanup level; however, the sediments (as defined in the past reports) collected in the uplands area (i.e., Wetland Fingers) do not. Pirnie suggest the samples collected in the uplands be differentiated between saturated soils (and thus are more appropriately regulated as soils) which occasionally support standing water, and those that support an aquatic ecosystem. Furthermore, wetlands commonly act as sinks because they contain elevated levels of sulfides and organic carbon. The sulfides limit the bioavailability and toxicity of lead, and methods for adjusting concentrations to account for this reduction in bioavailability are discussed.

Polychlorinated Biphenyls

- **Soil:** The EPA's AM proposes a tiered approach for PCB cleanup levels. Soils with PCBs greater than 1 mg/kg require capping; soils greater than 100 mg/kg require removal and off-site disposal. Pirnie suggests these cleanup values are inappropriately low for the non-residential areas of the Site. For example, based upon a child trespasser scenario that considers site use at a rate of 146 days per year, a soil screening level of approximately 18 mg/kg is derived, and a site-specific cleanup action level would equate to approximately 110 mg/kg.

- **Sediment:** EPA's proposed cleanup level (0.033 mg/kg) is based on a paper published by the State of Delaware that has no statutory authority or precedent, and is not adopted as guidance by the State of Delaware, State of Maryland, or EPA. Furthermore, this reference work does not comply with current EPA guidance regarding the calculation of human health risks or risk-based cleanup levels. Pirnie suggests that a site-specific risk-based goal would result in a level consistent with current EPA guidance. Area background concentrations of PCBs in the Back River should be assessed as well.

Review and Assessment of EPA's Action Memorandum Cleanup Levels – Sauer Dump Site, Baltimore County, Maryland

1. INTRODUCTION

This document evaluates the appropriateness and applicability of EPA's proposed cleanup levels for a Time Critical Removal Action (TCRA) at the Sauer Dump Site (Site).[1] The EPA's proposed TCRA cleanup levels are contained in its Sauer Dump Superfund Site (Site) Action Memorandum (AM), stamp-dated September 27, 2005.[2] Site characterization activities have generated a significant data set against which EPA's and other possible preliminary cleanup levels may be compared and contrasted.

The Sauer Dump Site is located to the west and adjacent to 4225 Lynhurst Road, Dundalk, Baltimore County, Maryland. From 1985 to 1999, concentrations of semi-volatile organic compounds (SVOCs), metals, PCBs, and pesticides in soil and sediment were investigated by MDE and EPA. Analytical results of Site samples showed various compounds of potential concern (COPC) exceeding risk-based screening levels. Additional investigations by MDE and EPA were performed between 2001 and March 2005. Based on these studies, EPA Region III submitted the AM requesting the Office of Solid Waste and Emergency Response to approve a removal action at the Site, exempting the action from the $2 million statutory limit, and specifically identifying cleanup levels and remedies defining the extent of the removal action.

Currently, the Site is under an EPA Administrative Order for Removal Response Action (EPA Docket Number CERC-03-2006-0239DC, August 18, 2006) requiring some limited additional Site characterization to fill in data gaps. These additional results will be published in an Extent of Contamination Study (ECOS) report.

Following the receipt and acceptance of the ECOS Report, EPA is expected to issue a new Administrative Order requiring specific removal actions at the Site based on the AM's cleanup levels and remedies.

The purpose of this document is to review the appropriateness and applicability of the AM's proposed cleanup levels. The AM specifies four cleanup levels. They are soil and sediment values for lead and PCBs.

- Soils

---

[1] The Response Action Plan defines the site as primarily located on Parcel 425 and may include surrounding residential properties (Five Parcels). In this paper the term 'Site' refers to Parcel 425 and the immediately adjacent undeveloped areas (e.g. Wetland Fingers). This paper does not consider the applicability of the proposed cleanup levels to the surrounding residential properties.

[2] Action Memorandum - Request for Removal Action and Exemption from the $2 Million Statutory Limit at the Sauer Dump Site, Baltimore County, Baltimore. MD. Memorandum from Richard Rupert, On Scene Coordinator Eastern Removal Response Section (3HS31) to Abraham Ferdas, Director Hazardous Sites Cleanup Division (3HSOO), UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION III, 1650 Arch Street, Philadelphia, Pennsylvania 19103-2029. September 26, 2005. Hereinafter cited as Action Memorandum.

  - Lead: 400 mg/kg
  - Total PCBs: greater than 100 mg/kg removed from the Site, greater than 1 mg/kg capped.
- Sediments
  - Lead: 130 mg/kg
  - Total PCBs:[3] 0.033 mg/kg

The derivation of more appropriate alternative cleanup levels is discussed with reference to a variety of applicable EPA regulation and guidance as well as the currently available Site-specific data.

2. REVIEW OF PROPOSED SOIL CLEANUP LEVEL FOR LEAD

The AM identified a 400 mg/kg cleanup level for lead in soil based on OSWER directives 9355.4-12 (issued July 12, 1994) and 9200.4-27P (issued August 1998). Specifically, the AM states:

> *"… OSWER's approach to addressing lead in soil at CERCLA and RCRA sites. The existing directive established a streamlined approach for determining protective levels for lead in soil at CERCLA and RCRA facilities. Under removal authority, CERCLA has established the following conservatively based cleanup standards for lead in soils."*[4]

The correctness and applicability of EPA's cited regulations and guidance to the Site, the precedent for the use of this lead clean-up level at other sites in the Region III, and the potential remedial impact this cleanup level has at the Site is reviewed below.

a. Accuracy and Applicability of Cited Regulations for Lead

The AM inaccurately presents the soil lead value of 400 mg/kg as an OWSER guidance numerical *cleanup* standard. The 1998 OSWER guidance states (emphasis added):

> *"The existing directive established a streamlined approach for determining protective levels for lead in soil at CERCLA sites and RCRA facilities as follow:*
>
> - *It recommends a 400 mg/kg **screening level** for lead in soil **at residential properties;"***

The 1994 OSWER guidance explains the difference between screening levels and cleanup goals as (bold - emphasis added; capitalized - emphasis in the original):

> ***"Screening levels are not cleanup goals**. Rather, these **screening levels may be used as a tool to determine which sites or portions of sites do not require further study** and to encourage voluntary cleanup. Screening levels are defined as a level of contamination above which there may be enough concern to warrant site-*

---

[3] Total PCBs is referenced in the AM to be calculated the sum of all the congeners.

[4] Action Memorandum at 9.

> *specific study of risks.* ***Levels of contamination above the screening level would NOT automatically require a removal action, nor designate a site as contaminated."***

The EPA's soil screening value of 400 mg/kg is specifically developed on the basis of a clearly defined exposure scenario for a child in a residential setting as assessed using the Integrated Exposure Uptake Biokinetic Model (IEUBK).[5] This is the same technical approach used by EPA for its TSCA §§ 402/403 guidance[6] and recent "Lead; Identification of Dangerous Levels of Lead" rule[7]. The 1994 OWSER directive clarifies and reconciles the numerical values associated with the TSCA and CERCLA/RCRA programs as follows (emphasis added):

> *" Both the TSCA Section 403 and OSWER programs use a flexible, tiered approach. The* ***OSWER guidance sets a residential screening level at 400 mg/kg****. As noted above,* ***this is not intended to be a cleanup level for CERCLA*** *and RCRA facilities, but only to serve as an indicator that further study is appropriate. The* ***Section 403 guidance indicates that physical exposure-reduction activities may be appropriate at 400 mg/kg, depending upon site-specific conditions such as use patterns, populations at risk and other factors****. Although worded somewhat differently, the guidances are intended to be similar in effect.* ***For neither guidance is 400 mg/kg to automatically be considered a cleanup level****; instead, it indicates a need for considering further action, but not necessarily for taking action. Neither is meant to indicate that cleanup is necessarily appropriate at 400mg/kg. The greater emphasis in this OSWER guidance on determining the scope of further study reflects the fact that both CERCLA and RCRA cleanups proceed in stages with detailed site characterization preceding response actions in every case.*

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[5] Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children. NTIS #PB93-963510, EPA 9285.7-15-1. February 1994.

[6] Lead in Paint, Dust, and Soil - Interpretive Guidance for the Federal Program TSCA Sections 402/403 - Lists of Q/A Documents. Available at http://www.epa.gov/lead/pubs/iglist.htm #scope and applicability. (last accessed 2 February 2007). The rule notice states on page 1234 that "[t]he 400 mg/kg screening level identified in the OSWER soil lead guidance is consistent with both the children's play area hazard determination identified in this rule and the initial candidate hazard level discussed in this preamble. Site-specific information at hazardous waste sites would provide a basis to identify a different soil lead level that would be protective of health. The TSCA soil hazard levels of 400 mg/kg (play areas) and an average 1,200 kg/mg (rest of yard) should not be understood as a minimum cleanup level for lead in soils at hazardous waste sites and levels greater than these could be consistent with CERCLA requirements, depending on site-specific factors. Soil lead levels less than these still may pose serious health risks and may warrant timely response actions including abatement. The hazard standard in this TSCA rule was intended as a ''worst first'' level that will aid in setting priorities to address the greatest lead risks promptly at residential and child-occupied facilities affected by lead-based paint. (emphasis added)"

[7] Lead; Identification of Dangerous Levels of Lead; Final Rule, 66 Fed. Reg. 1206, 1240 (January 5, 2001) (to be codified as 40 C.F.R. pt. 745). Cf. 40 C.F.R. § 745.65(c). "Soil-lead hazard. A soil-lead hazard is bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 parts per million (µg/g) in a play area or average of 1,200 parts per million of bare soil in the rest of the yard based on soil samples."

