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REPORT

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Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Remedial Investigation/Feasibility Study

Technical Memorandum 7

Allied Paper, Inc. Operable Unit

Volume 1 of 7

Allied Paper, Inc./Portage Creek/
Kalamazoo River Superfund Site
Kalamazoo, Michigan

August 1997

BBL
BLASLAND BOUCK & LEE, INC
engineers & scientists

TECHNICAL REPORT

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1. Introduction

1.1 OU Description

The Allied Paper, Inc. Operable Unit (Allied OU) is located along Portage Creek within the City of Kalamazoo and Kalamazoo County, Michigan (Figure 1). The OU occupies 51 acres along the Creek between Cork and Alcott Streets.

The OU consists of:

- Historical residuals and dewatering storage lagoons (HRDLs) for primary treatment of paper-making residuals (residuals);
- Former residuals decanting lagoons (FRDLs) for residuals;
- A former Type III Landfill for dewatered residuals;
- Other residuals disposal areas; and
- The former Bryant Mill Pond which received residuals in the past.

Based on previous investigations and on the presence of these various lagoons and disposal areas, the Allied OU has been divided into the following areas:

- Bryant HRDL;
- Monarch HRDL;
- FRDLs;
- Former Type III Landfill;
- Western Disposal Area;
- Pilot Study Area (a small area located north of the Former Type III Landfill);
- Former Bryant Mill Pond; and
- Portage Creek.

Figure 2 illustrates the location of these areas at the OU. A more extensive review of the physical setting and characteristics of the Allied OU is contained in the *Description of Current Situation (DCS) Report* (Blasland & Bouck, 1992).

1.2 OU Remedial Investigation Background

The Bryant Mill produced a variety of high quality paper products during its 94 years of operation. Raw materials used in the process included recycled paper, paper products that underwent a deinking process, and virgin pulp. Allied Paper, Inc. deinked and recycled waste paper at Bryant Mill A, located south of Alcott Street along the former Bryant Mill Pond (Blasland & Bouck, 1992). Process waste consisted mainly of residuals and water. The residuals contained PCB due to the presence of PCB-containing carbonless copy paper in some of the wastepaper utilized by the mills.

Process waste was discharged directly into Portage Creek until the early 1950s when Allied constructed a primary treatment facility for the Monarch Mill. The facility consisted of a clarifier and an earthen-diked dewatering lagoon, now referred to as the Monarch HRDL. This area is located south of Portage Creek bordering Cork Street. Wastewater from the mill was sent to the clarifier. After clarification, the supernatant was discharged to Portage Creek, while the settled residuals were pumped to the Monarch HRDL for dewatering.

The St. Regis Paper Company installed a similar treatment system for the Bryant Mill in 1954 (Blasland & Bouck, 1992). The system consisted of the Bryant Clarifier and the earthen-diked Bryant HRDL located north of Portage Creek. The Bryant HRDL has been filled and inactive since the late 1970s.

A number of activities have been, and continue to be performed to stabilize and maintain this site including:

- Activities in the Bryant HRDL involve occasional maintenance of the perimeter dikes and construction of new surface berms in the middle of the HRDL to facilitate solidification of the residuals (Limno-Tech, Inc., 1990).

- Routine Maintenance Activities - The site is maintained by staff who keep the grass mowed; remove brush, litter and trash; repair and plow roads; monitor for and correct any odor problems; monitor creek flow and blockage; and maintain buildings.

- Site Security - Site access is restricted by gates and a perimeter fence with posted warning signs. In addition, every morning and evening staff tour the area to ensure site access security.

- An erosion control plan was implemented at the landfill in 1991. This included construction of a soil cap, drainage swales, stormwater retention basins, grading the landfill surfaces and seeding the landfill surface with erosion control vegetation.

- A revegetation/soil stabilization program was successfully implemented. Lagoons were seeded in 1991 and 1992 with canary reed grass to facilitate evapotranspiration on the lagoons, which has also improved the aesthetics of the area. Also, the absence of standing water in this area significantly reduced odors.

- Allied maintains the former lagoons - A treatment system was installed in 1991 and stormwater which collects in the lagoons is pumped to the treatment plant and treated prior to discharge to the City of Kalamazoo WWTP.

- In December 1993, erosion control measures were completed for a 150-foot long section of the Bryant HRDL berm along the north side of Portage Creek. The erosion control effort involved clearing and grubbing, grading, liner installation, and installation of gabion baskets (rock-filled wire mesh baskets) followed by a final grading and seeding. The landfill berms are regularly monitored and maintained.

- In April 1995, berm stabilization measures were performed for a section of Monarch berm on the eastern edge of the Allied OU. The Monarch berm stabilization involved clearing, grubbing, grading, geotextile installation, gabion basket installation followed by final grading and seeding. The landfill berms are regularly monitored and maintained.

The Bryant HRDL and a series of four FRDLs occupy approximately 40 acres just north of Cork Street.

In 1966, under Act 87, Public Acts of 1965, Allied began operation of a licensed Type II landfill for dewatered residuals in the area north of the Bryant HRDL and FRDLs. The landfill was classified as Type III in 1984, then licensed under Michigan Act 641 on February 8, 1985 to receive dewatered residuals. The landfill license is no longer active.

1.3 Objectives of the Remedial Investigation

The primary objective of the Allied OU Remedial Investigation (RI) is to assess the nature and extent of polychlorinated biphenyls (PCB) present in residuals, native soil, sediments, groundwater/leachate, and surface water, and the potential, if any, for threats to public health, welfare, or the environment caused by the release or threatened release of hazardous substances, pollutants, or regulated substances from the area. Corollary objectives include:

- The assessment of potential migration pathways;
- The evaluation of the potential environmental and human exposure and risk;
- The screening for the presence of other constituents on the Contract Laboratory Program (CLP) Target Compound List (TCL) and Target Analyte List (TAL);
- The collection of data necessary to prepare an endangerment assessment and to evaluate remedial alternatives; and
- The evaluation of the geotechnical properties of the dikes and residuals.

1.4 Scope of the Technical Memorandum

The scope of this technical memorandum includes both the presentation of results and the preliminary findings of the OU investigation. Also included are field data, analytical data, and the results of the Quality Assurance/Quality Control (QA/QC) review of analytical data.

For comparative purposes, the historical PCB data for soils and sediment in the former Bryant Mill Pond area underwent QA/QC review, and are presented in this technical memorandum. The remainder of the historical data proposed for use in the RI will undergo QA/QC review as well. Results of the Allied OU surface water investigation, biota investigation, and wetlands assessment are included in the draft Technical Memorandum 1, which was submitted to the Michigan Department of Natural Resources (MDNR) in April 1994 (BBL, 1994).

2. Investigation Activities

Allied OU soil, sediment, dike material, residuals, and groundwater/leachate were evaluated by the installation of borings, monitoring wells, and piezometers, and by sampling and analysis of these media. The OU investigation activities reported in this memorandum include the following tasks:

- Residuals and Soil Characterization;
- Geotechnical Investigation;
- Hydrogeological Investigation;
- Sediments Investigation; and
- Residential Property Soil Sampling.

Field documentation for the investigation activities are included in Appendix A.

2.1 Residuals and Soil Characterization

Investigative activities performed to characterize the Allied OU residuals and soil included drilling and sampling 34 borings. Although the Work Plan (Blasland & Bouck, 1993b) specified the installation of 32 borings, two additional borings (BHDL-22 and BHDL-123) were installed in the Bryant HRDL as part of the Hydrogeological Investigation, and at the request of the MDNR. These borings were installed because no residuals were found or sampled in adjacent well clusters MW-22 and MW-123.

Depending on location and access, borings were installed using hollow-stem augering, tripod-mounted driven casing, hand driven split-barrel sampling, or hand augering methods. Residuals and soil characterization activities were conducted in the Bryant HRDL, Monarch HRDL, FRDLs, Former Type III Landfill, Western Disposal Area, Pilot Study Area, and the Monarch Clarifier. Selected samples were collected and analyzed for one or more of the following parameters: PCB, CLP TCL/TAL, polychlorinated dibenzo-p-dioxins (PCDD), or polychlorinated dibenzofurans (PCDF). Table 2-1 lists the CLP TCL/TAL compounds and analytes.

Additional soil and residuals sampling was conducted as part of the Hydrogeological Investigation and Sediments Investigation as discussed in Sections 2.3 and 2.4, respectively. Field documentation for the investigation, including boring logs, are provided in Appendix A.

Table 2-2 summarizes the Residuals and Soil Characterization boring samples submitted for laboratory analysis.

2.1.1 Bryant HRDL

Two soil borings, designated BLHB-1 and BLHB-2, were advanced outside the dikes forming the eastern and southern perimeter of the Bryant HRDL. BLHB-1 and BLHB-2 were advanced to collect samples of surficial soils at the base of the dikes within the Portage Creek Floodplain, and of saturated soils below the base of the dikes. Two additional soil borings, designated BHDL-22 and BHDL-123, were also installed in the Bryant HRDL in conjunction with the Hydrogeological Investigation as discussed in Section 2.3.2.2. Figure 3 displays the locations of the borings.

Borings BLHB-1 and BLHB-2 were advanced and samples collected using stainless steel hand augers in a manner consistent with the *Allied OU Field Sampling Plan* (FSP) (Blasland & Bouck, 1993c). At each boring location, two representative samples were homogenized and analyzed for PCB. The first sample was collected from the 0- to 6-inch interval, and the second sample from the 6-inch interval immediately above the water table which was encountered at a depth of 1.5 feet below ground surface (bgs) in BLHB-1 and at 1-foot bgs in BLHB-2.

Upon completion, the borings were abandoned by filling the boreholes with hydrated bentonite. The locations were flagged and subsequently surveyed for horizontal and vertical control.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the *Quality Assurance Project Plan* (QAPP) (Blasland & Bouck, 1993d).

2.1.2 Monarch HRDL

Two soil borings, designated MLHB-1 and MLHB-2, were installed along the perimeter of the Monarch HRDL within the Portage Creek Floodplain, and five borings, designated MLSS-1 through MLSS-5, were installed in the interior of the HRDL. Figure 3 illustrates the location of these borings.

The MLHB-1 and MLHB-2 borings were advanced to collect samples of the surficial soils at the base of the dike and of the saturated soils below the base of the dike. The borings were installed and sampled using a stainless steel hand auger in a manner consistent with the FSP. At each boring location, two representative samples were homogenized and analyzed for PCB. The first sample was collected from the 0- to 6-inch bgs interval in each boring. The second samples from MLHB-1 and MLHB-2 were collected from the 6-inch interval just above the water table which was encountered at a depth of 1-foot and 2 feet bgs, respectively.

Borings designated MLSS-1 through MLSS-5 were installed within the interior of the Monarch HRDL to characterize the extent of PCB within the residuals, and identify and characterize the residuals/soil interface. Borings MLSS-2 through MLSS-5 were installed using a tripod-mounted cathead and hammer to drive continuous split-barrel samples. An outer casing was driven in the boreholes to prevent collapse. Boring MLSS-1 was installed using a truck-mounted drill rig equipped with hollow stem augers to collect continuous split-barrel samples. Borings were terminated 2.5 feet below the residuals/native soil interface. The following samples were selected for analysis from each of the MLSS borings:

- One sample from the 0- to 6-inch bgs interval to be analyzed for PCB;
- One 2-foot interval sample from each 10-foot interval between 0.5 feet bgs and 6 feet above the residuals/native soil interface to be analyzed for PCB;
- Each 2-foot interval sample between 6 feet and 2 feet above the residuals/native soil interface to be analyzed for PCB; and
- A 2-foot interval sample immediately above the residuals/native soil interface and the 2-foot interval immediately below the residuals/native soil interface to be analyzed for TCL/TAL constituents.

This sampling scheme is illustrated as a representative cross-section in Figure 4.

The 0- to 6-inch bgs intervals from MLSS-1 and MLSS-3 were also analyzed for PCDD and PCDF.

Upon completion, all of the borings were abandoned by filling the boreholes with hydrated bentonite or a cement/bentonite slurry. In the MLHB-1 and MLHB-2 borings, the bentonite was poured into the boreholes and then hydrated in-place. In the MLSS borings, a cement/bentonite slurry was pumped into the boreholes as the casing or augers were removed. The locations were flagged and subsequently surveyed for horizontal and vertical control.

The collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.1.3 HRDLs

Six borings, designated DLHB-1 through DLHB-6, were installed within the FRDLs to determine the nature and extent of their residuals. BLHB-3 was installed outside of the FRDLs in the Portage Creek Floodplain to address the MDNR's concerns regarding possible seepage from the FRDLs. BLHB-3 was placed in the vicinity of the seep that was observed in the past. The locations of the borings are shown on Figure 3.

The borings DLHB-1 through DLHB-6 were advanced using a tripod-mounted cathead and hammer and driven casing method in a manner consistent with the FSP. Continuous split-barrel samples were collected from each boring for visual classification and delineation of the residuals. Borings were terminated 2.5 feet below the residuals/native soil interface. Boring BLHB-3 was advanced using hand augering methods in a manner consistent with the FSP. The boring was terminated at the water table which was encountered 5.5 feet bgs.

The following samples were selected for analysis from each of the DLHB borings, with exceptions noted below:

- The 0- to 6-inch bgs interval to be analyzed for PCB;
- One 2-foot interval sample from each 10-foot interval between 0.5 feet bgs and 6 feet above the residuals/native soil interface to be analyzed for PCB;
- Each 2-foot interval from between 6 feet and 2 feet above the residuals/native soil interface to be analyzed for PCB; and
- A 2-foot interval sample immediately above the residuals/native soil interface and the 2-foot interval immediately below the residuals/native soil interface to be analyzed for TCL/TAL constituents.

This sampling scheme is illustrated as a representative cross-section in Figure 4.

Due to the lack of any residuals at DLHB-4 and DLHB-5, only a single soil sample was collected from these borings at the 0- to 6-inch bgs interval. The samples were homogenized and analyzed for PCB. The 0- to 6-inch bgs interval from DLHB-1, DLHB-2, and DLHB-5 were also submitted for PCDD and PCDF analysis.

In BLHB-3, the 0- to 6-inch and the 5- to 5.5-foot bgs interval samples were selected for PCB analysis. Upon completion, the boring was filled with bentonite and then hydrated in place.

Upon completion, the DLHB borings were abandoned by pumping the boreholes full with a cement/bentonite (approximately 4 percent bentonite) grout. The grout mixture was pumped into the boreholes as the driven casing was removed to ensure that the boreholes would not collapse. The borings were marked with a PVC pipe sticking up above the water surface (or at the ground surface) of the FRDLs and subsequently surveyed for horizontal and vertical control.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.1.4 Former Type III Landfill

Three borings, designated FLF-1 through FLF-3, were installed south of the former Type III Landfill. The location of these borings are shown on Figure 3. The borings were advanced using a truck-mounted or all-terrain-vehicle-mounted drill rig equipped with hollow stem augers. Continuous split-barrel samples were collected from each boring between the ground surface and 2.5 feet below the residuals/soil interface.

In accordance with the Work Plan, a soil sample from each boring was collected from the 0- to 6-inch bgs interval for PCB analysis. One residuals sample was collected from the 0- to 2-foot interval above the residuals/native soil interface, and one soil sample was collected immediately below the interface to be analyzed for PCB. In order to accommodate the MDNR's need to collect split samples for TCL/TAL parameters from residuals and soil, boring FLF-1 was sampled in accordance with the typical residuals boring sampling scheme as presented in Figure 4 and first described in Section 2.1.2.

Upon completion, the borings were abandoned by pumping the boreholes full with a bentonite/cement grout. The grout mixture was pumped into the boreholes as the augers were removed to ensure that the boreholes would not collapse. The location of the borings were flagged and subsequently surveyed for horizontal and vertical control.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.1.5 Western Disposal Area

A total of eight borings, designated WA-1 through WA-8, were drilled on the western portion of the OU to evaluate areas believed to have received residuals in the past. The location of these borings are shown on Figure 3. The borings were advanced using a truck-mounted drill rig equipped with hollow-stem augers. Continuous split-barrel samples were collected from ground surface to 2.5 feet below the residuals/native soil interface.

With some modification, the following scheme was used to select samples to be submitted for analysis:

- The 0- to 6-inch bgs interval to be analyzed for PCB;
- One 2-foot interval sample from each 10-foot interval between 0.5 feet bgs and 6 feet above the residuals/native soil interface to be analyzed for PCB;
- Each 2-foot interval sample collected from between 6 feet and 2 feet above the residuals/native soil interface to be analyzed for PCB; and
- A 2-foot interval sample immediately above the residuals/native soil interface and the 2-foot interval immediately below the residuals/native soil interface to be analyzed for TCL/TAL constituents.

This sampling scheme is illustrated as a representative cross-section in Figure 4.

Some of the sampling intervals were modified as required by field conditions or sample recovery. In addition, the 0- to 6-inch *bgs* intervals from WA-2 and WA-6 were analyzed for PCDD and PCDF. Table 2-2 summarizes the samples that were actually submitted for laboratory analysis.

Upon completion, the borings were abandoned by pumping the boreholes full with a bentonite/cement (approximately 4 percent bentonite) grout. The grout mixture was pumped into the boreholes as the augers were removed to ensure that the boreholes would not collapse. The location of the borings were flagged and subsequently surveyed for horizontal and vertical control.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.1.6 Pilot Study Area

Five borings, designated MA-1 through MA-5, were installed in the Pilot Study Area located near existing monitoring wells MW-2 and MW-18. The locations of the borings are shown on Figure 3. The borings were advanced using hand augering methods in a manner consistent with the FSP. The borings were advanced to a depth of approximately 4.5 feet bgs. Two samples from each boring were selected for analysis for TAL analytes including the 0- to 1.5-foot bgs interval and the 3- to 4.5-foot bgs interval.

Upon completion, the borings were abandoned by filling the boreholes with bentonite powder and then hydrating the bentonite in place. The locations of the borings were flagged and subsequently surveyed for vertical and horizontal control.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.1.7 Background Soil Samples

Two background samples were collected from boring B-7B installed immediately adjacent to MW-7B in the Western Disposal Area. Soil samples were collected at 8 to 10 feet bgs and 10 to 12 feet bgs and analyzed for TCL/TAL parameters. The samples were collected using split-barrel samplers in a manner consistent with methods described in the FSP.

Background soil samples are intended to account for naturally occurring concentrations of TAL analytes in soil horizons underlying the OU. After review of the data collected from B-7B, these sample locations do not satisfy the MDEQ's criteria for "background samples." For the purpose of this report, they will be discussed with the site (Western Disposal Area) soil data.

2.1.8 Monarch Clarifier

One sample, designated MC-1, was collected from the solids remaining on the bottom of the Monarch Clarifier. The sample was collected using a hand-held dredge sampler in a manner consistent with the FSP. The sample was homogenized and analyzed for PCB.

2.2 Geotechnical Investigation

Geotechnical sampling and laboratory testing were conducted to provide data for assessing the stability of the dikes and the strength and deformation characteristics of the residuals. The Geotechnical Investigation included an evaluation of piezometer information and the collection of disturbed and undisturbed samples of soil and residuals. While specific borings were targeted for collecting geotechnical data, information from the other borings and wells at the OU were used

in the geotechnical evaluation as well. In particular, data from monitoring wells and piezometers were used to evaluate potentiometric surfaces for use in dike stability analysis.

Geotechnical borings (GEO-1, GEO-2, MW-22B, and MW-123B) generally were sampled continuously to their completion depth of 50 feet bgs. Breaks in the continuous sampling occurred in borings GEO-1, GEO-2, and MW-22B due to running sands or difficulties in extracting the previous sample from the borehole. All four were collected in the Bryant HRDL.

Disturbed samples collected for index testing were obtained using split-spoon samplers in selected borings, although samples were collected continuously for visual-manual classification and/or analytical testing in most boreholes. Disturbed samples for potential geotechnical testing were selected from the following boring locations: GEO-1, GEO-2, MW-2S, MW-7B, MW-20B, MW-22B, MW-122A, MW-123B, MW-127A, DLHB-1, DLHB-4, MLSS-2, and MLSS-3.

Collection of relatively undisturbed samples of soil and residuals (Shelby tubes) was attempted following ASTM D1587 procedures in the geotechnical borings (ASTM, 1993). Sample recovery was generally very poor and only four tubes were successfully collected, one from each boring. Although attempts were made in boreholes MW-120A and DLHB-2A to collect Shelby tubes of residuals, the residuals were generally very compressible and difficult to attain. Therefore, priority was given to the environmental samples for PCB or CLP TCL/TAL analysis because of the difficulty in geotechnical sampling. Field vane-shear testing was conducted in clay at boring MW-20B and in residuals at boring DLHB-2A. DLHB-2A was installed immediately adjacent to DLHB-2 for conducting vane-shear tests and to collect Shelby tubes of residuals.

Disturbed and undisturbed samples were selected for geotechnical laboratory testing. The testing program included analysis of moisture content, organic content, Atterberg Limits, specific gravity, gradation, unconsolidated-undrained (UU) triaxial shear, and one-dimensional consolidation. Table 2-3 summarizes the samples selected for geotechnical testing.

2.3 Hydrogeological Investigation

The Hydrogeological Investigation included:

- Existing Monitoring Well Inventory;
- Monitoring Well and Piezometer Installation, Construction, Rehabilitation, and Decommissioning;
- Groundwater/Leachate Sampling;
- In-Situ Hydraulic Conductivity Testing; and
- Gamma Ray Logging.

2.3.1 Existing Monitoring Well Inventory

An inventory of the existing monitoring wells at the OU was completed to aid in the evaluation of the wells as potential data collection points for use during the RI. The location of the wells are shown on Figure 3.

The existing wells were inspected following procedures detailed in the FSP. Items checked include surface seal integrity, depth to groundwater, depth of well, and apparent well condition. The implementation of the inspection and evaluation of each existing well was recorded on a well inspection checklist and an Existing Monitoring Well Evaluation Form. The documentation of the existing-well inventory is presented in Appendix B.

2.3.2 Monitoring Well and Piezometer Installation, Rehabilitation, and Decommissioning

To supplement the existing groundwater monitoring network at the OU and evaluate the potential movement of water within the dikes, the following monitoring wells and piezometers were installed:

- Twelve (12) shallow monitoring wells (MW-2S, MW-8A, MW-22A, MW-120A, MW-121A, MW-122A, MW-123A, MW-124A, MW-125A, MW-126A, MW-127A, and MW-128A);
- Ten (10) deep monitoring wells (MW-7B, MW-20B, MW-22B, MW-120B, MW-121B, MW-122B, MW-123B, MW-124B, MW-125B, and MW-126B);
- One (1) residuals monitoring well (perched water) (MW-125P);
- Two (2) replacement wells (MW-12R and MW-19BR); and
- Six (6) piezometers (P-1/1C, P-2/2C, and P-3/3C).

Monitoring well and piezometer locations are shown on Figure 3. Boring logs and well construction details are included in Appendix A.

2.3.2.1 Monitoring Well and Piezometer Installation

The monitoring wells were installed in two target zones: the saturated zone above the first confining layer (designated "A" wells), and the first 5 feet of the saturated zone below the first potential confining layer (designated "B" wells). In those wells where residuals were encountered, the target zone for the "A" wells was the uppermost 5 feet of saturated materials below the residuals as per MDNR direction. In those wells where residuals were not encountered, the "A" wells were constructed to straddle the water table. At some locations, a cluster of "A" and "B" wells was installed while at other locations, where a well already existed, an "A" or "B" well was installed to complete the shallow and deep cluster. Two replacement "B" wells were also installed in well clusters where the construction of the existing deep well was considered suspect.

As directed by the MDNR, saturated zones within the residuals (i.e., containing leachate) were also targeted for monitoring if the following conditions were encountered: 1) a zone at least 3 feet in thickness and at least 2 feet above the base of residuals (designated as an "R" well); or 2) a perched saturated zone (designated as a "P" well). No R-designated wells and one P-designated well (MW-125P) were installed at the Allied OU.

Three piezometer clusters (P-1/P-1C, P-2/P-2C, and P-3/P-3C) were installed on the dike of the Bryant HRDL to evaluate the potential phreatic surface and potential water movement within the dike. One piezometer in each cluster was located on top of the dike while the second piezometer at each cluster (designated with a "C") was placed on the creek-side slope of the dike.

Monitoring Well Construction Details

Monitoring well construction details are summarized on Table 2-4. Table 2-5 provides information on volumes purged and the size of the filter pack material for each new monitoring well.

Monitoring wells and piezometers (except the "C" piezometers) were all installed using a truck-mounted or all-terrain-vehicle-mounted drill rig equipped with 4 ¼-inch inside diameter (ID) hollow-stem augers. Continuous split-barrel samples were collected from the well and piezometer borings, except the shallow wells in new clusters, to allow for the visual classification of the materials and to collect samples for environmental and geotechnical analysis. Split-barrel samples were collected at 5-foot intervals from the shallow well borings of new clusters to verify stratigraphy.

All monitoring wells were constructed of 2-inch diameter, stainless-steel well screen (0.010-inch slot width) and appropriate length of stainless steel riser pipe. Once the completion depth was reached, the well screen (either 5- or 10-foot length), equipped with a flush-threaded end cap, was lowered through the augers to the bottom of the borehole. A flush-threaded riser pipe was added to the screen as it was lowered into the borehole. The riser pipe was allowed to stick up approximately two feet above ground surface (except the MW-123A/MW-123B cluster, as discussed later). Once the well assembly was in place, silica sand was added as a filter pack to the annular space around the well screen. The augers were lifted slowly as the sand pack was placed. The FSP stated that the sand pack should extend 2 to 3 inches above the top of the screen, however, due to subsurface stratigraphy restrictions the length of the sand pack required adjustment for some wells. These adjustments will be discussed later in this section. A 2- to 3-foot thick bentonite seal was placed on top of the sand pack. The bentonite was either added as a slurry using a tremie pipe or as bentonite chips which were hydrated in place by adding water. A cement/bentonite grout was pumped into the remainder of the annular space to the ground surface (except well cluster MW-123A/MW-123B, as discussed later).

All wells, except the MW-123A/MW-123B cluster, were completed at the surface with a locking, steel protective casing installed over the riser pipe. The riser pipe was equipped with a vented well cap. Once the grout had been allowed to set, a 2-foot diameter cement surface seal was placed around the casing. A weep hole was then drilled in the bottom of the outer casing to allow for the drainage of water.

Because of the location of the MW-123A/MW-123B cluster in the center of a narrow dike which also serves as an access road, these two wells were completed as flush-mounted wells. In these wells, the grout was brought to 1-foot bgs and the riser pipe was cut-off approximately 4-inches bgs. A galvanized curb steel box equipped with a bolted down manhole cover was grouted into place around the well head. The riser pipe was equipped with a non-vented well cap.

As directed by the MDNR and specified in the Work Plan, the shallow "A" wells in locations where residuals were encountered, targeted the uppermost 5 feet of saturated material under the residuals/native soil interface. In all "A" wells where residuals were encountered, the saturated material was detected within 0.5 feet of the interface. Because the well screen and sand pack could not cross the interface, the length of the sand pack had to be shortened so that it did not extend across the interface. In these wells, the sand pack was added just to the top of the well screen section. This modification to the FSP was discussed in the field, and the MDNR and its representatives agreed to the modification. It should be noted that the well screen section is only slotted to within 0.25 feet of each end. Therefore, bringing the sand pack to the top of the screen section still allowed for the sand pack to be 0.25 feet above the slotted portion of the screen section. In the "A" wells, dry bentonite chips were added on top of the sand pack and then hydrated in place by adding water. Tremie grouting was not used because of the possibility of washing-out some of the sand pack and allowing bentonite to contact the screen. The cement/bentonite grout was added after a minimum of one hour to allow the bentonite to hydrate.

The target zone for the "B" wells was the saturated materials below the first confining layer. A confining layer was detected at all the well cluster locations except MW-125, located in the Monarch HRDL. In this cluster, the top of the screen for the deep well was 5 feet below the bottom of the screen in the shallow well.

Piezometer Construction Details

Piezometer construction details are summarized on Table 2-4. Table 2-5 provides information on volumes purged and the size of the filter pack material for each new piezometer.

The piezometers placed through the top of the Bryant HRDL dike (P-1, P-2, and P-3) were installed in the same manner as the monitoring wells, except PVC well materials were used instead of stainless steel. The bottom of these piezometers were placed just above the base of the dike and were equipped with 10-foot screens. The piezometers were completed with the flush-mount assembly similar to the MW-123A/MW-123B well cluster. The piezometers installed on the slope of the dike (P-1C, P-2C, and P-3C) were constructed of a 4 foot, 1 ¼-inch diameter galvanized steel screened drive point, and appropriate length galvanized steel stand pipe. The base of the dike was estimated by using the angle of the slope and the vertical distance from the top of the dike. The drive point was hammered into place to just above the base of the dike. This modification to the FSP was necessary due to restricted access on the steep slope of the dike and was agreed upon in the field by MDNR representatives.

Two replacement wells, MW-12R and MW-19BR, were installed next to existing wells MW-12 and MW-19B because of concerns regarding the correct placement of well screen in MW-12, and concerns of a possible connection to a deeper water-bearing zone in MW-19B. These wells were installed using the same protocols as the other monitoring wells, as described above.

2.3.2.2 Monitoring Well and Piezometer Development

The new groundwater monitoring wells and piezometers were developed after installation. At the direction of the MDNR, the residuals well MW-125P was not developed. Monitoring wells MW-122A, MW-122B, MW-125A, MW-125B, MW-126A, and MW-126B were developed using a Grundfos submersible pump. The remaining wells and the piezometers were developed by hand bailing because of slow recharge rates. MW-20B and MW-121B were initially surged and developed by using a water sampling pump. However, because this pump was not removing sufficient amounts of sediment, development was completed by hand bailing. All wells were first surged with a bailer to remove the majority of the sediment.

The field parameters (including pH, temperature, and specific conductance) of water purged during development were measured and recorded in the field logs as development continued using either the pump or by bailing. Field parameters were measured at intervals of approximately once each well volume. When using a pump for development, the pump was raised and lowered across the screened interval to assist in development of the entire screen length. Well development ceased when the measured parameters stabilized and the recovered water was relatively sediment free. A minimum of 10 well volumes were removed from each well during development. Table 2-5 provides the number of well volumes removed.

2.3.2.3 Well Rehabilitation

Well rehabilitation completed at the OU consisted of the replacement of cement surface seals at wells with damaged or missing seals that were sampled in connection with this investigation. Surface seals were replaced or repaired on a total of 13 wells, including: MW-7, MW-8, MW-15, MW-16B, MW-16C, MW-17A, MW-17B, MW-18, MW-19C, MW-19D, MW-20, MW-21, and MW-114.

2.3.2.4 Well Decommissioning

Only one monitoring well was decommissioned at the OU. MW-19B was abandoned and replaced because of a concern of potential hydraulic connection between the screened interval and a lower saturated zone. The well was decommissioned by overdrilling with 6 ¼-inch ID hollow stem augers, pulling the screen and riser, and filling the borehole with a cement/bentonite slurry as the augers were withdrawn. Replacement well MW-19BR was installed adjacent to the abandoned well as described in Section 2.3.2.1.

2.3.3 Sampling of Monitoring Well and Piezometer Borings

In accordance with the MDNR representative's direction, in the three wells where residuals were encountered (MW-8A, MW-120B, and MW-121B), the following samples were submitted for analysis:

- The 0- to 6-inch bgs interval to be analyzed for PCB;
- One 2-foot interval sample from each 10-foot interval between 0.5 feet bgs and 6 feet above the residuals/native soil interface to be analyzed for PCB;
- Each 2-foot interval sample from between 6 feet and 2 feet above the residuals/native soil interface to be analyzed for PCB; and,
- A 2-foot interval sample immediately above the residuals/native soil interface and the 2-foot interval immediately below the residuals/native soil interface to be analyzed for TCL/TAL constituents.

This sampling scheme is illustrated as a representative cross-section in Figure 4.

The remaining well clusters (MW-125B, MW-126A, and MW-126B) were situated in the berm and sampling at MW-125B deviated from the above plan; no surficial sample was collected from MW-125B.

As specified in the Work Plan, continuous split-barrel samples were collected from the deep wells in the new well clusters or from the new individual wells (regardless of depth). The shallow wells for each cluster were sampled at 5-foot intervals to verify stratigraphy. Therefore, in the new well clusters, the majority of the samples for analysis were collected from the deep wells. However, in well cluster MW-126A/MW-126B, the TAL/TCL samples from the residuals and the native soil had to be collected from the shallow well. This deviation from the Work Plan was due to not knowing the exact location of the interface, and potentially exposing the interface too long to make the proper collection of VOC samples practical from the deep well at this location.

In those wells where no residuals were encountered (MW-7B, MW-12R, MW-19BR, MW-20B, MW-122B, MW-124B, MW-127A, and MW-128A) one sample was analyzed for PCB from each 10-foot interval between 0.5 feet bgs and 0.5 feet below the elevation of the residuals/native soil interface in the nearest boring where residuals were encountered. No samples were collected for analysis from clusters MW-22 and MW-123. Alternate borings were used for analysis at these locations as described later in this Section.

Additional Soil Borings

In accordance with a field modification to the Work Plan requested by the MDNR, no samples were collected from newly installed well clusters MW-22A/MW-22B, MW-122A, and MW-123A/MW-123B for analysis. Alternatively, the MDNR requested the drilling and sampling of two additional soil borings in the Bryant HRDL adjacent to clusters MW-

22 and MW-123 (designated BHDL-22 and BHDL-123, respectively). Boring DLHB-4 was considered sufficiently close to MW122A/MW122B to be used for analyses at this location. The borings were drilled in the same manner as those borings installed in the FRDLs (Section 2.1.3). Samples selected for analysis included the following:

- The 0- to 6-inch bgs interval to be analyzed for PCB;
- One 2-foot interval sample from each 10-foot interval between 0.5 feet bgs and 6 feet above the residuals/native soil interface to be analyzed for PCB;
- Each 2-foot interval sample from between 6 feet and 2 feet above the residuals/native soil interface to be analyzed for PCB; and,
- A 2-foot interval sample immediately above the residuals/native soil interface and the 2-foot interval immediately below the residuals/native soil interface to be analyzed for TCL/TAL constituents.

This sampling scheme is illustrated as a representative cross-section in Figure 4.

2.3.4 Groundwater/Leachate Sampling

One round of groundwater samples was collected from each of the 25 new wells and from 27 selected existing wells (MW-1, MW-2, MW-3, MW-5, MW-7, MW-8, MW-11, MW-12, MW-15, MW-16B, MW-16C, MW-17A, MW-17B, MW-18, MW-19C, MW-19D, MW-20, MW-21, MW-23, MW-24, MW-25, MW-26, MW-104, MW-106, MW-108, MW-112, and MW-114). A summary of groundwater/leachate sampling is provided in Table 2-6.

Before sampling, the direction of groundwater flow was established to insure that steady-state or near steady-state flow towards Portage Creek existed. There was concern that rising water levels in the Creek could create flow reversal conditions and consequently flow would be towards the interior of the OU. The potentiometric surface elevations at wells were used to calculate the groundwater flow direction. Creek elevations at CG-1 and monitoring well potentiometric surface elevations at MW-122A were monitored twice per week for two weeks (for a total of four sets of measurements) in advance of the groundwater sampling event. As described in the Work Plan, steady-state conditions were assumed to hold after two weeks of consistent observations indicating groundwater flow toward the Creek from September 10 through September 27, 1993.

The groundwater sampling event was conducted between September 28 and October 8, 1993, approximately four weeks following the new well installations and development. In accordance with MDNR requirements, the rate at which wells were purged did not exceed 500 milliliters per minute (ml/min.) and the sampling rate did not exceed 100 ml/min. These rates were selected to reduce the amount of suspended material in the groundwater samples in an effort to obtain samples representative of the groundwater in the formation.

During the purging of the monitoring wells, field measurements including pH, temperature, and specific conductance were recorded. An initial set of measurements was taken and then repeated after each well volume was purged from the well. Once these field parameters stabilized (after a minimum of 3 well volumes had been removed or the well went dry), the groundwater samples were collected in the following order:

- Volatile organic compounds (VOCs);
- Total organic carbon (TOC);

- Semivolatile organic compounds (SVOCs);
- PCB and pesticide compounds;
- TAL metals (unfiltered);
- TAL metals (filtered);
- Cyanide;
- Nitrate and chemical oxygen demand (COD); and
- Alkalinity, sulfate, chloride, carbonate, and bicarbonate.

Both filtered and unfiltered groundwater samples were collected for TAL metals. The filtered sample was pumped through a 0.45 micron filter prior to preservation. Field parameters measured at the time of groundwater collection included temperature, pH, specific conductance, dissolved oxygen, and turbidity. These measurements are presented in Table 2-7.

2.3.5 In-Situ Hydraulic Conductivity Measurements

In-situ hydraulic conductivity measurements were collected from some of the newly installed wells and piezometers. The testing was conducted in a manner consistent with methods described in the FSP.

2.3.6 Gamma Ray Logging

Gamma ray logging was conducted on all of the newly installed deep wells (MW-20B, MW-22B, MW-120B, MW-121B, MW-122B, MW-123B, MW-124B, MW-125B and MW-126B) and selected existing wells (MW-11, MW-16C, MW-19D, and MW-25). Continuous gamma ray logging was conducted on all of the wells in a manner consistent with procedures described in the FSP.

2.4 Sediments Investigation

The Sediments Investigation activities involved the collection of sediment samples from the former Bryant Mill Pond and along Portage Creek. The purpose of the investigation was to confirm and characterize the nature and extent of residuals and sediment in the former Bryant Mill Pond, assess the nature of stream bed armoring in Portage Creek, assess the absence or presence of PCB in the floodplain outside the fence on the eastern side of the former Bryant Mill Pond, and assess the significance of any PCB transformation processes which may be occurring in sediments and saturated floodplain soils. The activities conducted to achieve these goals included installation and sampling of 12 soil borings, collection of five stream bed samples from Portage Creek, and probing and collection of sediment cores in the stream bed of Portage Creek. Table 2-2 summarizes the sediment samples submitted for laboratory analysis.

2.4.1 Former Bryant Mill Pond

A total of 12 borings (BMP-1 through BMP-12) were performed as part of the Sediments Investigation activities within the former Bryant Mill Pond. The location of the borings are shown on Figure 3.

Borings BMP-1, and BMP-3 through BMP-6, were installed along the northeastern side of the former floodplain area to further characterize the extent of the former mill pond. The borings were installed using hand augering methods in a manner consistent with the FSP. Each of the borings were terminated 2 feet below the sediment/soil interface. The sediments of the former Bryant Mill Pond are a mixture of residuals as well as mineral and organic particles from the watershed. Although the sediments contain some residuals, they will be referred to as sediments in this document. Three samples were selected for PCB analysis from each of these borings, including:

- A 0- to 0.5-foot bgs interval sample;
- A 1-foot interval sample below the sediment/soil interface; and
- A 1- to 2-foot interval sample below the sediment/soil interface.

Boring BMP-2 was installed adjacent to existing boring 12 to confirm the elevated PCB concentrations detected at this location during previous investigation activities. Therefore, this boring was advanced to a depth of 5 feet bgs. Samples of the upper 0.5 feet and each 1-foot interval were collected using hand augering methods in a manner consistent with the FSP. The 0- to 0.5-foot bgs interval, and each 1-foot interval to 5 feet from this boring, were selected and analyzed for PCB congeners and TOC. In addition, the 0- to 0.5-foot bgs and the 3- to 4-foot bgs intervals were collected for analysis of TCL/TAL constituents.

Borings BMP-7 through BMP-9 were installed in the floodplain outside of the fence on the north side of Portage Creek. These borings were installed to 1-foot or 1.5 feet bgs using hand-augering methods in a manner consistent with the FSP. The upper 0- to 0.5-foot *bgs* interval and the 0.5- to 1.5-foot bgs interval (BMP-8 and -9) or 0.5- to 1-foot bgs interval (BMP-7) were collected for PCB and TOC analysis.

Borings BMP-10, BMP-11, and BMP-12 were installed to sample sediments on the western side of Portage Creek in the former Bryant Mill Pond. These borings were installed by hand-driving split-barrel samplers to the boring depth in a manner consistent with the FSP. BMP-10 was advanced to 3 feet bgs, and BMP-11 and BMP-12 were advanced to 7 feet bgs. In BMP-10, the 0- to 0.5-foot bgs interval was analyzed for PCB and TOC, and the 1.5 to 3-foot bgs interval was analyzed for PCB only. In BMP-11, each 1-foot interval to 4 feet bgs, and the 2-foot interval from 5 to 7 feet bgs, were analyzed for PCB. The 0- to 1-foot bgs interval was also analyzed for TOC. In BMP-12, each 1-foot interval to 4 feet bgs and the 2-foot interval from 5 to 7 feet bgs were analyzed for PCB congeners, oil and grease, and TOC. In addition, the 0- to 1-foot bgs and the 3- to 4-foot bgs intervals were analyzed for TCL/TAL constituents.

Upon completion, the borings were abandoned by filling the boreholes with hydrated bentonite. The location of the borings were flagged and subsequently surveyed for vertical and horizontal control.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.4.2 Portage Creek

To assess the nature of stream bed armoring, sediments along the center line of Portage Creek were probed to refusal at 100-foot intervals from Cork Street to Alcott Street. The probing was conducted in a manner consistent with methods described in the FSP.

To assess the levels of PCB in the surficial sediments in contact with Portage Creek, samples were collected from five locations in the Creek. The sample locations, designated GS-1 to GS-5, are shown on Figure 3. At each location the

upper 0.5-inch of sediment was recovered using a hand-operated dredge in a manner consistent with methods described in the FSP. All five samples were analyzed for PCB.

Collection of QA/QC samples was done in conjunction with the collection of residuals and soil samples. The number of QA/QC samples for this purpose followed the guidelines presented in the QAPP.

2.5 Residential Property Soil Sampling

The Residential Property Soil Sampling program was conducted in two phases. The purpose for the sampling was to assess the potential presence of PCB in the former floodplain sediments or surficial soils in or near the backyards of residents bordering Portage Creek. The initial phase of work was conducted on October 31, 1991, and consisted of the sampling of five hand-augered soil borings designated RP-1 through RP-5. From these five borings, 10 samples were analyzed for PCB. Details on the sampling procedures and results are presented in the DCS. The second phase of sampling was conducted in August and December 1993, and consisted of the collection of four surface soil samples designated BMSS-1 through BMSS-4. The locations of the samples are shown on Figure 3. Table 2-2 summarizes the soil samples from BMSS-1 to BMSS-4 that were submitted for laboratory analysis.

Borings RP-1 through RP-5 were installed near the back of the property lots and along the chain link fence adjacent to Portage Creek. All of the residential lots were located along Homecrest Avenue. Two samples were collected from each boring. The surficial soil samples were collected using a stainless steel hand auger in a manner consistent with the procedures described in the FSP. Fill material had been placed in this area and therefore the surficial samples are not representative of original floodplain materials. To obtain samples of the original floodplain material, a post hole digger was used to remove fill/rubble material which ranged from 2 to 4.5 feet thick. Once the fill/floodplain interface was reached, the stainless steel hand auger was again used to collect the sample in a manner consistent with procedures described in the FSP. Both samples from each RP boring location were analyzed for PCB.

The BMSS surface soil samples were collected on December 14, 1993. BMSS-1 and BMSS-2 samples were collected from the backyard of a house located on Norton Drive. BMSS-3 and BMSS-4 samples were collected from below the bluff on the east side of the fence. The location of all of the BMSS samples were identified based on consultation with the MDNR. The samples were each collected from a depth of 0 to 6 inches bgs using a hand auger in a manner consistent with the FSP. All four BMSS samples were analyzed for PCB.

2.6 QA/QC Review of Data

Data packages for the OU underwent review and evaluation to assess overall analytical precision and accuracy. These packages include data for samples of residuals, soil, and groundwater/leachate. Analytical data, organized into 36 sample delivery groups (SDGs), were reviewed using techniques appropriate to the various media and compounds tested. Table 2-8 presents these SDGs and their associated samples and matrices.

Laboratory analyses precision was assessed by comparing the analytical results between matrix spike (MS) and matrix spike duplicate (MSD) samples for organics, and MS and laboratory duplicates for inorganics. Field duplicates were also used, and relative percent differences (RPD) were calculated for each pair of duplicate analyses. To assess the analytical method's accuracy, other indicators such as surrogate spike and blank spike recovery data were also examined.

A precision and accuracy summary, as assessed through the review of QA/QC information including MS/MSD recovery data, RPD between recoveries, matrix spike blank recovery data, field duplicate RPD calculation results, surrogate spike recovery data, blank spike recovery data, and blank contamination detection, is presented in Appendix C.

A more detailed analysis of data quality is provided in the data review reports presented in Appendix D. Also note that data review procedures are derived from applicable USEPA guidance (USEPA, 1989b; 1991a; 1991b; 1991c; and 1991d) and the QAPP.

Chain-of-Custody forms are presented in Appendix E.

3. Investigation Results

3.1 Field Data

Field data collected included visual observation of subsurface materials, groundwater and surface water elevations, field instrumentation measurements (i.e., pH, specific conductance, temperature, etc.), in-situ hydraulic conductivities, and gamma-ray logging results. The materials sampled and observed during the investigation included native soil, sediment, dike materials, residuals, and groundwater/leachate. A complete set of field notes documenting the field activities and observations is provided as Appendix A.

3.1.1 Residuals/Soil/Sediment Field Data

The Allied OU has been divided into eight areas based on physical characteristics and geographical location. These areas include: the Bryant HRDL, the Monarch HRDL, the FRDLs, the former Type III Landfill, the Western Disposal Area, the Pilot Study Area, Portage Creek, and the former Bryant Mill Pond (see Figure 2). Field data were collected during the Residuals and Soil Characterization, the Hydrogeological Investigation, and the Sediments Investigation, and included visual observation of subsurface materials to characterize the residuals and native soil at the OU. Field observations for each boring and well location were recorded in the subsurface logs (Appendix A). Figure 3 displays the locations of each boring and well drilled for the investigation. Eight cross-sections have also been prepared to illustrate the subsurface stratigraphy. Figure 5 illustrates the location of the cross-sections, each cross-section is individually presented on Figures 6 through 12. In addition, two contour maps of a clay underlying much of the OU (Figures 13 and 14) and one map showing the thickness of peat encountered (Figure 15) were prepared to further illustrate site stratigraphy.

The natural glacial and fluvial deposition of subsurface deposits at the OU, complicated by human alterations including the HRDLs, FRDLs, and former Type III Landfill, have resulted in a complex subsurface stratigraphy. In general, the subsurface stratigraphy consists of a clay (Figure 14), or peat zone (Figure 15) beneath the residuals, fill, or dike materials. These zones are underlain by alternating sequences of gravels, sands, silts, and clays.

The stratigraphy is complex in the immediate vicinity of Portage Creek, where fluvial deposition, as evidenced by the discontinuous nature of deposits, appears to be dominant. In the central and western portions of the OU, thicker, more continuous clay, sand, and gravel units predominate. In these areas, the peat layer was not detected.

Correlation of units between borehole locations is therefore difficult because of the interlayered, non-continuous nature of some of the deposits; however, several units were identified which appear to be continuous over a significant portion of the OU (Figure 15). One such unit is the peat layer present under the residuals, dikes, and fill materials across much of the OU. Areas across the OU where peat was not detected were in the vicinity of the MW-125 cluster, the Western Disposal Area (except in the southern portion near WA-6, WA-8, and MW-8A), in the central portion including the FRDLs, MW-19 cluster, and the former Type III Landfill, and in the MW-124 cluster located on a hill southeast of the Monarch HRDL.

Another unit consistently encountered under the peat and/or fill materials is a sand zone. This zone appears fairly continuous throughout the OU and is composed of a series of different sand units. This zone is not as evident or continuous along Portage Creek where the depositional sequence consists of interbedded, non-continuous sands, silts, and clays.

A sand and gravel zone occurs across much of the OU at an approximate elevation of 770 to 780 feet National Geodetic Vertical Datum of 1928 (NGVD). This unit was often observed to be separated from the shallow sand units by a clay unit.

The clays beneath the Allied OU consist of three separate units, described here as: upper clay, middle clay and lower clay. These clay units are typically separated by layers of silt, sand, and gravel or mixtures of these materials. The upper clay unit is discontinuous and is found lateral to fill materials in the southern portion of the OU at the perimeter of the Bryant and Monarch HRDLs (e.g., MW-111, MW-124A, and MW-124B). The clay within this unit is typically light brown to gray, wet, and contains silt. Portions of this clay unit were likely re-worked into fill material as areas were graded, as evidenced by the thin lenses of clay that were found within the fill.

The middle clay unit is also discontinuous across portions of the OU and typically underlies the areas of fill and residuals. Within the interior portion of the site (i.e., beneath the FRDLs and the Bryant HRDL) the middle clay unit lies below a peat layer (e.g., GEO-2, MW-8, and MW-11); however, this unit also interfingers with (e.g., MW-18 to MW-17B), or is replaced by, peat along a narrow band nearest Portage Creek (e.g., MW-125B, MW-121A, and MW-121B). The upper surface of this clay unit ranges from its highest elevation within the central portion of the OU to its lowest elevation near Portage Creek (Figure 13). The middle clay unit is thickest in the vicinity of the Bryant HRDL and Bryant Clarifier and thins towards Portage Creek (Figure 14).

In many areas of the site the middle clay unit can be further subdivided into an upper-middle clay and a lower-middle clay. The upper-middle clay sub-unit is found beneath fill areas and is generally lateral to or beneath peat deposits (e.g., lateral clay/peat change from MW124B to MLSS-4 and beneath peat in GEO-2). In many portions of the OU the fill areas and berms have been built on the peat or clay sub-unit (e.g., MW-17B and GEO-1). This clay sub-unit is characterized as a brown, grey, or brown-grey silty clay that sometimes contains traces or interbeds of silt, sand, or gravel. The peat layer is typically dark brown to black, moist, loose, high in organic content such as roots, and may contain varying amounts of silts, sands, and clays. This peat layer occurs in a band along Portage Creek (Figure 15).

The lower-middle clay sub-unit is found below the upper-middle clay and may be separated from it by interbeds of sands, silts, or gravels (e.g., MW-19 and MW126B). This lower-middle clay sub-unit is similar to the upper-middle clay sub-unit in character, but is more often found containing or interbedded with silt, sands, and gravels.

The lower-middle clay sub-unit is underlain by sands, silts, and gravels. These materials have been observed to be underlain by a lower clay unit (e.g., MW-19D and MW-114). Although penetrated by only a few wells, the lower clay unit is found at an elevation of approximately 750 feet and exists below the north-central part of the OU. This unit grades to a silty clay or silt nearest the former Bryant Mill Pond portion of the OU.

The following sections present a description of the subsurface materials in each of the eight areas across the OU.

3.1.1.1 Bryant HRDL

To characterize the residuals, native soils, and dike materials in and around the Bryant HRDL, two soil borings (designated BLHB-1 and BLHB-2) were installed at the base of the dikes and three geotechnical borings (designated GEO-1 through GEO-3 (MW-123B)) were installed in the dike during the Residuals and Soil Characterization. One monitoring well (MW-121B) and two monitoring well clusters (designated MW-22A/MW-22B and MW-123A/MW-123B) were installed in the dike and two soil borings (designated BHDL-22 and BHDL-123) were installed within the Bryant HRDL during the Hydrogeological Investigation.

Cross-section D-D', included as Figure 9, illustrates the generalized stratigraphy through the dike. A portion of cross-section A-A', included as Figure 6, illustrates the stratigraphy under the Bryant HRDL and through the dikes.

No residuals were identified in either BLHB-1 or BLHB-2. Residuals were also not detected in GEO-2 and GEO-3 or in the two well clusters installed. Five feet of residuals were observed in geotechnical boring GEO-1 and 10 to 12 feet

of residuals were identified within the Bryant HRDL in borings BHDL-22 and BHDL-123. Typically the residuals were characterized according to the Burmister Soil Classification System, as light gray to greenish-gray, fibrous material with "little" (10 to 20 percent) clay.

Directly underlying the dike material and residuals was a peat layer ranging from 0.3 to 3 feet in thickness. The upper-middle clay unit was encountered under the peat within the HRDL. The materials encountered in the subsurface under the upper-middle clay consisted of interlayered gravels, sands, silts, and clays. In the deep geotechnical borings GEO-1 and GEO-2 along the southern perimeter of the Bryant HRDL, the material observed was mainly sand to at least 50 feet bgs. No clay zones were encountered in GEO-1, and two thin (1 to 3 feet) clay zones were encountered in GEO-2 at 18 (upper-clay unit) and 21 feet bgs. In MW-22A/MW-22B, located between GEO-1 and GEO-2, sand was detected to 30 feet bgs. Under the sand, a 6-foot thick silt layer followed by an 8-foot thick lower-middle clay layer were identified. From 44 feet bgs to 50 feet bgs, another sand zone was encountered.

The fill materials forming the dikes consisted principally of a mixture of sands, gravels, silts, and clays. Residuals were not identified in the dikes.

3.1.1.2 Monarch HRDL

To characterize the residuals, native soils, sediments, and dike materials in and around the Monarch HRDL, samples were collected continuously from two hand borings (designated MLHB-1 and MLHB-2) and five soil borings (designated MLSS-1 through MLSS-5) drilled as part of the Residuals and Soil Characterization and Sediments Characterization. Samples were also collected during the drilling of three well clusters (designated MW-124A/MW-124B, MW-125A/MW-125B/MW-125P, and MW-126A/MW-126B) installed as part of the Hydrogeological Investigation.

Geologic cross-sections E-E' and F-F', presented as Figure 10, illustrate the subsurface stratigraphy in the vicinity of the Monarch HRDL. In addition, the southern end of cross section A-A' extends across the Monarch HRDL and correlates with units from the adjacent Bryant HRDL area.

Residuals were encountered in each of the boreholes drilled in the Monarch HRDL with the exception of the MW-124A/MW-124B well cluster located upgradient of the HRDL and in MLHB-1 and MLHB-2 located at the base of the dike. Within the HRDL, residuals were detected at the surface in MLSS-2 through MLSS-5. Residuals were covered with 9 feet of fill materials at boring location MLSS-1. The depth to the base of the residuals ranged from 16 feet bgs at MLSS-1 to 24 feet bgs at MLSS-5. In general, the residuals in the Monarch HRDL were characterized according to the Burmister Soil Classification System, as light grey, fibrous material with a "trace" (<10 percent) to a "little" (10 to 20 percent) clay and a "little" sand and gravel. The residuals were also found to grade to a dark gray color with depth. Blow counts for the split-barrel samplers were low through the entire thickness of the materials and ranged from weight of hammer (WOH) to 1 to 4 blows per 6 inches.

A peat zone up to 3 feet thick was observed underlying the residuals in all of the borings and wells where residuals were encountered. The stratigraphic units underlying the peat zone were not continuous from the MW-126 cluster to the MW-125 cluster. In MW-125B, sand, and sand and gravel were logged to a depth of 52 feet bgs, and no clay units were encountered. However, in MW-126B, a 2-foot thick sand zone was encountered under the peat followed by a silt layer and a upper-middle clay layer to 26 feet bgs. From 26 feet to 32 feet bgs, the stratigraphy consists of alternating sand and lower-middle clay zones, each approximately 1 foot thick.

In MW-124A/MW-124B, 20 feet of fill materials were encountered over the native soils. Underlying the fill, a 4-foot thick sand layer was identified, followed by a 6-foot thick upper-clay zone. Under the clay, another 13-foot thick sand

layer was observed, followed by an 11-foot thick upper-middle clay zone. The remaining 6 feet consisted of alternating sand and lower-middle clay layers, which correlate with similar zones encountered in MW-126.

3.1.1.3 FRDLs

To characterize the residuals, native soils, and dike materials in the FRDLs, six soil borings (designated DLHB-1 through DLHB-6) and one hand boring designated BLHB-3, were installed as part of the Residuals and Soil Characterization and Sediments Characterization. In addition, one monitoring well cluster (designated MW-122A/MW-122B) was installed in the dike surrounding the FRDLs, and one replacement well (MW-12R) was installed in the dike between the FRDLs and the Bryant HRDL as part of the Hydrogeological Investigation.

A portion of cross-section D-D', included as Figure 9, illustrates the stratigraphy within and below the dike around the FRDLs. Portions of cross-section A-A' and C-C' included as Figures 6 and 8 also illustrate the stratigraphy in the vicinity of the FRDLs.

The DLHB borings were all installed within the FRDLs. Residuals were encountered in DLHB-1, DLHB-2, DLHB-3, and DLHB-6 and ranged from 7.5 to 16 feet thick. No residuals were detected in either DLHB-4 or DLHB-5. The residuals observed within the FRDLs were typically classified according to the Burmister Soil Classification System consisting of light gray, paper fiber, with a "trace" of clay. However, the residuals were observed to vary to an equal mixture of clay and paper fibers at some locations. The residuals were generally moist and soft with most blow counts from the split-barrel samplers recorded as WOH. At boring locations DLHB-4 and DLHB-5, where no residuals were encountered, subsurface materials were composed primarily of grey to grey/green sand and gravel with increasing amounts of silt and/or clay with depth.

Based on the boreholes drilled for monitoring wells MW-122A/MW-122B and MW-12R, (installed on the dike around the FRDLs), the fill materials were observed to consist of unstratified sands, silts, and clays. The dike material extended to a depth of 18 to 19 feet bgs.

A peat unit was identified under the fill materials forming the dikes. A 6.5-foot thick middle clay followed by a 27.5-foot thick alternating clay and silt unit was encountered in MW-122A/MW-122B from 21 to 55 feet bgs. Sand was encountered beneath the clay unit. A silt and clay unit was not observed beneath the peat in MW-12BR. At this location, sand and silt were detected underlying the peat to 40 feet bgs. A sand and gravel layer was encountered under the sand and silt followed by a sand and clay unit.

3.1.1.4 Former Type III Landfill Perimeter and the Pilot Study Area

To characterize the residuals, native soils, and fill materials along the southeastern perimeter of the Former Type III Landfill and in the Pilot Study Area, three soil borings (designated FLF-1 through FLF-3) were installed on the southeastern margin of the landfill, and five soil cores (designated MA-1 through MA-5) were collected near the northern end of the landfill in the Pilot Study Area as part of the Residuals and Soil Investigation. In addition, one monitoring well (MW-2S) was installed in the Pilot Study Area, one monitoring well (MW-127A) was installed on the northern edge of the landfill; and one replacement monitoring well (MW-19BR) was installed on the southern edge of the landfill as part of the Hydrogeological Investigation.

Cross-sections A-A' (Figure 6), C-C' (Figure 8), and H-H' (Figure 12) illustrate the stratigraphy across the former Type III Landfill, and a portion of cross-section A-A' illustrates the stratigraphy in the Pilot Study Area.

Residuals were found in all three of the FLF borings at thicknesses ranging from 6 to 10 feet. In FLF-1, the top portion of residuals were within 1 foot of ground surface while in FLF-2 and FLF-3 the residuals were under 10 to 11 feet of sand, silt, and clay fill material. The residuals observed in these borings were described according to the Burmister Soil Classification System as gray to dark gray, fibrous materials with a "trace" to "some" clay, and a "trace" of sand and silt. No residuals were found in the five MA borings, or the borings MW-2S, MW-127A, and MW-19BR.

Sand, silt, and gravel fill materials were observed in the shallow subsurface in cores MA-1 and MA-4. In MA-2, MA-3, and MW-5, which were installed on the fringes of the former Bryant Mill Pond, peat, sand, and silt were identified. In MW-2S, black organic silt, grading to a clay, was observed to a depth of 8 feet bgs, underlain by sand. In MW-127A, 5 feet of sand was observed overlying 5 feet of gray middle-clay.

Deeper subsurface stratigraphy underlying the former Type III Landfill and Pilot Study Area was observed during the installation of MW-19BR, and previously observed during installation of MW-16 and MW-17 well clusters and wells MW-2, MW-4, MW-12, and MW-18 (see Figure 8). In the vicinity of the MW-19 cluster, native soil encountered below the fill consisted of 5 to 10 feet of sand and gravel, followed by successive units of upper-middle clay and silt which extend to another sand unit. Under this sand, another silty lower-middle clay unit is evident at approximately 780 feet NGVD, and may be laterally continuous with middle clays and clay and silt units logged in MW-16 and the newly installed MW-122 well cluster (Figure 12). Underlying the silty clay is a sand zone that also appears to be continuous with the sands and gravels found in MW-16 and the MW-122 cluster. A lower-clay zone was encountered in MW-19C during previous investigations.

3.1.1.5 Western Disposal Area

To characterize the residuals and native soils in the Western Disposal Area, eight soil borings (designated WA-1 through WA-8) were installed as part of the Residuals and Soil Characterization. One shallow (MW-8A) and three deep (MW-7B, MW-20B, and MW-120B) monitoring wells were installed as part of the Hydrogeological Investigation.

Cross-sections B-B' and G-G', presented as Figures 7 and 11, illustrate the subsurface stratigraphy across the Western Disposal Area.

Residuals were observed in all eight of the WA borings as well as in MW-7B, MW-8A, MW-20B, and MW-120B. No residuals were found in the MW-7, MW-20, and MW-21 wells. In general, 1 to 3 feet of topsoil and sand material were observed to cover the residuals in the Western Disposal Area. The residuals ranged in thickness from 4 feet in WA-4 to 20 feet in WA-5. The residuals within this area were described according to the Burmister Soil Classification System as light to dark gray fibrous materials with a "little" to "some" clay and containing a few thin sand seams.

Native soil encountered under the residuals consisted primarily of sand and gravel. A thin layer of peat was found in WA-6, WA-8, and MW-8A, immediately underlying the residuals. Deeper stratigraphic units were characterized at monitoring well locations MW-7B, MW-8B, and MW-20B. The sand and gravel unit underlying the residuals appears to be continuous throughout the Western Disposal Area. A middle sandy clay/clay unit was encountered underlying the sand and gravel unit in the southern part of the area. Another sand layer was encountered under the middle sandy clay/clay layer.

3.1.2 Hydrogeological Field Data

Hydrogeological conditions at the Allied OU can be characterized by field data collected from the new and existing groundwater monitoring wells and piezometers.

Field data collected during the Hydrogeological Investigation included:

- Existing monitoring well inventory results;
- Potentiometric surface elevation depths;
- In-situ hydraulic conductivity testing data;
- Groundwater quality data as measured by field instrumentation; and
- Gamma-ray logging results.

3.1.2.1 Existing Monitoring Well Inventory Results

Each of the 27 existing wells used as data collection points during the RI, and 23 additional wells, were located and inspected for surface seal integrity, depth to groundwater, depth of well, and apparent well condition. The completed Existing Monitoring Well Inventory Forms and the Well Inspection Field Forms are included in Appendix B with pertinent data summarized in Table 3-1.

Measured well depths were compared to reported well installation depths to determine whether material had accumulated in the bottom of the wells. The accumulation of significant thickness of materials in the base of an existing well indicates the possible need to redevelop that well. In general, the data collected matched the reported information; therefore, no wells were recommended for redevelopment. The measured depth of two wells, MW-1 and MW-2, were observed to be deeper than the reported depths. These discrepancies may have been due to inaccurate well logs.

3.1.2.2 Groundwater Elevation Data

The potentiometric surface elevation and the in-situ hydraulic conductivity data were used to evaluate groundwater flow rates and directions. A complete round of groundwater/surface water elevation measurements for the new and existing monitoring wells, piezometers, and creek gauge stations were recorded on September 9 and 27, and December 14, 1993 and May 16 and June 15, 1994. In addition, on September 10, 13, 16, and 21, and October 6, 1993, groundwater/surface water elevations from both MW-122A and creek gauge CG-1 were measured to determine flow direction prior to groundwater sampling. Elevation measurements are presented in Table 3-2. Field measurement logs for elevation data are presented in Appendix A.

The six newly installed piezometers were all dry upon completion. However, groundwater was observed and its level recorded in piezometers P-1, P-2, P-3, and P-3C on September 9 and December 14, 1993. P-1C and P-2C were dry during both measurement events.

Water table contour maps for the Allied OU have been generated based on water level data collected on September 9 and 27, and December 14, 1993. These contour maps are presented on Figures 16, 17, and 18, respectively. The shallow groundwater at the OU was observed to flow generally toward Portage Creek. This results in a semi-radial flow pattern from the center of the OU as the creek bends around the OU. The flow pattern is also toward the Creek on the Monarch HRDL side.

A hydraulic gradient was evident below the Monarch HRDL. The hydraulic gradient was determined by using an average of the potentiometric surface elevation data collected on September 9, September 27, and December 14, 1993 (Table 3-2) for MW-124A (812.15 ft) and MW-125A (792.66 ft) and the horizontal distance between the two well

points as measured from the site map (250 ft). This calculation [(812.15 - 792.66/250] indicates a hydraulic gradient of approximately 0.077.

The hydraulic gradient across the main portion of the OU ranges from 0.008 to 0.013. The upper value was determined by using an average of the potentiometric surface elevation data collected on September 9, September 27, and December 14, 1993 (Table 3-2) for MW-7 (800.22 ft) and MW-2S (787.81 ft) and the horizontal distance between the two well points as measured from the site map (980 ft). The result of this calculation [(800.22 - 787.81)/980] indicates a hydraulic gradient of approximately 0.013. The lower value was determined by using an average of the potentiometric surface elevation data collected on September 9, September 27, and December 14, 1993 (Table 3-2) for MW-120A (800.59 ft) and MW-22 (794.78 ft) and the horizontal distance between the two well points as measured from the site map (760 ft). The results of this calculation [(800.59 - 794.78)/760] indicates a hydraulic gradient of approximately 0.008.

Vertical hydraulic gradients observed at well clusters MW-7, MW-8, MW-16, MW-17, MW-19, MW-20, MW-22, MW-120, MW-121, MW-122, MW-123, MW-124, MW-125, and MW-126 were calculated from the groundwater elevation data collected on September 9 and 27, and December 14, 1993. The results of these calculations are presented on Table 3-3. The results indicate slight upward gradients in well clusters MW-8, MW-16, MW-17, MW-22, MW-121, and MW-125, and slight downward gradients in MW-19, MW-120, and MW-124. In several well clusters, including MW-7, MW-20, MW-122, MW-123, and MW-126, the gradient was downward on some occasions and then upward on other occasions. In general, a downward vertical gradient or variable gradient was identified in wells on the interior of the OU and away from the Creek such as MW-7B, MW-19, and MW-20. Upward gradients were identified in some wells along the perimeter of the OU and near the Creek including MW-22, MW-122, and MW-125. Since all of the observed vertical gradients are small in comparison to the horizontal gradients across the OU, the direction of groundwater flow is anticipated to be predominantly horizontal rather than vertical.

3.1.2.3 In-Situ Hydraulic Conductivity Test Results

To evaluate the relative ability of the various materials observed in the subsurface to transmit groundwater, in-situ hydraulic conductivity tests were performed on each of the new wells. The results of the in-situ hydraulic conductivity tests indicate that the hydraulic conductivity of the various geologic units vary considerably. Table 3-4 summarizes the results and indicates a range in conductivities on the order of 1E-5 to 1E-2 centimeters per second (cm/sec). Most of the hydraulic conductivity values ranged between 1E-3 and 1E-4 cm/sec.

Documentation of the in-situ hydraulic conductivity testing is presented in Appendix F.

The lowest hydraulic conductivity value for the new wells was measured in MW-125B. Although this well is screened in sand and gravel, the unit was very dense, thus limiting groundwater flow. The highest hydraulic conductivity value of the new wells was measured in MW-120A, which is screened in a loose, coarse soil and gravel. In general (except MW-120A), values of 1E-3 and 1E-4 cm/sec were obtained from shallow wells screened directly below the residuals/soil interface. Typically, these wells crossed several units including peat zones, fine to medium sands, silty soils, and sands. Shallow wells including MW-2S, MW-127A, and MW-128A, were also screened across heterogeneous units and had hydraulic conductivity values of 1E-3 and 1E-4 cm/sec. Wells partially screened in dike materials (MW-22A, MW-122A, and MW-123A), and piezometers fully screened in the dike materials (P-1, P-2, and P-3), had hydraulic conductivity values of approximately 1E-3 cm/sec (except P-2 with a value of 1.7E-02 cm/sec, and MW-122A with a value of 9.9E-4 cm/sec). These data suggest that the dike material has hydraulic conductivities similar to native soil.

3.1.2.4 Groundwater Quality Data from Field Instrumentation

Table 3-5 presents general groundwater quality parameters collected using field instrumentation during groundwater sampling. Parameters measured included pH, temperature, specific conductivity, dissolved oxygen, and turbidity. Measurements of pH for all the wells ranged from 6.5 to 8.9 standard units. Water temperature in the wells ranged from 12 to 21°C. Specific conductivity values ranged from 507 microSiemens per centimeter (uS/cm) to 1,980 uS/cm. Dissolved oxygen values ranged from 0.79 mg/L to 10.27 mg/L. Turbidity values ranged from 0.65 nephelometric turbidity units (NTU) to 75.0 NTU. Field documentation is provided in Appendix A.

3.1.2.5 Gamma-Ray Logging Results

Natural gamma instruments utilize the presence of naturally occurring gamma radiation in units of counts per second (cps) using a scintillation crystal. Typically, silts, clays, and shales exhibit higher cps due to their higher percentage of potassium 40 (K40). Sand, gravels, sandstones, and limestones generally exhibit low cps as they usually contain little K40.

Gamma-ray logging was conducted on nine of the newly installed "B" wells and on four of the existing wells in an attempt to correlate subsurface stratigraphy observed in borings installed during this investigation with previous subsurface investigations. The gamma logs were reviewed to determine if the gamma log data could be used to assist in correlating stratigraphy at the OU. Gamma logs were reviewed for MW-11, MW-16C, MW-19D, MW-22B, MW-25, MW-120B, MW-121B, MW-122B, MW-123B, MW-124B, MW-125B, and MW-126B. Gamma logs were depth corrected for the smaller shaft encoder wheel used during the geophysical logging, resulting in deeper gamma logs than the corresponding well depths. A correction factor of 0.81 was applied to the gamma logs that were less than 40 feet deep, and a correction factor of 0.83 was applied to gamma logs that were greater than 40 feet deep.

Of the 13 gamma logs reviewed, four logs (MW-16C, MW-19D, MW-22B, and MW-120B) displayed good correlation with the subsurface stratigraphy described on their corresponding subsurface well logs. Five gamma logs (MW-121B, MW-122B, MW-123B, MW-125B, and MW-126B) had poor correlation with corresponding subsurface well logs, and the remaining three gamma logs (MW-11, MW-25, and MW-124B) displayed no correlation with their corresponding well logs. The four gamma logs that had good correlation exhibited a substantial increase in cps which could be associated with a dense grey silty clay unit that was 8 to 10 feet thick. Generally, stratigraphic units less than 4 feet in thickness or interbedded with units having gradational contacts (silty sands and clayey sands) were not discernible on the gamma logs.

Gamma-ray logs are provided as Appendix G.

3.1.3 Sediments Investigation

3.1.3.1 Former Bryant Mill Pond Sediments

The former Bryant Mill Pond has been extensively sampled during previous investigations. During the recent Sediments Investigation, additional soil borings (BMP-1 through BMP-12) were installed in the former pond or on the eastern bank to confirm previous results and further define the extent of PCB-containing sediments. Boring logs for the BMP borings are included in Appendix A.

Residuals were encountered in BMP-3 and BMP-12. The residuals consisted of a mixture of gray paper fibers, clay, and silt, and ranged from 0.4 to 6 feet thick. Soil and sediment encountered in the former Bryant Mill Pond consisted

of an upper 1- to 2-foot layer of organic silt (peat) overlying dark gray silt and clay. Sand was encountered under the silt and clay in BMP-5, BMP-6, BMP-11, and BMP-12.

3.1.3.2 Portage Creek Sediments

To characterize PCB levels in sediments in contact with Portage Creek on a daily basis, five surficial sediment samples (designated GS-1 through GS-5) were collected in the creek bed. In addition, the thickness and type of stream bed sediments were evaluated and described during stream sediment probing and sediment coring at 60 locations along the center line of Portage Creek.

The surficial sediments collected at GS-1 through GS-5 consisted mainly of fine to coarse sand. Organic-rich silt was also found at GS-2 and GS-3. Table 3-6 summarizes the field data collected at the GS sample locations. On the center line of the creek, where the 60 locations were probed, probe depths ranged from 0.2 to 9.0 feet bgs. Sediment cores collected from these locations were mainly fine to medium grained sands overlying organic-rich clay overlying peat deposits. Deeper cores encountered sand beneath the peat zone. Table 3-7 summarizes the field descriptions and lengths of the cores collected during this investigation.

3.1.4 Residential Property Soil Sampling

Residential property soil sampling was conducted in two phases of work. The initial phase consisted of the installation of five hand augered soil borings designated RP-1 through RP-5. At these locations, the upper 0.5 feet consisted of top-soil and/or sand. Under this zone was 2 to 4.5 feet of fill material consisting of bricks, clay, and sand. Former Bryant Mill Pond area sediments were encountered under the fill at 2 to 4.5 feet boring depths. Table 3-8 summarizes the field descriptions and the samples collected.

The second phase of residential soil sampling consisted of the collection of four surface soil samples, designated BMSS-1 through BMSS-4. The surficial samples consisted of silt and sand. A summary of this field data is also presented in Table 3-8.

3.2 Geotechnical Investigation Results

The geotechnical laboratory testing program included moisture contents, organic contents, Atterberg Limits, specific gravities, gradations, UU triaxial shear tests, and one-dimensional consolidation tests of soil and residuals. Appendix H includes a table which summarizes the results of the geotechnical testing and figures showing the consolidation, UU, CIU triaxial shear, and gradation test results.

Field vane-shear testing was conducted at borings MW-20B and DLHB-2A. The computed shear strengths are presented in Table 3-9. Typically, the materials at the field vane-shear testing locations identified in the Work Plan were found to be granular materials, such as sands, that were not appropriate for field vane-shear testing. The collection of Shelby tubes and/or environmental samples was given precedence over vane-shear testing at some borehole locations where vane-shear tests could not be performed.

Parameters from the laboratory testing program will be used primarily for the dike stability analyses. The residuals field and laboratory test data will be used for preliminary assessments of residuals stability and compressibility.

In general, laboratory testing was performed on three types of material--peat, clays, and residuals. The test results for each of these materials are discussed briefly below.

Two Shelby tubes of peat samples from borings GEO-1 and GEO-2 were tested. The test results indicated a wide range of organic content of 11 to 44 percent by weight for the two peat samples. The organic content is a key variable controlling the engineering behavior of peat. As a result, the water contents, specific gravity, and plasticity also vary across a wide range. The water contents tend to be lower than expected for these organic content results, but the plasticity and specific gravity are similar to expected values based on published correlations. It should be noted that these peats have been compressed by 14 to 16 feet of soil used for the dike construction, and this precompression likely squeezed out water that would be present in the peat in its original state prior to filling. Only the lower organic content sample had sufficient recovery for strength or compression testing. The test results indicate higher strength and lower compressibility than would normally be associated with peat. The peats appear to have formed in a fairly sandy environment which could explain these test results.

Two clay samples from borings MW-123B and MW-127A were tested. The clays appear to vary significantly in plasticity. The sample from MW-123B would have a Unified Soil Classification System (USCS) classification of CL with a liquid limit of 28, a plasticity index of 15, and a clay content of 30 percent. The activity (Plasticity Index/Clay Content) of the sample was 0.5 which indicates a relatively inactive clay mineralogy, such as kaolinites. The sample from MW-127A would have a USCS classification of CH with a higher liquid limit of 57, a plasticity index of 37, and a clay content of 27 percent. The activity of this sample was significantly higher at 1.4 which indicates the presence of more active clay minerals such as illite. This indicates that the parent materials of these two clays are likely from different sources.

The consolidation and strength tests were performed on the lower plasticity clay and indicate the clay is stiff to very stiff with a low to moderate compressibility. This is consistent with the plasticity and water content of the sample.

The residuals typically had consistently high organic contents (35 to 60 percent by weight) and water contents (232 to 449 percent by weight) except for the two samples from boring DLHB-4 which had very low organic contents of 1.5 to 2.3 percent and water contents of 17 to 19 percent. This indicates that there are likely to be large differences in the engineering properties of residuals in the FRDLs and HRDLs.

3.3 Analytical Data

Many of the reported laboratory results throughout this section have associated data qualifiers attached as required by USEPA guidelines (USEPA, 1989b; 1991a; 1991b; 1991c; and 1991d). Specifically, when a datum reported in this section is followed by a "J" the compound or analyte was positively identified; however, the numerical value reported is an estimated concentration only.

3.3.1 PCB

3.3.1.1 Residuals/Soil/Sediment

The results of residuals, soil, and sediment PCB analyses are summarized in Table 3-10 and Figures 19 through 23. A range of detected concentrations for TCL compounds, including total PCB, in native soil and residuals is presented in Table 3-11.

Bryant HRDL

PCB in surficial residuals samples in the Bryant HRDL were detected at concentrations of 0.29J mg/kg at BHDL-123 and 2.7J mg/kg at BHDL-22. A duplicate sample taken from BHDL-22 had a concentration of 0.081J mg/kg. Subsurface PCB concentrations in residuals from the Bryant HRDL ranged from 0.71J mg/kg at BHDL-123 (4 to 6 feet)

to 650 mg/kg at MW-121B (10 to 12 feet). The highest concentrations were observed at depths near the top of the residuals layer at BHDL-22 and MW-121B and near the bottom of the residuals layer at BHDL-123. PCB concentrations in underlying native soils ranged from not detected (MW-121B and BHDL-22) to 0.039J mg/kg (BHDL-123). The duplicate native soil sample of BHDL-22 had a concentration of 0.050 mg/kg although the original sample did not contain a detectable concentration of PCB. Subsurface samples of dike materials at P-1, P-2, and P-3 ranged in PCB concentration from not detected at P-3 to 35 mg/kg at P-1. Figure 19 illustrates the distribution of PCB in residuals and soil at the Bryant HRDL.

Monarch HRDL

PCB in surficial residuals samples ranged in concentration from not detected at MLSS-5 to 110 mg/kg at MLSS-2. The sample from MLSS-2 was the only sample with a PCB concentration greater than 20 mg/kg. PCB concentrations generally increase with depth in the residuals to approximately 60 percent of the total depth where the maximum concentration was typically observed followed by decreasing concentrations to depth. PCB concentrations in subsurface residuals ranged from 0.35 mg/kg at MLSS-5 (8 to 10 feet) to 140 mg/kg at MW-125B (14 to 16 feet). Concentrations in underlying native soil ranged from not detected at MLSS-2 and MW-126A to 0.47 mg/kg at MLSS-3. No PCB were detected in any of the samples from the upgradient well location MW-124A/MW-124B. Sample locations and PCB distribution are shown on Figure 20.

FRDLs

Within the FRDLs, PCB in surficial residuals samples ranged from not detected at DLHB-1 and DLHB-2 to 2.2 mg/kg at DLHB-3. Residuals were not encountered at DLHB-4 and DLHB-5. The surficial samples from DLHB-4 and DLHB-5 consisted of soils with PCB concentrations of 1.5 mg/kg at DLHB-4 and 8.0J mg/kg at DLHB-5. The areas where DLHB-4 and DLHB-5 are located are typically inundated with water. PCB concentrations in subsurface residuals ranged from not detected at DLHB-1 (2 to 4 feet) and DLHB-2 (2 to 4 feet) to 19 mg/kg at DLHB-6 (8 to 10 feet). The duplicate sample for DLHB-6 (6 to 8 feet) had a PCB concentration of 120J mg/kg. Twelve out of 15 samples with PCB detections (including duplicates) had PCB concentrations less than 10 mg/kg. PCB concentrations generally increased with depth for those locations where residuals were encountered. PCB concentrations in underlying native soils ranged from 0.093 mg/kg at DLHB-2 to 7.0 mg/kg at DLHB-6. Distribution of PCB at the FRDLs is shown on Figure 19.

Former Type III Landfill

PCB in surficial soils near the perimeter of the former Type III Landfill ranged from not detected at FLF-2 to 85J mg/kg at FLF-1. PCB concentrations reported in subsurface residuals samples ranged from 0.14J mg/kg at FLF-3 (14 to 16 feet) to 2,000 mg/kg at FLF-2 (20 to 22 feet). This sample was taken from residuals directly above the residuals/native soil interface. Concentrations from the subsurface soil samples ranged from not detected at FLF-3 to 2.4 mg/kg at FLF-2. PCB was detected in the soil sample from MW-127A at a concentration of 0.052J mg/kg, however, a duplicate from this location did not contain detectable concentrations of PCB. PCB was not detected in soil samples from MW-19BR at concentrations above 1 mg/kg. Distribution of PCB along the perimeter of the Former Type III Landfill is shown on Figure 19.

Western Disposal Area

In the Western Disposal Area, surficial PCB concentrations range from not detected at WA-1 and WA-5 to 8.8 mg/kg at WA-6. Subsurface residuals ranged in concentration from not detected at WA-5 (18 to 20 feet) and WA-7 (10 to 12 feet and 16 to 18 feet) to 2,500 mg/kg at MW-120B. PCB concentrations in subsurface residuals were less than 50

mg/kg in 22 out of 41 samples with detections (including duplicates). Subsurface residuals concentrations are variable with no apparent trend in concentration with respect to depth. Subsurface native soil had concentrations ranging from not detected to 0.41 mg/kg at WA-7. PCB were not detected in 11 out of 17 native soil samples. Soil PCB concentrations are lower than those in the associated residuals sample. Figure 21 shows the distribution of PCB in the Western Disposal Area.

Former Bryant Mill Pond

PCB concentrations in the surficial soil samples in the former Bryant Mill Pond ranged from not detected at BMP-9 to 140J mg/kg at BMP-4. Nine out of 12 samples with PCB detections (including duplicates) had PCB concentrations below 50 mg/kg. No surficial residuals were evident. Subsurface residuals PCB concentrations ranged from 13 mg/kg at BMP-12 to 14 mg/kg at BMP-3. Subsurface soil PCB concentrations ranged from not detected at BMP-5, BMP-6, and MW-128A to 510J mg/kg at BMP-11. Fourteen out of 16 subsurface soil samples with PCB detections (including duplicates) had PCB concentrations below 50 mg/kg. PCB were detected at a concentration of 0.031J mg/kg in the subsurface soil sample from the 14-to 16-foot interval at downgradient well location MW-128A. PCB was not detected in the other sample from MW-128A (6 to 8 feet). Figure 22 shows the distribution of PCB in the former Bryant Mill Pond.

The present investigation of the former Bryant Mill Pond was a particularly focused one, designed to verify and expand upon the extensive data which already exist for the area. The pre-existing database includes 74 surficial samples and 222 subsurface samples. A table summarizing these results is presented in Appendix C. Appendices C and D also present the QA/QC review of the historical data, confirming the quality of these data for use in the RI. The average PCB concentration for historical surficial samples is 110 mg/kg. Subsurface samples averaged 63 mg/kg. The comparable averages for the data collected during the current investigation are 38 mg/kg in surficial samples (12 samples) and 56 mg/kg for subsurface samples (20 samples). Congener specific analyses were performed on samples from BMP-2 and BMP-12. The congener specific data is summarized in Table 3-12.

Portage Creek Floodplain

PCB concentrations in the five samples from the base of the dikes along Portage Creek (BLHB-1 through BLHB-3, MLHB-1, and MLHB-2), ranged from not detected at MLHB-2 and BLHB-1 to 4.3J mg/kg at BLHB-2. PCB in the Portage Creek Floodplain are reported in Table 3-10 and on Figures 13 and 20.

Portage Creek Sediments

PCB concentrations in the Portage Creek Sediment samples (GS-1 to GS-5) range from not detected at GS-3 to 2.0 mg/kg at GS-1. Total organic carbon (TOC) normalized PCB data range from 4.7E-6 at GS-4 to 1.2E-4 at GS-2. These results are summarized in Table-13 and on Figure 23.

3.3.1.2 Residential Soil Samples

PCB concentrations in surficial soil samples taken in residential areas (RP-1 through RP-5) range from 0.025 mg/kg at RP-5 to 0.34 mg/kg at RP-4. The range in reported PCB results for the BMSS series of surficial samples ranges from not detected at BMSS-1 and BMSS-2 to 0.073 mg/kg at BMSS-4.

PCB concentrations in subsurface samples from RP-1 through RP-5 range from 0.26 mg/kg at RP-5 to 16 mg/kg at RP-2. A summary of the data for the residential samples is presented in Table 3-14 and Figure 24 illustrates the spatial distribution of these PCB results.

3.3.1.3 Groundwater/Leachate

The results of PCB analyses of unfiltered groundwater/leachate samples are presented in Table 3-15 and on Figure 25. Aroclor 1016 and 1232 were used to quantify PCB present in the samples. The range of detected concentrations of TCL compounds, including total PCB, in groundwater and leachate is presented in Table 3-16.

Bryant HRDL

PCB were detected in unfiltered groundwater from 5 of the 13 wells sampled at the Bryant HRDL. PCB quantified as Aroclor 1016 was detected in MW-22A, MW-24, MW-25, MW-121A and MW-121B. Concentrations ranged from 0.89J ug/L at MW-24 to 3.0 ug/L at MW-25. All of these wells are located on either the interior side of the berms or within the residuals. PCB were not detected in samples from wells on the exterior of the berm-adjacent stream bank areas or from Rivulet 2. Rivulet 2 is located at the southeast corner of the Bryant HRDL. During a 1985 investigation, LimnoTech, Inc. (1990) determined that Rivulet 2 drains a groundwater spring at the base of the dike approximately 10 feet from Portage Creek.

Monarch HRDL

PCB were not detected in unfiltered groundwater or leachate at the Monarch HRDL.

FRDLs

PCB were not detected in unfiltered groundwater at the FRDLs.

Former Type III Landfill

PCB were detected in unfiltered groundwater from one well at the former Type III Landfill; MW-5 contained 1.2 ug/L PCB as Aroclor 1232.

Western Disposal Area

PCB as Aroclor 1016 were detected in unfiltered groundwater at two of seven wells in the Western Disposal Area. The sample from MW-8A contained 3.8 ug/L of PCB and the sample from MW-120B contained 4.9J ug/L of PCB (note that PCB were not detected in a duplicate sample from MW-120B). No PCB were detected in unfiltered groundwater from the two upgradient wells (MW-7 and MW-7B).

Pilot Study Area

PCB were not detected in unfiltered groundwater at the Pilot Study Area.

Former Bryant Mill Pond

PCB were not detected in unfiltered groundwater at the former Bryant Mill Pond.

3.3.2 Pesticides

3.3.2.1 Residuals/Soil/Sediment

The results of pesticide analyses in residuals/soil/sediment are presented in Table 3-17 and Figures 26 and 27. A range of detected concentrations for TCL compounds, including pesticides, in native soil and residuals is presented in Table 3-11.

Bryant HRDL

Three pesticide compounds were detected in subsurface residuals samples from the Bryant HRDL. 4,4'-DDE was detected at concentrations ranging from 0.11J mg/kg in the duplicate sample at BHDL-22 to 0.36J mg/kg at BHDL-123. 4,4'-DDT was detected at concentrations ranging from 0.07 mg/kg at MW-121B to 0.41 mg/kg at BHDL-123. Endrin aldehyde was detected at concentrations ranging from 0.040J mg/kg at MW-121B to 0.084J mg/kg in the duplicate sample at BHDL-22.

No pesticides were detected in subsurface soil samples.

Monarch HRDL

Delta-BHC, gamma-chlordane, 4,4'-DDT, and endrin aldehyde were detected in residuals samples from the Monarch HRDL. Delta BHC was detected at a concentration of 0.043J mg/kg at MW-126A. Gamma-chlordane was detected in the residuals sample at MLSS-2 at a concentration of 0.034J mg/kg. 4.4'-DDT was detected in six subsurface residuals samples at concentrations ranging from 0.067J mg/kg at MW-126A to 0.25J mg/kg at MLSS-2. Endrin aldehyde was detected at concentration of 0.047J mg/kg in the subsurface residuals sample from MLSS-5.

Aldrin, 4,4'-DDE, and endosulfan I were detected in native soil samples from the Monarch HRDL. Aldrin was detected in three native soil samples ranging in concentration from 0.0021J mg/kg in MW-125B to 0.0069 mg/kg in MLSS-3. 4,4'-DDE was also detected in two native soil samples at concentrations of 0.0023J mg/kg at MLSS-5 and 0.0047J mg/kg at MLSS-3. Endosulfan I was detected in two native soil samples, MLSS-1 at a concentration of 0.0043 mg/kg and MLSS-3 at a concentration of 0.0045J mg/kg.

FRDLs

Pesticide compounds were detected in one residuals sample from the FRDLs (DLHB-2). 4,4'-DDD was detected at a concentration of 0.0088J mg/kg, and alpha BHC was detected at a concentration of 0.0093J mg/kg.

Aldrin and 4,4'-DDE were detected in subsurface soil samples at the FRDLs. Aldrin was detected in all four samples ranging in concentration from 0.0011J mg/kg at DLHB-2 to 0.0057 mg/kg at DLHB-1. 4,4'-DDE was only detected in the sample from DLHB-6 at a concentration of 0.013J mg/kg.

Former Type III Landfill

4,4'-DDE was the only pesticide detected in residuals or soil at the Former Type III Landfill. The residuals sample from FLF-1 contained 4,4'-DDE at a concentration of 0.25J mg/kg.

Western Disposal Area

Eight pesticide compounds were detected in subsurface residuals samples at the Western Disposal Area. Aldrin was detected in WA-1, WA-2, and WA-3 at concentrations ranging from 0.0032 mg/kg at WA-2 to 0.070J mg/kg at WA-1. Beta-BHC was detected at a concentration of 0.0091J mg/kg at WA-5. Delta-BHC was detected at a concentration of 0.0069 mg/kg at WA-3. 4,4'-DDD was detected in two samples at concentrations of 0.0067J mg/kg at WA-3 and 0.020J mg/kg at WA-5. 4,4'-DDE was detected in three samples at a concentration of 0.0038J mg/kg at WA-2, 0.0048J mg/kg at WA-3, and 0.42J mg/kg at MW-8A. 4,4'-DDT was detected in four samples ranging in concentration from 0.0047J mg/kg at WA-4 to 0.17J mg/kg at WA-6. Gamma-chlordane was detected at WA-5 at a concentration of 0.0056J mg/kg and at WA-3 at a concentration of 0.0061 mg/kg. Alpha-chlordane was detected at WA-2 at a concentration of 0.0081 mg/kg.

Aldrin was the only pesticide compound detected in native soil samples. Four of the 12 native soil samples had detectable concentrations ranging from 0.00085J mg/kg at WA-8 to 0.013 mg/kg at WA-7.

Former Bryant Mill Pond

Aldrin and 4,4'-DDE were the only pesticide compounds detected in subsurface residuals samples from the former Bryant Mill Pond. The sample from BMP-12 (3 to 4 feet) contained 0.14 mg/kg and 0.03 mg/kg of Aldrin, and 4,4'-DDE, respectively.

Aldrin and 4,4'-DDE were detected in the two surficial soil samples from the former Bryant Mill Pond. The concentrations of aldrin ranged from 0.69 mg/kg at BMP-12 (0 to 1 foot) to 1.1 mg/kg at BMP-2 (0 to 1 foot). 4,4'-DDE ranged in concentration from 0.12J mg/kg at BMP-12 (0 to 1 foot) to 0.33 mg/kg at BMP-2 (0 to 1 foot). 4,4'-DDT and endrin aldehyde were detected in the subsurface soil sample BMP-2 (3 to 4 feet) at concentrations of 0.12 J mg/kg and 0.071 mg/kg, respectively.

3.3.2.2 Groundwater/Leachate

Pesticide compounds were not detected in any of the groundwater samples from the OU. Alpha-BHC was detected at a concentration of 0.03J ug/L in the leachate sample from MW-125P. Table 3-18 summarizes these results. A range of detected concentrations of TCL compounds, including pesticides, in groundwater and leachate samples is presented in Table 3-16.