> *Above the 400 mg/kg level, the Section 403 guidance identifies ranges over which various types of responses are appropriate, commensurate with the level of potential risk reduction, and cost incurred to achieve such risk reduction. For example, in the range of 400 to 5000 mg/kg, limited interim controls are recommended depending, as noted above, on conditions at the site, while above 5000 mg/kg, soil abatement is recommended.* ***This OSWER guidance does not include comparable numbers above 400 mg/kg; instead, as discussed above, it recommends the site-specific use of the IEUBK model to set PRGs and MCSs, when necessary.*** *The remedy selection process specified in the National Contingency Plan (NCP) should then be used to decide what type of action is appropriate to achieve those goals."*[8]

Directly applicable at the Site is OSWER's recommendation that the IEUBK model be used in setting draft cleanup values known as Preliminary Remediation Goals (PRG).

b. Decision Precedents

EPA Region III has established soil cleanup levels for lead in soils at several sites as follows:

- Abex Corporation (EPA/AMD/R03-94/190) – 500 mg/kg for residential areas and 1,000 mg/kg for industrial
- Browns Battery Breaking (EPA/ROD/R03-92/150) - 1,000 mg/kg
- Jack's Creek, Sitkin Smelting and Refining Inc. (EPA/ROD/R03-97/087) - 1,000 mg/kg
- MW Manufacturing (EPA/ROD/R03-98/013) – 1,000 mg/kg
- Westinghouse Electric Corp. (EPA/ROD/r03-00/063) – 1,000 mg/kg
- Tonolli Corp. (EPA/ROD/R03-92/156) – 1,000 mg/kg
- E.I. DuPont Nemours & Co., Inc. (EPA/ROD/03-93/170) – 1,000 mg/kg

c. Defining a Site-Specific Cleanup Level for Lead in Soil

Although performing and reporting the calculations necessary to define and defend a site-specific cleanup level is beyond the scope and purpose of this document, the inappropriate use of the 400 mg/kg value as a cleanup level in the AM is best highlighted by reviewing the procedures used to establish cleanup levels under EPA guidance and rules.

EPA has well-established and detailed procedures for developing and implementing soil cleanup levels at a site. In 1996 EPA published the Soil Screening Guidance identifying the initial steps of deriving soil screening levels (SSL).[9] Specifically, the guidance states that soil screening is conducted with future residential land use for the purpose of "…identifying and defining areas, contaminants, and conditions, at a particular site that do not require further Federal attention."[10]

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[8] OSWER Directive 9355.4-12 at 2, 3.

[9] Soil Screening Guidance: User's Guide. OSWER Publication 9355.4-23. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1996. (See § 1.1 Purpose.)

[10] Soil Screening Guidance: User's Guide. OSWER Publication 9355.4-23. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1996. (See § 1.1 Purpose.)

As such, the first steps derive SSLs that are *de minimus* levels which screen chemicals and areas from further concern. The SSL guidance " ***provides a methodology for professionals to calculate risk-based, site-specific, soil screening levels (SSLs) for contaminants in soil that may be used to identify areas needing further investigation at NPL sites."***

For those areas that require further investigation, the EPA provides guidance on deriving residential soil preliminary remediation goals (PRGs) (i.e., *draft* cleanup values).[11] However, the EPA's supplemental guidance's nonresidential SSL approach supersedes the PRG guidance approach for these future use scenarios.[12] The supplemental guidance addresses the development of more site-specific or alternative values. Of specific relevance to this Site is EPA's development of nonresidential site-use SSLs contained in its supplemental guidance.[13] The EPA developed these additional nonresidential screening approaches to address the concern that a " ***…large number of NPL sites [have] anticipated non-residential future land uses and the desire on the part of site managers to develop SSLs that are not overly conservative for these sites."***[14]

The EPA's site-specific risk-based approach requires a number of site-related characterizations and decisions be made. Several of the most important characterizations and decisions are as follows:

Applicable Receptor Scenarios: A site's human receptors are potentially varied. This Site's current conditions suggest site remediation and construction workers, and trespassers as possible receptors. Adjacent areas (Parcels 514,503,464,295,137) may potentially involve residential

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[11] Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals). (RAGS, Part B) OSWER Directive 9285.7¬01B. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1991.

[12] Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER Directive 9355.4-24. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 2002. (See page 1-2). "RELATIONSHIP OF NON-RESIDENTIAL SSL FRAMEWORK TO RAGS EPA has previously provided guidance on evaluating exposure and risk for non-residential use scenarios at NPL sites in the following documents:

- Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual (HHEM), Supplemental Guidance, Standard Default Exposure Factors, Interim Guidance (U.S. EPA, 1991a).
- Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual (HHEM), Part B, Development of Risk-based Preliminary Remediation Goals (U.S. EPA, 1991b).

These two documents include default values and exposure equations for a generic commercial/industrial exposure scenario that have been widely used and that form the basis of many state site cleanup programs, as well as RCRA's Risk Based Corrective Action (RBCA) Provisional Standard for Chemical Releases. However, the approaches detailed in these documents may not always account for the full range of activities and exposures within commercial and industrial land uses. The models, equations, and default assumptions presented in this guidance supersede those presented in the RAGS Supplemental Guidance and RAGS Part B documents for evaluating exposures under non-residential land use assumptions."

[13] Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.

[14] Id. at 1-1.

receptors.

Each of these potential receptor types exhibit unique exposure factors related to their particular site-use activities. Because of this, and as recommended by EPA's guidance, it is important to derive soil cleanup values reflective of a reasonable conservative receptor exposure. This receptor is not believed to be a child playing on bare soil in a backyard residence placed at the Site (Parcel 425), but may require such a receptor be considered for potential risks that may be posed by conditions on nearby residential properties.

Current and Future Site Use: Current and future Site use will largely dictate which receptor scenario(s) represent the reasonable conservative exposure scenario(s). For future uses, the consideration of viable engineering and institutional controls may further modify PRGs. In setting draft cleanup levels for the Site it is important to identify reasonable future Site (Parcel 425) uses to avoid either insufficient or unnecessary levels of remediation. Obviously, the required level of remediation is driven by the need to meet some measure of acceptable risk for the entire Site. OSWER Directive 9355.7-04 presents guidance on selecting "Land Use in the CERCLA Remedy Process." In part, the directive states (emphasis in the original):

> *" In order to ensure use of realistic assumptions regarding future land uses at a site,* ***EPA should discuss reasonably anticipated future uses of the site with local land use planning authorities, local officials, and the public, as appropriate, as early as possible during the scoping phase of the RI/FS****. EPA should gain an understanding of the reasonably anticipated future land uses at a particular Superfund site to perform the risk assessment and select the appropriate remedy."*[15]

Lead Species Bioavailability: Site sample results generally report lead concentrations as total values. These results, in conjunction with other conservative assumptions are appropriate risk model inputs. For example, if only total lead values are available, the model parameters related to actual receptor absorption (bioavailability) would assume the most conservative factor (in terms of risk) associated with the different possible lead species on-site.

If site conditions warrant, soil lead can be speciated and compound-specific parameters used in the risk models. Lead compounds lend themselves to this type of refined analytical definition as the bioavailability of the different compounds vary considerably.[16] Table 1 presents the range of lead species bioavailability considered in the IEUBK Model when determining human exposure.[17]

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[15] Land Use in the CERCLA Remedy Selection Process. OSWER Directive No. 9355.7-04. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. May 25, 1995.

[16] IEUBK Guidance at 4-1. "The concept of bioavailability is important for site-specific risk assessments for lead. The concept springs from the fact that lead potentially available to produce harm and found in exposure pathways or in body receiving compartments (lung, skin, gut) must reach the biological sites of action in order for an adverse health effect to occur in exposed humans or ecological biota."

[17] Short Sheet: IEUBK Model Bioavailability Variable. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC 20460. OSWER 9285.7-32. (October 1999).

Table 1 – Lead Species Bioavailability

Potentially Lower Bioavailability (RBA < 25%)	**Intermediate Bioavailability (RBA = 25% to 75%)**	**Potentially Higher Bioavailability (RBA > 75%)**
Galena (PbS) Anglesite (PbSO4) Pb (M) Oxides Pb Fe (M) Sulfates Native Pb	Pb Oxide Pb Fe (M) Oxides Pb Phosphate Slags	Cerrusite (PbCO3) Pb Mn (M) Oxides

Pb = lead, S = sulfur, M = metals, Fe = iron, Mn = manganese

d. Relevance of the Soil Lead Cleanup Level to Site Management

The surface and subsurface soil lead levels on the Site which are above 1,000 mg/kg are primarily located in the southeastern portion of the site (Parcel 425). Deriving an appropriate guidance-based cleanup level of approximately 1,000 mg/kg or higher would focus remediation efforts on this area (see Figures 1 through 3).

3. REVIEW OF PROPOSED SOIL PCB CLEANUP LEVELS

The AM identifies a tiered PCB cleanup approach for Site soils. All soils with levels above 100 mg/kg are to be removed from the Site, and those soils containing more than 1 mg/kg are to be contiguously capped.

a. Accuracy and Applicability of Cited Regulations

The AM appropriately notes that TSCA's self-implementing cleanup provisions for PCB wastes are not binding on CERCLA removal actions.[18] However, TSCA does provide procedural and numerical standards for PCB wastes on site. These standards are predicated on a set of nominal site conditions described in § 761.61(a) as:

> " ***Self-implementing on-site cleanup and disposal of PCB remediation waste.*** *EPA designed the self-implementing procedure for a general, moderately-sized site where there should be low residual environmental impact from remedial activities. The procedure may be less practical for larger or environmentally diverse sites. For these other sites, the self-implementing procedure still applies, but an EPA Regional Administrator may authorize more practical procedures through paragraph (c) of this section. Any person may conduct self-implementing cleanup and disposal of PCB remediation waste in accordance with the following requirements without prior written approval from EPA."*

Of the four types of PCB wastes addressed under the self-implementing cleanup standards, bulk

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[18] 40 C.F.R. 761.61(a)(1)(ii). "The self-implementing cleanup provisions shall not be binding upon cleanups conducted under other authorities, including but not limited to, actions conducted under section 104 or section 106 of CERCLA, or section 3004(u) and (v) or section 3008(h) of RCRA."