3.3.3 TCL VOC Compounds

3.3.3.1 Residuals/Soil

VOCs were detected in both residuals and native soil. Sample concentrations are reported in Table 3-19. Figures 28 through 30 illustrate the distribution of VOCs in residuals and Figures 31 through 33 illustrate the distribution in native soil. A range of detected concentrations for TCL compounds, including VOCs, in native soil and residuals is presented in Table 3-11.

Bryant HRDL

Toluene was the only VOC detected in all three subsurface residuals samples collected at the Bryant HRDL. Its concentration ranged from 0.11J mg/kg at BHDL-22 to 0.93J mg/kg at MW-121B.

Acetone, carbon disulfide, 2-butanone, benzene, and xylenes were all detected in two residuals samples each. Acetone was detected at concentrations of 0.25J mg/kg at BHDL-22 and 0.47J mg/kg at BHDL-123. Carbon disulfide was detected at concentrations of 0.019J mg/kg in BHDL-22 and 0.034J mg/kg at BHDL-123. The concentrations of 2-butanone in BHDL-22 and BHDL-123 were 0.13J mg/kg and 0.34J mg/kg, respectively. Benzene was detected at concentrations of 0.032J mg/kg and 0.066J mg/kg in BHDL-22 and BHDL-123, respectively. Xylenes were detected at concentrations of 0.050J mg/kg at BHDL-22 and 0.18J mg/kg at BHDL-123. Xylenes were detected in the duplicate of BHDL-22 at a concentration of 0.090J mg/kg. Methylene chloride was detected at 0.030J mg/kg in the sample from BHDL-123.

Xylenes, acetone, benzene, 2-butanone, carbon disulfide, and toluene were also detected in the duplicate of BHDL-22 at concentrations of (mg/kg): 0.42J, 0.067J, 0.20J, 0.49J, and 0.32J, respectively.

Acetone and 2-butanone were detected in the three native soil samples. Acetone ranged in concentration from 0.033 mg/kg at BHDL-22 to 0.54J mg/kg at MW-121B. Acetone was also detected in the duplicate of BHDL-22 at a concentration of 0.028 mg/kg. The range in concentration for 2-butanone was 0.0070J mg/kg at BHDL-22 to 0.16 mg/kg at MW-121B. 2-Butanone was also detected in the duplicate of BHDL-22 at a concentration of 0.0080J mg/kg. Toluene was detected in two samples and ranged in concentration from 0.0020J mg/kg in the duplicate of BHDL-22 to 0.0080J mg/kg at MW-121B. Benzene was detected in the duplicate sample of BHDL-22 at a concentration of 0.0020J mg/kg and in MW-121B at a concentration of 0.016J mg/kg. Carbon disulfide was detected in MW-121B at a concentration of 0.010J mg/kg. Xylenes were detected at MW-121B at a concentration of 0.015J mg/kg.

Monarch HRDL

Acetone, carbon disulfide, toluene, 2-butanone, tetrachloroethene, and xylenes were detected in two subsurface residuals samples. Reported concentrations of these VOCs in the sample from MLSS-3 are as follows: 0.46J mg/kg acetone, 0.043J mg/kg carbon disulfide, 0.92J mg/kg toluene, 0.16J mg/kg 2-butanone, 0.026J mg/kg tetrachloroethene, and 0.12J mg/kg xylenes. The subsurface residuals sample from MLSS-1 contained the same VOCs at reported concentrations as follows: 2.5J mg/kg acetone, 0.073J mg/kg carbon disulfide, 0.067J mg/kg toluene, 0.68J mg/kg 2-butanone, 0.024J mg/kg tetrachloroethene, and 0.094J mg/kg xylenes. Benzene was detected in subsurface residuals at MLSS-3 at a concentration of 0.034J mg/kg. Carbon tetrachloride was detected in MLSS-4 at a concentration of 3.8J mg/kg.

Eight compounds were detected in the native soil samples. Acetone was detected in all seven samples ranging from 0.019 mg/kg at MLSS-1 to 1.4J mg/kg in MLSS-2. Carbon disulfide and 2-butanone were detected in five samples ranging from 0.0040J mg/kg at MLSS-5 to 0.028J mg/kg at MLSS-2 for carbon disulfide and 0.013J mg/kg at MLSS-5 to 0.55J mg/kg at MLSS-2 for 2-butanone. Toluene and xylenes were also detected in five native soil samples. Toluene concentrations ranged from 0.0020J mg/kg at MLSS-1 to 0.034J mg/kg at MLSS-2. Xylenes concentrations ranged from 0.0060J mg/kg in MLSS-1 to 0.078J mg/kg at MLSS-3. Benzene was detected in three samples. Benzene concentrations ranged from 0.0030J mg/kg at MW-126A to 0.041J at MLSS-2. Ethylbenzene was detected twice at concentrations of 0.011J mg/kg and 0.014J mg/kg in MLSS-2 and MLSS-3 respectively. 1,2-Dichloroethene was detected in one sample at a concentration of 0.0040J mg/kg at MW-126A.

FRDLs

Acetone, carbon disulfide, toluene, and 2-butanone were detected in each of the four subsurface residuals samples associated with the FRDLs. The highest concentrations of these compounds were observed in DLHB-2 and the lowest were observed in DLHB-6. Acetone ranged in concentration from 0.17J mg/kg to 1.3J mg/kg. However, acetone was also detected in the method blank associated with the samples from DLHB-1 and DLHB-2. Carbon disulfide was

detected at concentrations ranging from 0.0070J mg/kg to 0.043J mg/kg. Toluene ranged in concentration from 0.0050J mg/kg to 0.025J mg/kg. 2-Butanone ranged in concentration from 0.094J mg/kg to 0.71J mg/kg. 4-Methyl-2-pentanone was observed in three subsurface residuals samples ranging in concentration from 0.0080J mg/kg at DLHB-6 to 0.051J mg/kg at DLHB-2. Ethylbenzene was detected in the subsurface residuals sample from DLHB-2 and DLHB-3 at a concentration of 0.049J mg/kg and 0.011J mg/kg, respectively. Xylenes and 2-hexanone were detected in the sample from DLHB-2 at a concentration of 0.059J mg/kg and 0.041J mg/kg, respectively.

Acetone was the only VOC detected in all four native soil samples. Acetone concentrations ranged from 0.0060J mg/kg at DLHB-6 to 0.30 mg/kg at DLHB-1. Carbon disulfide was detected in three samples at a range in concentrations of 0.0010J mg/kg at DLHB-2 and DLHB-6 to 0.0030J mg/kg at DLHB-3. 2-Butanone and 1,1,1-trichloroethane were detected in DLHB-3 at concentrations of 0.0090J mg/kg and 0.0030J mg/kg, respectively. Toluene and xylenes were detected in DLHB-2 at concentrations of 0.0010J mg/kg and 0.0060J mg/kg, respectively.

Former Type III Landfill

Xylenes were the only VOC detected in the residuals sample adjacent to the former Type III Landfill. FLF-1 contained a xylenes concentration of 0.0090J mg/kg.

Acetone and toluene were the only VOCs detected in the native soils. FLF-1 contained concentrations of 0.0090J and 0.0030J mg/kg for acetone and toluene, respectively.

Western Disposal Area

Acetone, carbon disulfide, and 2-butanone were detected in nine out of 10 subsurface residuals samples each. Acetone ranged in concentration from 0.17J mg/kg at WA-7 to 2.4J mg/kg at WA-1. Carbon disulfide had concentrations ranging from 0.0060J mg/kg at WA-7 to 0.078J mg/kg at WA-4. 2-Butanone was detected at concentrations ranging from 0.028J mg/kg at WA-7 to 2.2J mg/kg at WA-1. Toluene and xylenes were detected in five samples each. Toluene ranged in concentrations from 0.0050J mg/kg at WA-7 to 0.015J mg/kg at WA-6. Xylenes were detected at concentrations ranging from 0.010J mg/kg at WA-5 to 0.22 mg/kg at WA-4. Ethylbenzene was detected in four samples ranging in concentration from 0.010J mg/kg at WA-7 to 0.032 mg/kg at WA-5. 2-Hexanone was detected in three samples ranging in concentration from 0.011J mg/kg at WA-2 to 0.29 mg/kg at WA-1. 4-Methyl-2-pentanone was detected at WA-5 and WA-2 at concentrations of 0.027 mg/kg and 0.018J mg/kg, respectively. Chloroform was detected at WA-4 and WA-3 at 0.014J mg/kg and 0.008J mg/kg, respectively. Methylene chloride was detected at WA-5 at 0.0040J mg/kg and cis-1,3-dichloropropene was detected at WA-4 at 0.014J mg/kg.

The most commonly detected VOC in native soils was acetone, which was detected in eight out of 12 native soil samples. Acetone concentrations ranged from 0.0030J mg/kg at WA-2 to 3.4J mg/kg at WA-6. 2-Butanone, reported in three samples, was detected at concentrations ranging from 0.21J mg/kg at MW-8A to 0.96J mg/kg at WA-6. Methylene chloride was detected in WA-2 and WA-5 at 0.0020J mg/kg and 0.0030J mg/kg, respectively. Carbon disulfide was detected in WA-6 and WA-8 at 0.013J mg/kg and 0.0080J mg/kg, respectively. Toluene was detected in WA-6 at 0.020J mg/kg and WA-8 at 0.038J mg/kg. Xylenes were detected at WA-6 and MW-8A at 0.19J mg/kg and 0.016J mg/kg, respectively. Ethylbenzene was detected in the sample from WA-6 at 0.030J mg/kg.

Former Bryant Mill Pond

Two VOCs were detected in the surficial soil sample from BMP-12. Acetone was detected at a concentration of 0.027J mg/kg and toluene was detected at a concentration at 0.039 mg/kg. The surficial soil sample from BMP-2 did not contain detectable VOC.

One subsurface native soil sample was obtained at BMP-2 for TCL analyses. This sample contained acetone at a concentration of 0.046J mg/kg, carbon disulfide at 0.0040J mg/kg, 2-butanone at 0.014J mg/kg, and toluene at 0.0040J mg/kg.

The subsurface residuals samples collected from BMP-12 contained acetone, carbon disulfide, and xylenes at concentrations of 0.15 mg/kg, 0.022J mg/kg, and 0.031J mg/kg, respectively. This sample was the only residuals sample analyzed in the former Bryant Mill Pond area.

3.3.3.2 Groundwater/Leachate

The results of VOC analyses in groundwater/leachate are summarized in Table 3-20 and on Figure 34. A range of detected concentrations of TCL compounds, including VOCs, in groundwater and leachate is presented in Table 3-16.

Bryant HRDL

Benzene and toluene were the only VOCs detected in groundwater samples from wells at the Bryant HRDL. Toluene was detected in MW-25 at a concentration of 7.0J ug/L and in MW-121B at a concentration of 1.0J ug/L. Benzene was detected only in MW-121A at a concentration of 1.0J ug/L.

Monarch HRDL

Tetrachloroethene, toluene, and 1,1,1-trichloroethane were detected in groundwater samples from wells at the Monarch HRDL. Tetrachloroethene was detected in MW-124B and MW-125A at concentrations of 2.0J ug/L and 3.0J ug/L, respectively. 1,1,1-Trichloroethane was detected at a concentration of 3.0J ug/L in MW-124A and MW-125B. Toluene was detected in a groundwater sample from MW-126A at a concentration of 1.0J ug/L.

Compounds detected in the leachate sample from MW-125P were 1.0J ug/L benzene, 34J ug/L 2-butanone, 2.0J ug/L carbon disulfide, 2.0J ug/L ethylbenzene, 2.0J ug/L toluene, and 10 ug/L xylenes.

FRDLs

VOCs were not detected in groundwater samples from wells adjacent to the FRDLs.

Former Type III Landfill

Benzene and methylene chloride, were detected in groundwater samples from wells at the former Type III Landfill. Benzene was detected at a concentration of 1.0J ug/L in MW-15 and MW-3, and at a concentration of 2.0J ug/L in MW-17A, MW-17B, and MW-19BR (and its duplicate). Methylene chloride was detected at a concentration of 1.0J ug/L at MW-17A.

Western Disposal Area

VOCs were not detected in the seven groundwater samples from wells associated with the Western Disposal Area. No VOCs were detected in the groundwater in the upgradient wells (MW-7 and MW-7B).

Pilot Study Area

Toluene was detected in groundwater samples from wells at the Pilot Study Area. Toluene was detected in the sample from MW-2S, and its duplicate, at a concentration of 2.0J ug/L.

Former Bryant Mill Pond

Methylene chloride, tetrachloroethene, and toluene were detected in groundwater samples from wells at the former Bryant Mill Pond. Tetrachloroethene was detected in the sample from MW-114 at a concentration of 13 ug/L. Toluene was detected in the sample from MW-108 at a concentration of 1.0J ug/L. Methylene chloride was detected at a concentration of 1.0J ug/L at MW-104.

3.3.4 TCL SVOC Compounds

3.3.4.1 Residuals/Soil

SVOCs were detected in both residuals and native soil. Sample concentrations are reported in Table 3-21. Figures 35 through 37 illustrate the distribution of SVOCs in residuals. Figures 38 through 40 illustrate the distribution of SVOCs in native soil. A range of detected concentrations for TCL compounds, including SVOCs, in native soils and residuals is presented in Table 3-11.

Bryant HRDL

Phenanthrene was detected in the three subsurface residuals samples from the Bryant HRDL at concentrations ranging from 0.59J mg/kg at MW-121B to 7.2J mg/kg at BHDL-123. 4-Methylphenol was detected at BHDL-22 at an average concentration of 5.9J mg/kg and at BHDL-123 at 16J mg/kg. 2-Methylnaphthalene was detected at the same two locations at a concentration of 2.0J mg/kg and 21J mg/kg, respectively. Fluoranthene was detected at MW-121B at a concentration of 0.30J mg/kg. Bis(2-ethylhexyl)phthalate was detected in the duplicate sample of BHDL-22 at a concentration of 2.5J mg/kg. Bis(2-ethylhexyl)phthalate was not detected in the original sample of BHDL-22. Phenanthrene, 4-methylphenol, and 2-methylnaphthalene were also detected in the duplicate sample of BHDL-22 at concentrations of 5.0J mg/kg, 8.1J mg/kg and 5.7 mg/kg, respectively.

2-Methylnaphthalene and bis(2-ethylhexyl)phthalate were the only SVOCs detected in native soils at the Bryant HRDL. Bis(2-ethylhexyl)phthalate was detected in the original sample of BHDL-22 at a concentration of 0.076J mg/kg. Bis(2-ethylhexyl)phthalate was not detected in the duplicate sample of BHDL-22. 2-Methylnaphthalene was detected in the original and duplicate samples at BHDL-22 at concentrations of 0.063J mg/kg and 0.062J mg/kg, respectively.

Monarch HRDL

2-Methylnaphthalene was detected in the seven subsurface residuals samples at the Monarch HRDL. The compound ranged in concentration from 0.18J mg/kg at MLSS-1 to 4.1 mg/kg at MLSS-5. 4-Methylphenol was detected in four samples at concentrations ranging from 2.1J mg/kg at MLSS-2 to 4.7J mg/kg at MLSS-4. Two samples (MLSS-1 and MW-126A) for 4-methylphenol were rejected due to quality control problems associated with poor surrogate recoveries. Naphthalene was detected at MLSS-4 at a concentration of 0.73J mg/kg and at MLSS-5 at a concentration of 1.0J mg/kg. Phenanthrene was detected at MW-126A at a concentration of 0.37J mg/kg and MLSS-4 at a concentration of 0.54J mg/kg. Bis(2-ethylhexyl)phthalate was detected at concentrations of 1.3J mg/kg at MLSS-4 and 3.1J mg/kg at MLSS-5.

Bis(2-ethylhexyl)phthalate was detected in six of the seven native soil samples at concentrations ranging from 0.031J mg/kg at MLSS-4 to 0.11J mg/kg at MLSS-5 and MW-125B. 2-Methylnaphthalene and fluoranthene were detected in three samples and ranged in concentration for 2-methylnaphthalene from 0.038J mg/kg at MLSS-5 and MW-125B. to 0.35J mg/kg at MLSS-3 and for fluoranthene 0.099J mg/kg at MW-126A to 0.45J mg/kg at MLSS-1. Naphthalene was detected at MLSS-1 at a concentration of 0.084J mg/kg.

At MLSS-1, 10 additional SVOCs were detected in native soil samples at the following concentrations (mg/kg) anthracene, 0.094J; benzo(a)anthracene, 0.21J; benzo(b)fluoranthene, 0.14J, benzo(k)fluoranthene, 0.17J; benzo(a) pyrene, 0.17J; carbazole, 0.070J; chrysene, 0.20J; naphthalene, 0.084J; phenanthrene, 0.44J; and pyrene, 0.36J. Seven of these compounds were also detected in MW-126A at the following concentrations (mg/kg): benzo(a)anthracene, 0.052J; benzo(b)fluoranthene, 0.045J; benzo(k)fluoranthene, 0.049J; benzo(a)pyrene, 0.046J; chrysene, 0.060J; phenanthrene, 0.059J; and pyrene, 0.090J.

FRDLs

4-Methylphenol was detected in three of the four subsurface residuals samples from the FRDLs at concentrations ranging from 0.37J mg/kg at DLHB-3 to 2.7J mg/kg at DLHB-1. Phenanthrene and bis(2-ethylhexyl)phthalate were detected in two residuals samples each. Phenanthrene was detected at a concentration of 0.11J mg/kg at DLHB-6 and 1.3J mg/kg at DLHB-3. Bis(2-ethylhexyl)phthalate was detected at a concentration of 0.24J mg/kg at DLHB-6 and 1.1J mg/kg at DLHB-3. 2-Methylnaphthalene and fluorene were detected at DLHB-3 at a concentration of 2.3 mg/kg and 0.40J mg/kg, respectively. Di-n-butylphthalate was detected at DLHB-2 at a concentration of 1.0J mg/kg. Di-n-butylphthalate was also detected in the laboratory method blank. Fluoranthene was detected at DLHB-6 at a concentration of 0.058 J mg/kg.

2-Methylnaphthalene and bis(2-ethylhexyl)phthalate were the only SVOCs which were detected in more than one sample in native soils. 2-Methylnaphthalene was detected at concentrations of 0.063J mg/kg at DLHB-1 and 1.3J mg/kg at DLHB-6. Bis(2-ethylhexyl)phthalate was detected at concentrations of 0.020J mg/kg at DLHB-2 and 0.028J mg/kg at DLHB-1. Bis(2-chloroethyl)ether, phenanthrene, and fluorene were all detected at DLHB-6 at a concentration of 2.1J mg/kg, 0.34J mg/kg, and 0.18J mg/kg, respectively.

Former Type III Landfill

2-Methylnaphthalene, phenanthrene, and bis(2-ethylhexyl)phthalate were detected in the subsurface residuals sample from FLF-1 at the former Type III Landfill. The compounds were detected at concentrations of 2.4J mg/kg, 0.64J mg/kg, and 0.63J mg/kg, respectively.

Bis(2-ethylhexyl)phthalate was also detected in the native soil sample from this location at a concentration of 0.028J mg/kg.

Western Disposal Area

Bis(2-ethylhexyl)phthalate was detected in seven of the 10 subsurface residuals samples from the Western Disposal Area. Concentrations ranged from 0.20J mg/kg at WA-2 to 5.4J mg/kg at WA-8. 4-Methylphenol was detected in five samples at concentrations ranging from 1.2J mg/kg at WA-3 to 38 mg/kg at WA-5. 2-Methylnaphthalene was also detected in five samples ranging from 0.50J mg/kg at MW-120B to 10J mg/kg at WA-6. Phenanthrene was detected in samples from WA-2 and MW-8A at a concentration of 0.17J mg/kg and 0.51J mg/kg, respectively. Fluoranthene and chrysene were detected at WA-2 at a concentration of 0.24J mg/kg and 0.12J mg/kg, respectively. Fluoranthene

was also detected in the laboratory method blank for WA-2. Pentachlorophenol was detected at WA-1 at a concentration of 2.8J mg/kg.

Bis(2-ethylhexyl)phthalate was detected in five of the 12 native soil samples from the Western Disposal Area at concentrations ranging from 0.057J mg/kg at WA-5 to 0.099J mg/kg at WA-7. Phenanthrene, fluoranthene, and pyrene were all detected in three samples (WA-7, MW-8A, and MW-120B). Phenanthrene concentrations ranged from 0.033J mg/kg at MW-8A to 0.31 mg/kg at WA-7. Fluoranthene ranged in concentration from 0.040J mg/kg at MW-120B to 0.094 mg/kg at WA-7. Pyrene concentrations ranged from 0.038J mg/kg at MW-8A to 0.083J mg/kg at WA-7. Chrysene, 2-methylnaphthalene, and naphthalene were detected in samples from WA-7 and MW-120B. Chrysene was detected at concentrations of 0.064J mg/kg (WA-7) and 0.024J mg/kg (MW-120B), 2-methylnaphthalene was detected at concentrations of 0.40J mg/kg (WA-7) and 0.085J mg/kg (MW-120B), and naphthalene was detected at concentrations of 0.23J mg/kg (WA-7) and 0.062J mg/kg (MW-120B). 4-Methylphenol was detected at WA-5 and MW-120B at concentrations of 0.016J mg/kg and 0.022J mg/kg, respectively. Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, carbazole, and dibenzofuran were detected at WA-7 at concentrations (mg/kg) of 0.031J, 0.052J, 0.059J, 0.029J, 0.028J, 0.032J, 0.021J, and 0.10J, respectively. Di-n-butylphthalate was detected at WA-6 at a concentration of 0.049J mg/kg, but was also detected in the laboratory method blank.

Former Bryant Mill Pond

Three native soil samples (two surficial and one subsurface) and one subsurface residuals sample from the former Bryant Mill Pond were analyzed for SVOCs. The subsurface native soils sample from BMP-2 (3 to 4 feet) had detectable concentrations of 2,4-dimethylphenol (4.1J mg/kg), bis(2-ethylhexyl)phthalate (0.58J mg/kg), 2-methylnaphthalene (1.4J mg/kg), 2-methylphenol (0.51J mg/kg), 4-methylphenol (0.42J mg/kg), naphthalene (0.28J mg/kg), phenanthrene (1.4J mg/kg) and phenol (0.78J mg/kg).

In addition to the SVOCs detected in the native soil sample (BMP-2, 3 to 4 feet), the residuals sample (BMP-12, 3 to 4 feet) had detectable concentrations of benzo(b)fluoranthene (0.43J mg/kg), benzo(k)fluoranthene (0.40J mg/kg), benzo(a)pyrene (0.29J mg/kg), chrysene (0.39J mg/kg), di-n-butylphthalate (2.2J mg/kg), fluoranthene (0.72J mg/kg) and pyrene (0.59J mg/kg).

The two surface soil samples (BMP-2 and BMP-12, 0-1 foot bgs interval) both contained the respective concentrations (mg/kg) of: benzo(a)anthracene (0.18J and 0.72J), benzo(b)fluoranthene (0.40J and 1.5J), benzo(k)fluoranthene (0.40J and 1.3J), chrysene (0.37J and 1.3J), di-n-butylphthalate (0.35J and 0.43J), 2,4-dimethylphenol (0.95J and 2.3), fluoranthene (0.57J and 2.4), 2-methylnaphthalene (0.40J and 0.61J), 2-methylphenol (2.1J and 5.2), 4-methylphenol (0.42J and 1.4J), phenanthrene (0.29J and 1.2J), phenol (2.3J and 5.2) and pyrene (0.47J and 2.0). The following SVOCs were also detected in BMP-12 (0-1 foot bgs interval): anthracene (0.12J), benzo(g,h,i)perylene (0.28J), benzo(a)pyrene (0.99J), carbazole (0.14J), dibenz(a,h) anthracene (0.19J), dibenzofuran (0.11J), ideno(1,2,3-cd)pyrene (0.75J), and naphthalene (0.27J).

3.3.4.2 Groundwater/Leachate

The analytical results for groundwater/leachate are summarized in Table 3-22 and Figure 41. A range of detected concentrations of TCL compounds, including SVOCs, in groundwater and leachate is presented in Table 3-16.

Bryant HRDL

4-Methylphenol was the only SVOC detected in groundwater at the Bryant HRDL. Concentrations of 6.0J ug/L in the sample from MW-121B and 11 ug/L in the sample from MW-121A.

Monarch HRDL

Only one groundwater sample from the Monarch HRDL had detectable concentrations for any SVOC. The groundwater sample from MW-126A contained 4-methylphenol at a concentration of 8.0J ug/L.

The leachate sample from MW-125P contained 4-methylphenol at a concentration of 600 ug/L.

FRDLs

No SVOCs were detected in groundwater adjacent to the FRDLs.

Former Type III Landfill

2-Methylphenol and 4-methylphenol were detected in the groundwater sample from MW-127A at concentrations of 0.60J and 0.90J ug/L, respectively. Di-n-butylphthalate, diethylphthalate, and naphthalene were detected in the groundwater sample from MW-15 at a concentration of 1.0J ug/L, 0.70J ug/L, and 1.0J ug/L, respectively.

Western Disposal Area

2-Methylnaphthalene and 4-methylphenol were detected in the groundwater at the Western Disposal Area. 2-Methylnaphthalene and 4-methylphenol were detected in the sample from MW-8A at concentrations of 0.60J ug/L and 15 ug/L, respectively.

Phenol was detected in the groundwater sample from the upgradient well (MW-7B) at a concentration of 0.80J ug/L.

Pilot Study Area

No SVOCs were detected in the groundwater at the Pilot Study Area.

Former Bryant Mill Pond

No SVOCs were detected in the groundwater at the former Bryant Mill Pond.

3.3.5 PCDD/PCDF

3.3.5.1 Residuals/Soil

The residuals/soil data are summarized on Table 3-23 and Figure 42.

PCDD and PCDF were detected in surficial samples taken from three areas--Monarch HRDL, FRDLs, and Western Disposal Area.

Monarch HRDL

Two surficial samples were collected in the Monarch HRDL. 2,3,7,8-Tetrachlorinated dibenzo-p-dioxin (2,2,7,8-TCDD) was detected in the surficial residuals sample from MLSS-3 at a concentration of 2.6E-5 mg/kg. 2,3,7,8-Tetrachlorinated dibenzofuran (2,3,7,8-TCDF) was detected in the original samples from MLSS-1 (surficial soil) and MLSS-3 (surficial residuals) at concentrations of 4.4E-7 mg/kg and 1.8E-4 mg/kg, respectively. 2,3,7,8-TCDF was not detected in the duplicate sample from MLSS-1. Several penta-, hexa-, hepta- and octachlorinated PCDD and PCDF congeners were detected in the samples. Although the octachlorinated dibenzo-p-dioxin concentrations were generally the highest congener concentrations, this congener was also frequently detected in blanks.

FRDLs

Both 2,3,7,8-TCDD and 2,3,7,8-TCDF were detected in the three surficial samples taken in the FRDLs at DLHB-1, DLHB-2, and DLHB-5. 2,3,7,8-TCDD ranged in concentration from 3.2E-6 mg/kg at DLHB-5 to 7.8E-6 mg/kg at DLHB-2. 2,3,7,8-TCDF ranged in concentration from 3.9E-5 mg/kg at DLHB-5 to 3.0E-4 mg/kg at DLHB-2. 2,3,7,8-TCDF was also found in the blank associated with DLHB-5. Several penta-, hexa-, and octachlorinated PCDD and PCDF were detected. The congener with the highest concentration was octachlorinated dibenzo-p-dioxin at a concentration of 0.0026 mg/kg at DLHB-5. The hepta- and octachlorinated dibenzo-p-dioxin and dibenzofuran were also detected in the associated method blanks.

Western Disposal Area

In the Western Disposal Area, 2,3,7,8-TCDD was detected in the duplicate sample from WA-6 at a concentration of 8E-6 mg/k, however, it was not detected in the original sample. 2,3,7,8-TCDF was detected in the original sample from at WA-2 at a concentration of 2E-6 mg/kg; however, it was not detected in the duplicate sample. The highest observed congener concentration was 0.045 mg/kg for octachlorinated dibenzo-p-dioxin at WA-6.

3.3.6 TAL Analytes

3.3.6.1 Residuals/Soils

A summary of the TAL data for subsurface residuals and soils is presented in Table 3-24 and Figures 43 through 50. Table 3-25 presents a range of detected concentrations of the naturally-occurring elements/compounds in native soil and residuals.

Bryant HRDL

Eighteen TAL analytes were detected in the residuals at the Bryant HRDL. Aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, vanadium, zinc, and cyanide were detected in all three samples. Nickel and sodium were detected in two samples (BHDL-22 and MW-121B). Sodium and nickel were also detected in the duplicate of BHDL-22. Potassium was detected in one sample (MW-121B). Refer to Table 3-25 for the range of detected concentration in residuals.

Twenty-two TAL analytes were detected in the native soil at the Bryant HRDL. Aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium and vanadium were detected in all three samples and the duplicate of BHDL-22. Zinc and selenium were each detected in two samples. Results for zinc were rejected for the duplicate sample of BHDL-22 and for BHDL-123 due to QC problems associated with serial dilutions. Sodium was detected in the original and duplicate sample of BHDL-22 and antimony was detected in the

original sample of BHDL-22 but not in the duplicate. Cadmium was detected in BHDL-22 and BHDL-123. Cadmium was also detected in the duplicate of BHDL-22. Mercury, and cyanide were detected in one sample (BHDL-123). Refer to Table 3-25 for the range of detected concentrations in native soil.

Monarch HRDL

Twenty-one TAL analytes were detected in residuals at the Monarch HRDL. Aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, vanadium, and zinc were detected in all seven samples. Cyanide was detected in six samples. Cobalt was detected in four samples. Cadmium, potassium and sodium were each detected in two samples. Beryllium and selenium were each detected in one sample. Refer to Table 3-25 for the range of detected concentrations in residuals.

Twenty TAL analytes were detected in native soil at the Monarch HRDL. Aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, vanadium, and zinc were detected in all seven samples. Cobalt was detected in six samples. Beryllium and potassium were each detected in four samples. Mercury, selenium, and cyanide were each detected in three samples and antimony was detected in one sample (MLSS-3). Refer to Table 3-25 for the range of detected concentrations in native soil.

FRDLs

Fifteen TAL analytes were detected in residuals at the FRDLs. Aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, vanadium, and zinc were detected in all four samples. Nickel was detected in three samples. Potassium and selenium were each detected in one sample (DLHB-6). Refer to Table 3-25 for the range of detected concentrations in the residuals.

Nineteen TAL analytes were detected in native soil at the FRDLs. Aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc were detected in all four samples. Beryllium, selenium, and cyanide were each detected in three samples. Mercury was detected in one sample (DLHB-6). Refer to Table 3-25 for the range of detected concentrations in native soil.

Former Type III Landfill

Seventeen TAL analytes were detected in the residuals sample (FLF-1, 6.0-6.5 feet) at the former Type III Landfill. Aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, vanadium, zinc, and cyanide were detected at FLF-1. Refer to Table 3-25 for the range of detected concentrations in the residuals.

Eighteen TAL analytes were detected in the native soil sample (FLF-1, 6.5-8.0 feet) at the former Type III Landfill. Aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, mercury, nickel, potassium, selenium, vanadium, zinc, and cyanide were detected at FLF-1. Refer to Table 3-25 for the range of detected concentrations in native soil.

Pilot Study Area

Twenty-three TAL analytes were detected in the soil at the Pilot Study Area. Aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, vanadium, and zinc were detected in all 10 samples. Beryllium, potassium, and selenium were each detected in nine samples. Mercury was detected in eight samples; cyanide was detected in seven samples; cadmium was detected in five samples; and sodium was detected in

two samples. Silver and thallium were each detected in one sample (MA-4 and MA-1, respectively). Refer to Table 3-25 for the range of detected concentrations in soil.

Western Disposal Area

Twenty-two TAL analytes were detected in residuals at the Western Disposal Area. Aluminum, arsenic, calcium, chromium, copper, iron, lead, magnesium, manganese, vanadium, and zinc were detected in all 10 samples. Barium was detected in eight samples. Cobalt and nickel were detected in seven samples each. Cyanide was detected in six samples and mercury was detected in five samples. Antimony, cadmium, potassium, and sodium were each detected in three samples. Beryllium was detected in two samples and selenium was detected in one sample. Refer to Table 3-25 for the range of detected concentrations in residuals.

Twenty-two TAL analytes were detected in native soils at the Western Disposal Area. Aluminum, arsenic, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, and vanadium were detected in all 12 samples. Lead was detected in 10 samples; results for two samples were rejected (B-7B, 8.0-10.0 feet and 10.0-12.0 feet). Zinc was detected in four samples and rejected in eight samples. Results for lead were rejected due to QC problems associated with matrix spike recoveries. Results for zinc were rejected due to QC problems associated with serial dilutions. Potassium was detected in 11 samples and barium was detected in nine samples. Beryllium was detected in eight samples. Selenium was detected in five samples and sodium was detected in four samples. Cyanide and mercury were each detected in three samples. Antimony and cadmium were each detected in two samples. Refer to Table 3-25 for the range of detected concentrations in native soil.

Former Bryant Mill Pond

Twenty-one TAL analytes were detected in the native soil at the former Bryant Mill Pond. Aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, vanadium, and zinc were detected in all three samples. Cyanide was detected in two samples. Silver and mercury were detected in one sample (BMP-2, 3 to 4 feet bgs). Refer to Table 3-25 for the detected concentrations in the residuals.

Seventeen TAL analytes were detected in the residuals sample (BMP-12, 3 to 4 feet bgs) at the former Bryant Mill Pond: aluminum, arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, selenium, vanadium, zinc and cyanide. Refer to Table 3-25 for the range of detected concentrations in the residuals.

3.3.6.2 Groundwater/Leachate

A summary of detected filtered TAL analytes and general groundwater quality data for groundwater/leachate samples are summarized on Table 3-26 and Figures 51 through 55. A range of detected concentrations of TAL analytes in filtered groundwater and leachate samples is presented in Table 3-27.

Bryant HRDL

Fourteen TAL analytes were detected in the filtered groundwater samples at the Bryant HRDL.

Barium, calcium, iron, magnesium, manganese, sodium, and zinc were detected in all 13 groundwater samples obtained at the Bryant HRDL. Potassium was detected in all the samples except for the sample from MW-26. Arsenic was detected in 11 samples and nickel was detected in 10 samples. Lead was detected in four samples. Cadmium and selenium were each detected in two samples. Copper was detected in one sample. Arsenic, barium, calcium, iron, magnesium, manganese, sodium, and zinc were detected in the sample from Rivulet 2.

Monarch HRDL

Thirteen TAL analytes were detected in the filtered groundwater samples at the Monarch HRDL. Barium, calcium, iron, magnesium, manganese, potassium, and sodium were detected in all six of the filtered groundwater samples from the Monarch HRDL. Zinc was detected in five samples and selenium was detected in three. Arsenic, lead, and nickel were each detected in two samples. Cadmium was detected in the duplicate of MW-126B, but not in the original.

Eleven TAL analytes were detected in the filtered leachate sample (MW-125P). Aluminum, arsenic, barium, calcium, chromium, iron, magnesium, manganese, nickel, potassium, and sodium were detected in the sample from MW-125P.

FRDLs

Ten TAL analytes were detected in the filtered groundwater samples at the FRDLs. Arsenic, barium, calcium, iron, magnesium, manganese, nickel, potassium, sodium, and zinc were detected in the two groundwater samples from the well cluster (MW-122A/B) adjacent to the FRDLs. Nickel was not detected in the duplicate for MW-122A.

Former Type III Landfill

Sixteen TAL analytes were detected in the filtered groundwater samples at the former Type III Landfill. Arsenic, barium, calcium, iron, magnesium, manganese, sodium, and zinc were detected in all 13 of the filtered groundwater samples from the former Type III Landfill. The result for zinc was rejected in the original sample from MW-19BR. The result for zinc was rejected due to QC problems; the concentration for the filtered sample was greater than the concentration for the total sample indicating probable laboratory contamination. Nickel was detected in 12 samples, potassium was detected in 11 samples and cobalt was detected in seven samples. Chromium, lead, and selenium were each detected in three samples. Beryllium and mercury were each detected in one sample (MW-19D and MW-17A, respectively). Chromium and cobalt were not detected in the duplicate for MW-19BR.

Pilot Study Area

Thirteen TAL analytes were detected in filtered groundwater samples at the Pilot Study Area. Arsenic, barium, calcium, iron, magnesium, manganese, potassium, selenium, sodium, and zinc were each detected in all three samples. Aluminum and nickel were each detected in one sample. Chromium was detected in the duplicate of MW-2S, but not in the original.

Western Disposal Area

Seventeen TAL analytes were detected in the filtered groundwater samples at the Western Disposal Area. Barium, calcium, iron, magnesium, manganese, potassium, and sodium were each detected in all seven groundwater samples. Arsenic and zinc were each detected in six samples and nickel was detected in five samples. Nickel was also detected in the duplicate for MW-20, but not in the original. Lead and selenium were each detected in three samples. Aluminum, beryllium, chromium, cobalt and vanadium were each detected in one sample.

Former Bryant Mill Pond

Fifteen TAL analytes were detected in the filtered groundwater samples at the former Bryant Mill Pond. Barium, calcium, iron, magnesium, manganese, potassium, and sodium were detected in all five of the groundwater samples from the former Bryant Mill Pond area. Zinc was detected in four samples and one sample result (MW-128A) was rejected. The result for zinc was rejected due to QC problems; the concentration for the filtered sample was greater than the concentration for the total sample indicating probable laboratory contamination. Arsenic was detected in three of the

samples. Lead, nickel, and selenium were detected in two samples each. Chromium, cobalt, and mercury, were detected in one sample each.

3.3.6.3 Upgradient Groundwater

Ten TAL analytes were detected in the filtered groundwater samples from upgradient locations MW-7 and MW-7B. The upgradient filtered groundwater samples both contained detectable concentrations of arsenic, barium, calcium, iron, magnesium, manganese, sodium, and zinc. In addition, potassium was detected in the MW-7B sample and selenium was detected in the MW-7 sample.

Figures 56 and 57 present Stiff diagrams illustrating the relative concentrations of eight TAL analytes and general water quality parameters observed in the collected groundwater samples. These ions include sodium (Na), calcium (Ca), magnesium (Mg), iron (Fe), chloride (Cl), sulfate (SO_4), bicarbonate (HCO_3), and nitrate (NO_3). The designated upgradient wells, including MW-7 and MW-7B, all display similar geo-chemical profiles as demonstrated by their associated Stiff diagrams.

3.4 Estimated Volumes of Residuals

In addition to the former Bryant Mill Pond, residuals were found at the Allied OU in the Monarch HRDL, Bryant HRDL, FRDLs, the former Type III Landfill and the Western Disposal Area.

In the Bryant HRDL, residuals ranged from 10 to 12 feet thick. No residuals were found in the dike material surrounding the Bryant HRDL. The total estimated volume of residuals in the Bryant HRDL is 390,000 cy.

In the Monarch HRDL, residuals were found at the surface in the eastern end of the HRDL to a depth of up to 24 feet bgs. In the western end of the Monarch HRDL, in the vicinity of boring MLSS-1, the residuals were covered with 8 feet of soil fill material and were approximately 8 feet thick. In the dikes on the northern side of the Monarch HRDL, residuals were found from 3 to 15 feet bgs in two locations. The estimated volume of residuals in the Monarch HRDL is 170,000 cubic yards (cy).

In the FRDLs, residuals, where present, were 7 to 16 feet thick. No residuals were found in borings DLHB-4 and DLHB-5, which were installed through standing water in the northeasternmost FRDL. No residuals were found in the dike between the FRDLs and Portage Creek. The estimated volume of residuals in the FRDLs is 62,000 cy.

Borings installed on the southeastern edge of the former Type III Landfill (designated FLF-1 through FLF-3) encountered residuals ranging from 6 to 10 feet thick. At FLF-1, the residuals were within one-foot of ground surface, but in FLF-2 and FLF-3, the residuals were covered with 10 to 12 feet of fill material. Based upon the observed thickness in the FLF borings, the estimated volume of residuals in the strip between the southeastern perimeter of the former Type III Landfill and the FRDLs is 18,000 cy.

In the Western Disposal Area, residuals were found in all eight of the borings. Based on location and thickness of the residuals, the Western Disposal Area can be subdivided into three areas. The first area is in the vicinity of WA-1, WA-2, and WA-3 where the residuals are 10 to 15 feet thick and are covered with two feet of fill materials. The second area is in the vicinity of WA-4 where the residuals are approximately 4 feet thick and are covered with approximately 6 feet of soil fill. The last area is the southern end of the Western Disposal Area, including WA-5, WA-6, WA-7, and WA-8 where residuals are up to 20 feet thick and covered with 2 to 3 feet of soil fill. The total estimated volume of residuals in the Western Disposal Area is 380,000 cy.

Dike materials encountered consisted of non-stratified gravels, sands, and clays. Some residuals were encountered in the dikes (one out of 11 boring locations) around the Bryant HRDL and FRDLs. The thickness of residuals at location GEO-1 is 5 feet. On the interior side of the dikes around the Monarch HRDL, 12 feet of residuals were encountered at two locations under 2 to 3 feet of fill materials.

3.5 Summary and Conclusions

The preliminary findings relevant to the investigation objectives which can be drawn from the results of this investigation are summarized as follows:

- The Allied OU encompasses an area of approximately 51 acres along the Portage Creek, between Alcott and Cork Streets in the Town of Kalamazoo, Michigan. The OU consists of the Monarch HRDL, the Bryant HRDL, the FRDLs, the former Type III Landfill, the Western Disposal Area, the former Bryant Mill Pond, and Portage Creek.

- The volume of residuals present in each area of the OU has been estimated based on the results of this and previous investigations including 170,000 cubic yards in the Monarch HRDL, 390,000 cubic yards in Bryant HRDL, 62,000 cubic yards in the FRDLs, 18,000 cubic yards along the southern perimeter of the former Type III Landfill, and 380,000 cubic yards in the Western Disposal Area. Combining the 120,000 cy previously estimated for the former Type III Landfill with the 83,000 cy of residuals and sediments of the former Bryant Mill Pond yields a total estimate of 1.1 million cy.

- The stratigraphic units most frequently observed underlying the residuals are a peat unit observed to underlay the residuals across the southern third of the Western Disposal Area, and the Bryant HRDL, the FRDLs, and the former Type III Landfill, where they border Portage Creek, and a sand unit was observed underlying the residuals across the interior portions of the FRDLs, the Type III Landfill, as well as much of the Monarch HRDL and the Western Area.

- A number of low permeability units were encountered within the subsurface at the OU including several clay units which locally appear to separate shallow water-bearing zones from deeper inter-berm zones.

- Correlation of subsurface units was particularly difficult in the vicinity of the Portage Creek. The stratigraphic units observed in the vicinity of the Creek suggest a complex depositional history including the erosion of older units followed by the re-deposition of materials in an alluvial environment. This depositional history has resulted in a complex stratigraphic sequence along the Creek.

- The direction of groundwater flow within the shallow overburden is generally toward Portage Creek, resulting in converging flow from opposite sides of the Creek. Groundwater flow across the Monarch HRDL is generally toward the north-northwest with an average horizontal gradient of approximately 0.077.

- Groundwater flow across the main portion of the Allied OU appears to be semi-radial in direction due to the fact that the Creek follows the southeastern, eastern, and northeastern border of this portion of the OU. The horizontal gradient across this main portion of the OU was observed to range from 0.013 to 0.008.

- Hydraulic conductivity values ranged from 1E-5 to 1E-2 cm/sec. Hydraulic conductivity values for most wells represent an average value for the multiple units (sands, clays, silts, peats, etc.) the well screens intersect.

- PCB concentrations in subsurface residuals were higher than those observed in surface samples. PCB concentrations in native soils underlying residuals are generally one to two orders of magnitude less than those in the overlying residuals sample.

- PCB concentrations in surface and subsurface samples from the former Bryant Mill Pond are similar to those observed in data from previous investigations. The extensive historical PCB data for Bryant Mill Pond were reviewed, and their useability for OU characterization was confirmed. The new data confirms and compliments the data from previous investigations.

- PCB were detected in eight groundwater samples collected from monitoring wells MW-5, MW-8A, MW-22A, MW-24, MW-25, MW-120B, MW-121A, and MW-121B.

- PCB were not detected in any of the groundwater samples from the wells associated with the Monarch HRDL, the FRDLs, Pilot Study Area, or the former Bryant Mill Pond. PCB were detected in samples from eight wells out of the 52 wells sampled. Of these, five of the eight wells are in the Bryant HRDL area, two wells are located in the Western Disposal Area, and one well is located near the perimeter of the former Type III Landfill.

- Residuals were not encountered in the dikes around the Bryant HRDL and the FRDLs. Residuals were encountered on the interior side of the dike around the Monarch HRDL.

- TAL inorganics concentrations in native soils underlying the residuals were generally higher than the soil samples collected from boreholes located upgradient of the residual containing areas. However, the underlying native soils typically consisted of peat or organic-rich mineral soil, while the upgradient soil samples represented sandy subsoils.

- The collection of soil and groundwater samples in the Pilot Study Area was intended to address the prior observation of elevated levels of aluminum, chromium, iron, lead, and nickel in a water sample from a shallow excavation in the area. Concentrations of the other analytes were generally two orders of magnitude lower than the results of the historical sample. The concentrations observed in soil samples were generally consistent with those observed in the samples from the native soils underlying the remainder of the OU.

- PCB was detected in surface soil samples associated with the Portage Creek Floodplain, Western Disposal Area, Monarch HRDL, former Bryant Mill Pond, Bryant HRDL, FRDLs, and the former Type III Landfill.

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Tables

TABLE 2-1

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
USEPA CONTRACT LABORATORY PROGRAM-TARGET COMPOUND LIST/TARGET ANALYTE LIST

TARGET COMPOUND LIST		
VOCs		
acetone	chloromethane	methylene chloride
benzene	dibromochloromethane	4-methyl-2-pentanone
bromodichloromethane	1,1-dichloroethane	styrene
bromoform	1,2-dichloroethane	1,1,2,2-tetrachloroethane
bromomethane	1,1-dichloroethene	tetrachloroethene
2-butanone	1,2-dichloroethene (total)	toluene
carbon disulfide	1,2-dichloropropane	1,1,1-trichloroethane
carbon tetrachloride	cis-1,3-dichloropropene	1,1,2-trichloroethane
chlorobenzene	trans-1,3-dichloropropene	trichloroethene
chloroethane	ethylbenzene	vinyl chloride
chloroform	2-hexanone	xylenes (total)
SVOCs		
acenaphthene	di-n-butylphthalate	isophorone
acenaphthylene	1,2-dichlorobenzene	2-methylnaphthalene
anthracene	1,3-dichlorobenzene	2-methylphenol
benzo(a)anthracene	1,4-dichlorobenzene	4-methylphenol
benzo(b)fluoranthene	3,3'-dichlorobenzidine	naphthalene
benzo(k)fluoranthene	2,4-dichlorophenol	2-nitroaniline
benzo(g,h,i)perylene	diethyl phthalate	3-nitroaniline
benzo(a)pyrene	2,4-dimethylphenol	4-nitroaniline
4-bromophenyl phenyl ether	4,6-dinitro-2-methyl phenol	nitrobenzene
butyl benzyl phthalate	dimethyl phthalate	2-nitrophenol
carbazole	2,4-dinitrophenol	4-nitrophenol
4-chloroaniline	2,4-dinitrotoluene	n-nitrosodiphenylamine
bis(2-chloroethoxy)methane	2,6-dinitrotoluene	n-nitroso-di-n-propylamine
bis(2-chloroethyl)ether	di-n-octyl phthalate	pentachlorophenol
4-chloro-3-methyl phenol	bis(2-ethlhexyl)phthalate	phenanthrene
2-chloronaphthalene	fluoranthene	phenol
2-chlorophenol	fluorene	pyrene
4-chlorophenyl phenyl ether	hexachlorobenzene	1,2,4-trichlorobenzene
2,2'-oxybis(1-chloropropane)	hexachlorobutadiene	2,4,5-trichlorophenol
chrysene	hexachlorocyclopentadiene	2,4,6-trichlorophenol
dibenz(a,h)anthracene	hexachloroethane	
dibenzofuran	indeno(1,2,3-cd)pyrene	

TABLE 2-1
(Cont'd.)

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
USEPA CONTRACT LABORATORY PROGRAM-TARGET COMPOUND LIST/TARGET ANALYTE LIST

Pesticides/PCB Compounds		
aldrin	beta-BHC	endosulfan I
alpha-BHC	gamma-BHC (lindane)	endosulfan II
Aroclor - 1016*	delta-BHC	endosulfan sulfate
Aroclor - 1221*	alpha-chlordane	endrin
Aroclor - 1232*	gamma-chlordane	endrin aldehyde
Aroclor - 1242*	4,4'-DDD	endrin ketone
Aroclor - 1248*	4,4'-DDE	heptachlor
Aroclor - 1254*	4,4'-DDT	heptachlor epoxide
Aroclor - 1260*	dieldrin	methoxychlor
		toxaphene
TARGET ANALYTE LIST		
Metals/Other Compounds		
aluminum	cobalt	nickel
antimony	copper	potassium
arsenic	cyanide	selenium
barium	iron	silver
beryllium	lead	sodium
cadmium	magnesium	thallium
calcium	manganese	vanadium
chromium	mercury	zinc

References:
TCL: USEPA, 1991a.
TAL: USEPA, 1991b.
*PCB were not included in the TCL/TAL analyses but were analyzed separately.

TABLE 2-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
Bryant HRDL					
BHDL-22	0 - 0.5	Residuals	A60690	PCB	Duplicate (A60693)
	6 - 8	Residuals	A60686	PCB	
	8 - 10	Residuals	A60687	PCB	
	10 - 12	Residuals	A60688	TCL/TAL	Duplicate (A60691)
	12 - 14	Soil	A60689	TCL/TAL	Duplicate (A60692)
BHDL-123	0 - 0.5	Residuals	A60680	PCB	MS/MSD
	4 - 6	Residuals	A60681	PCB	Duplicate (A60685)
	6 - 8	Residuals	A60682	PCB	MS/MSD
	8 - 9.5	Residuals	A60683	TCL/TAL	MS/MSD
	10 - 12	Soil	A60684	TCL/TAL	MS/MSD
MW-121B	0 - 0.5	Soil	A60042	PCB	
	10 - 12	Residuals	A60043	PCB	
	12 - 14	Residuals	A60044	PCB	
	14 - 16	Residuals	A60045	PCB	
	16 - 17.5	Residuals	A60046	TCL/TAL	
	17.5 - 19	Soil	A60047	TCL/TAL	
P-1	12 - 14	Soil	A60678	PCB	MS/MSD
P-2	12 - 14	Soil	A60677	PCB	
P-3	16 - 18	Soil	A60679	PCB	
Monarch HRDL					
MLSS-1	0-0.5	Soil	A60033	PCDD/PCDF	Duplicate (A60034)
	0-0.5	Soil	A60035	PCB	
	8-10	Residuals	A60036	PCB	Duplicate (A60041)
	10-12	Residuals	A60037	PCB	
	12-14	Residuals	A60038	PCB	
	14-15.5	Residuals	A60039	TCL/TAL	
	15.5-18	Soil	A60040	TCL/TAL	
MLSS-2	0-0.5	Residuals	A60560	PCB	
	2-4	Residuals	A60562	PCB	
	14-16	Residuals	A60568	PCB	
	16-18	Residuals	A60569	PCB	
	18-20	Residuals	A60570	PCB	
	20-22	Residuals	A60571	TCL/TAL	
	22-24	Soil	A60572	TCL/TAL	
MLSS-3	0-0.5	Residuals	A60540	PCDD/PCDF + PCB	
	8-10	Residuals	A60545	PCB	Duplicate (A60546)
	12-14	Residuals	A60548	PCB	
	14-16	Residuals	A60549	PCB	
	16-18	Residuals	A60550	PCB	
	18-20	Residuals	A60551	TCL/TAL	
	20-22	Soil	A60552	TCL/TAL	

See Notes on Page 7

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
Monarch HRDL (Cont'd.)					
MLSS-4	0-0.5	Residuals	A60520	PCB	
	6-8	Residuals	A60524	PCB	
	12-14	Residuals	A60527	PCB	
	14-16	Residuals	A60528	PCB	
	16-18	Residuals	A60529	PCB	
	18-20	Residuals	A60530	TCL/TAL	
	20-22	Soil	A60531	TCL/TAL	
MLSS-5	0-0.5	Residuals	A60500	PCB	
	8-10	Residuals	A60506	PCB	
	12-14	Residuals	A60507	PCB	
	18-20	Residuals	A60510	PCB	
	20-22	Residuals	A60511	PCB	
	22-24	Residuals	A60512	TCL/TAL	
	24-26	Soil	A60513	TCL/TAL	
MW-124B	4-6	Soil	A60102	PCB	
	12-14	Soil	A60106	PCB	
	20-22	Soil	A60108	PCB	Duplicate (A60103)
	36-38	Soil	A60109	PCB	
	40-42	Soil	A60110	PCB	
	54-56	Soil	A60111	PCB	
MW-125B	8-10	Residuals	A60024	PCB	
	14-16	Residuals	A60027	PCB	
	16-18	Residuals	A60028	PCB	
	18-19	Residuals	A60029	TCL/TAL	
	19-20	Soil	A60030	TCL/TAL	
MW-126A	14-16	Residuals	A60017	TCL/TAL	MS/MSD
	14-16	Soil	A60018	TCL/TAL	
MW-126B	0-0.5	Soil	A60001	PCB	
	6-8	Residuals	A60003	PCB	
	10-12	Residuals	A60006	PCB	
	12-14	Residuals	A60007	PCB	
FRDLs					
DLHB-1	0-0.5	Residuals	A60589	PCDD/PCDF + PCB	
	2-4	Residuals	A60590	PCB	
	10-12	Residuals	A60591	PCB	
	12-14	Residuals	A60592	PCB	
	14-16	Residuals	A60593	TCL/TAL	
	16-18	Soil	A60594	TCL/TAL	
DLHB-2	0 - 0.5	Soil	A60582	PCDD/PCDF + PCB	
	0.5 - 2	Residuals	A60583	PCB	
	2 - 4	Residuals	A60584	PCB	
	4 - 6	Residuals	A60585	PCB	
	6 - 8	Residuals	A60586	TCL/TAL	
	8 - 10	Soil	A60587	TCL/TAL	

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TABLE 2-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
FRDLs (Cont'd.)					
DLHB-3	0 – 0.5	Residuals	A60595	PCB	
	0.5 – 2	Residuals	A60596	PCB	MS/MSD
	2 – 4	Residuals	A60597	PCB	
	4 – 6	Residuals	A60598	PCB	
	6 – 8	Residuals	A60599	TCL/TAL	MS/MSD
	8 – 10	Soil	A60600	TCL/TAL	MS/MSD
DLHB-4	0 – 0.5	Soil	A60580	PCB	
DLHB-5	0 – 0.5	Soil	A60581	PCDD/PCDF+PCB	
DLHB-6	0 – 0.5	Residuals	A60601	PCB	
	2 – 4	Residuals	A60602	PCB	
	4 – 6	Residuals	A60603	PCB	
	6 – 8	Residuals	A60604	PCB	Duplicate (A60607)
	8 – 10	Residuals	A60605	TCL/TAL	
	10 – 12	Soil	A60606	TCL/TAL	
MW-12R	8 – 10	Soil	A60706	PCB	
	16 – 18	Soil	A60707	PCB	
	24 – 26	Soil	A60695	PCB	
	36 – 38	Soil	A60696	PCB	
MW-122B	4 – 6	Soil	A60079	PCB	Duplicate (A60080)
	18 – 20	Soil	A60081	PCB	
Former Type III Landfill					
FLF-1	0 – 0.5	Soil	A60094	PCB	
	2 – 4	Residuals	A60095	PCB	MS/MSD
	4 – 6	Residuals	A60096	PCB	MS/MSD
	6 – 6.5	Residuals	A60097	TCL/TAL	MS/MSD
	6.5 – 8	Soil	A60098	TCL/TAL	MS/MSD
FLF-2	0 – 0.5	Soil	A60632	PCB	
	20 – 22	Residuals	A60633	PCB	MS/MSD
	20 – 22	Soil	A60634	PCB	
FLF-3	0 – 0.5	Soil	A60635	PCB	
	14 – 16	Residuals	A60636	PCB	MS/MSD
	14 – 16	Soil	A60637	PCB	
MW-19BR	6 – 8	Soil	A60697	PCB	Duplicate (A60701)
	14 – 16	Soil	A60698	PCB	
	24 – 26	Soil	A60699	PCB	MS/MSD
	38 – 40	Soil	A60700	PCB	
MW-127A	4 – 6	Soil	A60103	PCB	Duplicate (A60104)
Western Disposal Area					
WA-1	0-0.5	Soil	A60064	PCB	
	2-4	Residuals	A60059	PCB	
	8-10	Residuals	A60060	PCB	
	10-12	Residuals	A60061	PCB	
	12-13	Residuals	A60062	TCL/TAL	
	13-14	Soil	A60063	TCL/TAL	

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TABLE 2-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
Western Disposal Area (Cont'd.)					
WA-2	0-0.5	Soil	A60670	PCB + PCDD/PCDF	
	6-8	Residuals	A60671	PCB	Duplicate (A60672)
	8-10	Residuals	A60673	PCB	
	10-12	Residuals	A60674	PCB	
	12-14	Residuals	A60675	TCL/TAL	
	14-18	Soil	A60676	TCL/TAL	
WA-3	0-0.5	Soil	A60664	PCB	
	2-4	Residuals	A60665	PCB	
	10-12	Residuals	A60666	PCB	
	12-14	Residuals	A60667	PCB	
	14-16	Residuals	A60668	TCL/TAL	
	16-18	Soil	A60669	TCL/TAL	
WA-4	0-0.5	Residuals	A60659	PCB	
	4-6	Residuals	A60660	PCB	
	6-8	Residuals	A60661	PCB	
	8-10	Residuals	A60662	TCL/TAL	
	10-12	Soil	A60663	TCL/TAL	
WA-5	0-0.5	Soil	A60645	PCB	
	2-4	Residuals	A60646	PCB	
	10-12	Residuals	A60647	PCB	
	18-20	Residuals	A60648	PCB	Duplicate (A60652)
	20-22	Residuals	A60649	PCB	
	22-23.5	Residuals	A60650	TCL/TAL	
	23.5-26	Soil	A60651	TCL/TAL	
WA-6	0-0.5	Soil	A60087	PCB + PCDD/PCDF	
	4-6	Residuals	A60082	PCB	
	8-10	Residuals	A60083	PCB	
	10-12	Residuals	A60084	PCB	
	12-13	Residuals	A60085	TCL/TAL	
	13-15	Soil	A60086	TCL/TAL	
WA-7	0-0.5	Soil	A60638	PCB	
	8-10	Residuals	A60639	PCB	
	10-12	Residuals	A60640	PCB	
	16-18	Residuals	A60641	PCB	
	18-20	Residuals	A60642	PCB	
	20-22	Residuals	A60643	TCL/TAL	
	22-24	Soil	A60644	TCL/TAL	
WA-8	0-0.5	Soil	A60653	PCB	
	2-4	Residuals	A60654	PCB	
	6-8	Residuals	A60655	PCB	
	8-10	Residuals	A60656	PCB	
	10-12	Residuals	A60657	TCL/TAL	
	12-14	Soil	A60658	TCL/TAL	
MW-7B	4-6	Soil	A60076	PCB	
	14-16	Soil	A60077	PCB	
	24-26	Soil	A60078	PCB	Not analyzed

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TABLE 2-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
Western Disposal Area (Cont'd.)					
B-7B	8-10	Soil	A60702	TCL/TAL	
	10-12	Soil	A60703	TCL/TAL	
MW-8A	0-0.5	Soil	A60105	PCB	
	4-6	Residuals	A60089	PCB	
	8-10	Residuals	A60090	PCB	
	10-12	Residuals	A60091	PCB	
	12-12.5	Residuals	A60092	TCL/TAL	
	12.5-14	Soil	A60093	TCL/TAL	
MW-20B	6-8	Soil	A60056	PCB	
	16-18	Soil	A60057	PCB	
	20-22	Soil	A60058	PCB	
MW-120B	0-0.5	Soil	A60048	PCB	
	6-8	Residuals	A60049	PCB	Duplicate (A60050)
	10-12	Residuals	A60051	PCB	
	14-16	Residuals	A60052	PCB	
	16-18	Residuals	A60053	PCB	
	18-19	Residuals	A60054	TCL/TAL	
	19-20	Soil	A60055	TCL/TAL	
Pilot Study Area					
MA-1	0 - 1.5	Soil	A60065	TAL	
	3 - 4.5	Soil	A60066	TAL	
MA-2	0 - 1.5	Soil	A60067	TAL	
	3 - 4.5	Soil	A60068	TAL	
MA-3	0 - 1.5	Soil	A60069	TAL	
	3 - 4.5	Soil	A60070	TAL	
MA-4	0 - 1.5	Soil	A60071	TAL	MS/MSD
	3 - 4.5	Soil	A60072	TAL	
MA-5	0 - 1.5	Soil	A60073	TAL	
	3 - 4.5	Soil	A60074	TAL	Duplicate (A60075)
Former Bryant Mill Pond					
BMP-1	0-0.5	Soil	A60626	PCB	
	7-8	Soil	A60627	PCB	
	8-9	Soil	A60628	PCB	MS/MSD
BMP-2[2]	0-1	Soil	A60621	TCL/TAL+PCB+TOC	MS/MSD
	1-2	Soil	A60622	PCB+TOC	
	2-3	Soil	A60623	PCB+TOC	
	3-4	Soil	A60624	TCL/TAL+PCB+TOC	
	4-5	Soil	A60625	PCB+TOC	
BMP-3	0-0.5	Soil	A60629	PCB	
	6-7	Residuals	A60630	PCB	
	7-8	Soil	A60631	PCB	
BMP-4	0-0.5	Soil	A60731	PCB	
	6-7	Soil	A60732	PCB	
	7-7.5	Soil	A60733	PCB	

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TABLE 2-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
Former Bryant Mill Pond (Cont'd.)					
BMP-5	0-0.5	Soil	A60728	PCB	
	5-6	Soil	A60729	PCB	
	5-6.5	Soil	A60730	PCB	
BMP-6	0-0.5	Soil	A60734	PCB	
	0.5-1.5	Soil	A60735	PCB	
	1.5-2.5	Soil	A60736	PCB	
BMP-7	0-0.5	Soil	A60726	PCB + TOC	MS/MSD
	0.5-1.0	Soil	A60727	PCB + TOC	
BMP-8	0-0.5	Soil	A60710	PCB + TOC	
	0.5-1.5	Soil	A60711	PCB + TOC	Duplicate (A60712)
BMP-9	0-0.5	Soil	A60738	PCB + TOC	
	0.5-1.5	Soil	A60739	PCB + TOC	
BMP-10	0-0.5	Soil	A60608	PCB + TOC	Duplicate (A60610)
	1.5-3.0	Soil	A60609	PCB	
BMP-11	0-1	Soil	A60611	PCB + TOC	
	1-2	Soil	A60612	PCB	
	2-3	Soil	A60613	PCB	
	3-4	Soil	A60614	PCB	
	5-7	Soil	A60615	PCB	
BMP-12[2]	0-1	Soil	A60616	TCL/TAL+PCB+TOC	
	1-2	Soil	A60617	PCB+TOC	
	2-3	Soil	A60618	PCB+TOC	
	3-4	Residuals	A60619	TCL/TAL+PCB+TOC	
	5-7	Soil	A60620	PCB+TOC	
MW-128A	6-8	Soil	A60704	PCB	
	14-16	Soil	A60705	PCB	
Portage Creek Floodplain					
BLHB-1	0 - 0.5	Soil	A60720	PCB	
	1.0 - 1.5	Soil	A60721	PCB	
BLHB-2	0 - 0.5	Soil	A60716	PCB	MS/MSD
	0.5 - 1	Soil	A60719	PCB	
BLHB-3	0 - 0.5	Soil	A60713	PCB	Duplicate (A60714)
	5 - 5.5	Soil	A60715	PCB	
MLHB-1	0-0.5	Soil	A60722	PCB	
	0.5-1	Soil	A60723	PCB	
MLHB-2	0-0.5	Soil	A60724	PCB	
	1.5-2	Soil	A60725	PCB	
Portage Creek Sediments					
GS-1	0-0.04	Sediment	A63000	PCB	
GS-2	0-0.04	Sediment	A63001	PCB	
GS-3	0-0.04	Sediment	A63002	PCB	
GS-4	0-0.04	Sediment	A63003	PCB	
GS-5	0-0.04	Sediment	A63004	PCB	Duplicate (A63005) and MS/MSD

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TABLE 2-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION RESIDUALS/SOIL/SEDIMENT SAMPLES

Location	Depth (ft)[1]	Media	Sample ID	Analysis	Comments
Residential Soil Samples					
BMSS-1	0 - 0.5	Soil	A60740	PCB	
BMSS-2	0 - 0.5	Soil	A60741	PCB	
BMSS-3	0 - 0.5	Soil	A60708	PCB	
BMSS-4	0 - 0.5	Soil	A60709	PCB	
Monarch Clarifier					
MC-1	0 - 0.2	Residuals	A69000	PCB	

Notes:

[1]The depth is referenced to ground surface.
[1]Samples also analyzed for PCB congeners and oil and grease.

TABLE 2- 3

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF GEOTECHNICAL TESTING SAMPLES

Boring	Depth[1] (ft)	Sampling Method	Material	Moisture Content	Organic Content	Atterberg Limits	Specific Gravity	UU Triaxial	1-D Consolidation	Gradation
Bryant HRDL										
GEO-1	8-10	SS	Sand/clay	X						X
	16-18	ST	Sand/peat	X	X	X	X			
GEO-2	8-10	SS	Sand/silt	X						
	10-12	SS	Clay/silt	X						
	12-14	SS	Silt/peat	X						
	14-16	ST	Sand/peat	X	X	X	X	X		X
	16-18	SS	Peat	X						
	18-20	SS	Clay/silt	X						
MW-22B	8-10	SS	Residuals	X	X	X				
MW-123B	20-22	ST	Clay	X		X	X	X	X	X
Monarch HRDL										
MLSS-2	6-8	SS	Residuals	X	X		X			
	8-10	SS	Residuals	X	X					
	12-14	SS	Residuals	X	X		X			
MLSS-3	2-4	SS	Residuals	X	X		X			
	10-12	SS	Residuals	X	X					
	12-14	SS	Residuals	X	X		X			
FRDLs										
DLHB-1	4-6	SS	Residuals	X	X		X			
DLHB-4	0-2	SS	Residuals	X	X		X			
	4-6	SS	Residuals	X	X		X			
MW-122A	16-18	SS	Peat	X	X	X				X
Pilot Study Area										
MW-2S	2-4	SS	Silt/organics	X						
	4-6	SS	Clay/organics	X						
	6-7	SS	Organics	X						
Former Type III Landfill										
MW-127A	6-8	SS	Clay	X		X				X

See Notes on Page 2

TABLE 2-3

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF GEOTECHNICAL TESTING SAMPLES

Boring	Depth[1] (ft)	Sampling Method	Material	Moisture Content	Organic Content	Atterberg Limits	Specific Gravity	UU Triaxial	1-D Consolidation	Gradation
Western Disposal Area										
MW-7B	36-38	SS	Clay	X		X				X
MW-20B	23.5 - 25.5	ST	Peat							
	26-28	SS	Clay	X	X	X				X
	27.5-28	SS	Clay/peat	X						X

Notes:

ST - Shelby Tube (ASTM D1587).
SS - Split-spoon sampler.
[1] Depth is referenced to ground surface.

TABLE 2-4

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
MONITORING WELL AND PIEZOMETER CONSTRUCTION DETAILS

Well/Piezometer	Date Installed	Date Developed	Total Depth (ft)[1]	Bottom of Screen (ft)[1]	Top of Screen (ft)[1]	Top of Sand (ft)[1]	Top of Bentonite (ft)[1]	Formation Screened
Bryant HRDL								
MW-12R	08/19/93	08/30/93	41.5	41.1	36.1	34.0	31.0	Yellow-brown sand and silt, and sand and gravel.
MW-22A	08/12/93	08/26/93	20.1	20.1	10.1	7.9	5.0	Brown fine sand, clay, peat, and gray fine sand
MW-22B	08/11/93	09/01/93	48.0	47.0	42.0	40.0	37.0	Dark gray fine to medium sand.
MW-121A	07/26/93	08/27/93	24.0	24.0	19.0	19.0	16.0	Gray-brown medium sand.
MW-121B	07/26/93	09/03/93	34.0	33.6	28.6	27.0	24.0	Brown fine to medium sand and silt.
MW-123A	08/10/93	08/27/93	21.0	21.0	11.0	9.4	6.0	Fill, peat, and medium sand.
MW-123B	08/10/93	09/03/93	32.0	32.0	27.0	25.2	22.0	Brown fine sand
P-1	08/11/93	--[2]	18.0	17.8	6.0	6.0	4.0	Dike material - Fill
P-1C	08/24/93	--[2]	8.0	7.8	4.0	--[3]	--[3]	Dike material - Fill
P-2	08/10/93	--[2]	17.0	16.1	6.5	4.0	2.0	Dike material - Fill
P-2C	08/24/93	--[2]	6.5	6.1	2.5	--[3]	--[3]	Dike material - Fill
P-3	08/11/93	--[2]	18.2	18.0	8.0	6.0	4.0	Dike material - Fill
P-3C	08/24/93	--[2]	8.0	7.8	4.0	--[3]	--[3]	Dike material - Fill
Monarch HRDL								
MW-124A	08/23/93	09/02/93	36.0	36.0	26.0	24.0	21.0	Brown fine sand
MW-124B	08/19/93	09/03/93	59.0	59.0	54.0	52.0	48.5	Gray fine sand and clay.
MW-125P	08/23/93	NA	14.9	14.5	9.5	8.5	4.5	Residuals.
MW-125A	08/22/93	08/25/93	25.0	24.5	19.5	19.4	16.4	Coarse sand, peat, and fine to coarse sand
MW-125B	07/21/93	08/25/93	35.0	34.5	30.0	28.0	25.0	Brown coarse sand and gravel.
MW-126A	07/21/93	08/25/93	20.5	20.5	15.5	15.5	12.5	Peat and brown/gray fine sand.
MW-126B	07/21/93	08/25/93	31.5	31.5	26.5	25.0	23.0	Brown to gray-brown fine to medium sand and gray clay
FRDLs								
MW-122A	08/06/93	08/26/93	21.5	21.5	11.5	9.4	6.0	Brown, fine to medium sand, peat, and gray sand
MW-122B	08/04/93	08/31/93	60.5	60.3	55.3	53.2	50.0	Gray fine sand
Former Type III Landfill								
MW-19BR	08/20/93	08/31/93	39.4	39.0	34.0	32.0	29.2	Brown silt, brown sand and gravel, and fine sand
MW-127A	08/18/93	09/01/93	6.0	6.0	1.0	1.0	0.5	Dark brown fine to medium sand
Western Disposal Area								
MW-7B	08/07/93	09/02/93	46.0	46.0	41.0	39.5	36.5	Gray medium to coarse sand, and gray clay
MW-8A	08/10/93	08/27/93	18.0	18.0	13.0	13.0	10.0	Peat, sand, gravel, and clay
MW-20B	07/29/93	09/02/93	32.5	32.5	27.5	26.0	23.0	Peat, brown/gray fine to medium sand.
MW-120A	07/28/93	08/26/93	23.8	23.5	18.5	18.2	15.0	Coarse sand and gravel
MW-120B	07/27/93	08/31/93	30.5	30.5	25.5	25.5	22.5	Brown sand and gravel
Pilot Study Area								
MW-2S	08/17/93	08/27/93	6.0	6.0	1.0	1.0	0.5	Dark brown fine to medium sand, and black silt
Former Bryant Mill Pond								
MW-128A	08/23/93	08/26/93	21.7	20.6	10.6	9.0	6.0	Fine to medium sand, peat, clay, and gravel

Notes:

[1]The depth is referenced to ground surface.
[2]Piezometers were not developed.
[3]Piezometers were installed as drive points. No sand pack or bentonite was used.
NA - Not applicable, wells screened in residuals were not developed as per MDNR guidance.

TABLE 2-5

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
SUMMARY OF VOLUMES PURGED AND FILTER PACK MATERIALS

Well/Piezometer No.	Well Volumes of Water Purged During Development	Volume of Water Purged During Development (gal.)	Well Volumes of Water Purged During Sampling	Volume of Water Purged During Sampling (gal.)	Filter Pack Material
Bryant HRDL					
MW-11	[1]	[1]	1.1[3]	20.3	Non-native Sand[6]
MW-12	[1]	[1]	1.2[3]	11.5	Non-native Sand[6]
MW-12R	15.8	55	3.2[4]	12	00-Size Monie Sand
MW-22A	97.56	80	3.6[4]	5	00-Size Monie Sand
MW-22B	13.01	70	3.4[4]	20	00-Size Monie Sand
MW-23	[1]	[1]	3.2[4]	7	Non-native Sand[6]
MW-24	[1]	[1]	3.1	4	Non-native Sand[6]
MW-25	[1]	[1]	1.1[3]	2	Non-native Sand[6]
MW-26	[1]	[1]	3	4.5	Native Sand
MW-121A	46.88	75	3	6	00-Size Monie Sand
MW-121B	11.3	34	1.2[3]	4	00-Size Monie Sand
MW-123A	87.82	50	3	3	00-Size Monie Sand
MW-123B	11.72	30	3.4[4]	10	00-Size Monie Sand
P-1	32.35	11	--	--	00-Size Monie Sand
P-1C	[3]	[3]	--	--	Native Sand
P-2	38.34	25	--	--	00-Size Monie Sand
P-2C	[3]	[3]	--	--	Native Sand
P-3	6.51	22	--	--	00-Size Monie Sand
P-3C	[3]	[3]	--	--	Native Sand
Monarch HRDL					
MW-124A	42.5	51	3.1	4	00-Size Monie Sand
MW-124B	2.46	20	2.1[3]	7	00-Size Monie Sand
MW-125P	[2]	[2]	2[3]	2.6	00-Size Monie Sand
MW-125A	6.23	46	3	5	00-Size Monie Sand
MW-125B	21.85	85	3	12	00-Size Monie Sand
MW-126A	22.01	35	3.2[4]	7	00-Size Monie Sand
MW-126B	15.63	55	3.5[4]	14	00-Size Monie Sand
FRDLs					
MW-122A	71.43	55	3.3[4]	3	00-Size Monie Sand
MW-122B	7.06	50	3	22	00-Size Monie Sand
Former Type III Landfill					
MW-1	[1]	[1]	3.2	5.6	Non-native Sand[6]
MW-3	[1]	[1]	3.2	9	Non-native Sand[6]
MW-5	[1]	[1]	3.5	2.6	Non-native Sand[6]
MW-15	[1]	[1]	3.1	16	Non-native Sand[6]
MW-16B	[1]	[1]	3.2	10	Non-native Sand[6]
MW-16C	[1]	[1]	3	22	Non-native Sand[6]
MW-17A	[1]	[1]	1[3]	2.3	Non-native Sand[6]
MW-17B	[1]	[1]	3.1	15.3	Non-native Sand[6]
MW-19BR	29.66	70	3	7.5	00-Size Monie Sand
MW-19C	[1]	[1]	3.2	14	Non-native Sand[6]
MW-19D	[1]	[1]	3.1	21	Non-native Sand[6]
MW-112	[1]	[1]	3.4	6.6	Native Sand
MW-127A	1.33	16	3.1[4]	2.5	00-Size Monie Sand
Western Disposal Area					
MW-7	[1]	[1]	3.2	7	Non-native Sand[6]
MW-7B	18.47	75	1.7[3]	8	00-Size Monie Sand
MW-8	[1]	[1]	3	7	Non-native Sand[6]
MW-8A	40.24	40	3	5	00-Size Monie Sand
MW-20	[1]	[1]	3.5[4]	6	Non-native Sand[6]
MW-20B	180.62	233	3	10	00-Size Monie Sand
MW-21	[1]	[1]	3.1	5.5	Native Sand
MW-120A	46.58	34	1.3[3]	1	00-Size Monie Sand
MW-120B	36.89	65	3.5[4]	6	00-Size Monie Sand
Pilot Study Area					
MW-2	[1]	[1]	4	6.06	Non-native Sand[6]
MW-26	37.13	30	3.3	2.7	00-Size Monie Sand
MW-18	[1]	[1]	3	17.4	Non-native Sand[6]
Former Bryant Mill Pond					
MW-104	[1]	[1]	3	5.3	Native Sand
MW-106	[1]	[1]	3.2[4]	4.6	Native Sand
MW-108	[1]	[1]	3	5.52	Native Sand
MW-114	[1]	[1]	3.1	19	Native Sand
MW-128A	97.4	85	3.6	3	00-Size Monie Sand

Notes:
[1] Existing wells were not developed.
[2] Perched wells were not developed at MDNR's request.
[3] Piezometer dry at time of development.
[4] Parameters not stabilized; therefore, more than three volumes were removed.
[5] Well went dry during sampling event.
[6] Well logs indicate that a non-native sand was used but do not specify grain size.
--Groundwater from piezometers was not sampled.
NA - Not applicable.

TABLE 2-8

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF REMEDIAL INVESTIGATION GROUNDWATER/LEACHATE SAMPLES

Location	Media	Sample ID	Analysis	Comments
Bryant HRDL				
MW-11	Groundwater	A66008	TCL/TAL[1]	
MW-12	Groundwater	A66054	TCL/TAL[1]	
MW-12R	Groundwater	A66028	TCL/TAL[1]	
MW-22A	Groundwater	A66017	TCL/TAL[1]	
MW-22B	Groundwater	A66018	TCL/TAL[1]	
MW-23	Groundwater	A66034	TCL/TAL[1]	
MW-24	Groundwater	A66009	TCL/TAL[1]	
MW-25	Groundwater	A66027	TCL/TAL[1]	
MW-26	Groundwater	A66015	TCL/TAL[1]	MS/MSD
MW-121A	Groundwater	A66013	TCL/TAL[1]	
MW-121B	Groundwater	A66014	TCL/TAL[1]	
MW-123A	Groundwater	A66025	TCL/TAL[1]	
MW-123B	Groundwater	A66026	TCL/TAL[1]	
Rivulet 2	Groundwater	A66007	TCL/TAL[1]	
Monarch HRDL				
MW-124A	Groundwater	A66003	TCL/TAL[1]	
MW-124B	Groundwater	A66004	TCL/TAL[1]	
MW-125P	Leachate	A66016	TCL/TAL[1]	
MW-125A	Groundwater	A66005	TCL/TAL[1]	
MW-125B	Groundwater	A66006	TCL/TAL[1]	
MW-126A	Groundwater	A66010	TCL/TAL[1]	
MW-126B	Groundwater	A66011	TCL/TAL[1]	Duplicate (A66012)
FRDLs				
MW-122A	Groundwater	A66033	TCL/TAL[1]	Duplicate (A66038)
MW-122B	Groundwater	A66039	TCL/TAL[1]	
Former Type III Landfill				
MW-1	Groundwater	A66032	TCL/TAL[1]	MS/MSD
MW-3	Groundwater	A66054	TCL/TAL[1]	
MW-5	Groundwater	A66046	TCL/TAL[1]	
MW-15	Groundwater	A66055	TCL/TAL[1]	
MW-16B	Groundwater	A66059	TCL/TAL[1]	MS/MSD
MW-16C	Groundwater	A66058	TCL/TAL[1]	
MW-17A	Groundwater	A66056	TCL/TAL[1]	
MW-17B	Groundwater	A66057	TCL/TAL[1]	
MW-19BR	Groundwater	A66030	TCL/TAL[1]	Duplicate (A66031)
MW-19C	Groundwater	A66040	TCL/TAL[1]	
MW-19D	Groundwater	A66041	TCL/TAL[1]	
MW-112	Groundwater	A66045	TCL/TAL[1]	
MW-127A	Groundwater	A66044	TCL/TAL[1]	
Western Disposal Area				
MW-7	Groundwater	A66001	TCL/TAL[1]	
MW-7B	Groundwater	A66000	TCL/TAL[1]	
MW-8	Groundwater	A66053	TCL/TAL[1]	
MW-8A	Groundwater	A66052	TCL/TAL[1]	
MW-20	Groundwater	A66049	TCL/TAL[1]	Duplicate (A66050)
MW-20B	Groundwater	A66051	TCL/TAL[1]	
MW-21	Groundwater	A66002	TCL/TAL[1]	
MW-120A	Groundwater	A66020	TCL/TAL[1]	
MW-120B	Groundwater	A66019	TCL/TAL[1]	Duplicate (A66024)
Pilot Study Area				
MW-2	Groundwater	A66060	TCL/TAL[1]	
MW-2S	Groundwater	A66022	TCL/TAL[1]	Duplicate (A66023)
MW-18	Groundwater	A66061	TCL/TAL[1]	
Former Bryant Mill Pond				
MW-104	Groundwater	A66037	TCL/TAL[1]	
MW-106	Groundwater	A66063	TCL/TAL[1]	
MW-108	Groundwater	A66047	TCL/TAL[1]	
MW-114	Groundwater	A66036	TCL/TAL[1]	
MW-128A	Groundwater	A66035	TCL/TAL[1]	

Note:

[1] Parameters also tested were pH, specific conductance, temperature, turbidity, TOC, DO, COD, TSS, HCO_3^-, NO_3^{2-}, Cl^-, SO_4^{2-}, and CO_3^{2-}.

TABLE 2-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location / Sample ID	MW-11 A66006				MW-12 A66064				MW-12R A66028				MW-22A A66017			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Bryant HRDL																
FIELD PARAMETERS[4]																
pH	–	–	–	7.6	7.17	–	–	7.15	6.9	6.85	6.82	6.94	6.84	6.98	6.97	7.05
Temperature	–	–	–	13.7	15.8	–	–	17.9	14.7	14.7	14.6	15.0	17.0	16.5	16.8	17.1
Specific Conductance	–	–	–	630	940	–	–	1190	1260	1300	1300	1300	1120	1200	1190	1200
Dissolved Oxygen				3.29				10.27				2.75				2.87
Turbidity				22.4				6.09				26.6				3.03
Well volumes of water purged during sampling				1.1[3]				1.2[3]				3.2				3.6
GENERAL PARAMETERS (mg/L)																
bicarbonate				280				600				670				610
chloride				78				44				49				11.8
nitrate				<0.01J				0.04				2.5J				0.48J
sulfate				59				11				10				73
COD				5.2				18				28				21
TOC				1				8.2				9.8				11.7
TSS				13.4				29				39				26

Location / Sample ID	MW-22B A66018				MW-23 A66034				MW-24 A66009				MW-25 A66027			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Bryant HRDL (Cont'd.)																
FIELD PARAMETERS[4]																
pH	7.67	7.71	7.68	7.80	7.14	7.19	7.18	7.25	7.59	6.76	6.72	6.77	6.84	–	–	6.96
Temperature	12.8	12.3	13.0	12.9	13.0	13.1	13.9	14.5	13.2	13.1	13.4	15.1	14.2	–	–	15.7
Specific Conductance	848	845	920	910	970	960	950	940	785	1150	1210	1250	1030	–	–	1110
Dissolved Oxygen				2.99				7.35				2.9				1.72
Turbidity				14.6				75				3.25				20.8
Well volumes of water purged during sampling				3.4				3.2				3.1				1.1[3]
GENERAL PARAMETERS (mg/L)																
bicarbonate				320				420				560				600
chloride				97				37				78				25
nitrate				14.5J				0.06J				<0.01J				1.27J
sulfate				67				16				8.0				7.7
COD				<5				26				22				42
TOC				0.7				4				5.9				13.4
TSS				44				35				48				46

See Notes on Page 8

TABLE 2-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location / Sample ID	MW-26[2] A66015				MW-121A A66013				MW-121B A66014				MW-123A A66025			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Bryant HRDL (Cont'd.)																
FIELD PARAMETERS[4]																
pH	7.22	7.23	7.17	7.3	6.90	6.94	6.92	7.02	7.28	–	–	–	6.60	6.64	6.65	6.77
Temperature	9.5	10.5	11.6	11.9	13.4	13.7	14.2	14.6	14.9	–	–	–	19.0	18.8	18.6	19.0
Specific Conductance	827	930	930	920	1340	1420	1450	1480	1010	–	–	–	755	764	756	732
Dissolved Oxygen				9.29				2.75				–				2.61
Turbidity				2.49				3.56				–				3.89
Well volumes of water purged during sampling				3.0				3.0				1.2[3]				3.0
GENERAL PARAMETERS (mg/L)																
bicarbonate				310				680				540				380
chloride				82				70				47				14
nitrate				0.01J				2.2J				<0.01J				0.35J
sulfate				91				11.4				5.8				5.7
COD				<5				77				160				44
TOC				0.8				NA				190				15
TSS				6.5				44				69				49

Location / Sample ID	MW-123B A66026				RIVULET2 A66007				MW-124A A66003				MW-124B A66004			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Brant HRDL (Cont'd.)									**Monarch HRDL**							
FIELD PARAMETERS[4]																
pH	7.17	7.17	7.23	7.26	–	–	–	7.19	7.17	7.16	7.17	7.25	8.93	7.24	–	7.42
Temperature	14.6	14.6	14.2	16.2	–	–	–	10.2	15.4	15.6	16.0	16.4	15.9	13.2	–	14.7
Specific Conductance	711	710	705	701	–	–	–	930	1310	1290	1300	1290	1460	1530	–	1560
Dissolved Oxygen				1.88				1.81				5.08				4.12
Turbidity				5.37				1.37				9.2				17.6
Well volumes of water purged during sampling				3.4				3.0				3.1				2.1[3]
GENERAL PARAMETERS (mg/L)																
bicarbonate				300				320				390				400
chloride				34				82				165				210
nitrate				0.39J				0.01J				9.0J				2.5J
sulfate				65				74				70				164
COD				7				5.2				11.5				<5
TOC				0.8				0.7				1.2				1.3
TSS				6.2				5.0				6.4				28

See Notes on Page 8

TABLE 2-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location	MW-125P				MW-125A				MW-125B				MW-126A			
Sample ID	A66016				A66005				A66006				A66010			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Monarch HRDL (Cont'd.)																
FIELD PARAMETERS[4]																
pH	NA	5.49	–	5.4	6.88	6.85	6.9	6.96	7.26	7.29	7.27	7.32	6.3	6.45	6.48	6.58
Temperature	15.8	17.1	–	14.8	13.1	13.3	13.4	12.6	13.2	13.8	13.5	13.4	13.6	13.2	13.2	14.3
Specific Conductance	1010	1.01	–	1000	1300	1310	1300	1290	1130	1120	1120	1120	2380	2100	2080	1980
Dissolved Oxygen				7.17				3.89				2.29				2.04
Turbidity				8.71				3.16				10.9				27.8
Well volumes of water purged during sampling				2.0[3]				3.0				3.0				3.2
GENERAL PARAMETERS (mg/L)																
bicarbonate				380				480				350				820
chloride				13.1				140				141				93
nitrate				2.6J				0.02J				0.14J				0.90J
sulfate				3.4				54				85				8.9
COD				930				8.3				<5				240
TOC				400				2.2				2.3				174
TSS				32				2.1				1.9				46

Location	MW-126B				MW-126B (Dup)				MW-122A				MW-122A (Dup)			
Sample ID	A66011				A66012				A66033				A66038			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Monarch HRDL (Cont'd.)									FRDLs							
FIELD PARAMETERS[4]																
pH	7.16	7.22	7.21	7.27	7.16	7.22	7.21	7.27	7.03	7.05	7.03	7.15	7.03	7.05	7.03	7.15
Temperature	12.8	13.2	13.0	13.6	12.8	13.2	13.0	13.6	18.2	18.3	18.9	18.0	18.2	18.3	18.9	18.0
Specific Conductance	1160	1160	1110	1110	1160	1160	1110	1110	597	590	592	606	597	590	592	606
Dissolved Oxygen				1.76				1.76				3.14				3.14
Turbidity				5.94				5.94				0.65				0.65
Well volumes of water purged during sampling				3.5				3.5				3.3				3.3
GENERAL PARAMETERS (mg/L)																
bicarbonate				370				390				320				310
chloride				114				116				8.6				9.3
nitrate				<0.01J				2.1J				0.07J				0.68J
sulfate				59				66				9.4				8.7
COD				8.4				12.6				23				32
TOC				6.2				5.8				9.2				9.0
TSS				6.1				7.1				19.2				17.8

See Notes on Page 8

TABLE 2-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location	MW-122B				MW-1[2]				MW-3				MW-5			
Sample ID	A66038				A66032				A66054				A66046			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
FRDLs (Cont'd.)					**Former Type III Landfill**											
FIELD PARAMETERS[4]																
pH	7.04	7.00	6.98	7.07	6.94	6.81	6.82	6.76	6.36	6.37	6.37	6.58	6.86	6.86	6.86	6.94
Temperature	13.8	12.9	12.5	13.6	15.8	17.2	17.2	16.7	14.4	14.2	14.4	16.0	14.8	15.0	14.9	16.5
Specific Conductance	826	842	910	846	1060	1050	1050	1050	1240	1250	1250	1240	1440	1450	1460	1450
Dissolved Oxygen				3.02				1.68				2.51				9.8
Turbidity				2.99				1.64				3.25				5.37
Well volumes of water purged during sampling				3.0				3.2				3.2				3.5
GENERAL PARAMETERS (mg/L)																
bicarbonate				480				480				600				710
chloride				186				41				36				47
nitrate				0.12J				0.05J				0.09				0.02J
sulfate				6.0				25				8				6
COD				31				11				34				28
TOC				11.5				3.1				12.3				11.4
TSS				28				27				48				38

Location	MW-15				MW-16B[3]				MW-16C				MW-17A			
Sample ID	A66055				A66059				A66058				A66056			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Former Type III Landfill (Cont'd.)																
FIELD PARAMETERS[4]																
pH	6.30	6.28	6.43	6.56	6.79	6.71	6.79	6.70	7.71	7.75	7.57	7.78	6.42	–	–	6.51
Temperature	14.4	14.0	13.7	14.4	15.9	16.6	16.5	19.3	15.2	15.6	16.4	18.0	15.4	–	–	19.1
Specific Conductance	1510	1550	1560	1550	772	844	900	846	539	542	542	527	1490	–	–	1470
Dissolved Oxygen				2.61				1.11				3.47				2.78
Turbidity				2.77				2.45				9.13				3.45
Well volumes of water purged during sampling				3.1				3.2				3.0				1.0[5]
GENERAL PARAMETERS (mg/L)																
bicarbonate				820				460				240				730
chloride				42				27				24				52
nitrate				0.12				0.06J				0.06				0.06
sulfate				7				18				37				6
COD				50				22				6				50
TOC				19.6				8.8				1				17.9
TSS				66				20				5.9				59

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location	MW-120B				MW-120B (Dup)				MW-2				MW-29			
Sample ID	A66019				A66024				A66060				A66022			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Western Disposal Area (Cont'd)									**Pilot Study Area**							
FIELD PARAMETERS[4]																
pH	7.02	6.93	6.89	7.01	7.02	6.93	6.89	7.01	6.53	6.60	6.57	6.86	6.92	6.86	6.8	6.75
Temperature	14.9	14.7	14.6	17.4	14.9	14.7	14.6	17.4	14.6	14.7	14.7	16.4	14.8	15.5	16.3	16.1
Specific Conductance	1440	1450	1460	1460	1440	1450	1460	1460	980	960	917	960	1000	1020	1040	1020
Dissolved Oxygen				2.16				2.16				2.88				8.47
Turbidity				8.02				8.02				5.34				1.53
Well volumes of water purged during sampling				3.5				3.5				4.0				3.3
GENERAL PARAMETERS (mg/L)																
bicarbonate				740				780				400				440
chloride				34				37				69				50
nitrate				0.09J				0.03J				0.1				<0.01J
sulfate				7.8				7.0				26				12
COD				36				45				6				8
TOC				18.4				19.2				2.4				6.5
TSS				R				R				26				31

Location	MW-29 (dup)				MW-18				MW-104				MW-106			
Sample ID	A66023				A66061				A66037				A66063			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Pilot Study Area (Cont'd.)									**Former Bryant Mill Pond**							
FIELD PARAMETERS[4]																
pH	6.92	6.88	6.8	6.75	7.05	7.17	7.25	7.37	7.45	7.39	7.52	7.60	7.56	7.58	7.58	7.67
Temperature	14.8	15.5	16.3	18.1	13.5	13.8	14.1	15.4	13.6	14.0	14.3	15.3	13.6	13.8	13.9	15.4
Specific Conductance	1000	1020	1040	1020	426	722	721	711	1060	1050	1060	1050	714	716	717	700
Dissolved Oxygen				8.47				2.50				9.69				3.56
Turbidity				1.53				1.14				9.04				10.7
Well volumes of water purged during sampling				3.3				3.0				3.0				3.2
GENERAL PARAMETERS (mg/L)																
bicarbonate				450				280				340				290
chloride				55				52				55				45
nitrate				<0.01J				0.06				0.07				0.05
sulfate				6				47				144				37
COD				15				5				<5				6
TOC				6.6				0.7				2.2				1.3
TSS				32				1.9				22				12.8

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location	MW-108				MW-114				MW-128A			
Sample ID	A66047				A66036				A66035			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final
Former Bryant Mill Pond (Cont'd.)												
FIELD PARAMETERS[4]												
pH	7.77	7.72	7.75	7.82	7.6	7.64	7.57	7.60	7.19	7.29	7.25	7.32
Temperature	14.9	14.9	15.1	15.7	14.4	14.7	13.5	14.3	15.9	16.3	16.7	16.6
Specific Conductance	716	722	719	720	940	920	960	960	1260	1230	1190	1150
Dissolved Oxygen				1106				9.81				9.96
Turbidity				4.56				1.24				2.15
Well volumes of water purged during sampling				3.0				3.1				3.6
GENERAL PARAMETERS (mg/L)												
bicarbonate				260				280				420
chloride				58				89				80
nitrate				0.05				0.75J				0.17J
sulfate				54				47				55
COD				6				<5				7
TOC				0.8				0.8				1.9
TSS				3.4				0.8				1.5

Notes:

[1] Showing only the results for analytes detected above quantitation limits.
[2] MS/MSD of this sample was analyzed.
[3] Well went dry.
[4] Units for field parameters are pH – Standard Units, Temperature – Degrees Celsius, Specific Conductance – microSiemens per centimeter Dissolved Oxygen – mg/L, and Turbidity – Nephelometric Turbidity Units
ND – Not Detected.
COD – Chemical Oxygen Demand.
TOC – Total Organic Carbon.
TSS – Total Suspended Solids.
NA – Not Analyzed.
– Not recorded

Notes Explaining Data Qualifiers:

J – The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
R – The sample results are rejected.

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38090	A60018	Soil	MW-126A		x	x			
	A60513	Soil	MLSS-5		x	x			
	A60030	Soil	MW-125B		x	x			
	A60531	Soil	MLSS-4		x	x			
	A60552	Soil	MLSS-3		x	x			
	A60572	Soil	MLSS-2		x	x			
	A60040	Soil	MLSS-1		x	x			
	A60587	Soil	DLHB-2		x	x			
	A60594	Soil	DLHB-1		x	x			
	A60047	Soil	MW-121B		x	x			
	A60055	Soil	MW-120B		x	x			
	A60600	Soil	DLHB-3		x	x			x
	A60606	Soil	DLHB-6		x	x			
	A60616	Soil	BMP-12		x	x			
	A60619	Soil	BMP-12		x	x			
	A60063	Soil	WA-1		x	x			
	A60621	Soil	BMP-2		x	x			x
38091	A60001	Soil	MW-126B	x					
	A60580	Soil	DLHB-4	x					
	A60581	Soil	DLHB-5	x					
	A60035	Soil	MLSS-1	x					
	A60042	Soil	MW-121B	x					
	A60048	Soil	MW-120B	x					
	A60608	Soil	BMP-10	x				A60610	
	A60609	Soil	BMP-10	x					
	A60611	Soil	BMP-11	x					
	A60612	Soil	BMP-11	x					
	A60613	Soil	BMP-11	x					
	A60614	Soil	BMP-11	x					
	A60615	Soil	BMP-11	x					
	A60616	Soil	BMP-12	x					
	A60617	Soil	BMP-12	x					

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location	MW-17B				MW-19BR				MW-19BR (Dup)				MW-19C			
Sample ID	A66057				A66030				A66031				A66040			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Former Type III Landfill (Cont'd.)																
FIELD PARAMETERS[4]																
pH	6.32	6.31	6.34	6.52	6.41	6.43	6.59	6.71	6.41	6.43	6.59	6.71	6.87	6.77	6 7	6 85
Temperature	14.3	14.5	14.8	16.4	14.8	15.0	15.1	18.1	14.8	15.0	15.1	18.1	15.7	16.2	15 8	14 2
Specific Conductance	1420	1410	1410	1410	1380	1380	1380	1360	1380	1380	1380	1360	1110	1100	1090	1110
Dissolved Oxygen				2.79				2.79				2.79				3 2
Turbidity				5.49				1.87				1.87				1 62
Well volumes of water purged during sampling				3.1				3.0				3.0				3 2
GENERAL PARAMETERS (mg/L)																
bicarbonate				700				660				660				560
chloride				47				43				40				38
nitrate				0.09				<0.01J				0.05J				0 06J
sulfate				6				10				9.9				8 3
COD				28				28				27				25
TOC				13.4				8.5				8.7				9 3
TSS				51				35				36				34

Location	MW-18D				MW-112				MW-127A				MW-7			
Sample ID	A66041				A66045				A66044				A66001			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Former Type III Landfill (Cont'd.)													**Western Disposal Area**			
FIELD PARAMETERS[4]																
pH	7.01	7.00	6.93	7.13	7.04	6.98	7	7.05	7.08	7.1	7.13	7.17	7.58	7.42	7.47	7.44
Temperature	15.4	15.5	14.9	13.7	13.8	14.1	14.1	15.1	13.2	14	14.2	14.9	14.3	15.2	15 3	16.5
Specific Conductance	1090	1090	1090	1090	1300	1310	1310	1310	1680	1730	1750	1940	772	770	772	766
Dissolved Oxygen				3.38				9.87				8.27				1.25
Turbidity				3.51				5.88				1.66				1.63
Well volumes of water purged during sampling				3.1				3.4				3.1				3 2
GENERAL PARAMETERS (mg/L)																
bicarbonate				540				630				880				300
chloride				52				39				95				106
nitrate				0.03J				0.08J				0.01J				0 34J
sulfate				12				8				49				48
COD				10				21				41				<5
TOC				4.5				7.9				15 3				0 6
TSS				16.5				37				73				0 8

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TABLE 2-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER INC. OPERABLE UNIT
SUMMARY OF FIELD PARAMETERS AND GENERAL WATER QUALITY
RESULTS FOR GROUNDWATER/LEACHATE WATER SAMPLES[1]

Location / Sample ID	MW-7B A66000				MW-8 A66053				MW-8A A66052				MW-20 A66049			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Western Disposal Area (Cont'd.)																
FIELD PARAMETERS[4]																
pH	8.28	–	–	8.92	7.42	7.24	7.26	7.28	6.43	6.47	6.51	6.76	7.12	7.15	7.12	7.18
Temperature	14.9	–	–	15.8	14.3	14.8	14.7	16.8	15.5	15.4	15.5	20.9	13.5	13.1	13.4	17.5
Specific Conductance	541	–	–	507	637	758	752	743	1190	1180	1170	1080	1010	1000	1010	1000
Dissolved Oxygen				9.54				0.79				2.78				2.82
Turbidity				4.12				1.72				2.49				2.72
Well volumes of water purged during sampling				1.7[3]				3.0				3.7				3.5
GENERAL PARAMETERS (mg/L)																
bicarbonate				167				240				460				340
chloride				95				54				68				85
nitrate				<0.01J				0.22J				0.06J				0.07J
sulfate				43				38				21				48
COD				8.3				6				34				5
TOC				1.2				1.2				14				1.6
TSS				3.8				1				40				21

Location / Sample ID	MW-20 (Dup) A66050				MW-20B A66051				MW-21 A66002				MW-120A A66020			
Well Volume	1	2	3	Final	1	2	3	Final	1	2	3	Final	1	2	3	Final
Western Disposal Area (Cont'd.)																
FIELD PARAMETERS[4]																
pH	7.12	7.15	7.12	7.18	7.22	7.29	7.20	7.26	7.50	7.48	7.51	7.51	–	–	–	6.73
Temperature	13.5	13.1	13.4	17.5	13.8	14.0	14.1	14.3	15.6	15.9	16.0	16.0	–	–	–	15.9
Specific Conductance	1010	1000	1010	1000	940	930	930	920	745	747	746	741	–	–	–	1930
Dissolved Oxygen				2.82				2.03				9.17				1.36
Turbidity				2.72				3.42				4.25				12.3
Well volumes of water purged during sampling				3.5				3.0				3.1				1.3[3]
GENERAL PARAMETERS (mg/L)																
bicarbonate				340				320				280				1090
chloride				87				87				83				22
nitrate				0.07J				0.06J				<0.01J				<0.01J
sulfate				48				51				42				8.8
COD				<5				<5				6.2				67
TOC				1.2				1.4				0.6				22
TSS				20				13.5				2.6				19.4

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38091 (Cont'd)	A60618	Soil	BMP-12	x					
	A60619	Residuals	BMP-12	x					
	A60620	Soil	BMP-12	x					
	A60056	Soil	MW-20B	x					
	A60057	Soil	MW-20B	x					
	A60058	Soil	MW-20B	x					
	A60064	Soil	WA-1	x					
	A60628	Soil	BMP-1	x					x
38097	A60017	Residuals	MW-126A		x	x			x
	A60029	Residuals	MW-125B		x	x			
	A60039	Residuals	MLSS-1		x	x			
	A60046	Residuals	MW-121B		x	x			
	A60054	Residuals	MW-120B		x	x			
	A60062	Residuals	WA-1		x	x			
	A60512	Residuals	MLSS-5		x	x			
	A60530	Residuals	MLSS-4		x	x			
	A60551	Residuals	MLSS-3		x	x			
	A60571	Residuals	MLSS-2		x	x			
	A60586	Residuals	DLHB-2		x	x			
	A60593	Residuals	DLHB-1		x	x			
	A60599	Residuals	DLHB-3		x	x			x
	A60605	Residuals	DLHB-6		x	x			
	A60624	Soil	BMP-2		x	x			
38098	A60003	Residuals	MW-126B	x					
	A60006	Residuals	MW-126B	x					
	A60007	Residuals	MW-126B	x					
	A60024	Residuals	MW-125B	x					
	A60027	Residuals	MW-125B	x					
	A60028	Residuals	MW-125B	x					
	A60500	Residuals	MLSS-5	x					
	A60505	Residuals	MLSS-5	x					
	A60507	Residuals	MLSS-5	x					
	A60510	Residuals	MLSS-5	x					
	A60511	Residuals	MLSS-5	x					
	A60520	Residuals	MLSS-4	x					

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38098 (Cont'd.)	A60524	Residuals	MLSS-4	x					
	A60527	Residuals	MLSS-4	x					
	A60528	Residuals	MLSS-4	x					
	A60529	Residuals	MLSS-4	x					
	A60540	Residuals	MLSS-3	x					
	A60545	Residuals	MLSS-3	x				A60546	
	A60596	Residuals	DLHB-3	x					x
38128	A60036	Residuals	MLSS-1	x				A60041	
	A60037	Residuals	MLSS-1	x					
	A60038	Residuals	MLSS-1	x					
	A60548	Residuals	MLSS-3	x					
	A60549	Residuals	MLSS-3	x					
	A60550	Residuals	MLSS-3	x					
	A60560	Residuals	MLSS-2	x					
	A60562	Residuals	MLSS-2	x					
	A60568	Residuals	MLSS-2	x					
	A60569	Residuals	MLSS-2	x					
	A60570	Residuals	MLSS-2	x					
	A60582	Residuals	DLHB-2	x					
	A60583	Residuals	DLHB-2	x					
	A60584	Residuals	DLHB-2	x					
	A60585	Residuals	DLHB-2	x					
	A60589	Residuals	DLHB-1	x					
	A60590	Residuals	DLHB-1	x					
	A60591	Residuals	DLHB-1	x					
	A60633	Residuals	FLF-2	x					x
38188	A60043	Residuals	MW-121B	x					
	A60044	Residuals	MW-121B	x					
	A60045	Residuals	MW-121B	x					
	A60049	Residuals	MW-120B	x				A60050	
	A60051	Residuals	MW-120B	x					
	A60052	Residuals	MW-120B	x					
	A60053	Residuals	MW-120B	x					

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TABLE 2-8

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38188 (Cont'd.)	A60059	Residuals	WA-1	x					
	A60060	Residuals	WA-1	x					
	A60592	Residuals	DLHB-1	x					
	A60595	Residuals	DLHB-3	x					
	A60597	Residuals	DLHB-3	x					
	A60598	Residuals	DLHB-3	x					
	A60601	Residuals	DLHB-6	x					
	A60602	Residuals	DLHB-6	x					
	A60603	Residuals	DLHB-6	x					
	A60604	Residuals	DLHB-6	x				A60607	
	A60636	Residuals	FLF-3	x					x
38292 (Congener)	A60616	Residuals	BMP-12	x					
	A60617	Soil	BMP-12	x					
	A60618	Soil	BMP-12	x					
	A60619	Soil	BMP-12	x					
	A60620	Soil	BMP-12	x					
	A60621	Soil	BMP-2	x					x
	A60622	Soil	BMP-2	x					
	A60623	Soil	BMP-2	x					
	A60624	Soil	BMP-2	x					
	A60625	Soil	BMP-2	x					
38352	A60076	Soil	MW-7B	x					
	A60077	Soil	MW-7B	x					
	A60078	Soil	MW-7B	x					
	A60079	Soil	MW-122B	x				A60080	
	A60081	Soil	MW-122B	x					
	A60087	Soil	WA-6	x					
	A60621	Soil	BMP-2	x					
	A60626	Soil	BMP-1	x					
	A60629	Soil	BMP-3	x					
	A60631	Soil	BMP-3	x					
	A60632	Soil	FLF-2	x					
	A60634	Soil	FLF-2	x					

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38352 (Cont'd.)	A60635	Soil	FLF-3	x					
	A60637	Soil	FLF-3	x					
	A60638	Soil	WA-7	x					
	A60645	Soil	WA-5	x					
	A60677	Soil	P-2	x					
	A60678	Soil	P-1	x					x
	A60679	Soil	P-3	x					
38361	A60061	Residuals	WA-1	x					
	A60082	Residuals	WA-6	x					
	A60083	Residuals	WA-6	x					
	A60084	Residuals	WA-6	x					
	A60622	Residuals	BMP-2	x					
	A60623	Residuals	BMP-2	x					
	A60624	Residuals	BMP-2	x					
	A60625	Residuals	BMP-2	x					
	A60627	Soil	BMP-1	x					
	A60630	Residuals	BMP-3	x					
	A60639	Residuals	WA-7	x					
	A60640	Residuals	WA-7	x					
	A60641	Residuals	WA-7	x					
	A60642	Residuals	WA-7	x					
	A60646	Residuals	WA-5	x					
	A60647	Residuals	WA-5	x					
	A60648	Residuals	WA-5	x				A60652	
	A60649	Residuals	WA-5	x					
	A60680	Residuals	BHDL-123	x					x
38493	A60065	Soil	MA-1			x			
	A60066	Soil	MA-1			x			
	A60067	Soil	MA-2			x			
	A60068	Soil	MA-2			x			
	A60069	Soil	MA-3			x			
	A60070	Soil	MA-3			x			
	A60071	Soil	MA-4			x			x

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38493 (Cont'd.)	A60072	Soil	MA-4			x			
	A60073	Soil	MA-5			x			
	A60074	Soil	MA-5			x		A60075	
38543	A60086	Soil	WA-6		x	x			
	A60093	Soil	MW-8A		x	x			
	A60644	Soil	WA-7		x	x			
	A60651	Soil	WA-5		x	x			
	A60658	Soil	WA-8		x	x			
	A60663	Soil	WA-4		x	x			
	A60669	Soil	WA-3		x	x			
	A60676	Soil	WA-2		x	x			
	A60684	Soil	BHDL-123		x	x			x
38553	A60085	Residuals	WA-6		x	x			
	A60092	Residuals	MW-8A		x	x			
	A60643	Residuals	WA-7		x	x			
	A60650	Residuals	WA-5		x	x			
	A60657	Residuals	WA-8		x	x			
	A60662	Residuals	WA-4		x	x			
	A60668	Residuals	WA-3		x	x			
	A60675	Residuals	WA-2		x	x			
	A60683	Residuals	BHDL-123		x	x			x
	A60688	Residuals	BHDL-22		x	x		A60691	
	A60689	Soil[6]	BHDL-22		x	x		A60692[3]	
38643	A60654	Residuals	WA-8	x					
	A60655	Residuals	WA-8	x					
	A60656	Residuals	WA-8	x					
	A60659	Residuals	WA-4	x					
	A60660	Residuals	WA-4	x					
	A60661	Residuals	WA-4	x					
	A60665	Residuals	WA-3	x					
	A60666	Residuals	WA-3	x					
	A60667	Residuals	WA-3	x					

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38643 (Cont'd.)	A60671	Residuals	WA-2	x				A60672	
	A60673	Residuals	WA-2	x					
	A60674	Residuals	WA-2	x					
	A60681	Residuals	BHDL-123	x				A60685	
	A60682	Residuals	BHDL-123	x					x
	A60686	Residuals	BHDL-22	x					
	A60687	Residuals	BHDL-22	x					
	A60690	Residuals	BHDL-22	x				A60693	
38656	A60094	Soil	FLF-1	x					
	A60102	Soil	MW-124B	x					
	A60103	Soil	MW-127A	x				A60104	
	A60105	Soil	MW-8A	x					
	A60106	Soil	MW-124B	x					
	A60107	Soil	MW-124B	x				A60108	
	A60109	Soil	MW-124B	x					
	A60110	Soil	MW-124B	x					
	A60111	Soil	MW-124B	x					
	A60653	Soil	WA-8	x					
	A60664	Soil	WA-3	x					
	A60670	Soil	WA-2	x					
	A60695	Soil	MW-12R	x					
	A60696	Soil	MW-12R	x					
	A60697	Soil	MW-19BR	x				A60701[2]	
	A60699	Soil	MW-19BR	x					x
	A60706	Soil	MW-12R	x					
	A60707	Soil	MW-12R	x					
38770	A60089	Residuals	MW-8A	x					
	A60090	Residuals	MW-8A	x					
	A60091	Residuals	MW-8A	x					
	A60095	Residuals	FLF-1	x					x
38875	A60098	Soil	FLF-1		x	x			x
	A60702	Soil	B-7B		x	x			
	A60703	Soil	B-7B		x	x			
38880	A60097	Soil	FLF-1		x	x			x

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
38887	A60096	Residuals	FLF-1	x					x
38893	A60698	Soil	MW-19BR	x					
	A60700	Soil	MW-19BR	x					
	A60704	Soil	MW-128A	x					
	A60705	Soil	MW-128A	x					
	A60708	Soil	BMSS-3	x					
	A60709	Soil	BMSS-4	x					
39680	A60710	Soil	BMP-8	x					
	A60711	Soil	BMP-8	x				A60712	
	A60713	Soil	BLHB-3	x				A60714	
	A60715	Soil	BLHB-3	x					
	A60716	Soil	BLHB-2	x					x
	A60719	Soil	BLHB-2	x					
	A60720	Soil	BLHB-1	x					
	A60721	Soil	BLHB-1	x					
	A60722	Soil	MLHB-1	x					
	A60723	Soil	MLHB-1	x					
	A60724	Soil	MLHB-2	x					
	A60725	Soil	MLHB-2	x					
	A60726	Soil	BMP-7	x					x
	A60727	Soil	BMP-7	x					
	A60728	Soil	BMP-5	x					
	A60738	Soil	BMP-9	x					
	A60739	Soil	BMP-9	x					
39684	A60729	Soil	BMP-5	x					
	A60730	Soil	BMP-5	x					
	A60731	Soil	BMP-4	x					
	A60732	Soil	BMP-4	x					
	A60733	Soil	BMP-4	x					
	A60734	Soil	BMP-6	x					
	A60735	Soil	BMP-6	x					
	A60736	Soil	BMP-6	x					

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
39721	A66000	Groundwater	MW-7B			x[1]			
	A66001	Groundwater	MW-7			x[1]			
	A66002	Groundwater	MW-21			x[1]			
	A66003	Groundwater	MW-124A			x[1]			
	A66004	Groundwater	MW-124B			x[1]			
	A66005	Groundwater	MW-125A			x[1]			
	A66006	Groundwater	MW-125B			x[1]			
	A66007	Groundwater	Rivulet2			x[1]			
	A66008	Groundwater	MW-11			x[1]			
	A66009	Groundwater	MW-24			x[1]			
	A66010	Groundwater	MW-126A			x[1]			
	A66011	Groundwater	MW-126B			x[1]		A60012	
	A66013	Groundwater	MW-121A			x[1]			
	A66014	Groundwater	MW-121B			x[1]			
	A66015	Groundwater	MW-26			x[1]			x
	A66016	Leachate	MW-125P			x[1]			
	A66017	Groundwater	MW-22A			x[1]			
	A66018	Groundwater	MW-22B			x[1]			
	A66019	Groundwater	MW-120B			x[1]		A66024[5]	
39726	A66000	Groundwater	MW-7B		x	x			
	A66001	Groundwater	MW-7		x	x			
	A66002	Groundwater	MW-21		x	x			
	A66003	Groundwater	MW-124A		x	x			
	A66004	Groundwater	MW-124B		x	x			
	A66005	Groundwater	MW-125A		x	x			
	A66006	Groundwater	MW-125B		x	x			
	A66007	Groundwater	Rivulet2		x	x			
	A66008	Groundwater	MW-11		x	x			
	A66009	Groundwater	MW-24		x	x			
	A66010	Groundwater	MW-126A		x	x			
	A66011	Groundwater	MW-126B		x	x		A66012	
	A66013	Groundwater	MW-121A		x	x			
	A66014	Groundwater	MW-121B		x	x			
	A66015	Groundwater	MW-26		x	x			x
	A66016	Leachate	MW-125P		x	x			

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TABLE 2-8

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
39825	A66017	Groundwater	MW-22A		x	x			
	A66018	Groundwater	MW-22B		x	x			
	A66019	Groundwater	MW-120B		x	x			
	A66020	Groundwater	MW-120A		x	x			
	A66022	Groundwater	MW-2S		x	x			
	A66025	Groundwater	MW-123A		x	x			
	A66026	Groundwater	MW-123B		x	x			
	A66027	Groundwater	MW-25		x	x			
	A66028	Groundwater	MW-12R		x	x			
	A66030	Groundwater	MW-19BR		x	x			
	A66032	Groundwater	MW-1		x	x			x
	A66033	Groundwater	MW-122A		x	x			
39828	A66020	Groundwater	MW-120A			x[1]			
	A66022	Groundwater	MW-2S			x[1]		A66023	
	A66025	Groundwater	MW-123A			x[1]			
	A66026	Groundwater	MW-123B			x[1]			
	A66027	Groundwater	MW-25			x[1]			
	A66028	Groundwater	MW-12R			x[1]			
	A66030	Groundwater	MW-19BR			x[1]		A66031	
	A66032	Groundwater	MW-1			x[1]			x
	A66033	Groundwater	MW-122A			x[1]		A66038	
	A66034	Groundwater	MW-23			x[1]			
	A66035	Groundwater	MW-128A			x[1]			
	A66036	Groundwater	MW-114			x[1]			
	A66039	Groundwater	MW-122B			x[1]			
	A66040	Groundwater	MW-19C			x[1]			
	A66030	Groundwater	MW-19BR			x[1]		A66031	
39885	A66037	Groundwater	MW-104			x[1]			
	A66041	Groundwater	MW-19D			x[1]			
	A66044	Groundwater	MW-127A			x[1]			

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TABLE 2-8

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
39885 (Cont'd)	A66045	Groundwater	MW-112			x[1]			
	A66046	Groundwater	MW-5			x[1]			
	A66047	Groundwater	MW-108			x[1]			
	A66049	Groundwater	MW-20			x[1]		A66050	
	A66051	Groundwater	MW-20B			x[1]			
	A66052	Groundwater	MW-8A			x[1]			
	A66053	Groundwater	MW-8			x[1]			
	A66054	Groundwater	MW-3			x[1]			
	A66055	Groundwater	MW-15			x[1]			
	A66056	Groundwater	MW-17A			x[1]			
	A66057	Groundwater	MW-17B			x[1]			
	A66058	Groundwater	MW-16C			x[1]			
	A66059	Groundwater	MW-16B			x[1]			x
39890	A66035	Groundwater	MW-128A		x	x			
	A66036	Groundwater	MW-114		x	x			
	A66039	Groundwater	MW-122B		x	x			
	A66040	Groundwater	MW-19C		x	x			
	A66041	Groundwater	MW-19D		x	x			
	A66044	Groundwater	MW-127A		x	x			
	A66045	Groundwater	MW-112		x	x			
	A66046	Groundwater	MW-5		x	x			
	A66049	Groundwater	MW-20		x	x		A66050	
	A66051	Groundwater	MW-20B		x	x			
	A66052	Groundwater	MW-8A		x	x			
	A66053	Groundwater	MW-8		x	x			
	A66059	Groundwater	MW-16B		x	x			x
39948	A66037	Groundwater	MW-104		x	x			
	A66047	Groundwater	MW-108		x	x			
	A66054	Groundwater	MW-3		x	x			
	A66055	Groundwater	MW-15		x	x			
	A66056	Groundwater	MW-17A		x	x			
	A66057	Groundwater	MW-17B		x	x			
	A66058	Groundwater	MW-16C		x	x			
	A66060	Groundwater	MW-2		x	x			
	A66061	Groundwater	MW-18		x	x			

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TABLE 2-8

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SAMPLE DELIVERY GROUP SUMMARY

Sample Delivery Group	Sample ID	Matrix	Location	Analysis				Duplicate	MS/MSD
				PCB	TCL	TAL	PCDD/ PCDF		
39948 (Con't)	A66063	Groundwater	MW-106		x	x			
	A66064	Groundwater	MW-12		x	x			
39965	A66060	Groundwater	MW-2	x					
	A66061	Groundwater	MW-18	x					
	A66063	Groundwater	MW-106	x					
	A66064	Groundwater	MW-12	x					
40261	A63000	Sediment	GS-1	x					
	A63001	Sediment	GS-2	x					
	A63002	Sediment	GS-3	x					
	A63003	Sediment	GS-4	x					
	A63004	Sediment	GS-5	x				A63005	x
40909	A69000	Residuals	MC-1	x					
41293	A60740	Soil	BMSS-1	x					
	A60741	Soil	BMSS-2	x					
TLI24546	A60540	Soil	MLSS-3				x		
	A60581	Soil	DLHB-5				x		
TLI24557	A60582	Soil	DLHB-2				x		
	A60589	Soil	DLHB-1				x		
	A60033	Soil	MLSS-1				x	A60034	
TLI24734	A60087	Soil	WA-6				x		
TLI24765	A60670	Soil	WA-2				x		

Notes:

[1]Dissolved TAL sample.
[2]Contained in SDG 38893.
[3]Contained in SDG 38543.
[4]Contained in SDG 39890.
[5]Contained in SDG 39828.
[6]Listed as residuals on chain-of-custody and lab reports.

TABLE 3-1

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
EXISTING MONITORING WELL INVENTORY

Well	Reported Depth of Well (ft)[1]	Measured Depth of Well (ft)[2]	Measured Depth to Water (ft)[2]	Surface Seal Integrity	Protective Casing Integrity	Comments
Bryant HRDL						
MW-10[4]	29.7	30.30	15.38	Poor	Good	No inner cap.
MW-11	50.9	51.45	9.79	Poor	Good	No inner cap.
MW-12	42.8	43.64	21.62	Poor	Good	No inner cap.
MW-13[4]	NA	9.24	7.44	Good	Good	No inner cap.
MW-14[4]	NA	8.12	1.58	Poor	Poor	No inner cap.
MW-22[4]	30.2	30.37	15.58	Poor	Good	No inner cap.
MW-23	29.7	29.57	16.93	Good	Good	Threaded cap.
MW-24	30.0	30.84	17.65	Good	Good	No inner cap.
MW-25	30.5	30.59	20.15	Poor	Good	No inner cap.
MW-26	11.4	11.29	2.00	Good	Good	Threaded cap.
Former Type III Landfill						
MW-1	50.7	46.88	35.51	Good	Good	No inner cap.
MW-3	27.3	27.46	9.75	Good	Good	
MW-4[4]	24.5	24.39	10.78	Poor	Good	Casing 0.05' above protective casing.
MW-5	9.4	9.46	4.48	Good	Good	No inner cap.
MW-15	40.0	40.26	8.19	Poor	Good	No inner cap.
MW-16B	34.4	35.18	16.20	Poor	Good	
MW-16C	55.5	55.69	10.93	Poor	Good	
MW-17A	31.6	32.83	18.61	Poor	Good	
MW-17B	48.0	49.49	18.23	Poor	Good	
MW-19B[4]	40.2	40.72	25.28	Poor	Good	Threaded cap.
MW-19C	53.2	53.63	26.04	Poor	Good	No inner cap.
MW-19D	66.9	68.01	26.02	Poor	Good	No inner cap.
MW-112	15.6	16.02	2.45	Good	Good	No inner cap.
Western Disposal Area						
MW-6[4]	27.4	28.32	14.69	Poor	Poor	Protective casing hits riser.
MW-7	32.6	33.01	18.95	Poor	Good	No inner cap.
MW-8	35.6	35.35	11.25	Poor	Poor	Casing too high, cannot close.
MW-9[4]	22.8	23.25	7.02	Poor	Good	No inner cap.
MW-20	24.8	25.01	14.37	Poor	Good	Outer casing drops when open.

See Notes on Page 2

TABLE 3-1

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
EXISTING MONITORING WELL INVENTORY

Well	Reported Depth of Well (ft)[1]	Measured Depth of Well (ft)[2]	Measured Depth to Water (ft)[2]	Surface Seal Integrity	Protective Casing Integrity	Comments
Western Disposal Area (Cont'd.)						
MW-21	14.5	15.41	4.54	Poor	Good	No inner cap.
MW-113A[4]	NA	30.18	6.25	Good	Good	No inner cap.
MW-113B[4]	14.9	14.4	8.55	Good	Good	No inner cap.
TW-1[4]	32.4	31.94	7.50	Poor	Good	6" diameter.
TW-2[4]	NA	NA	NA	NA	NA	Well was welded shut.
Pilot Study Area						
MW-2	19.9	16.37	4.04	Good	Good	
MW-18	38.9	39.23	3.67	Poor	Good	
Former Bryant Mill Pond						
MW-30[4]	16.5	17.64	14.26	Good	Good	No inner cap.
MW-101[4]	8.2	8.18	4.85	Poor	Good	Threaded cap.
MW-102[4]	18.1	18.29	6.60	Good	Good	Threaded cap.
MW-103[4]	17.1	16.72	2.0	Good	Good	Threaded cap.
MW-104	12.0	12.25	1.63	Poor	Good	Threaded cap.
MW-105[4]	11.3	--[3]	--[3]	Good	Good	Cannot open, cap was rusted shut.
MW-106	11.3	11.21	2.42	Good	Good	Threaded cap.
MW-107[4]	24.6	25.53	14.47	Good	Good	No inner cap.
MW-108	13.0	13.30	2.21	Good	Good	Threaded cap.
MW-109[4]	13.8	13.20	1.29	Poor	Good	Threaded cap.
MW-110[4]	8.2	8.12	4.21	Poor	Good	Outer casing drops when open.
MW-111[4]	15.4	15.32	0.56	Poor	Good	Threaded cap.
MW-114	45.0	45.67	6.85	Poor	Good	Protective casing above inner casing.
MW-115[4]	22.8	23.01	8.11	Poor	Good	No inner cap.
MW-116[4]	20.5	20.18	10.62	Poor	Good	No inner cap.

Notes:

[1]Corrected for stick-up; depth is referenced to the measuring point on the casing.
[2]Depth is referenced to the measuring point on the casing.
[3]The measurement could not be made.
[4]This well not sampled during this investigation.
NA - Not available.

TABLE 3-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
GROUNDWATER/LEACHATE AND SURFACE WATER ELEVATIONS

Location	Reference Elevation[1]	Water Level Elevation[2]									
		09/09/93	09/10/93	09/13/93	09/16/93	09/21/93	09/27/93	10/06/93	12/14/93	05/16/94	6/15/94
Bryant HRDL											
MW-10	810.09	794.79	–	–	–	–	–	–	–	–	–
MW-11	808.99	799.07	–	–	–	–	799.20	–	799.13	–	–
MW-12	809.21	788.19	–	–	–	–	–	–	787.91	–	–
MW-12R	808.30	788.22	–	–	–	–	788.62	–	786.87	–	787.47
MW-13	790.66	788.08	–	–	–	–	–	–	788.28	788.11	–
MW-14	786.79	785.40	–	–	–	–	–	–	785.37	–	–
MW-22	810.35	794.87	–	–	–	–	–	–	794.70	794.59	–
MW-22A	810.33	795.43	–	–	–	–	795.79	–	795.23	795.63	794.95
MW-22B	810.37	796.23	–	–	–	–	796.56	–	796.32	796.58	796.37
MW-23	813.13	796.25	–	–	–	–	796.29	–	796.06	796.11	795.98
MW-24	807.63	790.13	–	–	–	–	790.50	–	789.65	–	807.63
MW-25	808.95	789.68	–	–	–	–	789.84	–	789.01	–	–
MW-26	792.10	790.10	–	–	–	–	790.18	–	790.06	–	–
MW-121A	812.42	796.07	–	–	–	–	796.81	–	796.04	796.27	795.64
MW-121B	812.30	796.08	–	–	–	–	797.30	–	796.11	796.41	795.70
MW-123A	805.79	791.86	–	–	–	–	791.82	–	791.67	793.06	791.60
MW-123B	805.59	789.40	–	–	–	–	791.87	–	790.79	791.89	790.49
P-1	809.49	794.14	–	–	–	–	–	–	802.25	802.75	–
P-1C	801.91	DRY	–	–	–	–	–	–	DRY	DRY	–
P-2	807.07	794.20	–	–	–	–	–	–	793.79	794.70	–
P-2C	801.53	DRY	–	–	–	–	–	–	DRY	DRY	–
P-3	805.82	791.58	–	–	–	–	–	–	791.02	793.08	–
P-3C	799.65	790.52	–	–	–	–	–	–	790.07	792.15	–
Monarch HRDL											
MW-124A	843.74	812.26	–	–	–	–	812.99	–	811.21	811.41	810.82
MW-124B	844.43	803.74	–	–	–	–	805.01	–	803.55	803.68	803.43
MW-125A	810.05	792.62	–	–	–	–	792.72	–	792.55	792.45	792.27
MW-125B	809.92	796.34	–	–	–	–	797.15	–	797.34	797.67	797.62
MW-125P	810.38	801.01	–	–	–	–	800.84	–	800.41	800.57	800.68

See Notes on Page 3

TABLE 3-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
GROUNDWATER/LEACHATE AND SURFACE WATER ELEVATIONS

Location	Reference Elevation[1]	Water Level Elevation[2]									
		09/09/93	09/10/93	09/13/93	09/16/93	09/21/93	09/27/93	10/06/93	12/14/93	05/16/94	6/15/94
MW-126A	805.68	795.48	–	–	–	–	796.57	–	795.46	795.63	795.45
MW-126B	805.18	796.06	–	–	–	–	796.45	–	796.13	796.46	796.10
FRDLs											
MW-122A	806.51	788.01	787.89	787.68	788.08	788.02	788.12	787.80	788.86	789.91	787.19
MW-122B	806.18	788.35	–	–	–	–	788.51	–	788.31	788.37	788.08
Former Type III Landfill											
MW-1	833.19	797.64	–	–	–	–	797.69	–	797.49	–	826.39
MW-3	797.14	787.14	–	–	–	–	787.22	–	787.06	–	–
MW-4	801.60	790.82	–	–	–	–	–	–	790.79	–	–
MW-5	791.77	787.56	–	–	–	–	787.96	–	787.81	–	–
MW-15	795.24	786.71	–	–	–	–	786.84	–	786.70	–	–
MW-16B	803.61	787.18	–	–	–	–	787.33	–	787.23	–	–
MW-16C	804.14	793.14	–	–	–	–	793.13	–	792.99	–	–
MW-17A	810.28	791.62	–	–	–	–	791.65	–	791.50	791.53	791.33
MW-17B	810.07	791.77	–	–	–	–	791.83	–	791.69	791.73	791.52
MW-19BR	822.06	795.89	–	–	–	–	797.12	–	795.90	796.41	795.72
MW-19C	822.09	795.50	–	–	–	–	795.54	–	795.54	795.81	795.35
MW-19D	821.98	795.40	–	–	–	–	795.57	–	795.53	795.79	795.33
MW-112	791.62	789.25	–	–	–	–	789.48	–	789.28	–	–
MW-127A	791.65	787.35	–	–	–	–	787.69	–	787.58	787.40	787.10
Western Disposal Area											
MW-6	812.70	798.01	–	–	–	–	–	–	797.77	–	–
MW-7	818.94	800.95	–	–	–	–	800.01	–	799.72	799.81	799.79
MW-7B	818.30	798.64	–	–	–	–	800.35	–	798.46	798.50	798.54
MW-8	810.20	799.07	–	–	–	–	799.08	–	–	798.88	798.80
MW-8A	810.74	799.02	–	–	–	–	798.59	–	798.84	798.82	798.79
MW-9	802.97	795.97	–	–	–	–	–	–	795.93	–	–
MW-20	810.99	796.60	–	–	–	–	796.73	–	796.47	796.50	796.34
MW-20B	811.49	796.46	–	–	–	–	796.75	–	796.37	796.49	796.24

See Notes on Page 3

TABLE 3-2

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
GROUNDWATER/LEACHATE AND SURFACE WATER ELEVATIONS

Location	Reference Elevation[1]	Water Level Elevation[2]									
		09/09/93	09/10/93	09/13/93	09/16/93	09/21/93	09/27/93	10/06/93	12/14/93	05/16/94	6/15/94
MW-21	804.25	799.69	–	–	–	–	–	–	799.44	–	–
MW-113A	796.70	790.50	–	–	–	–	–	–	788.19	790.45	790.51
MW-113B	796.63	788.11	–	–	–	–	–	–	790.47	788.40	788.01
MW-120A	822.21	800.32	–	–	–	–	800.77	–	800.69	801.21	800.57
MW-120B	821.85	795.05	–	–	–	–	799.07	–	798.87	798.85	798.68
Pilot Study Area											
MW-2	793.29	789.25	–	–	–	–	789.31	–	789.12	788.81	788.85
MW-2S	791.12	787.67	–	–	–	–	788.30	–	787.46	–	787.73
MW-18	793.47	789.74	–	–	–	–	789.92	–	789.72	789.77	789.72
Former Bryant Mill Pond											
MW-30	796.58	782.52	–	–	–	–	–	–	782.33	782.18	782.28
MW-101	783.83	779.15	–	–	–	–	–	–	779.38	–	–
MW-102	783.64	776.94	–	–	–	–	–	–	776.84	–	781.18
MW-103	783.83	781.83[3]	–	–	–	–	–	–	781.81	781.33	781.70
MW-104	785.75	784.13[3]	–	–	–	–	784.27	–	783.99	783.93	784.05
MW-105	783.95	–	–	–	–	–	–	–	–	–	–
MW-106	783.82	781.48	–	–	–	–	781.75	–	781.51	–	–
MW-107	797.47	783.34	–	–	–	–	–	–	783.17	783.37	783.17
MW-108	787.13	785.11	–	–	–	–	785.20	–	–	–	–
MW-109	785.44	783.32	–	–	–	–	–	–	784.17	784.21	–
MW-110	787.57	784.32	–	–	–	–	–	–	784.09	–	784.27
MW-111	787.97	787.32[3]	–	–	–	–	–	–	787.35	–	–
MW-114	797.48	790.68	–	–	–	–	790.74	–	790.60	–	–
MW-115	795.48	787.47	–	–	–	–	–	–	787.35	–	–
MW-116	794.12	783.55	–	–	–	–	–	–	783.62	–	–
MW-128A	788.65	772.20	–	–	–	–	772.61		772.37	772.52	772.32
Portage Creek											
CG-1	788.85	–	783.62	783.70	783.87	783.73	783.92	783.54	–	–	–

Notes:

[1]Elevation of the top of the inner casing used as reference.
[2]Depth to water above ground surface.
[3]Elevations are expressed in units of feet above mean sea level.
– No measurement taken.

TABLE 3-3

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
VERTICAL GROUNDWATER FLOW GRADIENTS

Well	Midpoint[1]	09/09/93		09/27/93		12/14/93		Mean Vert.
		Elevation[2]	Vert. Grad.[3]	Elevation[2]	Vert. Grad.[3]	Elevation[2]	Vert. Grad.[3]	Gradient[4]
Bryant HRDL								
MW-22A		795.43		795.79		795.23		
MW-22B	29.33	796.23	-2.7E-2	796.56	-2.6E-2	796.32	-3.7E-2	-3.0E-2
MW-121A		796.07		796.81		796.04		
MW-121B	9.8	796.08	-1.0E-3	797.30	-5.0E-2	796.11	-7.1E-3	-1.9E-2
MW-123A		791.86		791.82		791.67		
MW-123B	13.6	789.40	+0.18	791.87	-3.7E-3	790.79	+6.5E-2	+8.0E-2
Monarch HRDL								
MW-124A		812.26		812.99		811.21		
MW-124B	24.7	803.74	+0.35	805.01	+0.32	803.55	+0.31	+0.33
MW-125A		792.62		792.72		792.65		
MW-125B	10.6	796.34	-0.35	797.15	-0.42	797.34	-0.44	-0.40
MW-126A		795.48		796.57		795.46		
MW-126B	10.9	796.06	-5.3E-2	796.45	+1.1E-2	796.13	-6.1E-2	-3.4E-2
FRDLs								
MW-122A		788.01		788.12		788.86		
MW-122B	41.1	788.35	-8.2E-3	788.51	-9.5E-3	788.31	+1.3E-2	-1.2E-3
Former Type III Landfill								
MW-16B		787.16		787.33		787.23		
MW-16C	19.6	793.14	-0.30	793.13	-0.29	792.99	-0.29	-0.29
MW-17A		791.62		791.65		791.50		
MW-17B	18.4	791.77	-8.2E-3	791.83	-9.7E-3	791.69	-1.0E-2	-9.3E-3
MW-19BR		795.88		797.12		795.90		
MW-19C	12.5	795.50	+3.1E-2	795.54	+1.3E-1	795.54	+2.8E-2	+6.3E-2
MW-19D	26.3	795.40	+1.8E-2	795.57	+5.8E-2	795.53	+1.4E-2	+3.0E-2
Western Disposal Area								
MW-7		800.95		800.01		799.72		
MW-7B	14.4	798.64	+0.16	800.35	-2.4E-2	798.46	+8.7E-2	+7.4E-2
MW-8A		799.02		799.13		798.84		
MW-8	17.2	799.07	-2.9E-3	799.08	+2.9E-3	NA	NA	0
MW-20		796.60		796.73		796.47		
MW-20B	9.1	796.46	+2.2E-2	796.75	-2.2E-2	796.37	-1.1E-2	-1.1E-2
MW-120A		800.32		800.77		800.69		
MW-120B	7.2	795.05	+0.59	799.07	+0.24	798.87	+0.25	+0.36

Notes:

[1]The distance of separation in feet of the midpoints of the screened intervals.
[2]Groundwater elevation in feet above mean sea level.
[3]The vertical groundwater gradient. A "-" indicates an upward gradient and a "+" indicates a downward gradient.
[4]Mean of calculated gradients from September 9 and 27 and December 14, 1993.
NA - Not applicable.

TABLE 3-4

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
IN-SITU HYDRAULIC CONDUCTIVITY RESULTS

Well	Bouwer-Rice	Hvorslev Time Lag	Hvorslev Variable Head
Bryant HRDL			
MW-12R	8.0E-5	1.1E-4	1.1E-4
MW-22A	1.7E-3	4.7E-4	4.7E-4
MW-121A	2.4E-4	3.6E-4	3.6E-4
MW-123A	2.9E-3	8.4E-4	8.3E-4
P-1	9.1E-3	3.0E-3	3.0E-3
P-2	1.7E-2	5.2E-3	5.2E-3
P-3	6.3E-3	1.9E-3	1.9E-3
Monarch HRDL			
MW-124A	1.0E-3	2.8E-4	2.8E-4
MW-125A[1]	1.4E-3	2.2E-3	2.2E-3
MW-125B	4.9E-5	6.4E-5	6.4E-5
MW-126A	2.3E-5	3.2E-5	3.2E-5
MW-126B	1.4E-4	1.8E-4	1.8E-4
FRDLs			
MW-122A	9.9E-4	1.7E-3	1.7E-3
Former Type III Landfill			
MW-19BR	7.4E-4	1.0E-3	1.0E-3
MW-127A	1.6E-4	2.8E-4	2.8E-4
Western Disposal Area			
MW-8A	3.5E-4	5.4E-4	5.4E-4
MW-20B	1.5E-3	2.0E-3	2.0E-3
MW-120A	1.2E-2	6.5E-3	6.5E-3
Pilot Study Area			
MW-2S	4.1E-4	7.0E-4	7.0E-4
Former Bryant Mill Pond			
MW-128A	9.4E-3	2.7E-3	2.7E-3

Notes:

Units are in centimeters per second (cm/sec).
[1]Testing was performed a second time at this well. This data is from the first run.

TABLE 3-5

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
GENERAL GROUNDWATER/LEACHATE PARAMETER FIELD DATA

Well No.	pH	Water Temperature (°C)[1]	Specific Conductivity (uS/cm)[2]	Dissolved Oxygen (mg/L)[3]	Turbidity (NTU)[4]
Bryant HRDL					
MW-11	7.4	12	777	3.29	22.40
MW-12	7.2	18	1,190	10.27[5]	6.09
MW-12R	6.9	15	1,300	2.75	26.60
MW-22A	7.1	17	1,200	2.87	3.03
MW-22B	7.8	13	910	2.99	14.60
MW-23	7.3	15	940	7.35	75.00
MW-24	6.8	15	1,250	2.90	3.25
MW-25	7.0	16	1,110	1.72	20.80
MW-26	7.3	12	920	9.29	2.49
MW-121A	7.0	15	1,480	2.75	3.56
MW-121B	-	-	-	-	-
MW-123A	6.8	19	732	2.61	3.89
MW-123B	7.3	16	701	1.88	5.37
Monarch HRDL					
MW-124A	7.3	16	1,290	5.08	9.20
MW-124B	7.4	15	1,560	4.12	17.60
MW-125P	5.0	20	1,020	7.17	8.71
MW-125A	7.0	13	1,290	3.89	3.16
MW-125B	7.3	13	1,120	2.29	10.90
MW-126A	6.6	14	1,980	2.04	27.80
MW-126B	7.3	14	1,110	1.76	5.94
FRDLs					
MW-122A	7.2	18	606	3.14	0.65
MW-122B	7.1	14	846	3.02	2.99
Former Type III Landfill					
MW-1	6.8	17	1,050	1.68	1.64
MW-3	6.6	16	1,240	2.51	3.25
MW-5	6.9	17	1,450	9.80	5.37
MW-15	6.6	14	1,550	2.61	2.77
MW-16B	6.7	19	846	1.11	2.45
MW-16C	7.8	18	527	3.47	9.13
MW-17A	6.5	19	1,470	2.78	3.45
MW-17B	6.5	16	1,410	2.79	5.49
MW-19BR	6.7	18	1,360	2.79	1.87
MW-19C	6.9	14	1,110	3.20	1.62
MW-19D	7.1	14	1,090	3.38	3.51
MW-112	7.1	15	1,310	9.87	5.88
MW-127A	7.2	15	1,940	8.27	1.66
Western Disposal Area					
MW-7	7.4	17	766	1.25	1.63
MW-7B	8.9	16	507	9.54	4.12
MW-8	7.3	17	743	0.79	1.72
MW-8A	6.8	21	1,080	2.78	2.49
MW-20	7.2	18	1,000	2.82	2.72
MW-20B	7.3	14	920	2.03	3.42
MW-21	7.5	16	741	9.17	4.25
MW-120A	6.7	16	1,930	1.36	12.30
MW-120B	7.0	17	1,460	2.16	8.02

(See Notes on Page 2)

TABLE 3-5

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
GENERAL GROUNDWATER/LEACHATE PARAMETER FIELD DATA

Well No.	pH	Water Temperature (°C)[1]	Specific Conductivity (uS/cm)[2]	Dissolved Oxygen (mg/L)[3]	Turbidity (NTU)[4]
Pilot Study Area					
MW-2	6.9	16	960	2.88	5.34
MW-2S	6.8	18	1,020	8.47	1.53
MW-18	7.4	15	711	2.50	1.14
Former Bryant Mill Pond					
MW-104	7.6	15	1,050	9.69	9.04
MW-106	7.7	15	700	3.56	10.70
MW-108	7.8	16	720	11.06[5]	4.56
MW-114	7.6	14	960	9.81	1.24
MW-128A	7.3	19	1,150	9.96	2.15

Notes:

[1] Units in degrees Celsius (°C).
[2] Units in microSiemens per centimeter (uS/cm).
[3] Units in milligrams per liter (mg/L).
[4] Units in nephelometric turbidity units (NTU).
[5] Instrument error suspected for this reading.
– No measurements collected.

TABLE 3-6

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT CORE FIELD DATA

Location	Depth of Sediment (ft)	Sample Description (Top 6 inches)	Depth of Water (ft)
GS-1	>8.0	Dark gray brown fine sand with a lot of organic matter.	2.3
GS-2	>8.0	Dark gray brown silt and fine sand with a lot of organic matter.	1.4
GS-3	>3.8	Dark gray/black silty material with some coarse sand and moderate organic odor.	2.2
GS-4	5.2	Brown fine to medium sand, some coarse sand.	1.6
GS-5	4.2	Brown fine sand with medium coarse sand and gravel.	1.6

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P0+00	–	–	–	Alcott Street Dam
P0+50	2.2	9.0*	9.0*	0.0'-0.4' - Dark brown to black fine sand 0.4'-1.0' - Dark gray clay-like material with fine to coarse sand mixed in 1.0'-1.4' - Gray fine to medium sand with some gray clay-like material mixed in 1.4'-9.0'* - Gray fine to coarse sand and gravel
P1+50	1.2	5.8	4.8	0.0'-0.2' - Light brown fine sand 0.2'-1.0' - Brown silt and peat with a lot of gray clay-like material mixed in 1.0'-2.0' - Gray clay-like material, strong organic odor 2.0'-3.0'* - Gray-brown silt and peat material, almost clay-like
P2+50	1.5	7.0	5.0	0.0'-0.2' - Light brown fine sand 0.2'-2.0' - Brown silt and peat mixed with a lot of gray clay-like material 2.0'-3.0' - Gray clay-like material, strong organic odor 3.0'-5.0'* - Tight gray-brown peat material
P3+50	1.3	4.6	4.6	0.0'-0.9' - Brown fine to medium sand 0.9'-2.3' - Gray clay-like material, strong organic odor 2.3'-3.0' - Gray-brown peat material with some gray clay-like material mixed in 3.0'-4.0'* - Reddish-brown peat
P4+50	1.1	3.5	3.5	0.0'-0.8' - Brown fine to medium sand 0.8'-1.5' - Gray clay-like material, strong organic odor 1.5'-1.9' - Gray-brown peat with some gray clay-like material mixed in 1.9'-3.0'* - Reddish-brown peat
P5+50	1.4	4.5	4.5	0.0'-0.8' - Brown fine to medium sand 0.8'-1.7' - Gray-brown silt and peat mixed with some gray clay-like material 1.7'-2.0' - Gray clay-like material, organic odor 2.0'-3.0'* - Reddish-brown peat

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P6+50	1.9	1.5	1.5	0.0'-0.6' - Brown fine sand 0.6'-1.5'* - Brown peat with some gray clay-like material mixed in, very tight material
P7+50	0.8	3.2	1.9	0.0'-0.2' - Brown fine sand 0.2'-0.8' - Gray fine sand, some organic matter 0.8'-2.0'* - Dark brown silt and peat
P8+50	0.8	7.1	5.1	0.0'-0.5' - Gray-brown fine to medium sand 0.5'-1.4' - Gray fine to medium sand 1.4'-1.8' - Gray clay-like material with gray fine to coarse sand, organic odor 1.8'-2.3' - Brown peat with some gray clay-like material mixed in 2.3'-3.0'* - Brown silt and peat
P9+50	1.0	6.3	4.1	0.0'-0.4' - Gray-brown fine sand 0.4'-0.9' - Gray clay-like material 0.9'-1.6' - Brown silt and peat with some gray clay-like material mixed in 1.6'-2.6'* - Brown silt and peat material
P10+50	0.8	4.2	3.5	0.0'-0.7' - Brown fine to coarse sand 0.7'-1.0' - Gray clay-like material, organic odor 1.0'-1.6' - Brown peat and silt 1.6'-2.0'* - Gray fine sandy clay, no odor
P11+50	0.7	3.3	3.1	0.0'-0.4' - Brown fine sand 0.4'-1.6' - Gray fine to medium sand 1.6'-2.0' - Gray clay-like material, organic odor 2.0'-2.5' - Brown peat 2.5'-3.0'* - Gray fine sandy clay, no odor, rock on the bottom

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P12+50	0.3	6.7	5.3	0.0'-0.2' - Brown fine sand 0.2'-0.5' - Dark gray to black fine sand, some organic matter 0.5'-1.0' - Gray fine to medium sand 1.0'-1.5' - Gray clay-like material, organic odor 1.5'-2.0' - Brown peat 2.0'-2.3" - Gray fine sandy clay - no odor, rock at 5' to 6'
P13+50	0.6	6.2	4.8	0.0'-0.2' - Brown fine sand 0.2'-1.2' - Gray-brown fine to coarse sand 1.2'-1.5' - Gray clay-like material, organic odor 1.5'-2.2' - Brown peat 2.2'-3.0" - Reddish-brown peat
P14+50	2.5	3.6	3.6	0.0'-0.8' - Brown fine sand 0.8'-1.3' - Gray clay-like material, organic odor 1.3'-2.0' - Gray-brown coarse material, some gray clay-like material mixed in 2.0'-2.8" - Light brown fine sand
P15+50	1.3	5.5	5.0	0.0'-0.7' - Brown fine to medium sand 0.7'-2.3' - Gray clay-like material, very slight organic odor 2.3'-2.8' - Light brown peat 2.8'-3.3" - Reddish-brown peat
P16+50	1.3	3.2	2.0	0.0'-0.3' - Brown fine to medium sand 0.3'-0.5' - Dark gray fine sand 0.5'-0.8' - Greenish-gray clay with peat mixed in, no odor 0.8'-1.2' - Reddish-brown peat 1.2'-1.8' - Greenish-gray clay, no odor 1.8'-2.0" - Greenish-gray clay with gravel

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P17+50	1.1	6.0	6.0	0.0'-1.0' - Gray-brown fine sand 1.0'-1.6' - Gray-brown peat 1.6'-2.5' - Reddish-brown peat 2.5'-3.0"* - Gray fine to medium sand
P18+50	1.1	4.9	4.7	0.0'-0.6' - Gray-brown fine to medium sand 0.6'-0.9' - Gray fine sand 0.9'-1.4' - Gray clay-like material mixed with coarse material - organic odor 1.4'-1.7' - Gray clay-like material mixed with peat 1.7'-2.5"* - Light gray fine to medium sand
P19+50	2.0	4.7	4.7	0.0'-0.2' - Brown fine sand 0.2'-1.5' - Gray clay-like material, strong organic odor 1.5'-2.3"* - Light gray fine sand, rock at 4.7'
P20+50	0.9	3.1	2.8	0.0'-0.4' - Brown fine to coarse sand 0.4'-1.4' - Dark gray to black clay-like material mixed with peat, slight organic odor 1.4'-2.0"* - Light gray fine sand mixed with peat
P21+50	1.1	2.7	2.6	0.0'-0.6' - Brown fine sand 0.6'-1.2' - Gray fine sand mixed with some dark brown peat and some gray clay-like material 1.2'-1.8"* - Light gray fine sand
P22+50	0.8	5.1	5.0	0.0'-0.2' - Brown fine to medium sand 0.2'-1.8' - Gray-brown fine to medium sand 1.8'-2.5' - Brown peat mixed with gray clay-like material 2.5'-3.5"* - Gray fine sand with some peat
P23+50	0.6	4.4	4.3	0.0'-0.5' - Brown fine to medium sand 0.5'-1.5"* - Gray clay-like material

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P24+50	2.6	2.4	1.7	0.0'-0.4' - Brown fine to medium sand 0.4'-0.7' - Gray fine sand with some gray clay-like material mixed in 0.7'-1.4" - Brown fine to coarse sand
P25+50	0.6	5.4	5.1	0.0'-0.4' - Brown fine to medium sand 0.4'-0.5' - Dark gray fine to medium sand 0.5'-1.5' - Gray-brown silt, some clay-like material, organic odor 1.5'-2.2' - Gray fine sand 2.2'-2.5' - Gray silt and peat 2.5'-3.0' - Reddish-brown peat 3.0'-3.5" - Brown silt with some peat
P26+50	1.5	4.3	4.3	0.0'-1.0' - Brown fine to medium sand 1.0'-1.5' - Gray fine sand 1.5'-2.5' - Gray-brown silt, trace of gray clay-like material - no odor 2.5'-2.8" - Brown peat and silt
P27+50	0.8	6.3	5.5	0.0'-0.6' - Brown fine to medium sand 0.6'-0.8' - Gray-brown fine sand 0.8'-1.6' - Gray-brown fine sand and peat, trace of clayey material, no odor 1.6'-2.7' - Reddish-brown peat 2.7'-3.0' - Gray fine sand 3.0'-3.3" - Gray fine to medium sand and gravel
P28+50	1.0	5.4	5.2	0.0'-0.1' - Brown fine to medium sand 0.1'-0.6' - Dark gray fine sand 0.6'-1.0' - Gray-brown peat and silt 1.0'-1.3' - Light gray fine sand 1.3'-2.3' - Reddish-brown peat 2.3'-2.8" - White crumbly material

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P29+50	0.6	5.4	4.8	0.0'-0.5' - Brown fine to medium sand 0.5'-1.0' - Dark gray fine sand 1.0'-1.8' - Gray-brown peat and silt 1.8'-2.1' - Brown peat 2.1'-2.4' - Reddish-brown peat 2.4'-2.7' - Brown peat 2.7'-3.3"* - Light brown or tan fine to medium sand and gravel
P30+50	1.2	4.8	4.8	0.0'-1.6' - Gray-brown fine to coarse sand 1.6'-2.9' - Gray-brown fine to very fine sand 2.9'-3.4' - Gray fine to coarse sand, some gravel 3.4'-4.0"* - Brown peat, coarse organic material
P31+50	1.7	4.2	3.0	0.0'-1.7' - Gray-brown fine to coarse sand 1.7'-2.0' - Brown peat or organic layer 2.0'-2.5' - Light brown to tan fine to medium sand 2.5'-2.7"* - Brown piece of wood
P32+50	1.3	--	--	No sediment adjacent to storm water outfall
P33+50	0.8	4.2	2.7	0.0'-0.2' - Brown fine to medium sand 0.2'-1.2' - Gray fine to coarse sand 1.2'-1.5' - Gray-brown clay-like material - organic odor 1.5'-1.8' - Gray-brown coarse sand 1.8'-2.5"* - Reddish-brown peat
P34+50	1.0	1.0	1.5	0.0'-0.4' - Brown fine to medium sand 0.4'-0.9' - Gray fine to coarse sand 0.9'-1.3"* - Light gray fine sand with gravel
P35+50	2.6	2.3	1.3	0.0'-1.0' - Brown fine to coarse sand, some gravel 1.0'-2.0"* - Light brown fine sandy clay (native)

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P36+50	1.7	2.3	1.3	0.0'-0.3' - Brown fine to medium sand 0.3'-0.7' - Dark gray fine to coarse sand 0.7'- + - Gray cobbles and gravel
P37+50	0.9	4.1	3.8	0.0'-1.1' - Gray-brown fine to coarse sand 1.1'-2.0' - Reddish-brown peat 2.0'-2.5' - Gray fine to coarse sand 2.5' - Piece of wood
P38+50	0.7	3.7	3.7	0.0'-0.4' - Brown fine to coarse sand 0.4'-1.1' - Gray fine to medium sand 1.1'-1.5' - Gray fine to very fine sand 1.5'-1.7' - Light brown fine to medium sand 1.7'-2.7' - Brown and reddish-brown peat 2.7'-3.3"* - Gray fine sand and gravel
P39+50	0.7	4.2	4.2	0.0'-0.5' - Brown fine to coarse sand 0.5'-1.7' - Gray fine to medium sand 1.7'-2.7' - Dark brown silt and peat 2.7'-3.0"* - Gray fine sand and gravel
P40+50	1.5	3.0	2.7	0.0'-0.3' - Brown fine to medium sand 0.3'-1.3' - Gray-brown fine sand 1.3'-1.8' - Dark gray fine to medium sand 1.8'-2.2' - Gray-brown fine to medium sand 2.2'-2.6"* - Brown and reddish-brown peat
P41+50	1.6	2.6	2.5	0.0'-1.2' - Brown fine to coarse sand 1.2'-1.5' - Dark brown peat 1.5'-2.2' - Gray fine to coarse sand, some gravel 2.2' - Rock

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P42+50	1.4	3.1	3.1	0.0'-0.3' - Brown medium to coarse sand 0.3'-0.5' - Brown fine sand 0.5'-1.0 '- Dark gray fine sand and very fine sand 1.0'-1.7' - Gray fine to medium sand 1.7'-2.3" - Dark brown peat and silt
P43+50	1.0	0.3	0.3	0.0'-0.3" - Brown fine to coarse sand and gravel
P44+50	3.6	1.4	1.4	0.0'-1.2' - Brown fine to coarse sand 1.2' - Coarse sand and gravel
P45+50	0.8	–	–	No sediment - adjacent to spring coming from landfill, rocks and cobbles, very fast moving water.
P46+50	1.4	–	–	No sediment - adjacent to downstream end of bank stabilization, rocks and cobbles, very fast moving water
P47+50	1.5	–	–	No sediment - rocks and cobbles, very fast moving water
P48+50	1.7	–	–	No sediment - rocks and cobbles, very fast moving water
P49+50	1.9	4.1	3.3	0.0'-0.8' - Gray-brown fine to coarse sand and gravel 0.8'-2.5" - Light brown fine very tight sand
P50+50	1.5	3.3	3.1	0.0'-2.5" - Brown and dark gray to black fine to coarse sand, some gravel
P51+50	2.0	1.0	1.0	0.0'-0.5' - Brown fine to coarse sand, some gravel 0.5'-1.0" - Dark gray to black coarse sand and gravel
P52+50	2.0	–	–	No sediment - rocks and cobbles, very fast moving water, adjacent to upstream bank stabilization area
P53+50	1.5	2.0	1.0	0.0'-1.0" - Gray-brown fine to coarse sand and gravel (adjacent to Monarch Clarifier - overhead pipes)

See Notes on Page 9

TABLE 3-7

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PORTAGE CREEK SEDIMENT PROBING DATA

Station	Depth of Water (ft)	Sediment Probed with Metal Rod (ft)	Sediment Penetrated with Lexan® Tube (ft)	Sample Description
P54+50	1.9	2.0	2.0	0.0'-1.5" - Gray-brown fine to coarse sand and gravel
P55+50	1.5	–	–	No sediment - rocks and cobbles, very fast moving water
P56+50	2.3	1.1	1.0	0.0'-0.4' - Brown fine to coarse sand and gravel 0.4'-1.0" - Gray-brown fine to medium sand and gravel
P57+50	1.5	2.4	2.3	0.0'-1.8" - Brown and gray-brown fine to coarse sand, some gravel
P58+50	2.9	0.2	–	Coarse sand and gravel
P59+20	–	–	–	No sample - Cork Street Bridge - Twin CMP pipes

Notes:

— No data
+ - Limit of probing. Sediments are present below this depth.

TABLE 3-8

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF RESIDENTIAL PROPERTY SOIL SAMPLING FIELD DATA

Core	Date Drilled	Total Depth (ft)[1]		Sample Description
RP-1	10/31/91	4.5	0.0' - 0.5'	Light brown sand with brick fragments.
			0.5' - 2.8'	Sand and bricks, groundwater at 2.8 feet.
			4.0' - 4.5'	Old pond sediments.
RP-2	10/31/91	5.0	0.0' - 0.5'	Light brown sand with brick fragments, no topsoil.
			0.5' - 1.5'	Brown medium sand mixed with brick.
			1.5' - 4.5'	Brown medium sand, some gravel, very little brick.
			4.5' - 5.0'	Dark gray to black silt with some clay, old swamp deposits.
RP-3	10/31/91	4.5	0.0' - 0.5'	Topsoil/fill mixture, light brown sand and silt.
			0.5' - 1.3'	Topsoil/fill, brown fine sand and silt.
			1.3' - 4.0'	Light brown sand and bricks, fill material.
			4.0' - 4.5'	Dark gray to black silt with clay, organic odor.
RP-4	10/31/91	2.2	0.0' - 0.5'	Brown sand with brock fragments, very little topsoil.
			0.5' - 1.7'	Brown sand and bricks.
			1.7' - 2.2'	Dark gray to black silt and clay, organic odor.
RP-5	10/31/91	3.0	0.0' - 0.5'	Brown sand and bricks.
			0.5' - 2.5'	Brown sand and bricks.
			2.5' - 3.0'	Dark gray to black silt with vegetation and organic odor.
BMSS-1	12/14/93	0.5	0.0' - 0.4'	Dark brown silt, some fine sand - grass covered.
			0.4' - 0.5'	Light brown fine sand.
BMSS-2	12/14/93	0.5	0.0' - 0.25'	Grass covered - dark brown silt, some fine sand.
			0.25' - 0.5'	Light brown fine to medium sand.
BMSS-3	8/26/93	0.5	0.0' - 0.5'	Light brown fine sand.
BMSS-4	8/26/93	0.5	0.0' - 0.5'	Light brown fine sand.

Note:

[1]The depth is referenced from ground surface.

TABLE 3-9

ALLIED PAPER, INC./ PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
VANE SHEAR TEST RESULTS

Boring	Depth (ft)	Peak Strength (psf)	Residual Strength (psf)
MW-20B	22 - 23.5	1990	1240
DLHB-2A	0 - 1.5	750	500
DLHB-2A	4 - 5.5	890	250

Note:

MW-20B installed in the Western Disposal Area. DLHB-2A installed in the FRDLs.

TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	BHDL-22 0.00-0.50 A60690	BHDL-22 (Dup) 0.00-0.50 A60693	BHDL-22 6.00-8.00 A60686	BHDL-22 8.00-10.00 A60687	BHDL-22 10.00-12.00 A60688	BHDL-22 (Dup) 10.00-12.00 A60691	BHDL-22 12.00-14.00 A60689	BHDL-22 (Dup) 12.00-14.00 A60692
Bryant HRDL								
Aroclor-1016	ND (0.46 U)	ND (0.081 UJ)	ND (19 U)	ND (7.9 U)	ND (0.94 U)	ND (0.97 U)	ND (0.038 U)	ND (0.038 U)
Aroclor-1242	2.7 J	0.081 J	430 DJ	93	11	6.9	ND (0.038 U)	0.050
Aroclor-1248	ND (0.46 U)	ND (0.081 UJ)	ND (19 U)	ND (7.9 U)	ND (0.94 U)	ND (0.97 U)	ND (0.038 U)	ND (0.038 U)
Aroclor-1254	ND (0.46 U)	ND (0.081 UJ)	ND (19 U)	ND (7.9 U)	4.8	2.2	ND (0.038 U)	ND (0.038 U)
Aroclor-1260	ND (0.46 U)	ND (0.081 UJ)	ND (19 U)	ND (7.9 U)	1.4	0.83 J	ND (0.038 U)	ND (0.038 U)

Location Depth (ft) Sample ID	BHDL-123[2] 0.00-0.50 A60680	BHDL-123 4.00-6.00 A60681	BHDL-123 (Dup) 4.00-6.00 A60685	BHDL-123[2] 6.00-8.00 A60682	BHDL-123[2] 8.00-9.50 A60683	BHDL-123 10.00-12.00 A60684	MW-12R 8.00-10.00 A60706	MW-12R 16.00-18.00 A60707
Bryant HRDL (Cont'd.)								
Aroclor-1016	0.052 J	ND (0.18 UJ)	ND (0.68 U)	ND (8.4 U)	ND (1.8 U)	ND (0.039 U)	ND (7.0 U)	ND (0.053 U)
Aroclor-1242	ND (0.14 U)	0.71 J	5.3 J	190 DJ	170 D	0.039 J	100	0.065
Aroclor-1248	0.17	ND (0.18 UJ)	ND (0.68 U)	ND (8.4 U)	ND (1.8 U)	ND (0.039 U)	ND (7.0 U)	ND (0.053 U)
Aroclor-1254	0.067 J	ND (0.18 UJ)	ND (0.68 U)	ND (8.4 U)	ND (1.8 U)	ND (0.039 U)	ND (7.0 U)	ND (0.053 U)
Aroclor-1260	ND (0.14 U)	ND (0.18 UJ)	ND (0.68 U)	5.0 J	3.6	ND (0.039 U)	ND (7.0 U)	ND (0.053 U)

Location Depth (ft) Sample ID	MW-12R 24.00-26.00 A60695	MW-12R 36.00-38.00 A60696	MW-121B 0.00-0.50 A60042	MW-121B 10.00-12.00 A60043	MW-121B 12.00-14.00 A60044	MW-121B 14.00-16.00 A60045	MW-121B 16.00-17.50 A60046	MW-121B 17.50-19.00 A60047
Bryant HRDL (Cont'd.)								
Aroclor-1016	ND (0.055 U)	ND (0.056 U)	ND (0.058 U)	650	ND (13 U)	ND (6.8 U)	ND (0.66 U)	ND (0.039 U)
Aroclor-1242	ND (0.055 U)	ND (0.056 U)	ND (0.058 U)	ND (66 U)	90	48	27 D	ND (0.039 U)
Aroclor-1248	ND (0.055 U)	ND (0.056 U)	ND (0.058 U)	ND (66 UJ)	ND (13 U)	ND (6.8 UJ)	ND (0.66 U)	ND (0.039 U)
Aroclor-1254	ND (0.055 U)	ND (0.056 U)	ND (0.058 U)	ND (66 UJ)	6.2 J	ND (6.8 UJ)	ND (0.66 U)	ND (0.039 U)
Aroclor-1260	ND (0.055 U)	ND (0.056 U)	ND (0.058 U)	ND (66 U)	ND (13 U)	3.4 J	ND (0.66 U)	ND (0.039 U)

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TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	P-1[2] 12.00-14.00 A60678	P-2 12.00-14.00 A60677	P-3 16.00-18.00 A60679	MLSS-1 0.00-0.50 A60035	MLSS-1 8.00-10.00 A60036	MLSS-1 (Dup) 8.00-10.00 A60041	MLSS-1 10.00-12.00 A60037	MLSS-1 12.00-14.00 A60038
Bryant HRDL (Cont'd.)				**Monarch HRDL**				
Aroclor-1016	ND (3.4 U)	0.084	ND (0.059 U)	ND (0.17 U)	ND (7.1 U)	ND (7.5 U)	ND (7.3 U)	ND (2.7 U)
Aroclor-1242	29	ND (0.061 U)	ND (0.059 U)	ND (0.17 U)	88	59	89	22
Aroclor-1248	ND (3.4 U)	ND (0.061 U)	ND (0.059 U)	ND (0.17 U)	6.6 J	ND (7.5 U)	7.5	1.4 J
Aroclor-1254	5.7	ND (0.061 U)	ND (0.059 U)	ND (0.17 U)	ND (7.1 U)	ND (7.5 U)	ND (7.3 U)	ND (2.7 U)
Aroclor-1260	ND (3.4 U)	ND (0.061 U)	ND (0.059 U)	ND (0.17 U)	ND (7.1 U)	ND (7.5 U)	ND (7.3 U)	ND (2.7 U)

Location Depth (ft) Sample ID	MLSS-1 14.00-15.50 A60039	MLSS-1 15.50-18.00 A60040	MLSS-2 0.00-0.50 A60560	MLSS-2 2.00-4.00 A60562	MLSS-2 14.00-16.00 A60568	MLSS-2 16.00-18.00 A60569	MLSS-2 18.00-20.00 A60570	MLSS-2 20.00-22.00 A60571
Monarch HRDL (Cont'd.)								
Aroclor-1016	ND (0.22 UJ)	ND (0.077 U)	ND (17 U)	0.28	ND (1.5 U)	ND (7.1 U)	ND (7.4 U)	ND (1.3 U)
Aroclor-1242	2.3 J	R	96	ND (0.17 U)	7.8	89	61	5.7
Aroclor-1248	ND (0.22 UJ)	ND (0.077 U)	17 J	ND (0.17 U)	7.5	ND (7.1 U)	ND (7.4 U)	ND (1.3 U)
Aroclor-1254	ND (0.22 UJ)	ND (0.077 U)	ND (17 U)	0.25	2.5	ND (7.1 U)	ND (7.4 U)	4.0
Aroclor-1260	ND (0.22 UJ)	ND (0.077 U)	ND (17 U)	ND (0.17 U)	ND (1.5 U)	ND (7.1 U)	ND (7.4 U)	ND (1.3 U)

Location Depth (ft) Sample ID	MLSS-2 22.00-24.00 A60572	MLSS-3 0.00-0.50 A60540	MLSS-3 8.00-10.00 A60545	MLSS-3 (Dup) 8.00-10.00 A60546	MLSS-3 12.00-14.00 A60548	MLSS-3 14.00-16.00 A60549	MLSS-3 16.00-18.00 A60550	MLSS-3 18.00-20.00 A60551
Monarch HRDL (Cont'd.)								
Aroclor-1016	ND (0.065 U)	ND (2.1 U)	ND (1.4 U)	ND (0.50 U)	ND (18 U)	ND (2.0 U)	ND (1.6 U)	ND (1.3 U)
Aroclor-1242	ND (0.065 U)	ND (2.1 U)	4.7	4.9	120	22	4.9	7.9
Aroclor-1248	ND (0.065 U)	17	1.5	1.4	ND (18 U)	5.6	6.2	ND (1.3 U)
Aroclor-1254	ND (0.065 U)	ND (2.1 U)	ND (1.4 U)	ND (0.50 U)	ND (18 U)	ND (2.0 U)	1.4 J	2.1
Aroclor-1260	ND (0.065 U)	ND (2.1 U)	ND (1.4 U)	ND (0.50 U)	ND (18 U)	ND (2.0 U)	ND (1.6 U)	ND (1.3 U)

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TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	MLSS-3	MLSS-4	MLSS-4	MLSS-4	MLSS-4	MLSS-4	MLSS-4	MLSS-4
Depth (ft)	20.00-22.00	0.00-0.50	6.00-8.00	12.00-14.00	14.00-16.00	16.00-18.00	18.00-20.00	20.00-22.00
Sample ID	A60552	A60520	A60524	A60527	A60528	A60529	A60530	A60531
Monarch HRDL (Cont'd.)								
Aroclor-1016	ND (0.074 U)	ND (0.47 U)	ND (0.26 U)	8.6	ND (2.0 U)	ND (2.0 U)	ND (0.53 U)	ND (0.039 U)
Aroclor-1242	0.38	ND (0.47 U)	0.29	38	32	18	3.8	R
Aroclor-1248	ND (0.074 U)	3.8	ND (0.26 U)	ND (3.7 U)	ND (2.0 U)	4.1	ND (0.53 U)	ND (0.039 U)
Aroclor-1254	0.089	ND (0.47 U)	0.24 J	ND (3.7 U)	2.6	ND (2.0 U)	1.4	ND (0.039 U)
Aroclor-1260	ND (0.074 U)	ND (0.47 U)	ND (0.26 U)	ND (3.7 U)	ND (2.0 U)	1.1 J	ND (0.53 U)	ND (0.039 U)

Location	MLSS-5	MLSS-5	MLSS-5	MLSS-5	MLSS-5	MLSS-5	MLSS-5	MW-124B
Depth (ft)	0.00-0.50	8.00-10.00	12.00-14.00	18.00-20.00	20.00-22.00	22.00-24.00	24.00-26.00	4.00-6.00
Sample ID	A60500	A60505	A60507	A60510	A60511	A60512	A60513	A60102
Monarch HRDL (Cont'd.)								
Aroclor-1016	ND (0.45 U)	ND (0.27 U)	ND (0.54 U)	ND (2.0 U)	ND (0.83 U)	ND (0.60 U)	ND (0.045 U)	ND (0.062 U)
Aroclor-1242	ND (0.45 U)	0.35	2.4	2.9	3.1	4.6	0.12 J	ND (0.062 U)
Aroclor-1248	ND (0.45 U)	ND (0.27 U)	0.80	7.5	5.6	ND (0.60 U)	ND (0.045 U)	ND (0.062 U)
Aroclor-1254	ND (0.45 U)	ND (0.27 U)	ND (0.54 U)	1.2 J	1.1	1.6	0.061	ND (0.062 U)
Aroclor-1260	ND (0.45 U)	ND (0.27 U)	ND (0.54 U)	0.99 J	0.41 J	ND (0.60 U)	ND (0.045 U)	ND (0.062 U)

Location	MW-124B	MW-124B	MW-124B (Dup)	MW-124B	MW-124B	MW-124B	MW-125B	MW-125B
Depth (ft)	12.00-14.00	20.00-22.00	20.00-22.00	36.00-38.00	40.00-42.00	54.00-56.00	8.00-10.00	14.00-16.00
Sample ID	A60106	A60107	A60108	A60109	A60110	A60111	A60024	A60027
Monarch HRDL (Cont'd.)								
Aroclor-1016	ND (5.8 U)	ND (0.052 UJ)	ND (0.052 UJ)	ND (0.055 U)	ND (0.055 U)	ND (0.061 U)	1.7	37
Aroclor-1242	ND (5.8 U)	ND (0.052 UJ)	ND (0.052 UJ)	ND (0.055 U)	ND (0.055 U)	ND (0.061 U)	6.7	100
Aroclor-1248	ND (5.8 U)	ND (0.052 UJ)	ND (0.052 UJ)	ND (0.055 U)	ND (0.055 U)	ND (0.061 U)	ND (0.93 U)	ND (18 U)
Aroclor-1254	ND (5.8 U)	ND (0.052 UJ)	ND (0.052 UJ)	ND (0.055 U)	ND (0.055 U)	ND (0.061 U)	ND (0.93 U)	ND (18 U)
Aroclor-1260	ND (5.8 U)	ND (0.052 UJ)	ND (0.052 UJ)	ND (0.055 U)	ND (0.055 U)	ND (0.061 U)	ND (0.93 U)	ND (18 U)

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MW-125B 16.00-18.00 A60028	MW-125B 18.00-19.00 A60029	MW-125B 19.00-20.00 A60030	MW-126A 14.00-16.00 (R) A60017	MW-126A 14.00-16.00 (S) A60018	MW-126B 0.00-0.50 A60001	MW-126B 6.00-8.00 A60003	MW-126B 10.00-12.00 A60006
Monarch HRDL (Cont'd.)								
Aroclor-1016	ND (2.4 U)	ND (0.91 U)	ND (0.038 U)	ND (0.91 U)	ND (0.062 U)	ND (0.060 U)	ND (1.6 UJ)	18
Aroclor-1242	25	11	0.18	2.3	ND (0.062 U)	ND (0.060 U)	11 J	67
Aroclor-1248	1.7 J	ND (0.91 U)	ND (0.038 U)	ND (0.91 U)	ND (0.062 U)	0.055 J	ND (1.6 UJ)	ND (17 U)
Aroclor-1254	1.2 J	1.4 J	ND (0.038 U)	1.0	ND (0.062 U)	ND (0.060 U)	ND (1.6 UJ)	ND (17 U)
Aroclor-1260	0.98 J	ND (0.91 U)	ND (0.038 U)	ND (0.91 U)	ND (0.062 U)	ND (0.060 U)	ND (1.6 UJ)	ND (17 U)

Location Depth (ft) Sample ID	MW-126B 12.00-14.00 A60007	DLHB-1 0.00-0.50 A60589	DLHB-1 2.00-4.00 A60590	DLHB-1 10.00-12.00 A60591	DLHB-1 12.00-14.00 A60592	DLHB-1 14.00-16.00 A60593	DLHB-1 16.00-18.00 A60594	DLHB-2 0.00-0.50 A60582
Monarch HRDL (Cont'd.)		**FRDLs**						
Aroclor-1016	ND (0.73 U)	ND (0.092 U)	ND (0.17 U)	ND (0.11 U)	0.071 J	ND (0.14 U)	0.49	ND (0.078 U)
Aroclor-1242	3.4	ND (0.092 U)	ND (0.17 U)	0.45	ND (0.14 UJ)	0.60 J	ND (0.039 U)	ND (0.078 U)
Aroclor-1248	1.4	ND (0.092 U)	ND (0.17 U)	ND (0.11 U)	ND (0.14 UJ)	ND (0.14 U)	ND (0.039 U)	ND (0.078 U)
Aroclor-1254	2.3	ND (0.092 U)	ND (0.17 U)	ND (0.11 U)	ND (0.14 UJ)	ND (0.14 U)	ND (0.039 U)	ND (0.078 U)
Aroclor-1260	ND (0.73 U)	ND (0.092 U)	ND (0.17 U)	ND (0.11 U)	ND (0.14 UJ)	ND (0.14 U)	ND (0.039 U)	ND (0.078 U)

Location Depth (ft) Sample ID	DLHB-2 0.50-2.00 A60583	DLHB-2 2.00-4.00 A60584	DLHB-2 4.00-6.00 A60585	DLHB-2 6.00-8.00 A60586	DLHB-2 8.00-10.00 A60587	DLHB-3 0.00-0.50 A60595	DLHB-3[2] 0.50-2.00 A60596	DLHB-3 2.00-4.00 A60597
FRDLs (Cont'd.)								
Aroclor-1016	ND (0.16 U)	ND (0.16 U)	ND (0.14 U)	ND (0.092 U)	0.093	ND (0.23 U)	ND (0.15 U)	ND (0.14 U)
Aroclor-1242	0.97	ND (0.16 U)	0.24	0.21 J	ND (0.037 U)	2.2	0.97	0.094 J
Aroclor-1248	0.10 J	ND (0.16 U)	ND (0.14 U)	ND (0.092 U)	ND (0.037 U)	ND (0.23 UJ)	0.29	ND (0.14 U)
Aroclor-1254	ND (0.16 U)	ND (0.16 U)	ND (0.14 U)	ND (0.092 U)	ND (0.037 U)	ND (0.23 UJ)	ND (0.15 U)	ND (0.14 U)
Aroclor-1260	ND (0.16 U)	ND (0.16 U)	ND (0.14 U)	ND (0.092 U)	ND (0.037 U)	ND (0.23 U)	ND (0.15 U)	ND (0.14 U)

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TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	DLHB-3 4.00-6.00 A60598	DLHB-3[2] 6.00-8.00 A60599	DLHB-3[2] 8.00-10.00 A60600	DLHB-4 0.00-0.50 A60580	DLHB-5 0.00-0.50 A60581	DLHB-6 0.00-0.50 A60601	DLHB-6 2.00-4.00 A60602	DLHB-6 4.00-6.00 A60603
FRDLs (Cont'd.)								
Arodor-1016	ND (0.17 UJ)	ND (0.58 U)	1.5	ND (0.13 U)	8.0 DJ	ND (0.27 UJ)	ND (0.19 U)	ND (0.090 U)
Arodor-1242	0.20 J	4.5	ND (0.20 U)	1.5	ND (0.38 U)	0.31 J	0.25	0.37
Arodor-1248	ND (0.17 UJ)	ND (0.58 U)	ND (0.20 U)	ND (0.13 U)	ND (0.38 U)	ND (0.27 UJ)	ND (0.19 U)	0.27
Arodor-1254	ND (0.17 UJ)	ND (0.58 U)	ND (0.20 U)	ND (0.13 U)	ND (0.38 U)	ND (0.27 UJ)	ND (0.19 U)	ND (0.090 U)
Arodor-1260	ND (0.17 UJ)	ND (0.58 U)	ND (0.20 U)	ND (0.13 U)	ND (0.38 U)	ND (0.27 UJ)	ND (0.19 U)	ND (0.090 U)

Location Depth (ft) Sample ID	DLHB-6 6.00-8.00 A60604	DLHB-6 (Dup) 6.00-8.00 A60607	DLHB-6 8.00-10.00 A60605	DLHB-6 10.00-12.00 A60606	MW-122B 4.00-6.00 A60079	MW-122B (Dup) 4.00-6.00 A60080	MW-122B 18.00-20.00 A60081
FRDLs (Cont'd.)							
Arodor-1016	ND (4.2 U)	120 J	ND (0.44 U)	6.6	ND (0.11 U)	ND (0.053 U)	ND (0.087 U)
Arodor-1242	14 J	ND (22 U)	19 D	ND (0.21 U)	1.1	0.28	ND (0.087 U)
Arodor-1248	ND (4.2 U)	ND (22 U)	ND (0.44 U)	ND (0.21 U)	0.35	0.027 J	ND (0.087 U)
Arodor-1254	ND (4.2 U)	ND (22 U)	0.48 JN	0.35	ND (0.11 U)	ND (0.053 U)	ND (0.087 U)
Arodor-1260	ND (4.2 U)	ND (22 U)	ND (0.44 U)	ND (0.21 U)	ND (0.11 U)	ND (0.053 U)	ND (0.087 U)

Location Depth (ft) Sample ID	FLF-1 0.00-0.50 A60094	FLF-1[2] 2.00-4.00 A60095	FLF-1[2] 4.00-6.00 A60096	FLF-1[2] 6.00-6.50 A60097	FLF-1[2] 6.50-8.00 A60098	FLF-2 0.00-0.50 A60632	FLF-2[2] 20.00-22.00 A60633	FLF-2 20.00-22.00 A60634
Former Type III Landfill								
Arodor-1016	ND (3.1 U)	ND (6.6 U)	ND (6.6 U)	ND (0.89 U)	ND (0.039 U)	ND (0.051 UJ)	ND (230 U)	ND (0.57 U)
Arodor-1242	ND (3.1 U)	260 DJ	240 DJ	75 BD	ND (0.039 U)	ND (0.051 UJ)	2000	2.4
Arodor-1248	85 DJ	ND (6.6 U)	ND (6.6 U)	ND (0.89 U)	0.073	ND (0.051 UJ)	ND (230 U)	ND (0.57 U)
Arodor-1254	ND (3.1 U)	ND (6.6 U)	ND (6.6 U)	ND (0.89 U)	ND (0.039 U)	ND (0.051 UJ)	ND (230 U)	ND (0.57 U)
Arodor-1260	ND (3.1 U)	ND (6.6 U)	ND (6.6 U)	ND (0.89 U)	ND (0.039 U)	ND (0.051 UJ)	ND (230 U)	ND (0.57 U)

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TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	FLF-3 0.00-0.50 A60635	FLF-3[2] 14.00-16.00 A60636	FLF-3 14.00-16.00 A60637	MW-19BR 6.00-8.00 A60697	MW-19BR (Dup) 6.00-8.00 A60701	MW-19BR 14.00-16.00 A60698	MW-19BR[2] 24.00-26.00 A60699	MW-19BR 38.00-40.00 A60700
Former Type III Landfill (Cont'd.)								
Aroclor-1016	ND (0.051 U)	ND (0.16 U)	ND (0.054 U)	ND (0.056 U)	ND (0.056 UJ)	ND (0.054 U)	ND (0.056 UJ)	ND (0.059 UJ)
Aroclor-1242	ND (0.051 U)	0.14 J	ND (0.054 U)	0.40	0.53 J	0.099	ND (0.056 UJ)	ND (0.059 UJ)
Aroclor-1248	0.25	ND (0.16 UJ)	ND (0.054 U)	0.040 J	ND (0.056 UJ)	ND (0.054 U)	ND (0.056 UJ)	ND (0.059 UJ)
Aroclor-1254	ND (0.051 U)	ND (0.16 U)	ND (0.054 U)	ND (0.056 U)	ND (0.056 UJ)	ND (0.054 U)	ND (0.056 UJ)	ND (0.059 UJ)
Aroclor-1260	ND (0.051 U)	ND (0.16 U)	ND (0.054 U)	ND (0.056 U)	ND (0.056 UJ)	ND (0.054 U)	ND (0.056 UJ)	ND (0.059 UJ)

Location Depth (ft) Sample ID	MW-127A (Dup) 4.00-6.00 A60104	MW-127A 4.00-6.00 A60103	WA-1 0.00-0.50 A6064	WA-1 2.00-4.00 A60059	WA-1 8.00-10.00 A60060	WA-1 10.00-12.00 A60061	WA-1 12.00-13.00 A60062	WA-1 13.00-14.00 A60063
Former Type III Landfill (Cont'd.)			**Western Disposal Area**					
Aroclor-1016	ND (0.058 U)	ND (0.056 U)	ND (0.057 U)	ND (0.13 U)	ND (0.15 U)	ND (3.1 U)	ND (0.46 U)	ND (0.035 U)
Aroclor-1242	ND (0.058 U)	ND (0.056 U)	ND (0.057 U)	0.17	0.69	22	5.5	ND (0.035 U)
Aroclor-1248	ND (0.058 U)	0.052 J	ND (0.057 U)	ND (0.13 UJ)	ND (0.15 UJ)	ND (3.1 U)	ND (0.46 U)	ND (0.035 U)
Aroclor-1254	ND (0.058 U)	ND (0.056 U)	ND (0.057 U)	ND (0.13 UJ)	0.062 J	ND (3.1 U)	ND (0.46 U)	ND (0.035 U)
Aroclor-1260	ND (0.058 U)	ND (0.056 U)	ND (0.057 U)	ND (0.13 U)	ND (0.15 U)	ND (3.1 U)	ND (0.46 U)	ND (0.035 U)

Location Depth (ft) Sample ID	WA-2 0.00-0.50 A60670	WA-2 6.00-8.00 A60671	WA-2 (Dup) 6.00-8.00 A60672	WA-2 8.00-10.00 A60673	WA-2 10.00-12.00 A60674	WA-2 12.00-14.00 A60675	WA-2 14.00-18.00 A60676	WA-3 0.00-0.50 A60664
Western Disposal Area (Cont'd.)								
Aroclor-1016	ND (0.062 U)	600 DJ	0.47 J	1.6	0.094 J	ND (0.062 U)	ND (0.037 U)	0.046 J
Aroclor-1242	0.029 J	ND (14 U)	ND (0.079 U)	ND (0.11 U)	ND (0.13 U)	0.11	ND (0.037 U)	ND (0.054 U)
Aroclor-1248	0.052 J	ND (14 U)	ND (0.079 U)	ND (0.11 U)	ND (0.13 U)	ND (0.062 U)	ND (0.037 U)	0.039 J
Aroclor-1254	ND (0.062 U)	ND (14 U)	ND (0.079 U)	ND (0.11 U)	0.11 J	ND (0.062 U)	ND (0.037 U)	ND (0.054 U)
Aroclor-1260	ND (0.062 U)	ND (14 U)	ND (0.079 U)	ND (0.11 U)	ND (0.13 U)	ND (0.062 U)	ND (0.037 U)	ND (0.054 U)