PCB remediation wastes are of primary concern at the Site. Bulk PCB remediation wastes in concentrations greater than 25 mg/kg, but less than or equal to 100 mg/kg may be left on site if capped.[19] Based on the upper allowable concentrations contained in this section, the AM has set a soil's PCB cleanup value of 100 mg/kg. Application of § 761.61(a)(4)(i)(B)(3) to Site soils and debris is consistent with a Site removal cleanup that opted for the self-implementing standards over a risk-based approach provided in § 761.61(c).

b. Decision Precedents

EPA Region III has identified PCB surface soil cleanup levels at other sites as follows:

- 25 mg/kg at the Westinghouse Electric Sharon Plant (EPA/ROD/R03-00/063);
- 25 mg/kg at Metal Banks (EPA/ROD/R03-98/012);
- 25 mg/kg (industrial) at the Paoli Rail Yard (EPA/ROD/R03-92/151);
- 25 mg/kg Aberdeen Proving Ground (Edgewood Area) (EPA/ROD/R0396/228);

OSWER Directive EPA/540/G-90/007 identifies a preliminary remediation goal for Total PCBs in soils to be 1 mg/kg for residential soils, and 10-25 mg/kg for industrial soils based on risk assessment calculations using a carcinogenic risk level at 1×10^{-5}.

c. Further Development of a Site-Specific PCB Soil Cleanup Level

The TSCA § 761.61(c) risk-based approach has yet to be considered for the Site's PCB-contaminated soils. Such an approach requires the following:

> *"**Risk-based disposal approval**. (1) Any person wishing to sample, cleanup, or dispose of PCB remediation waste in a manner other than prescribed in paragraphs (a) or (b) of this section, or store PCB remediation waste in a manner other than prescribed in §761.65, must apply in writing to the EPA Regional Administrator in the Region where the sampling, cleanup, disposal or storage site is located, for sampling, cleanup, disposal or storage occurring in a single EPA Region; or to the Director of the National Program Chemicals Division, for sampling, cleanup, disposal or storage occurring in more than one EPA Region. Each application must contain information described in the notification required by §761.61(a)(3). EPA may request other information that it believes necessary to evaluate the application. No person may conduct cleanup activities under this paragraph prior to obtaining written approval by EPA.*
>
> *(2) EPA will issue a written decision on each application for a risk-based method for PCB remediation wastes. EPA will approve such an application if it finds that the method will not pose an unreasonable risk of injury to health or the environment."*[20]

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[19] 40 C.F.R. § 761.61(a)(4)(i)(B)(3). "Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 mg/kg and ≤100 mg/kg if the site is covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section."

[20] 40 C.F.R. § 761.61(c).

The Site's evaluation and cleanup has not progressed to the point where a § 761.61(c) application has been considered; however, the relevance of risk-based cleanup values is evident when the EPA's guidance is examined for the underlying scientific derivation of numeric standards as discussed previously in Section 2.a. EPA guidance also states:[21]

> " *The superfund program expectations should be considered in developing appropriate response options for the identified area over which some action must take place. In particular, the expectation that principal threats at the site should be treated, whenever practicable, and that consideration should be given to containment of low-threat material, forms the basis for assembling alternatives. Principal threats will generally include material contaminated at concentrations exceeding 100 mg/kg for sites in residential areas and concentrations exceeding 500 mg/kg for sites in industrial areas reflecting concentrations that are 1 to 2 orders of magnitude higher than the preliminary remediation goals. Where concentrations are below 100 mg/kg, treatment is less likely to be practicable unless the volume of contaminated material is relatively low.*"

d. Relevance of Alternative Risk-Based Soil PCB Cleanup Levels

Based on the proximity of the site to residences and the presence of features (i.e., pond and woodland areas) on the site attractive to children, Pirnie believes a child / adolescent trespasser scenario would be appropriate for this site if a risk-based approach were taken.

Table 2 shows example assumptions and calculations that might be used to calculate child / adolescent trespasser soil screening level for PCBs. An advantage of using a risk-based approach is that trespasser exposure could reasonably be assumed to occur throughout the surface and subsurface soils as excavation activities would not confine exposure to a single strata or sample location. Thus, the exposure point concentration for the trespasser would be calculated based on the upper bound estimate of the average of the samples shown in Figures 4 through 7.

EPA does not publish baseline values for determining the exposure frequency of trespassers at a site. Rather, EPA allows the use of professional judgment in determining these parameter values on a site-specific basis. Figure 8 identifies the influence of the assumption of exposure frequency on the risk-based goal and cleanup action level. Assuming the child / adolescent trespasser scenario would drive the remediation under a risk-based approach, the influence of a risk-based approach on the site's remediation would depend on the exposure assumptions that EPA would judge protective and reasonable.

Thus, for example, based on the assumptions presented herein, a risk-based approach could result in a cleanup level allowing PCBs in soil below 110 mg/kg to remain on site without additional remediation. This is in contrast to the AM's requirement that soils above 1 mg/kg require a cap, and levels above 100 mg/kg require removal.

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[21] Guidance on Remedial Actions for Superfund Sites with PCB Contamination. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC 20460. EPA/540/G¬90/007. (August 1990).

4. REVIEW OF THE PROPOSED SEDIMENT LEAD CLEANUP LEVEL FOR LEAD

The AM's clean-up level of 130 mg/kg lead in sediments was proposed based on the "consideration" of a document published by MacDonald et al. (2000).[22] The following reviews this publication and its relationship to the regulations requiring site cleanup.

a. Accuracy and Applicability of the Cited Investigation

MacDonald et al. (2000) is a document published in the academic literature which proposes Sediment Quality Guidelines (SQGs) and thus has no specific regulatory application. However, the same value based on similar data was published in June 2000 as EPA 905/R-00/007.

Unlike soil and water, EPA has not promulgated risk-based screening or cleanup levels for freshwater sediments. Thus, the applicability of the selection of a specific level at a site is not quantifiable or apparent from the directives or regulations. OSWER Directive 9285.6-08 entitled, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* presents eleven risk management principles which serve to guide the selection of cleanup levels and actions regarding sediments.[23] These 11 principles are largely guidelines for effective communication and source control, not technical criteria guiding the specific selection of numerical cleanup levels. However, three specific criteria are relevant to the establishment of cleanup goals for the Site and to the value presented in the AM. These criteria are as follows:[24]

- Use an iterative approach in a risk-based framework.
- Select site-specific, project-specific, and sediment specific risk management approaches that will achieve risk-based goals.
- Ensure that sediment cleanup levels are clearly tied to risk management goals.

EPA's reliance on MacDonald et al (2000) must be viewed in the context of the various caveats associated with this work. Perhaps most important is the fact that MacDonald's consensus based value is not project or site-specific. As stated in EPA's report of MacDonald's data:[25]

> " *A database was developed from 92 published reports which included a total of 1657 samples with high-quality matching sediment toxicity and chemistry data.*"

Furthermore, MacDonald et al. (2000) acknowledge the need for a site-specific assessment to include more than just a numerical comparison to the SQG as they state:

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[22] MacDonald, D.D., C.G. Ingersoll, and T.A. Berger, 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Arch. Environ. Contam. Toxicol. 39:20-31.

[23] Directives for Managing Contaminated Sediment Risks at Hazardous Waste Sites. OSWER Directive 9285.6-08. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC 20460. February 12, 2002.

[24] Id. at 5 and 7.

[25] Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines. United States Geological Survey (USGS) final report for the U.S. Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO). EPA 905/R-00/007. June 2000.

> *"Numerical SQGs, when used with other tools such as sediment toxicity tests, bioaccumulation, and benthic community surveys, can provide a powerful weight of evidence for assessing the hazards associated with contaminated sediments"*

A number of other sources identify sediment quality values for lead in freshwater sediment environments:

- EPA Region III notes a screening benchmark of 35.8 mg/kg[26]
- New Jersey DEP has adopted a low effects level 31 mg/kg and a severe effects level of 250 mg/kg[27]
- ARCS[28] and NOAA[29] Threshold Effects Concentration of 34.2 mg/kg, and a Probable Effects Concentration of 396 mg/kg
- Minnesota Sediment Quality Target Level 1 of 36 mg/kg and Level 2 of 130 mg/kg[30]
- Background levels range from 4-17 mg/kg

While none of these values are project or site-specific, it is important to note that other commonly available screening levels are different than the cleanup value proposed in the AM. The proximity of this site to marine water suggests this area could be brackish in nature. Metals such as lead react differently in the marine environment and often form into salts which are relatively non-toxic. If different lead species exist, then the effects levels identified may not be applicable at this site. The database supporting this sediment effects level is limited both regionally, and in sample size. Thus, it may not be an accurate predictor of effects to biota inhabiting this particular site.

Finally, all the authors of the cited literature and OSWER guidance acknowledge the requirement that site-specific evaluations should be conducted before final remedies are selected. Simply stated, freshwater marine environments are highly variable and many characteristics can change the bioavailability of the chemical which can range from 0 – 100%. Thus, while literature-based values such as that proposed in the AM may serve as part of a screening process, the uncertainties associated with their application to site-specific conditions are too large to use them as measures to demonstrate compliance or achievement of a risk-based goal.

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[26] http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm, last access 10 February 2007.

[27] Values are based on a publication from Persaud et al. (1993) as adopted by the Ontario Ministry for the Environment.

[28] EPA (1996). USEPA 1996. Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and the midge *Chironomus riparius*. EPA 905/R96/008. Great Lakes National Program Office, Chicago, IL.

[29] NOAA SQUIRT; http://response.restoration.noaa.gov

[30] The Minnesota Pollution Control Agency does not have sediment quality guidelines; however, sediment quality targets (SQTs) which were used in the remediation of the St. Louis River are recommended for screening. http://www.pca.state.mn.us/water/sediments/

b. Review of Decision Precedents

EPA Records of Decision (RODs) addressing freshwater sediment contamination reinforce the variability associated with freshwater sediment cleanup levels. A review of previous EPA decisions in Region III reveals the following levels have been used:

- C&D Recycling Site in Foster Township, PA (EPA/ROD/R03-92/154): 500 mg/kg
- H&H Inc. Burn Pit in Farrington, VA (EPA/ROD/R03-95/196): 200 mg/kg
- USA Vint Hill Farms Station (EPA/ROD/R03-99/018): 465 mg/kg

c. Relevance of Alternative Risk-Based or Site-Specific Cleanup Levels

As shown in Figure 9, the sediment cleanup level proposed in the AM would not require any remedy in the nearby riverine environment (the Back River) based on available data. However, many of the sediments shown in the uplands areas exceed the proposed screening value.

While acknowledging the limitations of the data as discussed above, in the absence of site-specific bioassay testing, an alternative to the 130 mg/kg cleanup level is not currently proposed.

Site-specific toxicity testing would allow for refinement of the AM's proposed cleanup level. Typically, site-specific toxicity testing in wetland environments results in a significantly higher cleanup level and the demonstration of limited toxicity because both the high organic carbon content and the high content of sulfides associated with such environments reduces the bioavailability and therefore toxicity of the metal.

Further evaluation of the site habitat and site data may allow for appropriate adjustment to site data or risk-based cleanup objectives. If the sediments being evaluated in the uplands are seasonal, then the lack of year-round habitat makes the risk-based sediment goal inherent in the use of the SQGs from MacDonald et al (2000) inappropriate. In such areas, lead levels associated with demonstrating acceptable risk from incidental ingestion to a trespasser would arguably be more appropriate and consistent with the site conceptual model's risk-based goals. Such arguments have been made and are articulated in the RODs at other sites.

For those upland areas where water is present year-round, Pirnie would propose adjusting the site concentrations for bioavailability. EPA has recognized the use of the ratio between the Acid Volatile Sulfide (AVS) and Simultaneously Extracted Metal (SEM) to estimate the portion of the total concentration of lead that would be bioavailable, and therefore toxic. Where the AVS concentration is equal to or greater than the SEM concentration, research and EPA guidance recognize the SEM concentration will not likely be toxic because it will not be bio-available.

5. REVIEW OF THE PROPOSED PCB SEDIMENT CLEANUP LEVEL

The AM proposes a PCB sediment cleanup goal of 0.033 mg/kg. To demonstrate compliance, the AM requires total PCB to be calculated using analytical techniques that determine the concentrations of the specific congeners or homologues. These individual congener results are then summed to report a total PCB concentration. The AM-proposed sediment cleanup value of 0.033 mg/kg references a document entitled: ***Bioaccumulation-based Sediment Quality Criteria for the Protection of Human Health***, published by the Delaware Department of Natural

Resources.[31]

a. Accuracy and Applicability of the Cited Investigation

As noted in section 4.a, EPA has not promulgated risk-based screening or cleanup levels for freshwater sediments. However, in contrast to the proposed risk-based cleanup level for lead derived for the protection of the environment, the AM's proposed PCB risk-based sediment cleanup level targets the protection of human health. This exposure pathway involves the ingestion of fish as a portion of the receptor's diet.

The referenced Greene paper has no statutory authority. Numeric freshwater Sediment Quality Values have not been promulgated by EPA or EPA Region III. The Greene document was developed and published by the Delaware Department of Natural Resources. The paper is not referenced by the State of Maryland's Hazardous Waste Division as a guidance document, or as a source of information. The State of Delaware does not cite this document in its Remediation Standards Guidance.[32] The document is not provided or referenced on the State of Delaware's Department of Natural Resources and Environmental Control web site.[33]

For the purposes of further discussion, we separate the sediments that exist on the Site as part of wetland environments (e.g., Wetland Fingers and Pond) that are not directly connected to Back River, and those near-shore sediments in the Back River at the Site.

i. Wetland Sediments

In the wetland sediments, the inappropriateness of the AM's proposed cleanup level is readily apparent because the exposure pathway the cleanup level is based on probably does not exist, or exists too infrequently to be considered. The scientific assumptions behind Greene et al. (1997) as stated are (emphasis added):

> " *Fish consumption rates for these three groups were taken from a creel study of Delaware anglers conducted in1992/1993. That study covered the* ***area of the Delaware Estuary between the PA/DE border down to Cape Henlopen****. The average fish consumption rate for the three groups was reported as 0.0175 kg/d, 0.0159 kg/d, and 0.0059 kg/d.*"
>
> " *For purposes of the carcinogenicity assessment,* ***exposure duration*** *for the two adult groups was assumed to be 30 years,..*"
>
> " *For a typical PCB concentration of 1 mg/kg in the edible muscle of striped bass, channel catfish, or white perch, lifetime cancer risk …*" .

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[31] Greene, R.W. 1997. Bioaccumulation-based Sediment Quality Criteria for the Protection of Human Health. Delaware Department of Natural Resources and Environmental Control. Dover, DE.

[32] REMEDIATION STANDARDS GUIDANCE UNDER THE DELAWARE HAZARDOUS SUBSTANCE CLEANUP ACT. Revised DECEMBER 1999. Available at http://www.dnrec.state.de.us/DNREC2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/RemStnd.pdf. Last accessed 12 April 2007.

[33] http://www.dnrec.delaware.gov/, last accessed 11 February 2007.

The small ponds scattered around the uplands portion of the Site do not support populations of sport fish similar to those being evaluated in Greene et al.'s (1997) paper. Sport fish larger than fingerlings are unlikely present in the small wetland fingers bordering Parcel 425. Even if some harvest of biota did occur on this Site, it is unreasonable to assume the Site could support even a fraction of the use by recreational fishermen as that represented in Greene's Delaware River survey. This makes the cleanup levels proposed in the AM (which are based on exposure levels only experienced by fishing a much larger river) inapplicable and inconsistent with OSWER Directive 9285.6-08 as noted above.

ii. Near-Shore Back River Sediment

In the Back River itself, recreational sport fishing is a reasonable assumption. Notwithstanding the propriety of a recreational fishing assumption for the Back River, concerns about the appropriateness of the AM's proposed cleanup levels in this environment remain. Just as with the wetland fingers, the AM's proposed cleanup level as applied to the Back River is inappropriate because, (1) it has not been adjusted to take into account site-specific factors, (2) the ingestion rates are based on a study that has not received external peer review, and (3) the Biota Sediment Accumulation Factors (BSAFs) are not calculated in a scientifically defensible manner.

1. Site-Specific Calculation of Human Health Risks

EPA established risk-based methods for determining human health risks and setting remediation goals to protect human health for various media including sediments with its publication *Risk Assessment Guidance for Superfund.*[34] Exhibit 6-17 of this EPA guidance details the mathematical equation and variables used in calculating exposure to a human receptor via ingestion of contaminated fish and shellfish.

While Greene et al. (1997) generally followed this approach; they do not identify or include the variable "FI" defined by EPA as the *Fraction Ingested from Contaminated Source*. The purpose of this variable is to modify the exposure estimate to account for the percentage of total exposure attributable to the site being evaluated. Greene et al. (1997) ignores this parameter, in effect setting this parameter value to 100 percent. This results in an assumption that an individual's fish ingestion is entirely from a recreational catch in the Back River at the shoreline of the Site.

Greene et al.'s (1997) document identifies a large part of the Delaware River as the paper's study area. As such, it may be more appropriate to assume the recreational fisher interviewed could obtain 100 percent of their fish diet fraction from the catch area. However, by adopting a cleanup level for this Site without accounting for a very limited FI value in its own exposure calculation, EPA has inappropriately and inaccurately applied their guidance. As a result, EPA significantly overestimates the exposure and associated risk to site sediment contaminants and identifies an inappropriate cleanup level for the river sediments.

2. Calculation of Relevant Exposure Factors

In 1997, EPA's National Center for Environmental Assessment published the Exposure Factors Handbook. This reference work is a multi-volume review of available information related to

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[34] EPA/540/1-89/002.

exposure assumptions relevant to human health risk assessments. The document provides EPA recommendations for specific exposure estimates. Volume 10 specifically reviewed the levels of intake for fish and shellfish.[35] In its review and selection of appropriate studies, EPA acknowledges the following (emphasis added):

> " *Survey data on fish consumption have been collected using a number of different approaches which need to be considered in interpreting the survey results. Generally, surveys are either* ***creel studies in which fishermen are interviewed while fishing****, or broader population surveys using either mailed questionnaires or phone interviews.*
>
> *The typical survey seeks to draw inferences about a larger population from a smaller sample of that population. This larger population, from which the survey sample is to be taken and to which the results of the survey are to be generalized, is denoted the target population of the survey. In order to generalize from the sample to the target population,* ***the probability of being sampled must be known for each member of the target population.***
> …
> *In a creel study, the target population is anyone who fishes at the locations being studied; generally, in a creel study,* ***the probability of being sampled is not the same for all members of the target population****. For instance, if the survey is conducted for one day at a site, then it will include all persons who fish there daily, but only about 1/7 of the people who fish there weekly, 1/30th of the people who fish there monthly, etc. In this example, the probability of being sampled (or inverse weight) is seen to be proportional to the frequency of fishing. However, if the survey involves interviewers revisiting the same site on multiple days, and persons are only interviewed once for the survey, then the probability of being in the survey is not proportional to frequency; in fact, it increases less than proportionally with frequency.*
> …
> ***In the published analyses of most creel studies, there is no mention of sampling weights****; by default all weights are set to 1, implying equal probability of sampling. However, since the sampling probabilities in a creel study, even with repeated interviewing at a site, are highly dependent on fishing frequency,* ***the fish intake distributions reported for these surveys are not reflective of the corresponding target populations****. Instead,* ***those individuals with high fishing frequencies are given too big a weight and the distribution is skewed to the right****, i.e., it* ***overestimates*** *the target population distribution.*

In Greene et al. (1997), they state (emphasis added):

> " *Fish consumption rates for these three groups were taken from* ***a creel study*** *of Delaware anglers conducted in* ***1992/1993****."*

While Greene's specific creel study was unavailable for review at the time this document was

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[35] EPA. 1997. Exposure Factors Handbook.

drafted, it seems likely given the date the data were collected that the Greene et al authors would not have had the necessary information to appropriately weight their results and extrapolate them in an unbiased manner. Thus, this study very probably overestimates the actual consumption rates, and does not meet the requirements of such studies as expressed by EPA NCEA.

3. Calculation of BSAFs

The BSAF is a quotient used to estimate the amount of a chemical that would bioaccumulate into the tissue of a fish from a known sediment concentration. As stated by Greene et al. (1997),

> " *Finally, a value of 1.85 was specified for the BSAF based upon values reported in the technical literature.*"

No reference to the "technical literature" is provided to substantiate this critical variable. Since the Greene et al. (1997) paper itself has not been published in a peer reviewed journal, no other authors have had an opportunity to comment or publish alternative or similar findings. Furthermore, since the BSAF, which is a key factor in developing a tissue concentration from sediment is unreferenced; the resulting cleanup level is inadequately documented and certainly does not meet the necessary scientific standards.