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	WA-3	WA-3	WA-3	WA-3	WA-3	WA-4	WA-4	WA-4
Depth (ft)	2.00-4.00	10.00-12.00	12.00-14.00	14.00-16.00	16.00-18.00	0.00-0.50	4.00-6.00	6.00-8.00
Sample ID	A60665	A60666	A60667	A60668	A60669	A60659	A60660	A60661
Western Disposal Area (Cont'd.)								
Arodor-1016	ND (0.13 U)	ND (0.14 U)	ND (0.16 U)	ND (0.088 U)	ND (0.034 U)	ND (0.052 U)	ND (0.72 U)	ND (0.087 U)
Arodor-1242	0.058 J	0.55	0.13 J	0.33	0.025 J	ND (0.052 U)	8.2	ND (0.087 U)
Arodor-1248	ND (0.13 U)	ND (0.14 U)	ND (0.16 U)	ND (0.088 U)	ND (0.034 U)	0.24	ND (0.72 U)	0.088
Arodor-1254	ND (0.13 U)	ND (0.14 U)	ND (0.16 U)	ND (0.088 U)	ND (0.034 U)	ND (0.052 U)	ND (0.72 U)	ND (0.087 U)
Arodor-1260	ND (0.13 U)	ND (0.14 U)	ND (0.16 U)	ND (0.088 U)	ND (0.034 U)	ND (0.052 U)	ND (0.72 U)	ND (0.087 U)

Location	WA-4	WA-4	WA-5	WA-5	WA-5	WA-5	WA-5 (Dup)	WA-5
Depth (ft)	8.00-10.00	10.00-12.00	0.00-0.50	2.00-4.00	10.00-12.00	18.00-20.00	18.00-20.00	20.00-22.00
Sample ID	A60662	A60663	A60645	A60646	A60647	A60648	A60652	A60649
Western Disposal Area (Cont'd.)								
Arodor-1016	ND (0.085 U)	ND (0.034 U)	ND (0.062 UJ)	ND (0.12 UJ)	ND (0.13 UJ)	ND (0.11 UJ)	ND (0.11 UJ)	ND (0.13 UJ)
Arodor-1242	0.063 J	ND (0.034 U)	ND (0.062 UJ)	ND (0.12 UJ)	0.80 BJ	ND (0.11 UJ)	ND (0.11 UJ)	0.19 J
Arodor-1248	ND (0.085 U)	ND (0.034 U)	ND (0.062 UJ)	0.076 J	ND (0.13 UJ)	ND (0.11 UJ)	ND (0.11 UJ)	ND (0.13 UJ)
Arodor-1254	ND (0.085 U)	ND (0.034 U)	ND (0.062 UJ)	ND (0.12 UJ)	ND (0.13 UJ)	ND (0.11 UJ)	ND (0.11 UJ)	ND (0.13 UJ)
Arodor-1260	ND (0.085 U)	ND (0.034 U)	ND (0.062 UJ)	ND (0.12 UJ)	ND (0.13 UJ)	ND (0.11 UJ)	ND (0.11 UJ)	ND (0.13 UJ)

Location	WA-5	WA-5	WA-6	WA-6	WA-6	WA-6	WA-6	WA-6
Depth (ft)	22.00-23.50	23.50-26.00	0.00-0.50	4.00-6.00	8.00-10.00	10.00-12.00	12.00-13.00	13.00-15.00
Sample ID	A60650	A60651	A60087	A60082	A60083	AC0084	A60085	A60086
Western Disposal Area (Cont'd.)								
Arodor-1016	ND (0.15 U)	ND (0.034 U)	ND (0.61 U)	ND (250 UJ)	ND (220 UJ)	ND (200 UJ)	ND (2.1 U)	ND (0.043 U)
Arodor-1242	0.25	ND (0.034 U)	8.8	1100 BJ	480 BJ	800 BJ	300 D	0.22
Arodor-1248	ND (0.15 U)	ND (0.034 U)	ND (0.61 U)	ND (250 UJ)	ND (220 UJ)	ND (200 UJ)	ND (2.1 U)	ND (0.043 U)
Arodor-1254	ND (0.15 U)	ND (0.034 U)	ND (0.61 U)	ND (250 UJ)	ND (220 UJ)	ND (200 UJ)	ND (2.1 U)	ND (0.043 U)
Arodor-1260	ND (0.15 U)	ND (0.034 U)	ND (0.61 U)	ND (250 UJ)	ND (220 UJ)	ND (200 UJ)	1.3 J	ND (0.043 U)

(See Notes on Page 11)

TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	WA-7	WA-7	WA-7	WA-7	WA-7	WA-7	WA-7	WA-8
Depth (ft)	0.00-0.50	8.00-10.00	10.00-12.00	16.00-18.00	18.00-20.00	20.00-22.00	22.00-24.00	0.00-0.50
Sample ID	A60638	A60639	A60640	A60641	A60642	A60643	A60644	A60653
Western Disposal Area (Cont'd.)								
Arodor-1016	ND (0.060 U)	ND (0.13 UJ)	ND (0.17 UJ)	ND (0.13 UJ)	ND (0.15 UJ)	ND (0.91 U)	ND (0.22 U)	ND (0.28 U)
Arodor-1242	0.072	ND (0.13 UJ)	ND (0.17 UJ)	ND (0.13 UJ)	0.14 BJ	39 D	0.41	ND (0.28 U)
Arodor-1248	ND (0.060 U)	0.23 J	ND (0.17 UJ)	ND (0.13 UJ)	ND (0.15 UJ)	ND (0.91 U)	ND (0.22 U)	3.1
Arodor-1254	ND (0.060 U)	ND (0.13 UJ)	ND (0.17 UJ)	ND (0.13 UJ)	ND (0.15 UJ)	ND (0.91 U)	ND (0.22 U)	ND (0.28 U)
Arodor-1260	ND (0.060 U)	ND (0.13 UJ)	ND (0.17 UJ)	ND (0.13 UJ)	ND (0.15 UJ)	ND (0.91 U)	ND (0.22 U)	ND (0.28 U)

Location	WA-8	WA-8	WA-8	WA-8	WA-8	MW-7B	MW-7B	B-7B
Depth (ft)	2.00-4.00	6.00-8.00	8.00-10.00	10.00-12.00	12.00-14.00	4.0-6.0	14.00-16.00	8.00-10.00
Sample ID	A60654	A60655	A60656	A60657	A60658	A60076	A60077	A60702
Western Disposal Area (Cont'd.)								
Arodor-1016	ND (22 U)	ND (16 U)	ND (2.1 U)	ND (1.8 U)	ND (0.036 U)	ND (0.052U)	ND (0.055 U)	ND (0.034 U)
Arodor-1242	1100 DJ	ND (16 U)	51 DJ	120 D	0.042	ND (0.052U)	ND (0.055 U)	ND (0.034 U)
Arodor-1248	ND (22 U)	260 DJ	ND (2.1 U)	ND (1.8 U)	ND (0.036 U)	ND (0.052U)	ND (0.055 U)	ND (0.034 U)
Arodor-1254	ND (22 U)	ND (16 U)	ND (2.1 U)	ND (1.8 U)	ND (0.036 U)	ND (0.052U)	ND (0.055 U)	ND (0.034 U)
Arodor-1260	ND (22 U)	ND (16 U)	ND (2.1 U)	ND (1.8 U)	ND (0.036 U)	ND (0.052U)	ND (0.055 U)	ND (0.034 U)

Location	B-7B	MW-8A	MW-8A	MW-8A	MW-8A	MW-8A	MW-8A	MW-20B
Depth (ft)	10.00-12.00	0.00-0.50	4.00-6.00	8.00-10.00	10.00-12.00	12.00-12.50	12.50-14.00	6.00-8.00
Sample ID	A60703	A60105	A60089	A60090	A60091	A60092	A60093	A60056
Western Disposal Area (Cont'd.)								
Arodor-1016	ND (0.043 U)	ND (0.052 U)	370 DJ	220 DJ	ND (4.6 U)	ND (2.5 U)	ND (0.051 U)	ND (0.056 U)
Arodor-1242	ND (0.043 U)	ND (0.052 U)	ND (5.9 U)	ND (3.3 U)	330 DJ	220 D	0.081 J	ND (0.056 U)
Arodor-1248	ND (0.043 U)	0.16	ND (5.9 U)	ND (3.3 U)	ND (4.6 U)	ND (2.5 U)	ND (0.051 U)	ND (0.056 U)
Arodor-1254	ND (0.043 U)	ND (0.052 U)	ND (5.9 U)	ND (3.3 U)	ND (4.6 U)	ND (2.5 U)	ND (0.051 U)	ND (0.056 U)
Arodor-1260	ND (0.043 U)	ND (0.052 U)	ND (5.9 U)	ND (3.3 U)	ND (4.6 U)	ND (2.5 U)	ND (0.051 U)	ND (0.056 U)

(See Notes on Page 11)

TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MW-20B 16.00-18.00 A60057	MW-20B 20.00-22.00 A60058	MW-120B 0.00-0.50 A60048	MW-120B 6.00-8.00 A60049	MW-120B (Dup) 6.00-8.00 A60050	MW-120B 10.00-12.00 A60051	MW-120B 14.00-16.00 A60052	MW-120B 16.00-18.00 A60053
Western Disposal Area (Cont'd.)								
Aroclor-1016	ND (0.061 U)	ND (0.064 U)	ND (0.059 U)	ND (35 U)	ND (93 U)	ND (5.7 UJ)	ND (220 U)	ND (36 U)
Aroclor-1242	ND (0.061 U)	ND (0.064 U)	ND (0.059 U)	180	630	69 J	2500	330
Aroclor-1248	ND (0.061 U)	ND (0.064 U)	0.37	ND (35 UJ)	ND (93 UJ)	ND (5.7 UJ)	ND (220 UJ)	ND (36 UJ)
Aroclor-1254	ND (0.061 U)	ND (0.064 U)	ND (0.059 U)	ND (35 UJ)	ND (93 UJ)	ND (5.7 UJ)	ND (220 UJ)	ND (36 UJ)
Aroclor-1260	ND (0.061 U)	ND (0.064 U)	0.038 J	ND (35 U)	ND (93 U)	ND (5.7 UJ)	ND (220 U)	ND (36 U)

Location Depth (ft) Sample ID	MW-120B 18.00-19.00 A60054	MW-120B 19.00-20.00 A60055	BMP-1 0.00-0.50 A60626	BMP-1 7.00-8.00 A60627	BMP-1 8.00-9.00 A60628	BMP-2 0.00-1.00 A60621	BMP-2 3.00-4.00 A60624	BMP-3 0.00-0.50 A60629
Western Disposal Area (Cont'd.)			**Former Bryant Mill Pond**					
Aroclor-1016	ND (4.9 U)	ND (0.040 U)	28	ND (5.1 U)	ND (1.3 U)	ND (1.3 U)	ND (0.87 U)	ND (0.26 U)
Aroclor-1242	130 D	0.15	ND (7.3 U)	60	3.4	77	24 D	ND (0.26 U)
Aroclor-1248	ND (4.9 U)	ND (0.040 U)	19	ND (5.1 U)	ND (1.3 U)	ND (1.3 U)	ND (0.87 U)	1.2
Aroclor-1254	ND (4.9 U)	0.021 J	ND (7.3 U)	ND (5.1 U)	ND (1.3 U)	ND (1.3 U)	2.4	ND (0.26 U)
Aroclor-1260	ND (4.9 U)	ND (0.040 U)	ND (7.3 U)	ND (5.1 U)	ND (1.3 U)	ND (1.3 U)	ND (0.87 U)	ND (0.26 U)

Location Depth (ft) Sample ID	BMP-3 6.00-7.00 A60630	BMP-3 7.00-8.00 A60631	BMP-4 0.00-0.50 A60731	BMP-4 6.00-7.00 A60732	BMP-4 7.00-7.50 A60733	BMP-5 0.00-0.50 A60728	BMP-5 5.00-6.00 A60729	BMP-5 5.00-6.50 A60730
Former Bryant Mill Pond (Cont'd.)								
Aroclor-1016	ND (1.1 U)	ND (0.12 U)	ND (9.1 UJ)	ND (0.59 U)	ND (0.12 U)	ND (4.6 UJ)	ND (0.073 U)	ND (0.060 U)
Aroclor-1242	13	1.1	140 J	3.0	1.1	ND (4.6 UJ)	0.50	ND (0.060 U)
Aroclor-1248	ND (1.1 U)	ND (0.12 U)	ND (9.1 UJ)	ND (0.59 U)	ND (0.12 U)	61 J	ND (0.073 U)	ND (0.060 U)
Aroclor-1254	ND (1.1 U)	ND (0.12 U)	ND (9.1 UJ)	ND (0.59 U)	ND (0.12 U)	ND (4.6 UJ)	ND (0.073 U)	ND (0.060 U)
Aroclor-1260	0.94 J	ND (0.12 U)	ND (9.1 UJ)	ND (0.59 U)	ND (0.12 U)	ND (4.6 UJ)	ND (0.073 U)	ND (0.060 U)

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TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	BMP-6	BMP-6	BMP-6	BMP-7[2]	BMP-7	BMP-8	BMP-8	BMP-8 (Dup)
Depth (ft)	0.00-0.50	0.50-1.50	1.50-2.50	0.00-0.50	0.50-1.00	0.00-0.50	0.50-1.50	0.50-1.50
Sample ID	A60734	A60735	A60736	A60726	A60727	A60710	A60711	A60712
Former Bryant Mill Pond (Cont'd.)								
Aroclor-1016	ND (0.18 U)	ND (0.069 U)	ND (0.061 U)	ND (0.47 UJ)	ND (0.22 UJ)	ND (0.12 UJ)	ND (0.11 UJ)	ND (0.11 UJ)
Aroclor-1242	ND (0.18 U)	ND (0.069 U)	ND (0.061 U)	ND (0.47 UJ)	ND (0.22 UJ)	ND (0.12 UJ)	ND (0.11 UJ)	ND (0.11 UJ)
Aroclor-1248	2.0	0.15	ND (0.061 U)	1.6 J	1.1 J	0.57 J	1.1 J	1.3 J
Aroclor-1254	ND (0.18 U)	ND (0.069 U)	ND (0.061 U)	2.9 J	2.2 J	0.43 J	ND (0.11 UJ)	ND (0.11 UJ)
Aroclor-1260	0.20	0.028 J	ND (0.061 U)	ND (0.47 UJ)	ND (0.22 UJ)	ND (0.12 UJ)	0.26 J	0.42 J

Location	BMP-9	BMP-9	BMP-10	BMP-10 (Dup)	BMP-10	BMP-11	BMP-11	BMP-11
Depth (ft)	0.00-0.50	0.50-1.50	0.00-0.50	0.00-0.50	1.50-3.50	0.00-1.00	1.00-2.00	2.00-3.00
Sample ID	A60738	A60739	A60608	A60610	A60609	A60611	A60612	A60613
Former Bryant Mill Pond (Cont'd.)								
Aroclor-1016	ND (0.062 UJ)	ND (0.060 UJ)	32	ND (1.3 U)	ND (3.6 U)	30	ND (53 U)	ND (26 U)
Aroclor-1242	ND (0.062 UJ)	ND (0.060 UJ)	ND (2.5 U)	ND (1.3 U)	44	ND (2.7 U)	360	510 DJ
Aroclor-1248	ND (0.062 UJ)	ND (0.060 UJ)	4.2	7.3	ND (3.6 U)	9.5	ND (53 U)	ND (26 U)
Aroclor-1254	ND (0.062 UJ)	0.025 J	ND (2.5 U)	ND (1.3 U)	3.8	ND (2.7 U)	ND (53 U)	ND (26 U)
Aroclor-1260	ND (0.062 UJ)	ND (0.060 UJ)	ND (2.5 U)	ND (1.3 U)	1.4 J	ND (2.7 U)	ND (53 U)	ND (26 U)

Location	BMP-11	BMP-11	BMP-12	BMP-12	MW-128A	MW-128A	BLHB-1	BLHB-1
Depth (ft)	3.00-4.00	5.00-7.00	0.00-1.00	3.00-4.00	6.00-8.00	14.00-16.00	0.00-0.50	1.00-1.50
Sample ID	A60614	A60615	A60616	A60619	A60704	A60705	A60720	A60721
Former Bryant Mill Pond (Cont'd.)							**Portage Creek Floodplain**	
Aroclor-1016	ND (1.6 U)	ND (5.8 U)	ND (1.6 U)	ND (0.23 U)	ND (0.055 U)	ND (0.062 U)	ND (0.055 UJ)	ND (0.056 UJ)
Aroclor-1242	20	46	46	13	ND (0.055 U)	0.031 J	ND (0.055 UJ)	ND (0.056 UJ)
Aroclor-1248	ND (1.6 U)	ND (5.8 U)	ND (1.6 U)	ND (0.23 U)	ND (0.055 U)	ND (0.062 U)	0.027 J	ND (0.056 UJ)
Aroclor-1254	2.8	ND (5.8 U)	ND (1.6 U)	ND (0.23 U)	ND (0.055 U)	ND (0.062 U)	ND (0.055 UJ)	ND (0.056 UJ)
Aroclor-1260	1.6	ND (5.8 U)	ND (1.6 U)	ND (0.23 U)	ND (0.055 U)	ND (0.062 U)	ND (0.055 UJ)	ND (0.056 UJ)

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TABLE 3-10

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	BLHB-2 0.00-0.50 A60716	BLHB-2 0.50-1.00 A60719	BLHB-3 0.00-0.50 A60713	BLHB-3 (Dup) 0.00-0.50 A60714	BLHB-3 5.00-5.50 A60715	MLHB-1 0.00-0.50 A60722	MLHB-1 0.50-1.00 A60723	MLHB-2 0.00-0.50 A60724
Portage Creek Flobdplain (Cont'd.)								
Arodor-1016	ND (0.57 UJ)	ND (0.61 UJ)	ND (0.28 UJ)	ND (0.28 UJ)	ND (0.074 UJ)	ND (0.064 UJ)	ND (0.066 UJ)	ND (0.059 UJ)
Arodor-1242	ND (0.57 UJ)	ND (0.61 UJ)	ND (0.28 UJ)	ND (0.28 UJ)	ND (0.074 UJ)	ND (0.064 UJ)	ND (0.066 UJ)	ND (0.059 UJ)
Arodor-1248	2.4 J	4.3 J	2.7 J	2.0 J	ND (0.074 UJ)	0.086 J	0.31 J	ND (0.059 UJ)
Arodor-1254	ND (0.57 UJ)	ND (0.61 UJ)	ND (0.28 UJ)	ND (0.28 UJ)	0.29 J	ND (0.064 UJ)	ND (0.066 UJ)	ND (0.059 UJ)
Arodor-1260	ND (0.57 UJ)	ND (0.61 UJ)	ND (0.28 UJ)	ND (0.28 UJ)	0.055 J	ND (0.064 UJ)	ND (0.066 UJ)	ND (0.059 UJ)

Location Depth (ft) Sample ID	MLHB-2 1.50-2.00 A60725
Portage Creek Floodplain (Cont'd.)	
Arodor-1016	ND (0.062 UJ)
Arodor-1242	ND (0.062 UJ)
Arodor-1248	ND (0.062 UJ)
Arodor-1254	ND (0.062 UJ)
Arodor-1260	ND (0.062 UJ)

Notes:
[1]Showing only the results for analytes detected above quantitation limit.
[2]MS/MSD of this sample was analyzed.
ND - Not detected.
NA - Not analyzed.

Notes Explaining Data Qualifiers:

B - The compound has been found in the sample as well as its asociated method blank, a comparison of sample and blank concentrations indicates the compound is likely site-related.
D - Concentration is based on a diluted sample analysis.
N - The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
J - The compound was positively identified; however, the associated value is an estimated concentration only.
R - The sample results are rejected.
U - The compound was analyzed for but not detected The associated value is the compound quantitation limit.
UJ - The compound was not detected above the reported sample quantitative limit. However, the reported limit is approximate, and may or may not, represent the actual limit of quantitation.

TABLE 3-1

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TCL COMPOUNDS
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
VOCs		
Monarch HRDL[1]		
acetone	0.019-1.4	ND-2.5
benzene	ND-0.041	ND-0.034
2-butanone	ND-0.55	ND-0.68
carbon disulfide	ND-0.028	ND-0.073
carbon tetrachloride	ND	ND-3.8
1,2-dichloroethene	ND-0.0040	ND
ethylbenzene	ND-0.014	ND
tetrachloroethene	ND	ND-0.026
toluene	ND-0.034	ND-0.92
xylenes	ND-0.078	ND-0.12
Former Bryant Mill Pond[2]		
acetone	ND-0.046	0.15
2-butanone	ND-0.014	ND
carbon disulfide	ND-0.0040	0.022
toluene	ND-0.039	ND
xylenes	ND	0.031
Bryant HRDL[3]		
acetone	0.031-0.54	ND-0.47
benzene	ND-0.016	ND-0.066
2-butanone	0.0060-0.16	ND-0.34
carbon disulfide	ND-0.010	ND-0.034
methylene chloride	ND	ND-0.030
toluene	ND-0.0060	0.22-0.93
xylenes	ND-0.015	ND-0.18
FRDLs[4]		
acetone	0.0060-0.30	0.17-1.3
2-butanone	ND-0.0090	0.094-0.71
carbon disulfide	ND-0.0030	0.0070-0.043
ethylbenzene	ND	ND-0.049
2-hexanone	ND	ND-0.041
4-methyl-2-pentanone	ND	ND-0.051
toluene	ND-0.0010	0.0050-0.025
1,1,1-trichloroethane	ND-0.0030	ND
xylenes	ND-0.0060	ND-0.059
Former Type III Landfill[5]		
acetone	0.0090	ND
toluene	0.0030	ND
xylenes	ND	0.0090
Western Disposal Area[6]		
acetone	ND-3.4	ND-2.4
2-butanone	ND-0.96	ND-2.2
carbon disulfide	ND-0.013	ND-0.078
chloroform	ND	ND-0.014
cis-1,3-dichloropropene	ND	ND-0.014
ethylbenzene	ND-0.030	ND-0.032
2-hexanone	ND	ND-0.29
methylene chloride	ND-0.0030	ND-0.004
4-methyl-2-pentanone	ND	ND-0.027
toluene	ND-0.038	ND-0.015
xylenes	ND-0.19	ND-0.22

See Notes on Page 4

TABLE 3-11

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TCL COMPOUNDS
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
SVOCs		
Monarch HRDL[1]		
anthracene	ND-0.094	ND
benzo(a)anthracene	ND-0.21	ND
benzo(b)fluoranthene	ND-0.14	ND
benzo(k)fluoranthene	ND-0.17	ND
benzo(a)pyrene	ND-0.17	ND
carbazole	ND-0.070	ND
chrysene	ND-0.20	ND
bis(2-ethylhexyl)phthalate	ND-0.11	ND-3.1
fluoranthene	ND-0.45	ND
2-methylnaphthalene	ND-0.35	0.18-4.1
4-methylphenol	ND	ND-4.7
naphthalene	ND-0.084	ND-1.0
phenanthrene	ND-0.44	ND-0.54
pyrene	ND-0.36	ND
Former Bryant Mill Pond[2,7]		
anthracene	ND-0.12	ND
benzo(a)anthracene	ND-0.72	ND
benzo(b)fluoranthene	0.40-1.5	ND
benzo(k)fluoranthene	0.40-1.3	ND
benzo(g,h,i)perylene	ND-0.28	ND
benzo(a)pyrene	ND-0.99	ND
carbazole	ND-0.14	ND
chrysene	0.37-1.3	ND
dibenzo(a,h)anthracene	ND-0.19	ND
dibenzofuran	ND-0.11	ND
di-n-butyl phthalate	0.35-2.2	ND
2,4-dimethylphenol	0.95-16	4.1
bis(2-ethylhexyl)phthalate	ND	0.58
fluoranthene	0.57-2.4	ND
indeno(1,2,3-cd)pyrene	ND-0.75	ND
2-methylnaphthalene	0.40-1.2	1.4
2-methylphenol	2.1-28	0.51
4-methylphenol	0.42-7.4	0.42
naphthalene	ND-0.78	0.28
phenanthrene	0.29-1.2	1.4
phenol	2.3-27	0.78
pyrene	0.47-2.0	ND
Bryant HRDL[3]		
bis(2-ethylhexyl)phthalate	ND-0.13	ND-3.6
fluoranthene	ND	ND-0.30
2-methylnaphthalene	ND-0.063	ND-21
4-methylphenol	ND	ND-16
phenanthrene	ND	0.59-7.2
FRDLs[4]		
bis(2-chloroethyl)ether	ND-2.1	ND
di-n-butylphthalate	ND	ND-1.0
bis(2-ethylhexyl)phthalate	ND-0.028	ND-1.1
fluoranthene	ND	ND-0.058
fluorene	ND-0.18	ND-0.40
2-methylnaphthalene	ND-1.3	ND-2.3
4-methylphenol	ND	ND-2.7
phenanthrene	ND-0.34	ND-1.3

See Notes on Page 4

TABLE 3-11

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TCL COMPOUNDS
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
SVOCs (Cont'd.)		
Former Type III Landfill[5]		
bis(2-ethylhexyl)phthalate	0.028	0.63
2-methylnaphthalene	ND	2.4
phenanthrene	ND	0.64
Western Disposal Area[4]		
anthracene	ND-0.031	ND
benzo(a)anthracene	ND-0.052	ND
benzo(b)fluoranthene	ND-0.059	ND
benzo(k)fluoranthene	ND-0.029	ND
benzo(g,h,i)perylene	ND-0.028	ND
benzo(a)pyrene	ND-0.032	ND
carbazole	ND-0.021	ND
chrysene	ND-0.064	ND-0.12
dibenzofuran	ND-0.10	ND
di-n-butylphthalate	ND-0.049	ND
bis(2-ethylhexyl)phthalate	ND-0.099	ND-5.4
fluoranthene	ND-0.094	ND-0.24
2-methylnaphthalene	ND-0.4	ND-10
4-methylphenol	ND-0.022	ND-38
naphthalene	ND-0.23	ND
pentachlorophenol	ND	ND-2.8
phenanthrene	ND-0.31	ND-0.51
pyrene	ND-0.083	ND
Pesticides/PCB		
Monarch HRDL[1]		
aldrin	ND-0.0069	ND
delta-BHC	ND	ND-0.043
gamma-chlordane	ND	ND-0.034
4,4'-DDE	ND-0.0047	ND
4,4'-DDT	ND	ND-0.25
endosulfan I	ND-0.0045	ND
endrin aldehyde	ND	ND-0.047
Total PCB	ND-0.47	0.53-140
Former Bryant Mill Pond[2,5]		
aldrin	0.14-1.1	ND
4,4'-DDE	0.03-0.33	R
4,4'-DDT	ND	0.12
endrin aldehyde	ND	0.071
Total PCB	ND-510	14-60
Bryant HRDL[3]		
4,4'-DDE	ND	ND-0.36
4,4'-DDT	ND	0.070-0.41
endrin aldehyde	ND	ND-0.084
Total PCB[6]	ND - 100	3.0-650
FRDLs[4]		
aldrin	0.0011-0.13	ND
alpha-BHC	ND	ND-0.0093
4,4'-DDD	ND	ND-0.0088
4,4'-DDE	ND-0.013	ND
Total PCB[9]	ND-7.0	ND-19
Former Type III Landfill[5]		
4,4'-DDE	ND	0.25
Total PCB[10]	ND-2.4	0.14-2,000

See Notes on Page 4

TABLE 3-11

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TCL COMPOUNDS
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
Pesticides/PCB (Cont'd.)		
Western Disposal Area[4]		
aldrin	ND-0.013	ND-0.070
beta-BHC	ND	ND-0.0091
delta-BHC	ND	ND-0.0069
alpha-chlordane	ND	ND-0.0081
gamma-chlordane	ND	ND-0.0061
4,4'-DDD	ND	ND-0.020
4,4'-DDE	ND	ND-0.42
4,4'-DDT	ND	ND-0.17
Total PCB	ND-0.41	ND-2500

Notes:
[1] Includes the results of samples from MLSS-1 through MLSS-5.
[2] Includes the results of samples from BMP-2 and BMP-12.
[3] Includes the results of samples from BHDL-22, BHDL-123, and MW-121B.
[4] Includes the results of samples from DLHB-1, DLHB-2, DLHB-3, and DLHB-6.
[5] Includes the results of samples from FLF-1.
[6] Includes the results of samples from WA-1 through WA-8, B-7B, MW-8A, and MW-120B.
[7] Native soil also includes surficial soil samples.
[8] Also includes the results of samples from MW-12R, P-1, P-2, and P-3.
[9] Also includes the results of samples from MW-122B.
[10] Also includes the results of samples from FLF-2, FLF-3, MW-198R, and MW-127A.
ND - Not detected.
R - Sample results are rejected.

TABLE 3-12

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PCB CONGENER RESULTS

Location	Sample Depth (ft)	Total PCB (mg/kg)	Congener Concentration (mg/kg)						
			Di-CB	Tri-CB	Tetra-CB	Penta-CB	Hexa-CB	Hepta-CB	Octa-CB
BMP-2	0 - 1	130	3.1	62	55	8	1.5	0.45	0.0
	1 - 2	330	18	180	110	17	5	2	0.2
	2 - 3	440	34	230	140	23	6.3	2.3	0.2
	3 - 4	37	2.5	17	11	4.2	1.9	0.45	0.11
	4 - 5	2.2	0.33	0.85	0.41	0.23	0.11	0.19	0.08
BMP-12	0 - 1	38	1.3	17	16	3	0.32	0.045	0.008
	1 - 2	90	3.3	46	36	4.8	0.45	0.043	0.0
	2 - 3	36	2.5	19	12	1.7	0.5	0.17	0.031
	3 - 4	1.2	0.11	0.48	0.35	0.12	0.042	0.075	0.036
	5 - 7	6.6	0.41	3.4	2.4	0.31	0.069	0.02	0.01

Note:

CB - Chlorinated biphenyl.

TABLE 3-13

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB RESULTS AND TOC NORMALIZED DATA
PORTAGE CREEK SEDIMENT SAMPLES [1] (mg/kg)

Location Depth (inches) Sample ID	GS--1 0.0 – 0.5 A63000	GS-2 0.0 – 0.5 A63001	GS-3 0.0 – 0.5 A63002	GS-4 0.0 – 0.5 A63003	GS-5[2] 0.0 – 0.5 A63004	GS-5 (Duplicate) 0.0 – 0.5 A63005
Aroclor 1242	1.9	1.3	ND (0.14U)	0.081	0.074	0.064
Aroclor 1260	0.11J	0.082J	ND (0.14U)	ND (0.063U)	ND (0.060U)	ND (0.060U)
Total PCB	2.0	1.4	---	0.081	0.074	0.064
TOC (Percentage by Weight)	3.9	1.2	4.2	0.4	0.2	0.2
TOC-Normalized PCB (g/g)	5.2E-5	1.2E-4	---	4.7E-6	3.7E-5	3.2E-5

Notes:

[1]Showing only the results for compounds detected above quantitation limits.
[2]MS/MSD of this sample was analyzed.
ND – Not detected.
TOC – Total Organic Carbon.

Notes Explaining Data Qualifiers

U – The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
J – The compound was positively identified; however, the associated numerical value is an estimated concentration only.

TABLE 3-14

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF PCB RESULTS FOR RESIDENTIAL SOIL SAMPLES

Location	Sample Depth (ft)	Total PCB (mg/kg)
October 1991		
RP-1	0.0 - 0.5	0.072
	4.0 - 4.5	0.51
RP-2	0.0 - 0.5	0.15
	4.5 - 5.0	16
RP-3	0.0 - 0.5	0.087
	4.0 - 4.5	1.4
RP-4	0.0 - 0.5	0.34
	1.7 - 2.2	0.37
RP-5	0.0 - 0.5	0.025
	2.5 - 3.0	0.26
August to December 1993		
BMSS-1	0.0 - 0.5	ND
BMSS-2	0.0 - 0.5	ND
BMSS-3	0.0 - 0.5	0.042
BMSS-4	0.0 - 0.5	0.073

Note:

ND - Not detected.

TABLE 3-15

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-1[2] A66032	MW-2 A66060	MW-2S A66022	MW-2S (Dup) A66023	MW-3 A66054	MW-5 A66046	MW-7 A66001
Aroclor-1016	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.1 U)
Aroclor-1232	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	1.2	ND (1.1 U)

Location Sample ID	MW-7B A66000	MW-8 A66053	MW-8A A66052	MW-11 A66008	MW-12 A66064	MW-12R A66028	MW-15 A66055
Aroclor-1016	ND (1.0 U)	ND (1.0 U)	3.8	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)
Aroclor-1232	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)

Location Sample ID	MW-16B[2] A66059	MW-16C A66058	MW-17A A66056	MW-17B A66057	MW-18 A66061	MW-19BR A66030	MW-19BR (Dup) A66031
Aroclor-1016	ND (1.0 U)	ND (1.1 U)	ND (1.20 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)
Aroclor-1232	ND (1.0 U)	ND (1.1 U)	ND (1.20 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)

See Notes on Page 4

TABLE 3-15

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-19C A66040	MW-19D A66041	MW-20 A66049	MW-20 (Dup) A66050	MW-20B A66051	MW-21 A66002	MW-22A A66017
Aroclor-1016	ND (1.1 U)	ND (1.0 U)	ND (1.1 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	2.7
Aroclor-1232	ND (1.1 U)	ND (1.0 U)	ND (1.1 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)

Location Sample ID	MW-22B A66018	MW-23 A66034	MW-24 A66009	MW-25 A66027	MW-26[2] A66015	MW-104 A66037	MW-106 A66063
Aroclor-1016	ND (1.0 U)	ND (1.0 U)	0.89 J	3.0	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)
Aroclor-1232	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)

Location Sample ID	MW-108 A66047	MW-112 A66045	MW-114 A66036	MW-120A A66020	MW-120B A66019	MW-120B (Dup) A66024	MW-121A A66013
Aroclor-1016	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	4.9 J	ND (1.0 UJ)	2.5 J
Aroclor-1232	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)

See Notes on Page 4

TABLE 3-15

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-121B A66014	MW-122A A66033	MW-122A (Dup) A66038	MW-122B A66039	MW-123A A66025	MW-123B A66026	MW-124A A66003
Aroclor-1016	0.99 J	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)
Aroclor-1232	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)

Location Sample ID	MW-124B A66004	MW-125P A66016	MW-125A A66005	MW-125B A66006	MW-126A A66010	MW-126B A66011	MW-126B (Dup) A66012
Aroclor-1016	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)
Aroclor-1232	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)	ND (1.0 U)

Location Sample ID	MW-127A A66044	MW-128A A66035	RIVULET2 A66007
Aroclor-1016	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)
Aroclor-1232	ND (1.0 U)	ND (1.1 U)	ND (1.0 U)

See Notes on Page 4

TABLE 3-15

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCB
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Notes:

[1]Showing only the results for compounds detected above quantitation limit.
[2]MS/MSD of this sample was analyzed.
ND – Not detected.

Notes Explaining Data Qualifiers:

U – The compound was analyzed for but not detected. The associated value is the compound quantitative limit.
J – The compound was positively identified. However, the associated numerical value is an estimated concentration only.
UJ – The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

TABLE 3-16

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS OF TCL COMPOUNDS IN UNFILTERED
GROUNDWATER AND LEACHATE SAMPLES

Analyte	Range of Concentrations (ug/L)	
	Groundwater	Leachate
VOCs		
Monarch HRDL[1]		
benzene	[illegible]	[illegible]
2-butanone	ND	34
carbon disulfide	ND	2.0
ethylbenzene	ND	2.0
tetrachloroethene	ND-3.0	ND
toluene	ND-1.0	2.0
1,1,1-trichloroethane	ND-3.0	ND
xylenes	ND	10
Former Bryant Mill Pond[2]		
methylene chloride	ND-1.0	NA
tetrachloroethene	ND-[illegible]	NA
toluene	ND-[illegible]	NA
Bryant HRDL[3]		
benzene	ND-1.0	NA
toluene	ND-7.0	NA
Former Type III Landfill[4]		
benzene	ND-[illegible]	NA
methylene chloride	ND-[illegible]	NA
Pilot Study Area[5]		
toluene	ND-2.0	NA
SVOCs	[illegible]	[illegible]
Monarch HRDL	[illegible]	[illegible]
4-methylphenol	ND-[illegible]	[illegible]
Bryant HRDL	[illegible]	[illegible]
4-methylphenol	ND-11	NA
Former Type III Landfill[4]		
di-n-butylphthalate	ND-1.0	NA
diethyl phthalate	ND-0.70	NA
2-methylphenol	ND-0.60	NA
4-methylphenol	ND-0.90	NA
naphthalene	ND-1.0	NA
Western Disposal Area[4]		
2-methylnaphthalene	ND-0.60	NA
4-methylphenol	ND-15	NA
Pesticides/PCB		
Monarch HRDL[1]		
alpha-BHC	ND	0.028
Bryant HRDL[3]		
Total PCB	ND-3.0	NA
Former Type III Landfill[4]		
Total PCB	ND-1.2	NA
Western Disposal Area[4]		
Total PCB	ND-3.8	NA

Notes:

[1] Includes the results of samples from MW-124A, MW-124B, MW-125P (leachate), MW-125A, MW-125B, MW-126A, and MW-126B.
[2] Includes the results of samples from MW-104, MW-106, MW-108, MW-114, and MW-128A.
[3] Includes the results of samples from MW-11, MW-12, MW-12R, MW-22A, MW-22B, MW-23, MW-24, MW-25, MW-26, MW-121A, MW-121B, MW-123A, and MW-123B.
[4] Includes the results of samples from MW-7, MW-7B, MW-8, MW-8A, MW-20, MW-20B, MW-21, MW-120A, and MW-120B.
[5] Includes the results of samples from MW-2, MW-2S, and MW-18.
[6] Includes the results of samples from MW-1, MW-3, MW-5, MW-15, MW-16B, MW-16C, MW-17A, MW-17B, MW-19BR, MW-19C, MW-19D, MW-112, and MW-127A.
NA - Not applicable; no wells were installed in residuals in these areas.
ND - Not detected.

TABLE 3-17

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	BHDL-22 10.00-12.00 A60688	BHDL-22 (Dup) 10.00-12.00 A60691	BHDL-22 12.00-14.00 A60689	BHDL-22 (Dup) 12.00-14.00 A60692	BHDL-123[2] 8.00-9.50 A60683	BHDL-123 10.00-12.00 A60684	MW-121B 16.00-17.50 A60046	MW-121B 17.50-19.00 A60047
Bryant HRDL								
aldrin	ND (0.049 U)	ND (0.050 U)	ND (0.0020 U)	ND (0.0020 U)	ND (0.094 U)	ND (0.0020 U)	ND (0.034 U)	ND (0.0020 U)
alpha-BHC	ND (0.049 UJ)	ND (0.050 UJ)	ND (0.0020 UJ)	ND (0.0020 U)	ND (0.094 UJ)	ND (0.0020 U)	ND (0.034 U)	ND (0.0020 UJ)
beta-BHC	ND (0.049 U)	ND (0.050 U)	ND (0.0020 U)	ND (0.0020 U)	ND (0.094 U)	ND (0.0020 U)	ND (0.034 U)	ND (0.0020 U)
gamma-BHC (lindane)	ND (0.049 UJ)	ND (0.050 UJ)	ND (0.0020 UJ)	ND (0.0020 U)	ND (0.094 UJ)	ND (0.0020 U)	ND (0.034 U)	ND (0.0020 U)
delta-BHC	R	R	ND (0.0020 U)	ND (0.0020 UJ)	ND (0.094 U)	ND (0.0020 UJ)	ND (0.034 UJ)	ND (0.0020 U)
alpha-chlordane	R	R	ND (0.0020 U)	ND (0.0020 U)	R	ND (0.0020 U)	ND (0.034 U)	ND (0.0020 U)
gamma-chlordane	R	ND (0.050 U)	ND (0.0020 U)	ND (0.0020 U)	R	ND (0.0020 U)	R	ND (0.0020 U)
4,4-DDD	R	ND (0.097 U)	ND (0.0038 U)	ND (0.0038 U)	ND (0.18 U)	ND (0.0039 U)	ND (0.066 U)	ND (0.0039 U)
4,4-DDE	0.18 JN	0.11 JN	ND (0.0038 U)	ND (0.0038 U)	0.36 JN	ND (0.0039 U)	ND (0.066 U)	ND (0.0039 U)
4,4-DDT	R	0.13 JN	ND (0.0038 U)	ND (0.0038 U)	0.41	ND (0.0039 U)	0.070	ND (0.0039 U)
endosulfan I	ND (0.049 U)	ND (0.050 U)	ND (0.0020 U)	ND (0.0020 U)	ND (0.094 U)	ND (0.0039 U)	ND (0.034 U)	ND (0.0020 U)
endrin aldehyde	ND (0.049 U)	0.084 JN	ND (0.0038 U)	ND (0.0038 U)	ND (0.18 U)	ND (0.0039 U)	0.040 JN	ND (0.0039 U)

Location Depth (ft) Sample ID	MLSS-1 14.00-15.50 A60039	MLSS-1 15.50-18.00 A60040	MLSS-2 20.00-22.00 A60571	MLSS-2 22.00-24.00 A60572	MLSS-3 18.00-20.00 A60551	MLSS-3 20.00-22.00 A60552	MLSS-4 18.00-20.00 A60530	MLSS-4 20.00-22.00 A60531
Monarch HRDL								
aldrin	ND (0.011 UJ)	ND (0.0039 U)	ND (0.065 U)	ND (0.0033 U)	ND (0.065 U)	0.0069	ND (0.027 U)	ND (0.0020 U)
alpha-BHC	ND (0.011 UJ)	ND (0.0039 UJ)	ND (0.065 U)	ND (0.0033 UJ)	ND (0.065 U)	ND (0.0038 UJ)	ND (0.027 U)	ND (0.0020 UJ)
beta-BHC	ND (0.011 UJ)	ND (0.0039 U)	ND (0.065 U)	ND (0.0033 U)	ND (0.065 U)	ND (0.0038 U)	ND (0.027 U)	ND (0.0020 U)
gamma-BHC (lindane)	ND (0.011 UJ)	ND (0.0039 U)	ND (0.065 U)	ND (0.0033 U)	ND (0.065 U)	ND (0.0038 U)	ND (0.027 U)	ND (0.0020 U)
delta-BHC	ND (0.011 UJ)	ND (0.0039 U)	R	ND (0.0033 U)	R	ND (0.0038 U)	R	ND (0.0020 U)
alpha-chlordane	ND (0.011 UJ)	ND (0.0039 U)	ND (0.065 U)	ND (0.0033 U)	ND (0.065 U)	ND (0.0038 U)	ND (0.027 U)	ND (0.0020 U)
gamma-chlordane	ND (0.011 UJ)	ND (0.0039 U)	0.034 J	ND (0.0033 U)	ND (0.065 U)	ND (0.0038 U)	ND (0.027 U)	ND (0.0020 U)
4,4-DDD	ND (0.022 UJ)	ND (0.0077 U)	R	ND (0.0065 U)	ND (0.13 U)	ND (0.0074 U)	ND (0.053 U)	ND (0.0039 U)
4,4-DDE	ND (0.022 UJ)	ND (0.0077 U)	R	ND (0.0065 U)	R	0.0047 JN	ND (0.053 U)	ND (0.0039 U)
4,4-DDT	ND (0.022 UJ)	ND (0.0077 U)	0.25 J	ND (0.0065 U)	0.11 J	ND (0.0074 U)	0.073 J	ND (0.0039 U)
endosulfan I	ND (0.011 UJ)	0.0043	ND (0.065 U)	ND (0.0033 U)	ND (0.065 U)	0.0045 J	ND (0.027 U)	ND (0.0020 U)
endrin aldehyde	ND (0.022 UJ)	ND (0.0077 U)	ND (0.13 U)	ND (0.0065 U)	ND (0.13 U)	ND (0.0074 U)	ND (0.053 U)	ND (0.0039 U)

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TABLE 3-17

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MLSS-5 22.00-24.00 A60512	MLSS-5 24.00-26.00 A60513	MW-125B 18.00-19.00 A60029	MW-125B 19.00-20.00 A60030	MW-126A 14.00-16.00 A60017	MW-126A 14.00-16.00 A60018	DLHB-1 14.00-16.00 A60593	DLHB-1 16.00-18.00 A60594
Monarch HRDL (Cont'd.)							**FRDLs**	
aldrin	ND (0.031 U)	0.0028 J	ND (0.047 U)	0.0021 J	ND (0.047 U)	ND (0.0032 U)	ND (0.0072 U)	0.0057
alpha-BHC	ND (0.031 U)	ND (0.0023 UJ)	ND (0.047 U)	ND (0.0020 UJ)	ND (0.047 U)	ND (0.0032 UJ)	ND (0.0072 U)	ND (0.0020 UJ)
beta-BHC	ND (0.031 U)	ND (0.0023 U)	ND (0.047 U)	R	ND (0.047 U)	ND (0.0032 U)	ND (0.0072 U)	R
gamma-BHC (lindane)	ND (0.031 U)	ND (0.0023 U)	ND (0.047 U)	ND (0.0020 U)	ND (0.047 U)	ND (0.0032 U)	R	ND (0.0020 U)
delta-BHC	R	ND (0.0023 U)	R	ND (0.0020 U)	0.043 JN	ND (0.0032 U)	ND (0.0072 UJ)	ND (0.0020 U)
alpha-chlordane	ND (0.031 U)	ND (0.0023 U)	ND (0.047 U)	ND (0.0020 U)	ND (0.047 U)	ND (0.0032 U)	ND (0.0072 U)	ND (0.0020 U)
gamma-chlordane	ND (0.031 U)	ND (0.0023 U)	ND (0.047 U)	ND (0.0020 U)	ND (0.047 U)	ND (0.0032 U)	ND (0.0072 U)	ND (0.0020 U)
4,4-DDD	ND (0.060 U)	ND (0.0045 U)	ND (0.091 U)	ND (0.0038 U)	ND (0.091 U)	ND (0.0062 U)	ND (0.0014 U)	ND (0.0039 U)
4,4-DDE	ND (0.060 U)	0.0023 J	ND (0.091 U)	ND (0.0038 U)	ND (0.091 U)	ND (0.0062 U)	ND (0.0014 U)	ND (0.0039 U)
4,4-DDT	0.096 J	ND (0.0045 U)	0.12	ND (0.0038 U)	0.067 JN	ND (0.0062 U)	ND (0.0014 U)	ND (0.0039 U)
endosulfan I	ND (0.031 U)	ND (0.0023 U)	ND (0.047 U)	ND (0.0020 U)	ND (0.047 U)	ND (0.0032 U)	ND (0.0072 U)	ND (0.0020 U)
endrin aldehyde	0.047 JN	ND (0.0045 U)	ND (0.091 U)	ND (0.0038 U)	ND (0.091 U)	ND (0.0062 U)	ND (0.0014 U)	ND (0.0039 U)

Location Depth (ft) Sample ID	DLHB-2 6.00-8.00 A60586	DLHB-2 8.00-10.00 A60587	DLHB-3[2] 6.00-8.00 A60599	DLHB-3[2] 8.00-10.00 A60600	DLHB-6 8.00-10.00 A60605	DLHB-6 10.00-12.00 A60606	FLF-1[2] 6.00-6.50 A60097	FLF-1[2] 6.50-8.00 A60098
FRDLs (Cont'd.)							**Former Type III Landfill**	
aldrin	ND (0.0047 U)	0.0011 J	ND (0.030 U)	0.023	ND (0.023 U)	0.13	ND (0.046 UJ)	ND (0.0020 U)
alpha-BHC	0.0093 J	ND (0.0019 UJ)	ND (0.030 U)	ND (0.010 UJ)	ND (0.023 U)	ND (0.011 UJ)	ND (0.046 U)	ND (0.0020 U)
beta-BHC	ND (0.0047 U)	R	ND (0.030 U)	R	ND (0.023 U)	R	ND (0.046 U)	ND (0.0020 U)
gamma-BHC (lindane)	ND (0.0047 U)	ND (0.0019 U)	ND (0.030 U)	ND (0.010 U)	ND (0.023 U)	ND (0.011 U)	ND (0.046 UJ)	ND (0.0020 U)
delta-BHC	ND (0.0047 UJ)	ND (0.0019 U)	ND (0.030 U)	ND (0.010 U)	ND (0.023 UJ)	ND (0.011 U)	ND (0.046 U)	ND (0.0020 UJ)
alpha-chlordane	ND (0.0047 U)	ND (0.0019 U)	ND (0.030 U)	ND (0.010 U)	ND (0.023 U)	ND (0.011 U)	R	ND (0.0020 U)
gamma-chlordane	ND (0.0047 U)	ND (0.0019 U)	ND (0.030 U)	ND (0.010 U)	R	R	R	ND (0.0020 U)
4,4-DDD	0.0088 J	ND (0.0037 U)	ND (0.058 U)	ND (0.020 U)	ND (0.044 U)	ND (0.021 U)	ND (0.089 U)	ND (0.0039 U)
4,4-DDE	ND (0.0092 U)	ND (0.0037 U)	ND (0.058 U)	ND (0.020 U)	ND (0.044 U)	0.013 J	0.25 J	ND (0.0039 U)
4,4-DDT	ND (0.0092 U)	ND (0.0037 U)	ND (0.058 U)	ND (0.020 U)	R	ND (0.021 U)	R	ND (0.0039 U)
endosulfan I	ND (0.0047 U)	ND (0.0019 U)	ND (0.030 U)	ND (0.010 U)	ND (0.023 U)	ND (0.011 U)	ND (0.046 U)	ND (0.0020 U)
endrin aldehyde	ND (0.0092 U)	ND (0.0037 U)	ND (0.058 U)	ND (0.020 U)	ND (0.044 U)	ND (0.021 U)	ND (0.089 U)	ND (0.0039 U)

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TABLE 3-17

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	WA-1	WA-1	WA-2	WA-2	WA-3	WA-3	WA-4	WA-4
Depth (ft)	12.00-13.00	13.00-14.00	12.00-14.00	14.00-16.00	14.00-16.00	16.00-18.00	8.00-10.00	10.00-12.00
Sample ID	A60062	A60063	A60675	A60676	A60668	A60669	A60662	A60663
Western Disposal Area								
aldrin	0.070 J	ND (0.0018 U)	0.0032	ND (0.0019 U)	0.0051	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
alpha-BHC	ND (0.024 U)	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 U)	ND (0.0045 U)	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
beta-BHC	ND (0.024 U)	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 U)	ND (0.0045 U)	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
gamma-BHC (lindane)	R	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 U)	ND (0.0045 U)	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
delta-BHC	ND (0.024 UJ)	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 UJ)	0.0069	ND (0.0017 UJ)	ND (0.0044 U)	ND (0.0018 UJ)
alpha-chlordane	ND (0.024 U)	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 U)	0.0081	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
gamma-chlordane	ND (0.024 U)	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 U)	0.0061	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
4,4-DDD	ND (0.046 U)	ND (0.0035 U)	ND (0.0062 U)	ND (0.0037 U)	0.0067 J	ND (0.0034 U)	ND (0.0085 U)	ND (0.0034 U)
4,4-DDE	ND (0.046 U)	ND (0.0035 U)	0.0038 J	ND (0.0037 U)	0.0048 J	ND (0.0034 U)	ND (0.0085 U)	ND (0.0034 U)
4,4-DDT	ND (0.046 U)	ND (0.0035 U)	ND (0.0062 U)	ND (0.0037 U)	0.0061 J	ND (0.0034 U)	0.0047 J	ND (0.0034 U)
endosulfan I	ND (0.024 U)	ND (0.0018 U)	ND (0.0032 U)	ND (0.0019 U)	ND (0.0045 U)	ND (0.0017 U)	ND (0.0044 U)	ND (0.0018 U)
endrin aldehyde	ND (0.046 U)	ND (0.0035 U)	ND (0.0062 U)	ND (0.0037 U)	ND (0.0088 U)	ND (0.0034 U)	ND (0.0085 U)	ND (0.0034 U)

Location	WA-5	WA-5	WA-6	WA-6	WA-7	WA-7	WA-8	WA-8
Depth (ft)	22.00-23.50	23.50-26.00	12.00-13.00	13.00-15.00	20.00-22.00	22.00-24.00	10.00-12.00	12.00-14.00
Sample ID	A60650	A60651	A60085	A60086	A60643	A60644	A60657	A60658
Western Disposal Area (Cont'd.)								
aldrin	ND (0.0076 U)	ND (0.0018 U)	ND (0.11 U)	0.0035	ND (0.047 U)	0.013	ND (0.091 U)	0.00085 J
alpha-BHC	ND (0.0076 U)	ND (0.0018 U)	ND (0.11 U)	ND (0.0022 U)	ND (0.047 U)	ND (0.011 U)	ND (0.091 U)	ND (0.0018 U)
beta-BHC	0.0091 JN	ND (0.0018 U)	ND (0.11 U)	ND (0.0022 U)	ND (0.047 U)	ND (0.011 U)	ND (0.091 U)	ND (0.0018 U)
gamma-BHC (lindane)	ND (0.0076 U)	ND (0.0018 U)	ND (0.11 U)	ND (0.0022 U)	ND (0.047 U)	ND (0.011 U)	ND (0.091 U)	ND (0.0018 U)
delta-BHC	R	ND (0.0018 UJ)	ND (0.11 UJ)	ND (0.0022 UJ)	ND (0.047 UJ)	ND (0.011 UJ)	ND (0.091 UJ)	ND (0.0018 UJ)
alpha-chlordane	ND (0.0076 U)	ND (0.0018 U)	R	ND (0.0022 U)	R	ND (0.011 U)	ND (0.091 U)	ND (0.0018 U)
gamma-chlordane	0.0056 JN	ND (0.0018 U)	R	ND (0.0022 U)	ND (0.047 U)	ND (0.011 U)	R	ND (0.0018 U)
4,4-DDD	0.020	ND (0.0034 U)	ND (0.21 U)	ND (0.0043 U)	ND (0.091 U)	ND (0.022 U)	ND (0.18 U)	ND (0.0036 U)
4,4-DDE	ND (0.015 U)	ND (0.0034 U)	ND (0.21 U)	ND (0.0043 U)	ND (0.091 U)	ND (0.022 U)	ND (0.18 U)	ND (0.0036 U)
4,4-DDT	ND (0.015 U)	ND (0.0034 U)	0.17 JN	ND (0.0043 U)	ND (0.091 U)	ND (0.022 U)	0.11 J	ND (0.0036 U)
endosulfan I	ND (0.0076 U)	ND (0.0018 U)	ND (0.11 U)	ND (0.0022 U)	ND (0.047 U)	ND (0.011 U)	ND (0.091 U)	ND (0.0018 U)
endrin aldehyde	ND (0.015 U)	ND (0.0034 U)	ND (0.21 U)	ND (0.0043 U)	ND (0.091 U)	ND (0.022 U)	ND (0.18 U)	ND (0.0036 U)

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TABLE 3-17

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	B-7B	B-7B	MW-8A	MW-8A	MW-120B	MW-120B	BMP-2	BMP-2
Depth (ft)	8.00-10.00	10.00-12.00	12.00-12.50	12.50-14.00	18.00-19.00	19.00-20.00	0.00-1.00	3.00-4.00
Sample ID	A60702	A60703	A60092	A60093	A60054	A60055	A60621	A60624
Western Disposal Area (Cont'd.)							**Former Bryant Mill Pond**	
aldrin	ND (0.0018 U)	ND (0.0022 U)	R	ND (0.0026 U)	ND (0.25 U)	0.0024	1.1	ND (0.045 U)
alpha-BHC	ND (0.0018 U)	ND (0.0022 U)	ND (0.13 U)	ND (0.0026 U)	ND (0.25 U)	ND (0.0021 UJ)	ND (0.067 U)	ND (0.045 U)
beta-BHC	ND (0.0018 U)	ND (0.0022 U)	ND (0.13 U)	ND (0.0026 U)	ND (0.25 U)	ND (0.0021 U)	R	ND (0.045 U)
gamma-BHC (lindane)	ND (0.0018 U)	ND (0.0022 U)	ND (0.13 U)	ND (0.0026 U)	ND (0.25 U)	ND (0.0021 U)	ND (0.067 U)	ND (0.045 U)
delta-BHC	ND (0.0018 UJ)	ND (0.0022 UJ)	ND (0.13 UJ)	ND (0.0026 UJ)	ND (0.25 UJ)	ND (0.0021 U)	ND (0.067 U)	R
alpha-chlordane	ND (0.0018 U)	ND (0.0022 U)	ND (0.13 U)	ND (0.0026 U)	ND (0.25 U)	ND (0.0021 U)	ND (0.067 U)	ND (0.045 U)
gamma-chlordane	ND (0.0018 U)	ND (0.0022 U)	R	ND (0.0026 U)	ND (0.25 U)	ND (0.0021 U)	ND (0.067 U)	ND (0.045 U)
4,4-DDD	ND (0.0034 U)	ND (0.0043 U)	ND (0.25 U)	ND (0.0051 U)	ND (0.49 U)	ND (0.0040 U)	ND (0.13 U)	ND (0.087 U)
4,4-DDE	ND (0.0034 U)	ND (0.0043 U)	0.42 J	ND (0.0051 U)	ND (0.49 U)	ND (0.0040 U)	0.33	R
4,4-DDT	ND (0.0034 U)	ND (0.0043 U)	ND (0.25 U)	ND (0.0051 U)	ND (0.49 U)	ND (0.0040 U)	ND (0.13 U)	0.12 JN
endosulfan I	ND (0.0018 U)	ND (0.0022 U)	ND (0.13 U)	ND (0.0026 U)	ND (0.25 U)	ND (0.0021 U)	ND (0.067 U)	ND (0.045 U)
endrin aldehyde	ND (0.0034 U)	ND (0.0043 U)	ND (0.25 U)	ND (0.0051 U)	ND (0.49 U)	ND (0.0040 U)	ND (0.13 U)	0.071 J

Location	BMP-12	BMP-12
Depth (ft)	0.00-1.00	3.00-4.00
Sample ID	A60616	A60619
Former Bryant Mill Pond (Cont'd.)		
aldrin	0.69	0.14
alpha-BHC	ND (0.085 U)	ND (0.012 U)
beta-BHC	R	R
gamma-BHC (lindane)	ND (0.085 U)	ND (0.012 U)
delta-BHC	ND (0.085 U)	ND (0.012 U)
alpha-chlordane	ND (0.085 U)	ND (0.012 U)
gamma-chlordane	R	ND (0.012 U)
4,4-DDD	ND (0.16 U)	ND (0.023 U)
4,4-DDE	0.12 J	0.030
4,4-DDT	ND (0.16 U)	ND (0.023 U)
endosulfan I	ND (0.085 U)	ND (0.012 U)
endrin aldehyde	ND (0.16 U)	ND (0.023 U)

Notes:
[1]Showing only the results for analytes detected above quantitation limit.
[2]MS/MSD of this sample was analyzed.
ND - Not dectected.

Notes Explaining Data Qualifiers:

J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
N - The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
R - The sample results are rejected.
U - The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ - The compound was not detected above the reported sample quantitaiton limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

TABLE 3-18

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-11 A66008	MW-12 A66064	MW-12R A66028	MW-22A A66017	MW-22B A66018	MW-23 A66034	MW-24 A66009
Bryant HRDL							
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

Location Sample ID	MW-25 A66027	MW-26[2] A66015	MW-121A A66013	MW-121B A66014	MW-123A A66025	MW-123B A66026	RIVULET2 A66007
Bryant HRDL (Cont'd.)							
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

Location Sample ID	MW-124A A66003	MW-124B A66004	MW-125A A66005	MW-125B A66006	MW-125P A66016	MW-126A A66010	MW-126B A66011
Monarch HRDL							
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	0.028 J	ND (0.050 U)	ND (0.050 U)

Location Sample ID	MW-126B (Dup) A66012	MW-122A A66033	MW-122A (Dup) A66038	MW-122B A66039	MW-1[2] A66032	MW-3 A66054	MW-5 A66046
Monarch HRDL (Cont'd.)		**FRDLs**			**Former Type III Landfill**		
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

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TABLE 3-18

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-15 A66055	MW-16B[2] A66059	MW-16C A66058	MW-17A A66056	MW-17B A66057	MW-19BR A66030	MW-19BR (Dup) A66031
Former Type III Landfill (Cont'd.)							
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.060 U)	ND (0.060 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

Location Sample ID	MW-19C A66040	MW-19D A66041	MW-112 A66045	MW-127A A66044	MW-7 A66001	MW-7B A66000	MW-8 A66053
Former Type III Landfill (Cont'd.)					**Western Disposal Area**		
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

Location Sample ID	MW-8A A66052	MW-20 A66049	MW-20 (Dup) A66050	MW-20B A66051	MW-21 A66002	MW-120A A66020	MW-120B A66019
Western Disposal Area (Cont'd.)							
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

Location Sample ID	MW-120B (Dup) A66024	MW-2 A66060	MW-2S A66022	MW-2S (Dup) A66023	MW-18 A66061	MW-104 A66037	MW-106 A66063
Western Disposal Area (Cont'd.)		**Pilot Study Area**				**Former Bryant Mill Pond**	
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

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TABLE 3-16

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PESTICIDES
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-108 A66047	MW-114 A66036	MW-128A A66035
Former Bryant Mill Pond (Cont'd.)			
alpha-BHC	ND (0.050 U)	ND (0.050 U)	ND (0.050 U)

Notes:

[1] Showing only the results for compounds detected above quantitation limit.
[2] MS/MSD of this sample was analyzed.
ND - Not detected.

Notes Describing Data Qualifiers:

J - The compound was positively identified. However, the associated value is an estimated concentration only.
U - The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

TABLE 3-19

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	BHDL-22	BHDL-22 (Dup)	BHDL-22	BHDL-22 (Dup)	BHDL-123[2]	BHDL-123	MW-121B	MW-121B
Depth (ft)	10.00-12.00	10.00-12.00	12.00-14.00	12.00-14.00	8.00-9.50	10.00-12.00	16.00-17.50	17.50-19.00
Sample ID	A60688	A60691	A60689	A60692	A60683	A60684	A60046	A60047
Bryant HRDL								
acetone	0.25 J	0.42 J	0.033	0.028 B	0.47 J	0.070 B	ND (2.4 UJ)	0.54 J
benzene	0.032 J	0.067 J	ND (0.012 U)	0.0020 J	0.066 J	ND (0.012 U)	ND (2.4 U)	0.016 J
2-butanone	0.13 J	0.20 J	0.0070 J	0.0080 J	0.34 J	0.013 J	ND (2.4 U)	0.16
carbon disulfide	0.019 J	0.049 J	ND (0.012 U)	ND (0.011 U)	0.034 J	ND (0.012 U)	ND (2.4 U)	0.010 J
carbon tetrachloride	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
chloroform	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
1,2-dichloroethene	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
cis-1,3-dichloropropene	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
ethylbenzene	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
2-hexanone	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 UJ)	ND (0.12 UJ)	ND (0.012 UJ)	ND (2.4 U)	ND (0.047 U)
methylene chloride	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	0.030 J	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
4-methyl-2-pentanone	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
tetrachloroethene	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
toluene	0.11 J	0.32 J	ND (0.012 U)	0.0020 J	0.51 J	ND (0.012 U)	0.93 J	0.0080 J
1,1,1-trichloroethane	ND (0.086 UJ)	ND (0.12 UJ)	ND (0.012 U)	ND (0.011 U)	ND (0.12 UJ)	ND (0.012 U)	ND (2.4 U)	ND (0.047 U)
xylenes	0.050 J	0.090 J	ND (0.012 U)	ND (0.011 U)	0.18 J	ND (0.012 U)	ND (2.4 U)	0.015 J

Location	MLSS-1	MLSS-1	MLSS-2	MLSS-2	MLSS-3	MLSS-3	MLSS-4	MLSS-4
Depth (ft)	14.00-15.50	15.50-18.00	20.00-22.00	22.00-24.00	18.00-20.00	20.00-22.00	18.00-20.00	20.00-22.00
Sample ID	A60039	A60040	A60571	A60572	A60551	A60552	A60530	A60531
Monarch HRDL								
acetone	2.5 BJ	0.019	ND (3.9 UJ)	1.4 DJ	0.46	0.56 J	ND (3.8 UJ)	0.13
benzene	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	0.041	0.034 J	0.020 J	ND (3.8 UJ)	ND (0.012 U)
2-butanone	0.68	ND (0.013 U)	ND (3.9 UJ)	0.55 J	0.16 J	0.20 J	ND (3.8 UJ)	ND (0.012 U)
carbon disulfide	0.073 J	ND (0.013 U)	ND (3.9 UJ)	0.028 J	0.043 J	0.0050 J	ND (3.8 UJ)	ND (0.012 U)
carbon tetrachloride	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 U)	ND (0.17 U)	ND (0.028 U)	3.8 J	ND (0.012 U)
chloroform	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 U)	ND (0.17 U)	ND (0.028 U)	ND (3.8 UJ)	ND (0.012 U)
1,2-dichloroethene	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 U)	ND (0.17 U)	ND (0.028 U)	ND (3.8 UJ)	ND (0.012 U)
cis-1,3-dichloropropene	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 U)	ND (0.17 U)	ND (0.028 U)	ND (3.8 UJ)	ND (0.012 U)
ethylbenzene	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	0.011 J	ND (0.17 U)	0.014 J	ND (3.8 UJ)	ND (0.012 U)
2-hexanone	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 UJ)	ND (0.17 U)	ND (0.028 UJ)	ND (3.8 UJ)	ND (0.012 U)
methylene chloride	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 U)	ND (0.17 U)	ND (0.028 U)	ND (3.8 UJ)	ND (0.012 U)
4-methyl-2-pentanone	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 UJ)	ND (0.17 U)	ND (0.028 UJ)	ND (3.8 UJ)	ND (0.012 U)
tetrachloroethene	0.024 J	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 UJ)	0.026 J	ND (0.028 UJ)	ND (3.8 UJ)	ND (0.012 U)
toluene	0.067 J	0.0020 J	ND (3.9 UJ)	0.034 J	0.92	0.017 J	ND (3.8 UJ)	ND (0.012 U)
1,1,1-trichloroethane	ND (0.14 U)	ND (0.013 U)	ND (3.9 UJ)	ND (0.037 U)	ND (0.17 U)	ND (0.028 U)	ND (3.8 UJ)	ND (0.012 U)
xylenes	0.094 J	0.0060 J	ND (3.9 UJ)	0.062 J	0.12 J	0.078 J	ND (3.8 UJ)	ND (0.012 U)

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MLSS-5 22.00-24.00 A60512	MLSS-5 24.00-26.00 A60513	MW-125B 18.00-19.00 A60029	MW-125B 19.00-20.00 A60030	MW-126A 14.00-16.00 A60017	MW-126A 14.00-16.00 A60018	DLHB-1 14.00-16.00 A60593	DLHB-1 16.00-18.00 A60594
Monarch HRDL (Cont'd.)							**FRDLs**	
acetone	ND (4.0 UJ)	0.12	ND (3.3 UJ)	1.1 D	ND (3.3 UJ)	0.34	0.44 BJ	0.30
benzene	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	0.0030 J	ND (0.036 U)	ND (0.019 U)
2-butanone	ND (4.0 UJ)	0.013 J	ND (3.3 U)	0.27	ND (3.3 U)	0.11	0.17	ND (0.019 U)
carbon disulfide	ND (4.0 UJ)	0.0040 J	ND (3.3 U)	0.0080 J	ND (3.3 U)	0.015 J	0.013 J	ND (0.019 U)
carbon tetrachloride	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 U)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
chloroform	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 U)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
1,2-dichloroethene	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 U)	ND (0.014 U)	ND (3.3 U)	0.0040 J	ND (0.036 U)	ND (0.019 U)
cis-1,3-dichloropropene	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
ethylbenzene	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
2-hexanone	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
methylene chloride	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 U)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
4-methyl-2-pentanone	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	0.012 J	ND (0.019 U)
tetrachloroethene	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
toluene	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	0.0060 J	ND (3.3 U)	0.010 J	0.012 J	ND (0.019 U)
1,1,1-trichloroethane	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	ND (0.014 U)	ND (3.3 U)	ND (0.025 U)	ND (0.036 U)	ND (0.019 U)
xylenes	ND (4.0 UJ)	ND (0.015 U)	ND (3.3 UJ)	0.012 J	ND (3.3 U)	0.022 J	ND (0.036 U)	ND (0.019 U)

Location Depth (ft) Sample ID	DLHB-2 6.00-8.00 A60586	DLHB-2 8.00-10.00 A60587	DLHB-3[2] 6.00-8.00 A60599	DLHB-3[2] 8.00-10.00 A60600	DLHB-6 8.00-10.00 A60605	DLHB-6 10.00-12.00 A60606
FRDLs (Cont'd.)						
acetone	1.3 BJ	0.066	0.41 J	0.065	0.17 J	0.0060 J
benzene	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
2-butanone	0.71	ND (0.011 U)	0.13	0.0090 J	0.094	ND (0.012 U)
carbon disulfide	0.043 J	0.0010 J	0.015 J	0.0030 J	0.0070 J	0.0010 J
carbon tetrachloride	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
chloroform	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
1,2-dichloroethene	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
cis-1,3-dichloropropene	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
ethylbenzene	0.049 J	ND (0.011 U)	0.011 J	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
2-hexanone	0.041 J	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
methylene chloride	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
4-methyl-2-pentanone	0.051 J	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	0.0080 J	ND (0.012 U)
tetrachloroethene	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)
toluene	0.025 J	0.0010 J	0.0070 J	ND (0.012 U)	0.0050 J	ND (0.012 U)
1,1,1-trichloroethane	ND (0.12 U)	ND (0.011 U)	ND (0.029 U)	0.003 J	ND (0.014 U)	ND (0.012 U)
xylenes	0.059 J	0.0060 J	ND (0.029 U)	ND (0.012 U)	ND (0.014 U)	ND (0.012 U)

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TABLE 3-19

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	FLF-1[2]	FLF-1[2]	WA-1	WA-1	WA-2	WA-2	WA-3	WA-3
Depth (ft)	6.00-6.50	6.50-8.00	12.00-13.00	13.00-14.00	12.00-14.00	14.00-16.00	14.00-16.00	16.00-18.00
Sample ID	A60097	A60098	A60062	A60063	A60675	A60676	A60668	A60669
Former Type III Landfill			**Western Disposal Area**					
acetone	ND (0.017 U)	0.0090 J	2.4 J	ND (0.010 U)	0.59 D	0.0030 J	0.71	0.0050 J
benzene	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
2-butanone	ND (0.017 UJ)	ND (0.012 UJ)	2.2 J	ND (0.010 U)	0.36 J	ND (0.010 UJ)	0.22 J	ND (0.011 UJ)
carbon disulfide	ND (0.017 U)	ND (0.012 U)	0.020 J	ND (0.010 U)	0.040	ND (0.010 U)	0.030 J	ND (0.011 U)
carbon tetrachloride	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
chloroform	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	0.0080 J	ND (0.011 U)
1,2-dichloroethene	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
cis-1,3-dichloropropene	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
ethylbenzene	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
2-hexanone	ND (0.017 UJ)	ND (0.012 UJ)	0.29	ND (0.010 U)	0.011 J	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
methylene chloride	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	0.0020 J	ND (0.068 U)	ND (0.011 U)
4-methyl-2-pentanone	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	0.018 J	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
tetrachloroethene	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
toluene	ND (0.017 U)	0.0030 J	0.0070 J	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
1,1,1-trichloroethane	ND (0.017 U)	ND (0.012 U)	ND (0.068 U)	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)
xylenes	0.0090 J	ND (0.012 U)	0.028 J	ND (0.010 U)	ND (0.040 U)	ND (0.010 U)	ND (0.068 U)	ND (0.011 U)

Location	WA-4	WA-4	WA-5	WA-5	WA-6	WA-6	WA-7	WA-7
Depth (ft)	8.00-10.00	10.00-12.00	22.00-23.50	23.50-26.00	12.00-13.00	13.00-15.00	20.00-22.00	22.00-24.00
Sample ID	A60662	A60663	A60650	A60651	A60665	A60666	A60643	A60644
Western Disposal Area (Cont'd.)								
acetone	1.1	ND (0.011 U)	0.23	0.038 J	0.34	3.4 DJ	0.17 J	0.024 J
benzene	ND (0.088 U)	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
2-butanone	0.77 J	ND (0.011 UJ)	0.63 DJ	ND (0.012 U)	0.096	0.96 DJ	0.028 J	ND (0.015 U)
carbon disulfide	0.078 J	ND (0.011 U)	0.0090 J	ND (0.012 U)	0.015 J	0.013 J	0.0060 J	ND (0.015 U)
carbon tetrachloride	ND (0.088 U)	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
chloroform	0.014 J	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
1,2-dichloroethene	ND (0.088 U)	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
cis-1,3-dichloropropene	0.014 J	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
ethylbenzene	0.031 J	ND (0.011 U)	0.032	ND (0.012 U)	0.021 J	0.030 J	0.010 J	ND (0.015 UJ)
2-hexanone	ND (0.088 U)	ND (0.011 U)	0.070	ND (0.012 U)	ND (0.094 U)	ND (0.026 UJ)	ND (0.030 UJ)	ND (0.015 UJ)
methylene chloride	ND (0.088 U)	ND (0.011 U)	0.0040 J	0.0030 J	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
4-methyl-2-pentanone	ND (0.088 U)	ND (0.011 U)	0.027	ND (0.012 U)	ND (0.094 U)	ND (0.026 UJ)	ND (0.030 UJ)	ND (0.015 UJ)
tetrachloroethene	ND (0.088 U)	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 UJ)	ND (0.030 UJ)	ND (0.015 UJ)
toluene	ND (0.088 U)	ND (0.011 U)	0.0070 J	ND (0.012 U)	0.015 J	0.020 J	0.0050 J	ND (0.015 UJ)
1,1,1-trichloroethane	ND (0.088 U)	ND (0.011 U)	ND (0.018 U)	ND (0.012 U)	ND (0.094 U)	ND (0.026 U)	ND (0.030 UJ)	ND (0.015 U)
xylenes	0.22	ND (0.011 U)	0.010 J	ND (0.012 U)	0.14	0.19 J	0.066 J	ND (0.015 UJ)

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TABLE 3-19

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	WA-8 10.00-12.00 A60657	WA-8 12.00-14.00 A60658	B-7B 8.00-10.00 A60702	B-7B 10.00-12.00 A60703	MW-8A 12.00-12.50 A60092	MW-8A 12.50-14.00 A60093	MW-120B 18.00-19.00 A60054	MW-120B 19.00-20.00 A60055
Western Disposal Area (Cont'd.)								
acetone	0.39	0.58 DJ	ND (0.010 UJ)	ND (0.011 UJ)	0.46	0.77 BJ	ND (2.1 UJ)	0.10 J
benzene	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
2-butanone	0.091 J	0.32 J	ND (0.010 U)	ND (0.011 U)	0.11 J	0.21	ND (2.1 U)	ND (0.017 U)
carbon disulfide	0.020 J	0.0080 J	ND (0.010 U)	ND (0.011 U)	0.028 J	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
carbon tetrachloride	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
chloroform	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
1,2-dichloroethene	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
cis-1,3-dichloropropene	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
ethylbenzene	ND (0.091 U)	ND (0.026 UJ)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
2-hexanone	ND (0.091 U)	ND (0.026 UJ)	ND (0.010 U)	ND (0.011 U)	ND (0.11 UJ)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
methylene chloride	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
4-methyl-2-pentanone	ND (0.091 U)	ND (0.026 UJ)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
tetrachloroethene	ND (0.091 U)	ND (0.026 UJ)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
toluene	0.010 J	0.038 J	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
1,1,1-trichloroethane	ND (0.091 U)	ND (0.026 U)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	ND (0.056 U)	ND (2.1 U)	ND (0.017 U)
xylenes	ND (0.091 U)	ND (0.026 UJ)	ND (0.010 U)	ND (0.011 U)	ND (0.11 U)	0.016 J	ND (2.1 U)	ND (0.017 U)

Location Depth (ft) Sample ID	BMP-2 0.00-1.00 A60621	BMP-2 3.00-4.00 A60624	BMP-12 0.00-1.00 A60616	BMP-12 3.00-4.00 A60619
Former Bryant Mill Pond				
acetone	ND (0.024 U)	0.15	0.027 J	0.046 J
benzene	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
2-butanone	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	0.014 J
carbon disulfide	ND (0.024 U)	0.022 J	ND (0.029 U)	0.0040 J
carbon tetrachloride	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
chloroform	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
1,2-dichloroethene	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
cis-1,3-dichloropropene	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
ethylbenzene	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
2-hexanone	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
methylene chloride	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
4-methyl-2-pentanone	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
tetrachloroethene	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
toluene	ND (0.024 U)	ND (0.12 U)	0.039	0.0040 J
1,1,1-trichloroethane	ND (0.024 U)	ND (0.12 U)	ND (0.029 U)	ND (0.020 U)
xylenes	ND (0.024 U)	0.031 J	ND (0.029 U)	ND (0.020 U)

(See Notes on Page 5)

TABLE 3-19

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Notes:

[1]Showing only the results for analytes detected above quantitation limits.
[2]MS/MSD of this sample was analyzed.
ND – Not Detected.

Notes Explaining Data Qualifiers:

B – The compound has been found in the sample as well as its associated blank. A comparison of sample and blank concentrations indicates that its presence is likely site-related.
D – Concentration is based on a diluted sample analysis.
J – The compound was positively identified. However, the associated value is an estimated concentration only.
U – The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ – The compound was not detected above the reported sample quantitative limit. However, the reported limit is approximate, and may or may not represent the actual limits of quantitation.

TABLE 3-20

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-11 A66008	MW-12 A66064	MW-12R A66028	MW-22A A66017	MW-22B A66018	MW-23 A66034	MW-24 A66009
Bryant HRDL							
acetone	R	ND (10 UJ)	ND (10 UJ)	ND (10 U)	ND (10 U)	ND (10 UJ)	R
benzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 U)	ND (10 U)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 U)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-25 A66027	MW-26[2] A66015	MW-121A A66013	MW-121B A66014	MW-123A A66025	MW-123B A66026	RIVULET2 A66007
Bryant HRDL (Cont'd.)							
acetone	ND (10 UJ)	R	R	R	ND (10 UJ)	ND (10 UJ)	R
benzene	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 U)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	7.0 J	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

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TABLE 3-20

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-124A A66003	MW-124B A66004	MW-125P A66016	MW-125A A66005	MW-125B A66006	MW-126A A66010	MW-126B A66011
Monarch HRDL							
acetone	R	R	R	R	R	R	R
benzene	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 U)	ND (10 U)	34 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
carbon disulfide	ND (10 U)	ND (10 U)	2.0 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	2.0 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	2.0 J	ND (10 U)	3.0 J	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	2.0 J	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)
1,1,1-trichloroethane	3.0 J	ND (10 U)	ND (10 U)	ND (10 U)	3.0 J	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	10	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-126B (Dup) A66012	MW-122A A66033	MW-122A (Dup) A66038	MW-122B A66039	MW-1[2] A66032	MW-3 A66054	MW-5 A66046
Monarch HRDL (Cont'd.)		**FRDLs**			**Former Type III Landfill**		
acetone	R	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 U)
benzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)
2-butanone	ND (10 U)	ND (10 U)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 U)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

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TABLE 3-20

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-15 A66055	MW-16B[2] A66059	MW-16C A66058	MW-17A A66056	MW-17B A66057	MW-19BR A66030	MW-19BR (Dup) A66031
Former Type III Landfill (Cont'd.)							
acetone	ND (10 UJ)	R	R	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
benzene	1.0 J	ND (10 U)	ND (10 U)	2.0 J	2.0 J	2.0 J	2.0 J
2-butanone	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-19C A66040	MW-19D A66041	MW-112 A66045	MW-127A A66044	MW-7 A66001	MW-7B A66000	MW-8 A66053
Former Type III Landfill (Cont'd.)					**Western Disposal Area**		
acetone	ND (10 UJ)	ND (10 UJ)	ND (10 U)	ND (10 U)	R	R	R
benzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 UJ)	ND (10 UJ)	ND (10 U)	ND (10 U)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

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TABLE 3-20

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-8A A66052	MW-20 A66049	MW-20 (Dup) A66050	MW-20B A66051	MW-21 A66002	MW-120A A66020	MW-120B A66019
Western Disposal Area (Cont'd.)							
acetone	R	ND (10 U)	R	R	R	ND (10 U)	ND (10 U)
benzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 UJ)	ND (10 U)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-120B (Dup) A66024	MW-2 A66060	MW-2S A66022	MW-2S (Dup) A66023	MW-18 A66061	MW-104 A66037	MW-106 A66063
Western Disposal Area (Cont'd.)		**Pilot Study Area**				**Former Bryant Mill Pond**	
acetone	ND (10 U)	ND (10 UJ)	ND (10 U)	ND (10 U)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
benzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)	ND (10 U)	ND (10 UJ)	ND (10 U)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)
tetrachloroethene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
toluene	ND (10 U)	ND (10 U)	2.0 J	2.0 J	ND (10 U)	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

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TABLE 3-20

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL VOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-108 A66047	MW-114 A66036	MW-128A A66035
Former Bryant Mill Pond (Cont'd.)			
acetone	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
benzene	ND (10 U)	ND (10 U)	ND (10 U)
2-butanone	ND (10 UJ)	ND (10 UJ)	ND (10 UJ)
carbon disulfide	ND (10 U)	ND (10 U)	ND (10 U)
chloroform	ND (10 U)	ND (10 U)	ND (10 U)
ethylbenzene	ND (10 U)	ND (10 U)	ND (10 U)
methylene chloride	ND (10 U)	ND (10 U)	ND (10 U)
tetrachloroethene	ND (10 U)	13	ND (10 UJ)
toluene	1.0 J	ND (10 U)	ND (10 U)
1,1,1-trichloroethane	ND (10 U)	ND (10 U)	ND (10 U)
xylenes	ND (10 U)	ND (10 U)	ND (10 U)

Notes:

[1]Showing only the results for compounds detected above quantitation limits.
[2]MS/MSD of this sample was analyzed.
ND -- Not detected.