In addition to lack of peer review and documentation, the use of a single BSAF to characterize a mixture of 209 known compounds is inappropriate. The potential for each PCB congener to bioaccumulate in the tissues of an organism is unique and quite variable. BSAF values have been reported to have an average value of about 1.7, but they can range up to two orders of magnitude.[36] For example, BSAFs for accumulation of PCBs from marine sediments by mollusks ranged from 1.7 to 4.6.[37] (BSAFs for accumulation by mussels ranged from 0.19 (PCB 209) to 4.74 for PCB 118.) As the PCB mixture at any given site may be quite different, assuming a general literature derived value from another site would have substantial uncertainty and be inappropriate as a basis for establishing a site-specific cleanup level. EPA recognition of this is reflected in their recent proposed guidance (emph. added):[38]

> " *Because physical, chemical, and biological properties vary among the individual PCDDs, PCDFs, and PCBs,* ***bioaccumulation factors must also be congener- and species-specific****. Hence, exposure assessments performed in conjunction with the toxicity equivalence methodology will require congener-specific fate and transport information, and risk assessors should consider how to acquire such information.*"

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[36] 30 DiToro, D.M., C.S.Zarba, D.J.Hansen, W.J.Berry, R.C.Swartz, C.E.Cowan, S.P. Pavlou, H.E.Allen, N.A.Thomas, and P.R.Paquin. 1991. Technical basis for establishing sediment quality criteria for nonionic organic chemicals using equilibrium partitioning. Environ. Toxicol. Chem. 10:1541–1583.31

[37] Lake, J.L., N.I.Rubinstein, H.I.I.Lee, C.A.Lake, J.Heltshe, and S.Pavignano. 1990. Equilibrium partitioning and bioaccumulation of sediment-associated contaminants by infaunal organisms. Environ.Toxicol. Chem. 9(8):1095–1106.32

[38] EPA/630/P-03/002A. 2003. External Draft Review Copy of the "Framework for Application of the Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans and Biphenyls in Ecological Risk Assessment."

b. Review of Decision Precedents

The value of 0.033 mg/kg is below other values previously used. EPA Region III has identified PCB sediment cleanup levels of:

- 10 mg/kg for sediments at the Marine Corps Combat Development Command, Quantico, VA (Record of Decision EPA/ROD/R03-97/093),
- 1 mg/kg at Paoli Rail Yard (EPA/ROD/R03-92/151),
- 1 mg/kg at Metal Banks (EPA/ROD/R03-98/012), and
- 1 mg/kg at H&H Inc., Burn Pit (EPA/ROD/R03-95/196).

At the large and well known Fox River site, the risk-based goal for total PCBs in sediments was identified as 1 mg/kg.

c. Relevance of Alternative Risk-Based PCB Cleanup Levels

Figure 10 presents relevant PCB sampling results. Past analyses did not routinely achieve detection limits capable of demonstrating compliance with the cleanup level proposed in the AM. Many samples do show levels below the 1 mg/kg cleanup level recommended by the EPA's BTAG coordinator for this site.[39] However, there are still several areas in which sample results exceed the BTAG proposed level.

Malcolm Pirnie recommends the following actions be considered to determine more site-specific, and regionally consistent cleanup levels for PCBs in sediments.

1) The wetlands on Site need to be classified relative to their maintenance of standing water. Those wetlands which only maintain water seasonally, should be discussed, and the sediments in these areas should not be associated with the pathways and risk based goals which require the development and use of Freshwater Sediment Quality Values, or the protection of human health due to exposure from food chain bioaccumulation. In these areas, PCB cleanup levels should be based on pathways of incidental ingestion and dermal exposure and cleanup levels similar to those for soil are more appropriate.
2) For wetlands on the site where water is present for most or all of the year, these areas should still be discussed, and the pathway associated with human health exposure resulting from bioaccumulation to, and ingestion of biota eliminated as a pathway of concern. Pirnie would suggest further modifying this for site-specific purposes by proposing a cleanup level based on an organic carbon normalized basis to account for bioavailability.
3) For sediments collected near the Site in the river, a site-specific risk assessment using congener or homologue-specific BSAFs, a more realistic Fraction Ingested from Site, and an ingestion rate consistent with EPA's current exposure factors handbook will result in a more realistic goal, and more accurately demonstrate the issue relative to Site compliance.

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[39] EPA, 2005. Development of Lead and PCB Sediment Clean Up Levels, Draft Action Memorandum; Sauer Dump; Baltimore, Maryland. Memorandum from Bruce R. Pluta, Coordinator Biological Technical Assistance Group to Richard Rupert (3HS31) Eastern Response Branch. USEPA, 1650 Arch Street, Philadelphia, Pennsylvania 19103-2029. August 30, 2005. (BTAG Memorandum).

4) The area background sediment PCB levels are significant. These levels are reflected in the elevated PCB concentrations found in fish within the Back River drainage.[40] In fact, the EPA's BTAG sediment PCB cleanup levels are substantially based on the reality that cleanup levels below those recommended will not have an appreciable impact on reducing human health risks from this pathway.[41] The background concentrations can be used to demonstrate the lack of any change in the incremental risk from a recreational fisherman that would result from the cleanup of this small portion of the river.

6. CONCLUSION

EPA Region III has identified in its Action Memorandum of 27 September 2005 a number of compound- and media-specific cleanup levels applicable to a Time Critical Removal Action at the Sauer Dump Site. The values EPA proposes as cleanup levels appear inconsistent with respect to current EPA guidance and known Site-specific conditions. Malcolm Pirnie's review of EPA's relevant guidance as well as current Site conditions suggests that a risk-based site-specific approach would be appropriate to establish appropriate cleanup goals for the Site.

Implementing such an approach would require timely and methodical coordination with EPA's management of the Site. Because appropriate removal and / or remedial activities can only be defined and subsequently defended by a more fully developed understanding of the potential risks posed by the Site, future site management and closure decisions should reconcile and align whatever additional investigatory needs exist with EPA's requirements for specific Site actions.

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[40] See http://www.mde.state.md.us/assets/document/fish/advisory_summary.pdf. Last accessed 13 April 2007.

[41] BTAG Memorandum.

Table 2. Calculation of Soil Screening Level for a Child Trespasser

$$Screening\ Level = \frac{TR \times BW \times AT \times 365}{\left(EF \times ED \times 10^{-6}\right)\left[\left(SF_O \times IR\right) + \left(SF_{ABS} \times AF \times ABS \times SA \times EV\right)\right]}$$

SSL - PCBs	**=**	**18.2**	ppm	calculated based on equation above
TR	=	1.E-05	untiless	Target Risk Level[a]
BW	=	45	kg	Body Weight[b]
AT	=	70	years	Averaging Time[c]
EF	=	146	days/year	Exposure Frequency[d]
ED	=	10	years	Exposure Duration[b]
SF_o	=	2	(mg/kg-day)$^{-1}$	Oral Cancer Slope Factor[g]
IR	=	200	mg/day	Soil Ingestion Rate[e]
AF	=	0.3	mg/cm^2-event	Skin-Soil Adherence Factor[c]
ABS	=	1	unitless	Dermal Absorption Fraction[f]
SA	=	2800	cm^2	Skin Surface Area Exposued[g]
EV	=	1	events/day	Event Frequency[c]
SF_{abs}	=	0.04	(mg/kg-day)$^{-1}$	Dermally Adjusted Cancer Slope Factor[h]

[a] State of Maryland, Department of the Environment Cleanup Standards for Soil and Groundwater.

[b] EPA Region 4 typical trespasser body weight and exposure duration (http://www.epa.gov/region4/waste/ots/healthbul.htm#hhexp)

[c] EPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December. (Equation 5-1)

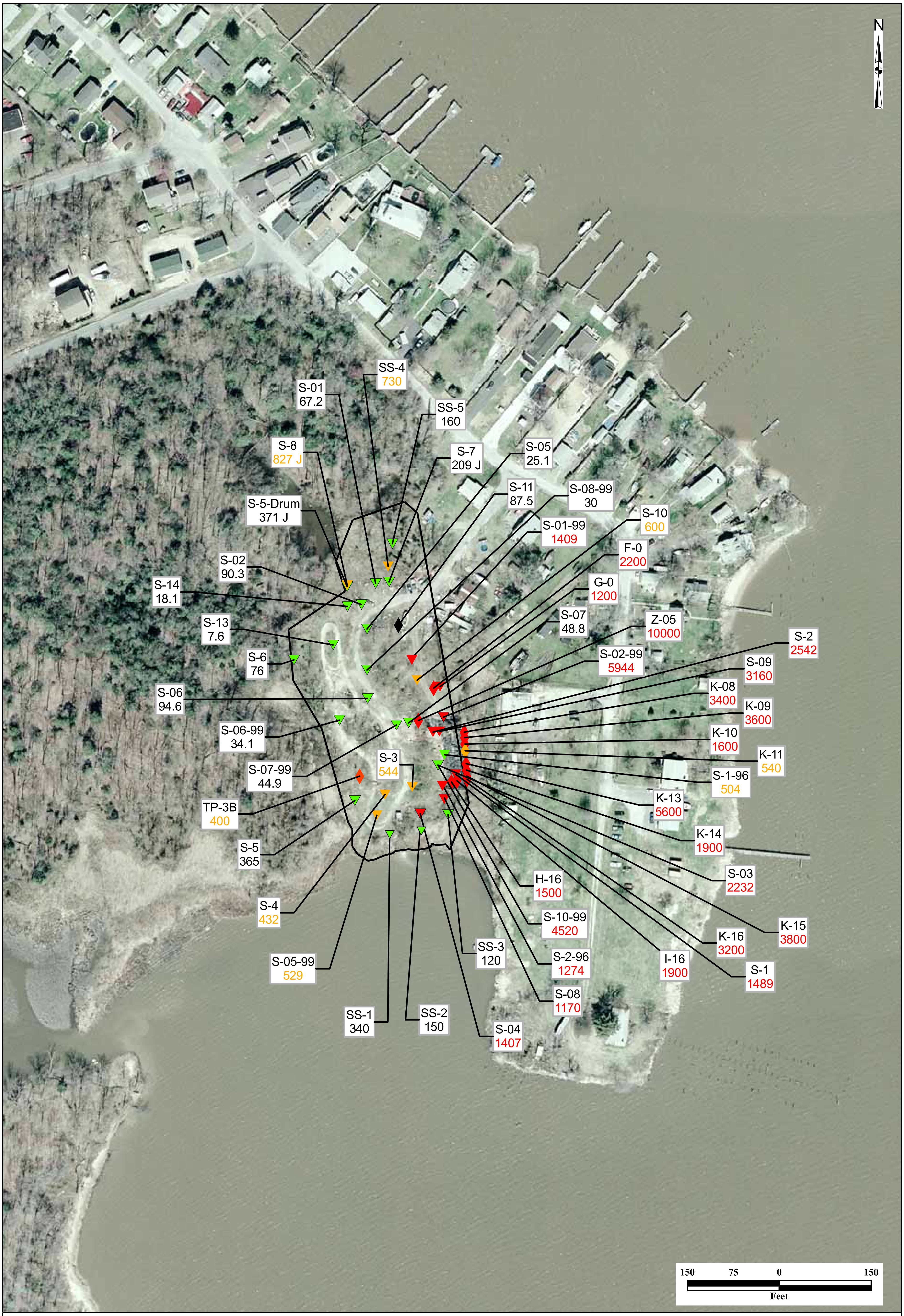
[d] Exposure frequency assumes child is out of school for 12 weeks (2 weeks vacation away from home) and will trespass 7 days per week during that period and will trespass 2 days per week the rest of the year

[e] EPA's Exposure Factors Handbook (http://www.epa.gov/ncea/efh/pdfs/efh-chapter04.pdf)

[f] Assumed 100 percent absorption

[g] EPA Region 3 guidance as published as http://www.epa.gov/reg3hwmd/risk/human/info/dermalag.htm 2/7/07.