Notes Explaining Data Qualifiers:
J - The compound was positively identified. However, the associated numerical value is an estimated concentration only.
R - The sample results are rejected.
U - The compound was analyzed for but not detected. However, the associated numerical value is an estimated concentration only.
UJ - The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	BHDL-22 10.00-12.00 A60688	BHDL-22 (Dup) 10.00-12.00 A60691	BHDL-22 12.00-14.00 A60689	BHDL-22 (Dup) 12.00-14.00 A60692	BHDL-123[2] 8.00-9.50 A60683	BHDL-123 10.00-12.00 A60684	MW-121B 16.00-17.50 A60046	MW-121B 17.50-19.00 A60047
Bryant HRDL								
anthracene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
benzo(a)anthracene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
benzo(b)fluoranthene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
benzo(k)fluoranthene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
benzo(g,h,i)perylene	ND (9.4 UJ)	ND (19 UJ)	ND (0.38 UJ)	ND (0.38 U)	ND (46 UJ)	ND (0.40 U)	ND (2.2 U)	ND (0.39 UJ)
benzo(a)pyrene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
carbazole	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 UJ)	ND (46 U)	ND (0.40 UJ)	ND (2.2 U)	ND (0.39 U)
bis(2-chloroethyl)ether	ND(9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
4-chloro-3-methylphenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
2-chlorophenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
chrysene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
dibenz(a,h)anthracene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
dibenzofuran	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
di-n-butylphthalate	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
2,4-dichlorophenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
2,4-dimethylphenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
4,6-dinitro-2-methylphenol	ND (23 UJ)	ND (47 UJ)	ND (0.93 UJ)	ND (0.93 U)	ND (110 UJ)	ND (0.96 U)	ND (5.3 U)	ND (0.95 U)
2,4-dinitrophenol	ND (23 UJ)	ND (47 UJ)	ND (0.93 UJ)	ND (0.93 U)	ND (110 UJ)	ND (0.96 U)	ND (5.3 U)	ND (0.95 U)
bis(2-ethylhexyl)phthalate	ND (9.4 U)	2.5 J	0.076 J	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
fluoranthene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	0.30 J	ND (0.39 U)
fluorene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
indeno(1,2,3-cd)pyrene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
2-methylnaphthalene	2.2 J	5.7 J	0.063 J	0.062 J	21 J	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
2-methylphenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
4-methylphenol	5.9 J	8.1 J	ND (0.38 U)	ND (0.38 U)	16 J	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
naphthalene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
2-nitrophenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
4-nitrophenol	ND (23 UJ)	ND (47 UJ)	ND (0.93 UJ)	ND (0.93 U)	ND (110 UJ)	ND (0.96 U)	ND (5.3 U)	ND (0.95 UJ)
pentachlorophenol	ND (23 U)	ND (47 U)	ND (0.93 U)	ND (0.93 U)	ND (110 U)	ND (0.96 U)	ND (5.3 UJ)	ND (0.95 U)
phenanthrene	2.0 J	5.0 J	ND (0.38 U)	ND (0.38 U)	7.2 J	ND (0.40 U)	0.59 J	ND (0.39 U)
phenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)
pyrene	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 UJ)
2,4,5-trichlorophenol	ND (23 U)	ND (47 U)	ND (0.93 U)	ND (0.93 U)	ND (110 U)	ND (0.96 U)	ND (5.3 U)	ND (0.95 U)
2,4,6-trichlorophenol	ND (9.4 U)	ND (19 U)	ND (0.38 U)	ND (0.38 U)	ND (46 U)	ND (0.40 U)	ND (2.2 U)	ND (0.39 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MLSS-1 14.00-15.50 A60039	MLSS-1 15.50-18.00 A60040	MLSS-2 20.00-22.00 A60571	MLSS-2 22.00-24.00 A60572	MLSS-3 18.00-20.00 A60551	MLSS-3 20.00-22.00 A60552	MLSS-4 18.00-20.00 A60530	MLSS-4 20.00-22.00 A60531
Monarch HRDL								
anthracene	ND (1.4 U)	0.094 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
benzo(a)anthracene	ND (1.4 U)	0.21 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
benzo(b)fluoranthene	ND (1.4 U)	0.14 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
benzo(k)fluoranthene	ND (1.4 U)	0.17 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
benzo(g,h,i)perylene	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
benzo(a)pyrene	ND (1.4 U)	0.17 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
carbazole	ND (1.4 U)	0.070 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
bis(2-chloroethyl)ether	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
4-chloro-3-methylphenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
2-chlorophenol	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
chrysene	ND (1.4 U)	0.20 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
dibenz(a,h)anthracene	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
dibenzofuran	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
di-n-butylphthalate	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
2,4-dichlorophenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
2,4-dimethylphenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
4,6-dinitro-2-methylphenol	R	ND (3.6 U)	ND (31 U)	ND (1.6 U)	ND (31 U)	ND (18 U)	ND (13 UJ)	ND (0.95 U)
2,4-dinitrophenol	R	ND (3.6 U)	ND (31 UJ)	ND (1.6 U)	ND (31 UJ)	ND (18 U)	ND (13 U)	ND (0.95 U)
bis(2-ethylhexyl)phthalate	ND (1.4 U)	0.10 J	ND (13 U)	0.091 J	ND (13 U)	ND (7.4 U)	1.3 J	0.031 J
fluoranthene	ND (1.4 U)	0.45 J	ND (13 U)	ND (0.64 U)	ND (13 U)	0.37 J	ND (5.3 U)	ND (0.39 U)
fluorene	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
indeno(1,2,3-cd)pyrene	ND (1.4 U)	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
2-methylnaphthalene	0.18 J	ND (1.5 U)	2.8 J	ND (0.64 U)	3.4 J	0.35 J	2.7 J	ND (0.39 U)
2-methylphenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
4-methylphenol	R	ND (1.5 U)	2.1 J	ND (0.64 U)	2.7 J	ND (7.4 U)	4.7 J	ND (0.39 U)
naphthalene	ND (1.4 U)	0.084 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	0.73 J	ND (0.39 U)
2-nitrophenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
4-nitrophenol	R	ND (3.6 U)	ND (31 U)	ND (1.6 U)	ND (31 U)	ND (18 U)	ND (13 U)	ND (0.95 U)
pentachlorophenol	R	ND (3.6 U)	ND (31 UJ)	ND (1.6 U)	ND (31 UJ)	ND (18 U)	ND (13 U)	ND (0.95 U)
phenanthrene	ND (1.4 U)	0.44 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	0.54 J	ND (0.39 U)
phenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
pyrene	ND (1.4 U)	0.36 J	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)
2,4,5-trichlorophenol	R	ND (3.6 U)	ND (31 U)	ND (1.6 U)	ND (31 U)	ND (18 U)	ND (13 U)	ND (0.95 U)
2,4,6-trichlorophenol	R	ND (1.5 U)	ND (13 U)	ND (0.64 U)	ND (13 U)	ND (7.4 U)	ND (5.3 U)	ND (0.39 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MLSS-5 22.00-24.00 A60512	MLSS-5 24.00-26.00 A60513	MW-125B 18.00-19.00 A60029	MW-125B 19.00-20.00 A60030	MW-126A 14.00-16.00 A60017	MW-126A 14.00-16.00 A60018
Monarch HRDL (Cont'd.)						
anthracene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
benzo(a)anthracene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.052 J
benzo(b)fluoranthene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.045 J
benzo(k)fluoranthene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.049 J
benzo(g,h,i)perylene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
benzo(a)pyrene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.046 J
carbazole	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
bis(2-chloroethyl)ether	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
4-chloro-3-methylphenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
2-chlorophenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
chrysene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.060 J
dibenz(a,h)anthracene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
dibenzofuran	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
di-n-butylphthalate	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
2,4-dichlorophenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
2,4-dimethylphenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
4,6-dinitro-2-methylphenol	ND (30 UJ)	ND (1.1 U)	ND (22 UJ)	ND (0.91 U)	R	ND (1.5 U)
2,4-dinitrophenol	ND (30 U)	ND (1.1 U)	ND (22 U)	ND (0.91 U)	R	ND (1.5 U)
bis(2-ethylhexyl)phthalate	3.1 J	0.11 J	ND (9.2 U)	0.11 J	ND (3.6 U)	0.034 J
fluoranthene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.099 J
fluorene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
indeno(1,2,3-cd)pyrene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
2-methylnaphthalene	4.1 J	0.038 J	2.0 J	0.038 J	1.3 J	ND (0.61 U)
2-methylphenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
4-methylphenol	2.3 J	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
naphthalene	1.0 J	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	ND (0.61 U)
2-nitrophenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
4-nitrophenol	ND (30 U)	ND (1.1 U)	ND (22 U)	ND (0.91 U)	R	ND (1.5 U)
pentachlorophenol	ND (30 U)	ND (1.1 U)	ND (22 U)	ND (0.91 U)	R	ND (1.5 U)
phenanthrene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	0.37 J	0.059 J
phenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)
pyrene	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	ND (3.6 U)	0.090 J
2,4,5-trichlorophenol	ND (30 U)	ND (1.1 U)	ND (22 U)	ND (0.91 U)	R	ND (1.5 U)
2,4,6-trichlorophenol	ND (12 U)	ND (0.45 U)	ND (9.2 U)	ND (0.38 U)	R	ND (0.61 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	DLHB-1 14.00-16.00 A60593	DLHB-1 16.00-18.00 A60594	DLHB-2 6.00-8.00 A60586	DLHB-2 8.00-10.00 A60587	DLHB-3[2] 6.00-8.00 A60599	DLHB-3[2] 8.00-10.00 A60600	DLHB-6 8.00-10.00 A60605	DLHB-6 10.00-12.00 A60606
FRDLs								
anthracene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
benzo(a)anthracene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
benzo(b)fluoranthene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
benzo(k)fluoranthene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
benzo(g,h,i)perylene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 UJ)	ND (0.88 U)	ND (2.1 UJ)
benzo(a)pyrene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
carbazole	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
bis(2-chloroethyl)ether	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 UJ)	ND (0.88 U)	2.1 J
4-chloro-3-methylphenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
2-chlorophenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
chrysene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
dibenz(a,h)anthracene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
dibenzofuran	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
di-n-butylphthalate	ND (2.8 U)	ND (0.38 U)	1.0 BJ	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
2,4-dichlorophenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
2,4-dimethylphenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
4,6-dinitro-2-methylphenol	ND (2.8 U)	ND (0.93 U)	ND (8.9 U)	ND (0.89 U)	ND (4.7 U)	ND (1.9 U)	ND (2.1 U)	R
2,4-dinitrophenol	ND (2.8 U)	ND (0.93 U)	ND (8.9 U)	ND (0.89 U)	ND (4.7 U)	ND (1.9 U)	ND (2.1 U)	R
bis(2-ethylhexyl)phthalate	ND (2.8 U)	0.028 J	ND (3.7 U)	0.020 J	1.1 J	ND (0.79 U)	0.24 J	ND (2.1 UJ)
fluoranthene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	0.058 J	ND (2.1 UJ)
fluorene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	0.40 J	ND (0.79 U)	ND (0.88 U)	0.18 J
indeno(1,2,3-cd)pyrene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
2-methylnaphthalene	ND (2.8 U)	0.063 J	ND (3.7 U)	ND (0.37 U)	2.3	ND (0.79 U)	ND (0.88 U)	1.3 J
2-methylphenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
4-methylphenol	2.7 J	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	0.37 J	ND (0.79 U)	0.48 J	ND (2.1 UJ)
naphthalene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	ND (2.1 UJ)
2-nitrophenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
4-nitrophenol	ND (6.8 U)	ND (0.93 U)	ND (8.9 U)	ND (0.89 UJ)	ND (4.7 U)	ND (1.9 UJ)	ND (2.1 U)	R
pentachlorophenol	ND (6.8 UJ)	ND (0.93 U)	ND (8.9 UJ)	ND (0.89 U)	ND (4.7 UJ)	ND (1.9 U)	ND (2.1 U)	R
phenanthrene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	1.3 J	ND (0.79 U)	0.11 J	0.34 J
phenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R
pyrene	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 UJ)	ND (0.88 U)	ND (2.1 UJ)
2,4,5-trichlorophenol	ND (6.8 U)	ND (0.93 U)	ND (8.9 U)	ND (0.89 U)	ND (4.7 U)	ND (1.9 U)	ND (2.1 U)	R
2,4,6-trichlorophenol	ND (2.8 U)	ND (0.38 U)	ND (3.7 U)	ND (0.37 U)	ND (1.9 U)	ND (0.79 U)	ND (0.88 U)	R

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	FLF-1[2] 6.00-6.50 A60097	FLF-1[2] 6.50-8.00 A60098
Former Type III Landfill		
anthracene	ND (8.8 U)	ND (0.39 U)
benzo(a)anthracene	ND (8.8 U)	ND (0.39 U)
benzo(b)fluoranthene	ND (8.8 U)	ND (0.39 U)
benzo(k)fluoranthene	ND (8.8 U)	ND (0.39 U)
benzo(g,h,i)perylene	ND (8.8 U)	ND (0.39 U)
benzo(a)pyrene	ND (8.8 U)	ND (0.39 U)
carbazole	ND (8.8 U)	ND (0.39 U)
bis(2-chloroethyl)ether	ND (8.8 U)	ND (0.38 U)
4-chloro-3-methylphenol	ND (8.8 U)	ND (0.39 U)
2-chlorophenol	ND (8.8 U)	ND (0.39 U)
chrysene	ND (8.8 U)	ND (0.39 U)
dibenz(a,h)anthracene	ND (8.8 U)	ND (0.39 U)
dibenzofuran	ND (8.8 U)	ND (0.39 U)
di-n-butylphthalate	ND (8.8 U)	ND (0.39 U)
2,4-dichlorophenol	ND (8.8 U)	ND (0.39 U)
2,4-dimethylphenol	ND (8.8 U)	ND (0.39 U)
4,6-dinitro-2-methylphenol	ND (21 UJ)	ND (0.94 U)
2,4-dinitrophenol	ND (21 UJ)	ND (0.94 U)
bis(2-ethylhexyl)phthalate	0.63 J	0.028 J
fluoranthene	ND (8.8 U)	ND (0.39 U)
fluorene	ND (8.8 U)	ND (0.39 U)
indeno(1,2,3-cd)pyrene	ND (8.8 U)	ND (0.39 U)
2-methylnaphthalene	2.4 J	ND (0.39 U)
2-methylphenol	ND (8.8 U)	ND (0.39 U)
4-methylphenol	ND (8.8 U)	ND (0.39 U)
naphthalene	ND (8.8 U)	ND (0.39 U)
2-nitrophenol	ND (8.8 U)	ND (0.39 U)
4-nitrophenol	ND (21 U)	ND (0.94 U)
pentachlorophenol	ND (21 U)	ND (0.94 U)
phenanthrene	0.64 J	ND (0.39 U)
phenol	ND (8.8 U)	ND (0.39 U)
pyrene	ND (8.8 U)	ND (0.39 U)
2,4,5-trichlorophenol	ND (21 U)	ND (0.94 U)
2,4,6-trichlorophenol	ND (8.8 U)	ND (0.39 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	WA-1	WA-1	WA-2	WA-2	WA-3	WA-3	WA-4	WA-4
Depth (ft)	12.00-13.00	13.00-14.00	12.00-14.00	14.00-16.00	14.00-16.00	16.00-18.00	8.00-10.00	10.00-12.00
Sample ID	A60062	A60063	A60675	A60676	A60668	A60669	A60662	A60663
Western Disposal Area								
anthracene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
benzo(a)anthracene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
benzo(b)fluoranthene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
benzo(k)fluoranthene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
benzo(g,h,i)perylene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
benzo(a)pyrene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
carbazole	ND (3.7 U)	ND (0.35 UJ)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
bis(2-chloroethyl)ether	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
4-chloro-3-methylphenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2-chlorophenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
chrysene	ND (3.7 U)	ND (0.35 U)	0.12 J	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
dibenz(a,h)anthracene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
dibenzofuran	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
di-n-butylphthalate	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2,4-dichlorophenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2,4-dimethylphenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
4,6-dinitro-2-methylphenol	ND (8.9 U)	ND (0.84 U)	ND (4.9 UJ)	ND (0.88 U)	ND (21 UJ)	ND (0.83 U)	ND (20 UJ)	ND (0.82 U)
2,4-dinitrophenol	ND (8.9 U)	ND (0.84 U)	ND (4.9 UJ)	ND (0.88 UJ)	ND (21 U)	ND (0.83 UJ)	ND (20 U)	ND (0.82 UJ)
bis(2-ethylhexyl)phthalate	0.44 J	ND (0.35 U)	0.20 J	ND (0.36 U)	1.7 J	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
fluoranthene	ND (3.7 U)	ND (0.35 U)	0.24 BJ	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
fluorene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
indeno(1,2,3-cd)pyrene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2-methylnaphthalene	0.54 J	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2-methylphenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
4-methylphenol	ND (3.7 U)	ND (0.35 U)	1.5 J	ND (0.36 U)	1.2 J	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
naphthalene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2-nitrophenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
4-nitrophenol	ND (8.9 U)	ND (0.84 U)	ND (4.9 U)	ND (0.88 U)	ND (21 U)	ND (0.83 U)	ND (20 U)	ND (0.82 U)
pentachlorophenol	2.8 J	ND (0.84 U)	ND (4.9 U)	ND (0.88 U)	ND (21 U)	ND (0.83 U)	ND (20 U)	ND (0.82 U)
phenanthrene	ND (3.7 U)	ND (0.35 U)	0.17 J	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
phenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
pyrene	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)
2,4,5-trichlorophenol	ND (8.9 U)	ND (0.84 U)	ND (4.9 U)	ND (0.88 U)	ND (21 U)	ND (0.83 U)	ND (20 U)	ND (0.82 U)
2,4,6-trichlorophenol	ND (3.7 U)	ND (0.35 U)	ND (2.0 U)	ND (0.36 U)	ND (8.7 U)	ND (0.34 U)	ND (8.5 U)	ND (0.34 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	WA-5 22.00-23.50 A60650	WA-5 23.50-26.00 A60651	WA-6 12.00-13.00 A60085	WA-6 13.00-15.00 A60086	WA-7 20.00-22.00 A60643	WA-7 22.00-24.00 A60644	WA-8 10.00-12.00 A60657	WA-8 12.00-14.00 A60658
Western Disposal Area (Cont'd.)								
anthracene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.031 J	ND (12 U)	ND (0.36 U)
benzo(a)anthracene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.052 J	ND (12 U)	ND (0.36 U)
benzo(b)fluoranthene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.059 J	ND (12 U)	ND (0.36 U)
benzo(k)fluoranthene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.029 J	ND (12 U)	ND (0.36 U)
benzo(g,h,i)perylene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.028 J	ND (12 U)	ND (0.36 U)
benzo(a)pyrene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.032 J	ND (12 U)	ND (0.36 U)
carbazole	ND (25 U)	ND (0.34 UJ)	ND (24 U)	ND (0.44 UJ)	ND (30 U)	0.021 J	ND (12 U)	ND (0.36 U)
bis(2-chloroethyl)ether	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
4-chloro-3-methylphenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
2-chlorophenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
chrysene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.064 J	ND (12 U)	ND (0.36 U)
dibenz(a,h)anthracene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
dibenzofuran	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.10 J	ND (12 U)	ND (0.36 U)
di-n-butylphthalate	ND (25 U)	ND (0.34 U)	ND (24 U)	0.049 BJ	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
2,4-dichlorophenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
2,4-dimethylphenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
4,6-dinitro-2-methylphenol	ND (60 U)	ND (0.34 U)	ND (58 U)	ND (1.0 U)	ND (73 U)	ND (1.0 U)	ND (29 UJ)	ND (0.87 UJ)
2,4-dinitrophenol	ND (60 U)	ND (0.34 U)	ND (58 U)	ND (1.0 U)	ND (73 U)	ND (1.0 U)	ND (29 U)	ND (0.87 UJ)
bis(2-ethylhexyl)phthalate	ND (25 U)	0.057 J	2.0 J	ND (0.44 U)	ND (30 U)	0.099 J	5.4 J	ND (0.36 U)
fluoranthene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.094 J	ND (12 U)	ND (0.36 U)
fluorene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
indeno(1,2,3-cd)pyrene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
2-methylnaphthalene	ND (25 U)	ND (0.34 U)	10 J	ND (0.44 U)	ND (30 U)	0.40 J	3.5 J	ND (0.36 U)
2-methylphenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
4-methylphenol	38	0.016 J	1.7 J	ND (0.44 U)	12 J	ND (0.43 U)	ND (12 U)	ND (0.36 U)
naphthalene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.23 J	ND (12 U)	ND (0.36 U)
2-nitrophenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
4-nitrophenol	ND (60 UJ)	ND (0.83 U)	ND (58 UJ)	ND (1.0 U)	ND (73 UJ)	ND (1.0 U)	ND (29 U)	ND (0.87 U)
pentachlorophenol	ND (60 U)	ND (0.83 U)	ND (58 U)	ND (1.0 U)	ND (73 U)	ND (1.0 U)	ND (29 U)	ND (0.87 U)
phenanthrene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.31 J	ND (12 U)	ND (0.36 U)
phenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)
pyrene	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	0.083 J	ND (12 U)	ND (0.36 U)
2,4,5-trichlorophenol	ND (60 U)	ND (0.83 U)	ND (58 U)	ND (1.0 U)	ND (73 U)	ND (1.0 U)	ND (29 U)	ND (0.87 U)
2,4,6-trichlorophenol	ND (25 U)	ND (0.34 U)	ND (24 U)	ND (0.44 U)	ND (30 U)	ND (0.43 U)	ND (12 U)	ND (0.36 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	B-7B 8.00-10.00 A60702	B-7B 10.00-12.00 A60703	MW-8A 12.00-12.50 A60092	MW-8A 12.50-14.00 A60093	MW-120B 18.00-19.00 A60054	MW-120B 19.00-20.00 A60055
Western Disposal Area (Cont'd.)						
anthracene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
benzo(a)anthracene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
benzo(b)fluoranthene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
benzo(k)fluoranthene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
benzo(g,h,i)perylene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 UJ)
benzo(a)pyrene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
carbazole	ND (0.34 UJ)	ND (0.43 UJ)	ND (5.2 U)	ND (0.53 UJ)	ND (1.6 U)	ND (0.40 U)
bis(2-chloroethyl)ether	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 UJ)
4-chloro-3-methylphenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
2-chlorophenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
chrysene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	0.024 J
dibenz(a,h)anthracene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
dibenzofuran	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
di-n-butylphthalate	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
2,4-dichlorophenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
2,4-dimethylphenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
4,6-dinitro-2-methylphenol	ND (0.83 U)	ND (1.0 U)	ND (12 UJ)	ND (1.3 U)	ND (3.9 U)	ND (0.97 U)
2,4-dinitrophenol	ND (0.83 U)	ND (1.0 U)	ND (12 UJ)	ND (1.3 U)	ND (3.9 U)	ND (0.97 U)
bis(2-ethylhexyl)phthalate	0.070 J	0.073 J	3.1 J	0.074 J	0.28 J	ND (0.40 U)
fluoranthene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	0.053 J	ND (1.6 U)	0.040 J
fluorene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
indeno(1,2,3-cd)pyrene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
2-methylnaphthalene	ND (0.34 U)	ND (0.43 U)	4.1 J	ND (0.53 U)	0.50 J	0.085 J
2-methylphenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
4-methylphenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	0.022 J
naphthalene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	0.062 J
2-nitrophenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
4-nitrophenol	ND (0.83 U)	ND (1.0 U)	ND (12 U)	ND (1.3 U)	ND (3.9 U)	ND (0.97 UJ)
pentachlorophenol	ND (0.83 U)	ND (1.0 U)	ND (12 U)	ND (1.3 U)	ND (3.9 UJ)	ND (0.97 U)
phenanthrene	ND (0.34 U)	ND (0.43 U)	0.51 J	0.033 J	ND (1.6 U)	0.070 J
phenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)
pyrene	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	0.038 J	ND (1.6 U)	0.058 J
2,4,5-trichlorophenol	ND (0.83 U)	ND (1.0 U)	ND (12 UJ)	ND (1.3 U)	ND (3.9 U)	ND (0.97 U)
2,4,6-trichlorophenol	ND (0.34 U)	ND (0.43 U)	ND (5.2 U)	ND (0.53 U)	ND (1.6 U)	ND (0.40 U)

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TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	BMP-2 0.00-1.00 A60621	BMP-2 3.00-4.00 A60624	BMP-12 0.00-1.00 A60618	BMP-12 3.00-4.00 A60619
Former Bryant Mill Pond				
anthracene	ND (3.2 U)	ND (2.5 U)	0.12 J	ND (5.9 U)
benzo(a)anthracene	0.18 J	ND (2.5 U)	0.72 J	ND (5.9 U)
benzo(b)fluoranthene	0.40 J	ND (2.5 U)	1.5 J	0.43 J
benzo(k)fluoranthene	0.40 J	ND (2.5 U)	1.3 J	0.40 J
benzo(g,h,i)perylene	ND (3.2 U)	ND (2.5 U)	0.28 J	ND (5.9 U)
benzo(a)pyrene	ND (3.2 U)	ND (2.5 U)	0.99 J	0.29 J
carbazole	ND (3.2 UJ)	ND (2.5 U)	0.14 J	ND (5.9 U)
bis(2-chloroethyl)ether	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)
4-chloro-3-methylphenol	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)
2-chlorophenol	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)
chrysene	0.37 J	ND (2.5 U)	1.3 J	0.39 J
dibenz(a,h)anthracene	ND (3.2 U)	ND (2.5 U)	0.19 J	ND (5.9 U)
dibenzofuran	ND (3.2 U)	ND (2.5 U)	0.11 J	ND (5.9 U)
di-n-butylphthalate	0.35 J	ND (2.5 U)	0.43 J	2.2 J
2,4-dichlorophenol	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)
2,4-dimethylphenol	0.95 J	4.1	2.3	16
4,6-dinitro-2-methylphenol	ND (7.8 U)	ND (6.0 U)	ND (4.0 U)	ND (14 U)
2,4-dinitrophenol	ND (7.8 U)	ND (6.0 U)	ND (4.0 U)	ND (14 U)
bis(2-ethylhexyl)phthalate	ND (3.2 U)	0.58 J	ND (1.6 U)	ND (5.9 U)
fluoranthene	0.57 J	ND (2.5 U)	2.4	0.72 J
fluorene	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)
indeno(1,2,3-cd)pyrene	ND (3.2 U)	ND (2.5 U)	0.75 J	ND (5.9 U)
2-methylnaphthalene	0.40 J	1.4 J	0.61 J	1.2 J
2-methylphenol	2.1 J	0.51 J	5.2	28
4-methylphenol	0.42 J	0.42 J	1.4 J	7.4
naphthalene	ND (3.2 U)	0.28 J	0.27 J	0.78 J
2-nitrophenol	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)
4-nitrophenol	ND (7.8 U)	ND (6.0 U)	ND (4.0 U)	ND (14 U)
pentachlorophenol	ND (7.8 U)	ND (6.0 U)	ND (4.0 U)	ND (14 U)
phenanthrene	0.29 J	1.4 J	1.2 J	0.53 J
phenol	2.3 J	0.78 J	5.2	27
pyrene	0.47 J	ND (2.5 U)	2.0	0.59 J
2,4,5-trichlorophenol	ND (7.8 U)	ND (6.0 U)	ND (4.0 U)	ND (14 U)
2,4,6-trichlorophenol	ND (3.2 U)	ND (2.5 U)	ND (1.6 U)	ND (5.9 U)

See Notes on Page 10

TABLE 3-21

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED SVOC RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Notes:

[1] Showing only the results for analytes detected above quantitation limits.
[2] MS/MSD of this sample was analyzed.
ND - Not Detected.

Notes Explaining Data Qualifiers:

B - The compound has been found in the sample as well as its associated blank, a comparison of sample and blank concentrations indicates that its presence is likely site-related.
J - The compound was positively identified. However, the associated value is an estimated concentration only.
R - The sample results are rejected.
U - The compound was analyzed for but not detected. The associated value is the compound quantitation limits.
UJ - The compound was not detected above the reported sample quantitative limit. However, the reported limit is approximate, and may or may not represent the actual limit of quantitation.

TABLE 3-22

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL SVOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-125P A66016	MW-125A A66005	MW-125B A66006	MW-126A A66010	MW-126B A66011	MW-126B (Dup) A66012	MW-122A A66033	MW-122A (Dup) A66038
Monarch HRDL (Cont'd.)							**FRDLs**	
di-n-butylphthalate	ND (500 U)	ND (10 U)	ND (10 U)	ND (41 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
diethyl phthalate	ND (500 U)	ND (10 U)	ND (10 U)	ND (41 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylnaphthalene	ND (500 U)	ND (10 U)	ND (10 U)	ND (41 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylphenol	ND (500 U)	ND (10 U)	ND (10 U)	ND (41 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
4-methylphenol	600	ND (10 U)	ND (10 U)	8.0 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
naphthalene	ND (500 U)	ND (10 U)	ND (10 U)	ND (41 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
phenol	ND (500 U)	ND (10 U)	ND (10 U)	ND (41 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-122B A66039	MW-1[2] A66032	MW-3 A66054	MW-5 A66046	MW-15 A66055	MW-16B[2] A66059	MW-16C A66058	MW-17A A66056
FRDLs (Cont'd.)		**Former Type III Landfill**						
di-n-butylphthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)	ND (10 U)	ND (10 U)
diethyl phthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	0.70 J	ND (10 U)	ND (10 U)	ND (10 U)
2-methylnaphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
4-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
naphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	1.0 J	ND (10 U)	ND (10 U)	ND (10 U)
phenol	ND (10 U)	ND (10 UJ)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

See Notes on Page 5

TABLE 3-22

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL SVOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-17B A66057	MW-19BR A66030	MW-19BR (Dup) A66031	MW-19C A66040	MW-19D A66041	MW-112 A66045	MW-127A A66044
Former Type III Landfill (Cont'd.)							
di-n-butylphthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
diethyl phthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylnaphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	0.60 J
4-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	0.90 J
naphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
phenol	ND (10 U)	ND (10 UJ)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-7 A66001	MW-7B A66000	MW-8 A66053	MW-8A A66052	MW-20 A66049	MW-20 (Dup) A66050	MW-20B A66051	MW-21 A66002
Western Disposal Area								
di-n-butylphthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
diethyl phthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylnaphthalene	ND (10 U)	ND (10 U)	ND (10 U)	0.60 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
4-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	15	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
naphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
phenol	ND (10 U)	0.60 J	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

See Notes on Page 5

TABLE 3-22

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL SVOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Location Sample ID	MW-120A A66020	MW-120B A66019	MW-120B (Dup) A66024	MW-2 A66060	MW-2S A66022	MW-2S (Dup) A66023	MW-18 A66061
Western Disposal Area (Cont'd.)				**Pilot Study Area**			
di-n-butylphthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
diethyl phthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylnaphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
4-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
naphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
phenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

Location Sample ID	MW-104 A66037	MW-106 A66063	MW-108 A66047	MW-114 A66036	MW-128A A66035
Former Bryant Mill Pond					
di-n-butylphthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
diethyl phthalate	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylnaphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
2-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
4-methylphenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
naphthalene	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)
phenol	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)	ND (10 U)

See Notes on Page 5

TABLE 3-22

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TCL SVOC
RESULTS FOR GROUNDWATER/LEACHATE SAMPLES[1] (ug/L)

Notes:

[1]Showing only the results for analytes detected above quantitation limits.
[2]MS/MSD of this sample was analyzed.
ND – Not Detected.

Notes Expalining Data Qualifiers:

J – The compound was positively identified. However, the associated numerical value is an estimated concentration only.
U – The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ – The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

TABLE 3-23

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED PCDD/PCDF
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MLSS-1 0.00-0.50 A60093	MLSS-1 (Dup) 0.00-0.50 A60034	MLSS-3 0.00-0.50 A60540	DLHB-1 0.00-0.50 A60589	DLHB-2 0.00-0.50 A60582	DLHB-5 0.00-0.50 A60581
Monarch HRDL				FRDLs		
2,3,7,8-Tetrachlorinated dibenzo-p-dioxin	ND (2.0E-7 U)	ND (3.0E-7 U)	2.6E-5	3.6E-6	7.8E-6	3.2E-6
1,2,3,7,8-Pentachlorinated dibenzo-p-dioxin	ND (4.0E-7 U)	ND (5.0E-7 U)	6.7E-6	ND (2.0E-7 U)	ND (3.4E-6 UJ)	ND (1.4E-6 U)
1,2,3,4,7,8-Hexachlorinated dibenzo-p-dioxin	ND (5.0E-7 U)	ND (5.0E-7 U)	ND (2.3E-5 UJ)	ND (3.0E-7 U)	ND (1.1E-6 U)	ND (2.3E-6 U)
1,2,3,6,7,8-Hexachlorinated dibenzo-p-dioxin	ND (4.0E-7 U)	ND (4.0E-7 U)	3.1E-4	4.5E-6	6.7E-5	1.3E-5
1,2,3,7,8,9-Hexachlorinated dibenzo-p-dioxin	2.7E-6	2.0E-6 PR	1.3E-4 PR	3.0E-6	4.7E-5	8.1E-6
1,2,3,4,6,7,8-Heptachlorinated dibenzo-p-dioxin	3.2E-6 B	2.2E-6 B	6.9E-3 B	7.5E-6 B	1.1E-4 B	2.2E-4 B
Octachlorinated dibenzo-p-dioxin	1.7E-5 B	1.0E-5 B	3.1E-2 B,S	5.7E-5 B	7.4E-4 B	2.6E-3 B
2,3,7,8-Tetrachlorinated dibenzofuran	4.4E-7	ND (3.1E-7 UJ)	1.8E-4 B	1.2E-4	3.0E-4	3.9E-5 B
1,2,3,7,8-Pentachlorinated dibenzofuran	ND (2.0E-7 U)	ND (3.0E-7 U)	5.4E-6	2.8E-6	2.7E-6	1.0E-6
2,3,4,7,8-Pentachlorinated dibenzofuran	ND (2.0E-7 U)	ND (3.0E-7 U)	8.9E-6	2.5E-6	4.3E-6	ND (1.9E-6 UJ)
1,2,3,4,7,8-Hexachlorinated dibenzofuran	ND (3.0E-7 U)	ND (4.0E-7 U)	1.9E-5	ND (2.0E-7 U)	1.1E-6	2.8E-6
1,2,3,6,7,8-Hexachlorinated dibenzofuran	ND (3.0E-7 U)	ND (3.0E-7 U)	8.8E-6	ND (1.0E-7 U)	ND (6.0E-7 U)	ND (1.2E-6 U)
2,3,4,6,7,8-Hexachlorinated dibenzofuran	ND (4.0E-7 U)	ND (3.0E-7 U)	1.9E-5 B,PR	ND (2.0E-7 U)	ND (1.0E-6 U)	ND (1.6E-6 U)
1,2,3,7,8,9-Hexachlorinated dibenzofuran	ND (4.0E-7 U)	ND (4.0E-7 U)	ND (7.7E-6 UJ,E)	ND (2.0E-7 U)	ND (8.0E-7 U)	ND (1.8E-6 U)
1,2,3,4,6,7,8-Heptachlorinated dibenzofuran	2.1E-6 B	ND (9.6E-7U)	4.4E-4 B	ND (2.0E-7 U)	6.6E-6 B	1.5E-5 B
1,2,3,4,7,8,9-Heptachlorinated dibenzofuran	ND (5.0E-7 U)	ND (5.0E-7 U)	2.9E-5	ND (3.0E-7 U)	ND (1.3E-6 U)	ND (2.8E-6 U)
Octachlorinated dibenzofuran	3.6E-6 B	ND (1.2E-6 U)	1.3E-3 B	ND (3.0E-7 U)	3.1E-5 B	4.1E-5 B

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TABLE 3-24

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MLSS-1 14.00-15.50 A60039	MLSS-1 15.50-18.00 A60040	MLSS-2 20.00-22.00 A60571	MLSS-2 22.00-24.00 A60572	MLSS-3 18.00-20.00 A60551	MLSS-3 20.00-22.00 A60552	MLSS-4 18.00-20.00 A60530	MLSS-4 20.00-22.00 A60531
Monarch HRDL								
aluminum	5800	4900	7000	430	7200	11000	4500	2600
antimony	ND (9.1 U)	ND (20 U)	ND (22 U)	ND (19 U)	ND (21 U)	25	ND (32 U)	ND (6.0 U)
arsenic	3.2	7.8 J	1.8 B	44 J	1.5 B	27 J	1.5 B	1.5 BJ
barium	25 B	150	430	64 B	210	360	550	31
beryllium	0.17 B	ND (0.37 U)	ND (0.40 U)	ND (0.34 U)	ND (0.38 U)	0.58 B	ND (0.58 U)	0.14 B
cadmium	ND (0.51 U)	ND (1.1 U)	1.3 B	ND (1.1 U)	ND (1.2 U)	ND (1.0 U)	ND (1.8 U)	ND (0.34 U)
calcium	30000	14000	8100	140000	3500	19000	23000	16000
chromium	7.4	5.8	79	4.1	100	46	82	5.8
cobalt	1.7 B	3.2 B	4.0 B	5.1 B	3.7 B	5.4 B	ND (3.6 U)	2.1 B
copper	25	5.9 B	56	3.4 B	47	77	34	3.9
iron	5100	11000	2100	17000	1200	27000	1000	5300
lead	15	18	460	0.33 B	550	120	390	2.9
magnesium	5500	1700 B	1400 B	2500	670 B	4800	640 B	4100
manganese	200	290	40	350	40	260	43	86
mercury	0.060 B	ND (0.090 U)	0.55	ND (0.090 U)	1.6	3.3	2.0	ND (0.050 U)
nickel	5.3 B	5.3 B	7.6 B	3.5 B	5.3 B	13 B	9.1 B	5.5
potassium	260 B	460 B	ND (330 U)	ND (280 U)	ND (320 U)	ND (280 U)	ND (480 U)	230 B
selenium	0.43 B	ND (0.64 UJ)	ND (0.90 U)	0.95 BJ	ND (0.58 U)	0.76 BJ	ND (0.66 U)	ND (0.26 UJ)
silver	ND (1.0 U)	ND (2.3 U)	ND (2.4 U)	ND (2.1 U)	ND (2.3 U)	ND (2.0 U)	ND (3.6 U)	ND (0.66 U)
sodium	240 B	ND (390 U)	760 B	ND (360 U)	ND (400 U)	ND (350 U)	ND (610 U)	ND (110 U)
thallium	ND (0.37 U)	ND (1.1 U)	ND (1.6 U)	ND (0.80 U)	ND (1.0 U)	ND (1.1 U)	ND (1.1 U)	ND (0.45 U)
vanadium	8.5 B	11 B	8.7 B	12 B	8.4 B	23	5.4 B	7.6
zinc	96	24	240	5.7 B	200	160	450	14
cyanide	ND (0.10 U)	ND (0.17 U)	15	ND (0.14 U)	2.3	1.8	6.5	ND (0.080 U)

See Notes on Page 10

TABLE 3-24

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	MLSS-5	MLSS-5	MW-125B	MW-125B	MW-126A	MW-126A	DLHB-1	DLHB-1
Depth (ft)	22.00-24.00	24.00-26.00	18.00-19.00	19.00-20.00	14.00-16.00	14.00-16.00	14.00-16.00	16.00-18.00
Sample ID	A60512	A60513	A60029	A60030	A60017	A60018	A60593	A60594
Monarch HRDL (Cont'd)							**FRDLs**	
aluminum	4700	1100	6200	4600	8900	13000	15000	2000
antimony	ND (24 U)	ND (9.3 U)	ND (17 U)	ND (6.4 U)	ND (21 U)	ND (17 U)	ND (15 U)	ND (7.9 U)
arsenic	1.3 B	3.1 J	1.7 B	2.7 J	1.8 B	9.2 J	1.1 B	0.70 BJ
barium	490	69	68	98	110	610	44 B	11 B
beryllium	ND (0.43 U)	ND (0.17 U)	ND (0.30 U)	0.18 B	ND (0.38 U)	0.95 B	ND (0.28 U)	ND (0.14 U)
cadmium	ND (1.3 U)	ND (0.52 U)	ND (0.95 U)	ND (0.36 U)	1.6 B	ND (0.93 U)	ND (0.86 U)	ND (0.44 U)
calcium	14000	23000	860 B	40000	2200	29000	5400	20000
chromium	86	5.2	85	13	69	17	14	4.8
cobalt	ND (2.6 U)	ND (1.0 U)	3.4 B	3.1 B	ND (2.3 U)	6.9 B	ND (1.7 U)	1.6 B
copper	44	11	77	6.4	54	20	95	5.4
iron	1200	6300	1000	8300	1200	15000	2400	3100
lead	370	9.7	400	4.9	410	27	17	2.5
magnesium	600 B	2000	390 B	9800	610 B	3400	560 B	11000
manganese	39	65	23	220	24	360	8.8	84
mercury	1.8	0.26	1.1	ND (0.040 U)	0.59	0.090 B	ND (0.080 U)	ND (0.040 U)
nickel	8.2 B	2.2 B	7.9 B	8.8	3.7 B	14	5.0 B	4.1 B
potassium	ND(360 U)	ND (140 U)	ND (250 U)	310 B	420 B	560 B	ND (230 U)	340 B
selenium	ND (0.98 U)	ND (0.22 UJ)	ND (0.58 U)	ND (0.29 UJ)	ND (0.74 U)	0.53 BJ	ND (0.51 U)	0.20 BJ
silver	ND (2.6 U)	ND (1.0 U)	ND (1.9 U)	ND (0.71 U)	ND (2.3 U)	ND (1.8 U)	ND (1.7 U)	ND (0.87 U)
sodium	ND (450 U)	ND (180 U)	ND (320 U)	ND (120 U)	ND (400 U)	ND (320 U)	ND (290 U)	ND (150 U)
thallium	ND (1.7 U)	ND (0.38 U)	ND (1.0 U)	ND (0.50 U)	ND (1.3 U)	ND (0.92 U)	ND (0.88 U)	ND (0.35 U)
vanadium	4.9 B	4.0 B	7.3 B	14	10 B	28	19	6.2 B
zinc	250	20	320	20	140	72	220	14
cyanide	7.4	0.10 B	2.6	0.97	5.3	ND (0.14 U)	ND (0.16 U)	0.70

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TABLE 3-24

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	DLHB-2	DLHB-2	DLHB-3[2]	DLHB-3[2]	DLHB-6	DLHB-6	FLF-1[2]	FLF-1[2]
Depth (ft)	6.00-8.00	8.00-10.00	6.00-8.00	8.00-10.00	8.00-10.00	10.00-12.00	6.00-6.50	6.50-8.00
Sample ID	A60586	A60587	A60599	A60600	A60605	A60606	A60097	A60098
FRDLs (Cont'd.)							**Former Type III Landfill**	
aluminum	10000	4700	11000	5600	3000	4400	7400	6500
antimony	ND (20 U)	ND (9.5 U)	ND (17 U)	ND (6.1 U)	ND (9.4 U)	ND (11 U)	ND (13 UJ)	ND (9.1 UJ)
arsenic	0.80 B	1.9 BJ	1.3 B	3.6 J	0.51 B	24 J	4.5	2.2
barium	17 B	22 B	21 B	29	13 B	51	180	41
beryllium	ND (0.36 U)	0.21 B	ND (0.30 U)	0.18 B	ND (0.17 U)	0.22 B	ND (0.23 U)	0.24 B
cadmium	ND (1.1 U)	ND (0.53 U)	ND (0.93 U)	ND (0.34 U)	ND (0.53 U)	ND (0.63 U)	ND (0.73 U)	ND (0.51 U)
calcium	2500	59000	23000	66000	29000	120000	48000	1300
chromium	9.6	9.9	12	12	6.2	15	37	9.5 J
cobalt	ND (2.2 U)	3.3 B	ND (1.8 U)	4.1 B	ND (1.0 U)	2.4 B	3.6 B	3.9 B
copper	28	7.5	54	15	18	9.1	31	4.1 B
iron	1600	8900	2000	12000	1700	16000	9000	8500
lead	12	3.5	19	7.1	4.9	31	150 J	R
magnesium	580 B	23000	730 B	35000	2400	65000	17000	1500
manganese	11	240	39	380	40	620	190 J	200 J
mercury	ND (0.10 U)	ND (0.050 U)	ND (0.070 U)	ND (0.050 U)	ND (0.060 U)	0.080 B	0.75	0.070 B
nickel	ND (3.0 U)	9.2	3.3 B	9.7	2.6 B	6.6 B	8.3 B	6.6 B
potassium	ND (300 U)	1100	ND (250 U)	630	170 B	700 B	430 B	300 B
selenium	ND (0.75 U)	ND (0.30 UJN)	ND (0.41 U)	0.48 BJ	0.29 B	0.38 BJ	ND (0.21 UJ)	0.22 BJ
silver	ND (2.2 U)	ND (1.0 U)	ND (1.8 U)	ND (0.67 U)	ND (1.0 U)	ND (1.2 U)	ND (1.4 U)	ND (1.0 U)
sodium	ND (380 U)	ND (180 U)	ND (310 U)	ND (120 U)	ND (180 U)	ND (210 U)	ND (250 U)	ND (170 U)
thallium	ND (1.3 U)	ND (0.52 UJW)	ND (0.70 U)	ND (0.38 UJ)	ND (0.47 U)	ND (0.47 U)	ND (0.37 U)	ND (0.37 U)
vanadium	15 B	13	13 B	16	4.9 B	22	17	15
zinc	57	19	160	36	31	21	74	18
cyanide	ND (0.21 U)	0.22 B	ND (0.13 U)	ND (0.090 U)	ND (0.090 U)	0.65	1.8	0.070 B

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TABLE 3-24

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	WA-1 12.00-13.00 A60062	WA-1 13.00-14.00 A60063	WA-2 12.00-14.00 A60675	WA-2 14.00-18.00 A60676	WA-3 14.00-16.00 A60668	WA-3 16.00-18.00 A60669	WA-4 8.00-10.00 A60662	WA-4 10.00-12.00 A60663
Western Disposal Area								
aluminum	8900	2100	12000	1900	12000	2300	9800	1200
antimony	ND (15 U)	ND (5.3 U)	14	6.5 BJ	ND (21 U)	ND (8.1 UJ)	ND (18 U)	ND (8.2 UJ)
arsenic	2.7 B	2.3 J	2.3 B	2.0	1.3 B	7.5	1.7 B	2.3
barium	13 B	13 B	12 B	7.9 BJ	ND (16 U)	8.3 BJ	ND (14 U)	ND (6.4 U)
beryllium	ND (0.28 U)	0.12 B	ND (0.18 U)	0.12 B	ND (0.37 U)	0.15 B	ND (0.32 U)	ND (0.15 U)
cadmium	ND (0.86 U)	0.61	ND (0.56 U)	ND (0.36 U)	ND (1.1 U)	ND (0.45 U)	1.4 BJ	0.58 B
calcium	3000	79000	10000	67000	920 B	75000	920 B	27000
chromium	8.7	6.2	19	4.9	14	7.9	13	4.7
cobalt	ND (1.7 U)	1.9 B	1.8 B	2.7 B	ND (2.3 U)	2.2 B	2.1 B	1.1 B
copper	59	5.3	28 J	7.1 J	48 J	5.6 J	50 J	3.6 BJ
iron	1700	5500	7700	7900	4200	7100	3600	4300
lead	18	3.1	12	3.2	12	5.9	7.8	2.6
magnesium	700 B	29000	2300	21000	ND (310 U)	29000	ND (270 U)	6000
manganese	33	180	41	350 J	11	220 J	12	70 J
mercury	1.3	0.19	ND (0.060 UJ)	ND (0.040 U)	ND (0.12 UJ)	ND (0.040 U)	ND (0.090 UJ)	ND (0.040 U)
nickel	ND (2.3 U)	5.2	5.4 B	6.2	ND (3.1 U)	5.7 B	ND (2.7 U)	4.2 B
potassium	250 B	310 B	ND (150 U)	300 B	ND (300 U)	300 B	ND (270 U)	150 B
selenium	ND (0.73 U)	0.19 BJ	ND (0.56 U)	ND (0.19 U)	ND (0.54 U)	ND (0.16 UJ)	ND (0.60 U)	ND (0.19 U)
silver	ND (1.7 U)	ND (0.59 U)	ND (1.1 U)	ND (0.70 U)	ND (2.3 U)	ND (0.89 U)	ND (2.0 U)	ND (0.90 U)
sodium	ND (290 U)	ND (100 U)	210 B	130 B	ND (390 U)	ND (150 U)	ND (340 U)	ND (160 U)
thallium	ND (1.3 U)	ND (0.33 UJ)	ND (0.98 U)	ND (0.49 UJ)	ND (0.94 U)	ND (0.41 UJ)	ND (1.0 U)	ND (0.50 U)
vanadium	11 B	8.1	12	10	13 B	9.1	11 B	5.4 B
zinc	180	12	49	R	110	R	140	R
cyanide	ND (0.22 U)	ND (0.060 U)	ND (0.10 U)	ND (0.060 U)	ND (0.13 U)	0.10 B	ND (0.20 U)	ND (0.080 U)

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	WA-5	WA-5	WA-6	WA-6	WA-7	WA-7	WA-8	WA-8
Depth (ft)	22.00-23.50	23.50-26.00	12.00-13.00	13.00-15.00	20.00-22.00	22.00-24.00	10.00-12.00	12.00-14.00
Sample ID	A60650	A60651	A60085	A60086	A60643	A60644	A60657	A60658
Western Disposal Area (Cont'd.)								
aluminum	13000	980	11000	10000	16000	3300	6600	2900
antimony	ND (12 U)	ND (5.6 UJ)	ND (17 U)	ND (6.9 UJ)	ND (16 U)	14 J	11	ND (10 UJ)
arsenic	1.8 B	1.1 B	1.8 B	4.4	2.2 B	15	5.9	5.5
barium	28 B	ND (4.3 U)	170	66 J	47 B	57 J	130	23 BJ
beryllium	ND (0.21 U)	ND (0.10 U)	ND (0.30 U)	0.44 B	ND (0.28 U)	0.29 B	1.2	0.41 B
cadmium	ND (0.66 U)	ND (0.31 U)	1.7 J	ND (0.38 U)	ND (0.87 U)	ND (0.55 U)	ND (0.49 U)	ND (0.57 U)
calcium	5900	39000	15000	32000	3600	32000	11000	75000
chromium	17	3.2	55	16	17	7.6	25	8.3
cobalt	ND (1.3 U)	0.93 B	8.4 B	6.8 B	2.6 B	3.8 B	5.8 B	2.2 B
copper	47 J	2.2 BJ	62 J	12 J	50 J	11 J	41 J	15 J
iron	4900	3700	8600	11000	7600	12000	4600	58000
lead	9.8	1.4	120	5.8	17	17	35	5.0
magnesium	740 B	9200	5000	12000	390 B	10000	1500	28000
manganese	25	76 J	370	400 J	32	240 J	76	500 J
mercury	ND (0.10 UJ)	ND (0.040 UN)	0.38 J	ND (0.050 U)	ND (0.13 UJ)	ND (0.040 U)	0.14 BJ	ND (0.050 U)
nickel	4.9 B	3.4 B	17	15	3.3 B	9.4	12	10
potassium	ND (180 U)	150 B	ND (250 U)	1100	ND (230 U)	400 B	150 B	420 B
selenium	ND (0.50 U)	ND (0.11 U)	ND (0.44 U)	0.29 BJ	ND (0.49 UJ)	1.1	ND (0.42 U)	ND (0.13 UJ)
silver	ND (1.3 U)	ND (0.61 U)	ND (1.8 U)	ND (0.76 U)	ND (1.7 U)	ND (1.1 U)	ND (0.95 U)	ND (1.1 U)
sodium	ND (220 U)	ND (100 U)	560 B	350 B	ND (290 U)	ND (190 U)	220 B	220 B
thallium	ND (0.87 U)	ND (0.29 U)	ND (0.76 U)	ND (0.55 UJ)	ND (0.84 U)	ND (0.52 U)	ND (0.73 U)	ND (0.35 UJ)
vanadium	19	4.2 B	16 B	29	14 B	13	16	39
zinc	79	R	270	R	100	R	180	R
cyanide	0.29 B	0.080 B	2.1	ND (0.10 U)	0.36 B	0.42 B	0.68 B	ND (0.070 U)

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	B-7B	B-7B	MW-8A	MW-8A	MW-120B	MW-120B	MA-1	MA-1
Depth (ft)	8.00-10.00	10.00-12.00	12.00-12.50	12.50-14.00	18.00-19.00	19.00-20.00	0.00-1.50	3.00-4.50
Sample ID	A60702	A60703	A60092	A60093	A60054	A60055	A60065	A60066
Western Disposal Area (Cont'd.)							**Pilot Study Area**	
aluminum	940	1100	11000	9100	13000	4000	2000	6000
antimony	ND (10 UJ)	ND (8.2 UJ)	15 B	ND (13 UJ)	ND (13 U)	ND (8.7 U)	ND (9.1 U)	ND (8.3 U)
arsenic	2.6	2.8	1.7 B	1.8 B	1.8 B	6.5 J	3.5	65
barium	ND (7.7 U)	6.9 B	94	100 J	100	66	15 B	1000
beryllium	ND (0.18 U)	ND (0.15 U)	0.28 B	0.54 B	ND (0.23 U)	0.62 B	0.18 B	6.7
cadmium	ND (0.56 U)	ND (0.46 U)	2.0 J	ND (0.74 U)	ND (0.71 U)	ND (0.49 U)	ND (0.51 U)	ND (0.46 U)
calcium	3100	900	4200	13000	15000	7400	28000	7400
chromium	2.8 J	4.0 J	27	16	31	9.6	5.7	8.6
cobalt	1.3 B	2.2 B	7.1 B	4.8 B	6.4 B	3.2 B	2.5 B	7.5 B
copper	3.1 B	3.7 B	55 J	13 J	48	17	6.8	32
iron	3200	4900	3500	10000	5100	8200	7100	6600
lead	R	R	57	11	62	35	14	7.8
magnesium	1400	500 B	2100	5800	4000	1700	6800	1400
manganese	78 J	89 J	43	65 J	64	150	180	51
mercury	ND (0.050 U)	ND (0.060 U)	0.17 J	0.11 BJ	0.24	0.23	ND (0.040 U)	0.060 B
nickel	2.8 B	3.7 B	9.0 B	13	17	7.6	5.4 B	12
potassium	220 B	ND (120 U)	ND (200 U)	640 B	270 B	360 B	230 B	760 B
selenium	ND (0.22 U)	ND (0.24 U)	ND (0.43 U)	1.2 B	0.40 B	1.1 BJ	ND (0.17 U)	0.81 B
silver	ND (1.1 U)	ND (0.90 U)	ND (1.5 U)	ND (1.4 U)	ND (1.4 U)	ND (0.96 U)	ND (1.0 U)	ND (0.91 U)
sodium	ND (190 U)	ND (160 U)	ND (260 U)	360 B	ND (240 U)	ND (170 U)	ND (170 U)	330 B
thallium	ND (0.38 U)	ND (0.41 U)	ND (0.74 U)	ND (0.65 U)	ND (0.50 U)	ND (0.62 U)	ND (0.45 U)	0.77 B
vanadium	3.7 B	6.3 B	15	33	12 B	13	7.2 B	32
zinc	8.3	13	270	R	190	60	20	13
cyanide	ND (0.080 U)	ND (0.10 U)	1.7	ND (0.12 U)	1.2	ND (0.090 U)	ND (0.070 U)	0.53 B

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location	MA-2	MA-2	MA-3	MA-3	MA-4[2]	MA-4	MA-5	MA-5
Depth (ft)	0.00-1.50	3.00-4.50	0.00-1.50	3.00-4.50	0.00-1.50	3.00-4.50	0.00-1.50	3.00-4.50
Sample ID	A60067	A60068	A60069	A60070	A60071	A60072	A60073	A60074
Pilot Study Area (Cont'd.)								
aluminum	11000	12000	13000	1300	3800	5000	10000	19000
antimony	ND (39 U)	ND (26 U)	ND (13 U)	ND (19 U)	ND (9.9 U)	ND (8.4 U)	ND (15 U)	ND (27 U)
arsenic	13	14	6.3	11	7.9	9.5	17	13
barium	560	220	300	330	90	150	280	400
beryllium	ND (0.70 U)	0.53 B	0.69 B	0.69 B	1.8	1.7	0.75 B	0.79 B
cadmium	ND (2.2 U)	3.8	0.97 B	1.8 B	ND (0.56 U)	ND (0.47 U)	2.4	3.2
calcium	49000	21000	41000	63000	3400	12000	54000	20000
chromium	94	100	21	31	5.9	22	56	130
cobalt	10 B	7.4 B	7.4 B	6.8 B	5.0 B	5.9 B	6.2 B	8.9 B
copper	81	140	24	53	17	150	58	160
iron	66000	10000	17000	14000	4000	13000	22000	13000
lead	440	710	63	170	10	66	280	930
magnesium	2100 B	3200	5600	3400	450 B	4000	6100	3500
manganese	310	130	700	280	31	96	370	290
mercury	2.1	6.6	0.84	3.1	ND (0.060 U)	0.35	1.6	2.1
nickel	19 B	9.4 B	14	11 B	9.9	24	12 B	14 B
potassium	ND (580 U)	1100 B	830 B	700 B	400 B	420 B	630 B	1100 B
selenium	0.73 B	1.1 B	0.41 B	1.1 B	0.86 B	1.8	0.78 B	0.98 B
silver	ND (4.3 U)	ND (2.8 U)	ND (1.5 U)	ND (2.0 U)	ND (1.1 U)	1.5 B	ND (1.6 U)	ND (3.0 U)
sodium	ND (730 U)	ND (480 U)	ND (250 U)	ND (350 U)	ND (190 U)	180 B	ND (280 U)	ND (510 U)
thallium	ND (1.6 U)	ND (1.6 U)	ND (0.54 U)	ND (0.76 U)	ND (0.58 U)	ND (0.54 U)	ND (0.73 U)	ND (1.1 U)
vanadium	25 B	14 B	28	22	21	19	22	22 B
zinc	480	270	120	140	31	130	410	390
cyanide	0.51 B	1.0 B	ND (0.13 U)	0.38 B	ND (0.12 U)	0.17 B	0.90 B	1.0 B

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TABLE 3-24

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Location Depth (ft) Sample ID	MA-5 (Dup) 3.00-4.50 A60075	BMP-2[2] 0.00-1.00 A60621	BMP-2 3.00-4.00 A60624	BMP-12 0.00-1.00 A60616	BMP-12 3.00-4.00 A60619
Pilot Study Area (Cont'd.)		**Former Byrant Mill Pond**			
aluminum	19000	11000	11000	17000	5500
antimony	ND (31 U)	ND (17 U)	ND (13 U)	ND (23 U)	ND (32 U)
arsenic	13	12 J	9.5	26 J	11 J
barium	310	120	850	180	110 B
beryllium	0.67 B	0.40 B	0.37 B	0.56 B	ND (0.58 U)
cadmium	3.5	3.6	3.7	6.9	17
calcium	26000	3000	27000	19000	8300
chromium	150	120	210	62	98
cobalt	10 B	3.5 B	11 B	7.1 B	ND (3.5 U)
copper	190	140	280	130	130
iron	14000	5600	8800	24000	8600
lead	1100	1200	1400	340	610
magnesium	3900	1100 B	2300	6400	2200 B
manganese	290	51	170	600	180
mercury	0.25 B	ND (0.080 U)	2.6	ND (0.10 U)	4.5
nickel	14 B	5.3 B	11	18 B	6.0 B
potassium	474 B	280 B	280 B	630 B	ND (460 U)
selenium	0.91 B	0.83 BJ	1.6 B	1.4 BJ	1.4 BJ
silver	ND (3.4 U)	ND (1.8 U)	2.1 B	ND (2.5 U)	ND (3.5 U)
sodium	ND (580 U)	ND (310 U)	ND (250 U)	ND (430 U)	ND (610 U)
thallium	ND (0.96 U)	ND (0.89 U)	ND (1.1 U)	ND (1.3 U)	ND (1.5 U)
vanadium	23 B	19	16	28	11 B
zinc	400	260	470	540	840
cyanide	1.4 B	0.70 B	6.1	ND (0.18 U)	1.2 B

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TABLE 3-24

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED TAL
RESULTS FOR RESIDUALS/SOIL SAMPLES[1] (mg/kg)

Notes:
[1] Showing only the results for analytes detected.
[2] MS/MSD of this sample was analyzed.
ND Not Detected.

Notes Explaining Data Qualifiers:

B - The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).
J - The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
R - The sample results are rejected.
U - The analyte was analyzed for but not detected. The associated value is the analyte CRDL.
UJ - The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

TABLE 3-25

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TAL ANALYTES
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
Monarch HRDL[1]		
aluminum	430-13,000	4,500-8,900
antimony	ND-25	ND
arsenic	1.5-44	1.3-3.2
barium	31-610	25-550
beryllium	ND-0.95	ND-0.17
cadmium	ND	ND-1.3
calcium	14,000-140,000	860-30,000
chromium	4.1-46	7.4-100
cobalt	ND-6.9	ND-4.0
copper	3.4-77	25-77
cyanide	ND-1.8	ND-15
iron	5,300-27,000	1,000-5,100
lead	0.33-120	15-550
magnesium	1,700-9,800	390-5,500
manganese	65-360	23-200
mercury	ND-3.3	0.06-2.0
nickel	2.2-14	3.7-9.1
potassium	ND-560	ND-420
selenium	ND-0.95	ND-0.43
sodium	ND	ND-760
vanadium	4.0-28	4.9-10
zinc	5.7-180	96-450
Former Bryant Mill Pond[2,3]		
aluminum	5,500-17,000	11,000
arsenic	11-26	9.5
barium	110-180	850
beryllium	ND-0.56	0.37
cadmium	3.6-17	3.7
calcium	3,000-19,000	27,000
chromium	62-120	210
cobalt	ND-7.1	11
copper	130-140	280
cyanide	ND-1.2	6.1
iron	5,600-24,000	8,800
lead	340-1,200	1,400
magnesium	1,100-6,400	2,300
manganese	51-600	170
mercury	ND-4.5	2.6
nickel	5.3-18	11
potassium	ND-630	280
selenium	0.83-1.4	1.6
silver	ND	2.1
vanadium	11-28	16
zinc	260-840	470
Bryant HRDL[3]		
aluminum	5,000-8,700	7,100-15,000
antimony	ND-7.7	ND
arsenic	1.5-5.6	0.85-3.2
barium	61-390	120-240
beryllium	0.18-0.46	ND

See Notes on Page 4

TABLE 3-25

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TAL ANALYTES
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
Bryant HRDL[3] (Cont'd.)		
cadmium	ND-0.91	ND
calcium	2,400-7,100	7,400-11,000
chromium	8.4-25	57-150
cobalt	1.2-5.7	2.6-9.2
copper	1.8-24	50-88
cyanide	ND-0.16	1.1-82
iron	7,700-21,000	820-2,600
lead	4.0-22	300-810
magnesium	1,600-2,800	900-2,000
manganese	45-3,200	16-53
mercury	ND-0.070	1.0-4.8
nickel	3.1-18	ND-4.4
potassium	290-910	ND-400
selenium	ND-0.35	ND
sodium	ND-270	ND-1,200
vanadium	11-28	11-19
zinc	17	250-550
FRDLs[4]		
aluminum	2,000-5,600	3,000-15,000
arsenic	0.7-24	0.5-1.3
barium	11-51	13-44
beryllium	ND-0.22	ND
calcium	20,000-120,000	2,500-29,000
chromium	4.8-15	6.2-14
cobalt	1.6-4.1	ND
copper	5.4-15	18-95
cyanide	ND-0.70	ND
iron	3,100-16,000	1,600-2,400
lead	2.5-31	4.9-19
magnesium	11,000-65,000	560-2,400
manganese	84-620	8.8-40
mercury	ND-0.080	ND
nickel	4.1-9.7	ND-5.0
potassium	340-1,100	ND-170
selenium	ND-0.48	ND-0.29
vanadium	6.2-22	4.9-19
zinc	14-36	31-220
Former Type III Landfill[5]		
aluminum	6,500	7,400
arsenic	2.2	4.5
barium	41	180
beryllium	0.24	ND

See Notes on Page 4

TABLE 5-25

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TAL ANALYTES
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
Former Type III Landfill[5] (Cont'd.)		
calcium	1,300	48,000
chromium	9.5	37
cobalt	3.9	3.6
copper	4.1	31
cyanide	0.070	1.8
iron	8,500	9,000
lead	R	150
mangesium	1,500	17,000
manganese	200	190
mercury	0.070	0.75
nickel	6.6	8.3
potassium	300	430
selenium	0.22	ND
vanadium	15	17
zinc	18	74
Western Disposal Area[6]		
aluminum	940-10,000	6,600-16,000
antimony	ND-14	ND-15
arsenic	1.1-15	1.3-5.9
barium	ND-100	ND-170
beryllium	ND-0.62	ND-1.2
cadmium	ND-0.61	ND-2.0
calcium	900-79,000	920-15,000
chromium	2.8-16	8.7-55
cobalt	0.93-6.8	ND-8.4
copper	2.2-17	28-62
cyanide	ND-0.42	ND-2.1
iron	3,200-58,000	1,700-8,600
lead	1.4-35	7.8-120
magnesium	510-29,000	ND-5,000
manganese	65-500	11-370
mercury	ND-0.23	ND-1.3
nickel	2.8-15	ND-17
potassium	ND-1,100	ND-270
selenium	ND-1.2	ND-0.4
sodium	ND-360	ND-560
vanadium	3.7-39	11-19
zinc	8.3-60	49-270
Pilot Study Area[7,8]		
aluminum	1,300-19,000	NA
arsenic	3.5-65	NA
barium	15-1,000	NA
beryllium	ND-6.7	NA
cadmium	ND-3.8	NA
calcium	3,400-63,000	NA
chromium	5.7-140	NA

See Notes on Page 4

TABLE 3-25

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS FOR TAL ANALYTES
IN NATIVE SOIL AND RESIDUALS

Analyte	Range of Concentrations (mg/kg)	
	Native Soil	Residuals
Pilot Study Area[7,8] (Cont'd.)		
cobalt	2.5-10	NA
copper	6.8-180	NA
cyanide	ND-1.2	NA
iron	4,000-66,000	NA
lead	7.8-1,000	NA
magnesium	450-6,800	NA
manganese	31-700	NA
mercury	ND-6.6	NA
nickel	5.4-24	NA
potassium	ND-1,100	NA
selenium	ND-1.8	NA
silver	ND-1.5	NA
sodium	ND-330	NA
thallium	ND-0.77	NA
vanadium	7.2-32	NA
zinc	13-480	NA

Notes:

[1] Includes the results of samples from MLSS-1 through MLSS-5, MW-125B, and MW-126A.
[2] Includes the results of samples from BMP-2 and BMP-12.
[3] Includes the results of samples from BHDL-22, BHDL-123, and MW-121B.
[4] Includes the results of samples from DLHB-1 through DLHB-3.
[5] Includes the results of samples from FLF-1.
[6] Includes the results of samples from WA-1 through WA-8, B-7B, MW-8A, and MW-120B.
[7] Includes the results of samples from MA-1 through MA-5.
[8] Native soils also include surficial soil samples.
NA - Not applicable.
ND - Not detected.
R - Sample results are rejected.

TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-11 A66008	MW-12 A66064	MW-12R A66028	MW-22A A66017	MW-22B A66018	MW-23 A66034	MW-24 A66009
Bryant HRDL							
TAL Parameters (ug/L) [3]							
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	ND(1.2 U)	15	34 J	6.6 B	3.0 B	ND(0.99 U)	24
barium	67 B	280	220	400	100 B	210	500
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	4.5BJ	ND(3.3 U)	ND (3.3 U)	4.0 BJ
calcium	71000	160000	140000	220000	120000	120000	130000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND (2.5 U)	ND(2.5 U)
cobalt	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND (4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	7.3 B	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND (3.7 U)	ND(3.7 U)
iron	340	14000	8000	12000	2300	6300	26000
lead	1.1 B	ND(0.79 UJ)	1.0 BJ	ND(0.80 U)	ND(0.80 U)	0.98 BJ	0.90 B
magnesium	33000	50000	62000	20000	34000	38000	53000
manganese	55	130	75	1100	170	130	250
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND (0.070 U)	ND(0.070 U)
nickel	11 B	15 B	7.0 B	7.5 B	18 B	5.2 B	ND(4.1 U)
potassium	1700 B	3100 B	3000 B	3800 B	1300 B	1300 B	1500 B
selenium	ND(0.79 U)	2.8 BJ	1.1 BJ	ND(0.80 UJ)	ND(0.80 UJ)	ND (0.79 UJ)	ND(0.80 UJ)
sodium	22000	25000	69000	14000	11000	25000	34000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND (3.3 U)	ND(3.3 U)
zinc	220	1500	33	170	19 B	680	920
General Parameters (mg/L)							
bicarbonate	280	600	670	610	320	420	560
chloride	78	44	49	12	97	37	78
COD	5.2	18	28	21	<5	26	22
nitrate	<0.010 J	0.040	2.5J	0.48J	15J	0.060J	<0.010J
sulfate	59	11	10	73	67	16	8.0
TOC	1.0	8.2	9.8	12	0.70	4.0	5.9
TSS	13	29	39	26	44	35	48

See Notes on Page 10

TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-25 A66027	MW-26[2] A66015	MW-121A A66013	MW-121B A66014	MW-123A A66025	MW-123B A66026	RIVULET2 A66007
Bryant HRDL (Cont'd.)							
TAL Parameters (ug/L) [3]							
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	38	2.2 B	130	20	36	2.4 B	1.7 B
barium	133 B	89 B	360	220	170 B	140 B	96 B
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
calcium	120000	120000	150000	150000	120000	110000	120000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)
cobalt	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	7000	1300	33000	29000	21000	1700	1500
lead	ND(0.79 UJ)	ND(0.79 U)	ND(0.80 UJ)	ND(0.80 U)	ND(0.80 U)	ND(0.80 U)	ND(0.79 U)
magnesium	51000	31000	66000	59000	14000	31000	32000
manganese	52	220	340	340	1000	120	300
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	R
nickel	53	ND(4.1 U)	ND(4.1 U)	130	13 B	4.7 B	ND(4.1 U)
potassium	12000	ND(730 U)	1400B	3500 B	3700 B	1100 B	ND(730 U)
selenium	ND(0.79 UJ)	ND(0.79 UJ)	ND(0.80 UJ)	ND(0.80 U)	ND(0.80 U)	ND(0.80 U)	ND(0.79 UJ)
sodium	33000	22000	66000	21000 J	16000	5000 J	23000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
zinc	3300	270	31	7.5 B	78	29	4.2 B
General Parameters (mg/L)							
bicarbonate	600	310	680	540	380	300	320
chloride	25	82	70	47	14	34	82
COD	42	<5.0	77	170	44	7	5.2
nitrate	1.3J	0.010J	2.2J	<0.010J	0.35J	0.39J	<0.010J
sulfate	7.7	91	11	5.8	5.7	65	74
TOC	13	0.80	NA	200	15	0.80	0.70
TSS	46	6.5	44	69	49	6.2	5.0

See Notes on Page 10

TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-124A A66003	MW-124B A66004	MW-125P A66016	MW-125A A66005	MW-125B A66006	MW-126A A66010	MW-126B A66011
Monarch HRDL							
TAL Parameters (ug/L) [2]							
aluminum	ND(45 U)	ND(45 U)	1100	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	ND(1.2 U)	ND(1.2 U)	26	ND(1.2 U)	4.8 B	ND(1.2 U)	1.2 B
barium	67 B	80 B	230	270	100 B	930	190 B
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.3 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	3.6 BJ	ND(3.3 U)	R	ND(3.3 U)
calcium	150000	140000	130000	160000	130000	280000	140000
chromium	ND(2.5 U)	ND(2.5 U)	7.1 B	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)
cobalt	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	64 B	200	86000	640	1700	25000	2600
lead	1.7 BJ	ND(0.80 UJ)	ND(0.80 U)	ND(0.79 UJ)	1.0 BJ	ND(0.80 U)	ND(0.80 U)
magnesium	35000	42000	17000	39000	36000	45000	37000
manganese	46	300	1900	470	300	1700	220
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)
nickel	120	23 B	20 B	ND(4.1 U)	ND(4.1 U)	ND(4.1 U)	ND(4.1 U)
potassium	3300 B	8700	2600 B	2600 B	1400 B	5200	3800B
selenium	2.3 BJ	1.2 BJ	ND(0.80 U)	ND(0.79 UJ)	ND(0.80 UJ)	ND(0.80 UJ)	ND(0.80 UJ)
sodium	76000	130000	24000	59000	51000	48000	34000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
zinc	180	7.7 B	ND(3.1 U)	3.4 B	17 B	110	ND(3.1 U)
General Parameters (mg/L)							
bicarbonate	390	400	380	480	350	820	370
chloride	170	210	13	140	141	93	110
COD	12	<5.0	930	8.3	<5.0	240	8.4
nitrate	9.0J	2.5J	2.6J	0.020J	0.14J	0.90J	<0.010J
sulfate	70	160	3.4	54	85	8.9	59
TOC	1.2	1.3	400	2.2	2.3	170	6.2
TSS	6.4	28	32	2.1	1.9	46	6.1

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TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-126B (Dup) A66012	MW-122A A66033	MW-122A (Dup) A66038	MW-122B A66039	MW-1[2] A66032	MW-3 A66054	MW-5 A66046
Monarch HRDL (Cont'd.)		**FRDLs**			**Former Type III Landfill**		
TAL Parameters (ug/L)[3]							
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	1.7 B	30 J	25	79	60 J	83	20
barium	200 B	100 B	100 B	200	210	190 B	250
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	4.8 BJ	ND (3.3 U)	ND(3.3 U)	ND(3.3 U)	ND (3.3 U)	ND(3.3 U)	ND(3.3 U)
calcium	140000	110000	100000	100000	140000	150000	180000
chromium	ND(2.5 U)	ND (2.5 U)	ND(2.5 U)	ND(2.5 U)	2.8 B	ND(2.5 U)	3.4 B
cobalt	ND(4.9 U)	ND (4.9 U)	ND(4.9 U)	ND(4.9 U)	5.6 B	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND (3.7 U)	ND(3.7 U)	ND(3.7 U)	ND (3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	2600	8200	7800	11000	13000	23000	21000
lead	ND(0.80 U)	ND (0.80 U)	ND(0.80 U)	ND(0.80 U)	ND (0.80 UJ)	ND(0.60 U)	0.95 B
magnesium	38000	13000	13000	45000	36000	47000	56000
manganese	220	810	780	230	250	91	1000
mercury	ND(0.070 U)	ND (0.070 U)	ND(0.070 U)	ND(0.070 U)	ND (0.070 U)	ND(0.070 U)	ND(0.070 U)
nickel	ND(4.1 U)	4.3 B	ND(4.1 U)	14 B	6.9 B	5.7 B	7.9 B
potassium	3500B	3700 B	3500 B	3500 B	2100 B	5100	4700 B
selenium	0.95 BJ	ND (0.80 UJ)	ND(0.80 UJ)	ND(0.80 U)	1.2 BJ	ND(1.1 UJ)	ND(1.1 UJ)
sodium	34000	11000	10000	31000	24000	44000	50000
vanadium	ND(3.3 U)	ND (3.3 U)	ND(3.3 U)	ND(3.3 U)	ND (3.3 U)	ND(3.3 U)	ND(3.3 U)
zinc	ND(3.1 U)	9.2 B	13 B	25 J	910	510	110
General Parameters (mg/L)							
bicarbonate	390	320	310	480	480	600	710
chloride	120	8.6	9.3	190	41	36	47
COD	13	23	32	31	11	34	28
nitrate	2.1J	0.070J	0.68J	0.12J	0.050J	0.090	0.020J
sulfate	66	9.4	8.7	6.0	25	8.0	6
TOC	5.8	9.2	9.0	12	3.1	12	11
TSS	7.1	19	18	28	27	48	38

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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-15 A66055	MW-16B[2] A66059	MW-16C A66058	MW-17A A66056	MW-17B A66057	MW-19BR A66030	MW-19BR (Dup) A66031
Former Type III Landfill (Cont'd.)							
TAL Parameters (ug/L)[3]							
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	60	69	1.4 B	160	140	46 J	47 J
barium	260	460	100 B	280	280	200 B	190 B
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND (3.3 U)	ND (3.3 U)
calcium	200000	110000	71000	180000	180000	170000	170000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	3.0 B	ND (2.5 U)
cobalt	7.3 B	ND(4.9 U)	ND(4.9 U)	14 B	8.2 B	5.2 B	ND (4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND (3.7 U)	ND (3.7 U)
iron	30000	11000	280	27000	29000	22000	21000
lead	ND(0.60 U)	ND(0.60 U)	ND(0.60 U)	ND(0.60 U)	ND(0.60 U)	0.85 B	ND (0.80 U)
magnesium	59000	36000	27000	53000	49000	47000	46000
manganese	90	53	52	78	200	420	420
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	0.090 B	ND(0.070 U)	ND (0.070 U)	ND (0.070 U)
nickel	12 B	4.6 B	ND(4.1 U)	31 B	13 B	14 B	12 B
potassium	7000	3500 B	ND(730 U)	8300	6700	4300 B	4800 B
selenium	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	1.7 BJ	1.2 B
sodium	58000	32000	9200	56000	49000	55000	55000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND (3.3 U)	ND (3.3 U)
zinc	100	940	950	2400	1900	R	29 J
General Parameters (mg/L)							
bicarbonate	820	460	240	730	700	660	660
chloride	42	27	24	52	47	43	40
COD	50	22	6	50	28	28	27
nitrate	0.12	0.060J	0.060	0.090	0.090	<0.010J	0.050J
sulfate	7	18	37	6.0	6.0	10	9.9
TOC	20	8.8	1.0	18	13	8.5	8.7
TSS	66	20	5.9	59	51	35	36

See Notes on Page 10

TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location	MW-19C	MW-19D	MW-112	MW-127A	MW-7	MW-7B
Sample ID	A66040	A66041	A66045	A66044	A66001	A66000
Former Type III Landfill					**Western Disposal Area**	
TAL Parameters (ug/L)[3]						
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	48 J	37	46	15	1.6 B	2.3B
barium	130 B	110 B	200 B	590	75 B	54 B
beryllium	ND(0.30 U)	0.32 B	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
calcium	140000	130000	160000	210000	93000	26000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)
cobalt	5.9 B	ND(4.9 U)	7.8 B	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	17000	7100	23000	36000	76 B	32 B
lead	ND(0.80 UJ)	2.5 B	ND(0.59 U)	ND(0.60 UJ)	ND(0.80 U)	ND(0.80 U)
magnesium	49000	51000	53000	72000	30000	13000
manganese	210	180	580	1600	38	44
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)
nickel	9.0 B	5.0 B	12 B	17 B	ND(4.1 U)	ND(4.1 U)
potassium	3200 B	ND(730 U)	3600 B	830 B	ND(720 U)	24000
selenium	1.5 BJ	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	1.0 BJ	ND(0.80 UJ)
sodium	31000	45000	43000	140000	35000	50000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
zinc	2300	2100	2800	3.5 B	680	6.5 B
General Parameters (mg/L)						
bicarbonate	560	540	630	880	300	170
chloride	38	52	39	95	110	95
COD	25	10	21	41	<5.0	8.3
nitrate	0.060J	0.030J	0.080J	0.010J	0.34J	<0.010J
sulfate	8.3	12	8.0	49	48	43
TOC	9.3	4.5	7.9	15	0.60	1.2
TSS	34	17	37	73	0.80	3 8

See Notes on Page 10

TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-8 A66053	MW-8A A66052	MW-20 A66049	MW-20 (Dup) A66050	MW-20B A66051	MW-21 A66002	MW-120A A66020
Western Disposal Area (Cont'd.)							
TAL Parameters (ug/L)[3]							
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	56 B
arsenic	ND(1.2 U)	4.8 B	25	28	27	2.3 B	7.3 B
barium	56 B	160 B	540	480	230	92 B	660
beryllium	ND(0.30 U)	ND(0.30 U)	0.32 B	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3U)	ND(3.3 U)
calcium	80000	130000	110000	99000	110000	92000	300000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	6.8 B
cobalt	ND(4.9 U)	8.1 B	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	76 B	22000	7900	7800	5500	820	40000
lead	1.6 B	ND(0.6 U)	ND(0.59 U)	ND(0.60 U)	1.6 B	ND(0.80 U)	ND(0.80 U)
magnesium	30000	49000	32000	29000	33000	29000	53000
manganese	74	1500	240	220	160	430	670
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)
nickel	ND(4.1 U)	9.4 B	ND(4.1 U)	4.2 B	30 B	ND(4.1 U)	7.8 B
potassium	2000 B	2800 B	2500 B	2000 B	1700 B	1300 B	7200
selenium	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	ND(1.1 UJ)	1.4 BJ	3.8 BJ
sodium	31000	49000	48000	44000	39000	27000	20000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	7.3 B
zinc	360	24	830	560	18 B	59	40
General Parameters (mg/L)							
bicarbonate	240	460	340	340	320	280	1100
chloride	54	68	85	87	67	83	22
COD	6.0	34	5.0	<5.0	<5.0	6.2	67
nitrate	0.22J	0.060J	0.070J	0.070J	0.080J	<0.010J	<0.010J
sulfate	38	21	48	48	51	42	8.8
TOC	1.2	14	1.6	1.2	1.4	0.60	22
TSS	1.0	40	21	20	14	2.6	19

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TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-120B A66019	MW-120B (Dup) A66024	MW-2 A66060	MW-2S A66022	MW-2S (Dup) A66023	MW-18 A66061
Western Disposal Area (Cont'd.)			**Pilot Study Area**			
TAL Parameters (ug/L)[3]						
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	45 B	ND(45 U)	ND(45 U)
arsenic	59	62	40	2.2 BJ	2.4 BJ	1.9 B
barium	540	550	690	310	310	85 B
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
calcium	190000	190000	120000	130000	130000	90000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	2.6 B	ND(2.5 U)
cobalt	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	28000	29000	12000	15000	15000	750
lead	ND(0.79 U)	0.90 BJ	ND(0.79 U)	ND(0.79 U)	ND(0.80 U)	ND(0.80 U)
magnesium	58000	59000	33000	31000	31000	32000
manganese	240	240	500	190	190	35
mercury	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)	ND(0.070 U)
nickel	10 B	11 B	ND(4.1 U)	7.6 B	5.5 B	ND(4.1 U)
potassium	7500	8500	3400 B	3700 B	4100 B	860 B
selenium	ND(0.79 UJ)	2.0 BJ	1.9 BJ	1.1 B	1.3 BJ	1.4 B
sodium	29000	29000	33000	28000	28000	23000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
zinc	ND(3.1 U)	ND(3.1 U)	430	3.8 B	13 B	69
General Parameters (mg/L)						
bicarbonate	740	780	400	440	450	280
chloride	34	37	69	50	55	52
COD	36	45	6	8	15	5
nitrate	0.090J	0.030J	0.10	<0.010 J	<0.010 J	0.060
sulfate	7.8	7.0	26	12	6.0	47
TOC	18	19	2.4	6.5	6.6	0.70
TSS	R	R	26	31	32	1.9

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TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Location Sample ID	MW-104 A66037	MW-106 A66063	MW-108 A66047	MW-114 A66036	MW-128A A66035
Former Bryant Mill Pond					
TAL Parameters (ug/L) [3]					
aluminum	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)	ND(45 U)
arsenic	16	21	ND(1.2 U)	ND(0.99 U)	1.6 BJ
barium	310	190 B	110 B	120 B	100 B
beryllium	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)	ND(0.30 U)
cadmium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)
calcium	130000	94000	87000	100000	140000
chromium	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	ND(2.5 U)	3.5 B
cobalt	5.5 B	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)	ND(4.9 U)
copper	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)	ND(3.7 U)
iron	9200	4500	1200	130	420
lead	1.3 B	ND(0.80 U)	ND(0.60 U)	1.1 B	ND(0.80 UJ)
magnesium	2800	30000	29000	33000	25000
manganese	620	64	69	29	220
mercury	ND(0.070 U)	0.13 B	ND(0.070 U)	ND(0.070 U)	R
nickel	ND(4.1 U)	ND(4.1 U)	ND(4.1 U)	5.2 B	38 B
potassium	2800 B	770 B	800 B	1600 B	3100 B
selenium	ND(1.1 UJ)	1.5 BJ	ND(1.1 UJ)	ND(0.79 U)	1.6 BJ
sodium	37000	15000	23000	41000	66000
vanadium	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3 U)	ND(3.3U)
zinc	770	260	330	220	R
General Parameters (mg/L)					
bicarbonate	340	290	260	280	420
chloride	55	45	58	89	80
COD	<5.0	6.0	6.0	<5.0	7.0
nitrate	0.070	0.050	0.050	0.75J	0.17J
sulfate	140	37	54	47	55
TOC	2.2	1.3	0.80	0.80	1.9
TSS	22	13	3.4	0.80	1.5

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TABLE 3-26

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC. OPERABLE UNIT
SUMMARY OF DETECTED FILTERED TAL AND GENERAL GROUNDWATER QUALITY RESULTS
FOR GROUNDWATER/LEACHATE SAMPLES[1]

Notes:

[1] Showing only the results for analytes detected above quantitation limits.
[2] MS/MSD of this sample was analyzed.
[3] Samples were pumped through a 0.45 micron filter before TAL analysis.
ND – Not Detected.
COD – Chemical Oxygen Demand.
TOC – Total Organic Carbon.
TSS – Total Suspended Solids.
NA – Not Analyzed.

Notes Explaining Data Qualifiers:

B – The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).
J – The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
R – The sample results are rejected.
U – The analyte was analyzed for but not detected. The associated value is the analyte CRDL.
UJ – The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

TABLE 3-27

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS OF TAL ANALYTES IN FILTERED
GROUNDWATER AND LEACHATE SAMPLES

Analyte	Range of Concentrations (ug/L)	
	Groundwater	Leachate
Monarch HRDL[1]		
aluminum	ND	1,100
arsenic	ND - 4.8	26
barium	67 - 930	230
cadmium	ND-3.6	ND
calcium	130,000-280,000	130,000
chromium	ND	7.1
iron	64-25,000	86,000
lead	ND-1.7	ND
magnesium	35,000-45,000	17,000
manganese	46-1,700	1,900
nickel	ND-120	20
potassium	1,400-8,700	2,600
selenium	ND-2.3	ND
sodium	34,000-130,000	24,000
zinc	ND-180	ND
Former Bryant Mill Pond[2]		
arsenic	ND-21	NA
barium	100-310	NA
calcium	87,000-140,000	NA
chromium	ND-3.5	NA
cobalt	ND-5.5	NA
iron	130-9,200	NA
lead	ND-1.3	NA
magnesium	25,000-30,000	NA
manganese	29-620	NA
mercury	ND-0.13	NA
nickel	ND-38	NA
potassium	770-3,100	NA
selenium	ND-1.6	NA
sodium	15,000-66,000	NA
zinc	220-770	NA
Bryant HRDL[3]		
arsenic	ND-130	NA
barium	67-500	NA
cadmium	ND-4.5	NA
calcium	71,000-220,000	NA
copper	ND-7.3	NA
iron	340-33,000	NA
lead	ND-1.1	NA
magnesium	14,000-66,000	NA
manganese	32-1,100	NA
nickel	ND-130	NA
potassium	ND-12,000	NA
selenium	ND-2.8	NA
sodium	5,000-69,000	NA
zinc	4.2-3,300	NA
FRDLs[4]		
arsenic	28-79	NA
barium	100-200	NA
calcium	100,000-110,000	NA
iron	8,000-11,000	NA
magnesium	13,000-45,000	NA
manganese	230-800	NA
nickel	ND-14	NA
potassium	3,500-3,600	NA
sodium	11,000-31,000	NA
zinc	11-25	NA

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TABLE 3-27

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
SUPERFUND SITE

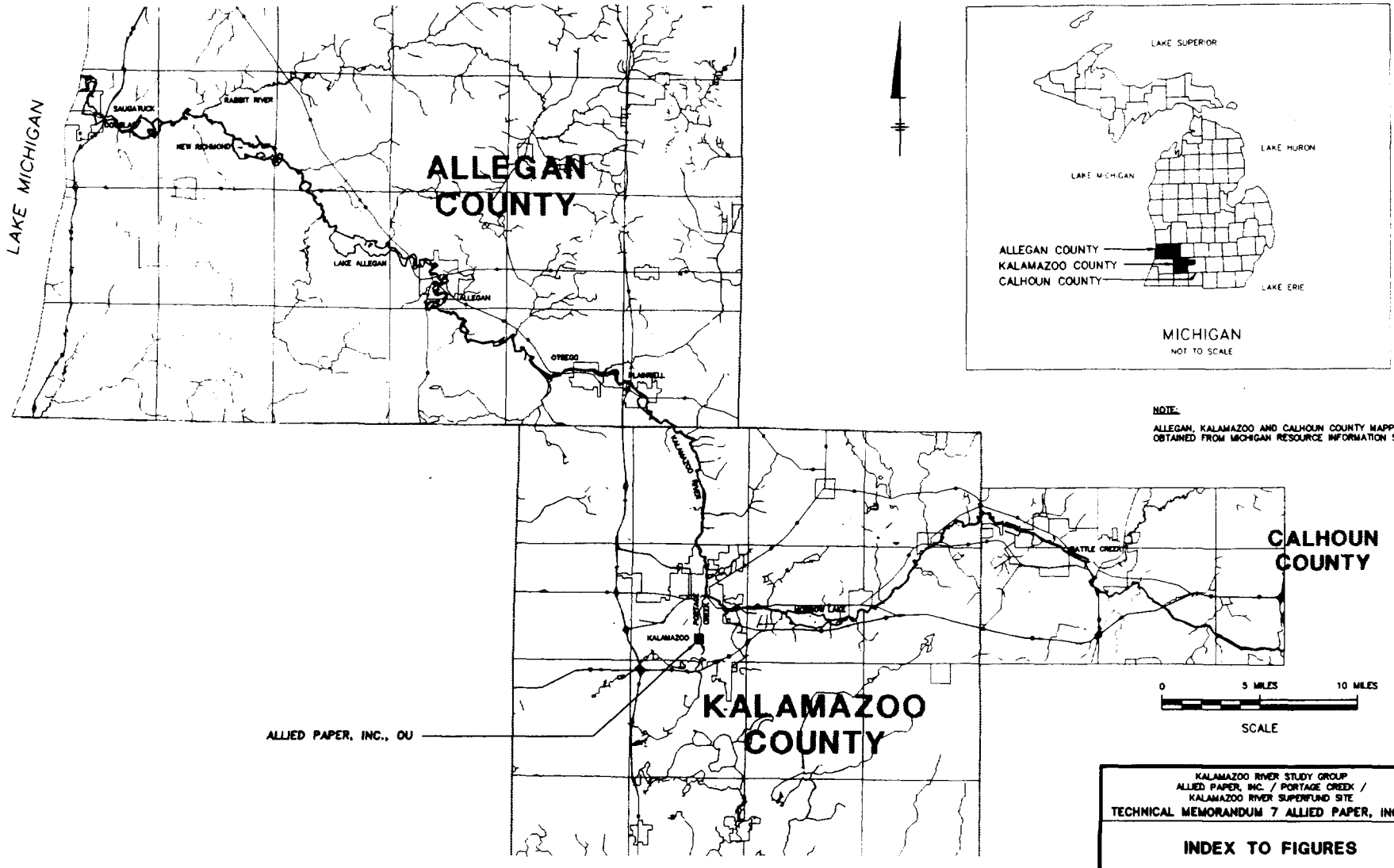
ALLIED PAPER, INC., OPERABLE UNIT
RANGE OF DETECTED CONCENTRATIONS OF TAL ANALYTES IN FILTERED
GROUNDWATER AND LEACHATE SAMPLES

Analyte	Range of Concentrations (ug/L)	
	Groundwater	Leachate
Former Type III Landfill[3]		
arsenic	1.4-160	NA
barium	100-590	NA
beryllium	ND-0.32	NA
calcium	71,000-210,000	NA
chromium	ND-3.4	NA
cobalt	ND-14	NA
iron	280-36,000	NA
lead	ND-2.5	NA
magnesium	27,000-72,000	NA
manganese	52-1,600	NA
mercury	ND-0.090	NA
nickel	ND-31	NA
potassium	ND-8,300	NA
selenium	ND-1.5	NA
sodium	9,200-140,000	NA
zinc	3.5-2,800	NA
Western Disposal Area[6]		
aluminum	ND-56	NA
arsenic	ND-61	NA
barium	54-660	NA
beryllium	ND-0.24	NA
calcium	26,000-300,000	NA
chromium	ND-6.8	NA
cobalt	ND-8.1	NA
iron	32-40,000	NA
lead	ND-1.6	NA
magnesium	13,000-59,000	NA
manganese	38-1,500	NA
nickel	ND-30	NA
potassium	ND - 24,000	NA
selenium	ND-3.8	NA
sodium	20,000-50,000	NA
vanadium	ND-7.3	NA
zinc	ND-630	NA
Pilot Study Area[7]		
aluminum	ND-34	NA
arsenic	1.9-40	NA
barium	85-690	NA
calcium	90,000-130,000	NA
chromium	ND-1.9	NA
iron	750-15,000	NA
magnesium	31,000-33,000	NA
manganese	35-500	NA
nickel	ND-13	NA
potassium	860-3,900	NA
selenium	1.2-1.9	NA
sodium	23,000-33,000	NA
zinc	8.4-430	NA

Notes:

[1] Includes the results of samples from MW-124A, MW-124B, MW-125P (leachate), MW-125A, MW-125B, MW-126A, and MW-126B.
[2] Includes the results of samples from MW-104, MW-106, MW-108, MW-114, and MW-123A.
[3] Includes the results of samples from MW-11, MW-12, MW-12R, MW-22A, MW-22B, MW-23, MW-24, MW-25, MW-26, MW-121A, MW-121B, MW-123A, and MW-123B.
[4] Includes the results of samples from MW-122A and MW-122B.
[5] Includes the results of samples from MW-1, MW-3, MW-5, MW-15, MW-16B, MW-16C, MW-17A, MW-17B, MW-19BR, MW-19C, MW-19D, MW-112, and MW-127A.
[6] Includes the results of samples from MW-8, MW-8A, MW-20, MW-20B, MW-21, MW-120A, and MW-123B.
[7] Includes the results of samples from MW-2, MW-2S, and MW-18.
NA - Not applicable; no wells were installed in residuals in these areas.
ND - Not detected.

Figures



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INDEX TO FIGURES

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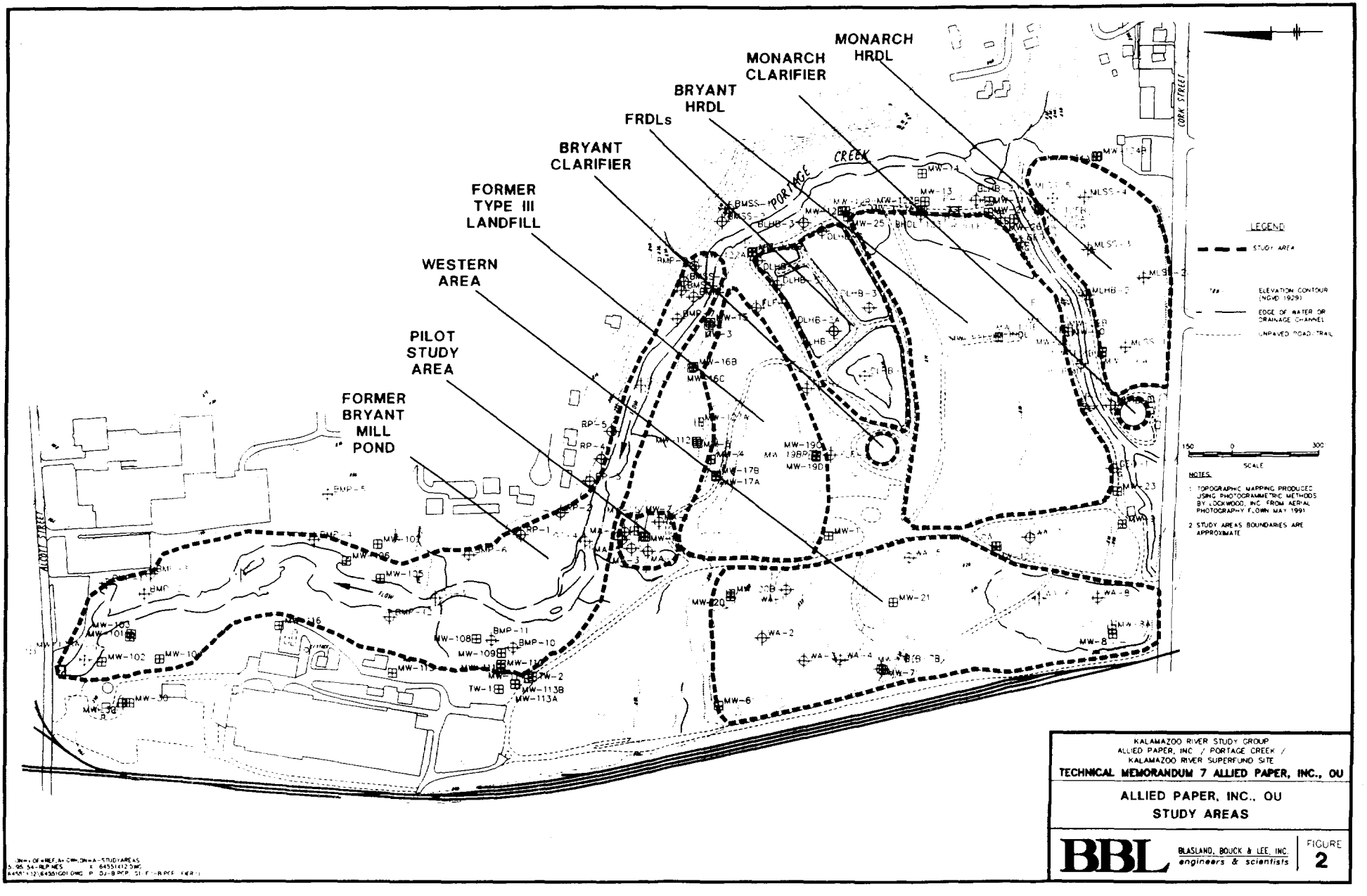
FIGURE 1



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STUDY AREAS

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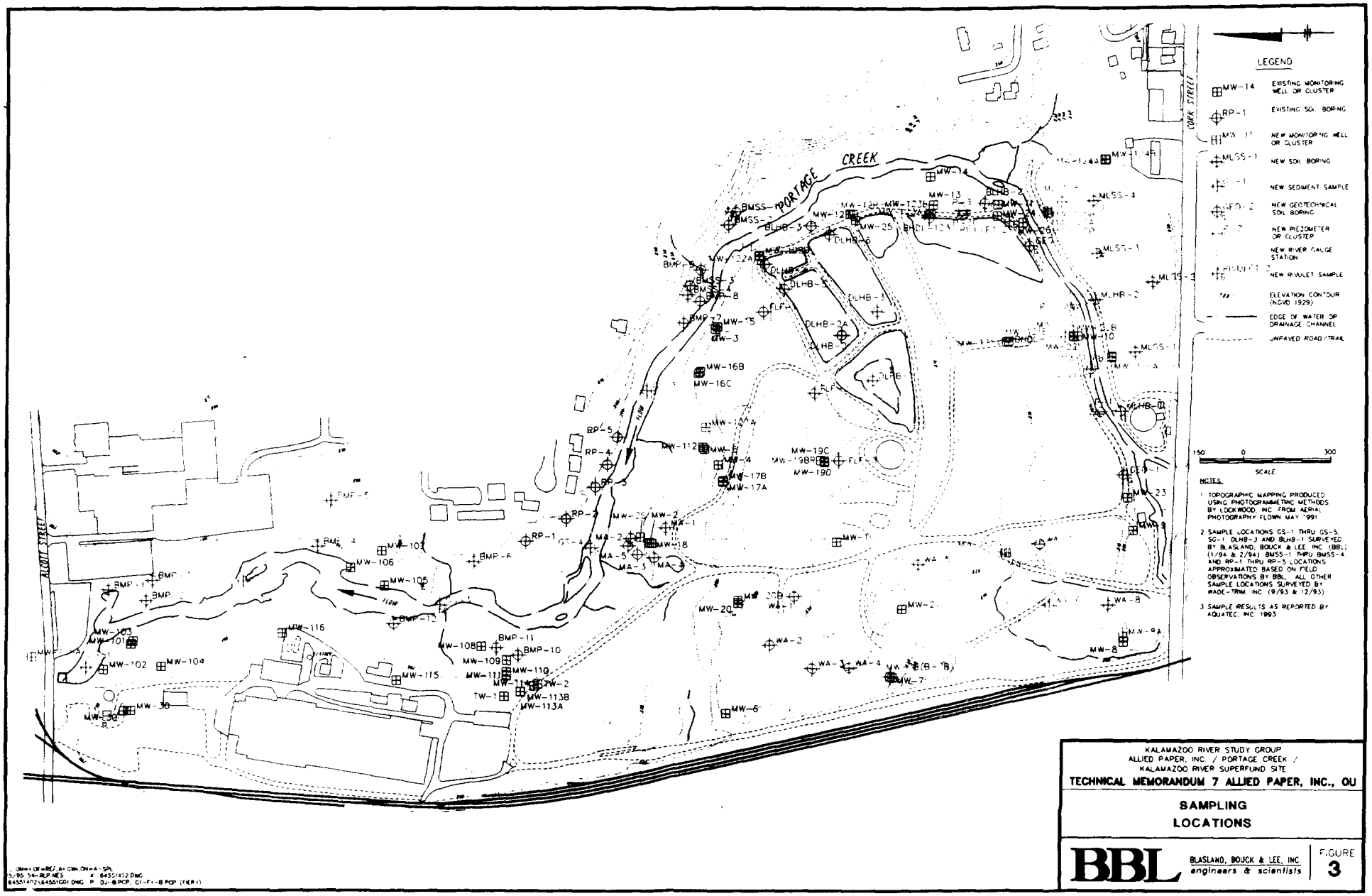
FIGURE **2**



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SAMPLING LOCATIONS

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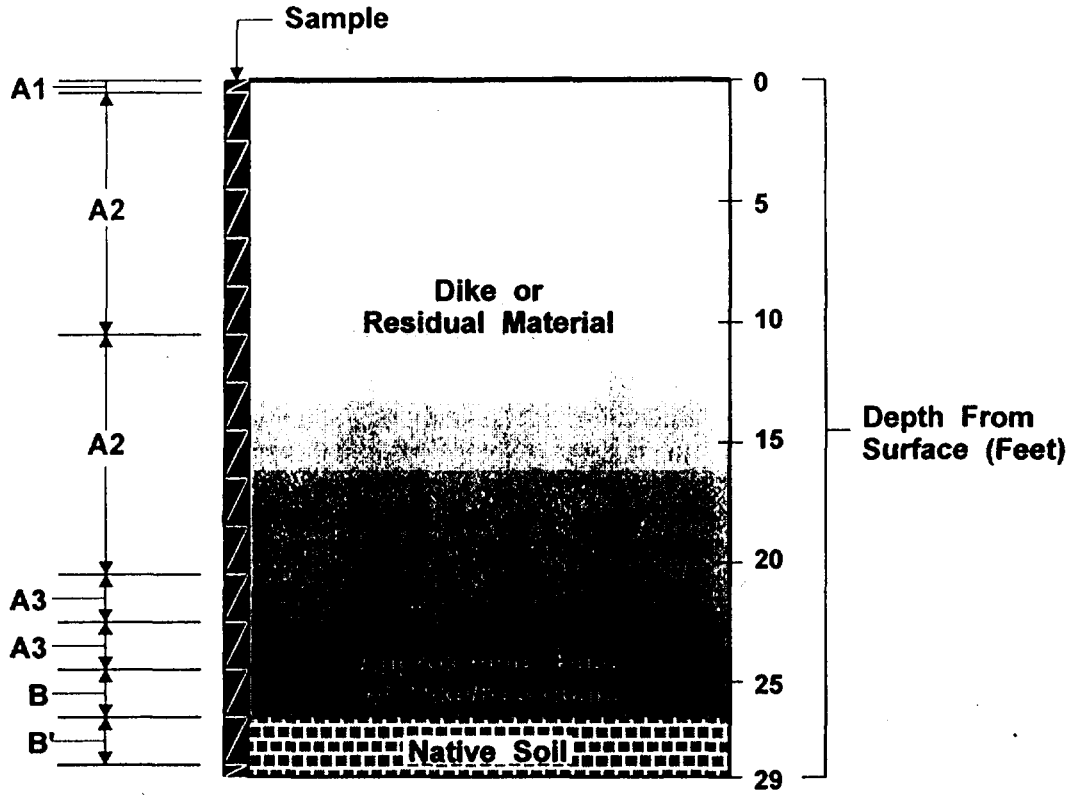
FIGURE **3**



LEGEND

Two-foot split-barrel sample collected for visual classification and standard penetration resistance testing

A1: A 0-to-6-inch sample analyzed for PCBs at all borings; and PCDDs and PCDFs at B1-2, B2-2, and B3-1.