[h] EPA's Integrated Risk Information System (IRIS)



LEGEND

- Property Boundary
- ◆ Soil - Surface and Subsurface
- ▼ Surface Soil

Pb - all lead values reported in mg/kg

- ◆ ▼ Concentrations ≥ 1000 mg/kg
- ◆ ▼ Concentrations ≥ 400 mg/kg

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Surface Soil Sample
Lead Analytical Results
Sauer Dump

October 2006

Figure 1

LEGEND

— Property Boundary

◆ Soil - Surface and Subsurface

▲ Subsurface Soil

Pb - all Lead values reported in mg/kg

◆▲ Concentrations ≥ 1000 mg/kg

◆▲ Concentrations ≥ 400 mg/kg

🟨 See inset on Figure 3

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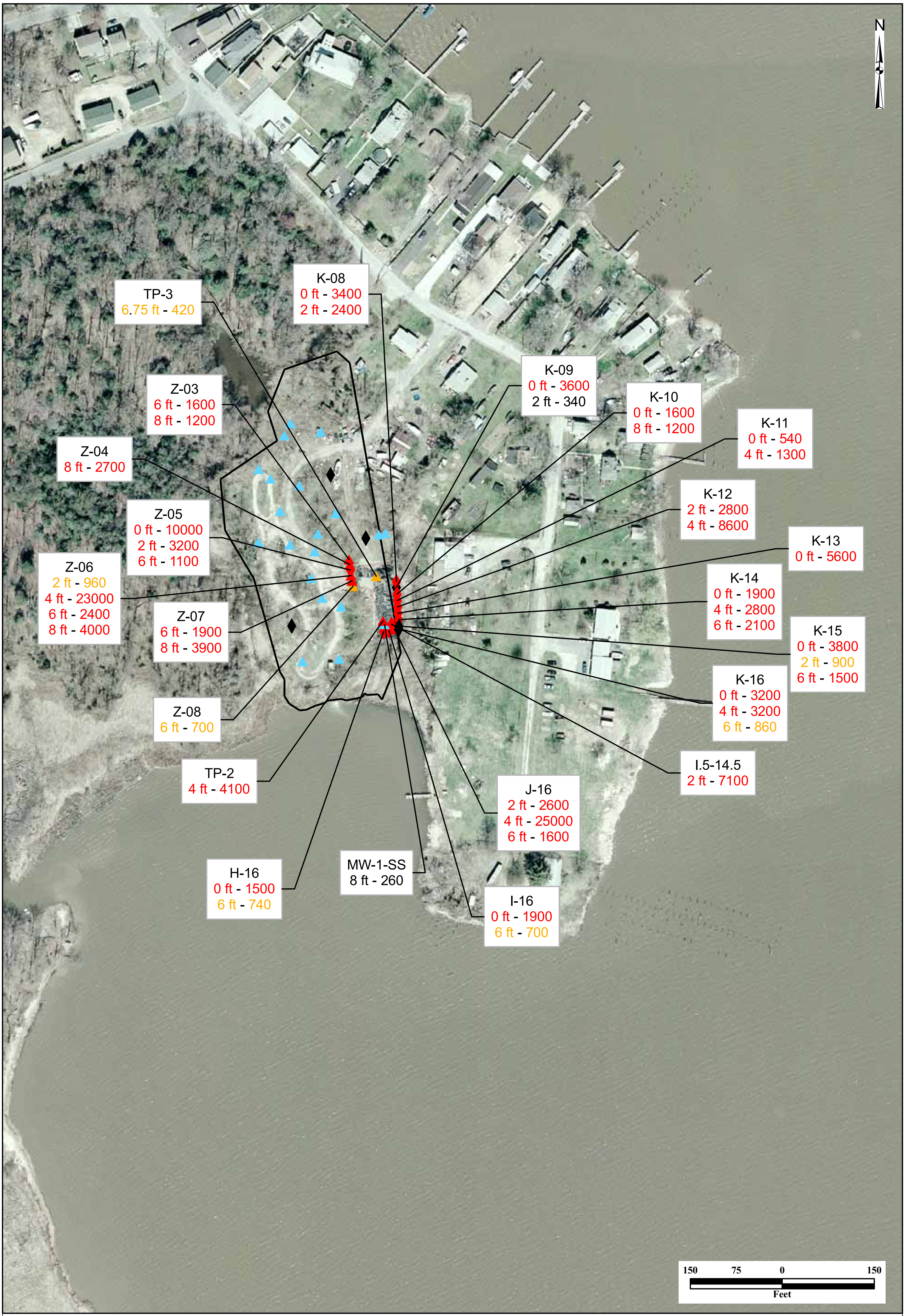
Subsurface Soil Sample
Lead Analytical Results
Sauer Dump

October 2006

AR103607

Figure 2



LEGEND

— Property Boundary

◆ Soil - Surface and Subsurface

▲ Subsurface Soil

Pb - all Lead values reported in mg/kg

◆▲ Concentrations ≥ 1000 mg/kg

◆▲ Concentrations ≥ 400 mg/kg

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Subsurface Soil Sample
Lead Analytical Results
Sauer Dump

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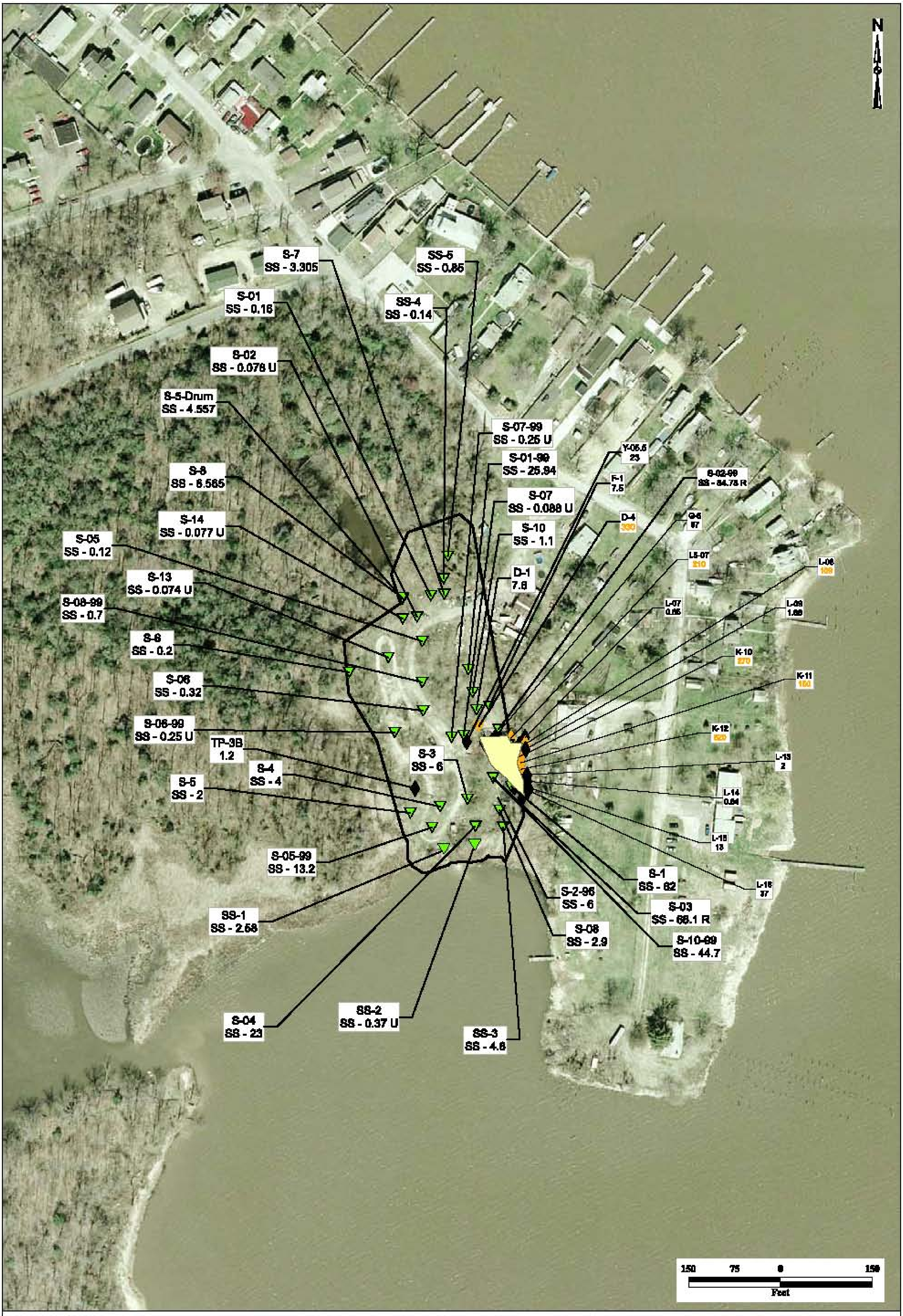
AR103608

Figure 3



LEGEND

—	Property Boundary
◆	Soil - Surface and Subsurface
▼	Surface Soil
🟨	See Inset on Figure 5

PCB - all PCB values reported in mg/kg

◆▲ Concentrations > 109 mg/kg

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Surface Soil Sample
PCB Analytical Results
Sauer Dump