A2: A 2-foot split-spoon sample will be taken every 10-feet and analyzed for PCBs.

A3: A 2-foot residuals sample analyzed for PCBs.

B: A 2-foot residuals sample analyzed for CLP TCL/TAL.

B': A 2-foot native soil sample analyzed for CLP TCL/TAL.

NOTES:

1. This plan applies to both borings and monitoring wells.
2. The base of residuals or dike are approximate and may not be representative of the actual conditions.

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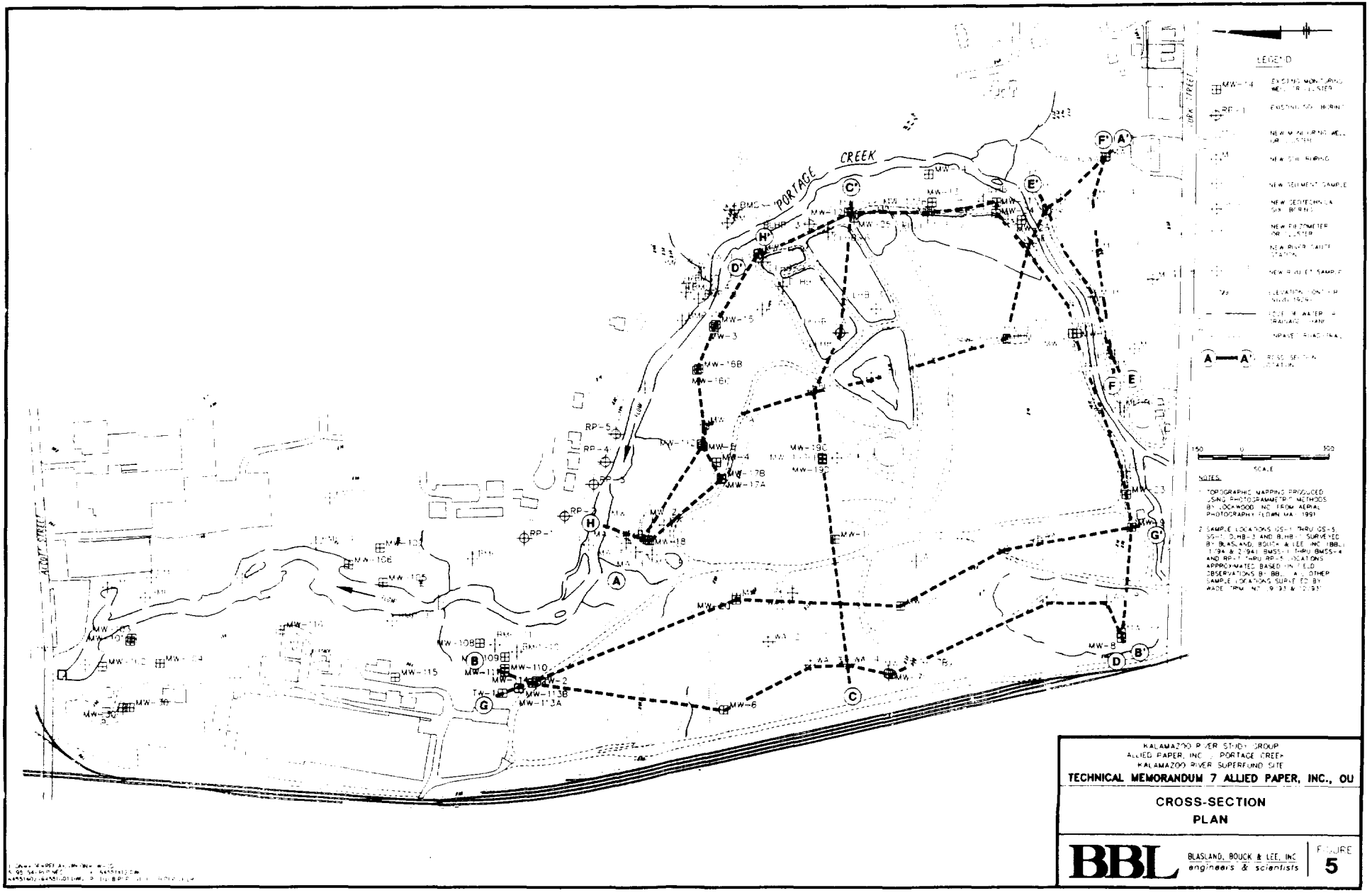
TECHNICAL MEMORANDUM 7
ALLIED PAPER, INC. OU

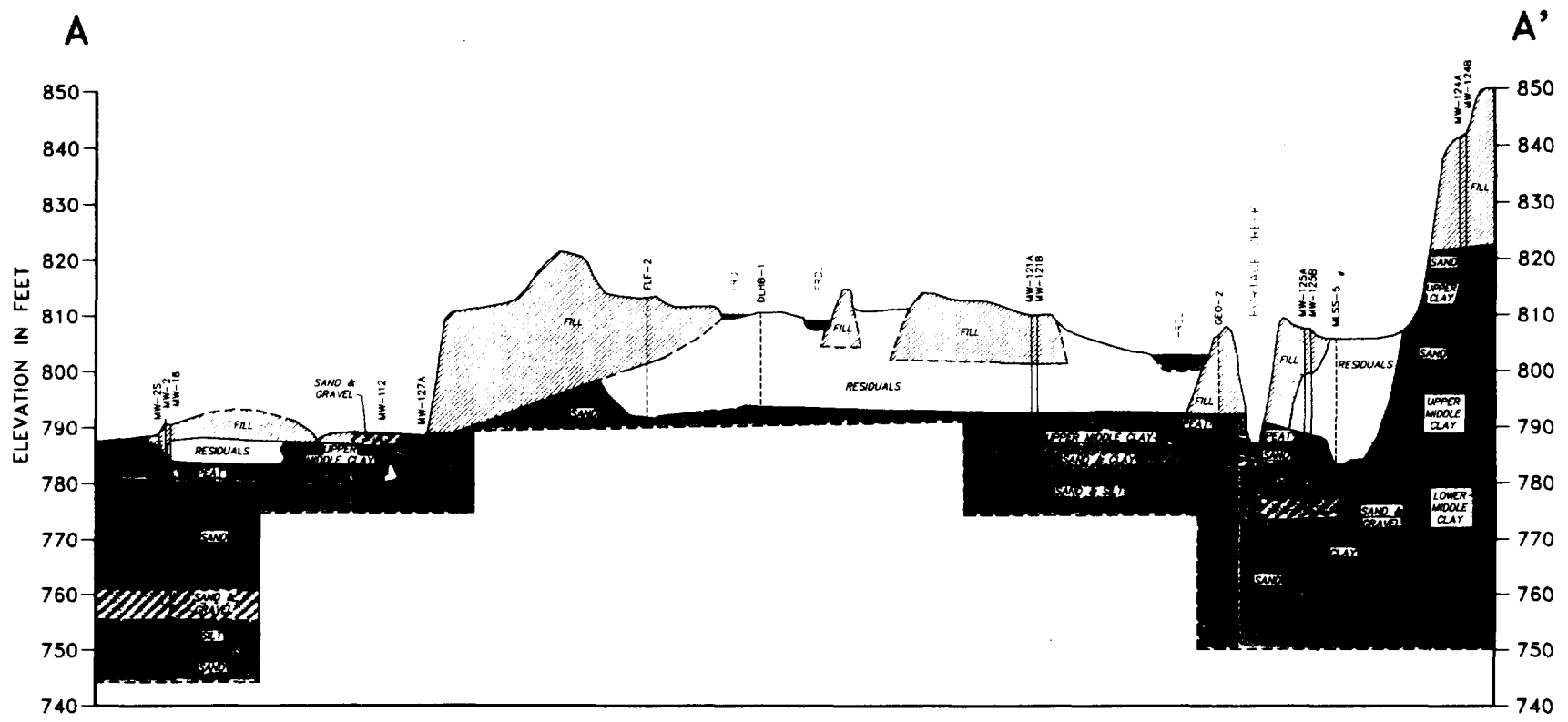
BORING SAMPLING AND ENVIRONMENTAL ANALYSIS PLAN

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

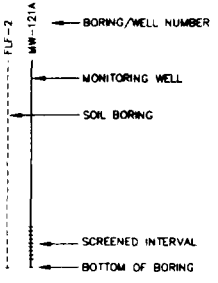
FIGURE 4

08/97 SYR-D54-DJH
64551200/64551F01.CDR


PORTAGE CREEK
OAK STREET
ACME STREET
LEGEND
NOTES:
SCALE
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
CROSS-SECTION
PLAN
BBL
BLASLAND, BOUCK & LEE, INC
engineers & scientists
FIGURE
5



LEGEND



- RESIDUALS
- FILL
- PEAT
- CLAY
- SILT
- SAND
- GRAVEL

NOTES:

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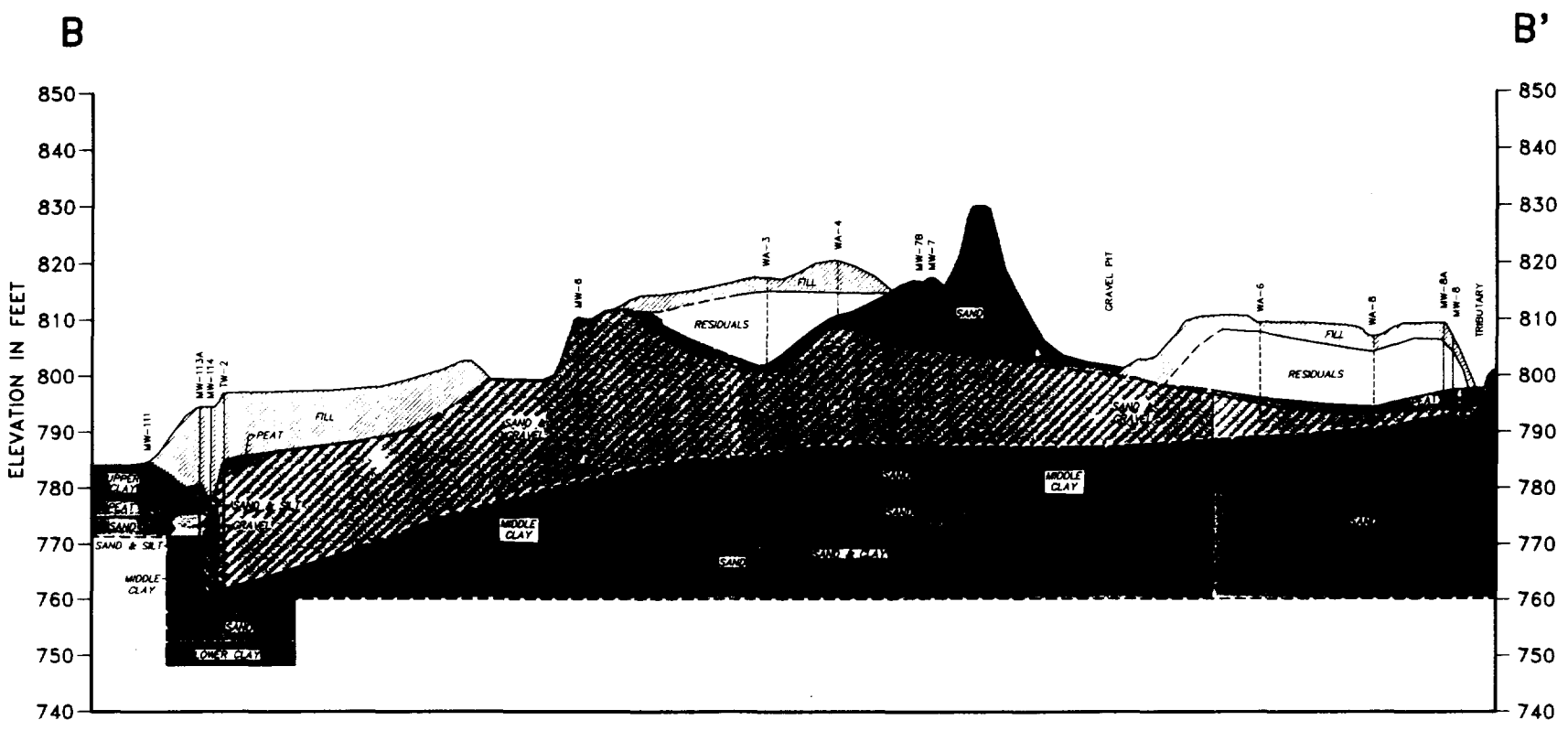
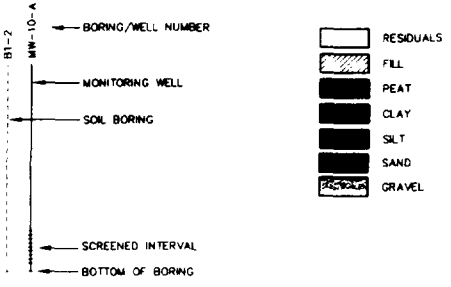
GEOLOGIC CROSS-SECTION
A-A'

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

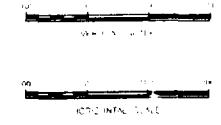
FIGURE 6



LEGEND



NOTES



KALAMAZOO RIVER STUDY GROUP
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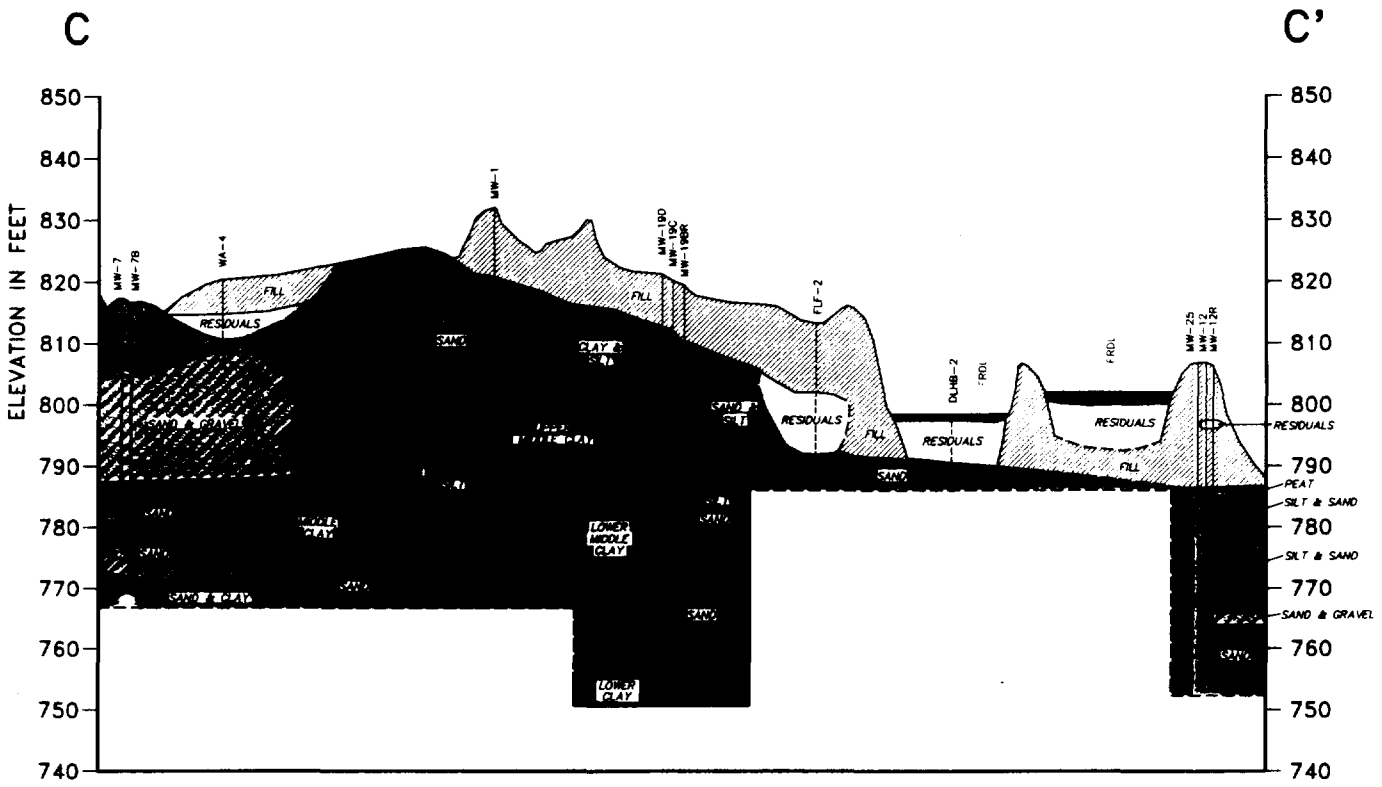
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

GEOLOGIC CROSS-SECTION
B-B'

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 7



LEGEND

B1-2 — BORING/WELL NUMBER
MW-10-A — MONITORING WELL
SOIL BORING
SCREENED INTERVAL
BOTTOM OF BORING

RESIDUALS
FILL
PEAT
CLAY
SILT
SAND
GRAVEL

NOTES:
1. SURFACE WATER ELEVATIONS ARE APPROXIMATE
2. DASHED LINES BETWEEN UNITS REPRESENT INFERRED BOUNDARIES
3. SURFACE ELEVATIONS FROM TOPOGRAPHIC MAPPING BY LOCKWOOD, INC.

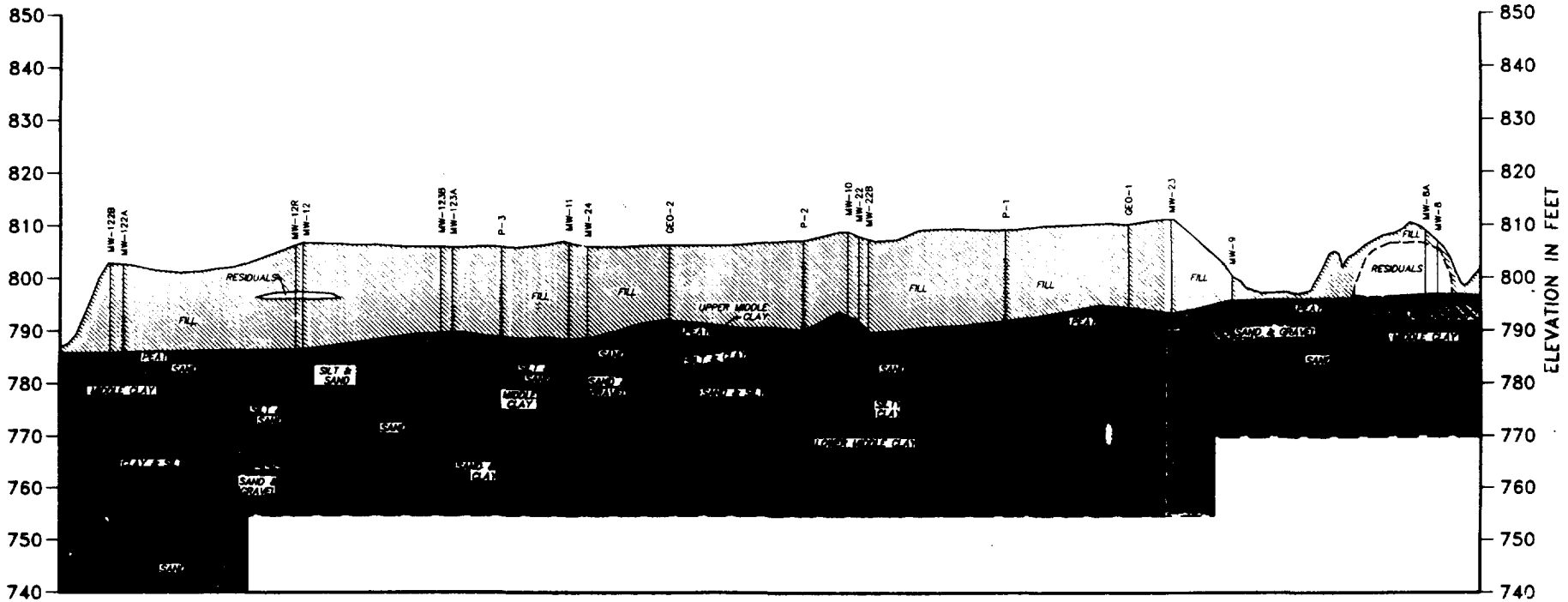
VERTICAL SCALE
HORIZONTAL SCALE

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

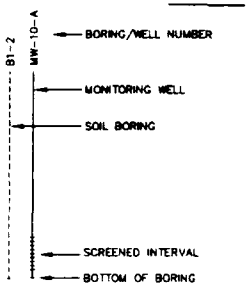
GEOLOGIC CROSS-SECTION C-C'

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 8



LEGEND



RESIDUALS
FILL
PEAT
CLAY
SILT
SAND
GRAVEL

NOTES:
1. DASHED LINES BETWEEN UNITS REPRESENTS INFERRED BOUNDARIES.
2. SURFACE ELEVATIONS FROM TOPOGRAPHIC MAPPING (1" = 100' W.S.P.)

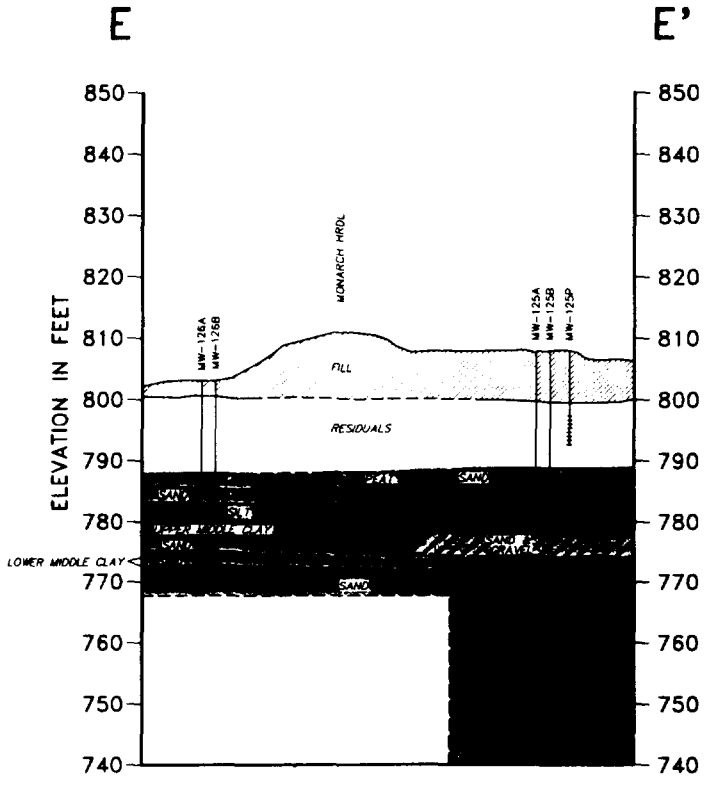
VERTICAL SCALE
HORIZONTAL SCALE

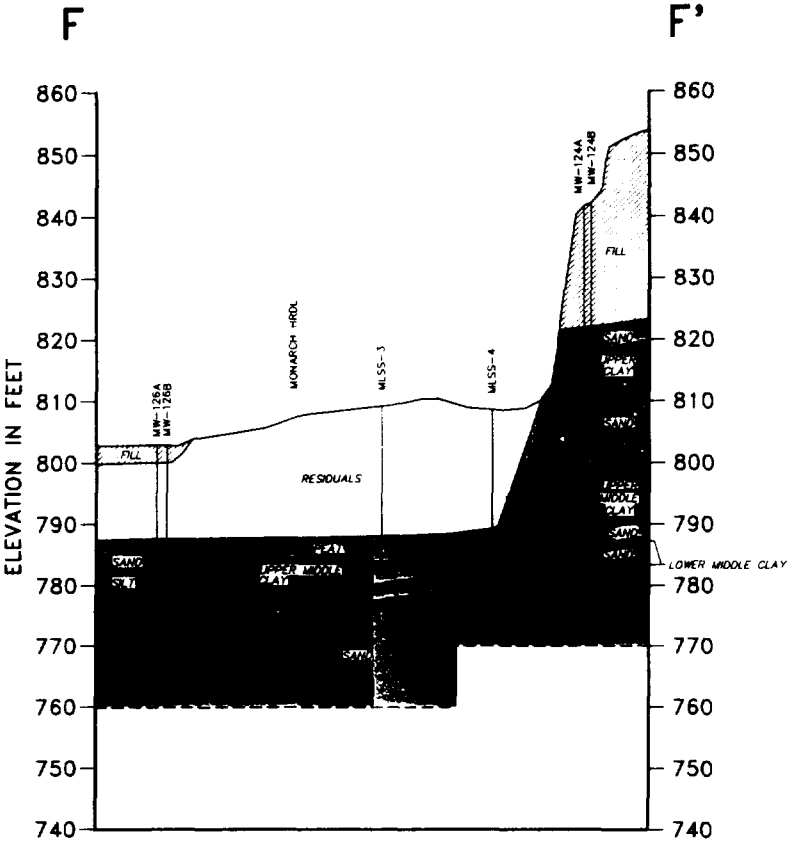
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

GEOLOGIC CROSS-SECTION D-D'

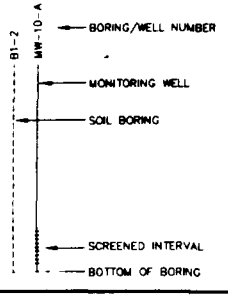
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

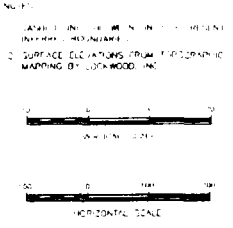
FIGURE 9





LEGEND





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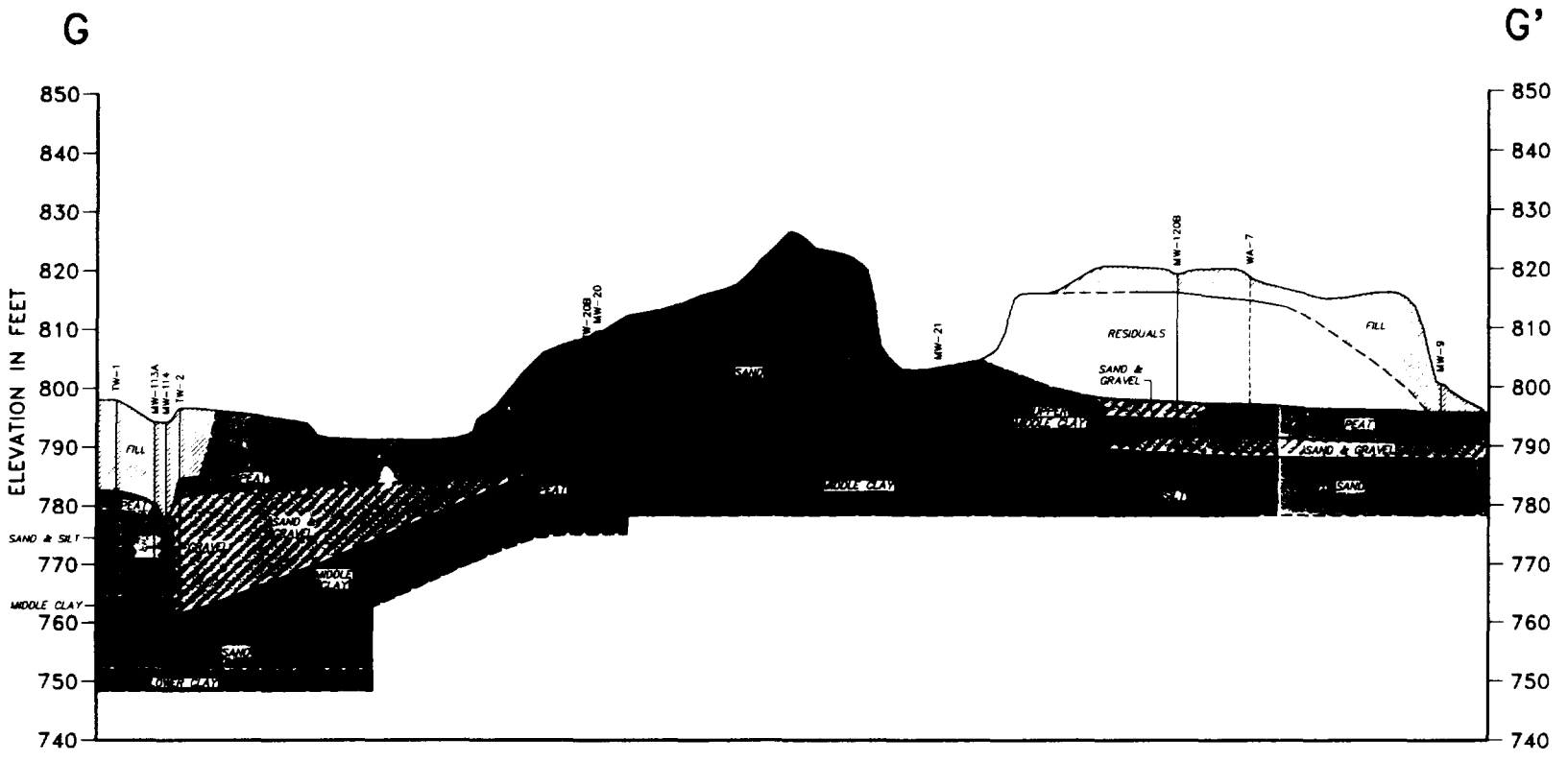
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

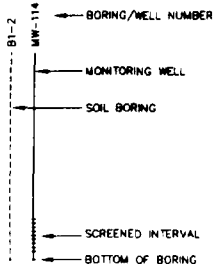
GEOLOGIC CROSS-SECTION
E-E' & F-F'

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

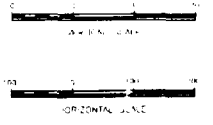
FIGURE
10



LEGEND



NOTES:



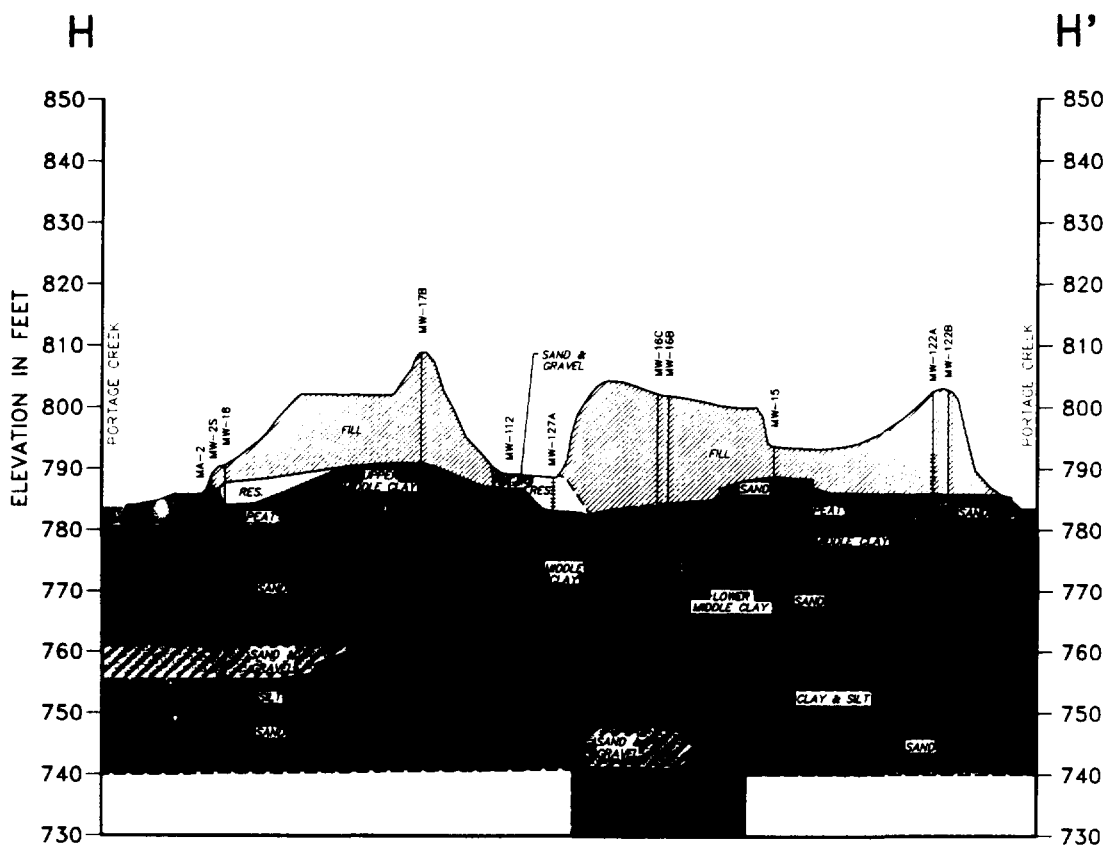
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

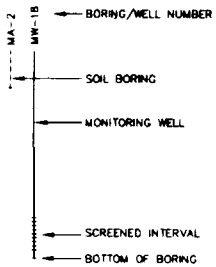
GEOLOGIC CROSS-SECTION
G-G'

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
11



LEGEND



RESIDUALS
FILL
PEAT
CLAY
SILT
SAND
GRAVEL

NOTES:

1. SURFACE WATER ELEVATIONS ARE APPROXIMATE
2. [illegible] INTERVAL IS [illegible]
3. SURFACE ELEVATIONS FROM TOPOGRAPHIC MAPPING BY [illegible]
4. POSSIBLE PAPER CHIPS, PROBABLY DEPOSITED DOWN FROM UPPER [illegible]

VERTICAL SCALE

HORIZONTAL SCALE

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

GEOLOGIC CROSS-SECTION
H-H'

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
12

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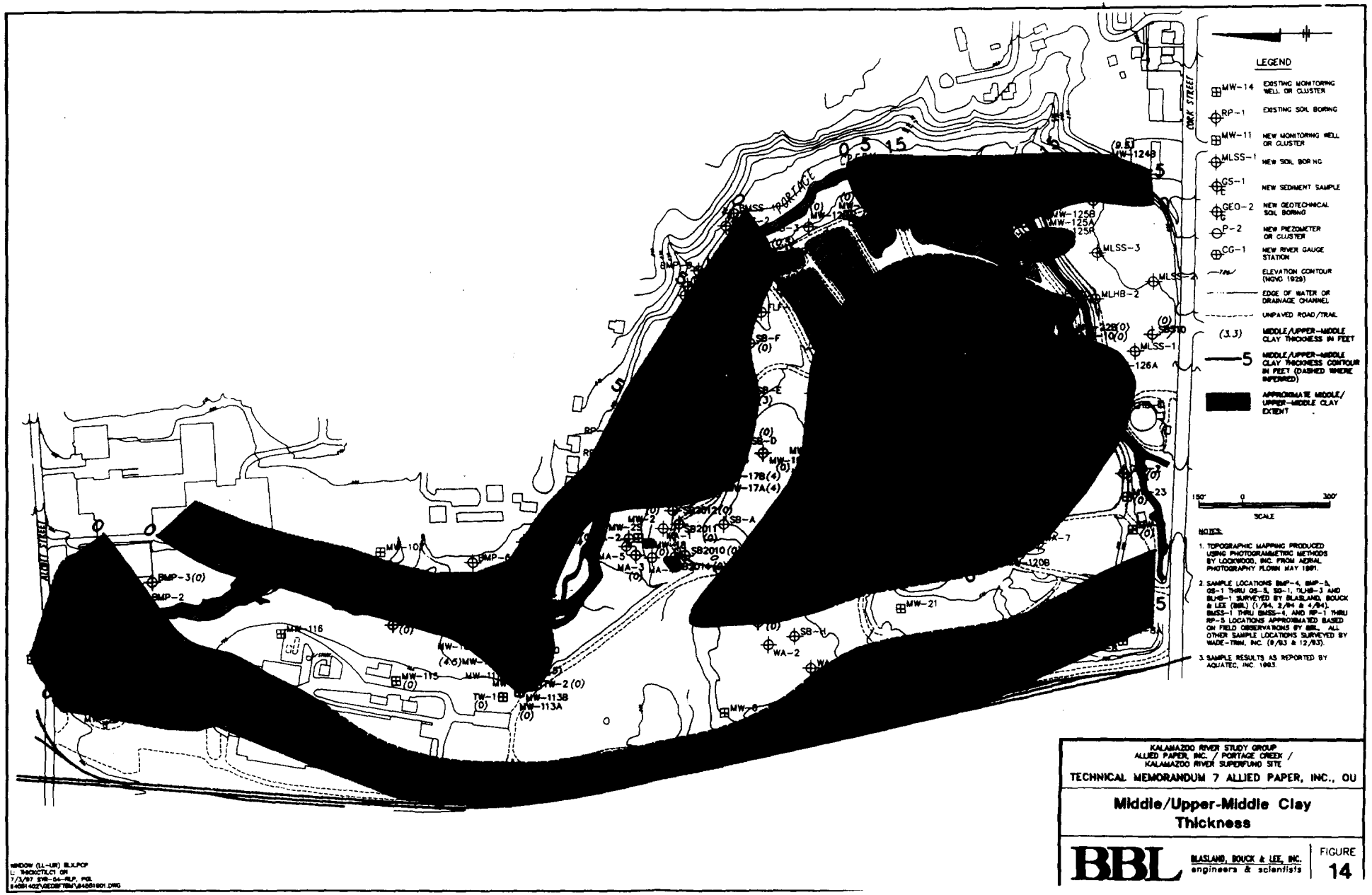
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

Middle/Upper-Middle Clay Elevation

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 13



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TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

Middle/Upper-Middle Clay Thickness

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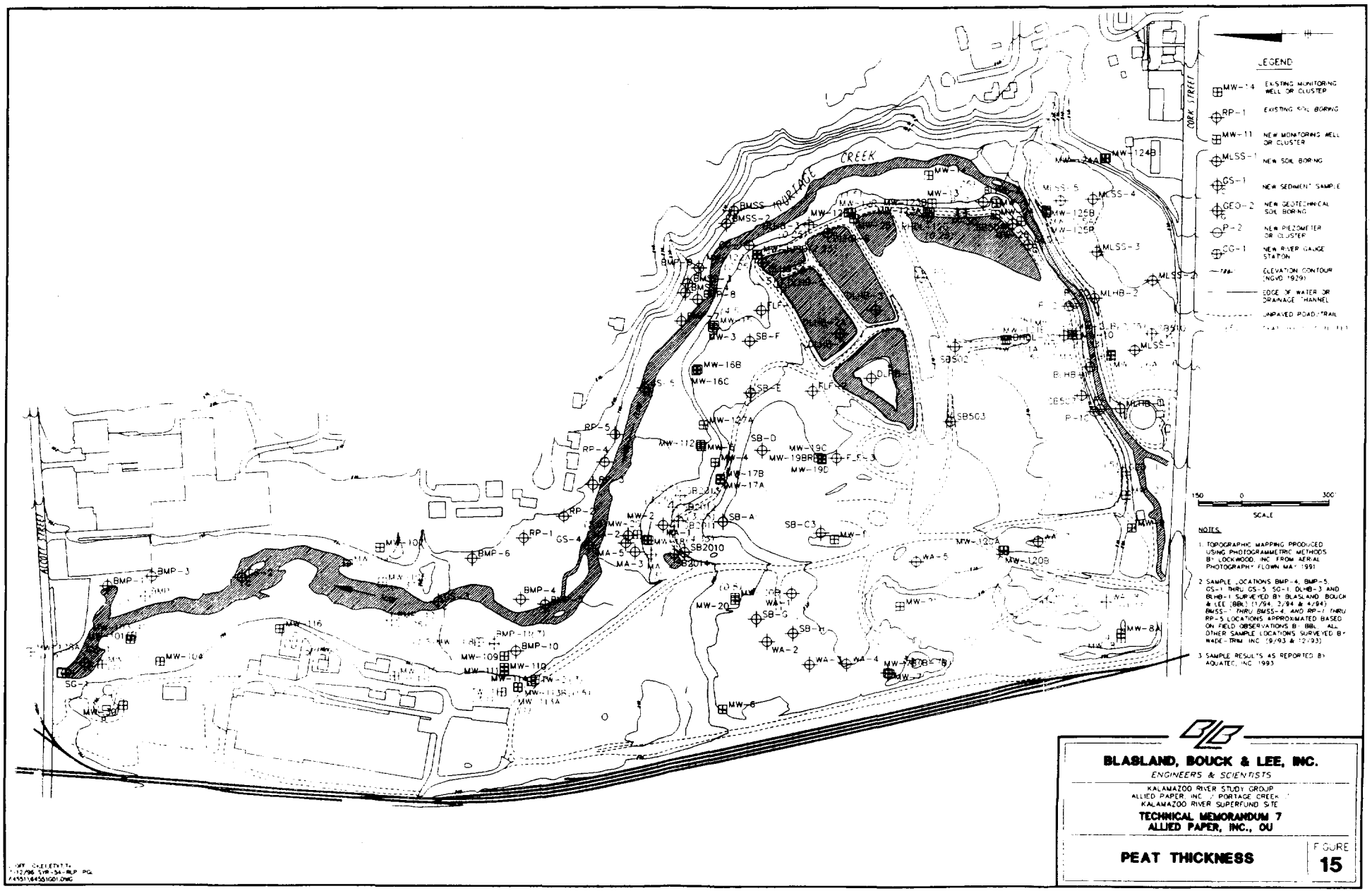
FIGURE 14



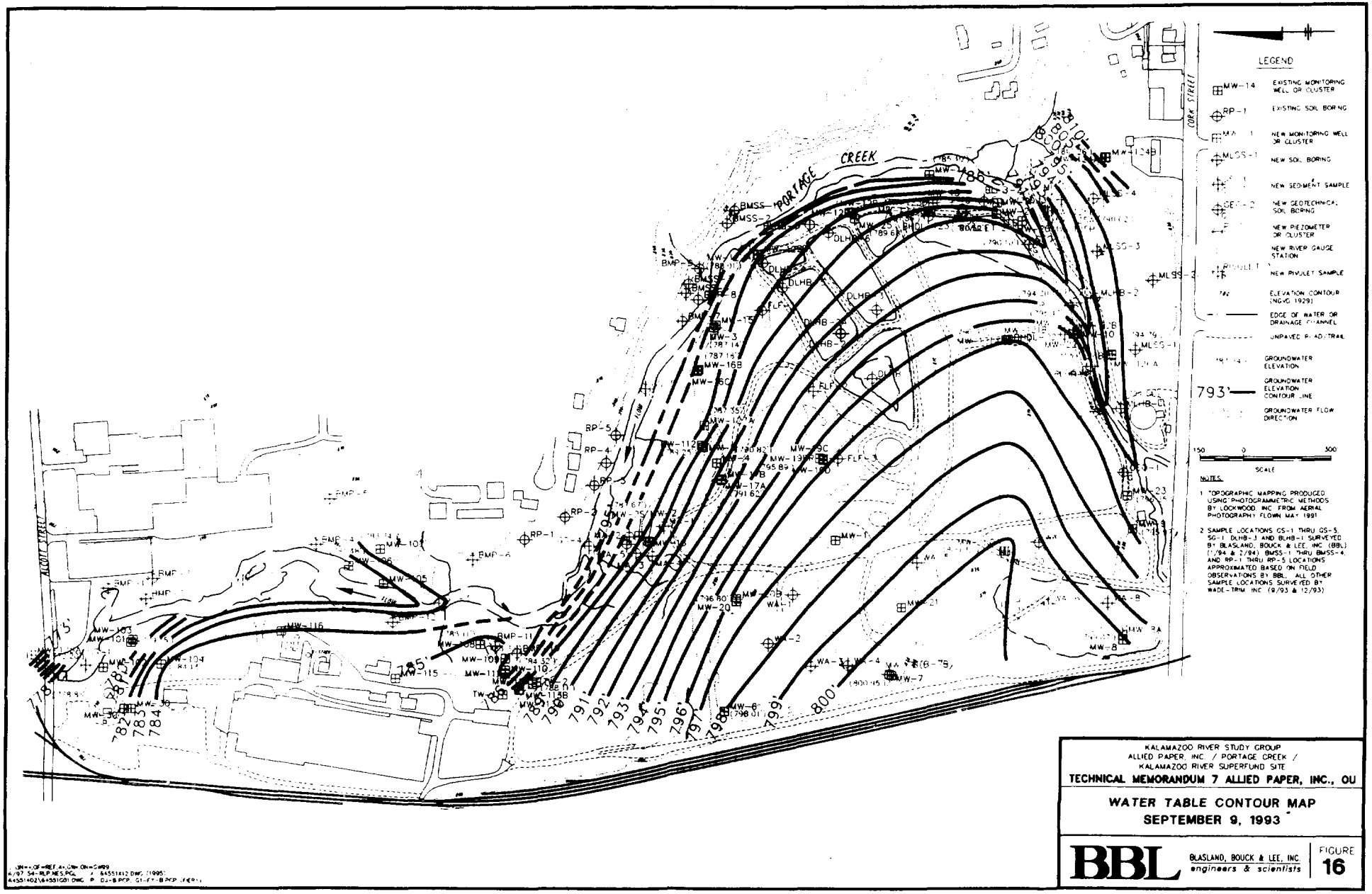
BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7
ALLIED PAPER, INC., OU

PEAT THICKNESS

FIGURE **15**



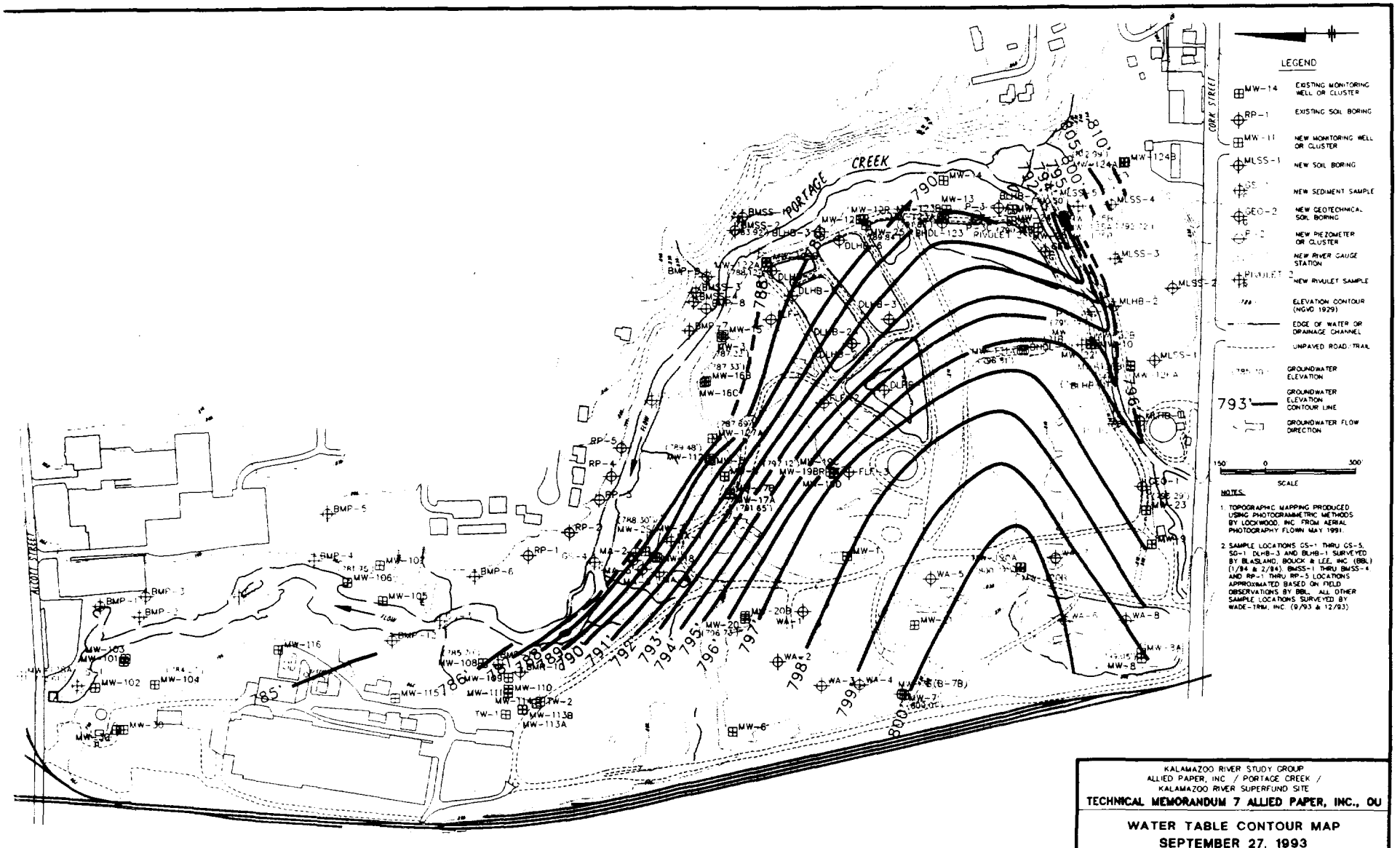
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

WATER TABLE CONTOUR MAP
SEPTEMBER 9, 1993

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **16**



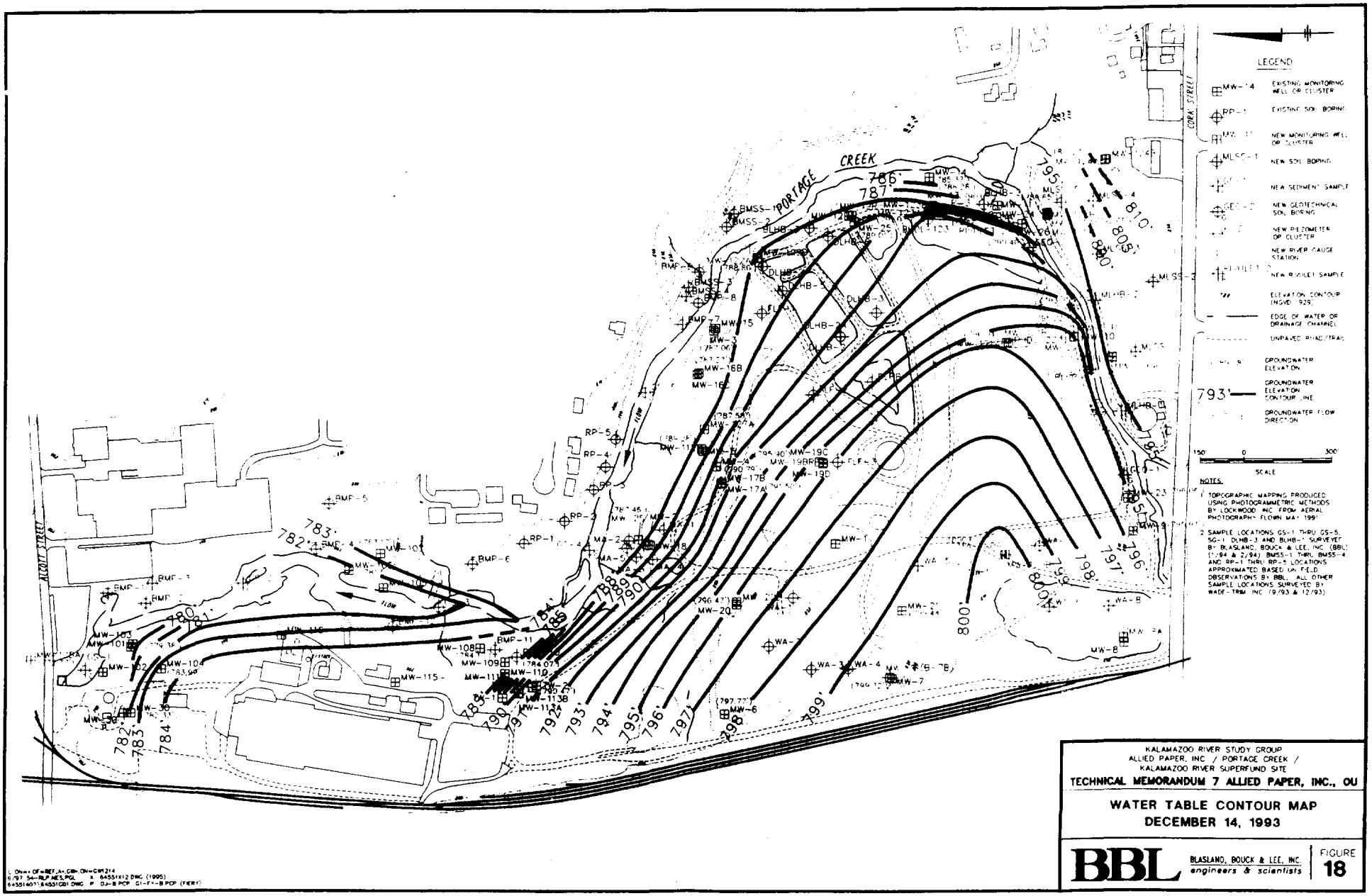
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

WATER TABLE CONTOUR MAP
SEPTEMBER 27, 1993

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 17



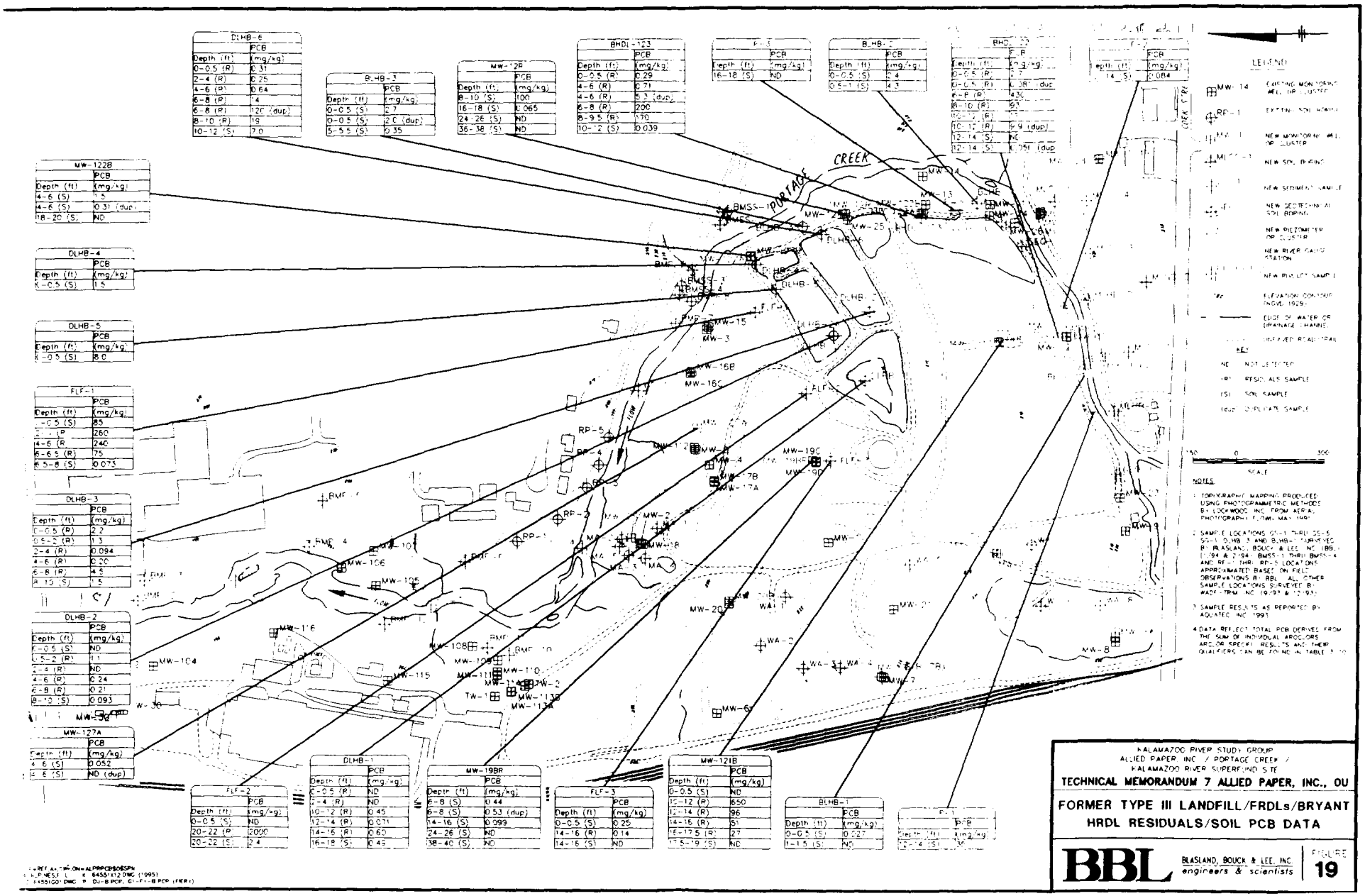
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

WATER TABLE CONTOUR MAP
DECEMBER 14, 1993

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **18**



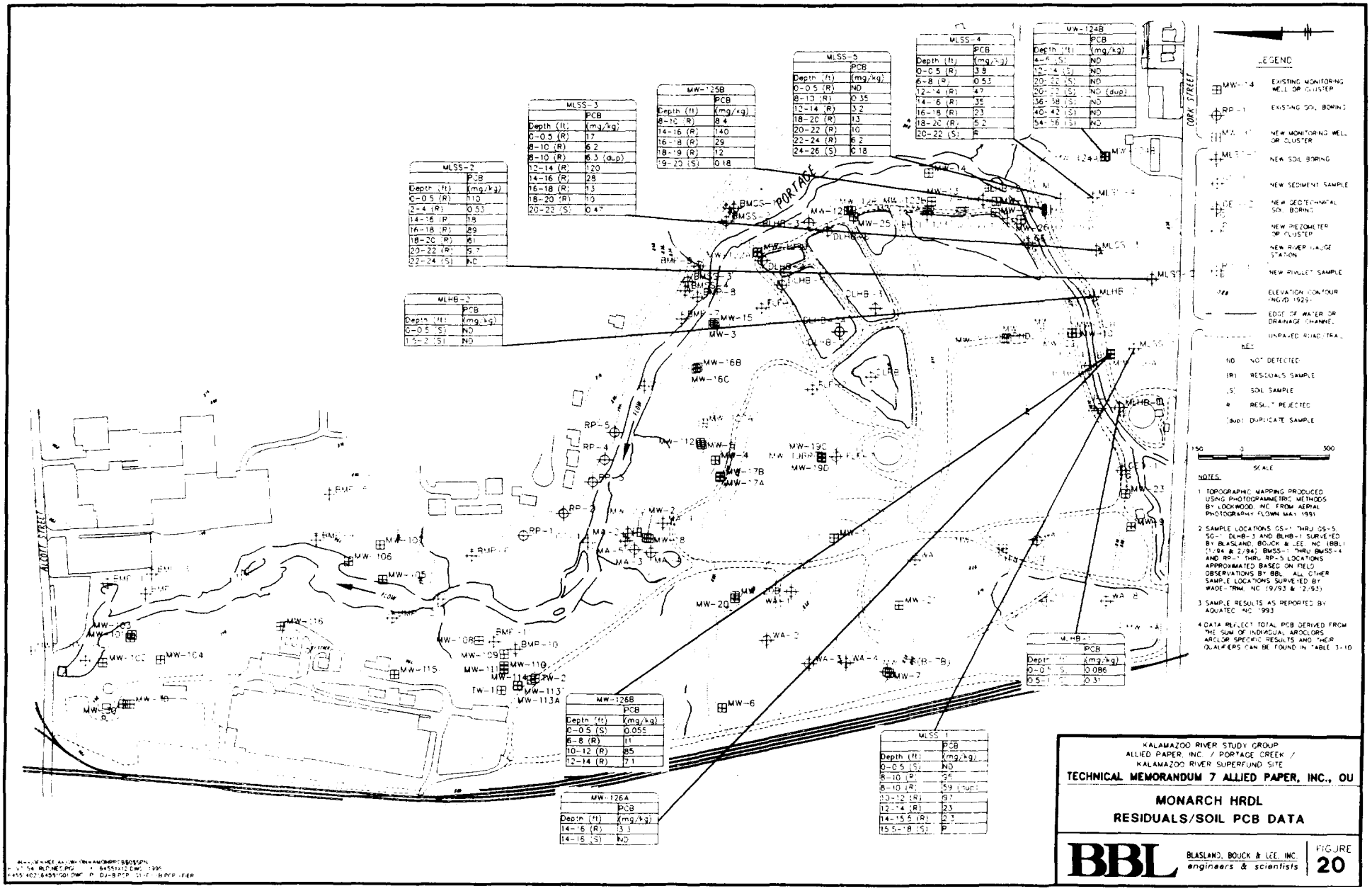
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/FRDLs/BRYANT HRDL RESIDUALS/SOIL PCB DATA

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 19



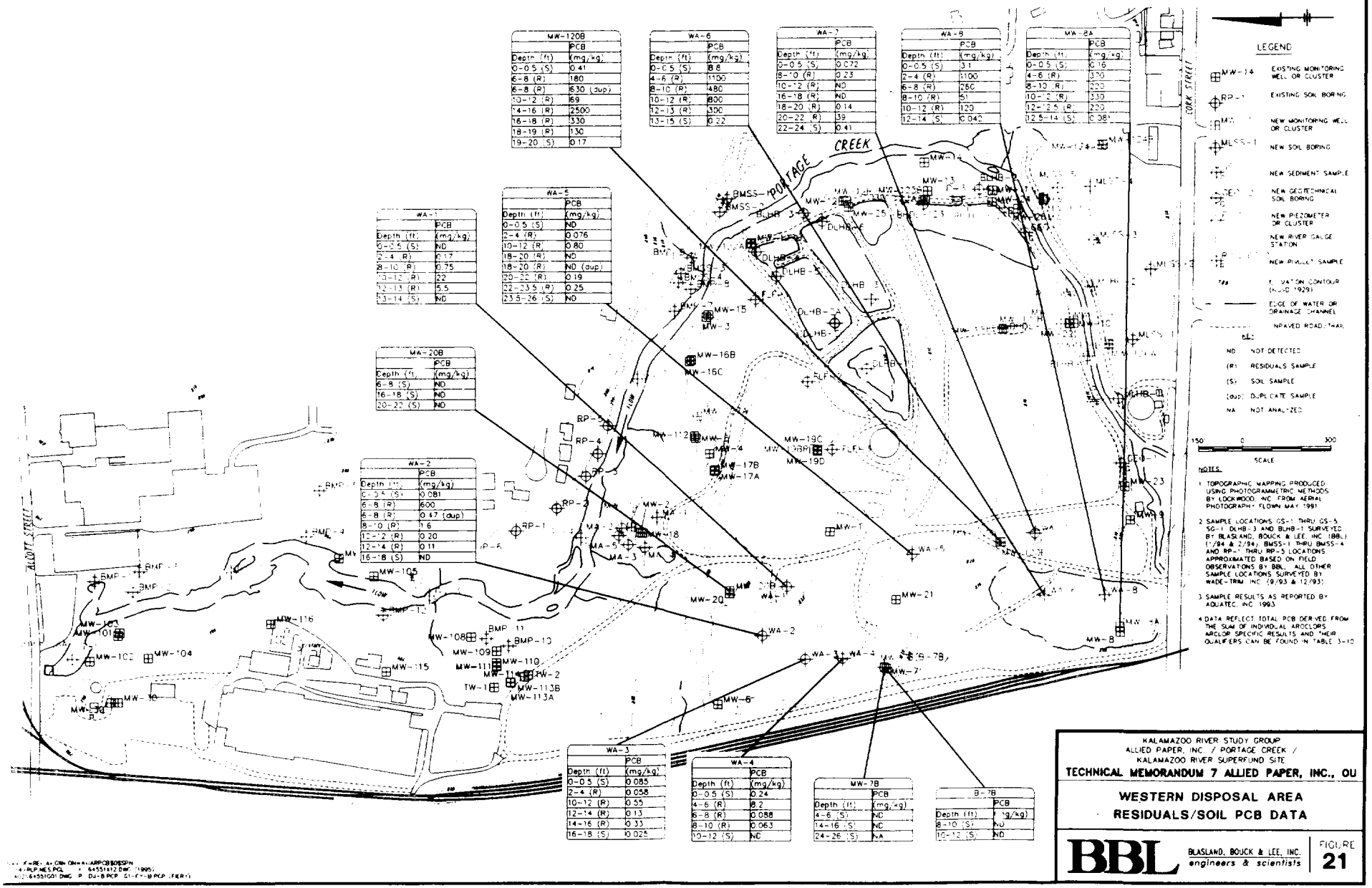
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

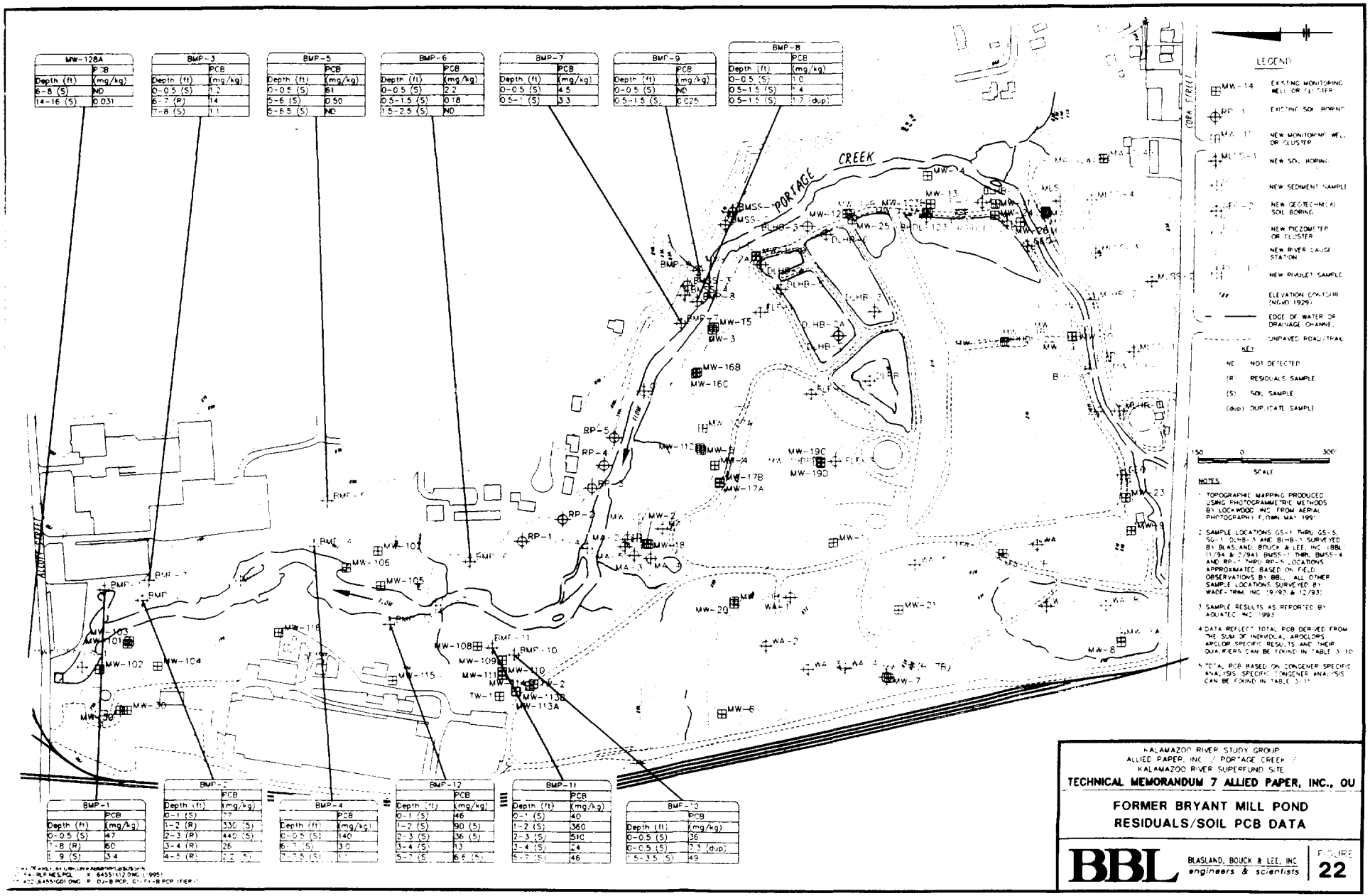
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

MONARCH HRDL
RESIDUALS/SOIL PCB DATA

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **20**


MW-120B
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 0.41
6-8 (R) | 180
6-8 (R) | 630 (dup)
10-12 (R) | 69
14-16 (R) | 2500
16-18 (R) | 330
18-19 (R) | 130
19-20 (S) | 0.17
WA-6
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 8.8
4-6 (R) | 1100
8-10 (R) | 480
10-12 (R) | 800
12-13 (R) | 300
13-15 (S) | 0.22
WA-7
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 0.072
8-10 (R) | 0.23
10-12 (R) | ND
16-18 (R) | ND
18-20 (R) | 0.14
20-22 (R) | 39
22-24 (S) | 0.41
WA-8
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 3.1
2-4 (R) | 1100
6-8 (R) | 260
8-10 (R) | 51
10-12 (R) | 120
12-14 (S) | 0.042
WA-8A
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 0.16
4-6 (R) | 370
8-10 (R) | 220
10-12 (R) | 330
12-12.5 (R) | 200
12.5-14 (S) | 0.081
WA-1
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | ND
2-4 (R) | 0.37
8-10 (R) | 0.75
10-12 (R) | 22
12-13 (R) | 5.5
13-14 (S) | ND
WA-5
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | ND
2-4 (R) | 0.076
10-12 (R) | 0.80
18-20 (R) | ND
18-20 (R) | ND (dup)
20-22 (R) | 0.19
22-23.5 (R) | 0.25
23.5-26 (S) | NO
MW-20B
Depth (ft) | PCB (mg/kg)
6-8 (S) | ND
16-18 (S) | ND
20-22 (S) | ND
WA-2
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 0.081
6-8 (R) | 600
6-8 (R) | 0.47 (dup)
8-10 (R) | 1.6
10-12 (R) | 0.20
12-14 (R) | 0.11
16-18 (S) | ND
WA-3
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 0.085
2-4 (R) | 0.058
10-12 (R) | 0.55
12-14 (R) | 0.13
14-16 (R) | 0.33
16-18 (S) | 0.025
WA-4
Depth (ft) | PCB (mg/kg)
0-0.5 (S) | 0.24
4-6 (R) | 8.2
6-8 (R) | 0.088
8-10 (R) | 0.063
10-12 (S) | ND
MW-7B
Depth (ft) | PCB (mg/kg)
4-6 (S) | ND
14-16 (S) | ND
24-26 (S) | NA
B-7B
Depth (ft) | PCB (mg/kg)
8-10 (S) | ND
10-12 (S) | ND
PORTAGE CREEK
ALLOTT STREET
CORK STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAUGE STATION
NEW PUDDLE SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD/TRAIL
ND NOT DETECTED
(R) RESIDUALS SAMPLE
(S) SOIL SAMPLE
(dup) DUPLICATE SAMPLE
NA NOT ANALYZED
150 0 300
SCALE
NOTES:
1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2. SAMPLE LOCATIONS GS-1 THRU GS-5, SG-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) (7/94 & 2/96). BMSS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC. (9/93 & 12/93).
3. SAMPLE RESULTS AS REPORTED BY AQUATEC, INC. 1993.
4. DATA REFLECT TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS. AROCLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 3-10.
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
WESTERN DISPOSAL AREA
RESIDUALS/SOIL PCB DATA
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 21



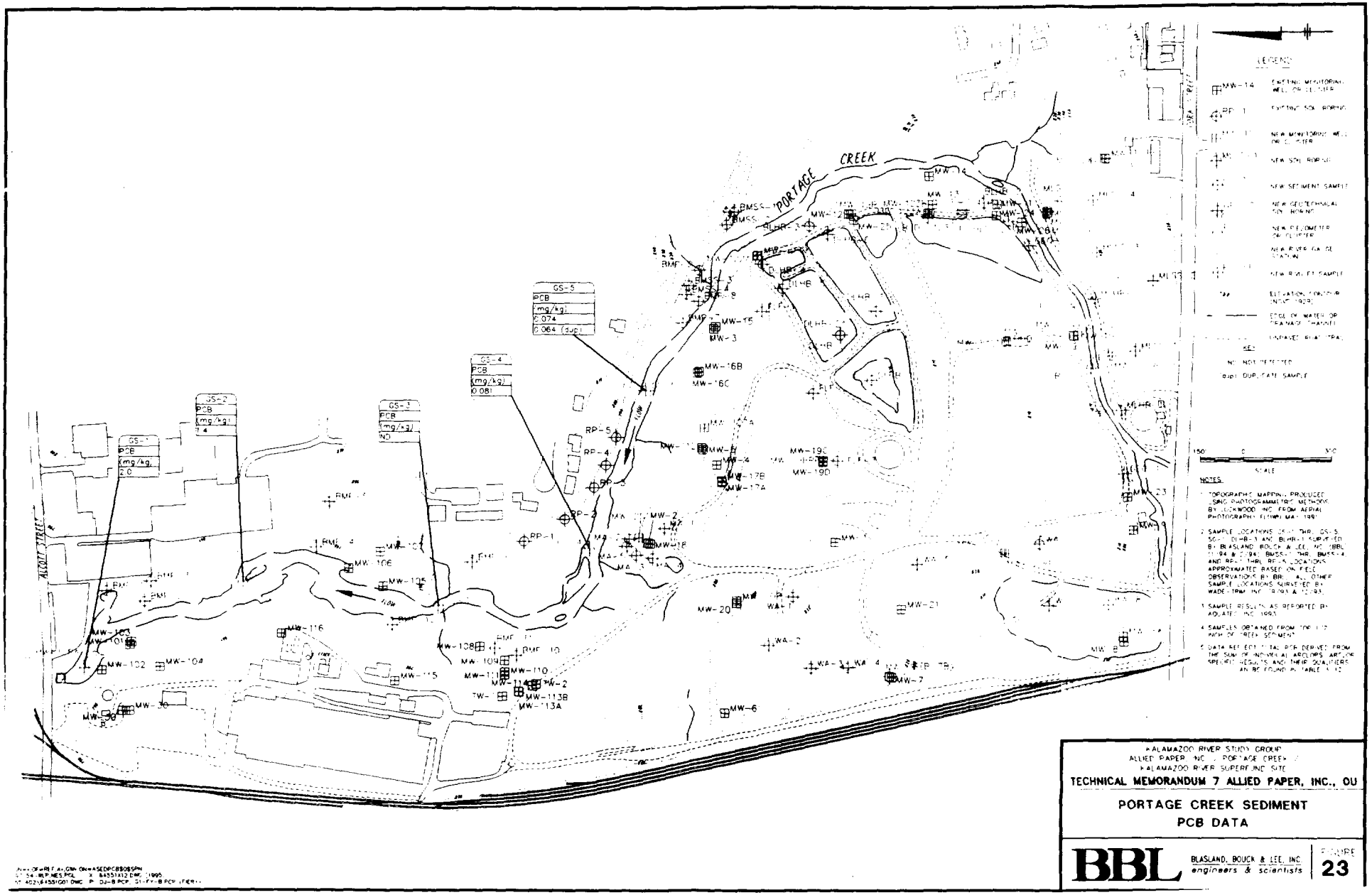
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

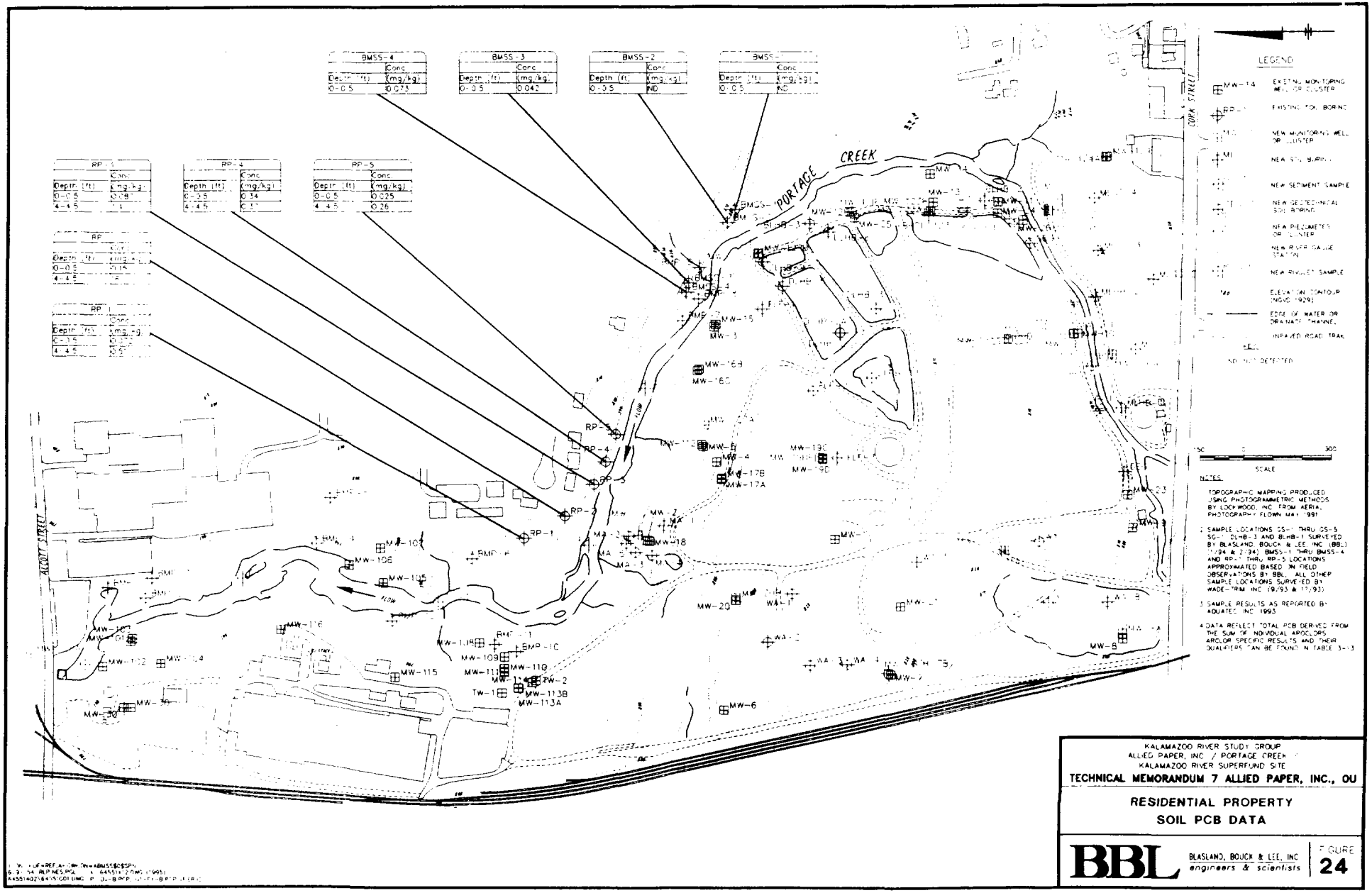
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER BRYANT MILL POND
RESIDUALS/SOIL PCB DATA

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **22**


PORTAGE CREEK
ALCOTT STREET
GS-1
PCB
(mg/kg)
2.0
GS-2
PCB
(mg/kg)
1.4
GS-3
PCB
(mg/kg)
ND
GS-4
PCB
(mg/kg)
0.081
GS-5
PCB
(mg/kg)
0.074
0.064 (dup)
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAGE LOCATION
NEW BULK SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD TRAIL
SEEP
NO NOT REPORTED
DUP DUPLICATE SAMPLE
150 0 300
SCALE
NOTES
1 TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD INC FROM AERIAL PHOTOGRAPHS FLOWN MAY 1991
2 SAMPLE LOCATIONS SS-1 THRU SS-5, SC-1 THRU SC-3 AND BLMR-1 SURVEYED BY BLASLAND BOUCK & LEE INC (BBL) 11/94 & 2/95 BMSS-1 THRU BMSS-4 AND RES-1 THRU RES-4 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL A LL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC (8/93 & 12/93)
3 SAMPLE RESULTS AS REPORTED BY ADL ATEC INC 1993
4 SAMPLES OBTAINED FROM TOP 0 12 INCH OF CREEK SEDIMENT
5 DATA REFLECT TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS ARCLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 5 12
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER INC / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
PORTAGE CREEK SEDIMENT
PCB DATA
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
23



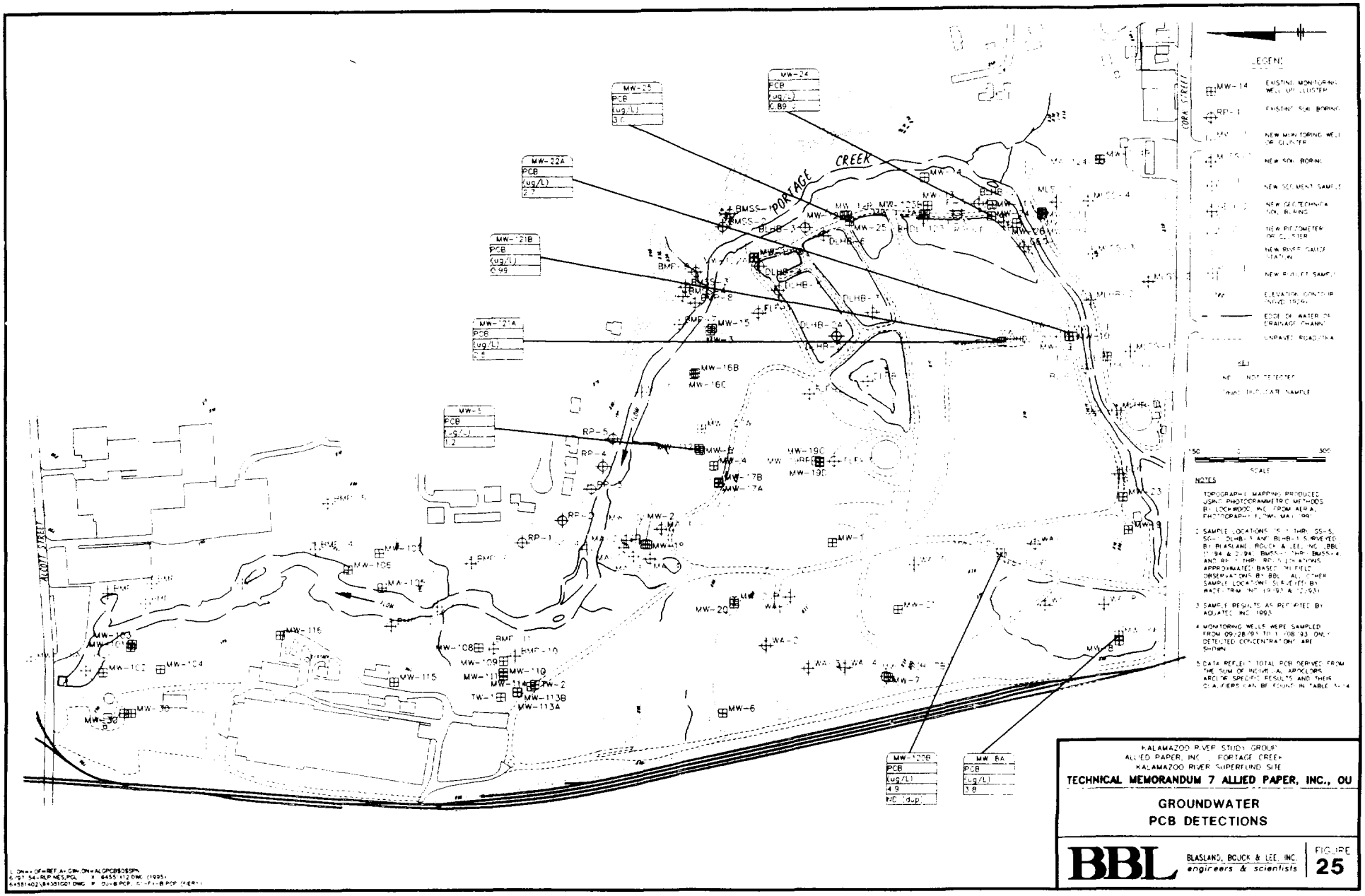
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

RESIDENTIAL PROPERTY
SOIL PCB DATA

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **24**



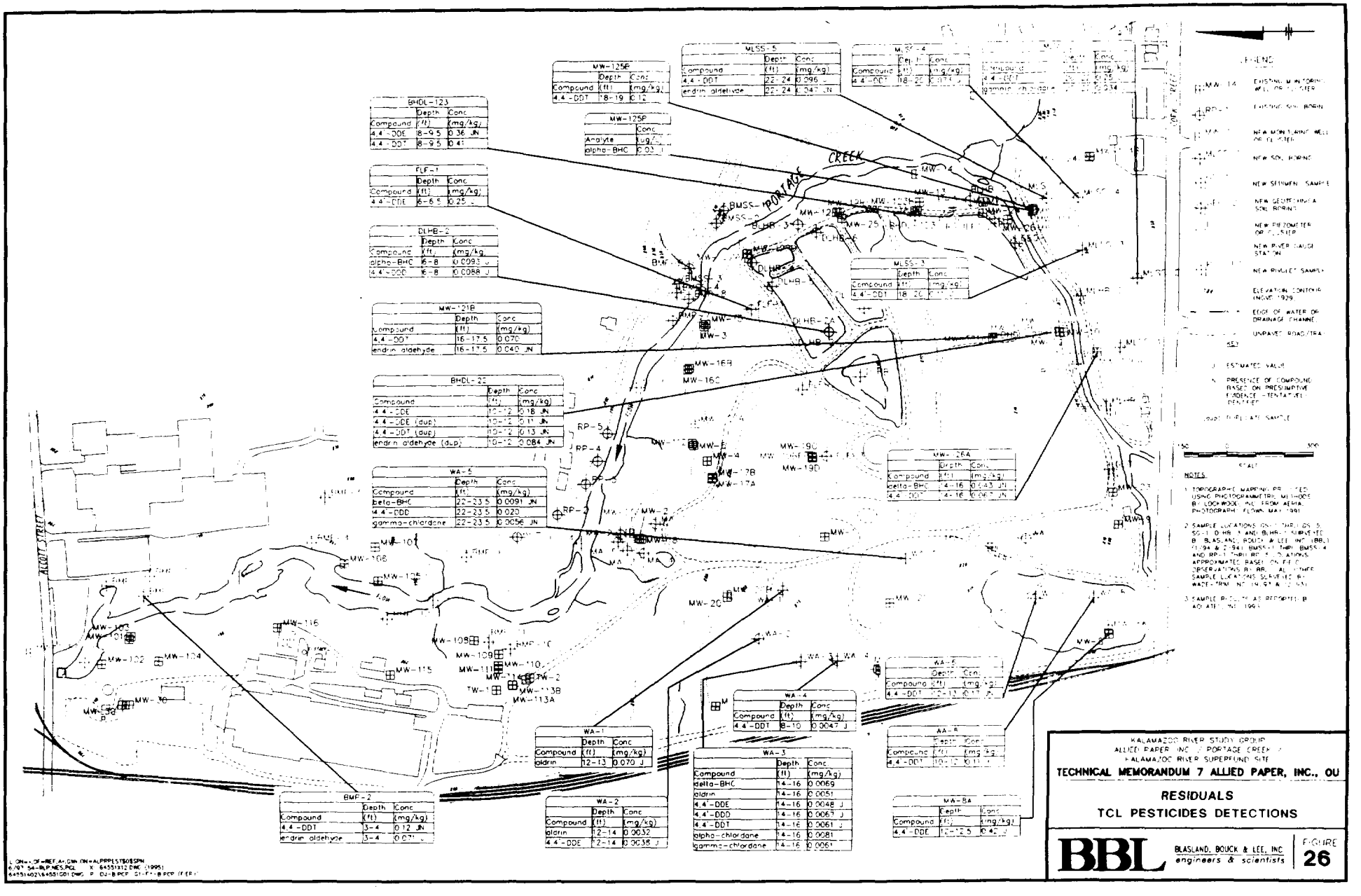
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

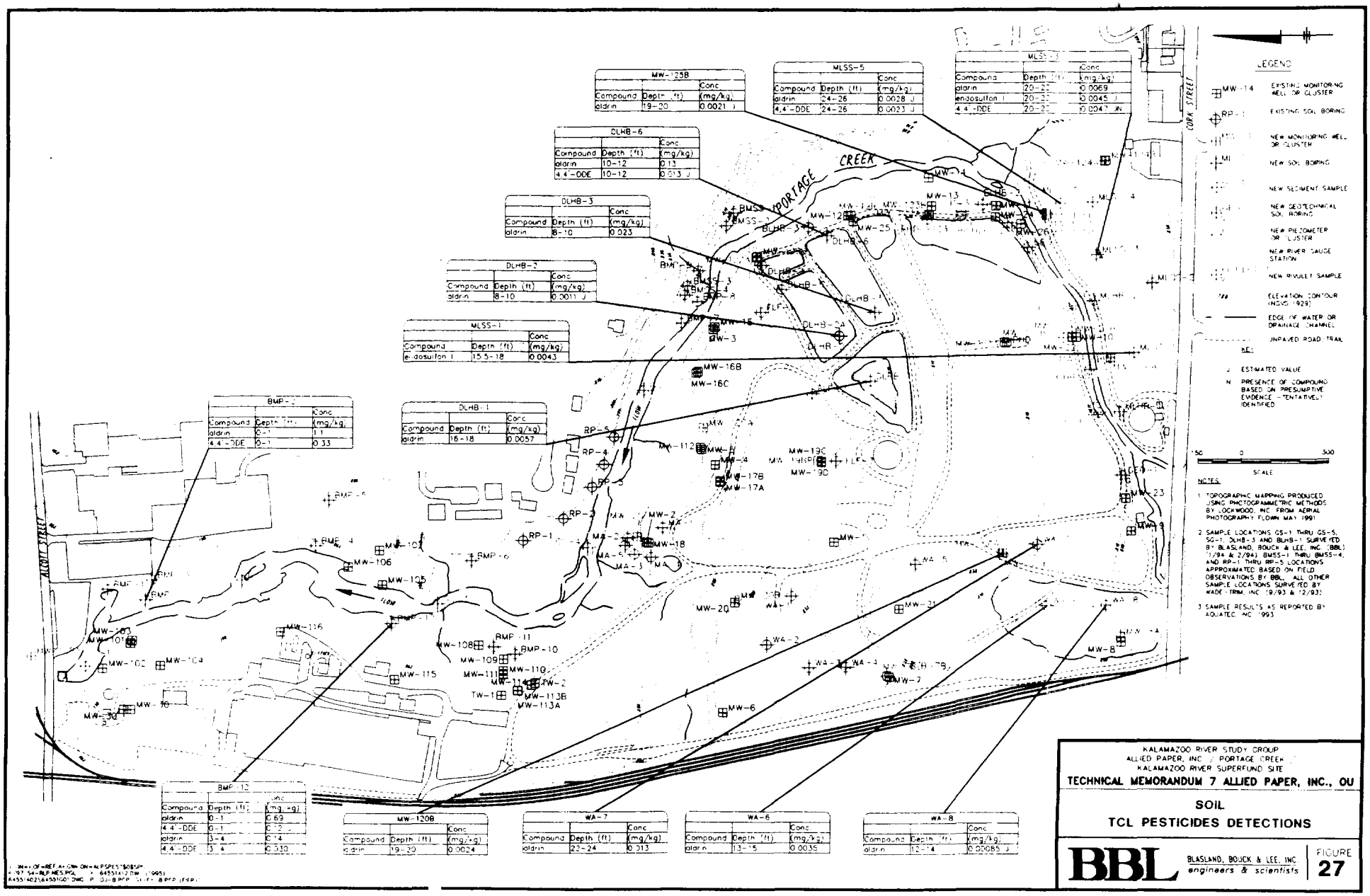
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

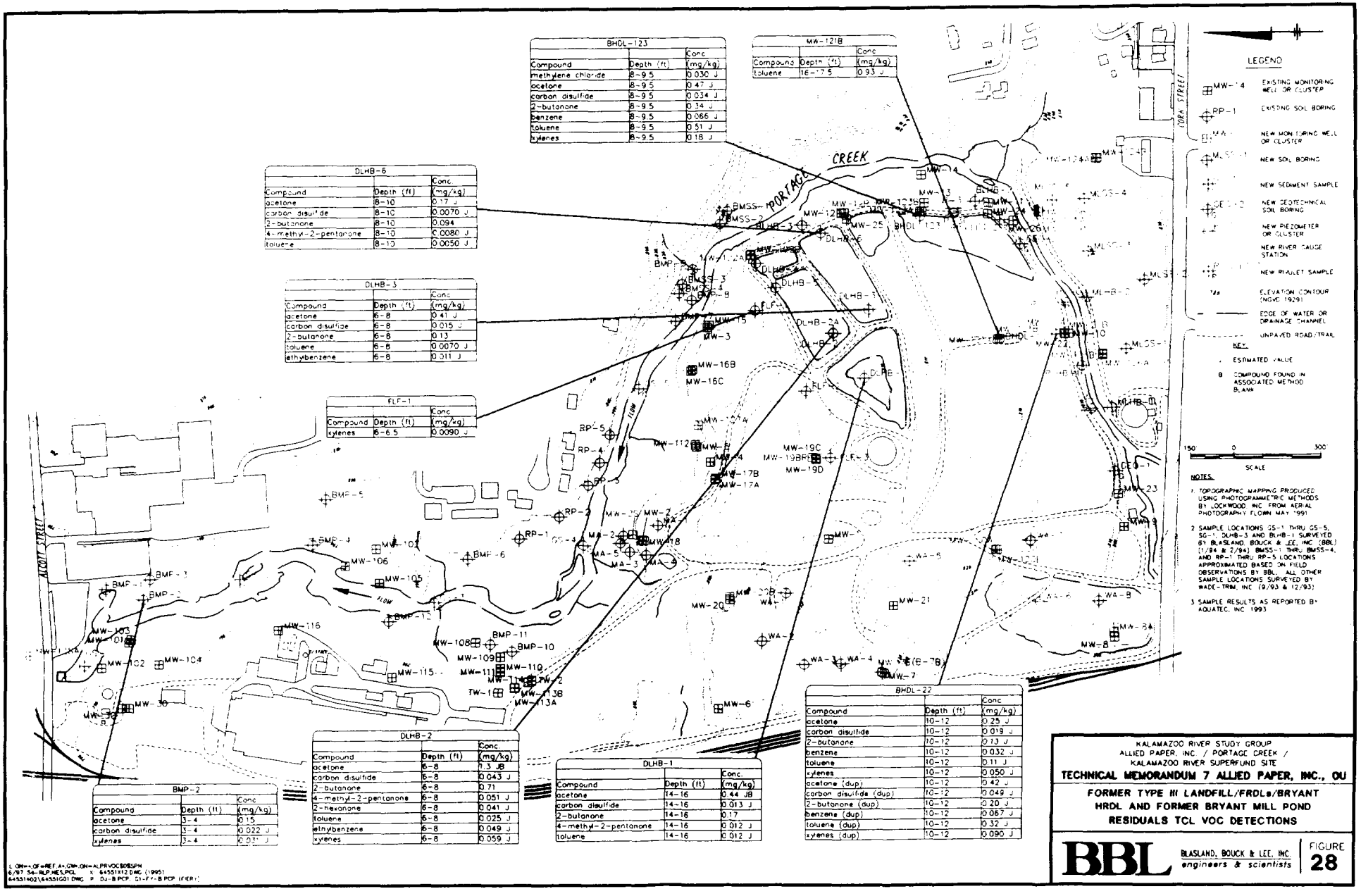
GROUNDWATER PCB DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **25**


MW-125F
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 18-19 | 0.12
MW-125P
Analyte | Conc (ug/L)
alpha-BHC | 0.03 J
MLSS-5
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 22-24 | 0.096 J
endrin aldehyde | 22-24 | 0.047 JN
BHDL-123
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDE | 8-9.5 | 0.36 JN
4,4'-DDT | 8-9.5 | 0.41
FLF-1
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDE | 6-6.5 | 0.25 J
DLHB-2
Compound | Depth (ft) | Conc (mg/kg)
alpha-BHC | 6-8 | 0.0093 J
4,4'-DDD | 6-8 | 0.0088 J
MW-121B
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 16-17.5 | 0.070
endrin aldehyde | 16-17.5 | 0.040 JN
BHDL-22
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDE | 10-12 | 0.18 JN
4,4'-DDE (dup) | 10-12 | 0.11 JN
4,4'-DDT (dup) | 10-12 | 0.13 JN
endrin aldehyde (dup) | 10-12 | 0.084 JN
WA-5
Compound | Depth (ft) | Conc (mg/kg)
beta-BHC | 22-23.5 | 0.0091 JN
4,4'-DDD | 22-23.5 | 0.020
gamma-chlordane | 22-23.5 | 0.0056 JN
MW-126A
Compound | Depth (ft) | Conc (mg/kg)
beta-BHC | 14-16 | 0.43 JN
4,4'-DDT | 14-16 | 0.067 JN
MLSS-3
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 18-20 | 0.34
WA-4
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 8-10 | 0.0047 J
WA-1
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 12-13 | 0.070 J
WA-2
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 12-14 | 0.0032
4,4'-DDE | 12-14 | 0.0038 J
WA-3
Compound | Depth (ft) | Conc (mg/kg)
beta-BHC | 14-16 | 0.0069
aldrin | 14-16 | 0.0051
4,4'-DDE | 14-16 | 0.0048 J
4,4'-DDD | 14-16 | 0.0067 J
4,4'-DDT | 14-16 | 0.0061 J
alpha-chlordane | 14-16 | 0.0081
gamma-chlordane | 14-16 | 0.0061
WA-6
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 10-12 | 0.17 J
WA-8
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 10-12 | 0.11 J
WA-8A
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDE | 14-16.5 | 0.42 J
BMP-2
Compound | Depth (ft) | Conc (mg/kg)
4,4'-DDT | 3-4 | 0.12 JN
endrin aldehyde | 3-4 | 0.071 J
LEGEND
EXISTING MONITORING WELL OR PIEZOMETER
EXISTING SOIL BORING
NEW MONITORING WELL OR PIEZOMETER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR PIEZOMETER
NEW RIVER GAUGE STATION
NEW RIVULET SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD/TRAIL
KEY
J ESTIMATED VALUE
N PRESENCE OF COMPOUND BASED ON PRESUMPTIVE EVIDENCE - TENTATIVELY IDENTIFIED
(DUP) DUPLICATE SAMPLE
150 0 300
SCALE
NOTES
1. TOPOGRAPHIC MAPPING PROVIDED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2. SAMPLE LOCATIONS (EXCEPT FOR SS-1, SD-1, DLHB-1 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) (1994 & 2-94); BMSS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC. IN 1993 & 1994).
3. SAMPLE RESULTS AS REPORTED IN ADAPTIVE, INC. 1995.
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
RESIDUALS
TCL PESTICIDES DETECTIONS
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 26


MW-125B
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 19-20 | 0.0021 J
MLSS-5
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 24-26 | 0.0028 J
4,4'-DDE | 24-26 | 0.0023 J
MLSS-4
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 20-22 | 0.0069
endosulfan I | 20-22 | 0.0045 J
4,4'-DDE | 20-22 | 0.0047 JN
DLHB-6
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 10-12 | 0.13
4,4'-DDE | 10-12 | 0.513 J
DLHB-3
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 8-10 | 0.023
DLHB-2
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 8-10 | 0.0011 J
MLSS-1
Compound | Depth (ft) | Conc (mg/kg)
endosulfan I | 15.5-18 | 0.0043
BMP-2
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 0-1 | 1.1
4,4'-DDE | 0-1 | 0.33
DLHB-1
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 16-18 | 0.0057
BMP-12
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 0-1 | 0.69
4,4'-DDE | 0-1 | 0.12
aldrin | 3-4 | 0.14
4,4'-DDE | 3-4 | 0.330
MW-120B
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 19-20 | 0.0024
WA-7
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 23-24 | 0.313
WA-6
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 13-15 | 0.0035
WA-8
Compound | Depth (ft) | Conc (mg/kg)
aldrin | 12-14 | 0.00085 J
PORTAGE CREEK
CORK STREET
ALCOTT STREET
FLOW
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAUGE STATION
NEW RIVULET SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD/TRAIL
NOTES:
J ESTIMATED VALUE
N PRESENCE OF COMPOUND BASED ON PRESUMPTIVE EVIDENCE - "TENTATIVELY IDENTIFIED"
50 0 100
SCALE
NOTES:
1 TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991
2 SAMPLE LOCATIONS GS-1 THRU GS-5, SG-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) 1/94 & 2/94). BMSS-1 THRU BMSS-4, AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC '9/93 & 12/93)
3 SAMPLE RESULTS AS REPORTED BY AQUATEC, INC '993
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
SOIL
TCL PESTICIDES DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
27



BHDL-123		
Compound	Depth (ft)	Conc (mg/kg)
methylene chloride	8-9.5	0.030 J
acetone	8-9.5	0.47 J
carbon disulfide	8-9.5	0.034 J
2-butanone	8-9.5	0.34 J
benzene	8-9.5	0.066 J
toluene	8-9.5	0.51 J
xylenes	8-9.5	0.18 J

MW-121B		
Compound	Depth (ft)	Conc (mg/kg)
toluene	16-17.5	0.93 J

DLHB-6		
Compound	Depth (ft)	Conc (mg/kg)
acetone	8-10	0.17 J
carbon disulfide	8-10	0.0070 J
2-butanone	8-10	0.094
4-methyl-2-pentanone	8-10	0.0080 J
toluene	8-10	0.0050 J

DLHB-3		
Compound	Depth (ft)	Conc (mg/kg)
acetone	6-8	0.41 J
carbon disulfide	6-8	0.015 J
2-butanone	6-8	0.13
toluene	6-8	0.0070 J
ethylbenzene	6-8	0.011 J

FLF-1		
Compound	Depth (ft)	Conc (mg/kg)
xylenes	6-6.5	0.0090 J

BMP-2		
Compound	Depth (ft)	Conc (mg/kg)
acetone	3-4	0.15
carbon disulfide	3-4	0.022 J
xylenes	3-4	0.03 J

DLHB-2		
Compound	Depth (ft)	Conc (mg/kg)
acetone	6-8	1.3 JB
carbon disulfide	6-8	0.043 J
2-butanone	6-8	0.71
4-methyl-2-pentanone	6-8	0.051 J
2-hexanone	6-8	0.041 J
toluene	6-8	0.025 J
ethylbenzene	6-8	0.049 J
xylenes	6-8	0.059 J

DLHB-1		
Compound	Depth (ft)	Conc. (mg/kg)
acetone	14-16	0.44 JB
carbon disulfide	14-16	0.013 J
2-butanone	14-16	0.17
4-methyl-2-pentanone	14-16	0.012 J
toluene	14-16	0.012 J

BHDL-22		
Compound	Depth (ft)	Conc (mg/kg)
acetone	10-12	0.25 J
carbon disulfide	10-12	0.019 J
2-butanone	10-12	0.13 J
benzene	10-12	0.032 J
toluene	10-12	0.11 J
xylenes	10-12	0.050 J
acetone (dup)	10-12	0.42 J
carbon disulfide (dup)	10-12	0.049 J
2-butanone (dup)	10-12	0.20 J
benzene (dup)	10-12	0.067 J
toluene (dup)	10-12	0.32 J
xylenes (dup)	10-12	0.090 J

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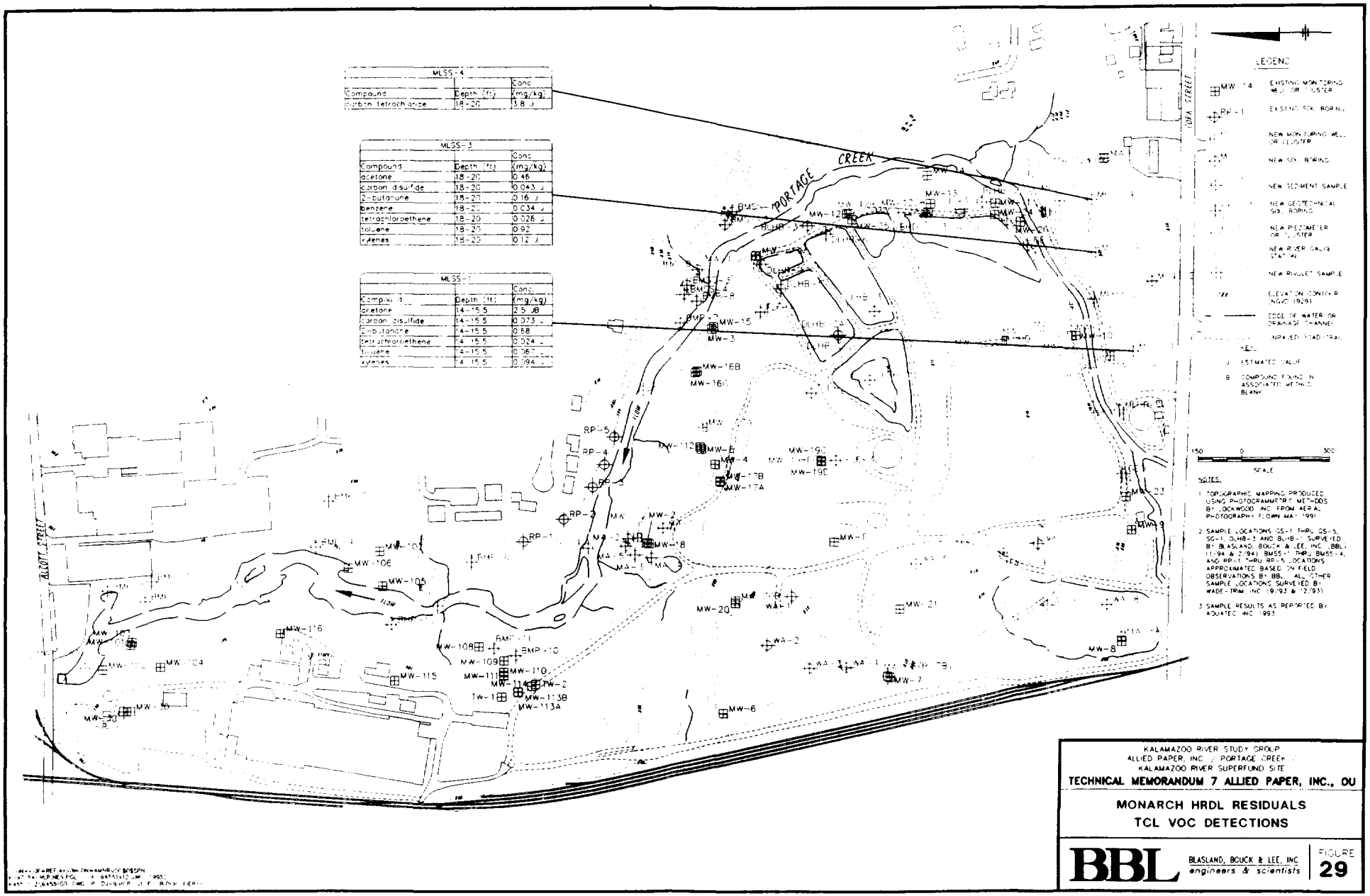
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/FRDLs/BRYANT HRDL AND FORMER BRYANT MILL POND RESIDUALS TCL VOC DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 28



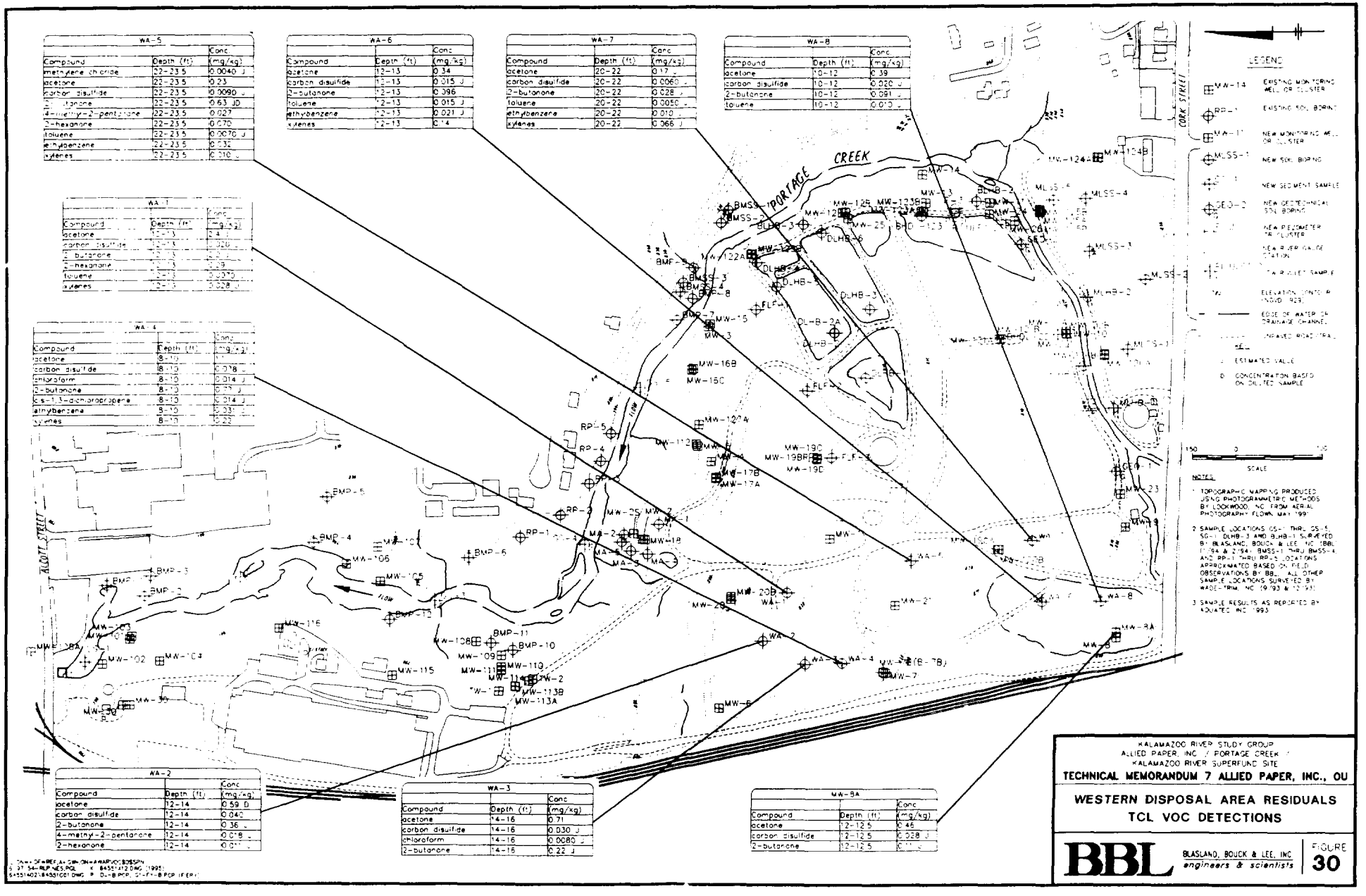
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

MONARCH HRDL RESIDUALS
TCL VOC DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **29**



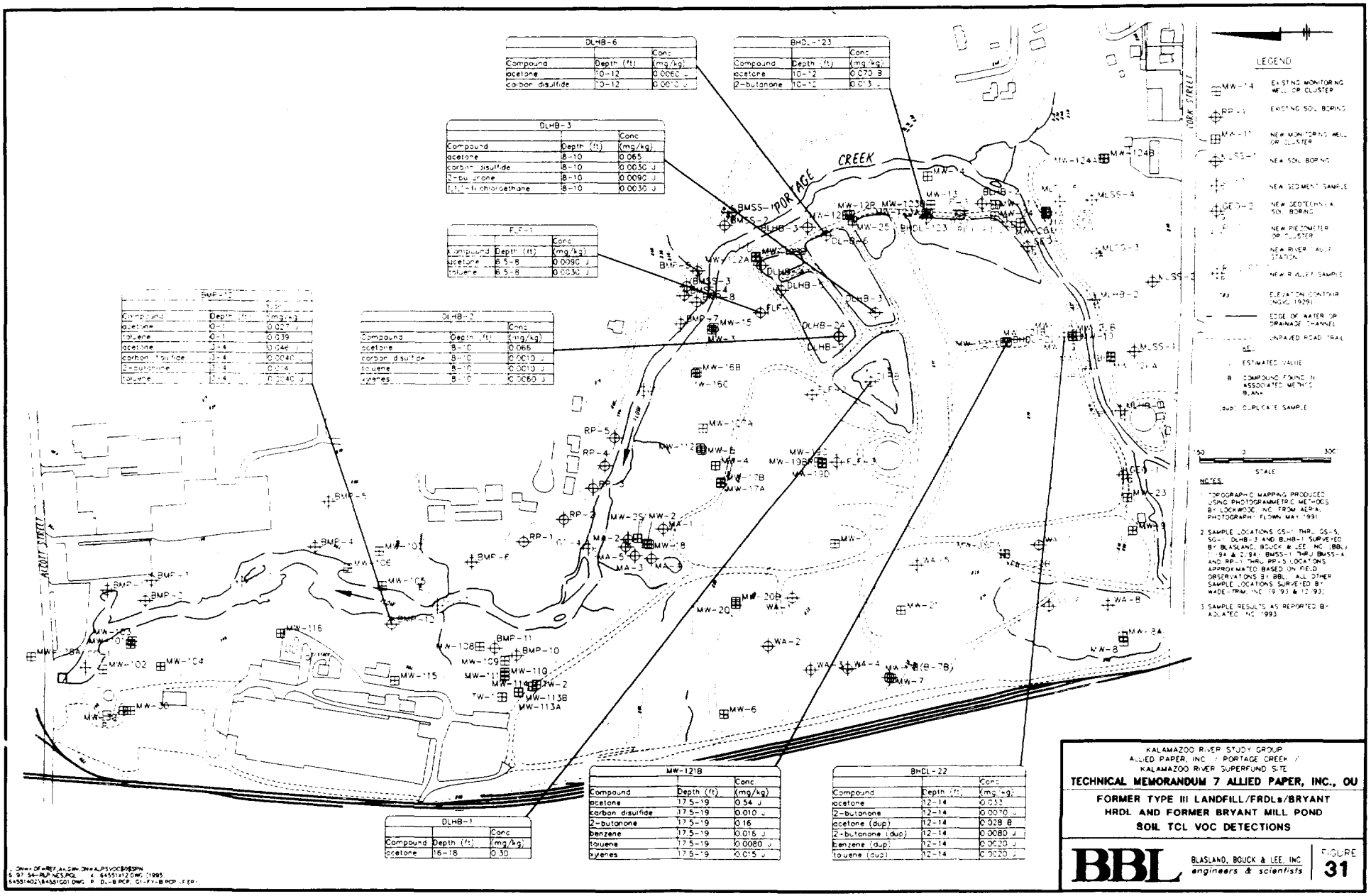
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

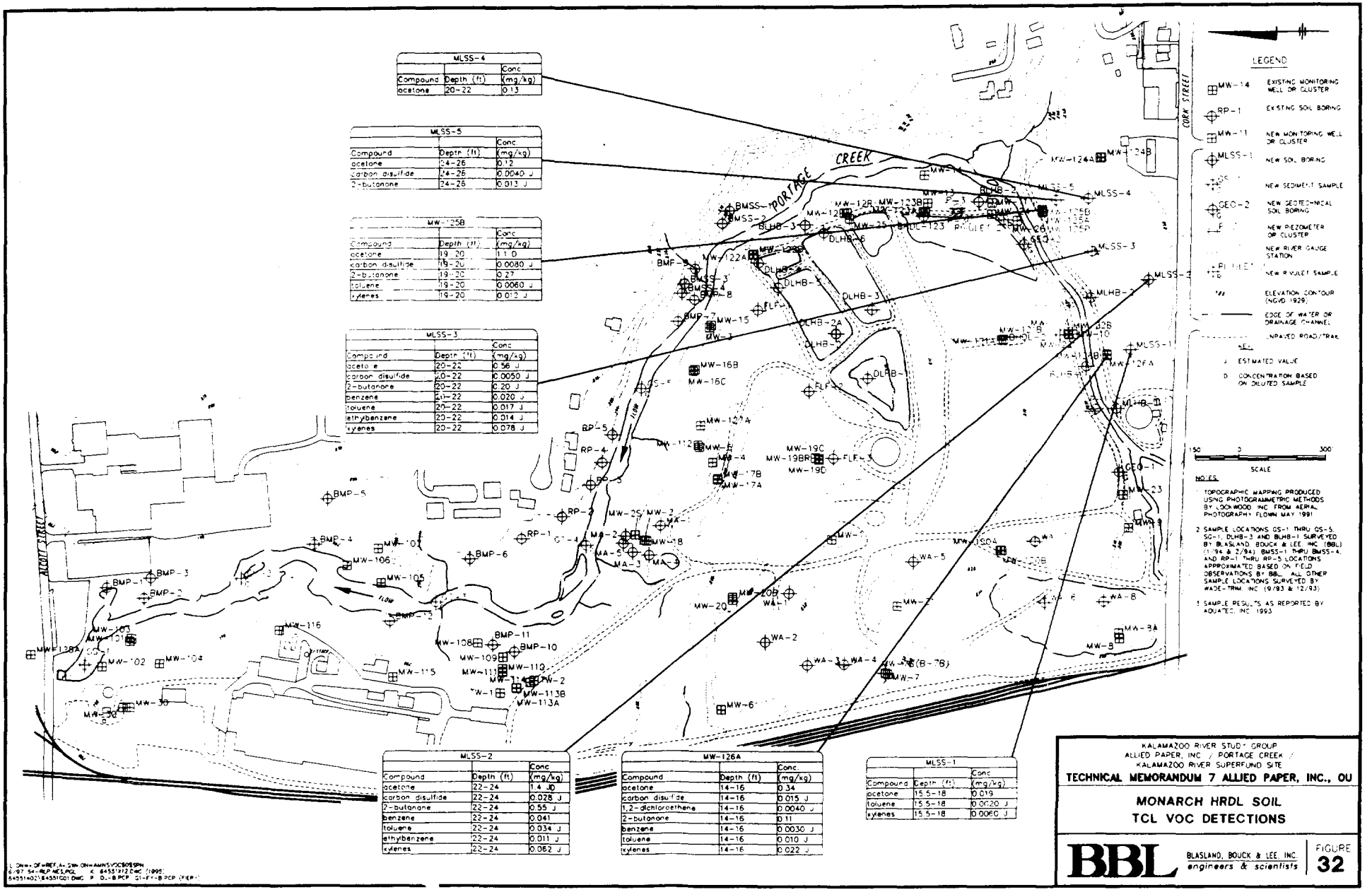
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

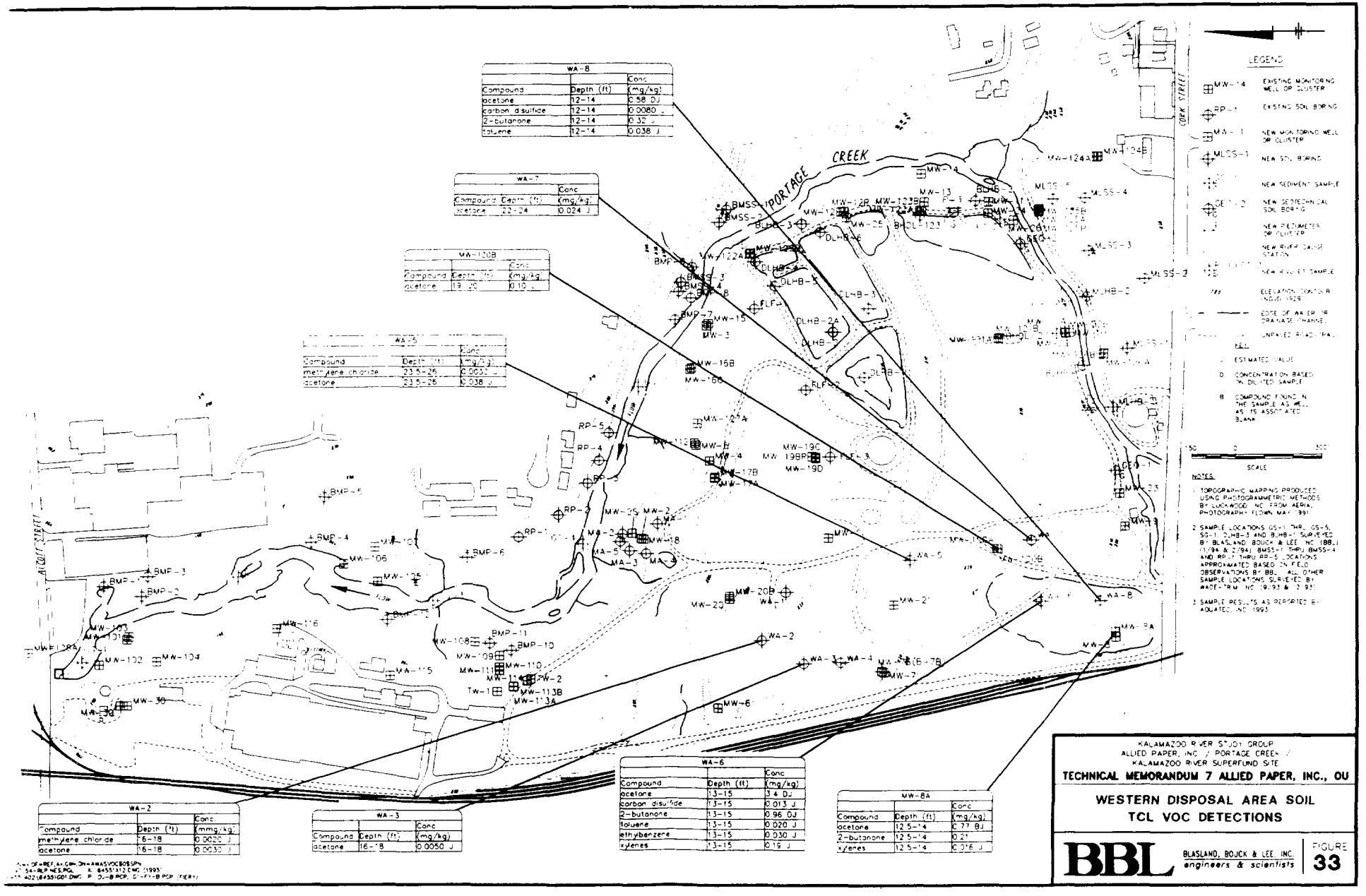
WESTERN DISPOSAL AREA RESIDUALS
TCL VOC DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **30**


DLHB-6
Compound | Depth (ft) | Conc (mg/kg)
acetone | 10-12 | 0.0060 J
carbon disulfide | 10-12 | 0.0010 J
BHDL-123
Compound | Depth (ft) | Conc (mg/kg)
acetone | 10-12 | 0.070 B
2-butanone | 10-12 | 0.013 J
DLHB-3
Compound | Depth (ft) | Conc (mg/kg)
acetone | 8-10 | 0.065
carbon disulfide | 8-10 | 0.0030 J
2-butanone | 8-10 | 0.0090 J
1,1,1-trichloroethane | 8-10 | 0.0030 J
FLF-1
Compound | Depth (ft) | Conc (mg/kg)
acetone | 6.5-8 | 0.0090 J
toluene | 6.5-8 | 0.0030 J
BMP-12
Compound | Depth (ft) | Conc (mg/kg)
acetone | 0-1 | 0.023
toluene | 0-1 | 0.039
acetone | 3-4 | 0.046
carbon disulfide | 3-4 | 0.0040 J
2-butanone | 3-4 | 0.014
toluene | 3-4 | 0.0240 J
DLHB-2
Compound | Depth (ft) | Conc (mg/kg)
acetone | 8-10 | 0.065
carbon disulfide | 8-10 | 0.0010 J
toluene | 8-10 | 0.0010 J
xylenes | 8-10 | 0.0060 J
DLHB-1
Compound | Depth (ft) | Conc (mg/kg)
acetone | 16-18 | 0.30
MW-121B
Compound | Depth (ft) | Conc (mg/kg)
acetone | 17.5-19 | 0.54 J
carbon disulfide | 17.5-19 | 0.010 J
2-butanone | 17.5-19 | 0.16
benzene | 17.5-19 | 0.016 J
toluene | 17.5-19 | 0.0080 J
xylenes | 17.5-19 | 0.015 J
BHDL-22
Compound | Depth (ft) | Conc (mg/kg)
acetone | 12-14 | 0.033
2-butanone | 12-14 | 0.0070 J
acetone (dup) | 12-14 | 0.028 B
2-butanone (dup) | 12-14 | 0.0080 J
benzene (dup) | 12-14 | 0.0020 J
toluene (dup) | 12-14 | 0.0020 J
PORTAGE CREEK
CORK STREET
AIRPORT STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAUGE STATION
NEW RIVER WATER SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD TRAIL
ESTIMATES VALUE
COMPOUND FOUND IN ASSOCIATED METHOD BLANK
(dup) DUPLICATE SAMPLE
150 0 300
SCALE
NOTES:
1 TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2 SAMPLE LOCATIONS GS-1 THRU GS-5, SG-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) 11-94 & 2-94; BMSS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC. (9-93 & 12-93).
3 SAMPLE RESULTS AS REPORTED BY ADL-TEC, INC. 1993.
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
FORMER TYPE III LANDFILL/FRDLs/BRYANT
HRDL AND FORMER BRYANT MILL POND
SOIL TCL VOC DETECTIONS
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 31


MLSS-4
Compound | Depth (ft) | Conc (mg/kg)
acetone | 20-22 | 0.13
MLSS-5
Compound | Depth (ft) | Conc (mg/kg)
acetone | 24-26 | 0.12
carbon disulfide | 24-26 | 0.0040 J
2-butanone | 24-26 | 0.013 J
MW-125B
Compound | Depth (ft) | Conc (mg/kg)
acetone | 19-20 | 11 D
carbon disulfide | 19-20 | 0.0080 J
2-butanone | 19-20 | 0.27
toluene | 19-20 | 0.0060 J
xylenes | 19-20 | 0.012 J
MLSS-3
Compound | Depth (ft) | Conc (mg/kg)
acetone | 20-22 | 0.56 J
carbon disulfide | 20-22 | 0.0050 J
2-butanone | 20-22 | 0.20 J
benzene | 20-22 | 0.020 J
toluene | 20-22 | 0.017 J
ethylbenzene | 20-22 | 0.014 J
xylenes | 20-22 | 0.078 J
MLSS-2
Compound | Depth (ft) | Conc (mg/kg)
acetone | 22-24 | 1.4 JD
carbon disulfide | 22-24 | 0.028 J
2-butanone | 22-24 | 0.55 J
benzene | 22-24 | 0.041
toluene | 22-24 | 0.034 J
ethylbenzene | 22-24 | 0.011 J
xylenes | 22-24 | 0.062 J
MW-126A
Compound | Depth (ft) | Conc (mg/kg)
acetone | 14-16 | 0.34
carbon disulfide | 14-16 | 0.015 J
1,2-dichloroethene | 14-16 | 0.0040 J
2-butanone | 14-16 | 0.11
benzene | 14-16 | 0.0030 J
toluene | 14-16 | 0.010 J
xylenes | 14-16 | 0.022 J
MLSS-1
Compound | Depth (ft) | Conc (mg/kg)
acetone | 15.5-18 | 0.019
toluene | 15.5-18 | 0.0020 J
xylenes | 15.5-18 | 0.0060 J
PORTAGE CREEK
CORK STREET
ALCOTT STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAUGE STATION
NEW PUMP TEST SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD/TRAIL
NOTES
J ESTIMATED VALUE
D CONCENTRATION BASED ON DILUTED SAMPLE
150 0 300
SCALE
NOTES
1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2. SAMPLE LOCATIONS GS-1 THRU GS-5, SG-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE INC. (BBL) (1/94 & 2/94). BMSS-1 THRU BMSS-4, AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC (9/93 & 12/93).
3. SAMPLE RESULTS AS REPORTED BY AQUATEC INC. 1993.
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
MONARCH HRDL SOIL
TCL VOC DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
32



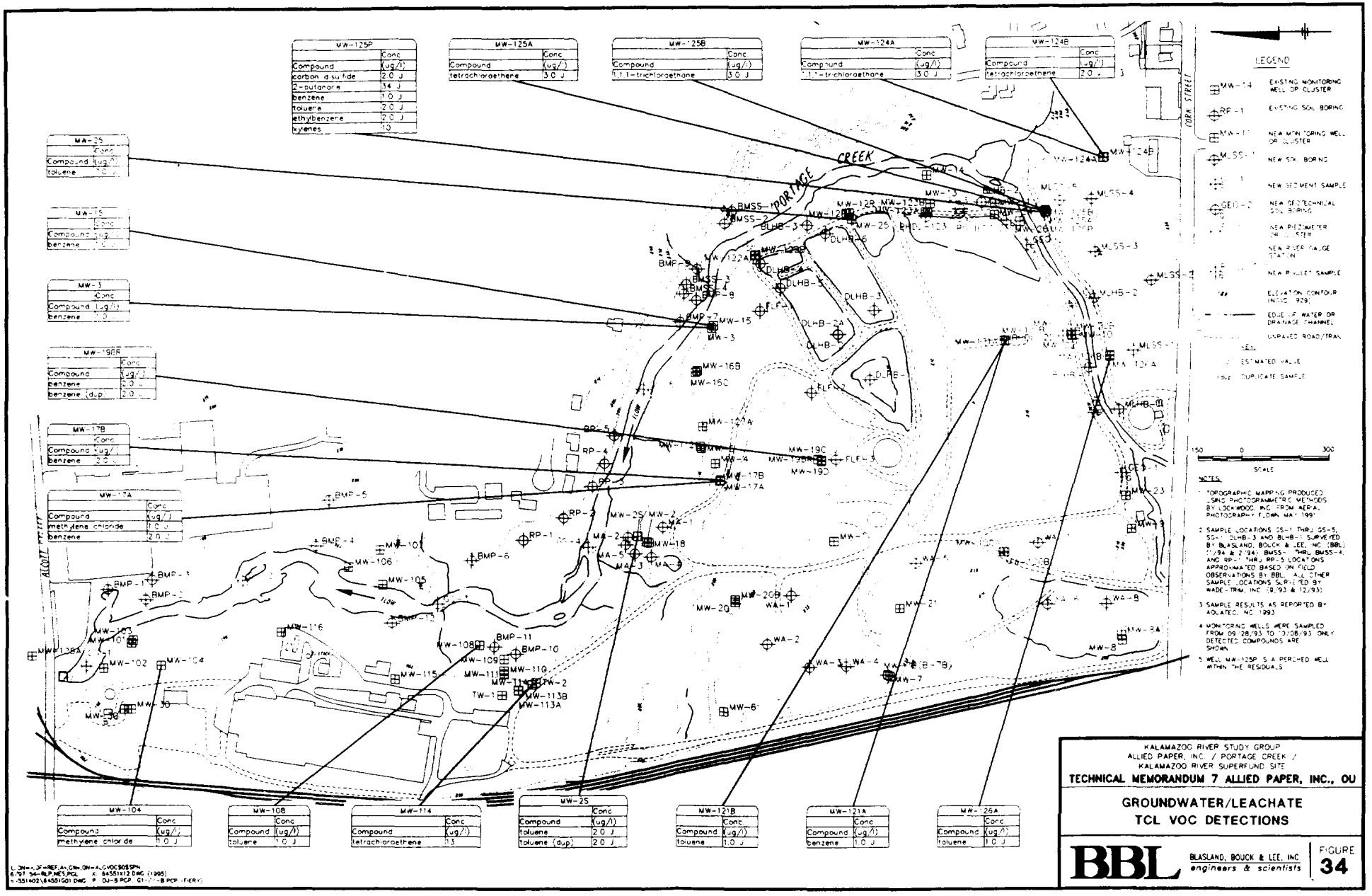
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

WESTERN DISPOSAL AREA SOIL TCL VOC DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **33**



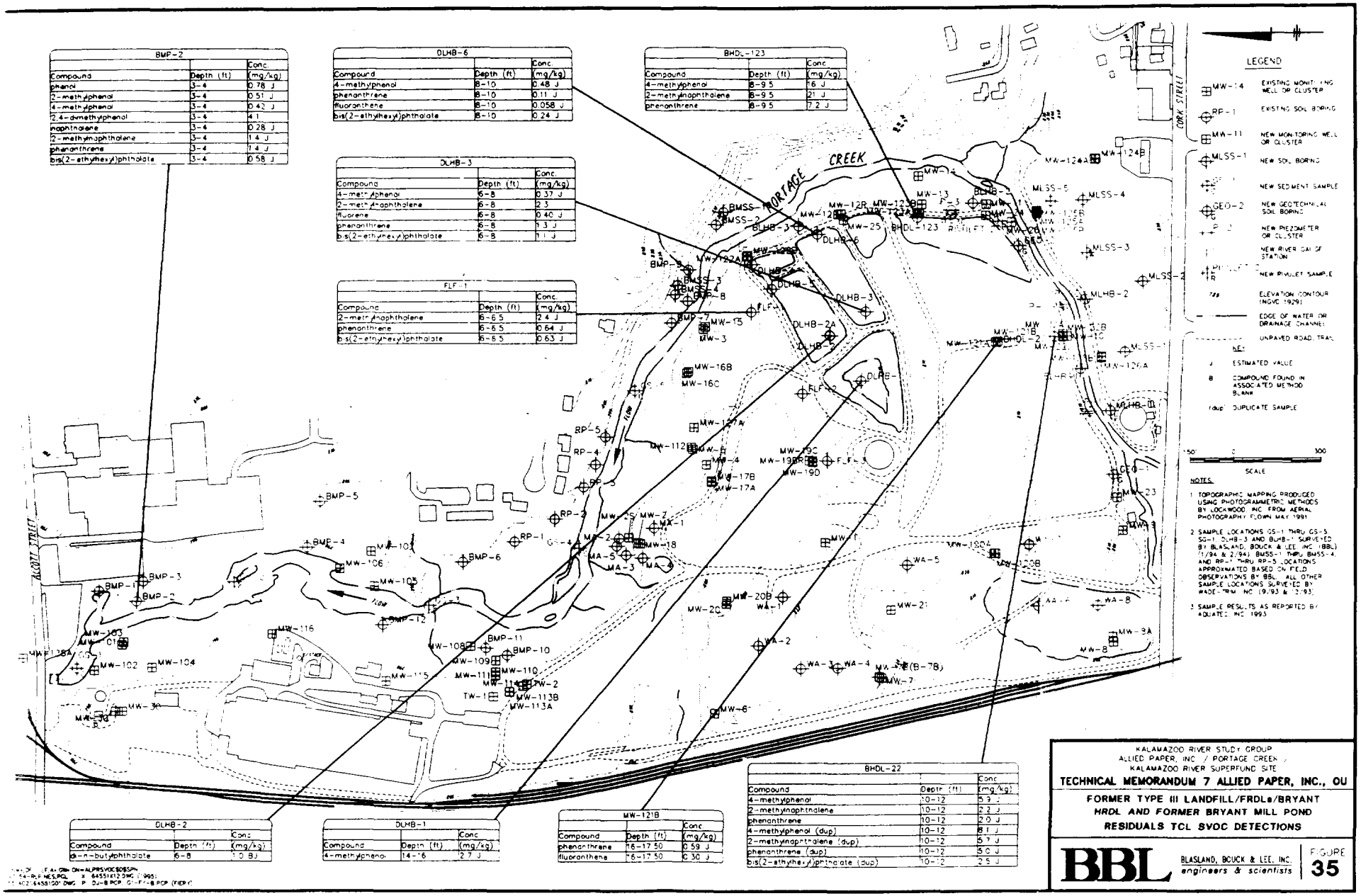
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

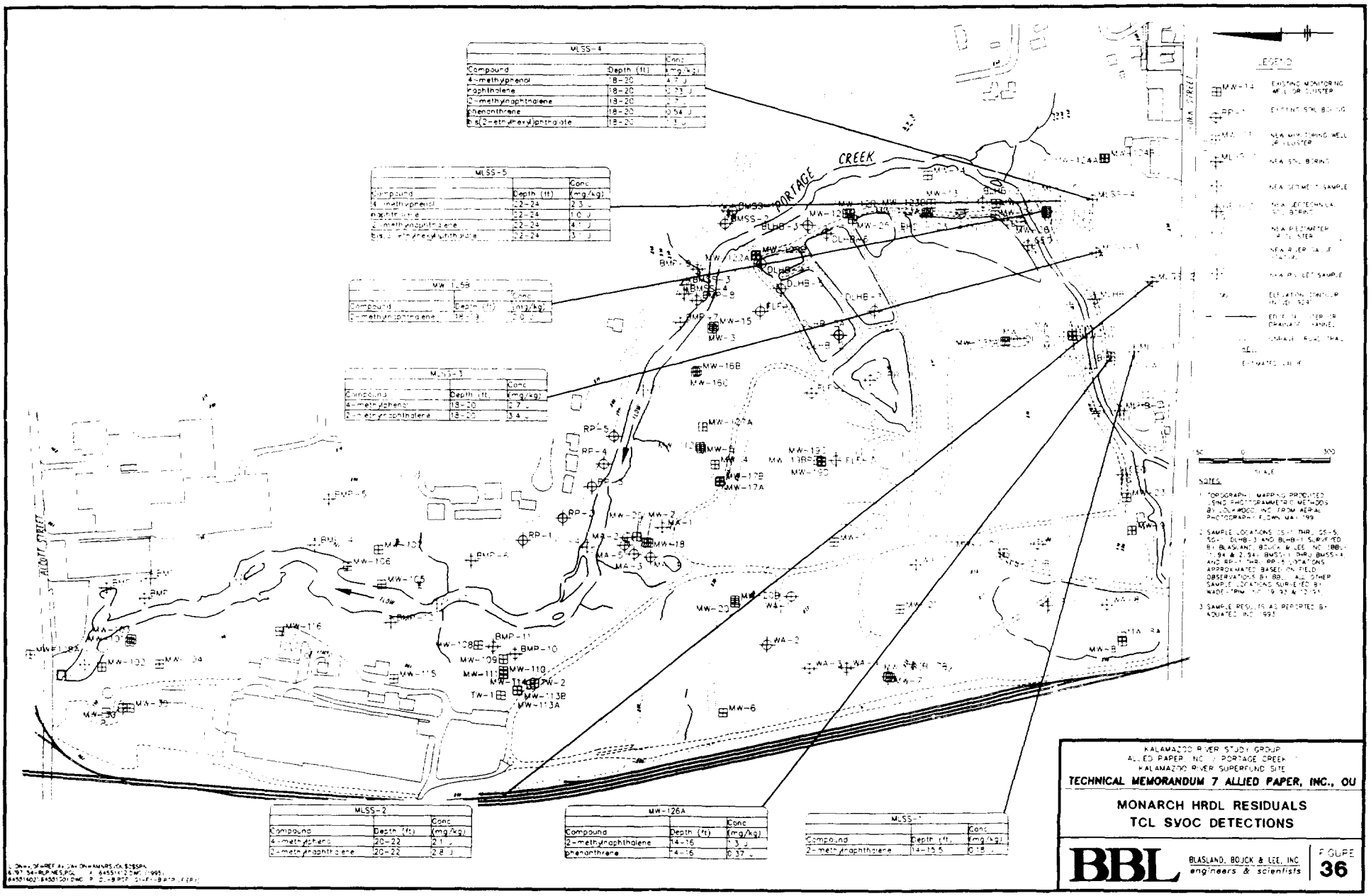
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

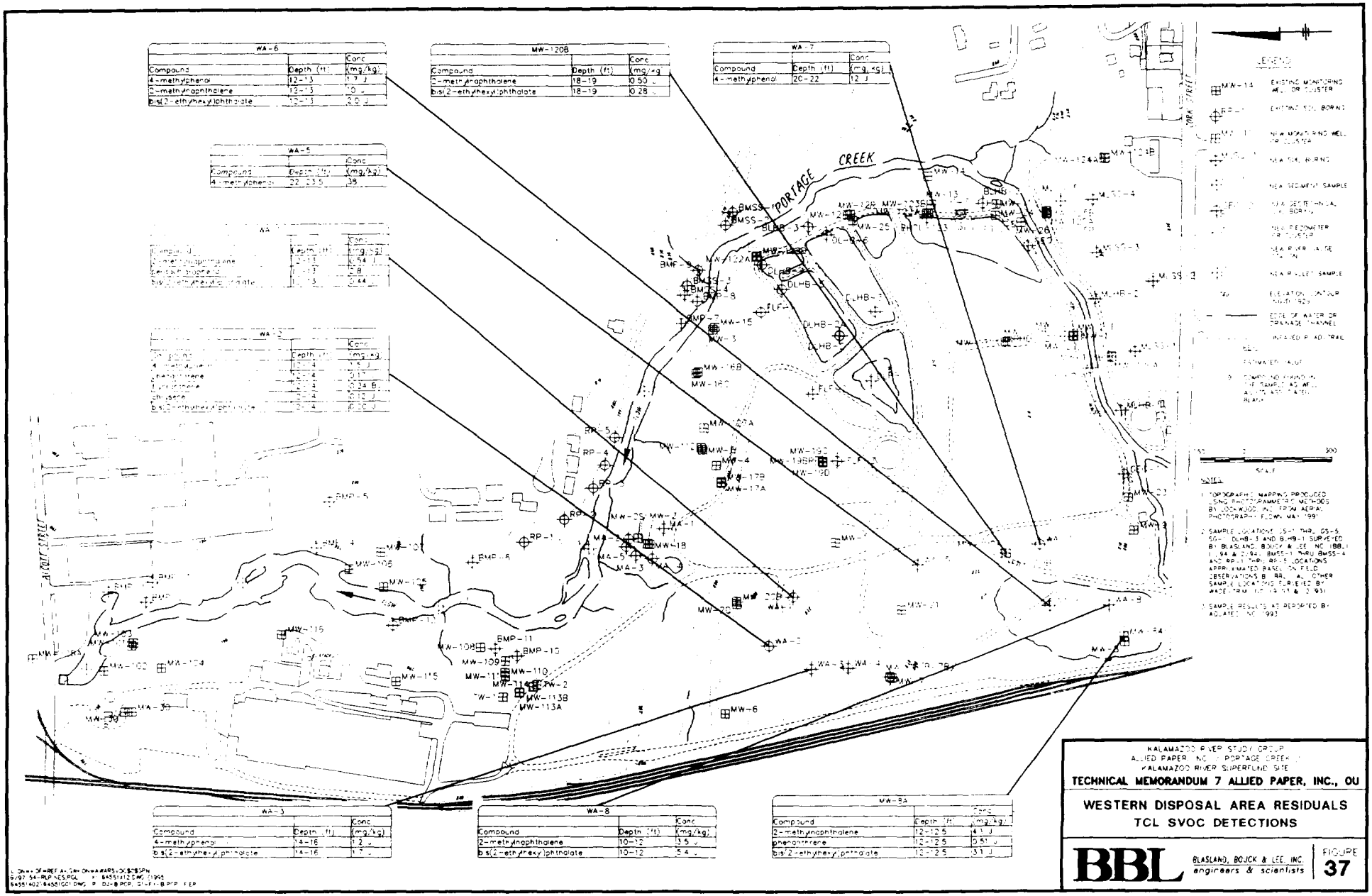
GROUNDWATER/LEACHATE TCL VOC DETECTIONS

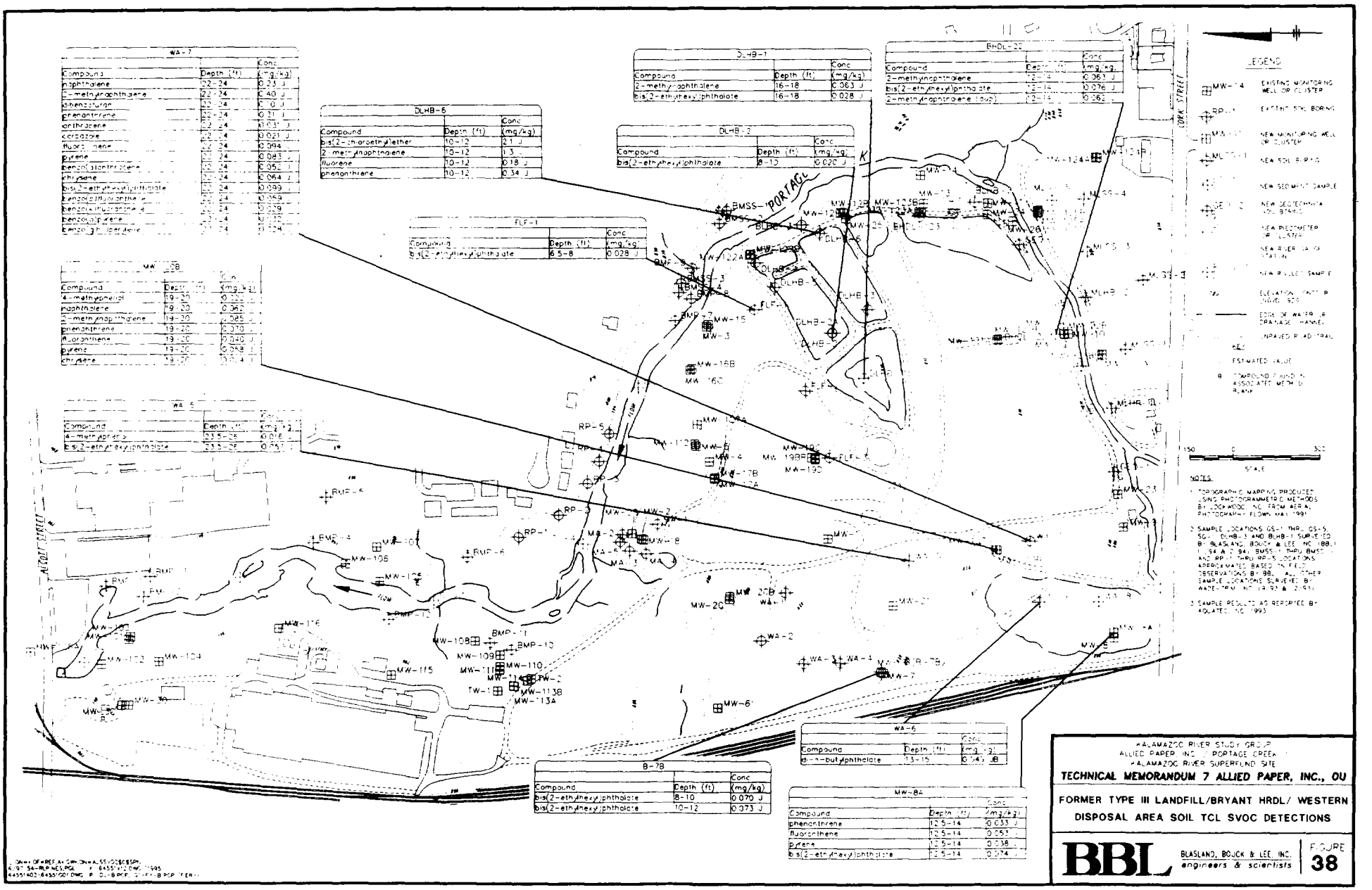
BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **34**


BMP-2
Compound | Depth (ft) | Conc. (mg/kg)
phenol | 3-4 | 0.78 J
2-methylphenol | 3-4 | 0.51 J
4-methylphenol | 3-4 | 0.42 J
2,4-dimethylphenol | 3-4 | 4.1
naphthalene | 3-4 | 0.28 J
2-methylnaphthalene | 3-4 | 1.4 J
phenanthrene | 3-4 | 1.4 J
bis(2-ethylhexyl)phthalate | 3-4 | 0.58 J
DLHB-6
Compound | Depth (ft) | Conc. (mg/kg)
4-methylphenol | 8-10 | 0.48 J
phenanthrene | 8-10 | 0.11 J
fluoranthene | 8-10 | 0.058 J
bis(2-ethylhexyl)phthalate | 8-10 | 0.24 J
BHDL-123
Compound | Depth (ft) | Conc. (mg/kg)
4-methylphenol | 8-9.5 | 16 J
2-methylnaphthalene | 8-9.5 | 21 J
phenanthrene | 8-9.5 | 7.2 J
DLHB-3
Compound | Depth (ft) | Conc. (mg/kg)
4-methylphenol | 6-8 | 0.37 J
2-methylnaphthalene | 6-8 | 2.3
fluorene | 6-8 | 0.40 J
phenanthrene | 6-8 | 1.3 J
bis(2-ethylhexyl)phthalate | 6-8 | 1.1 J
FLF-1
Compound | Depth (ft) | Conc. (mg/kg)
2-methylnaphthalene | 6-6.5 | 2.4 J
phenanthrene | 6-6.5 | 0.64 J
bis(2-ethylhexyl)phthalate | 6-6.5 | 0.63 J
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAGE STATION
NEW PHOTOLOG SAMPLE
ELEVATION CONTOUR (NGVD 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD, TRAIL
NOTES:
J ESTIMATED VALUE
B COMPOUND FOUND IN ASSOCIATED METHOD BLANK
(dup) DUPLICATE SAMPLE
SCALE
NOTES
1 TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2 SAMPLE LOCATIONS GS-1 THRU GS-5, SG-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE INC. (BBL) (1/94 & 2/94). BMSS-1 THRU BMSS-4, AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. (9/93 & 2/93).
3 SAMPLE RESULTS AS REPORTED BY ADUATEC INC. 1993.
DLHB-2
Compound | Depth (ft) | Conc. (mg/kg)
di-n-butylphthalate | 6-8 | 1.0 BJ
DLHB-1
Compound | Depth (ft) | Conc. (mg/kg)
4-methylphenol | 14-16 | 2.7 J
MW-121B
Compound | Depth (ft) | Conc. (mg/kg)
phenanthrene | 16-17.50 | 0.59 J
fluoranthene | 16-17.50 | 0.30 J
BHDL-22
Compound | Depth (ft) | Conc. (mg/kg)
4-methylphenol | 10-12 | 5.9 J
2-methylnaphthalene | 10-12 | 2.2 J
phenanthrene | 10-12 | 2.0 J
4-methylphenol (dup) | 10-12 | 8.1 J
2-methylnaphthalene (dup) | 10-12 | 5.7 J
phenanthrene (dup) | 10-12 | 5.0 J
bis(2-ethylhexyl)phthalate (dup) | 10-12 | 2.5 J
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
FORMER TYPE III LANDFILL/FRDLs/BRYANT
HRDL AND FORMER BRYANT MILL POND
RESIDUALS TCL SVOC DETECTIONS
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 35


MLSS-4
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 18-20 | 4.7 J
naphthalene | 18-20 | 0.23 J
2-methylnaphthalene | 18-20 | 0.5 J
phenanthrene | 18-20 | 0.54 J
bis(2-ethylhexyl)phthalate | 18-20 | 1 U
MLSS-5
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 22-24 | 2.3 U
naphthalene | 22-24 | 1.0 U
2-methylnaphthalene | 22-24 | 4.1 J
bis(2-ethylhexyl)phthalate | 22-24 | 3 J
MW-1.5B
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 18-20 | 2.0 U
MLSS-3
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 18-20 | 2.7 U
2-methylnaphthalene | 18-20 | 3.4 U
MLSS-2
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 20-22 | 2.1 U
2-methylnaphthalene | 20-22 | 2.8 J
MW-126A
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 14-16 | 1.3 J
phenanthrene | 14-16 | 0.37 J
MLSS-1
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 14-15.5 | 0.15 J
PORTAGE CREEK
ALCOTT STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER CLUSTER
NEW RIVER GAUGE LOCATION
NEW PCB LEVEL SAMPLE
ELEVATION CONTOUR (IN FEET)
EDGE OF WATER OR DRAINAGE CHANNEL
RAILROAD
ROAD
ESTIMATED VALUE
SCALE
NOTES:
1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY ADAM ASPOC, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1993.
2. SAMPLE LOCATIONS SS-1 THRU SS-5, SS-7, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) ON 2 & 3 SEPTEMBER 1994. BMS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC. ON 9 & 10 SEPTEMBER 1993.
3. SAMPLE RESULTS AS REPORTED BY AQUATEC, INC. 1993.
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
MONARCH HRDL RESIDUALS
TCL SVOC DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
36


WA-6
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 12-13 | 1.7 J
2-methylnaphthalene | 13-13 | 10 J
bis(2-ethylhexyl)phthalate | 12-13 | 2.0 J
MW-120B
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 18-19 | 0.50 J
bis(2-ethylhexyl)phthalate | 18-19 | 0.28 J
WA-7
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 20-22 | 12 J
WA-5
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 22-23.5 | 38
WA-4
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 3-5 | 0.54 J
4-methylphenol | 3-5 | 2.8
bis(2-ethylhexyl)phthalate | 3-5 | 0.44 J
WA-2
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 3-4 | 1.6 J
naphthalene | 3-4 | 0.17 J
fluorene | 3-4 | 0.24 B
chrysene | 3-4 | 0.12 J
bis(2-ethylhexyl)phthalate | 3-4 | 0.30 J
WA-3
Compound | Depth (ft) | Conc (mg/kg)
4-methylphenol | 14-16 | 1.2 J
bis(2-ethylhexyl)phthalate | 14-16 | 1.7 J
WA-8
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 10-12 | 3.5 J
bis(2-ethylhexyl)phthalate | 10-12 | 5.4 J
MW-8A
Compound | Depth (ft) | Conc (mg/kg)
2-methylnaphthalene | 12-12.5 | 4.1 J
phenanthrene | 12-12.5 | 0.51 J
bis(2-ethylhexyl)phthalate | 12-12.5 | 3.1 J
PORTAGE CREEK
AIRPORT CANAL
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW GEOTECHNICAL SOIL BORING
NEW PIEZOMETER OR CLUSTER
NEW RIVER GAGE
NEW PLANT SAMPLE
ELEVATION DATUM (USGS 1929)
EDGE OF WATER OR DRAINAGE CHANNEL
INFERRED FLOODPLAIN
FILL
ESTIMATED VALUE
NOTES
1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY JOHNSON, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2. SAMPLE LOCATIONS GS-1 THRU GS-6, SS-1, DLHB-1 AND B-19-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL). SB-94 & 2-94, BMSS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS. BBL, AWI, OTHER SAMPLE LOCATIONS FURNISHED BY WADE-TRIM (10-19-91 & 2-95).
3. SAMPLE RESULTS AS REPORTED BY ADL (TEC 1993).
SCALE
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
WESTERN DISPOSAL AREA RESIDUALS
TCL SVOC DETECTIONS
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 37



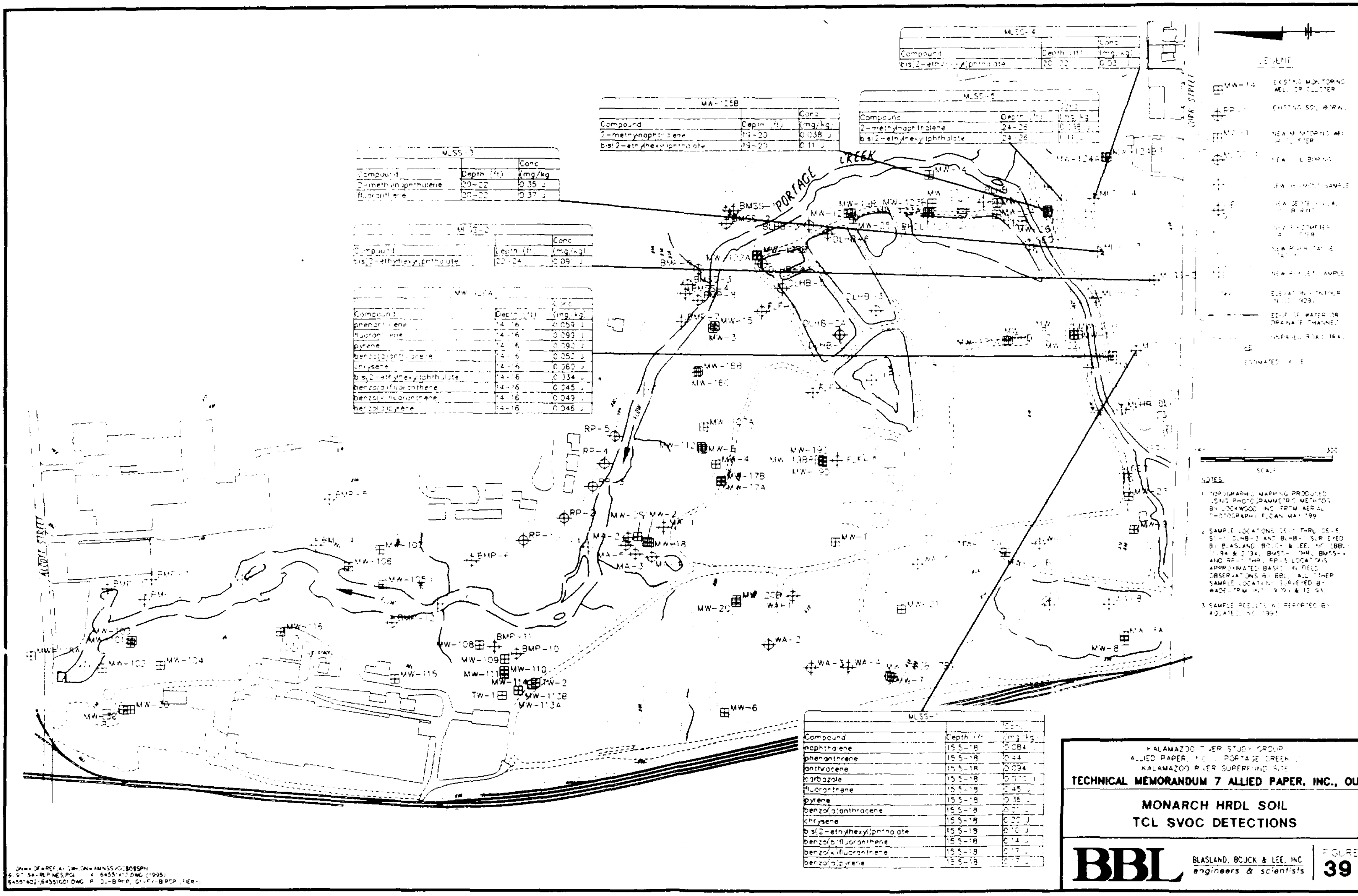
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/BRYANT HRDL/ WESTERN DISPOSAL AREA SOIL TCL SVOC DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 38



MLSS-4		
Compound	Depth (ft)	Conc (mg/kg)
bis(2-ethylhexyl)phthalate	20-22	0.03 J

MW-125B		
Compound	Depth (ft)	Conc (mg/kg)
2-methylnaphthalene	19-20	0.038 J
bis(2-ethylhexyl)phthalate	19-20	0.11 J

MLSS-5		
Compound	Depth (ft)	Conc (mg/kg)
2-methylnaphthalene	24-26	0.038 J
bis(2-ethylhexyl)phthalate	24-26	[illegible]

MLSS-3		
Compound	Depth (ft)	Conc (mg/kg)
2-methylnaphthalene	20-22	0.35 J
fluoranthene	20-22	0.37 J

MLSS-2		
Compound	Depth (ft)	Conc (mg/kg)
bis(2-ethylhexyl)phthalate	22-24	0.091 J

MW-102A		
Compound	Depth (ft)	Conc (mg/kg)
phenanthrene	14-16	0.059 J
fluoranthene	14-16	0.093 J
pyrene	14-16	0.090 J
benzo(a)anthracene	14-16	0.052 J
chrysene	14-16	0.060 J
bis(2-ethylhexyl)phthalate	14-16	0.034 J
benzo(b)fluoranthene	14-16	0.045 J
benzo(k)fluoranthene	14-16	0.049 J
benzo(a)pyrene	14-16	0.046 J

MLSS-1		
Compound	Depth (ft)	Conc (mg/kg)
naphthalene	15.5-18	0.084
phenanthrene	15.5-18	0.44
anthracene	15.5-18	0.094
carbazole	15.5-18	[illegible]
fluoranthene	15.5-18	0.45 J
pyrene	15.5-18	0.38 J
benzo(a)anthracene	15.5-18	[illegible]
chrysene	15.5-18	0.20 J
bis(2-ethylhexyl)phthalate	15.5-18	0.10 J
benzo(b)fluoranthene	15.5-18	0.14 J
benzo(k)fluoranthene	15.5-18	0.17 J
benzo(a)pyrene	15.5-18	0.17 J

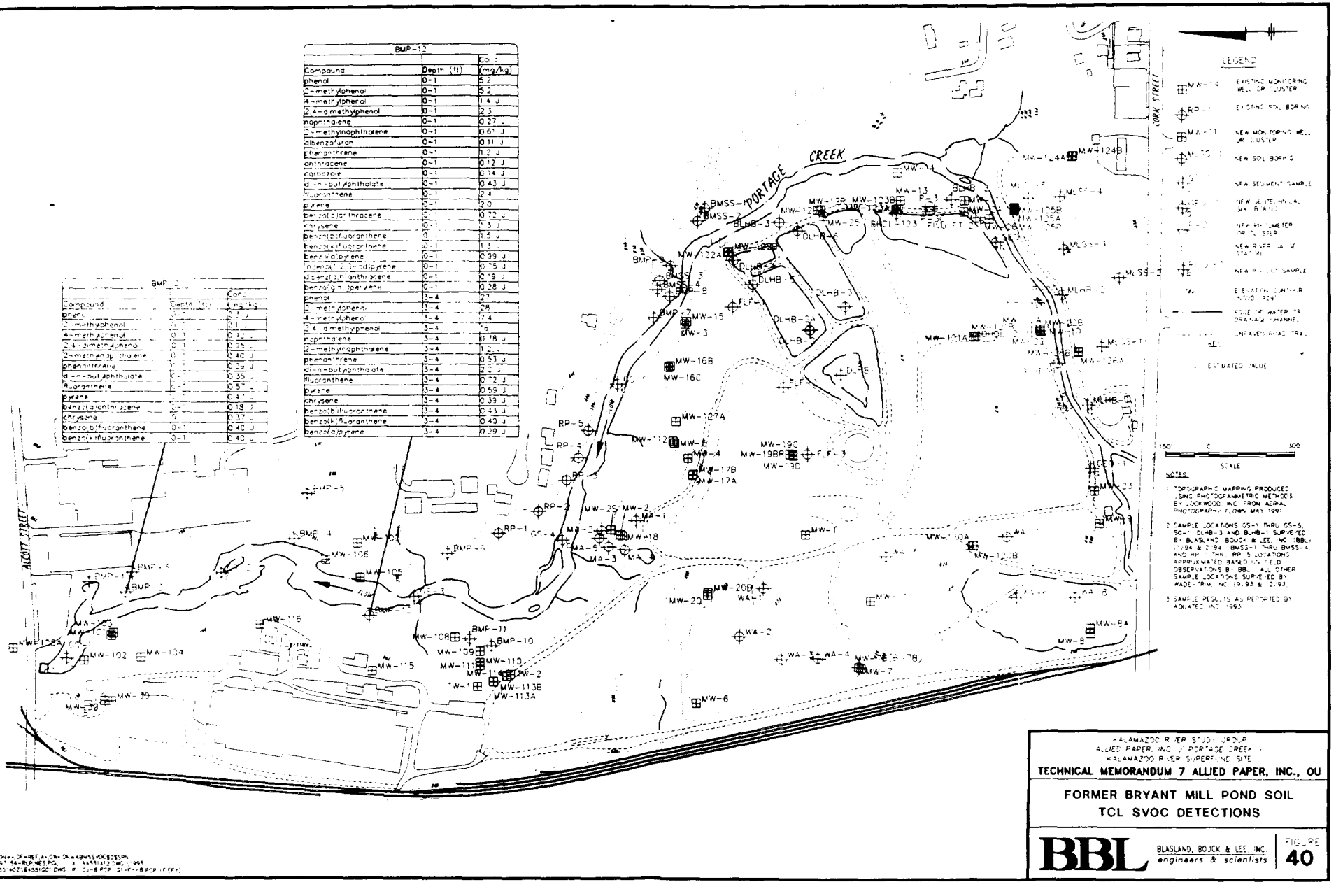
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

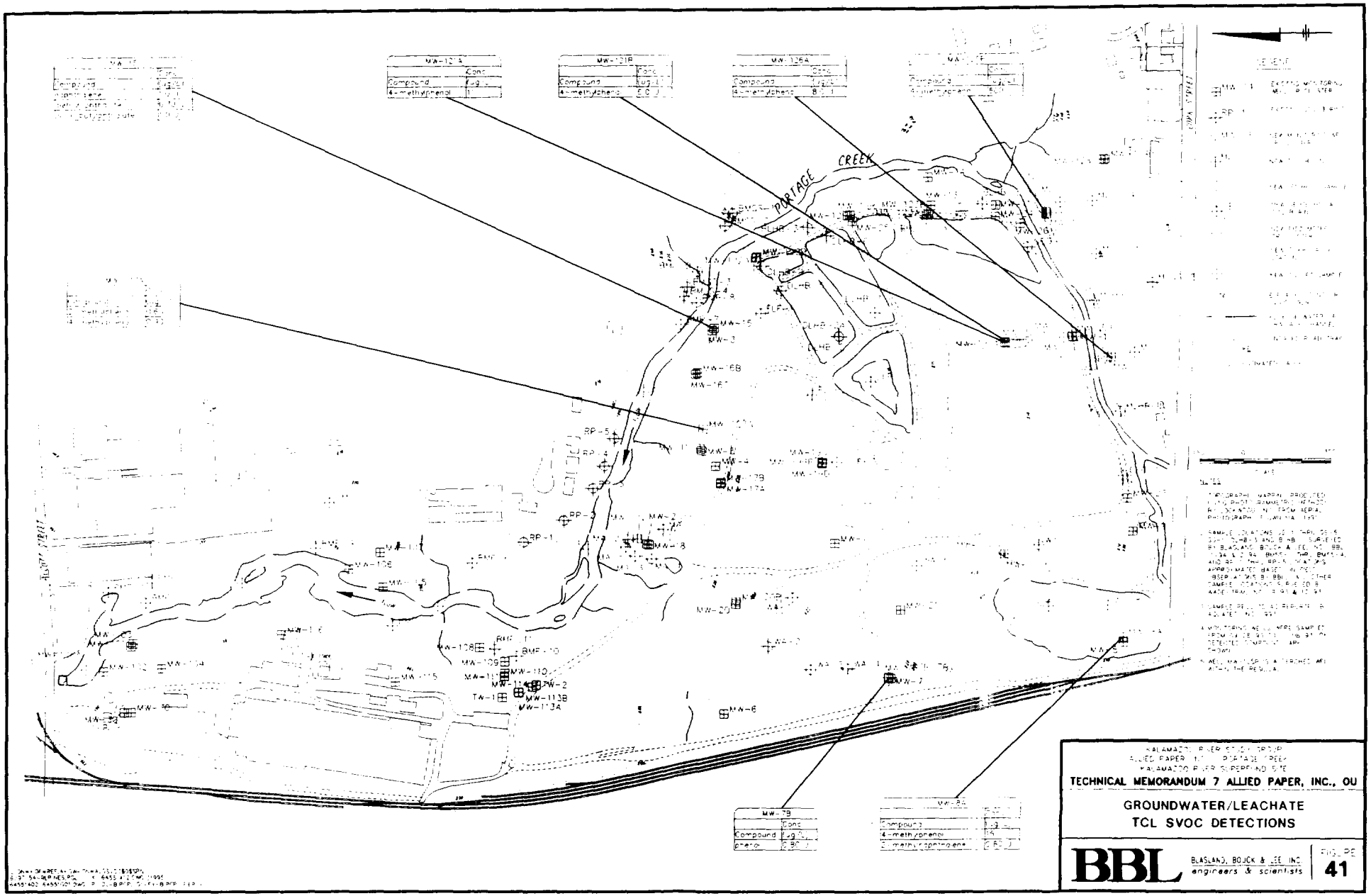
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

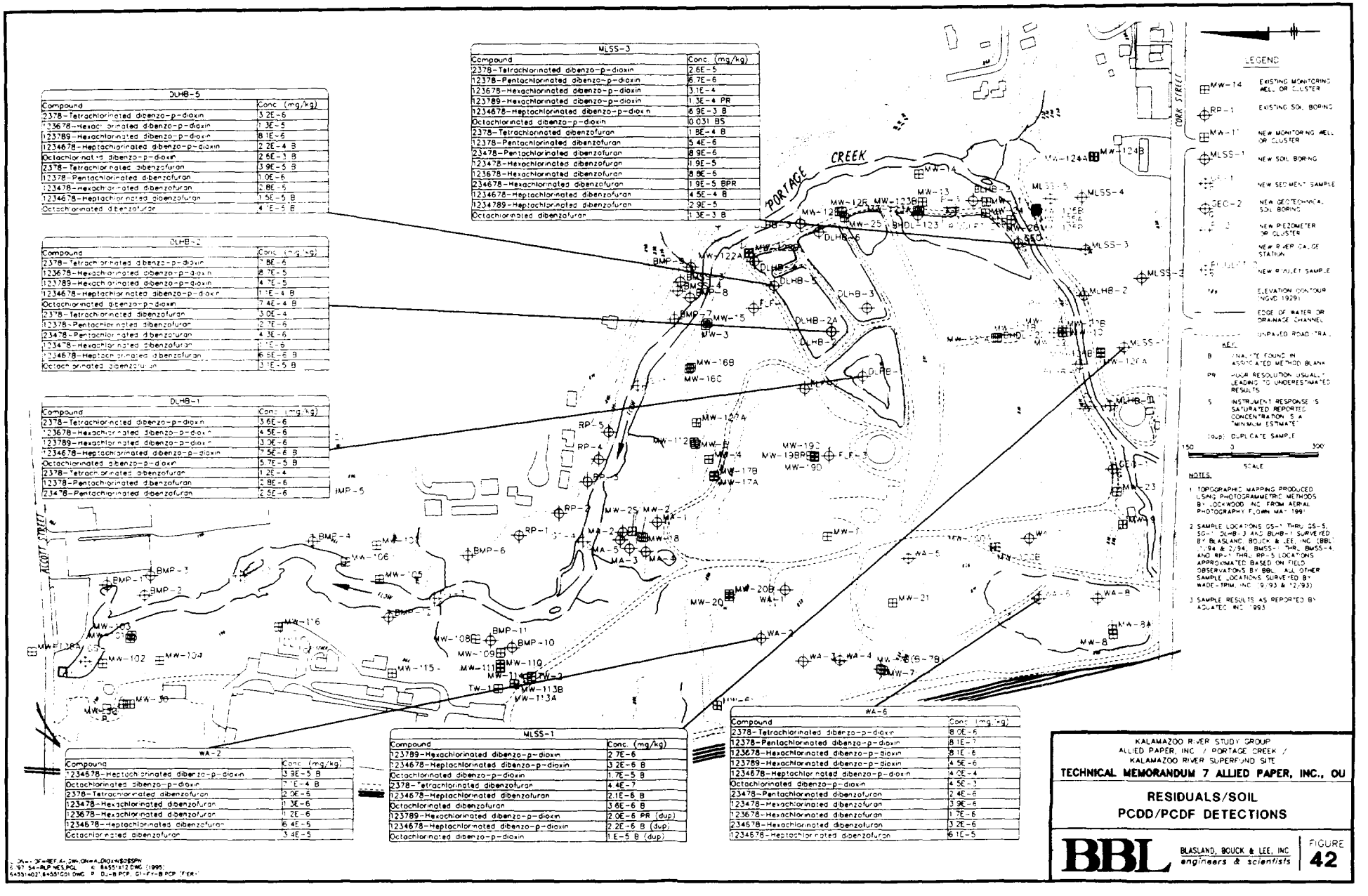
MONARCH HRDL SOIL TCL SVOC DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 39


BMP-13
Compound | Depth (ft) | Conc (mg/kg)
phenol | 0-1 | 5.2
2-methylphenol | 0-1 | 5.2
4-methylphenol | 0-1 | 14 J
2,4-dimethylphenol | 0-1 | 2.3
naphthalene | 0-1 | 0.27 J
2-methylnaphthalene | 0-1 | 0.61 J
dibenzofuran | 0-1 | 0.11 J
phenanthrene | 0-1 | 1.2 J
anthracene | 0-1 | 0.12 J
carbazole | 0-1 | 0.14 J
di-n-butylphthalate | 0-1 | 0.43 J
fluoranthene | 0-1 | 2.4
pyrene | 0-1 | 2.0
benzo(a)anthracene | 0-1 | 0.72 J
chrysene | 0-1 | 1.3 J
benzo(b)fluoranthene | 0-1 | 1.5 J
benzo(k)fluoranthene | 0-1 | 1.3 J
benzo(a)pyrene | 0-1 | 0.99 J
indeno(1,2,3-cd)pyrene | 0-1 | 0.75 J
dibenz(a,h)anthracene | 0-1 | 0.19 J
benzo(g,h,i)perylene | 0-1 | 0.28 J
phenol | 3-4 | 27
2-methylphenol | 3-4 | 28
4-methylphenol | 3-4 | 74
2,4-dimethylphenol | 3-4 | 7.6
naphthalene | 3-4 | 0.18 J
2-methylnaphthalene | 3-4 | 1.2 J
phenanthrene | 3-4 | 0.53 J
di-n-butylphthalate | 3-4 | 2.2 J
fluoranthene | 3-4 | 0.72 J
pyrene | 3-4 | 0.59 J
chrysene | 3-4 | 0.39 J
benzo(b)fluoranthene | 3-4 | 0.43 J
benzo(k)fluoranthene | 3-4 | 0.40 J
benzo(a)pyrene | 3-4 | 0.29 J
BMP-12
Compound | Depth (ft) | Conc (mg/kg)
phenol | 0-1 | 5.2 J
2-methylphenol | 0-1 | 5.2 J
4-methylphenol | 0-1 | 0.42 J
2,4-dimethylphenol | 0-1 | 0.35 J
2-methylnaphthalene | 0-1 | 0.40 J
phenanthrene | 0-1 | 0.34 J
di-n-butylphthalate | 0-1 | 0.35 J
fluoranthene | 0-1 | 0.57 J
pyrene | 0-1 | 0.47 J
benzo(a)anthracene | 0-1 | 0.18 J
chrysene | 0-1 | 0.37 J
benzo(b)fluoranthene | 0-1 | 0.40 J
benzo(k)fluoranthene | 0-1 | 0.40 J
PORTAGE CREEK
ACOST STREET
CORK STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW SURFACE WATER SAMPLE
NEW PIEZOMETER
NEW RIVER SAMPLE
ESTIMATED VALUE
EDGE OF WATER OR DRAINAGE CHANNEL
UNPAVED ROAD TRAIL
150 0 300
SCALE
NOTES:
1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2. SAMPLE LOCATIONS GS-1 THRU GS-5, SG-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) 1994 & 2 94. BMSS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC (9/93 & 12/93).
3. SAMPLE RESULTS AS REPORTED BY AQUATEC, INC. 1993.
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
FORMER BRYANT MILL POND SOIL
TCL SVOC DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
40


PORTAGE CREEK
MW-128A
Compound Conc
4-methylphenol 8.0 J
MW-128B
Compound Conc
4-methylphenol 5.0 J
MW-128A
Compound Conc
4-methylphenol 8.0 J
MW-7B
Compound Conc
phenol 0.80 J
MW-8A
Compound Conc
4-methylphenol 5.0 J
2-methylnaphthalene 0.60 J
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
GROUNDWATER/LEACHATE
TCL SVOC DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
41



DLHB-5	
Compound	Conc. (mg/kg)
2378-Tetrachlorinated dibenzo-p-dioxin	3.2E-6
123678-Hexachlorinated dibenzo-p-dioxin	1.3E-5
123789-Hexachlorinated dibenzo-p-dioxin	8.1E-6
1234678-Heptachlorinated dibenzo-p-dioxin	2.2E-4 B
Octachlorinated dibenzo-p-dioxin	2.6E-3 B
2378-Tetrachlorinated dibenzofuran	3.9E-5 B
12378-Pentachlorinated dibenzofuran	1.0E-6
123478-Hexachlorinated dibenzofuran	2.8E-6
123678-Heptachlorinated dibenzofuran	1.5E-5 B
Octachlorinated dibenzofuran	4.7E-5 B

DLHB-2	
Compound	Conc. (mg/kg)
2378-Tetrachlorinated dibenzo-p-dioxin	1.8E-6
123678-Hexachlorinated dibenzo-p-dioxin	8.7E-5
123789-Hexachlorinated dibenzo-p-dioxin	4.7E-5
1234678-Heptachlorinated dibenzo-p-dioxin	1.1E-4 B
Octachlorinated dibenzo-p-dioxin	7.4E-4 B
2378-Tetrachlorinated dibenzofuran	3.0E-4
12378-Pentachlorinated dibenzofuran	2.7E-6
23478-Pentachlorinated dibenzofuran	4.3E-6
123478-Hexachlorinated dibenzofuran	1.1E-5
123678-Heptachlorinated dibenzofuran	6.5E-6 B
Octachlorinated dibenzofuran	3.1E-5 B

DLHB-1	
Compound	Conc. (mg/kg)
2378-Tetrachlorinated dibenzo-p-dioxin	3.6E-6
123678-Hexachlorinated dibenzo-p-dioxin	4.5E-6
123789-Hexachlorinated dibenzo-p-dioxin	3.0E-6
1234678-Heptachlorinated dibenzo-p-dioxin	7.5E-6 B
Octachlorinated dibenzo-p-dioxin	5.7E-5 B
2378-Tetrachlorinated dibenzofuran	1.2E-4
12378-Pentachlorinated dibenzofuran	2.8E-6
23478-Pentachlorinated dibenzofuran	2.5E-6

MLSS-3	
Compound	Conc. (mg/kg)
2378-Tetrachlorinated dibenzo-p-dioxin	2.6E-5
12378-Pentachlorinated dibenzo-p-dioxin	6.7E-6
123678-Hexachlorinated dibenzo-p-dioxin	3.1E-4
123789-Hexachlorinated dibenzo-p-dioxin	1.3E-4 PR
1234678-Heptachlorinated dibenzo-p-dioxin	6.9E-3 B
Octachlorinated dibenzo-p-dioxin	0.031 BS
2378-Tetrachlorinated dibenzofuran	1.8E-4 B
12378-Pentachlorinated dibenzofuran	5.4E-6
23478-Pentachlorinated dibenzofuran	8.9E-6
123478-Hexachlorinated dibenzofuran	1.9E-5
123678-Hexachlorinated dibenzofuran	8.8E-6
234678-Hexachlorinated dibenzofuran	1.9E-5 BPR
1234678-Heptachlorinated dibenzofuran	4.5E-4 B
1234789-Heptachlorinated dibenzofuran	2.9E-5
Octachlorinated dibenzofuran	1.3E-3 B

WA-2	
Compound	Conc. (mg/kg)
1234678-Heptachlorinated dibenzo-p-dioxin	3.9E-5 B
Octachlorinated dibenzo-p-dioxin	7.7E-4 B
2378-Tetrachlorinated dibenzofuran	2.0E-6
123478-Hexachlorinated dibenzofuran	1.3E-6
123678-Hexachlorinated dibenzofuran	1.2E-6
1234678-Heptachlorinated dibenzofuran	6.4E-5
Octachlorinated dibenzofuran	3.4E-5

MLSS-1	
Compound	Conc. (mg/kg)
123789-Hexachlorinated dibenzo-p-dioxin	2.7E-6
1234678-Heptachlorinated dibenzo-p-dioxin	3.2E-6 B
Octachlorinated dibenzo-p-dioxin	1.7E-5 B
2378-Tetrachlorinated dibenzofuran	4.4E-7
1234678-Heptachlorinated dibenzofuran	2.1E-6 B
Octachlorinated dibenzofuran	3.6E-6 B
123789-Hexachlorinated dibenzo-p-dioxin	2.0E-6 PR (dup)
1234678-Heptachlorinated dibenzo-p-dioxin	2.2E-6 B (dup)
Octachlorinated dibenzo-p-dioxin	1.1E-5 B (dup)

WA-6	
Compound	Conc. (mg/kg)
2378-Tetrachlorinated dibenzo-p-dioxin	8.0E-6
12378-Pentachlorinated dibenzo-p-dioxin	8.1E-7
123678-Hexachlorinated dibenzo-p-dioxin	8.1E-6
123789-Hexachlorinated dibenzo-p-dioxin	4.5E-6
1234678-Heptachlorinated dibenzo-p-dioxin	4.0E-4
Octachlorinated dibenzo-p-dioxin	4.5E-3
23478-Pentachlorinated dibenzofuran	2.4E-6
123478-Hexachlorinated dibenzofuran	3.9E-6
123678-Hexachlorinated dibenzofuran	1.7E-6
234678-Hexachlorinated dibenzofuran	3.2E-6
1234678-Heptachlorinated dibenzofuran	6.1E-5