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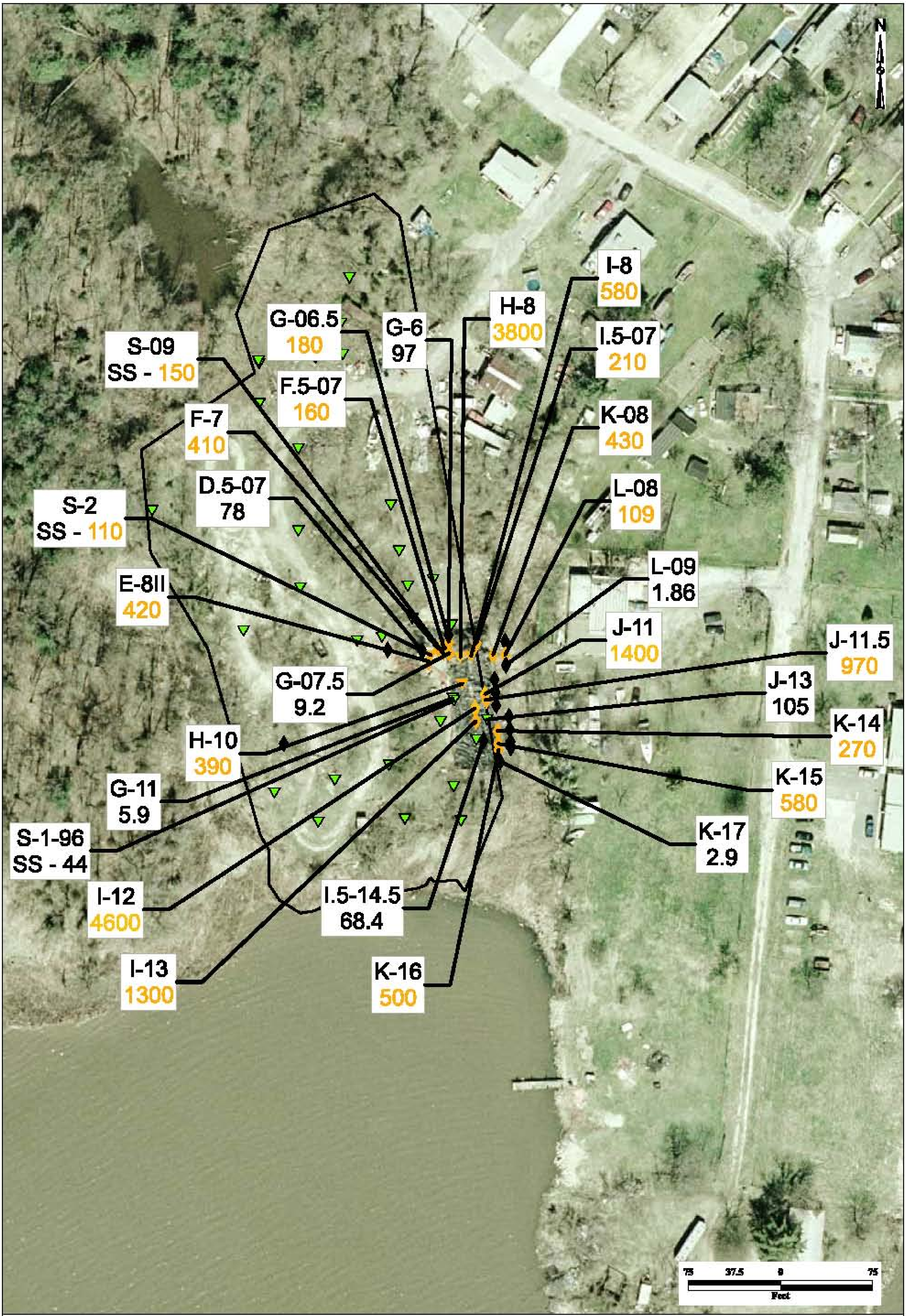
Figure 4



LEGEND

Property Boundary

♦ Soil - Surface and Subsurface

▼ Surface Soil

PCB - all PCB values reported in mg/kg

♦▲ Concentrations > 109 mg/kg

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Surface Soil Sample
PCB Analytical Results
Sauer Dump

AR103610

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Figure 5

LEGEND

▬ Property Boundary

◆ Soil - Surface and Subsurface

▲ Subsurface Soil

PCB - all PCB values reported in mg/kg

◆▲ Concentrations > 109 mg/kg

🟨 See Inset on Figure 7

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Subsurface Soil Sample
PCB Analytical Results
Sauer Dump

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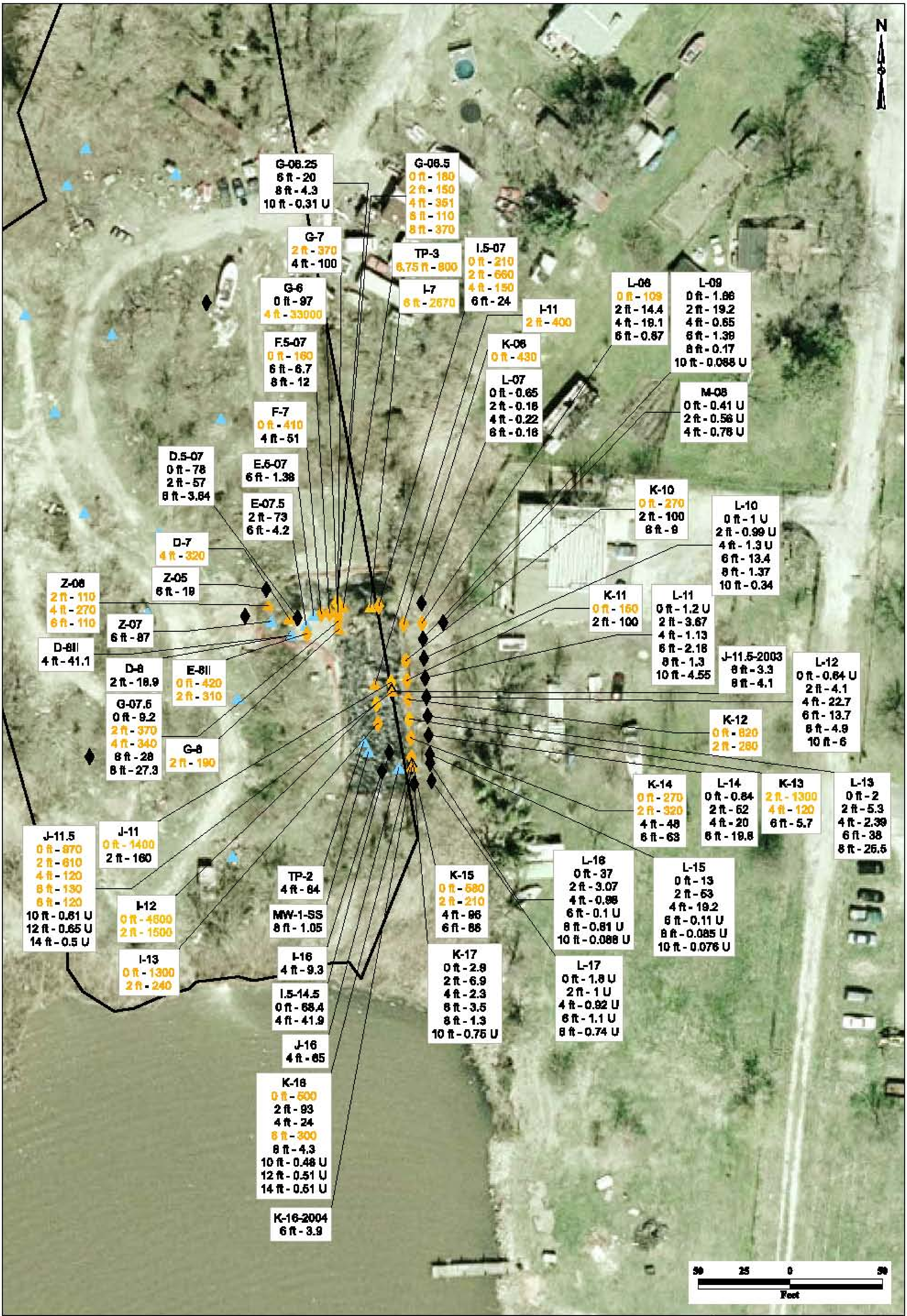
Figure 6



LEGEND

—	Property Boundary
◆	Soil - Surface and Subsurface
▲	Subsurface Soil

PCB - all PCB values reported in mg/kg

◆▲ Concentrations ≥ 109 mg/kg

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Subsurface Soil Sample PCB Analytical Results Sauer Dump