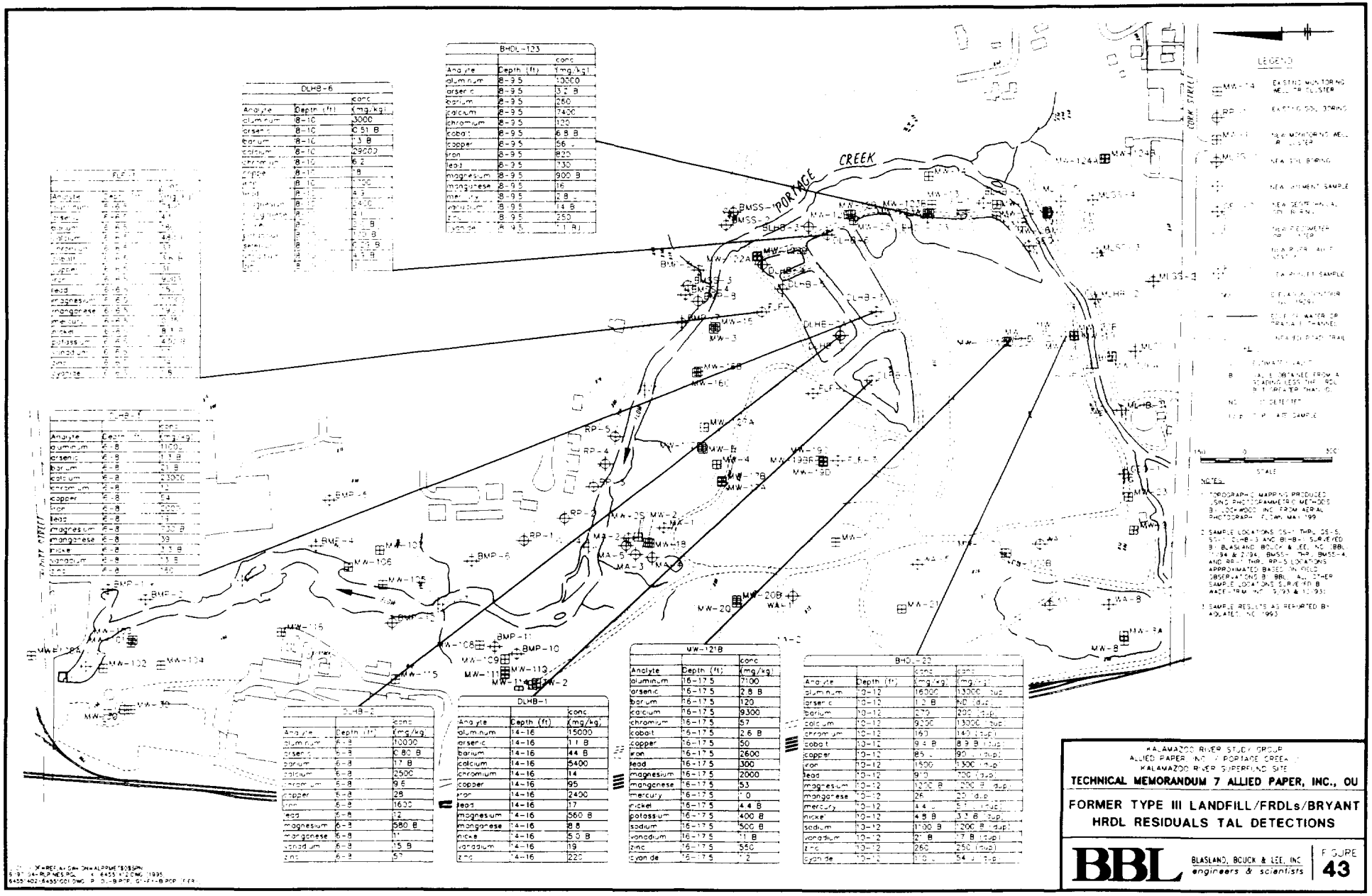
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

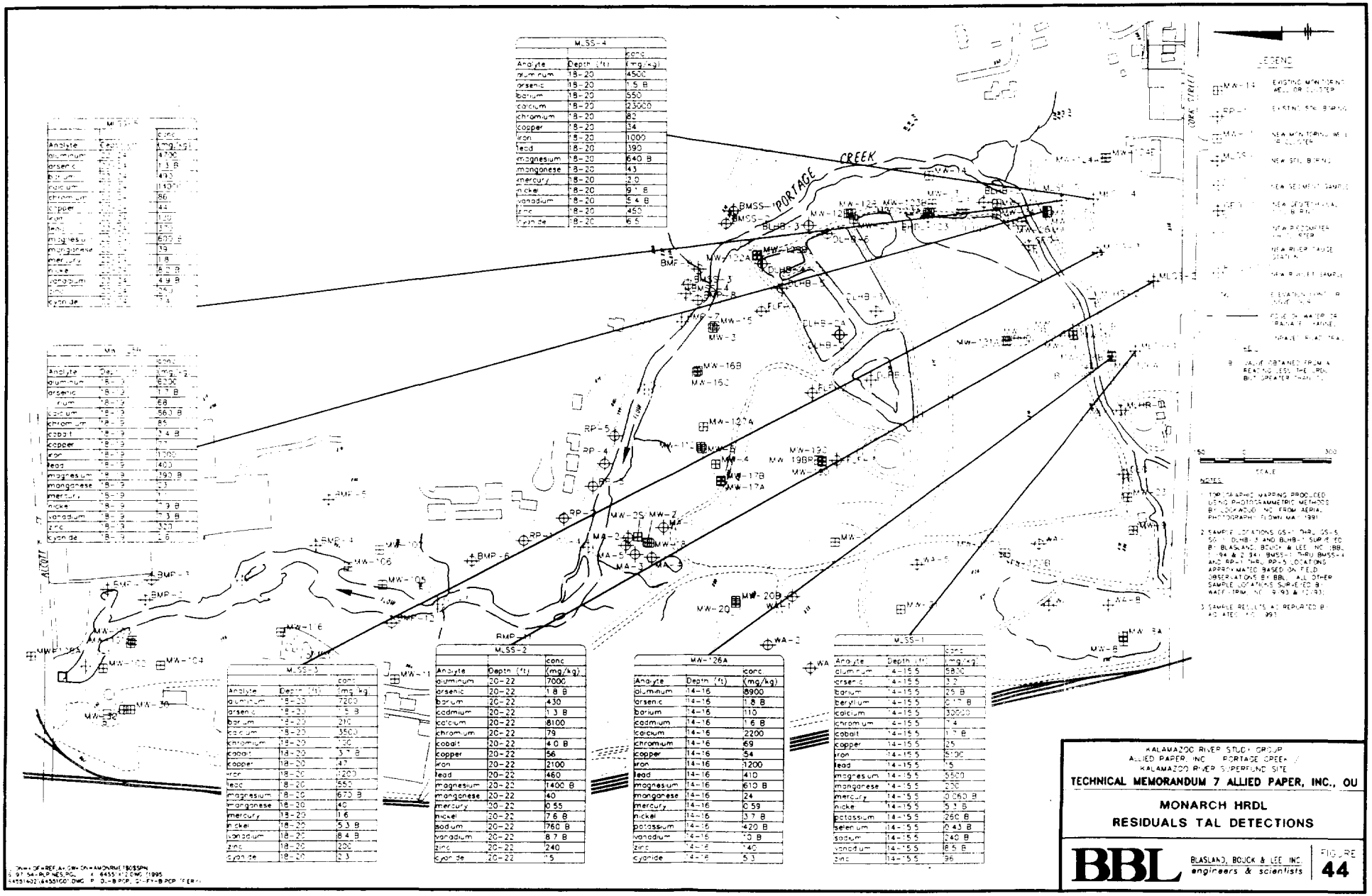
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

RESIDUALS/SOIL
PCDD/PCDF DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **42**


PORTAGE CREEK
CORK STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW SEDIMENT/SOIL BORING
NEW STAFF GAUGE
NEW SURFACE WATER SAMPLE
EXISTING WATER OR DRAINAGE CHANNEL
NEW BOARDWALK TRAIL
ESTIMATED VALUE
B ALSO ANALYZED FROM A READING LESS THAN PQL BUT GREATER THAN D
ND NOT DETECTED
SCALE
NOTES:
1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY ROCKWOOD, INC. FROM AERIAL PHOTOGRAPHS FLOWN MAY 1993.
2. SAMPLE LOCATIONS DLHB-1, THRU DLHB-5, DLHB-3 AND BHOL-123 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) ON 6 & 7/94. BMSS-1 AND BMSS-2 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS. ALL OTHER SAMPLE LOCATIONS SURVEYED BY MACTEC ENGINEERING AND CONSULTING, INC. (MACTEC) ON 12/93 & 1/94.
3. SAMPLE RESULTS AS REPORTED BY ADVANCED TECHNOLOGY LABORATORIES, INC. (ATL) 1993.
DLHB-6
Analyte | Depth (ft) | conc (mg/kg)
aluminum | 8-10 | 3000
arsenic | 8-10 | 0.51 B
barium | 8-10 | 13 B
calcium | 8-10 | 29000
chromium | 8-10 | 6.2
cyanide | 8-10 | 8
iron | 8-10 | 100
lead | 8-10 | 4.3
magnesium | 8-10 | 1400
manganese | 8-10 | 41
mercury | 8-10 | 0.08 B
nickel | 8-10 | 2.3 B
potassium | 8-10 | 233 B
sodium | 8-10 | 43 B
vanadium | 8-10 | 5
zinc | 8-10 | 21
BHOL-123
Analyte | Depth (ft) | conc (mg/kg)
aluminum | 8-9.5 | 10000
arsenic | 8-9.5 | 3.2 B
barium | 8-9.5 | 260
calcium | 8-9.5 | 7400
chromium | 8-9.5 | 120
cobalt | 8-9.5 | 6.8 B
copper | 8-9.5 | 56
iron | 8-9.5 | 820
lead | 8-9.5 | 130
magnesium | 8-9.5 | 900 B
manganese | 8-9.5 | 18
mercury | 8-9.5 | 0.8
nickel | 8-9.5 | 14 B
zinc | 8-9.5 | 250
cyanide | 8-9.5 | 1 BJ
DLHB-4
Analyte | Depth (ft) | conc (mg/kg)
aluminum | 6-8 | 11000
arsenic | 6-8 | 1.1 B
barium | 6-8 | 31 B
calcium | 6-8 | 23000
chromium | 6-8 | 12
copper | 6-8 | 54
iron | 6-8 | 2000
lead | 6-8 | 31
magnesium | 6-8 | 4200 B
manganese | 6-8 | 39
nickel | 6-8 | 3.3 B
vanadium | 6-8 | 15 B
zinc | 6-8 | 150
DLHB-2
Analyte | Depth (ft) | conc (mg/kg)
aluminum | 6-8 | 10000
arsenic | 6-8 | 0.80 B
barium | 6-8 | 17 B
calcium | 6-8 | 2500
chromium | 6-8 | 9.6
copper | 6-8 | 28
iron | 6-8 | 1600
lead | 6-8 | 12
magnesium | 6-8 | 580 B
manganese | 6-8 | 11
vanadium | 6-8 | 15 B
zinc | 6-8 | 57
DLHB-1
Analyte | Depth (ft) | conc (mg/kg)
aluminum | 14-16 | 15000
arsenic | 14-16 | 11 B
barium | 14-16 | 44 B
calcium | 14-16 | 5400
chromium | 14-16 | 14
copper | 14-16 | 95
iron | 14-16 | 2400
lead | 14-16 | 17
magnesium | 14-16 | 560 B
manganese | 14-16 | 88
nickel | 14-16 | 5.0 B
vanadium | 14-16 | 19
zinc | 14-16 | 220
MW-121B
Analyte | Depth (ft) | conc (mg/kg)
aluminum | 16-17.5 | 7100
arsenic | 16-17.5 | 2.8 B
barium | 16-17.5 | 120
calcium | 16-17.5 | 9300
chromium | 16-17.5 | 57
cobalt | 16-17.5 | 2.6 B
copper | 16-17.5 | 50
iron | 16-17.5 | 2600
lead | 16-17.5 | 300
magnesium | 16-17.5 | 2000
manganese | 16-17.5 | 53
mercury | 16-17.5 | 1.0
nickel | 16-17.5 | 4.4 B
potassium | 16-17.5 | 400 B
sodium | 16-17.5 | 500 B
vanadium | 16-17.5 | 11 B
zinc | 16-17.5 | 550
cyanide | 16-17.5 | 2
BHOL-22
Analyte | Depth (ft) | conc (mg/kg) | conc (mg/kg)
aluminum | 10-12 | 16000 | 13000 (dup)
arsenic | 10-12 | 1.2 B | ND (dup)
barium | 10-12 | 270 | 200 (dup)
calcium | 10-12 | 9200 | 13000 (dup)
chromium | 10-12 | 160 | 140 (dup)
cobalt | 10-12 | 9.4 B | 8.9 B (dup)
copper | 10-12 | 85 | 90 (dup)
iron | 10-12 | 1500 | 1300 (dup)
lead | 10-12 | 910 | 700 (dup)
magnesium | 10-12 | 1200 B | 1200 B (dup)
manganese | 10-12 | 26 | 25 (dup)
mercury | 10-12 | 4.4 | 5.1 (dup)
nickel | 10-12 | 4.8 B | 3.3 B (dup)
sodium | 10-12 | 1100 B | 1200 B (dup)
vanadium | 10-12 | 21 B | 17 B (dup)
zinc | 10-12 | 260 | 250 (dup)
cyanide | 10-12 | 1.0 | 54 (dup)
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
FORMER TYPE III LANDFILL/FRDLs/BRYANT HRDL RESIDUALS TAL DETECTIONS
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 43



MLSS-4		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	18-20	4500
arsenic	18-20	1.5 B
barium	18-20	550
calcium	18-20	23000
chromium	18-20	82
copper	18-20	34
iron	18-20	1000
lead	18-20	190
magnesium	18-20	640 B
manganese	18-20	43
mercury	18-20	2.0
nickel	18-20	9.1 B
vanadium	18-20	5.4 B
zinc	18-20	450
cyanide	18-20	6.5

MLSS-5		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	18-20	7200
arsenic	18-20	1.5 B
barium	18-20	310
calcium	18-20	3500
chromium	18-20	100
cobalt	18-20	3.7 B
copper	18-20	47
iron	18-20	11200
lead	18-20	555
magnesium	18-20	670 B
manganese	18-20	140
mercury	18-20	1.6
nickel	18-20	15.3 B
vanadium	18-20	18.4 B
zinc	18-20	260
cyanide	18-20	2.3

MLSS-2		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	20-22	7000
arsenic	20-22	1.8 B
barium	20-22	430
cadmium	20-22	1.3 B
calcium	20-22	8100
chromium	20-22	79
cobalt	20-22	4.0 B
copper	20-22	56
iron	20-22	2100
lead	20-22	460
magnesium	20-22	1400 B
manganese	20-22	40
mercury	20-22	0.55
nickel	20-22	7.6 B
sodium	20-22	760 B
vanadium	20-22	8.7 B
zinc	20-22	240
cyanide	20-22	1.5

MW-26A		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	14-16	8900
arsenic	14-16	1.8 B
barium	14-16	110
cadmium	14-16	1.6 B
calcium	14-16	2200
chromium	14-16	69
copper	14-16	54
iron	14-16	11200
lead	14-16	410
magnesium	14-16	610 B
manganese	14-16	24
mercury	14-16	0.59
nickel	14-16	3.7 B
potassium	14-16	420 B
vanadium	14-16	10 B
zinc	14-16	140
cyanide	14-16	5.3

MLSS-1		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	4-15.5	5800
arsenic	4-15.5	3.2
barium	4-15.5	25 B
beryllium	4-15.5	0.17 B
calcium	4-15.5	30000
chromium	4-15.5	14
cobalt	4-15.5	1.7 B
copper	4-15.5	25
iron	4-15.5	5100
lead	4-15.5	15
magnesium	4-15.5	5500
manganese	4-15.5	230
mercury	4-15.5	0.060 B
nickel	4-15.5	5.3 B
potassium	4-15.5	250 B
selenium	4-15.5	0.43 B
sodium	4-15.5	240 B
vanadium	4-15.5	8.5 B
zinc	4-15.5	96

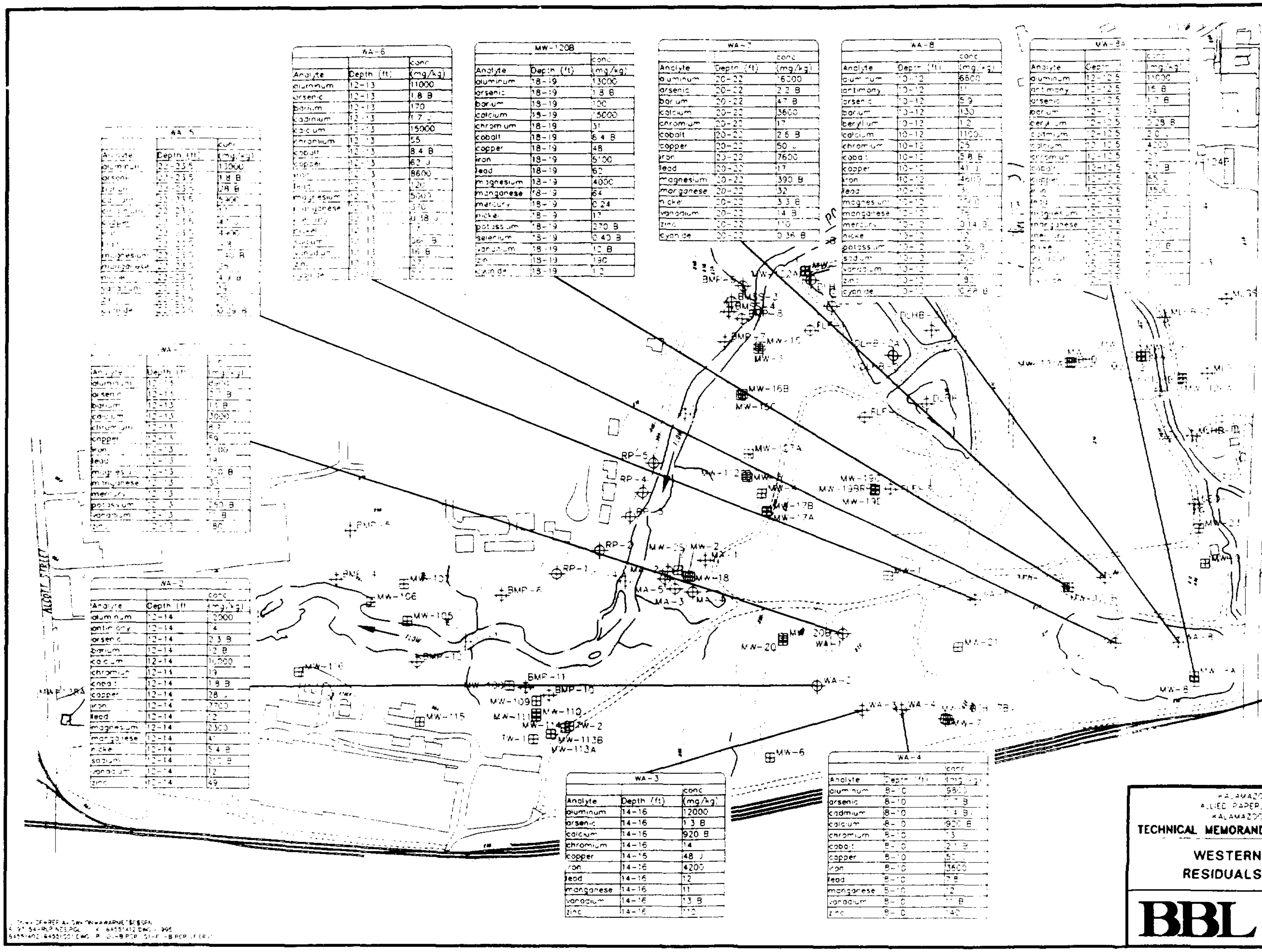
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

MONARCH HRDL
RESIDUALS TAL DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 44



WA-5		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	22-23.5	13000
arsenic	22-23.5	1.8 B
barium	22-23.5	28 B
calcium	22-23.5	5400
chromium	22-23.5	[illegible]
copper	22-23.5	41 J
iron	22-23.5	4400
lead	22-23.5	[illegible]
magnesium	22-23.5	[illegible] B
manganese	22-23.5	[illegible]
nickel	22-23.5	4.3 B
vanadium	22-23.5	[illegible]
zinc	22-23.5	[illegible]
cyanide	22-23.5	0.29 B

WA-6		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	12-13	11000
arsenic	12-13	1.8 B
barium	12-13	170
cadmium	12-13	1.7 J
calcium	12-13	15000
chromium	12-13	55
cobalt	12-13	8.4 B
copper	12-13	62 J
iron	12-13	8600
lead	12-13	120
magnesium	12-13	5000
manganese	12-13	370
mercury	12-13	0.38 J
nickel	12-13	[illegible]
sodium	12-13	560 B
vanadium	12-13	16 B
zinc	12-13	[illegible]
cyanide	12-13	[illegible]

MW-120B		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	18-19	13000
arsenic	18-19	1.8 B
barium	18-19	100
calcium	18-19	15000
chromium	18-19	31
cobalt	18-19	6.4 B
copper	18-19	48
iron	18-19	5100
lead	18-19	62
magnesium	18-19	4000
manganese	18-19	64
mercury	18-19	0.24
nickel	18-19	17
potassium	18-19	270 B
selenium	18-19	0.40 B
vanadium	18-19	12 B
zinc	18-19	190
cyanide	18-19	1.2

WA-7		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	20-22	16000
arsenic	20-22	2.2 B
barium	20-22	47 B
calcium	20-22	3600
chromium	20-22	17
cobalt	20-22	2.6 B
copper	20-22	50 J
iron	20-22	7600
lead	20-22	17
magnesium	20-22	390 B
manganese	20-22	32
nickel	20-22	3.3 B
vanadium	20-22	14 B
zinc	20-22	110
cyanide	20-22	0.36 B

WA-8		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	10-12	6500
antimony	10-12	11
arsenic	10-12	5.9
barium	10-12	130
beryllium	10-12	1.2
calcium	10-12	11000
chromium	10-12	25
cobalt	10-12	5.8 B
copper	10-12	41 J
iron	10-12	4600
lead	10-12	[illegible]
magnesium	10-12	[illegible]
manganese	10-12	75
mercury	10-12	0.14 B
nickel	10-12	[illegible]
potassium	10-12	[illegible] B
sodium	10-12	[illegible]
vanadium	10-12	[illegible]
zinc	10-12	93
cyanide	10-12	0.68 B

MW-8A		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	12-12.5	11000
antimony	12-12.5	15 B
arsenic	12-12.5	1.7 B
barium	12-12.5	34
beryllium	12-12.5	0.28 B
cadmium	12-12.5	2.0 J
calcium	12-12.5	4200
chromium	12-12.5	[illegible]
cobalt	12-12.5	[illegible] B
copper	12-12.5	55 J
iron	12-12.5	3500
lead	12-12.5	[illegible]
magnesium	12-12.5	[illegible]
manganese	12-12.5	43
mercury	12-12.5	[illegible]
nickel	12-12.5	[illegible] B
[illegible]	12-12.5	[illegible]
[illegible]	12-12.5	[illegible]
[illegible]	12-12.5	[illegible]

WA-1		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	12-13	[illegible]
arsenic	12-13	[illegible] B
barium	12-13	15 B
calcium	12-13	3000
chromium	12-13	8.7
copper	12-13	59
iron	12-13	[illegible]
lead	12-13	18
magnesium	12-13	[illegible] B
manganese	12-13	33
mercury	12-13	[illegible]
potassium	12-13	250 B
vanadium	12-13	[illegible] B
zinc	12-13	180

WA-2		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	12-14	12000
antimony	12-14	4
arsenic	12-14	2.3 B
barium	12-14	12 B
calcium	12-14	10,000
chromium	12-14	19
cobalt	12-14	1.8 B
copper	12-14	28 J
iron	12-14	2700
lead	12-14	12
magnesium	12-14	2300
manganese	12-14	41
nickel	12-14	5.4 B
sodium	12-14	210 B
vanadium	12-14	12
zinc	12-14	49

WA-3		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	14-16	12000
arsenic	14-16	1.3 B
calcium	14-16	920 B
chromium	14-16	14
copper	14-16	48 J
iron	14-16	4200
lead	14-16	12
manganese	14-16	11
vanadium	14-16	13 B
zinc	14-16	110

WA-4		
		conc
Analyte	Depth (ft)	(mg/kg)
aluminum	8-10	9800
arsenic	8-10	[illegible] B
cadmium	8-10	[illegible] B
calcium	8-10	920 B
chromium	8-10	13
cobalt	8-10	2.1 B
copper	8-10	50 J
iron	8-10	3600
lead	8-10	7.8
manganese	8-10	12
vanadium	8-10	[illegible] B
zinc	8-10	140

LEGEND

- EXISTING MONITORING WELL OR CLUSTER
- EXISTING SOIL BORING
- NEW MONITORING WELL OR CLUSTER
- NEW SOIL BORING
- NEW SEDIMENT SAMPLE
- NEW GEOTECHNICAL SOIL BORING
- NEW PIEZOMETER OR CLUSTER
- NEW RIVER GAUGE STATION
- NEW RESIDUALS SAMPLE
- ELEVATION CONTOUR
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL

KEY:

J ESTIMATED VALUE

B VALUE OBTAINED FROM A READING LESS THAN THE CRDL BUT GREATER THAN IDL

NOTES:

1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1991.
2. SAMPLE LOCATIONS DS-1 THRU DS-5, SD-1, DLHB-3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. (BBL) (1/94 & 2/94). BMSS-1 THRU BMSS-4, AND RP-1 THRU RP-5 LOCATIONS APPROXIMATED BASED ON FIELD OBSERVATIONS BY BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED BY WADE-TRIM, INC. (9/93 & 12/93).
3. SAMPLE RESULTS AS REPORTED BY AQUATEC, INC. 1993.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

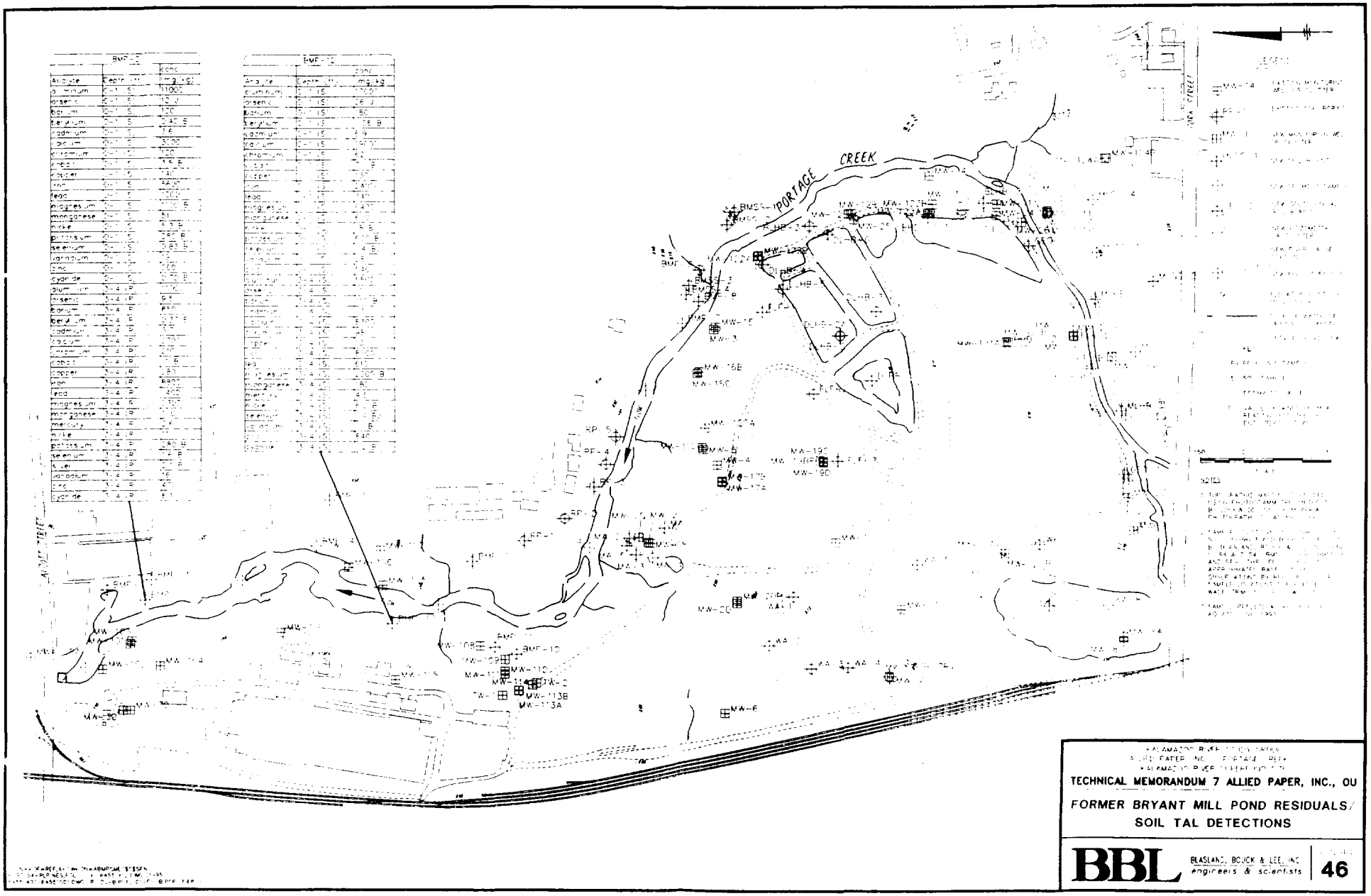
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

WESTERN DISPOSAL AREA
RESIDUALS TAL DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 45

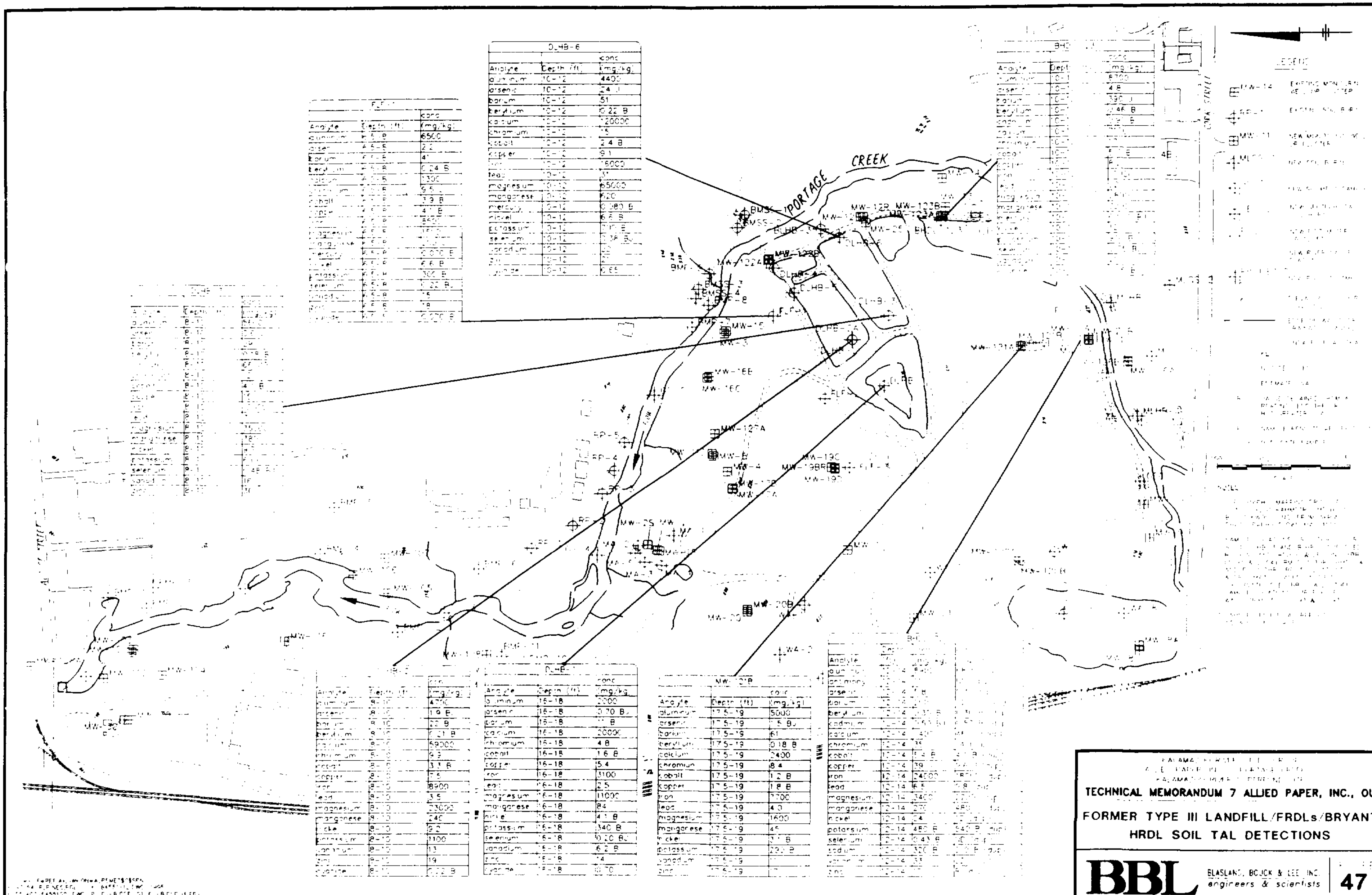
[illegible] 1995



TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER BRYANT MILL POND RESIDUALS/ SOIL TAL DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists



DLHB-6		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	10-12	4400
arsenic	10-12	2.4 J
barium	10-12	51
beryllium	10-12	0.22 B
calcium	10-12	120000
chromium	10-12	15
cobalt	10-12	2.4 B
copper	10-12	9.1
iron	10-12	16000
lead	10-12	31
magnesium	10-12	65000
manganese	10-12	620
mercury	10-12	0.080 B
nickel	10-12	6.6 B
potassium	10-12	[illegible] B
selenium	10-12	0.38 BJ
vanadium	10-12	[illegible]
zinc	10-12	27
cyanide	10-12	0.65

FLF-[illegible]		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	6.5-8	6500
arsenic	6.5-8	2.2
barium	6.5-8	41
beryllium	6.5-8	0.24 B
calcium	6.5-8	1300
chromium	6.5-8	9.5 J
cobalt	6.5-8	3.9 B
copper	6.5-8	4.1 B
iron	6.5-8	8500
magnesium	6.5-8	[illegible]
manganese	6.5-8	[illegible]
mercury	6.5-8	0.070 B
nickel	6.5-8	6.6 B
potassium	6.5-8	300 B
selenium	6.5-8	0.22 BJ
vanadium	6.5-8	15
zinc	6.5-8	18
cyanide	6.5-8	0.020 B

DLHB-[illegible]		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	8-1[illegible]	[illegible]
arsenic	8-1[illegible]	[illegible]
barium	8-1[illegible]	[illegible]
beryllium	8-1[illegible]	[illegible] B
calcium	8-1[illegible]	[illegible]
chromium	8-1[illegible]	[illegible]
cobalt	8-1[illegible]	4[illegible] B
copper	8-1[illegible]	[illegible]
iron	8-1[illegible]	[illegible]
lead	8-1[illegible]	[illegible]
magnesium	8-1[illegible]	[illegible]
manganese	8-1[illegible]	18[illegible]
nickel	8-1[illegible]	[illegible]
potassium	8-1[illegible]	[illegible]
selenium	8-1[illegible]	[illegible] BJ
vanadium	8-1[illegible]	16
zinc	8-1[illegible]	3[illegible]

BH[illegible]		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	10-1[illegible]	6700
arsenic	10-1[illegible]	4.8
barium	10-1[illegible]	390 J
beryllium	10-1[illegible]	0.46 B
cadmium	10-1[illegible]	[illegible] B
calcium	10-1[illegible]	[illegible]
chromium	10-1[illegible]	[illegible]
cobalt	10-1[illegible]	[illegible] B
copper	10-1[illegible]	[illegible]
iron	10-1[illegible]	[illegible]
lead	10-1[illegible]	[illegible]
magnesium	10-1[illegible]	[illegible]
manganese	10-1[illegible]	[illegible]
mercury	10-1[illegible]	[illegible]
nickel	10-1[illegible]	[illegible]
potassium	10-1[illegible]	[illegible] B
selenium	10-1[illegible]	[illegible] BJ
vanadium	10-1[illegible]	[illegible]
zinc	10-1[illegible]	[illegible] B

[illegible]B-2		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	8-10	4700
arsenic	8-10	1.9 B
barium	8-10	22 B
beryllium	8-10	0.21 B
calcium	8-10	59000
chromium	8-10	9.3
cobalt	8-10	3.3 B
copper	8-10	7.5
iron	8-10	8900
lead	8-10	3.5
magnesium	8-10	23000
manganese	8-10	240
nickel	8-10	9.2
potassium	8-10	1100
vanadium	8-10	13
zinc	8-10	19
cyanide	8-10	0.22 B

DLHB-[illegible]		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	16-18	2000
arsenic	16-18	0.70 BJ
barium	16-18	11 B
calcium	16-18	20000
chromium	16-18	4.8
cobalt	16-18	1.6 B
copper	16-18	5.4
iron	16-18	3100
lead	16-18	2.5
magnesium	16-18	11000
manganese	16-18	84
nickel	16-18	4.1 B
potassium	16-18	340 B
selenium	16-18	0.20 BJ
vanadium	16-18	6.2 B
zinc	16-18	14
cyanide	16-18	0.70

MW-121B		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	17.5-19	5000
arsenic	17.5-19	1.5 BJ
barium	17.5-19	61
beryllium	17.5-19	0.18 B
calcium	17.5-19	2400
chromium	17.5-19	8.4
cobalt	17.5-19	1.2 B
copper	17.5-19	1.8 B
iron	17.5-19	7700
lead	17.5-19	4.0
magnesium	17.5-19	1600
manganese	17.5-19	45
nickel	17.5-19	3.1 B
potassium	17.5-19	230 B
vanadium	17.5-19	[illegible]
zinc	17.5-19	[illegible]

BH[illegible]		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	12-14	6400
antimony	12-14	[illegible]
arsenic	12-14	[illegible] B
barium	12-14	[illegible]
beryllium	12-14	0.31 B
cadmium	12-14	0.63 BJ
calcium	12-14	[illegible]
chromium	12-14	35
cobalt	12-14	5.4 B
copper	12-14	39
iron	12-14	24000
lead	12-14	6.5
magnesium	12-14	3400
manganese	12-14	270
nickel	12-14	24
potassium	12-14	480 B
selenium	12-14	0.43 B
sodium	12-14	320 B
vanadium	12-14	33
zinc	12-14	[illegible]

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/FRDLs/BRYANT HRDL SOIL TAL DETECTIONS

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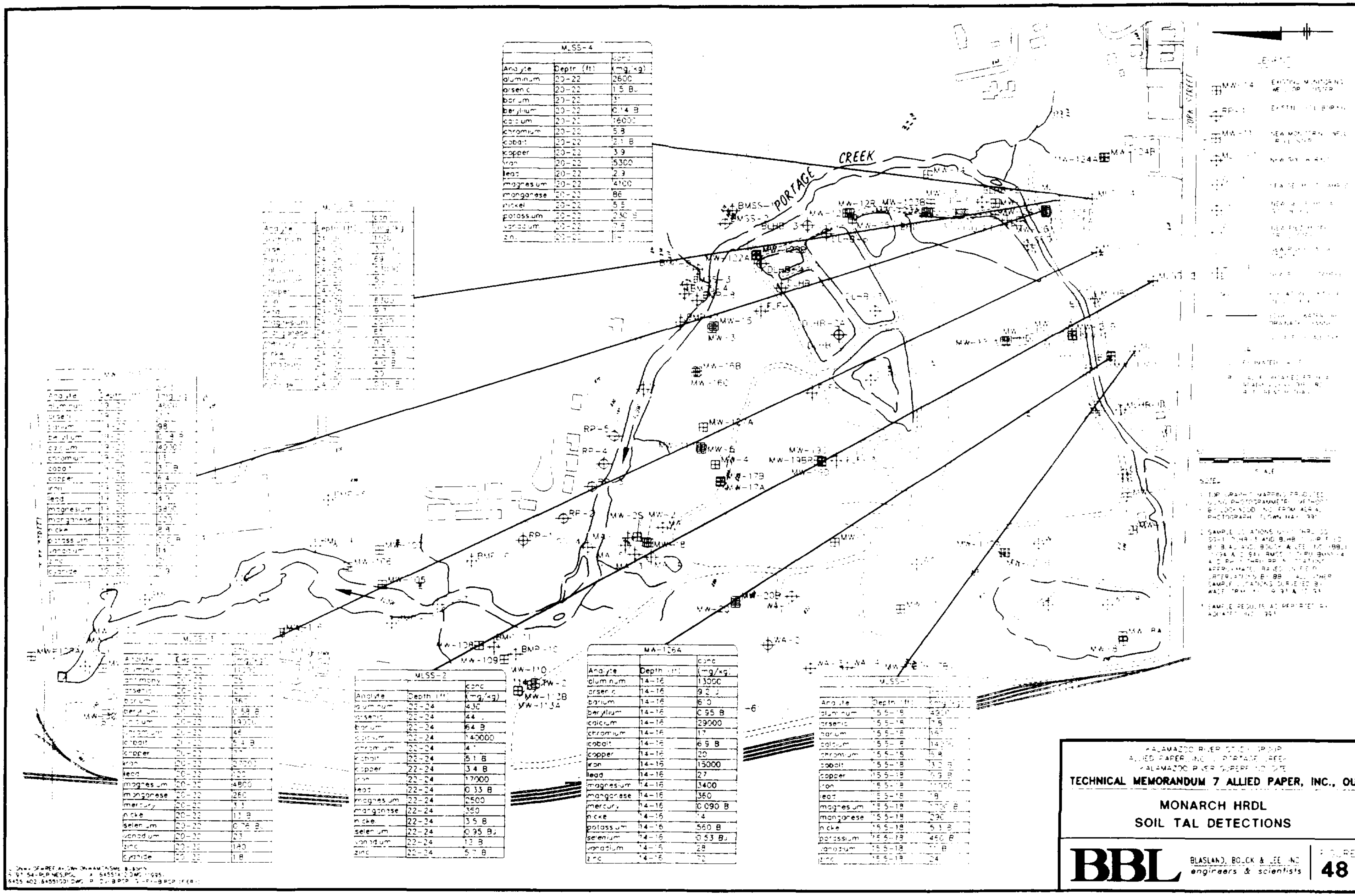


MLSS-4		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	20-22	2600
arsenic	20-22	1.5 BJ
barium	20-22	31
beryllium	20-22	0.14 B
calcium	20-22	16000
chromium	20-22	5.8
cobalt	20-22	2.1 B
copper	20-22	3.9
iron	20-22	5300
lead	20-22	2.9
magnesium	20-22	4100
manganese	20-22	86
nickel	20-22	5.5
potassium	20-22	230 B
vanadium	20-22	7.6
zinc	20-22	[illegible]

MLSS-3		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	20-22	[illegible]
antimony	20-22	25
arsenic	20-22	[illegible]
barium	20-22	367
beryllium	20-22	0.58 B
calcium	20-22	19000
chromium	20-22	46
cobalt	20-22	5.4 B
copper	20-22	[illegible]
iron	20-22	[illegible]
lead	20-22	[illegible]
magnesium	20-22	4800
manganese	20-22	260
mercury	20-22	3.3
nickel	20-22	13 B
selenium	20-22	0.76 BJ
vanadium	20-22	23
zinc	20-22	180
cyanide	20-22	1.8

MLSS-2		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	22-24	430
arsenic	22-24	44
barium	22-24	64 B
calcium	22-24	140000
chromium	22-24	4[illegible]
cobalt	22-24	5.1 B
copper	22-24	3.4 B
iron	22-24	17000
lead	22-24	0.33 B
magnesium	22-24	2500
manganese	22-24	350
nickel	22-24	3.5 B
selenium	22-24	0.95 BJ
vanadium	22-24	12 B
zinc	22-24	5.7 B

MA-126A		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	14-16	13000
arsenic	14-16	9.2 J
barium	14-16	610
beryllium	14-16	0.95 B
calcium	14-16	29000
chromium	14-16	17
cobalt	14-16	6.9 B
copper	14-16	20
iron	14-16	15000
lead	14-16	27
magnesium	14-16	3400
manganese	14-16	360
mercury	14-16	0.090 B
nickel	14-16	14
potassium	14-16	560 B
selenium	14-16	0.53 BJ
vanadium	14-16	28
zinc	14-16	72

MLSS-[illegible]		
Analyte	Depth (ft)	conc (mg/kg)
aluminum	15.5-18	4300
arsenic	15.5-18	7.6
barium	15.5-18	[illegible]
calcium	15.5-18	[illegible]
chromium	15.5-18	5.8
cobalt	15.5-18	3.2 B
copper	15.5-18	5.9 B
iron	15.5-18	[illegible]
lead	15.5-18	18
magnesium	15.5-18	[illegible] B
manganese	15.5-18	290
nickel	15.5-18	5.3 B
potassium	15.5-18	450 B
vanadium	15.5-18	[illegible] B
zinc	15.5-18	24

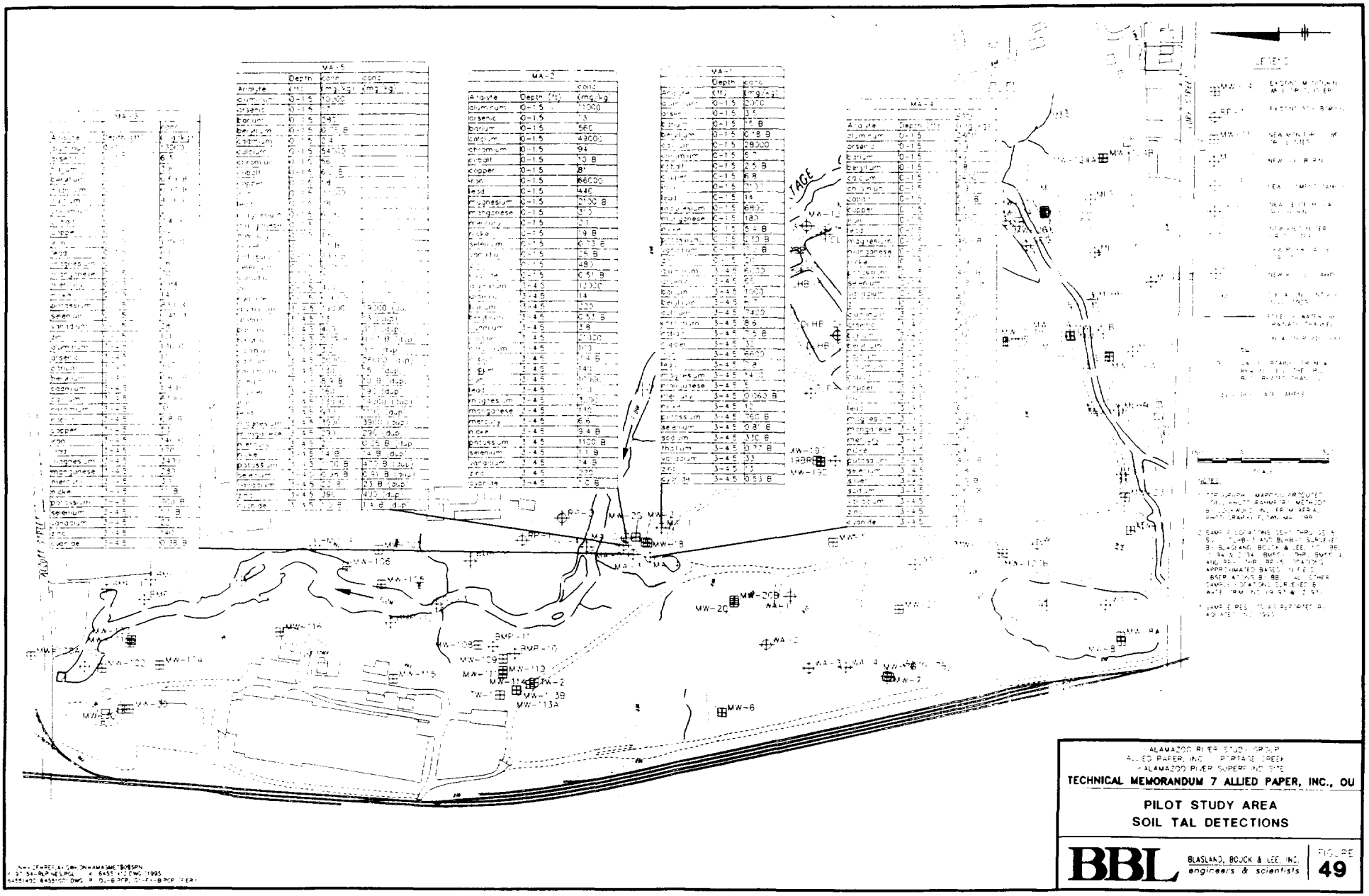
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

MONARCH HRDL
SOIL TAL DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **48**



ALAMAZOO RIVER STUDY GROUP
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KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

PILOT STUDY AREA
SOIL TAL DETECTIONS

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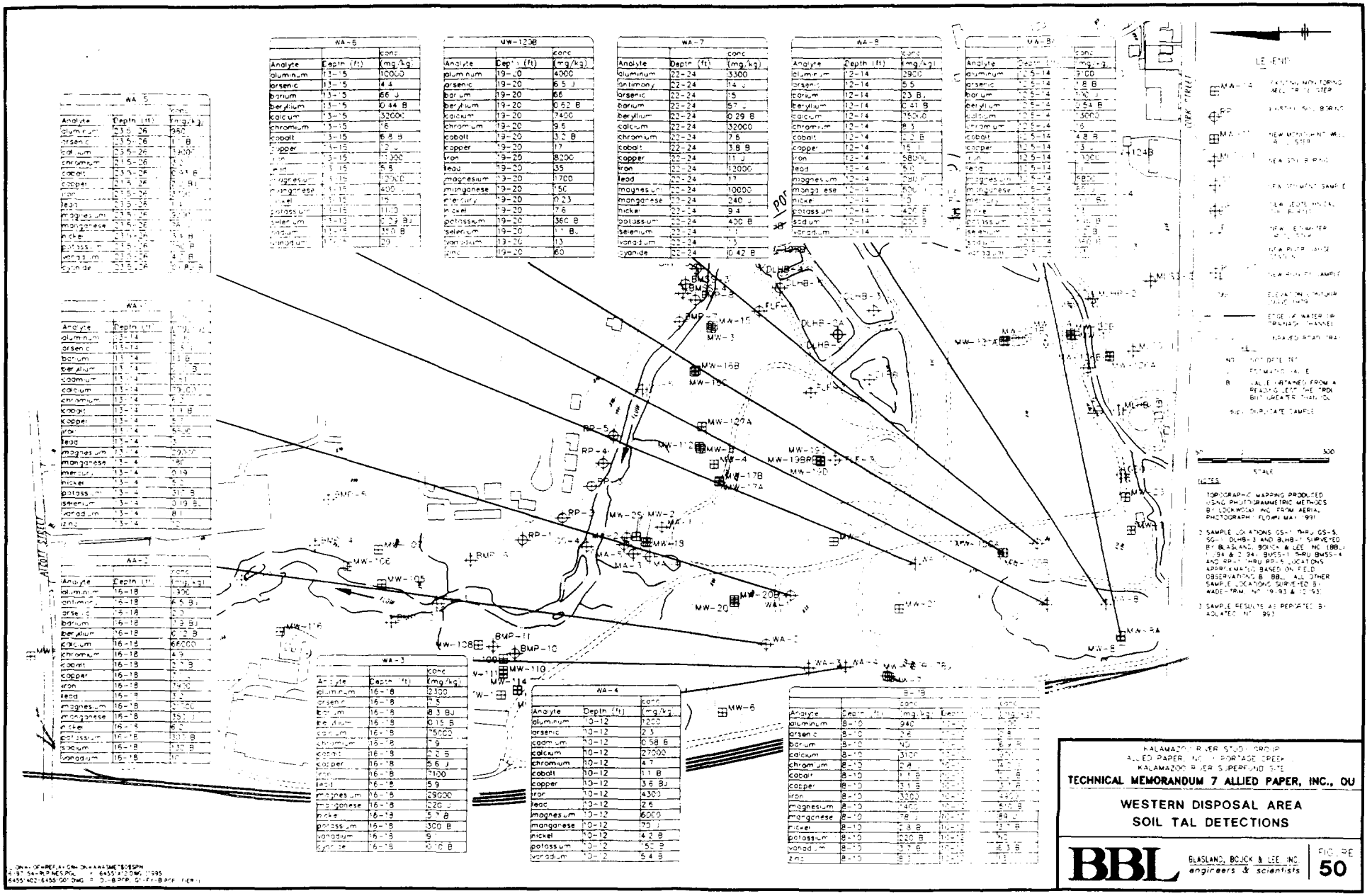
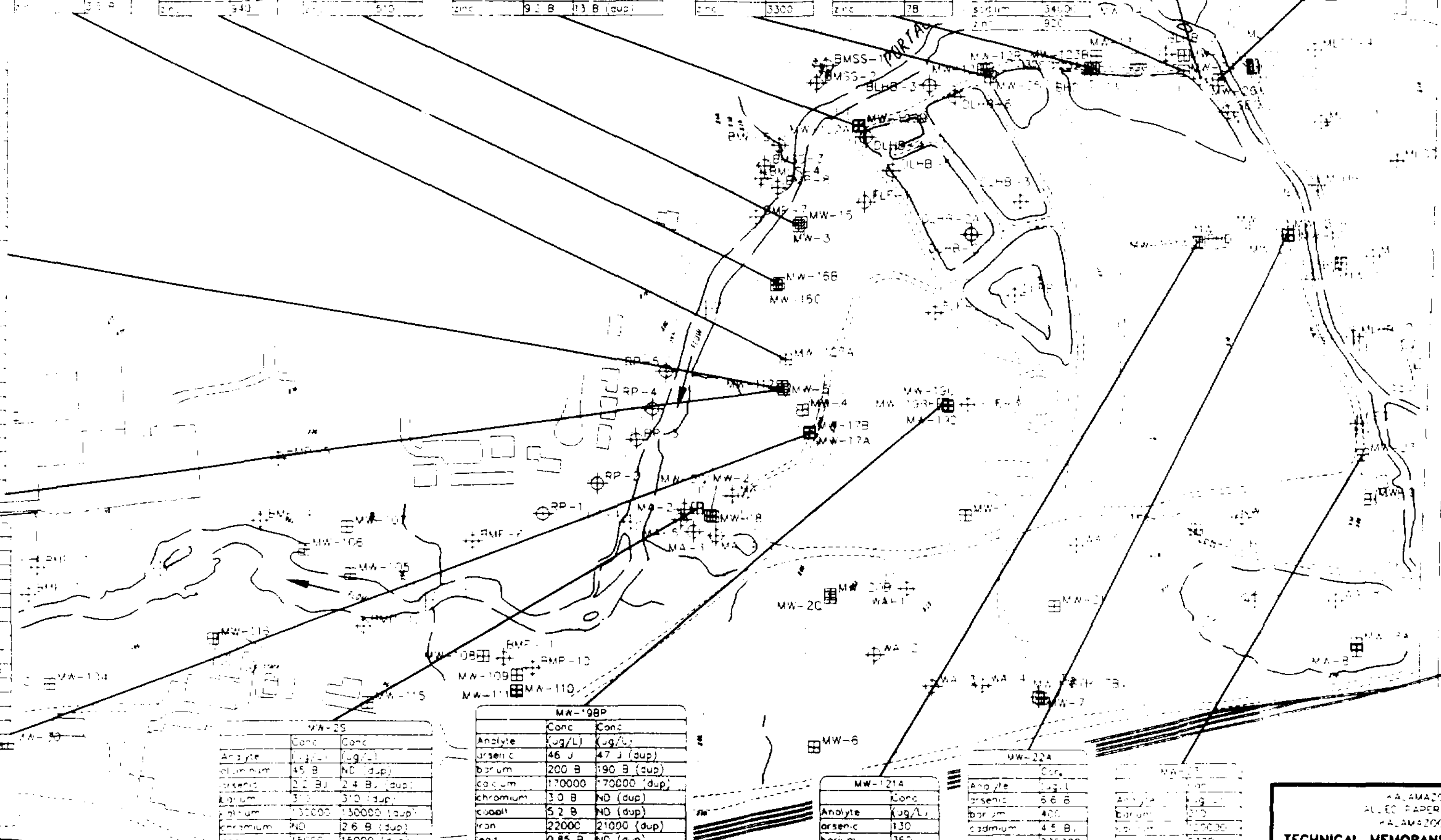
FIGURE **49**


WA-5
WA-6
MW-123B
WA-7
WA-8
WA-1
WA-2
WA-3
WA-4
B-19
LEGEND
NOTES
SCALE
KALAMAZOO RIVER STUDY GROUP
ALLED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
WESTERN DISPOSAL AREA
SOIL TAL DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
50



MW-127A	
Analyte	Conc (ug/L)
arsenic	15
barium	590
calcium	[illegible]
iron	36000
magnesium	12000
manganese	[illegible]
nickel	17 B
potassium	830 B
sodium	140000
zinc	[illegible]

MW-16B	
Analyte	Conc (ug/L)
arsenic	69
barium	460
calcium	110000
iron	11000
magnesium	36000
manganese	53
nickel	4.6 B
potassium	3500 B
sodium	32000
zinc	940

MW-3	
Analyte	Conc (ug/L)
arsenic	83
barium	190 B
calcium	150000
iron	23000
magnesium	47000
manganese	91
nickel	5.7 B
potassium	5100
sodium	44000
zinc	510

MW-122A		
Analyte	Conc (ug/L)	Conc (ug/L)
arsenic	30 J	25 (dup)
barium	110 B	100 B (dup)
calcium	110000	100000 (dup)
iron	8200	7800 (dup)
magnesium	13000	13000 (dup)
manganese	800	780 (dup)
nickel	4.3 B	ND (dup)
potassium	3700 B	3500 B (dup)
sodium	11000	10000 (dup)
zinc	9.2 B	13 B (dup)

MW-25	
Analyte	Conc (ug/L)
arsenic	38
barium	130 B
calcium	130000
iron	7000
magnesium	[illegible]
manganese	50
nickel	53
potassium	12000
sodium	33000
zinc	3300

MW-123A	
Analyte	Conc (ug/L)
arsenic	36
barium	170 B
calcium	120000
iron	21000
magnesium	14000
manganese	1000
nickel	13 B
potassium	3700 B
sodium	16000
zinc	78

MW-24	
Analyte	Conc (ug/L)
arsenic	24
barium	500
cadmium	4.0 B
calcium	130000
iron	26000
lead	0.90 B
magnesium	53000
manganese	250
potassium	1500 B
sodium	34000
zinc	920

[illegible]	
Analyte	Conc (ug/L)
arsenic	7 B
barium	94 B
calcium	22000
iron	1500
magnesium	32000
manganese	[illegible]
sodium	23000
zinc	4.2 B

MW-26	
Analyte	Conc (ug/L)
[illegible]	2.2 B
[illegible]	89 B
[illegible]	120000
[illegible]	1300
magnesium	31000
manganese	220
[illegible]	22000
[illegible]	[illegible]

[illegible]	
Analyte	Conc (ug/L)
arsenic	46
barium	200 B
calcium	[illegible]
cobalt	7.8 B
iron	[illegible]
magnesium	[illegible]
manganese	58
nickel	12 B
potassium	3600 B
sodium	43000
zinc	28

[illegible]	
Analyte	Conc (ug/L)
arsenic	20
barium	250
calcium	180000
chromium	3.4 B
iron	21000
lead	0.95 B
magnesium	56000
manganese	1000
nickel	[illegible]
potassium	4700 B
sodium	[illegible]
zinc	[illegible]

MW-17A	
Analyte	Conc (ug/L)
arsenic	160
barium	260
calcium	150000
cobalt	14 B
iron	27000
magnesium	53000
manganese	78
mercury	0.090 B
nickel	31 B
potassium	8300
sodium	56000
zinc	2400

MW-2S		
Analyte	Conc (ug/L)	Conc (ug/L)
aluminum	45 B	ND (dup)
arsenic	2.2 BJ	2.4 BJ (dup)
barium	310	310 (dup)
calcium	130000	130000 (dup)
chromium	ND	2.6 B (dup)
iron	15000	15000 (dup)
magnesium	31000	31000 (dup)
manganese	130	190 (dup)
nickel	7.6 B	5.5 B (dup)
potassium	3700 B	4100 B (dup)
selenium	1.1 B	1.3 BJ (dup)
sodium	28000	28000 (dup)
zinc	3.8 B	13 B (dup)

MW-19BP		
Analyte	Conc (ug/L)	Conc (ug/L)
arsenic	46 J	47 J (dup)
barium	200 B	190 B (dup)
calcium	170000	170000 (dup)
chromium	3.0 B	ND (dup)
cobalt	5.2 B	ND (dup)
iron	22000	21000 (dup)
lead	0.85 B	ND (dup)
magnesium	47000	47000 (dup)
manganese	420	420 (dup)
nickel	14 B	12 B (dup)
potassium	4300	4800 B (dup)
selenium	1.7 BJ	1.2 B (dup)
sodium	55000	55000 (dup)
zinc	R	29 J (dup)

MW-121A	
Analyte	Conc (ug/L)
arsenic	130
barium	360
calcium	150000
iron	33000
magnesium	66000
manganese	340
potassium	1400 B
sodium	66000
zinc	31

MW-22A	
Analyte	Conc (ug/L)
arsenic	6.6 B
barium	400
cadmium	4.5 B
calcium	230000
iron	12000
magnesium	20000
manganese	1100
nickel	7.5 B
potassium	3800 B
sodium	14000
zinc	[illegible]

[illegible]	
Analyte	Conc (ug/L)
barium	210
calcium	[illegible]
iron	6300
lead	0.93 B
magnesium	18000
manganese	130
nickel	[illegible]
potassium	1300 B
sodium	25000
zinc	680

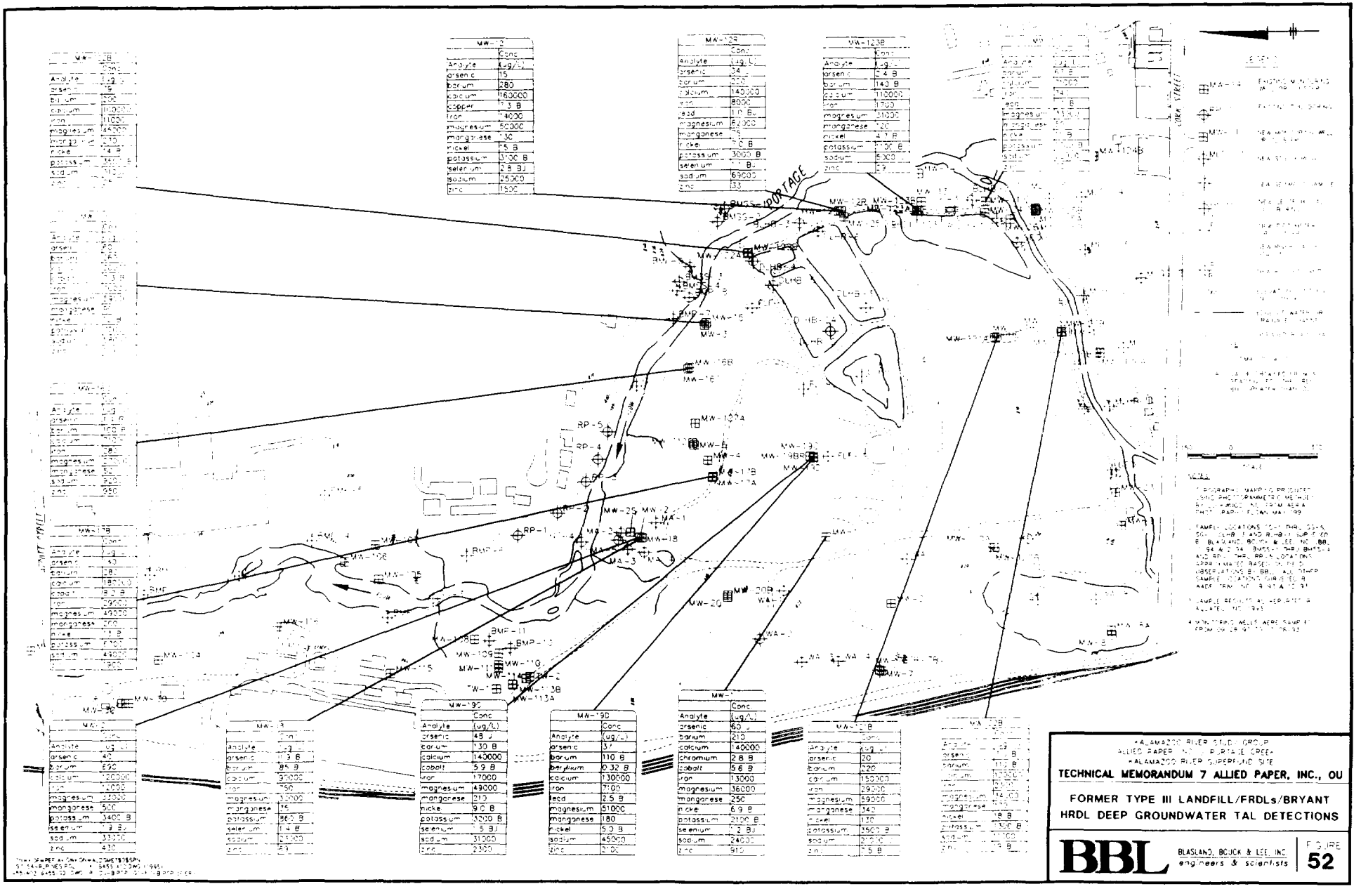
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/FRDLe/BRYANT HRDL AND PILOT STUDY AREA SHALLOW GROUNDWATER TAL DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 51



KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/FRDLs/BRYANT HRDL DEEP GROUNDWATER TAL DETECTIONS

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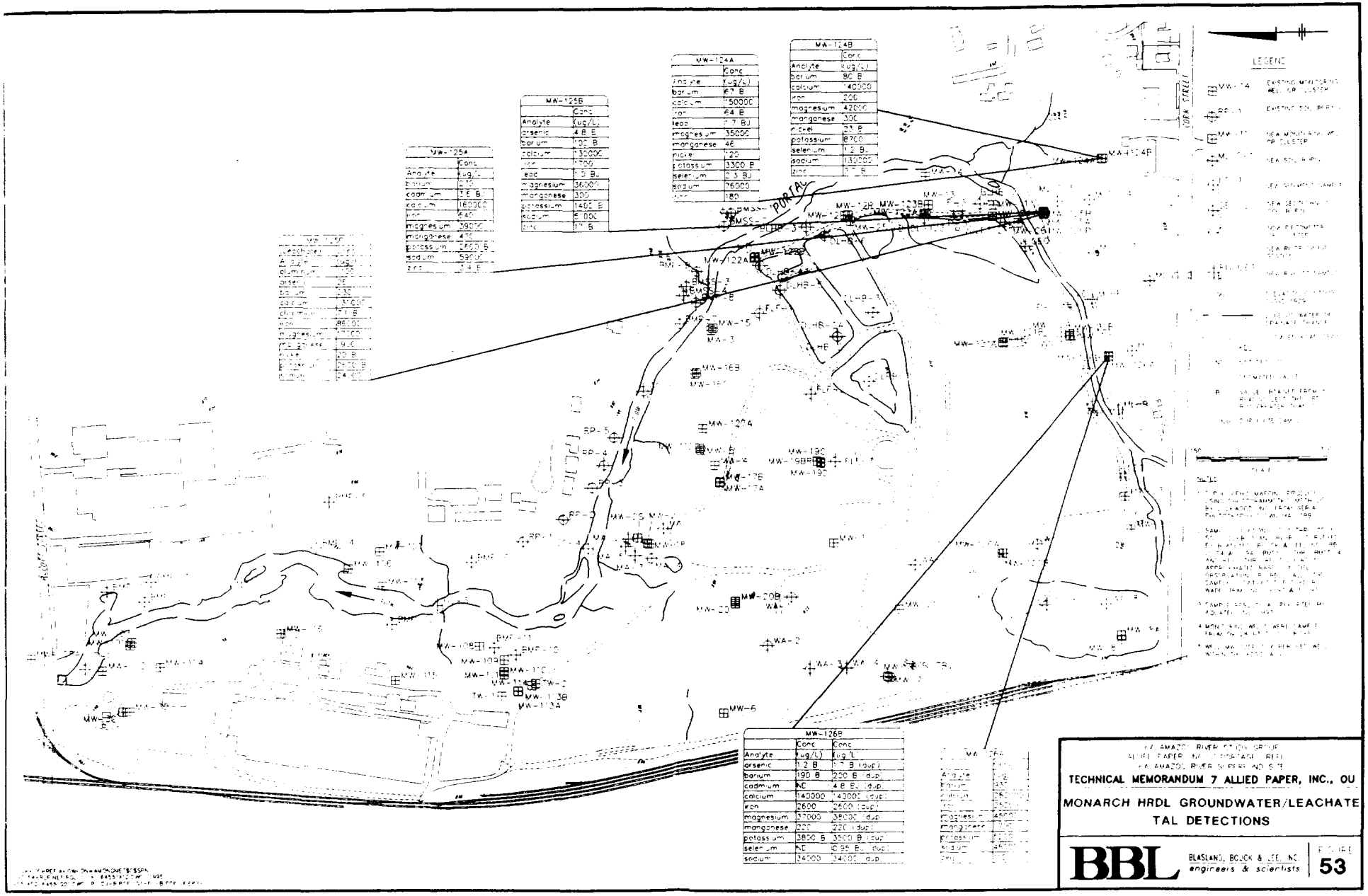
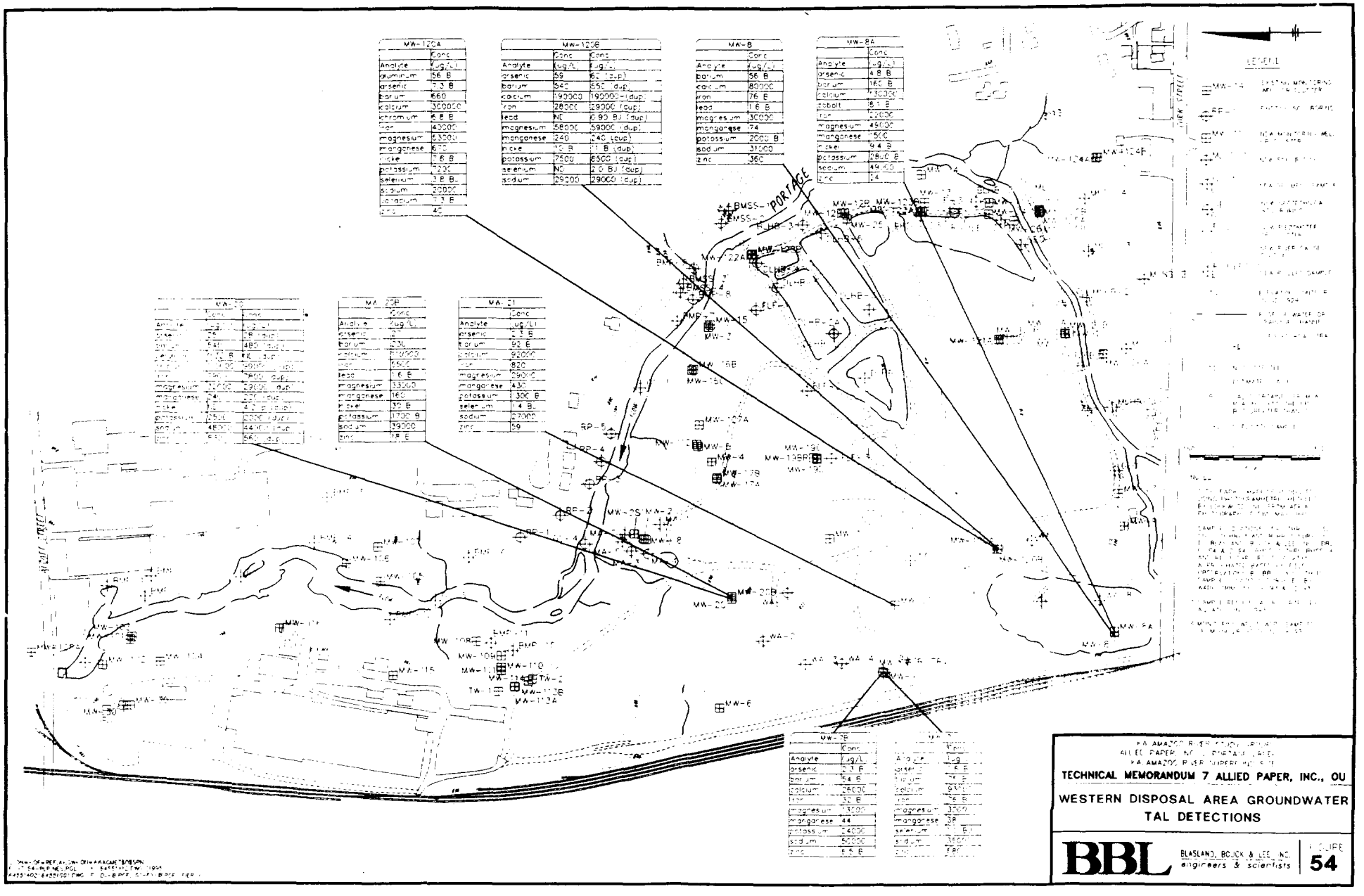
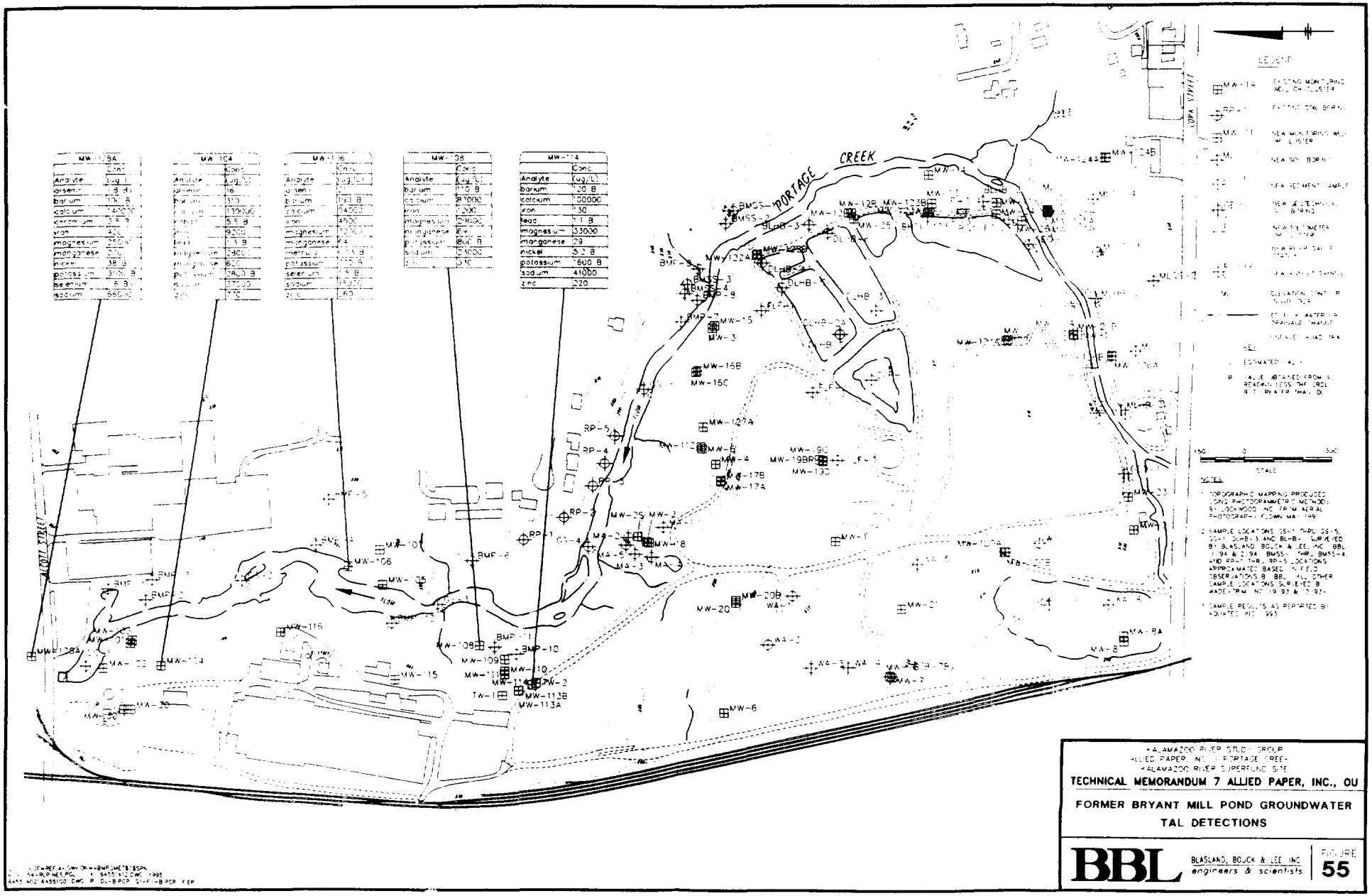
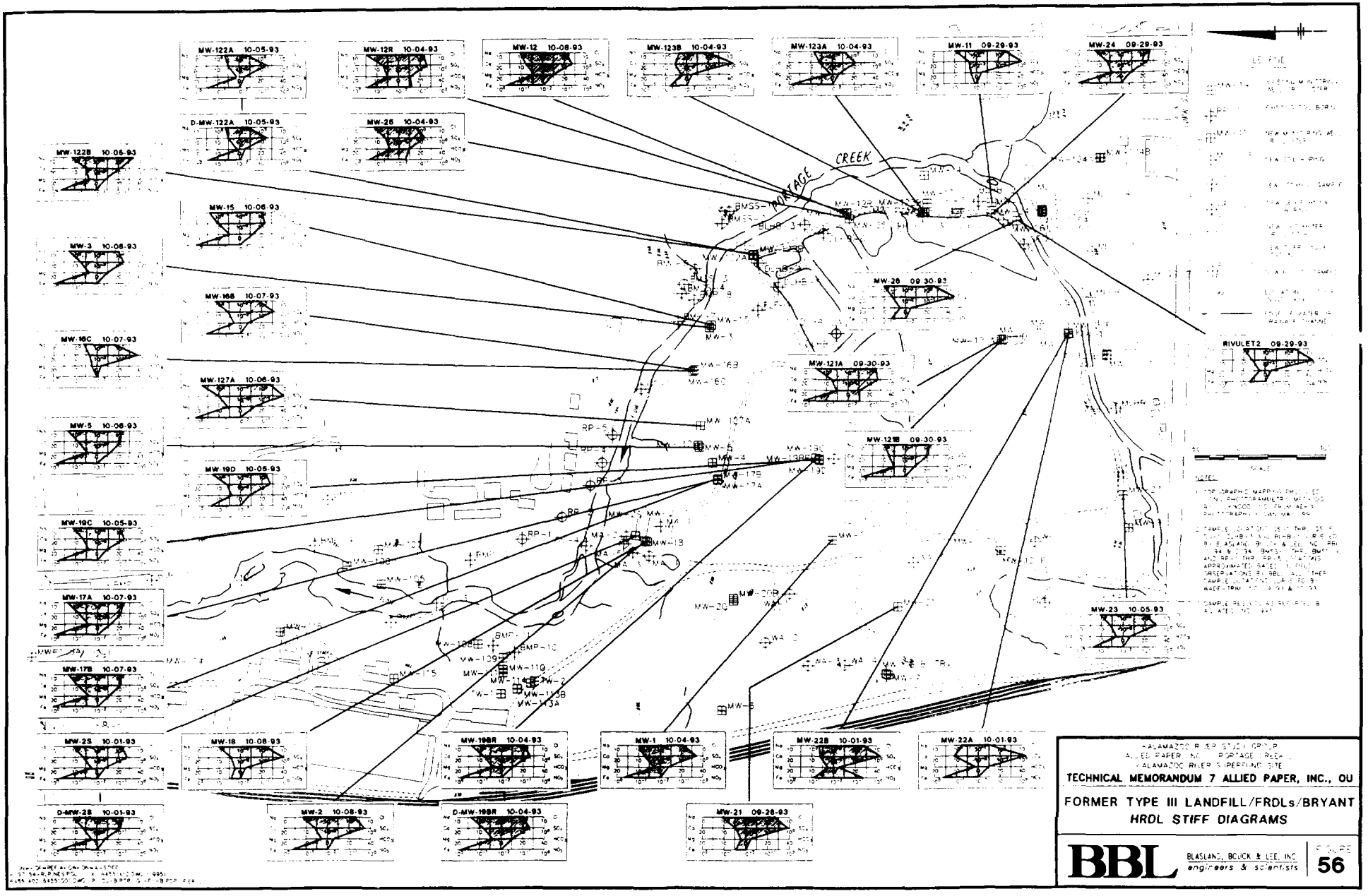
FIGURE **52**


MW-125A
Conc
Analyte ug/L
cadmium 3.6 B
calcium 160000
iron 440
magnesium 39000
manganese 470
potassium 2600 B
sodium 59700
zinc 24 B
MW-125B
Conc
Analyte ug/L
arsenic 4.8 B
barium 130 B
calcium 130000
iron 1700
lead 1.9 BJ
magnesium 36000
manganese 300
potassium 1400 B
sodium 5000
zinc 17 B
MW-124A
Conc
Analyte ug/L
barium 67 B
calcium 150000
iron 64 B
lead 1.7 BJ
magnesium 35000
manganese 46
nickel 20
potassium 3300 B
selenium 2.3 BJ
sodium 76000
zinc 180
MW-124B
Conc
Analyte ug/L
barium 80 B
calcium 140000
iron 200
magnesium 42000
manganese 300
nickel 23 B
potassium 8700
selenium 1.3 B
sodium 130000
zinc 17 B
MW-126B
Conc
Conc
Analyte ug/L
ug/L
arsenic 1.2 B
1.7 B (dup)
barium 190 B
200 B (dup)
cadmium ND
4.8 BJ (dup)
calcium 140000
140000 (dup)
iron 2600
2600 (dup)
magnesium 37000
38000 (dup)
manganese 220
220 (dup)
potassium 3800 B
3500 B (dup)
selenium ND
0.95 B (dup)
sodium 34000
34000 (dup)
PORAY
LEGEND
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
MONARCH HRDL GROUNDWATER/LEACHATE
TAL DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
53


MW-122A
Conc
Analyte ug/L
aluminum 56 B
arsenic 7.3 B
barium 660
calcium 300000
chromium 6.8 B
iron 40000
magnesium 53000
manganese 670
nickel 7.6 B
potassium 2200
selenium 3.8 B
sodium 20000
vanadium 7.3 B
zinc 40
MW-122B
Conc Conc
Analyte ug/L ug/L
arsenic 59 62 (dup)
barium 540 550 (dup)
calcium 190000 190000 (dup)
iron 28000 29000 (dup)
lead NC 0.93 BJ (dup)
magnesium 58000 59000 (dup)
manganese 240 240 (dup)
nickel 10 B 11 B (dup)
potassium 7500 6500 (dup)
selenium NC 2.0 BJ (dup)
sodium 29300 29000 (dup)
MW-8
Conc
Analyte ug/L
barium 56 B
calcium 80000
iron 76 B
lead 1.6 B
magnesium 30000
manganese 174
potassium 2000 B
sodium 31000
zinc 360
MW-8A
Conc
Analyte ug/L
arsenic 4.8 B
barium 160 B
calcium 130000
cobalt 6.1 B
iron 22000
magnesium 46000
manganese 1500
nickel 9.4 B
potassium 2800 B
sodium 49000
zinc 24
MW-22
Conc
Analyte ug/L
arsenic 2.1 B
barium 480 (dup)
calcium 110000
iron 7600 (dup)
lead 2.5 B
magnesium 33000 (dup)
manganese 1600
nickel 4.5 B (dup)
potassium 4800 (dup)
sodium 44000 (dup)
zinc 56 B
MW-22B
Conc
Analyte ug/L
arsenic 2
barium 230
calcium 110000
iron 6600
lead 1.6 B
magnesium 33000
manganese 160
nickel 3.6 B
potassium 1700 B
sodium 39000
zinc 18 B
MW-21
Conc
Analyte ug/L
arsenic 1.3 B
barium 90 B
calcium 92000
iron 820
magnesium 29000
manganese 430
potassium 300 B
selenium 4 B
sodium 27000
zinc 59
MW-7B
Conc
Analyte ug/L
arsenic 2.3 B
barium 54 B
calcium 26000
iron 32 B
magnesium 3500
manganese 44
potassium 2400
sodium 5200
zinc 5.5 B
MW-7A
Conc
Analyte ug/L
arsenic 5.6
barium 94
calcium 91000
iron 56 B
magnesium 3900
manganese 38
selenium 6.1
sodium 3600
zinc 18
PORTAGE
CREEK
LEGEND
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
WESTERN DISPOSAL AREA GROUNDWATER
TAL DETECTIONS
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
54


MW-108A
Analyte Conc
arsenic 3 B
barium 110 B
calcium 47000
cadmium 3.5 B
iron 420
magnesium 2200
manganese 240
nickel 38 B
potassium 3100 B
selenium 5 B
sodium 5600
MW-104
Analyte Conc
arsenic 6
barium 100
calcium 139000
cadmium 5.5 B
iron 9200
lead 3 B
magnesium 2800
manganese 620
potassium 2800 B
sodium 37000
zinc 70
MW-106
Analyte Conc
arsenic 5
barium 161 B
calcium 54000
iron 4500
magnesium 2500
manganese 84
mercury 0.1 B
selenium 5 B
sodium 15000
zinc 60
MW-108
Analyte Conc
barium 110 B
calcium 87000
iron 1200
magnesium 21000
manganese 64
potassium 800 B
sodium 24000
zinc 310
MW-114
Analyte Conc
barium 120 B
calcium 100000
iron 30
lead 1.1 B
magnesium 33000
manganese 29
nickel 5.2 B
potassium 600 B
sodium 41000
zinc 220
PORTAGE CREEK
MOOI STREET
LEGEND
EXISTING MONITORING WELL OR CLUSTER
EXISTING SOIL BORING
NEW MONITORING WELL OR CLUSTER
NEW SOIL BORING
NEW SEDIMENT SAMPLE
NEW SURFACE WATER SAMPLE
ESTIMATED ALT
B VALUE OBTAINED FROM A READING LESS THAN THE CRDL BUT GREATER THAN OR
SCALE
NOTES
1 TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY ROSEWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN MAY 1989
2 SAMPLE LOCATIONS SS-1 THRU SS-5, SCP-1, SLHB-1, 3 AND BLHB-1 SURVEYED BY BLASLAND, BOUCK & LEE, INC. BBL 11/94 & 12/94. BMSS-1 THRU BMSS-4 AND RP-1 THRU RP-5 LOCATIONS APPROXIMATELY BASED ON FIELD OBSERVATIONS B BBL. ALL OTHER SAMPLE LOCATIONS SURVEYED B MADE-TRM, INC 10/93 & 12/93
3 SAMPLE RESULTS AS REPORTED BY ROUTES, INC 1993
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU
FORMER BRYANT MILL POND GROUNDWATER TAL DETECTIONS
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists
FIGURE 55



KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER INC. PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE

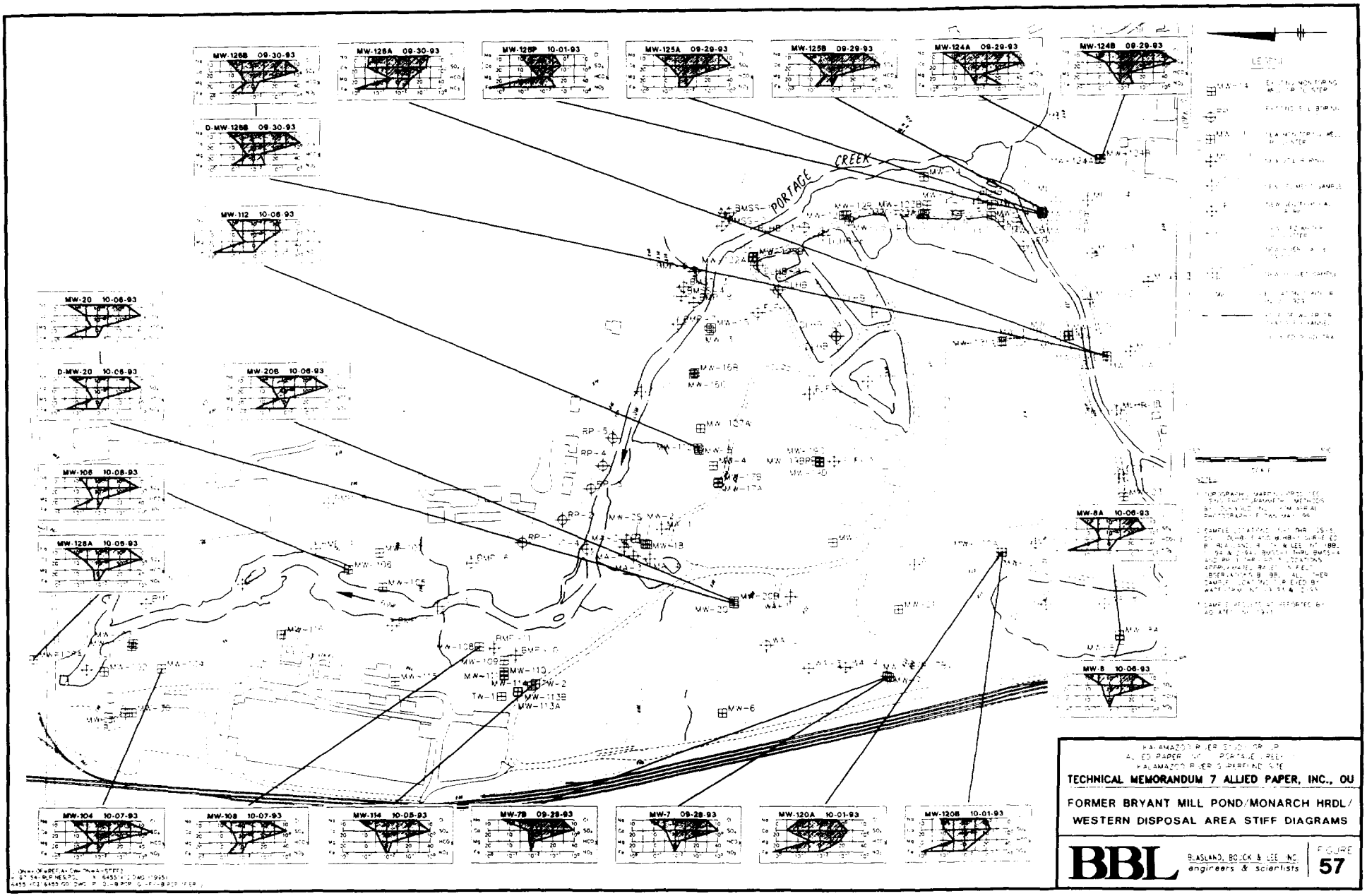
TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER TYPE III LANDFILL/FRDLs/BRYANT

HRDL STIFF DIAGRAMS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE **56**



KALAMAZOO RIVER (LOWER) OPERABLE UNIT
ALLIED PAPER INC./PORTAGE CREEK/
KALAMAZOO RIVER/BRYANT MILL POND SITE

TECHNICAL MEMORANDUM 7 ALLIED PAPER, INC., OU

FORMER BRYANT MILL POND/MONARCH HRDL/
WESTERN DISPOSAL AREA STIFF DIAGRAMS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 57