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Figure 7

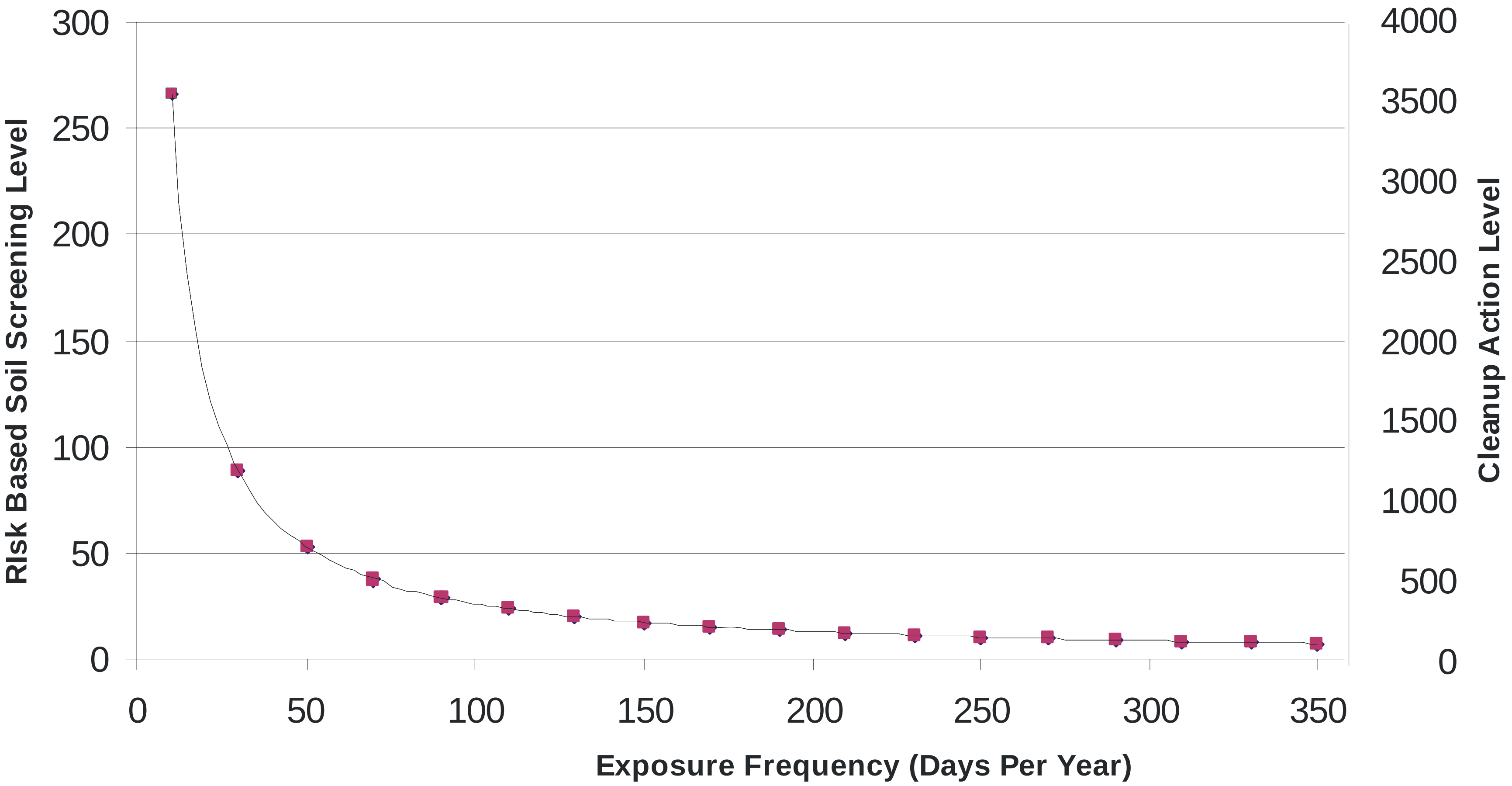
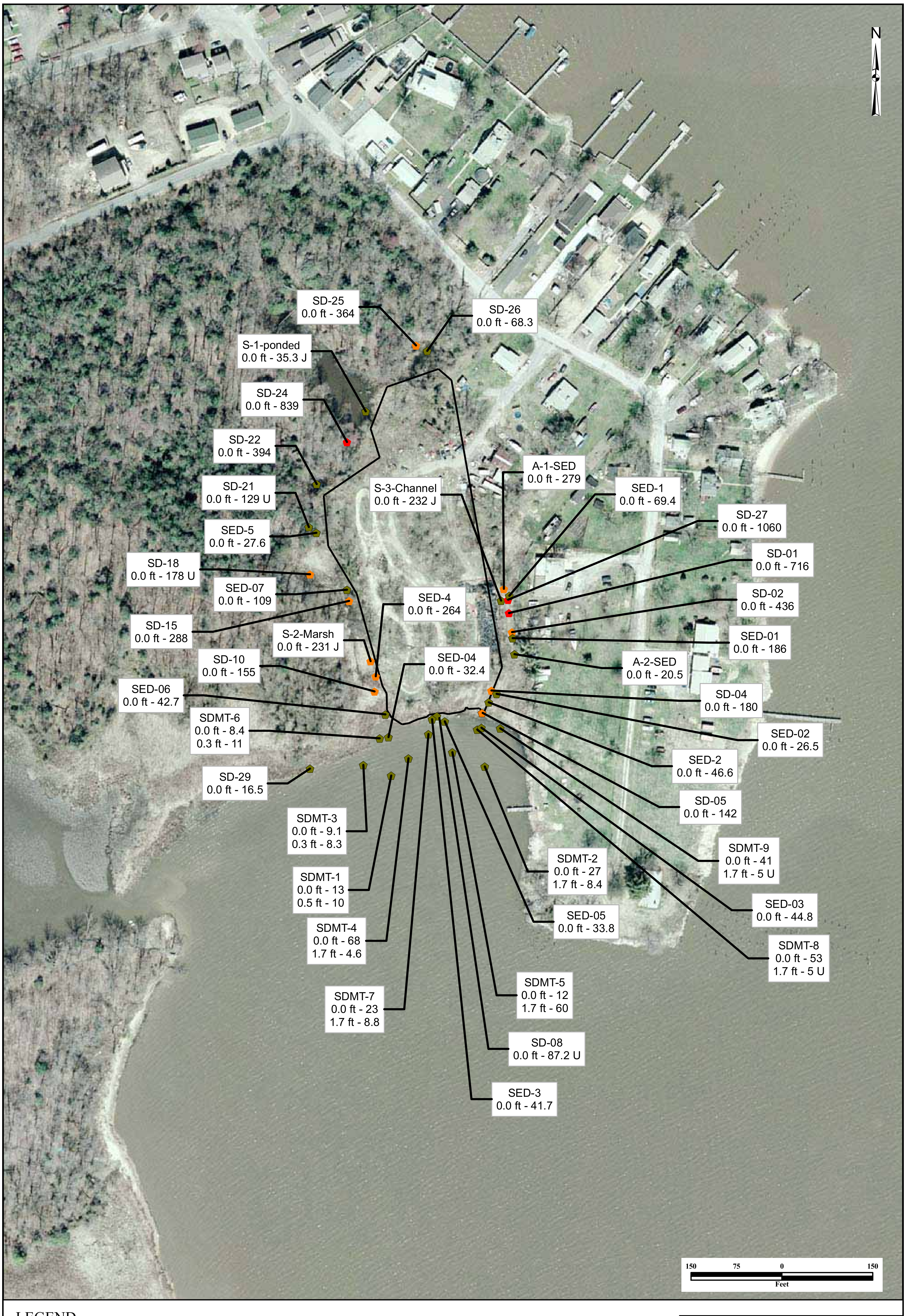


Figure 8. The relationships between risk-based SSLs, Cleanup Action Levels, and the exposure frequency of a child receptor.



LEGEND

— Property Boundary

⬟ Sediment Sample

⬟ > 130 ppm

⬟ > 500 ppm

Pb - all lead values reported in mg/kg

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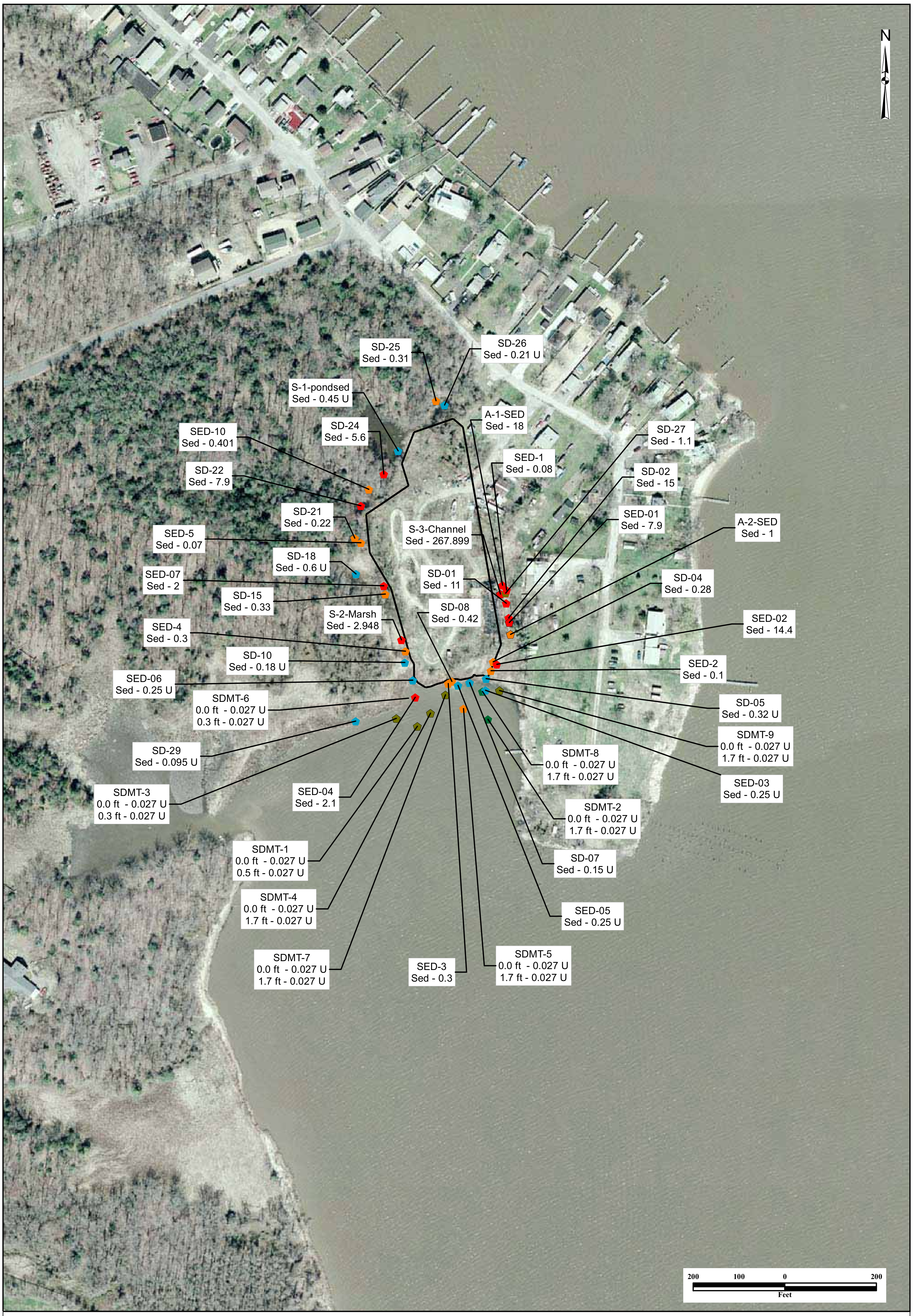
Sediment Sample
Lead Analytical Results
Sauer Dump

October 2006 | Figure 9



LEGEND

— Property Boundary

⬟ Sediment Sample

⬟ > 0.033 ppm

⬟ Detection Limit > 0.033 ppm

⬟ > 1 ppm

PCBs - all PCB values reported in mg/kg

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Sediment Sample
PCB Analytical Results
Sauer Dump

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